

6487 Picoammeter Specifications

RANGE	5½ DIGIT DEFAULT RESOLUTION	ACCURACY (1YR) ¹ ±(% RDG. + OFFSET) 18°-28°C, 0-70% RH	TYPICAL RMS NOISE ²	TYPICAL ANALOG RISE TIME (10% TO 90%) ³ DAMPING ⁴	
				OFF	ON
2 nA	10 fA	0.3 % + 400 fA	20 fA	4 ms	80 ms
20 nA	100 fA	0.2 % + 1 pA	20 fA	4 ms	80 ms
200 nA	1 pA	0.15 % + 10 pA	1 pA	300 μs	1 ms
2 μA	10 pA	0.15% + 100 pA	1 pA	300 μs	1 ms
20 μA	100 pA	0.1 % + 1 nA	100 pA	110 μs	110 μs
200 μA	1 nA	0.1 % + 10 nA	100 pA	110 μs	110 μs
2 mA	10 nA	0.1 % + 100 nA	10 nA	110 μs	110 μs
20 mA	100 nA	0.1 % + 1 μA	10 nA	110 μs	110 μs

TEMPERATURE COEFFICIENT: 0°-18°C & 28°-50°C. For each °C, add 0.1 % (× rdg + offset) to accuracy spec.

INPUT VOLTAGE BURDEN: <200μV on all ranges except <1mV on 20mA range.

MAXIMUM INPUT CAPACITANCE: Stable to 10nF on all nA ranges and 2μA range; 1μF on 20μA and 200μA ranges, and on mA ranges.

MAXIMUM CONTINUOUS INPUT VOLTAGE: 505 VDC

NMRR¹: (50 or 60Hz) :60dB

ISOLATION (Ammeter Common or Voltage Source to chassis): Typically >1×10¹¹Ω in parallel with <1nF

MAXIMUM COMMON MODE VOLTAGE (Between Chassis and Voltage Source or Ammeter): 505 VDC.

MAXIMUM VOLTAGE BETWEEN VOLTAGE SOURCE AND AMMETER: 505 VDC

ANALOG OUTPUT: Scaled voltage output (inverting 2V full scale on all ranges) 2.5% ±2mV

ANALOG OUTPUT IMPEDANCE³: <100Ω, DC-2kHz.

VOLTAGE SOURCE

Range (Max)	Step Size (typical)	Accuracy ⁵ ±(% PROG. + OFFSET) 18°C - 28°C, 0 - 70% R.H.	Noise (p-p) 0.1 - 10 Hz	Temperature Coefficient	Typical Rise Time ^{6,8} (10%-90%)	Typical Fall Time ^{7,8} (90%-10%)
±10.100	200μV	0.1% + 1mV	<50μV	(0.005% + 20μV) / °C	250 μs	150 μs
±50.500	1mV	0.1% + 4mV	<150μV	(0.005% + 200μV) / °C	250 μs	300 μs
±505.00	10mV	0.15% + 40mV	<1.5mV	(0.008% + 2mV) / °C	4.5 ms	1 ms

SELECTABLE CURRENT LIMIT: 2.5mA, 250μA, 25μA for 50V and 500V ranges, 25mA additional limit for 10V range. All current limits are -20%/+35% of nominal.

WIDEBAND NOISE⁹: <30mVp-p 0.1Hz - 20MHz.

TYPICAL TIME STABILITY: ±(0.003% + 1mV) over 24 hours at constant temperature (within 1°C, between 18°C - 28°C, after 5 minute settling).

OUTPUT RESISTANCE: <2.5Ω.

VOLTAGE SWEEPS: Supports linear voltage sweeps on fixed source range, one current or resistance measurement per step. Maximum sweep rate: 200 steps per second. Maximum step count 3000. Optional delay between step and measure.

RESISTANCE MEASUREMENT (V/I): Used with voltage source; resistance calculated from voltage setting and measured current. Accuracy is based on voltage source accuracy plus ammeter accuracy. Typical accuracy better than 0.6% for readings between 1kΩ and 1TΩ.

ALTERNATING VOLTAGE RESISTANCE MEASUREMENT: Offers alternating voltage resistance measurements for resistances from 10²Ω to 10¹⁵Ω. Alternates between 0V and user-selectable voltage up to ±505V.

¹ At 1 PLC - limited to 60 rdgs/sec under this condition.

² At 6 PLC, 1 standard deviation, 100 readings, filter off, capped input - limited to 10 rdgs/sec under this condition.

³ Measured at analog output with resistive load >2kΩ.

⁴ Maximum rise time can be up to 25% greater.

⁵ Accuracy does not include output resistance/load regulation.

⁶ Rise Time is from 0V to ± full-scale voltage (increasing magnitude).

⁷ Fall Time is from ± full-scale voltage to 0V (decreasing magnitude).

⁸ For capacitive loads, add C*ΔV/I_{limit} to Rise Time, and C*ΔV/I_{mA} to Fall Time.

⁹ Measured with LO connected to chassis ground.

REMOTE OPERATION

IEEE-488 BUS IMPLEMENTATION: SCPI (IEEE-488.2, SCPI-1996.0); DDC (IEEE-488.1).

LANGUAGE EMULATION: Keithley Model 486/487 emulation via DDC mode.

RS-232 IMPLEMENTATION:

Supports: SCPI 1996.0.

Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19.2k, 38.4k, 57.6k.

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

Connector: DB-9 TXD/RXD/GND.

GENERAL

AMMETER INPUT CONNECTOR: Three lug triaxial on rear panel.

ANALOG OUTPUT CONNECTOR: Two banana jacks on rear panel.

VOLTAGE SOURCE OUTPUT CONNECTOR: Two banana jacks on rear panel.

INTERLOCK CONNECTOR: 4 pin DIN.

TRIGGER LINE: Available, see manual for usage.

DISPLAY: 12 character vacuum fluorescent.

DIGITAL FILTER: Median and averaging (selectable from 2 to 100 readings).

RANGING: Automatic or manual.

AUTORANGING TIME³: <250ms (analog filter off, 1PLC)

OVERRANGE INDICATION: Display reads "OVRFLOW".

CONVERSION TIME: Selectable 0.01 PLC to 60 PLC (50PLC under 50Hz operation). (Adjustable from 200μs to 1s)

READING RATE:

To internal buffer 1000 readings/second¹

To IEEE-488 bus 900 readings/second^{1,2}

BUFFER: Stores up to 3000 readings.

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

EMC: Conforms with European Union Directive 89/336/EEC, EN61326-1.

SAFETY: Conforms with European Union Directive 73/23/EEC, EN61010-1, CAT I.

ENVIRONMENT:

Operating: 0°-50°C; relative humidity 70% non-condensing, up to 35°C. Above 35°C, derate humidity by 3% for each °C.

Storage: -10°C to +65°C.

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

POWER: 100-120V or 220-240V, 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: 394mm (15.5 inches).

NET WEIGHT: <4.7 kg (<10.3 lbs).

Notes:

¹ 0.01 PLC, digital filters off, front panel off, auto zero off.

² Binary transfer mode. IEEE-488.1.

³ Measured from trigger in to meter complete.