MODEL 6517 SPECIFICATIONS

VOLTS

RANGE	5½ DIGIT RESOLUTION	ACCURACY (1 Yr.)[1] 18°– 28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°– 18°C & 28°– 50°C ±(%rdg + counts)/°C
2 V	10 µV	0.025 + 4	0.003 + 2
20 V	100 µV	0.025 + 3	0.002 + 1
200 V	1 mV	0.06 + 3	0.002 + 1

Note: [1]When properly zeroed, 5½ digit, 1 PLC (power line cycle), median filter on, digital filter =10 readings.

NMRR: 60dB on 2V, 20V, >55dB on 200V, at 50Hz or 60Hz ±0.1%.

CMRR: >120dB at DC, 50Hz or 60Hz.

INPUT IMPEDANCE: >200TΩ in parallel with 20pF, < 2pF guarded (10MΩ with zero check on).

SMALL SIGNAL BANDWIDTH AT PREAMP OUTPUT: Typically 100kHz (–3db).

AMPS

RANGE	5½ DIGIT RESOLUTION	ACCURACY (1 Yr.)[1] 18°– 28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°–18°C & 28°–50°C ±(%rdg + counts)/°C
20 pA	100 aA[2]	1 + 30	0.1 + 5
200 pA	1 fA[2]	1 + 5	0.1 + 1
2 nA	10 fA	0.2 + 30	0.1 + 2
20 nA	100 fA	0.2 + 5	0.03 + 1
200 nA	1 pA	0.2 + 5	0.03 + 1
2 µA	10 pA	0.1 + 10	0.005 + 2
20 µA	100 pA	0.1 + 5	0.005 + 1
200 µA	1 nA	0.1 + 5	0.005 + 1
2 mA	10 nA	0.1 + 10	0.008 + 2
20 mA	100 nA	0.1 + 5	0.008 + 1

Note: [1]When properly zeroed, 5½ digit, 1 PLC (power line cycle), median filter on, digital filter =10 readings.
[2]aA =10^{-18}A, fA=10^{-15}A.

INPUT BIAS CURRENT: <3fA at TCAL. Temperature coefficient = 0.5fA/°C.

INPUT BIAS CURRENT NOISE: <750aA p-p (capped input), 0.1Hz to 10Hz bandwidth, damping on. Digital filter = 40 readings.

INPUT VOLTAGE BURDEN at TCAL ± 1°C:

<20µV on 20pA, 2nA, 20nA, 2µA, 20µA ranges.

<100µV on 200pA, 200nA, 200µA ranges.

<2mV on 2mA range.

<4mV on 20mA range.

TEMPERATURE COEFFICIENT OF INPUT VOLTAGE BURDEN:

<10µV/°C on pA, nA, µA ranges.

PREAMP SETTLING TIME (to 10% of final value): 2.5s typical on pA ranges, damping off, 4s typical on pA ranges damping on, 9ms on nA ranges, 1ms on µA and mA ranges.

NMRR: >95dB on pA, 60dB on nA, µA, and mA ranges at 50Hz or 60Hz ±0.1%.

COULOMBS

RANGE	5½ DIGIT RESOLUTION	ACCURACY (1 Yr.)[1,2] 18°– 28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°– 18°C & 28°– 50°C ±(%rdg + counts)/°C
2 nC	10 fC	0.4 + 5	0.04 + 3
20 nC	100 fC	0.4 + 5	0.04 + 1
200 nC	1 pC	0.4 + 5	0.04 + 1
2 µC	10 pC	0.4 + 5	0.04 + 1

Note: [1]Charge acquisition time must be <1000s, derate 1% for each additional 10,000s.
[2]When properly zeroed, 5½ digit, 1 PLC (power line cycle), median filter on, digital filter =10 readings.

INPUT BIAS CURRENT: <4fA at TCAL. Temperature coefficient = 0.5fA/°C.

OHMS

RANGE	5½ DIGIT RESOLUTION	ACCURACY[1] (10-100% Range) 18°-28°C (1 Yr.) ± (% rdg + cts)	TEMPERATURE COEFFICIENT (10-100% Range) 0°-18°C & 28°-50°C ± (% rdg + cts)	TEST VOLTS	AMPS RANGE
2 MΩ	10 Ω	0.125 + 1	0.01 + 1	40 V	200 µA
20 MΩ	100 Ω	0.125 + 1	0.01 + 1	40 V	20 µA
200 MΩ	1 kΩ	0.15 + 1	0.015 + 1	40 V	2 µA
2 GΩ	10 kΩ	0.225 + 1	0.035 + 1	40 V	200 nA
20 GΩ	100 kΩ	0.225 + 1	0.035 + 1	40 V	20 nA
200 GΩ	1 MΩ	0.35 + 1	0.110 + 1	40 V	2 nA
2 TΩ	10 MΩ	0.35 + 1	0.110 + 1	400 V	2 nA
20 TΩ	100 MΩ	1.025 + 1	0.105 + 1	400 V	200 pA
200 TΩ	1 GΩ	1.15 + 1	0.125 + 1	400 V	20 pA

Note: [1]Specifications are for auto V-source ohms, when properly zeroed 5½ digit, 1 PLC, median filter on, digital filter = 10 readings. If user selectable voltage is required, use manual mode. Manual mode displays resistance (up to 10^{18}Ω) calculated from measured current. Accuracy is equal to accuracy of V-source plus accuracy of selected Amps range.

PREAMP SETTLING TIME: Add voltage source settling time to preamp settling time in Amps specification.

VOLTAGE SOURCE

RANGE	STEP SIZE	ACCURACY (1 Yr.) 18°– 28°C ±(% setting+offset)	TEMPERATURE COEFFICIENT 0°– 18°C & 28°– 50°C ±(% setting+offset)/°C
100 V	5 mV	0.15 + 10 mV	0.005 + 1 mV
1000 V	50 mV	0.15 + 100 mV	0.005 + 10 mV

MAXIMUM OUTPUT CURRENT:

±10mA; active current limit at <11.5mA for 100V range.

±1mA; active current limit at <1.15mA for 1000V range.

SETTLING TIME:

<8ms to rated accuracy for 100V range.

<50ms to rated accuracy for 1000V range.

NOISE:

<150µV p-p from 0.1Hz to 10Hz for 100V range.

<1.5mV p-p from 0.1Hz to 10Hz for 1000V range.

TEMPERATURE (THERMOCOUPLE)

THERMOCOUPLE TYPE	RANGE	ACCURACY (1 Yr.)[1] 18°– 28°C ±(% rdg + °C)
K	–25°C to 150°C	± (0.3% ± 1.5°C)

Note: [1]Excluding probe errors, TCAL ± 5°C, 1 PLC integration time.

HUMIDITY

RANGE	ACCURACY (1 Yr.)[1] 18°– 28°C ±(% rdg + % RH)
0 - 100%	± (0.3% +0.5)

Note: [1]Humidity probe accuracy must be added. This is ± 3% RH, for Model 6517-RH, up to 65°C probe environment, not to exceed 85°C.

IEEE-488 BUS IMPLEMENTATION

MULTILINE COMMANDS: DCL, LLO, SDC, GET, GTL, UNT, UNL, SPE, SPD.

IMPLEMENTATION: SCPI (IEEE-488.2, SCPI-1994.0); DDC (IEEE-488.1).

UNILINE COMMANDS: IFC, REN, EOI, SRQ, ATN.

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

PROGRAMMABLE PARAMETERS: Function, Range, Zero Check, Zero Suppress, EOI (DDC mode only), Trigger, Terminator (DDC mode only), 100-Reading Storage (DDC mode), 15706 Max. Reading Storage (SCPI mode), Calibration (SCPI mode only), V-Source Output, Display Format, SRQ, Status (including V-Source I-Limit), Output Format, Guard.

ADDRESS MODES: TALK ONLY and ADDRESSABLE.

TRIGGER TO READING DONE: 150ms typical, with external trigger.

RS-232 IMPLEMENTATION:

Supports: SCPI 1994.0.

Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19.2k.

Protocols: Xon/Xoff, 7 or 8 bit ASCII, parity-odd/even/none.

Connector: DB-9 TXD/RXD/GND.

GENERAL

DISPLAY: 6½-digit vacuum fluorescent multiline.

OVERRANGE INDICATION: Display reads "OVERFLOW".

RANGING: Automatic or manual.

CONVERSION TIME: Selectable 0.01 PLC to 10 PLC.

PROGRAMS: Provide front panel access to IEEE address, choice of engineering units or scientific notation, and digital calibration.

MAXIMUM INPUT: 250V peak, DC to 60Hz sine wave; 10s per minute maximum on mA ranges.

MAXIMUM COMMON MODE VOLTAGE (DC to 60Hz sine wave): Electrometer, 500V peak; V Source, 750V peak.

ISOLATION (Meter COMMON to chassis): Typically $10^{10}\Omega$ in parallel with 500pF.

INPUT CONNECTOR: Three lug triaxial on rear panel.

2V ANALOG OUTPUT: 2V for full range input. Inverting in Volts mode. Output impedance 10kΩ.

PREAMP OUTPUT: Provides a guard output for Volts measurements. Can be used as an inverting output or with external feedback in Amps and Coulombs modes.

EXTERNAL TRIGGER: TTL compatible External Trigger and Electrometer Complete.

GUARD: Switchable voltage guard available.

DIGITAL I/O AND TRIGGER LINE: Available, see manual for usage.

EMI/RFI: Meets VDE-0871 and FCC Class B limits.

TEST SEQUENCES: Device-Characterization (Diode, Capacitor, Cable, Resistor), Resistivity, Surface-Insulation-Resistance, Sweep.

READING STORAGE: 100 readings (DDC mode), 15706 max. readings (SCPI mode).

READING RATE:

To internal buffer	125 readings/second[1]
To IEEE-488 bus	115 readings/second[1,3]
To front panel	17 readings/second[2]
Bus transfer	2500 readings/second[3]

Note: [1] 0.01 PLC, digital filters off, front panel off, temperature + RH off.
[2] 1.00 PLC, digital filters off, temperature + RH off.
[3] Binary transfer mode.

DIGITAL FILTER: Median and averaging.

ENVIRONMENT:

Operating: 0°-50°C; relative humidity 70% non-condensing, up to 35°C.

Storage: –25° to +65°C.

WARM-UP: 1 hour to rated accuracy (see manual for recommended procedure).

POWER: 105–125V or 210–250V (external switch selected), 90–110V (internal modification required), 50–60Hz, 50VA.

PHYSICAL:

Case Dimensions: 90mm high × 214mm wide × 369mm deep (3½ in. × 8½ in. × 14½ in.).

Working Dimensions: From front of case to rear including power cord and IEEE-488 connector: 15.5 inches.

Net Weight: <4.6 kg (<10.1 lbs.).

Shipping Weight: <9.5 kg (<21 lbs.).

ACCESSORIES SUPPLIED:

Model 237-ALG-2 Low Noise Triax Cable, 3-slot Triax to Alligator clips 2m (6.6 ft.).

Model 8607 Safety High Voltage Dual Test Leads.

Model 6517-TP Thermocouple Input Lead.

CS-459 Interlock Connector.

Specifications subject to change without notice.