

Resistance Temperature Detector (RTDs)

TECHNICAL DATA FOR RESISTANCE TEMPERATURE DETECTORS

Sensing Element Materials and Temperature Limits	
Material	Usable Temperature Range
Platinum	-200°C To 850°C
Nickel	-100°C To 315°C
Copper	-75°C To 150°C

Connecting Wire Temperature Limits - Construction	
Wire / Insulation Materials	Maximum Usage Temperature
Nickel Plated Copper/ PTFE Insulated	250°C
Solid Nickel Wire	650°C
Solid Copper Wire	300°C

Connecting Wire Temperature Limits – Extension	
Wire / Insulation Materials	Maximum Usage Temperature
Tinned Copper/PVC Insulated	105°C
Silver Plated Copper/ PTFE Insulated	205°C
Silver Plated Copper/ PTFE Insulated	250°C
Nickel Plated Copper/ PTFE Insulated	250°C
Nickel Plated Copper/Fiberglass Insulated	480°C

Resistance Temperature Detector Types				
Element Metal	Temperature Range	Benefits	Base Resistance	TCR($\Omega / \Omega / ^\circ\text{C}$)
Platinum	-260 to 850°C	Best stability, good linearity	100 Ω at 0°C	0.00385 (IEC-751), 0.003916 (JIS 1604-1981)
Copper	-100 to 260°C	Best linearity	10 Ω at 0°C	0.00427
Nickel	-100 to 260°C	Low cost, High Sensitivity	120 Ω at 0°C	0.00672

Platinum Resistance Temperature Detector Tolerance Values			
Temperature °C	Resistance Value Ω	Tolerance IEC-751	
		Class A °C (Ω)	Class B °C (Ω)
-200	18.49	± 0.55 -(± 0.24)	± 1.3 -(± 0.56)
-100	60.25	± 0.35 -(± 0.14)	± 0.8 -(± 0.32)
0	100.00	± 0.15 -(± 0.06)	± 0.3 -(± 0.12)
100	138.50	± 0.35 -(± 0.13)	± 0.8 -(± 0.30)
200	175.84	± 0.55 -(± 0.20)	± 1.3 -(± 0.48)
300	212.02	± 0.75 -(± 0.27)	± 1.8 -(± 0.64)
400	247.04	± 0.95 -(± 0.33)	± 2.3 -(± 0.79)
500	280.90	± 1.15 -(± 0.38)	± 2.8 -(± 0.93)
600	313.59	± 1.35 -(± 0.43)	± 3.3 -(± 1.06)
650	329.51	± 1.45 -(± 0.46)	± 3.6 -(± 1.13)

Typical values of currents recommended for sensors for minimal self-heating are between 1mA and 5mA.

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.00385)

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	°C
-200	18.52											-200
-190	22.83	22.40	21.97	21.54	21.11	20.68	20.25	19.82	19.38	18.95	18.52	-190
-180	27.10	26.67	26.24	25.82	25.39	24.97	24.54	24.11	23.68	23.25	22.83	-180
-170	31.34	30.91	30.49	30.07	29.64	29.22	28.80	28.37	27.95	27.52	27.10	-170
-160	35.54	35.12	34.70	34.28	33.86	33.44	33.02	32.60	32.18	31.76	31.34	-160
-150	39.72	39.31	38.89	38.47	38.05	37.64	37.22	36.80	36.38	35.96	34.54	-150
-140	43.88	43.46	43.05	42.63	42.22	41.80	41.39	40.97	40.56	40.14	39.72	-140
-130	48.00	47.59	47.18	46.77	46.36	45.94	45.53	45.12	44.70	44.29	43.88	-130
-120	52.11	51.70	51.29	50.88	50.47	50.06	49.65	49.24	48.83	48.42	48.00	-120
-110	56.19	55.79	55.38	54.97	54.56	54.15	53.75	53.34	52.93	52.52	52.11	-110
-100	60.26	59.85	59.44	59.04	58.63	58.23	57.82	57.41	57.01	56.60	56.19	-100
-90	64.30	63.90	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66	60.26	-90
-80	68.33	67.92	67.52	67.12	66.72	66.31	65.91	65.51	65.11	64.70	64.30	-80
-70	72.33	71.93	71.53	71.13	70.73	70.33	69.93	69.53	69.13	68.73	68.33	-70
-60	76.33	75.93	75.53	75.13	74.73	74.33	73.93	73.53	73.13	72.72	72.33	-60
-50	80.31	79.91	79.51	79.11	78.72	78.32	77.92	77.52	77.12	76.73	76.33	-50
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70	80.31	-40
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67	84.27	-30
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62	88.22	-20
-10	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55	92.16	-10
0	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48	96.09	0
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	°C
°C	0	1	2	3	4	5	6	7	8	9	10	°C
0	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51	103.90	0
10	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40	107.79	10
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29	111.67	20
30	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15	115.54	30
40	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01	119.40	40
50	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86	123.24	50
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69	127.08	60
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52	130.90	70
80	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33	134.71	80
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13	138.51	90
°C	0	1	2	3	4	5	6	7	8	9	10	°C

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.00385)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
100	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91	142.29	100
110	142.29	142.67	143.05	143.43	143.80	144.18	144.56	144.94	145.31	145.69	146.07	110
120	146.07	146.44	146.82	147.20	147.57	147.95	148.33	148.70	149.08	149.46	149.83	120
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21	153.58	130
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.20	156.58	156.95	157.33	140
150	157.33	157.70	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68	161.05	150
160	161.05	161.43	161.80	162.17	162.54	162.91	163.29	163.66	164.03	164.40	164.77	160
170	164.77	165.14	165.51	165.89	166.26	166.63	167.00	167.37	167.74	168.11	168.48	170
180	168.48	168.85	169.22	169.59	169.96	170.33	170.70	171.07	171.43	171.80	172.17	180
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49	175.86	190
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16	179.53	200
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82	183.19	210
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47	186.84	220
230	186.84	187.20	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11	190.47	230
240	190.47	190.84	191.20	191.56	191.92	192.29	192.65	193.01	193.37	193.74	194.10	240
250	194.10	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35	197.71	250
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95	201.31	260
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55	204.90	270
280	204.90	205.26	205.62	205.98	206.34	206.70	207.05	207.41	207.77	208.13	208.48	280
290	208.48	208.84	209.20	209.56	209.91	210.27	210.63	210.98	211.34	211.70	212.05	290
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.90	215.25	215.61	300
310	215.61	215.96	216.32	216.67	217.03	217.38	217.74	218.09	218.44	218.80	219.15	310
320	219.15	219.51	219.86	220.21	220.57	220.92	221.27	221.63	221.98	222.33	222.68	320
330	222.68	223.04	223.39	223.74	224.09	224.45	224.80	225.15	225.50	225.85	226.21	330
340	226.21	226.56	226.91	227.26	227.61	227.96	228.31	228.66	229.02	229.37	229.72	340
350	229.72	230.07	230.42	230.77	231.12	231.47	231.82	232.17	232.52	232.87	233.21	350
360	233.21	233.56	233.91	234.26	234.61	234.96	235.31	235.66	236.00	236.35	236.70	360
370	236.70	237.05	237.40	237.74	238.09	238.44	238.79	239.13	239.48	239.83	240.18	370
380	240.18	240.52	240.87	241.22	241.56	241.91	242.26	242.60	242.95	243.29	243.64	380
390	243.64	243.99	244.33	244.68	245.02	245.37	245.71	246.06	246.40	246.75	247.09	390
°C	0	1	2	3	4	5	6	7	8	9	10	°C

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.00385)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
400	247.09	247.44	247.78	248.13	248.47	248.81	249.16	249.50	249.85	250.19	250.53	400
410	250.53	250.88	251.22	251.56	251.91	252.25	252.59	252.93	253.28	253.62	253.96	410
420	253.96	254.30	254.65	254.99	255.33	255.67	256.01	256.35	256.70	257.04	257.38	420
430	257.38	257.72	258.06	258.40	258.74	259.08	259.42	259.76	260.10	260.44	260.78	430
440	260.78	261.12	261.46	261.80	262.14	262.48	262.82	263.16	263.50	263.84	264.18	440
450	264.18	264.52	264.86	265.20	265.53	265.87	266.21	266.55	266.89	267.22	267.56	450
460	267.56	267.90	268.24	268.57	268.91	269.25	269.59	269.92	270.26	270.60	270.93	460
470	270.93	271.27	271.61	271.94	272.28	272.61	272.95	273.29	273.62	273.96	274.29	470
480	274.29	274.63	274.96	275.30	275.63	275.97	276.30	276.64	276.97	277.31	277.64	480
490	277.64	277.98	278.31	278.64	278.98	279.31	279.64	279.98	280.31	280.64	280.98	490
500	280.98	281.31	281.64	281.98	282.31	282.64	282.97	283.31	283.64	283.97	284.30	500
510	284.30	284.63	284.97	285.30	285.63	285.96	286.29	286.62	286.95	287.29	287.62	510
520	287.62	287.95	288.28	288.61	288.94	289.27	289.60	289.93	290.26	290.59	290.92	520
530	290.92	291.25	291.58	291.91	292.24	292.56	292.89	293.22	293.55	293.88	294.21	530
540	294.21	294.54	294.86	295.19	295.52	295.85	296.18	296.50	296.83	297.16	297.49	540
550	297.49	297.81	298.14	298.47	298.80	299.12	299.45	299.78	300.10	300.43	300.75	550
560	300.75	301.08	301.41	301.73	302.06	302.38	302.71	303.03	303.36	303.69	304.01	560
570	304.01	304.34	304.66	304.98	305.31	305.63	305.96	306.28	306.61	306.93	307.25	570
580	307.25	307.58	307.90	308.23	308.55	308.87	309.20	309.52	309.84	310.16	310.49	580
590	310.49	310.81	311.13	311.45	311.78	312.10	312.42	312.74	313.06	313.39	313.71	590
600	313.71	314.03	314.35	314.67	314.99	315.31	315.64	315.96	316.28	316.60	316.92	600
610	316.92	317.24	317.56	317.88	318.20	318.52	318.84	319.16	319.48	319.80	320.12	610
620	320.12	320.43	320.75	321.07	321.39	321.71	322.03	322.35	322.67	322.98	323.30	620
630	323.30	323.62	323.94	324.26	324.57	324.89	325.21	325.53	325.84	326.16	326.48	630
640	326.48	326.79	327.11	327.43	327.74	328.06	328.38	328.69	329.01	329.32	329.64	640
650	329.64											650
°C	0	1	2	3	4	5	6	7	8	9	10	°C

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.003916)

°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	°C
-200	17.14											-200
-190	21.46	21.03	20.59	20.16	19.73	19.29	18.86	18.43	18.00	17.57	17.14	-190
-180	25.80	25.37	24.93	24.50	24.07	23.63	23.20	22.76	22.33	21.90	21.46	-180
-170	30.12	29.69	29.26	28.83	28.40	27.97	27.53	27.10	26.67	26.24	25.80	-170
-160	34.42	33.99	33.56	33.13	32.70	32.28	31.85	31.42	30.99	30.56	30.12	-160
-150	38.68	38.26	37.83	37.41	36.98	36.55	36.13	35.70	35.27	34.85	34.42	-150
-140	42.91	42.49	42.07	41.64	41.22	40.80	40.38	39.95	39.53	39.10	38.68	-140
-130	47.11	46.69	46.27	45.85	45.43	45.01	44.59	44.17	43.75	43.33	42.91	-130
-120	51.29	50.87	50.45	50.04	49.62	49.20	48.78	48.37	47.95	47.53	47.11	-120
-110	55.44	55.02	54.61	54.19	53.78	53.36	52.95	52.53	52.12	51.70	51.29	-110
-100	59.57	59.16	58.74	58.33	57.92	57.50	57.09	56.68	56.26	55.85	55.44	-100
-90	63.68	63.27	62.86	62.45	62.04	61.63	61.21	60.80	60.39	59.98	59.57	-90
-80	67.77	67.36	66.96	66.55	66.14	65.73	65.32	64.91	64.50	64.09	63.68	-80
-70	71.85	71.44	71.04	70.63	70.22	69.81	69.41	69.00	68.59	68.18	67.77	-70
-60	75.91	75.51	75.10	74.70	74.29	73.88	73.43	73.07	72.66	72.26	71.85	-60
-50	79.96	79.56	79.15	78.75	78.34	77.94	77.53	77.13	76.72	76.32	75.91	-50
-40	83.99	83.59	83.19	82.79	82.38	81.98	81.58	81.17	80.77	80.36	79.96	-40
-30	88.01	87.61	87.21	86.81	86.41	86.01	85.60	85.20	84.80	84.40	83.99	-30
-20	92.02	91.62	91.22	90.82	90.42	90.02	89.62	89.22	88.82	88.42	88.01	-20
-10	96.02	95.62	95.22	94.82	94.42	94.02	93.62	93.22	92.82	92.42	92.02	-10
0	100.00	99.60	99.20	98.81	98.41	98.01	97.61	97.21	96.81	96.42	96.02	0
°C	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	-10	°C
°C	0	1	2	3	4	5	6	7	8	9	10	°C
0	100.00	100.40	100.80	101.19	101.59	101.99	102.38	102.78	103.18	103.57	103.97	0
10	103.97	104.37	104.76	105.16	105.56	105.95	106.35	106.74	107.14	107.53	107.93	10
20	107.93	108.32	108.72	109.11	109.51	109.90	110.30	110.69	111.09	111.48	111.88	20
30	111.88	112.27	112.66	113.06	113.45	113.84	114.24	114.63	115.02	115.42	115.81	30
40	115.81	116.20	116.59	116.99	117.38	117.77	118.16	118.56	118.95	119.34	119.73	40
50	119.73	120.12	120.51	120.91	121.30	121.69	122.08	122.47	122.86	123.25	123.64	50
60	123.64	124.03	124.42	124.81	125.20	125.59	125.98	126.37	126.76	127.15	127.54	60
70	127.54	127.93	128.32	128.71	129.09	129.48	129.87	130.26	130.65	131.04	131.42	70
80	131.42	131.81	132.20	132.59	132.98	133.36	133.75	134.14	134.52	134.91	135.30	80
90	135.30	135.68	136.07	136.46	136.84	137.23	137.62	138.00	138.39	138.77	139.16	90
°C	0	1	2	3	4	5	6	7	8	9	10	°C

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.003916)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
100	139.16	139.55	139.93	140.32	140.70	141.09	141.47	141.86	142.24	142.63	143.01	100
110	143.01	143.39	143.78	144.16	144.55	144.93	145.31	145.70	146.08	146.46	146.85	110
120	146.85	147.23	147.61	148.00	148.38	148.76	149.15	149.53	149.91	150.29	150.67	120
130	150.67	151.06	151.44	151.82	152.20	152.58	152.96	153.35	153.73	154.11	154.49	130
140	154.49	154.87	155.25	155.63	156.01	156.39	156.77	157.15	157.53	157.91	158.29	140
150	158.29	158.67	159.05	159.43	159.81	160.19	160.57	160.95	161.33	161.70	162.08	150
160	162.08	162.46	162.84	163.22	163.60	163.97	164.35	164.73	165.11	165.48	165.86	160
170	165.86	166.24	166.62	166.99	167.37	167.75	168.12	168.50	168.88	169.25	169.63	170
180	169.63	170.00	170.38	170.76	171.13	171.51	171.88	172.26	172.63	173.01	173.38	180
190	173.38	173.76	174.13	174.51	174.88	175.26	175.63	176.01	176.38	176.75	177.13	190
200	177.13	177.50	177.88	178.25	178.62	179.00	179.37	179.74	180.12	180.49	180.86	200
210	180.86	181.23	181.61	181.98	182.35	182.72	183.09	183.47	183.84	184.21	184.58	210
220	184.58	184.95	185.32	185.70	186.07	186.44	186.81	187.18	187.55	187.92	188.29	220
230	188.29	188.66	189.03	189.40	189.77	190.14	190.51	190.88	191.25	191.62	191.99	230
240	191.99	192.36	192.73	193.09	193.46	193.83	194.20	194.57	194.94	195.31	195.67	240
250	195.67	196.04	196.41	196.78	197.14	197.51	197.88	198.25	198.61	198.98	199.35	250
260	199.35	199.71	200.08	200.45	200.81	201.18	201.55	201.91	202.28	202.64	203.01	260
270	203.01	203.38	203.74	204.11	204.47	204.84	205.20	205.57	205.93	206.30	206.66	270
280	206.66	207.02	207.39	207.75	208.12	208.48	208.85	209.21	209.57	209.94	210.30	280
290	210.30	210.66	211.03	211.39	211.75	212.11	212.48	212.84	213.20	213.56	213.93	290
300	213.93	214.29	214.65	215.01	215.37	215.74	216.10	216.46	216.82	217.18	217.54	300
310	217.54	217.90	218.26	218.63	218.99	219.35	219.71	220.07	220.43	220.79	221.15	310
320	221.15	221.51	221.87	222.23	222.59	222.94	223.30	223.66	224.02	224.38	224.74	320
330	224.74	225.10	225.46	225.81	226.17	226.53	226.89	227.25	227.61	227.96	228.32	330
340	228.32	228.68	229.04	229.39	229.75	230.11	230.46	230.82	231.18	231.53	231.89	340
350	231.89	232.25	232.60	232.96	233.31	233.67	234.03	234.38	234.74	235.09	235.45	350
360	235.45	235.80	236.16	236.51	236.87	237.22	237.58	237.93	238.28	238.64	238.99	360
370	238.99	239.35	239.70	240.05	240.41	240.76	241.11	241.47	241.82	242.17	242.53	370
380	242.53	242.88	243.23	243.58	243.94	244.29	244.64	244.99	245.35	245.70	246.05	380
390	246.05	246.40	246.75	247.10	247.46	247.81	248.16	248.51	248.86	249.21	249.56	390
°C	0	1	2	3	4	5	6	7	8	9	10	°C

100 Ohm Platinum RTD (Resistance Vs Temperature table)
(Alpha = 0.003916)

°C	0	1	2	3	4	5	6	7	8	9	10	°C
400	249.56	249.91	250.26	250.61	250.96	251.31	251.66	252.01	252.36	252.71	253.06	400
410	253.06	253.41	253.76	254.11	254.46	254.80	255.15	255.50	255.85	256.20	256.55	410
420	256.55	256.89	257.24	257.59	257.94	258.29	258.63	258.98	259.33	259.67	260.02	420
430	260.02	260.37	260.72	261.06	261.41	261.75	262.10	262.45	262.79	263.14	263.49	430
440	263.49	263.83	264.18	264.52	264.87	265.21	265.56	265.90	266.25	266.59	266.94	440
450	266.94	267.28	267.63	267.97	268.31	268.66	269.00	269.35	269.69	270.03	270.38	450
460	270.38	270.72	271.06	271.41	271.75	272.09	272.44	272.78	273.12	273.46	273.80	460
470	273.80	274.15	274.49	274.83	275.17	275.51	275.86	276.20	276.54	276.88	277.22	470
480	277.22	277.56	277.90	278.24	278.58	278.92	279.26	279.61	279.95	280.29	280.63	480
490	280.63	280.96	281.30	281.64	281.98	282.32	282.66	283.00	283.34	283.68	284.02	490
500	284.02	284.36	284.69	285.03	285.37	285.71	286.05	286.39	286.72	287.06	287.40	500
°C	0	1	2	3	4	5	6	7	8	9	10	°C

