

Model 4950

4950 Specifications

Specifications are \pm ppm of reading, valid within the measurement band and within $\pm 1\%$ of all frequencies

Function	Transfer Point [1]	Frequency	Transfer Stability [2] ppm $\pm 1^\circ\text{C}$ TCAL		Temperature Coefficient ppm/ $^\circ\text{C}$ [3]	MTS_CAL [4] calibration uncertainty	CAL_CAL [4] uncertainty [5] [6]	
			30 day	90 day				
DC Voltage	± 100 mV		3	4.2	0.6	4.0	5.0	
	± 1 V		1.5	2.1	0.5	2.2	2.6	
	± 10 V		1.5	2.1	0.5	1.4	2.1	
	± 19 V		1.5	2.1	0.5	1.8	2.3	
	± 100 V		2	2.8	0.8	2.0	2.9	
	± 100 V		2	2.8	0.8	2.0	2.9	
AC Voltage	1mV, 10mV and 100mV [7]	10 Hz	20 + 2 μ V	28 + 2 μ V	1	117	120 + 2 μ V	
		20 Hz	20 + 2 μ V	28 + 2 μ V	1	117	120 + 2 μ V	
		30 Hz	20 + 2 μ V	28 + 2 μ V	1	117	120 + 2 μ V	
		40 Hz	20 + 2 μ V	28 + 2 μ V	1	117	120 + 2 μ V	
		55 Hz	20 + 2 μ V	28 + 2 μ V	1	117	120 + 2 μ V	
		300 Hz	20 + 2 μ V	28 + 2 μ V	1	89	91 + 2 μ V	
		1 kHz	20 + 2 μ V	28 + 2 μ V	1	89	91 + 2 μ V	
		10 kHz	20 + 2 μ V	28 + 2 μ V	1	103	105 + 2 μ V	
		20 kHz	20 + 2 μ V	28 + 2 μ V	1	117	119 + 2 μ V	
		30 kHz	20 + 2 μ V	28 + 2 μ V	1	190	191 + 2 μ V	
		50 kHz	30 + 2 μ V	42 + 2 μ V	5	190	192 + 2 μ V	
		100 kHz	50 + 3 μ V	70 + 3 μ V	5	356	359 + 3 μ V	
		300 kHz	100 + 3 μ V	140 + 3 μ V	5	579	588 + 3 μ V	
		500 kHz	200 + 3 μ V	280 + 3 μ V	40	607	639 + 3 μ V	
		1 MHz	300 + 3 μ V	420 + 3 μ V	40	945	992 + 3 μ V	
		1V and 10V	10 Hz	10	14	1	36	38
			20 Hz	10	14	1	36	38
			30 Hz	10	14	1	36	38
			40 Hz	10	14	1	24	26
			55 Hz	10	14	1	24	26
			300 Hz	10	14	1	24	26
1 kHz	10		14	1	24	26		
10 kHz	10		14	1	24	26		
20 kHz	10		14	1	24	26		
30 kHz	10		14	1	26	26		
50 kHz	20		28	5	26	37		
100 kHz	30		42	5	37	47		
300 kHz	70		98	10	96	119		
500 kHz	100		140	40	202	226		
1 MHz	200		280	40	557	591		
19V	1 kHz	10	14	1	24	26		
100V	10 Hz	10	14	2	41	42		
	20 Hz	10	14	2	41	42		
	30 Hz	10	14	2	41	42		
	40 Hz	10	14	2	36	38		
	55 Hz	10	14	2	36	38		
	300 Hz	10	14	2	26	28		
	1 kHz	10	14	2	26	28		
	10 kHz	10	14	2	26	28		
	20 kHz	10	14	2	26	28		
	30 kHz	10	14	2	29	31		
	50 kHz	20	28	5	35	40		
	100 kHz	30	42	5	64	71		
	200 kHz	50	70	10	239	244		
	700V	50 kHz	50	70	8	110	121	
		100 kHz	50	70	8	344	348	
1000V	55 Hz	15	21	2	37	40		
	300 Hz	15	21	2	37	40		
	1 kHz	15	21	2	37	40		
	10 kHz	15	21	2	42	44		
	20 kHz	15	21	2	47	49		
	30 kHz	15	21	2	74	75		

[1] Measurements within $\pm 10\%$ of band and $\pm 1\%$ of frequency except the 190% bands.

[2] Assumes a successful 4950 transportation loop closure.

[3] Within $\pm 5^\circ\text{C}$ of TCAL.

[4] MTS_CAL & CAL_CAL refer to Wavetek automatic calibration software.

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Function	Transfer Point [1]	Frequency	Transfer Stability [2] ppm $\pm 1^\circ\text{C}$ TCAL		Temperature Coefficient ppm/ $^\circ\text{C}$ [3]	MTS_CAL [4] calibration uncertainty	CAL_CAL [4] uncertainty [5] [6]	
			30 day	90 day				
DC Current	$\pm 100 \mu\text{A}$		7	9.8	10	20	21	
	$\pm 1 \text{ mA}$		7	9.8	10	11	13	
	$\pm 10 \text{ mA}$		7	9.8	10	11	13	
	$\pm 100 \text{ mA}$		7	9.8	10	14	16	
	$\pm 1 \text{ A}$		15	21	10	24	28	
	$\pm 10 \text{ A}$ [2]		20	28	10[2]	54	57	
AC Current	100 μA	10Hz	50	70	20	122	132	
		20Hz	50	70	20	122	132	
		30Hz	50	70	20	107	118	
		40Hz	50	70	20	85	99	
		55Hz	50	70	20	85	99	
		300Hz	50	70	20	85	99	
		1kHz	50	70	20	85	99	
		5kHz	100	140	20	129	163	
		10kHz	300	420	30	459	548	
		1 mA, 10 mA, 100 mA and 1 A [7]	10Hz	40	56	20	113	120
	20Hz		40	56	20	113	120	
	30Hz		40	56	20	96	104	
	40Hz		40	56	20	75	85	
	55Hz		40	56	20	75	85	
	300Hz		40	56	20	75	85	
	1kHz		40	56	20	75	85	
	5kHz		70	98	20	115	134	
	10kHz		200	280	30	410	456	
	10 A [8]		10Hz	200	280	40	234	308
		20Hz	200	280	40	234	310	
		30Hz	200	280	40	234	310	
		40Hz	200	280	40	212	292	
		55Hz	200	280	40	200	280	
		300Hz	200	280	40	200	280	
		1kHz	200	280	40	200	280	
		5kHz	300	420	50	300	395	
		10kHz	600	840	80	337	688	
		20kHz	1000	1400	120	1234	1590	
	Resistance	1 Ω		20	28	1.2	7	9
		2 Ω		15	21	1.2	7	9
10 Ω			5	7	1.2	7	9	
19 Ω			5	7	1	7	9	
30 Ω			3	4.2	1	6	7	
100 Ω			3	4.2	1	6	6.5	
190 Ω			3	4.2	1	6	7	
300 Ω			3	4.2	1	3	5	
1 k Ω			3	4.2	1	3	4.5	
1.9 k Ω			3	4.2	1	3	5	
3 k Ω			3	4.2	1	3	5	
10 k Ω			3	4.2	1	3	4.5	
19 k Ω			3	4.2	1	3	5	
30 k Ω			5	7	1	6	8	
100 k Ω			5	7	1	6	7.5	
190 k Ω			5	7	1	6	8	
300 k Ω			8	11.2	1.5	11	14	
1 M Ω			8	11.2	1.5	11	13.5	
1.9 M Ω			8	11.2	1.5	11	14	
3 M Ω			12	16.8	2	21	24	
10 M Ω		12	16.8	2	21	23.5		
19 M Ω		12	16.8	2	21	24		
30 M Ω		180	252	20	82	198		
100 M Ω		180	252	20	82	198		

[5] Combined uncertainties to 95% minimum confidence level for calibrator calibration assuming Model 4950 successful loop closure within 30 days.

[6] Assumes a successful 4950 transportation loop closure within the Model 4950's 30 day transfer specification.

[7] Uncertainties quoted are for the 100mV and 10mA ranges. Other uncertainties are available on request.

[8] Only when used in conjunction with the Model 4953.