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5½-Digit Digital Multimeter Instrument Specifications

SPECIFICATION CONDITIONS

This document contains specifications and supplemental information for the Model 2110 5½-Digit Digital Multimeter instrument. Specifications are the standards against which the Model 2110 is tested. Upon leaving the factory, the Model 2110 meets these specifications. Supplemental and typical values are nonwarranted, apply at 23 °C, and are provided solely as useful information. Specifications are valid after a two hour warm-up.

DC CHARACTERISTICS: ACCURACY¹ ± (% OF READING + % OF RANGE)

Function	Range	Resolution	Input resistance	One year, 23 °C ±5 °C	Temperature coefficient 0 °C to 18 °C & 28 °C to 40 °C
DC voltage	100.000 mV	1 µV	10 MΩ	0.012 + 0.004	0.001 + 0.0005
	1.00000 V	10 µV		0.012 + 0.001	0.0009 + 0.0005
	10.0000 V	0.1 mV		0.012 + 0.002	0.0012 + 0.0005
	100.000 V	1 mV		0.012 + 0.002	0.0012 + 0.0005
	1000.00 V	10 mV		0.02 + 0.003	0.002 + 0.0015
DC current	10.0000 mA	0.1 µA	5.1 Ω	0.05 + 0.020	0.005 + 0.002
	100.000 mA	1 µA	5.1 Ω	0.05 + 0.010	0.005 + 0.001
	1.000000 A	10 µA	0.1 Ω	0.150 + 0.020	0.008 + 0.001
	3.0000 A	100 µA	0.1 Ω	0.200 + 0.030	0.008 + 0.001
	10.0000 A	100 µA	0.005 Ω	0.250 + 0.050	0.008 + 0.001
Resistance ²	100.000 Ω	1 mΩ	1 mA	0.020 + 0.020	0.003 + 0.0005
	1.00000 kΩ	10 mΩ	1 mA	0.020 + 0.003	0.003 + 0.0005
	10.0000 kΩ	100 mΩ	100 µA	0.020 + 0.002	0.003 + 0.0005
	100.000 kΩ	1 Ω	10 µA	0.020 + 0.002	0.003 + 0.0005
	1.00000 MΩ	10 Ω	1 µA	0.030 + 0.004	0.005 + 0.0005
	10.0000 MΩ	100 Ω	0.1 µA	0.200 + 0.004	0.05 + 0.0005
	100.000 MΩ	1 kΩ	0.1 µA	2.000 + 0.005	0.5 + 0.0005
Diode test	1.0000 V	10 µV	1 mA	0.020 + 0.030	0.002 + 0.0005
Continuity	1000 Ω	10 mΩ	1 mA	0.020 + 0.020	0.002 + 0.0005

¹ ADC set for continuous trigger operation. Input bias current <30 pA at 25 °C. Input protection 1000 V all ranges (2 wire input). Measurement rate set to 10 PLC.

² Specifications for 4-wire ohms mode. For 2-wire ohms, use zero null or subtract lead resistance from displayed reading. Maximum lead resistance 10% of range per lead for 100 Ω and 1 kΩ ranges; add 1 kΩ per lead for all other ranges.



MEASUREMENT NOISE REJECTION DC (60 HZ/50 HZ) AT 5½ DIGITS

CMRR³	NMRR⁴
120 dB	60 dB

³ For 1 kΩ unbalance in LO lead.

⁴ For line frequency ±0.1 %.

TEMPERATURE (THERMOCOUPLE) CHARACTERISTICS: ACCURACY⁵

Thermocouple type	Range (°C)	One year, exclusive of lead accuracy
B	600 to 1800	±1.5 °C
C	0 to 2300	±1.5 °C
E	-250 to 1000	±1.5 °C
J	-200 to 1200	±1.0 °C
K	-200 to 1350	±1.0 °C
N	-200 to 1300	±1.0 °C
R	0 to 1750	±1.5 °C
S	0 to 1750	±1.5 °C
T	-250 to 400	±1.5 °C

RTD AND NTC THERMISTOR MEASUREMENTS: ACCURACY ±0.8 °C, ONE YEAR, EXCLUSIVE OF LEAD ACCURACY

PT100, D100, F100, PT385, PT3916, SPRTD (R-Zero, A4, B4, Ax, Bx, Cx, and Dx), NTCT (A, B, and C), and user-definable RTD.

⁵ ADC set for continuous trigger operation

AC CHARACTERISTICS: ACCURACY⁶ ± (% OF READING + % OF RANGE)

Function	Range	Resolution	Frequency (Hz)	One year, 23 °C ±5 °C	Temperature coefficient 0 °C to 18 °C & 28 °C to 40 °C
Frequency and period	100.000 mV to 750.00 V ⁷	1 μV to 10 mV	10 to 40	0.03	0.002
			40 to 300 k	0.02	0.002
AC T_{RMS} voltage	100.000 mV to 750.00 V	1 μV to 10 mV	10 to 20 k	0.12 + 0.05	0.01 + 0.01
			20 K to 50 k	0.25 + 0.05	0.02 + 0.02
			50 k to 100 k	0.65 + 0.08	0.04 + 0.02
			100 k to 300 k	5.00 + 0.50	0.2 + 0.02
AC T_{RMS} current	1.0000 A to 3.00000 A	10 μA to 100 μA	10 to 900	0.30 + 0.06	0.02 + 0.01
			900 to 5 k	1.50 + 0.15	0.02 + 0.01
	10.0000 A	100 μA	10 to 900	0.50 + 0.12	0.02 + 0.01
			900 to 5 k	2.50 + 0.20	0.02 + 0.01

CAPACITANCE CHARACTERISTICS: ACCURACY⁸ ± (% OF READING + % OF RANGE)

Range	Test current	One year, 23 °C ±5 °C
1.000 nF	10 μA	2.0 + 0.80
10.00 nF	10 μA	1.0 + 0.50
100.0 nF	100 μA	1.0 + 0.50
1.000 μF	100 μA	1.0 + 0.50
10.00 μF	100 μA	1.0 + 0.50
100.0 μF	1 mA	1.0 + 0.50
1000 μF	1 mA	1.0 + 0.50
10000 μF	1 mA	2.0 + 0.50

⁶ Slow AC filter (3 Hz bandwidth). Pure sine wave input greater than 5 % of range.

⁷ 750 VAC range is limited to 100 kHz.

⁸ ADC set for continuous trigger operation. Null must be used.

GENERAL SPECIFICATIONS

Item	Limitation and description
Input bias current	<30pA at 25 °C
Input protection	1000V all ranges (2W input)
AC CMRR	70 dB (for 1 kΩ unbalanced LO lead)
Power supply	100 V, 120 V, 220 V (230 V), 240 V ±10 %
Power line frequency	50/60 Hz auto detected ± 10 %
Power consumption	25 VA maximum
Digital I/O interface	USB-compatible type B connection, GPIB (optional)
Environment	For indoor use only
Operating temperature	0 °C to 40 °C
Operating humidity	Maximum relative humidity 80% for temperature up to 31 °C
Storage temperature	-40 °C to 70 °C
Operating altitude	Up to 2000 m above sea level
Bench dimensions (with handles and bumpers)	107 mm high × 252.8 mm wide × 305 mm deep (3.49 in. × 9.95 in. × 12.00 in.)
Weight	2.23 kg (4.92 lb)
Safety	Conforms to European Union Low Voltage Directive UL listed to UL61010-1: 2004
Pollution degree	2
EMC	Conforms to European Union EMC Directive
Warranty	Three years