MODEL 617 SPECIFICATIONS

VOLTS

RANGE	RESOLUTION	ACCURACY (1 Yr.)* 18°–28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°–18°C & 28°–50°C ±(%rdg + counts)/°C
200 mV	10 µV	0.05 + 4	0.004 + 3
2 V	100 µV	0.05 + 1	0.004 + 0.3
20 V	1 mV	0.05 + 1	0.005 + 0.1
200 V	10 mV	0.07 + 1	0.007 + 0.1

*When properly zeroed.

NMRR: >80dB on 200mV, 60dB on 2V and 20V, 55dB on 200V range, at 50Hz or 60Hz ±0.1%.

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

INPUT IMPEDANCE: >200TΩ in parallel with 20pF (<2pF guarded).

AMPS

RANGE	RESOLUTION	ACCURACY (1 Yr.)* 18°–28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°–18°C & 28°–50°C ±(%rdg + counts)/°C
2 pA	100 aA	1.6 + 66	0.15 + 8
20 pA	1 fA	1.6 + 7	0.15 + 1
200 pA	10 fA	1.6 + 1	0.15 + 0.1
2 nA	100 fA	0.25 + 5	0.015 + 3
20 nA	1 pA	0.25 + 1	0.015 + 0.3
200 nA	10 pA	0.25 + 1	0.015 + 0.1
2 µA	100 pA	0.15 + 4	0.005 + 3
20 µA	1 nA	0.15 + 1	0.005 + 0.3
200 µA	10 nA	0.15 + 1	0.006 + 0.1
2 mA	100 nA	0.15 + 4	0.005 + 3
20 mA	1 µA	0.15 + 1	0.005 + 0.3

*When properly zeroed using recommended warm-up procedure.

INPUT BIAS CURRENT: <5fA (5×10^{-15}A) at 23°C

INPUT VOLTAGE BURDEN: <1mV except 3mV on 20mA range.

PREAMP SETTLING TIME (to 10% of final value): 2.5s on pA ranges, 15ms on nA ranges, 5ms on µA and mA ranges.

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

COULOMBS

RANGE	RESOLUTION	ACCURACY (1 Yr.)* 18°–28°C ±(%rdg + counts)	TEMPERATURE COEFFICIENT 0°–18°C & 28°–50°C ±(%rdg + counts)/°C
200 pC	10 fC	0.4 + 4	0.02 + 3
2 nC	100 fC	0.4 + 1	0.02 + 0.3
20 nC	1 pC	0.4 + 1	0.02 + 0.1

*When properly zeroed.

INPUT BIAS CURRENT: <5fA (5×10^{-15}A) at 23°C.

OHMS

RANGE	RESOLUTION	ACCURACY (1 Yr.)* 18°–28°C ±(%rdg+counts)	TEMPERATURE COEFFICIENT 0°–18°C & 28°–50°C ±(%rdg+counts)/°C	TEST CURRENT ±1.5%
2 kΩ	100 mΩ	0.20 + 4	0.01 + 3	100 µA
20 kΩ	1 Ω	0.15 + 1	0.01 + 0.3	100 µA
200 kΩ	10 Ω	0.25 + 1	0.01 + 0.3	10 µA
2 MΩ	100 Ω	0.25 + 1	0.02 + 0.3	1 µA
20 MΩ	1 kΩ	0.25 + 1	0.02 + 0.3	100 nA
200 MΩ	10 kΩ	0.30 + 1	0.02 + 0.3	10 nA
2 GΩ	100 kΩ	1.5 + 1	0.04 + 0.3	1 nA
20 GΩ	1 MΩ	1.5 + 1	0.04 + 0.1	1 nA
200 GΩ	10 MΩ	1.5 + 1	0.04 + 0.1	1 nA

*When properly zeroed.

MAXIMUM OPEN CIRCUIT VOLTAGE: 300V DC.

PREAMP SETTLING TIME (To 0.1% of final value with <100pF input capacitance): 2kΩ through 20MΩ: 15ms; 200MΩ: 150ms. (To 1% of final value with Input Guard on and <1pF of unguarded input capacitance): 2GΩ: 10ms; 20GΩ: 100ms; 200GΩ: 1 s.

V/I MODE: Used with V source; displays resistance (5×10^4 to 10^{16}Ω) calculated from measured current. V/I Ohms accuracy equal to accuracy of V source plus accuracy of selected Amps range.

VOLTAGE SOURCE

OUTPUT: –102V to +102V in 50mV steps.

ACCURACY (1 Yr., 18°–28°C): ±(0.2% + 50mV).

TEMPERATURE COEFFICIENT: ±(0.005% + 1mV)/°C

MAXIMUM OUTPUT CURRENT: ±2mA; active current limit at <4mA with annunciation.

SETTLING TIME: <3ms to rated accuracy.

NOISE: <(1ppm of output voltage + 200µV) p-p from 0.1Hz to 10Hz.

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, RL0, PP0, DC1, DT1, C0, E1.

PROGRAMMABLE PARAMETERS: Function, Range, Zero Check, Zero Correct, Zero Suppress, EOI, Trigger, Terminator, 100-Reading Storage and Retrieval, Calibration, V Source Output, Display Format, SRQ, Status (including V Source I-Limit), Output Format.

ADDRESS MODES: TALK ONLY and ADDRESSABLE.

TRIGGER TO READING DONE: 350ms typical.

GENERAL

DISPLAY: 4½-digit numeric LEDs with appropriate decimal point and polarity indication; signed two-digit alphanumeric exponent.

OVERRANGE INDICATION: Display reads "OL".

RANGING: Automatic or manual.

CONVERSION TIME: 330ms.

DATA STORE and MIN/MAX: 100-reading store capacity; records data at one of six selectable rates from every reading to 1 reading/hour, or by manual triggering. Also detects and stores maximum and minimum readings continuously while in the Data Store mode.

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, 100V peak.

ISOLATION (Input LO to chassis): Typically 10^{14}Ω in parallel with 500pF.

INPUT CONNECTOR: Two lug triaxial on rear panel.

OUTPUT CONNECTORS: 5-way binding posts on rear panel for V source, preamp, and analog outputs. Rear panel BNC for External Trigger and Meter Complete.

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

PREAMP OUTPUT: Provides a guard output for Volts and Ohms measurements. Can be used as an inverting output or with external feedback in Amps and Coulombs modes. Output impedance: 100Ω.

GAIN ERROR AT PREAMP OUTPUT: Typically 5ppm.

SMALL SIGNAL BANDWIDTH AT PREAMP OUTPUT: Typically –3dB at 100kHz.

EXTERNAL TRIGGER: TTL compatible External Trigger and Electrometer Complete.

V, Ω GUARD SWITCH: OFF position: Inner shield of triax is Input LO, input capacitance is ≤20pF. ON position: Inner shield of triax is Guard (follows input HI). Input capacitance is ≤2pF. Use Analog Output COM for Input LO connection.

ENVIRONMENT: Operating: 0°–50°C; relative humidity 70% non-condensing, up to 35°C. Storage: –25° to +65°C.

SHIELDING: Double shielded.

WARM-UP: 2 hours to rated accuracy (see manual for recommended procedure).

POWER: 105–125V or 210–250V (internal switch selected), 90–110V available; 50–60Hz, 25VA.

DIMENSIONS, WEIGHT: 127mm high × 216mm wide × 359mm deep (5 in. × 8.5 in. × 14.125 in.). Net weight 3.6kg (8 lbs.).

ACCESSORY SUPPLIED: Model 6011 Triaxial Input Cable.