

SPECIFICATIONS

DC VOLTS

(5½ Digits)

RANGE	RESOLUTION	INPUT RESISTANCE	ACCURACY†‡		TEMPERATURE COEFFICIENT
			±(%rdg + counts) 24Hr., 23° ± 1°C	1 Yr., 18°-28°C	±(%rdg + counts)/°C 0°-18°C & 28°-50°C
20mV	100 nV	> 1GΩ	0.01 + 40	0.025 + 40	0.003 + 2
200mV	1 μV	> 1GΩ	0.01 + 6	0.025 + 6	0.003 + 0.5
2 V	10 μV	> 1GΩ	0.01 + 8	0.020 + 8	0.003 + 0.5
20 V	100 μV	10MΩ	0.01 + 6	0.030 + 6	0.003 + 0.5
200 V	1mV	10MΩ	0.01 + 8	0.025 + 8	0.003 + 0.5
1000 V	10mV	10MΩ	0.01 + 6	0.025 + 6	0.003 + 0.5

†After pushbutton or bus zeroing.

‡In 4½ digit mode, counts = ±2 (except ±4 on 20mV range after zeroing).

NMRR: Greater than 60dB at 50 or 60Hz.

CMRR: Greater than 120dB at DC and 50 or 60Hz (with 1kΩ in either lead).

MAXIMUM ALLOWABLE INPUT: 1000V peak.

BENCH READING RATE: 5 readings/second.

OHMS

(5½ Digits)

RANGE	RESOLUTION	I short	OUTPUT Vopen	ACCURACY†‡		TEMPERATURE COEFFICIENT
				±(%rdg + counts) 24Hr., 23° ± 1°C	1 Yr., 18°-28°C	±(%rdg + counts)/°C 0°-18°C & 28°-50°C
20 Ω	100 μΩ	- 2mA	-2V	0.015 + 25	0.025 + 25	0.003 + 2
200 Ω	1mΩ	- 2mA	-2V	0.015 + 7	0.025 + 7	0.003 + 0.5
2 kΩ	10mΩ	- 2mA	-2V	0.015 + 5	0.022 + 5	0.003 + 0.5
20 kΩ	100mΩ	- 20 μA	-2V	0.015 + 7	0.025 + 7	0.003 + 0.5
200 kΩ	1 Ω	- 20 μA	-2V	0.015 + 5	0.022 + 5	0.003 + 0.5
2MΩ	10 Ω	-200 nA	-2V	0.03 + 7	0.050 + 7	0.015 + 1
20MΩ	100 Ω	-200 nA	-2V	0.06 + 5	0.100 + 5	0.025 + 1

†After pushbutton or bus zeroing.

‡In 4½-digit mode, counts = ±2 (except ±4 on 20Ω range after zeroing).

CONFIGURATION: Automatic 2- or 4-terminal.

MAXIMUM ALLOWABLE INPUT: 360V peak or 250V rms.

BENCH READING RATE: 3 readings/second except 20MΩ range, 1 reading/second.

TEMPERATURE

(5½ Digits)

SPAN	RESOLUTION	4-WIRE ACCURACY ¹		TEMPERATURE COEFFICIENT
		±(%rdg + counts) 1 YR., 18°-28°C	±(%rdg + counts) 0°-18°C & 28°-50°C	±(%rdg + counts)/°C 0°-18°C & 28°-50°C
°C				
-200.00° to 230.00°	0.01°	0.03 + 10		0.003 + 0.4
230.00° to 630.00°	0.01°	0.03 + 40		0.003 + 4
-220.00° to -200.00°	0.01°	0.03 + 40		0.003 + 4
°F				
-328.00° to 446.00°	0.01°	0.03 + 18		0.003 + 0.7
446.00° to 1100.00°	0.01°	0.03 + 72		0.003 + 7
-360.00° to -328.00°	0.01°	0.03 + 72		0.003 + 7

¹ Autorange mode, excluding probe errors.

RTD TYPE: 100Ω platinum; DIN 43 760 or IPTS-68, Programmable alpha and delta 3- or 4-wire.

MAXIMUM LEAD RESISTANCE (each lead): 4-wire: 25Ω.
3-wire: 15Ω.

SENSOR CURRENT: 1.0mA maximum, RMS.

BENCH READING RATE: 1.2 reading per second.

MAXIMUM COMMON MODE VOLTAGE: 500V (42V with Model 1951 connected).

COMMON MODE REJECTION: Less than 0.005°C/volt at DC, 50Hz and 60Hz (100Ω unbalance, LO driven).

MAXIMUM ALLOWABLE INPUT: 360V peak, 250V rms.

TRMS AC VOLTS (Option 1950)

(5½ Digits)

RANGE	RESOLUTION	20Hz-45Hz	ACCURACY (1 Year)†‡		
			±(%rdg + counts) 18°-28°C	10kHz-20kHz	20kHz-50kHz
200mV*	1 μV	0.8 + 200	0.3 + 200	0.7 + 200	2.0 + 300
2 V	10 μV	0.8 + 200	0.3 + 200	0.7 + 200	2.0 + 250
20 V	100 μV	0.8 + 200	0.3 + 200	0.7 + 200	1.5 + 250
200 V	1mV	0.8 + 200	0.3 + 200	0.7 + 200	1.5 + 250
700 V	10mV	0.8 + 200	0.3 + 200	0.7 + 200	1.5 + 250

†In 4½ digit mode, divide count error by 10.

*Above 1mV.

TEMPERATURE COEFFICIENT (0°-18°C & 28°-50°C): Less than ±(0.1 × applicable accuracy specification)/°C.

RESPONSE: True root mean square, AC coupled.

CREST FACTOR (ratio of peak to rms): Up to 3:1 allowable.

INPUT IMPEDANCE: 2MΩ shunted by less than 75pF.

MAXIMUM ALLOWABLE INPUT: 1000V peak, 10⁷V•Hz.

BENCH READING RATE: 3 readings/second.

CMRR: Greater than 60dB at DC, 50 or 60Hz (with 1kΩ in either lead).

BANDWIDTH: -3dB at 250kHz typical.

DC AMPS (Option 1950)

(5½ Digits)

RANGE	RESOLUTION	ACCURACY (1 YEAR)†‡	TEMPERATURE COEFFICIENT	MAXIMUM VOLTAGE BURDEN
			±(%rdg + counts) 18°-28°C	
20 μA	100pA	0.14 + 40‡	0.01 + 2	0.03V
200 μA	1nA	0.09 + 10	0.01 + 0.5	0.25V
2mA	10nA	0.09 + 10	0.01 + 0.5	0.25V
20mA	100nA	0.09 + 10	0.01 + 0.5	0.25V
200mA	1 μA	0.09 + 10	0.01 + 0.5	0.28V
2 A	10 μA	0.09 + 10	0.01 + 0.5	1 V

†In 4½ digit mode, counts = ±2 (except ±4 on 20μA range after zeroing).

‡After pushbutton or bus zeroing.

OVERLOAD PROTECTION: 2A fuse (250V), externally accessible.

BENCH READING RATE: 5 readings/second.

TRMS AC AMPS (Option 1950)

(5½ Digits)

RANGE	RESOLUTION	ACCURACY (1 YEAR)†‡	TEMPERATURE COEFFICIENT	MAXIMUM VOLTAGE BURDEN
			±(%rdg + counts) 18°-28°C	
200 μA	1nA	0.6 + 250	0.04 + 10	0.25V
2mA	10nA	0.6 + 250	0.04 + 10	0.25V
20mA	100nA	0.6 + 250	0.04 + 10	0.25V
200mA	1 μA	0.6 + 250	0.04 + 10	0.28V
2 A	10 μA	0.6 + 250	0.04 + 10	1 V

†In 4½ digit mode, divide count error by 10.

‡Above 0.5% of range.

RESPONSE: True root mean square, AC coupled.

CREST FACTOR (ratio of peak to rms): Up to 3:1 allowable.

OVERLOAD PROTECTION: 2A fuse (250V), externally accessible.

BENCH READING RATE: 3 readings/second.

IEEE-488 BUS IMPLEMENTATION

Multiline Commands: DCL, LLO, SDC, GET, GTL, UNT, UNL, SPE, SPD.

Uniline Commands: IFC, REN, EOI, SRQ, ATN.

Interface Functions: SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1.

Programmable Parameters: Range, Function, Zero, Integration Period, Averaging, EOI, Trigger, Terminator, Delay*, 100-rdg. Storage, Calibration, Display, Multiplex Off, Status, Service Request, Self Test, Output Format.

*First reading is correct when step input is coincident with trigger.

Conversion Rates (DC Volts):

USEABLE RESOLUTION	INTEGRATION PERIOD	TRIGGER TO FIRST BYTE OUT	MAXIMUM READING RATE†
3 ½ Digit	3.3 ms	17ms	76
4 ½ Digit	16.66ms‡	30ms	36
5 ½ Digit	100 ms	114ms	9

†Readings/second.

‡20ms at 50Hz.

Address Modes: TALK ONLY and ADDRESSABLE.

FRONT PANEL PROGRAMS

0 Clear—Cancels program mode.

1 Non-Volatile RAM Storage—Store programs 3, 4, 5, 6 and 8 data in NVRAM

2 Multiplex—Defeats input amplifier multiplexing.

3 IEEE bus mode—ADDRESSABLE and TALK ONLY entry.

4 Line Frequency—Selects 50Hz or 60Hz operation.

5 Calibration—Performs digital calibration.

6 Temperature—Allows °C and °F temperature measurements.

7 Data Logger—Allows 100-reading storage at 9 programmable rates; also stores highest, lowest and average reading.

8 Diagnostics—Troubleshooting aid and self-test.

9 Trigger—Enables front panel or external triggering.

GENERAL

DISPLAY: Six 0.5" LED digits with decimal point, exponent and polarity. Function and IEEE bus status also displayed.

RANGING: Manual or fast autoranging (150ms per range change on DCV).

ISOLATION: Input LO to IEEE LO or power line ground: 500V max, 5×10^5 V•Hz; greater than $10^9\Omega$ paralleled by 300pF.

WARMUP: 1 hour to rated accuracy.

OPERATING ENVIRONMENT: 0°-50°C, 0% to 80% relative humidity up to 35°C.

STORAGE ENVIRONMENT: -25° to 65°C.

POWER: 105-125V or 210-250V (internal switch selected), 50Hz to 400Hz, 24V•A maximum. 90-110V and 180-220V version available upon request.

CONNECTORS: **Analog:** Switch selectable front or rear, 5-way gold plated binding posts. **Digital:** Trigger input and Voltmeter Complete output on rear panel, BNCs.

DIMENSIONS, WEIGHT: 127mm high × 216mm wide × 359mm deep (5" × 8½" × 14 1/8 "). Net weight 3.2kg (7 lbs.).