

PRT temperature vs. resistance table

How to use this chart to calculate equivalent temperature accuracy

A PRT readout's accuracy is specified in ohms. The equivalent temperature accuracy depends on both the resistance and temperature sensitivity of the PRT at temperature (T). Use this chart to estimate PRT resistance and sensitivity, for specific temperatures and PRT types. First, select the row (T) with the temperature you are interested in and the columns with the desired PRT type. For each PRT type, the first column contains the PRT resistance reading at specified temperatures and the second column contains the associated temperature sensitivity. Readout resistance accuracy at a specified temperature depends on the resistance reading of the PRT, found in the first column for each PRT type. Equivalent temperature accuracy depends on the resistance

accuracy and also the sensitivity (dR/dT) found in column two for each PRT type. First, calculate resistance accuracy and then divide by the PRT temperature sensitivity (dR/dT) to convert accuracy from units of resistance to units of temperature.

EXAMPLE: The Black Stack 2560 module has an accuracy of 25 ppm and model 5626 is a PT100 (100 Ω PRT) meeting the platinum purity requirements of the ITS-90 ($\alpha = 0.003926$).

From the table: at 600 °C, a PT100 with $\alpha = 0.003926$ would have resistance close to 318.04 and its sensitivity would be 0.33 Ω/°C, so the equivalent temperature accuracy would be calculated:

$$= \pm (25\text{ppm})(\text{resistance})/(\text{sensitivity})$$

$$= \pm (25\text{ppm})(318.04)/(0.33 \text{ } \Omega/^{\circ}\text{C}) = (25/1000000)(318.04)/(0.33)$$

$$= \pm 0.024 \text{ } ^{\circ}\text{C}.$$

T	PT100 $\alpha=0.00385$		PT100 $\alpha=0.003926$		PT25 $\alpha=0.003926$		PT10 $\alpha=0.003926$		ITS-90 Reference Function	
	R	dR/dT	R	dR/dT	R	dR/dT	R	dR/dT	W	dW/dT
-200	18.52	0.43	16.98	0.43	4.24	0.11			0.16975189	0.00430
-180	27.10	0.43	25.64	0.43	6.41	0.11			0.25642164	0.00434
-160	35.54	0.42	34.26	0.43	8.57	0.11			0.34263838	0.00428
-140	43.88	0.41	42.76	0.42	10.69	0.11			0.42764804	0.00422
-120	52.11	0.41	51.15	0.42	12.79	0.10			0.51154679	0.00417
-100	60.26	0.41	59.45	0.41	14.86	0.10			0.59454082	0.00413
-80	68.33	0.40	67.68	0.41	16.92	0.10			0.67679040	0.00410
-60	76.33	0.40	75.84	0.41	18.96	0.10			0.75839970	0.00407
-40	84.27	0.40	83.94	0.40	20.99	0.10			0.83943592	0.00404
-20	92.16	0.39	91.99	0.40	23.00	0.10			0.91994588	0.00401
0	100.00	0.39	100.00	0.40	25.00	0.10	10.00	0.040	0.99996011	0.00399
20	107.79	0.39	107.95	0.40	26.99	0.10	10.79	0.040	1.07948751	0.00396
40	115.54	0.39	115.85	0.39	28.96	0.10	11.59	0.039	1.15853017	0.00394
60	123.24	0.38	123.71	0.39	30.93	0.10	12.37	0.039	1.23709064	0.00392
80	130.90	0.38	131.52	0.39	32.88	0.10	13.15	0.039	1.31517094	0.00389
100	138.51	0.38	139.28	0.39	34.82	0.10	13.93	0.039	1.39277281	0.00387
120	146.07	0.38	146.99	0.38	36.75	0.10	14.70	0.038	1.46989789	0.00384
140	153.58	0.37	154.65	0.38	38.66	0.10	15.47	0.038	1.54654781	0.00382
160	161.05	0.37	162.27	0.38	40.57	0.09	16.23	0.038	1.62272420	0.00380
180	168.48	0.37	169.84	0.38	42.46	0.09	16.98	0.038	1.69842880	0.00377
200	175.86	0.37	177.37	0.37	44.34	0.09	17.74	0.037	1.77366331	0.00375
220	183.19	0.37	184.84	0.37	46.21	0.09	18.48	0.037	1.84842945	0.00373
240	190.47	0.36	192.27	0.37	48.07	0.09	19.23	0.037	1.92272884	0.00370
260	197.71	0.36	199.66	0.37	49.91	0.09	19.97	0.037	1.99656298	0.00368
280	204.90	0.36	206.99	0.37	51.75	0.09	20.70	0.037	2.06993313	0.00366
300	212.05	0.36	214.28	0.36	53.57	0.09	21.43	0.036	2.14284029	0.00363
320	219.15	0.35	221.53	0.36	55.38	0.09	22.15	0.036	2.21528514	0.00361
340	226.21	0.35	228.73	0.36	57.18	0.09	22.87	0.036	2.28726797	0.00359
360	233.21	0.35	235.88	0.36	58.97	0.09	23.59	0.036	2.35878867	0.00357
380	240.18	0.35	242.98	0.35	60.75	0.09	24.30	0.035	2.42984670	0.00354
400	247.09	0.34	250.04	0.35	62.51	0.09	25.00	0.035	2.50044110	0.00352
420	253.96	0.34	257.06	0.35	64.26	0.09	25.71	0.035	2.57057048	0.00350
440	260.78	0.34	264.02	0.35	66.01	0.09	26.40	0.035	2.64023304	0.00347
460	267.56	0.34	270.94	0.34	67.74	0.09	27.09	0.034	2.70942664	0.00345
480	274.29	0.34	277.81	0.34	69.45	0.09	27.78	0.034	2.77814885	0.00342
500	280.98	0.33	284.64	0.34	71.16	0.08	28.46	0.034	2.84639697	0.00340
520			291.42	0.34	72.85	0.08	29.14	0.034	2.91416813	0.00338
540			298.15	0.34	74.54	0.08	29.81	0.034	2.98145939	0.00335
560			304.83	0.33	76.21	0.08	30.48	0.033	3.04826779	0.00333
580			311.46	0.33	77.86	0.08	31.15	0.033	3.11459044	0.00330
600			318.04	0.33	79.51	0.08	31.80	0.033	3.18042462	0.00328
700							35.02	0.032	3.50219482	0.00316
800							38.12	0.030	3.81156573	0.00303
900							41.09	0.029	4.10872717	0.00291
1000							43.94	0.028	4.39418009	0.00280