

Temperature sensing elements Ni 891

Basic technical parameters

Sensing element	Thin-film nickel resistor
Working temperature range	-50 to 200 °C *
Resistance at 0 °C	891.1 Ω
Long-term resistance stability	0.1 % after 1000 h at 150 °C
Recommended / maximum direct measuring current	0.3 mA / 1 mA

* The real range of working temperature of the sensor is given by the design and technology

The temperature dependence of the sensing element resistance in the temperature range of -50 to 200 °C is expressed as follows:

$$R = 891.05945(1 + At + Bt^2 + Ct^3)$$

where: $A = 5.64742 \cdot 10^{-3} \text{ } ^\circ\text{C}^{-1}$
 $B = 6.69504 \cdot 10^{-6} \text{ } ^\circ\text{C}^{-2}$
 $C = 5.68816 \cdot 10^{-9} \text{ } ^\circ\text{C}^{-3}$

Dependence of resistance on temperature in ohms [Ω]:

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
-50	653.7									
-40	699.0	694.4	689.9	685.3	680.8	676.2	671.7	667.2	662.7	658.2
-30	745.3	740.6	736.0	731.3	726.7	722.0	717.4	712.8	708.2	703.6
-20	792.8	788.0	783.2	778.4	773.7	768.9	764.2	759.4	754.7	750.0
-10	841.3	836.4	831.5	826.6	821.8	816.9	812.1	807.2	802.4	797.6
0	891.1	886.0	881.0	876.0	871.0	866.0	861.1	856.1	851.2	846.2

°C	0	1	2	3	4	5	6	7	8	9
0	891.1	896.1	901.1	906.2	911.3	916.4	921.5	926.6	931.7	936.8
10	942.0	947.1	952.3	957.5	962.7	967.9	973.1	978.4	983.6	988.9
20	994.1	999.4	1004.7	1010.0	1015.3	1020.7	1026.0	1031.4	1036.7	1042.1
30	1047.5	1052.9	1058.4	1063.8	1069.2	1074.7	1080.2	1085.7	1091.2	1096.7
40	1102.2	1107.8	1113.3	1118.9	1124.5	1130.1	1135.7	1141.3	1146.9	1152.6
50	1158.2	1163.9	1169.6	1175.3	1181.0	1186.7	1192.5	1198.2	1204.0	1209.8
60	1215.6	1221.4	1227.2	1233.0	1238.9	1244.7	1250.6	1256.5	1262.4	1268.3
70	1274.3	1280.2	1286.2	1292.2	1298.2	1304.2	1310.2	1316.2	1322.3	1328.3
80	1334.4	1340.5	1346.6	1352.7	1358.9	1365.0	1371.2	1377.4	1383.5	1389.8
90	1396.0	1402.2	1408.5	1414.7	1421.0	1427.3	1433.6	1439.9	1446.3	1452.6
100	1459.0	1465.4	1471.8	1478.2	1484.6	1491.1	1497.5	1504.0	1510.5	1517.0
110	1523.5	1530.1	1536.6	1543.2	1549.8	1556.4	1563.0	1569.6	1576.3	1582.9
120	1589.6	1596.3	1603.0	1609.7	1616.4	1623.2	1630.0	1636.7	1643.6	1650.4
130	1657.2	1664.0	1670.9	1677.8	1684.7	1691.6	1698.5	1705.5	1712.4	1719.4
140	1726.4	1733.4	1740.4	1747.5	1754.5	1761.6	1768.7	1775.8	1782.9	1790.1
150	1797.2	1804.4	1811.6	1818.8	1826.0	1833.2	1840.5	1847.8	1855.1	1862.4
160	1869.7	1877.0	1884.4	1891.8	1899.1	1906.6	1914.0	1921.4	1928.9	1936.3
170	1943.8	1951.3	1958.9	1966.4	1974.0	1981.6	1989.1	1996.8	2004.4	2012.0
180	2019.7	2027.4	2035.1	2042.8	2050.5	2058.3	2066.0	2073.8	2081.6	2089.5
190	2097.3	2105.2	2113.0	2120.9	2128.8	2136.8	2144.7	2152.7	2160.7	2168.7
200	2176.7									

Sensing element accuracy classes

Sensing elements are manufactured in accuracy classes A and B, expressed as follows:

	for $-50\text{ °C} \leq t < 0\text{ °C}$	for $0\text{ °C} \leq t \leq 200\text{ °C}$
Class A	$\Delta T = \pm (0.2 + 0.014 * t)$ in °C	$\Delta T = \pm (0.2 + 0.0035 * t)$ in °C
Class B	$\Delta T = \pm (0.4 + 0.028 * t)$ in °C	$\Delta T = \pm (0.4 + 0.0070 * t)$ in °C

* |t| is the absolute value of temperature

Temperature [°C]	Resistance [Ω]	Class A		Class B	
		ΔT [°C]	ΔR [Ω]	ΔT [°C]	ΔR [Ω]
-30	745.3	± 0.62	± 2.91	± 1.24	± 5.83
0	891.1	± 0.20	± 1.00	± 0.40	± 2.00
50	1158.2	± 0.38	± 2.14	± 0.75	± 4.28
100	1459.0	± 0.55	± 3.52	± 1.10	± 7.04
150	1797.2	± 0.73	± 5.26	± 1.45	± 10.52
200	2176.7	± 0.90	± 7.20	± 1.80	± 14.40

Application of sensing elements:

