

6220 Programmable Current Source

SOURCE SPECIFICATIONS

Range (+5% over range)	Accuracy (1 Year) 23°C±5°C ±(%rdg. + amps)	Programming Resolution	Temperature Coefficient/°C 0°-18°C& 28°-50°C	Typical Noise (peak-peak) /RMS ^{3,4,5} 0.1Hz-10Hz	Settling Time ^{1,2} (1% of final value)
2nA	0.4% + 2pA	100fA	0.02% + 200fA	400/80fA	100µs
20nA	0.3% + 10pA	1pA	0.02% + 200fA	4/0.8pA	100µs
200nA	0.3% + 100pA	10pA	0.02% + 2pA	20/4pA	100µs
2µA	0.1% + 1nA	100pA	0.01% + 20pA	200/40pA	100µs
20µA	0.05% + 10nA	1nA	0.005% + 200pA	2/0.4nA	100µs
200µA	0.05% + 100nA	10nA	0.005% + 2nA	20/4nA	100µs
2mA	0.05% + 1µA	100nA	0.005% + 20nA	200/40nA	100µs
20mA	0.05% + 10µA	1µA	0.005% + 200nA	2/0.4µA	100µs
100mA	0.1% + 50µA	10µA	0.01% + 2µA	10/2µA	100µs

ADDITIONAL SOURCE SPECIFICATIONS

OUTPUT RESISTANCE: $>10^{14}\Omega$. (2nA/20nA range)

OUTPUT CAPACITANCE: $<10\text{pF}$, $<100\text{pF}$ Filter ON. (2nA/20nA range)

LOAD IMPEDANCE: Stable into 100µH typical.

CURRENT REGULATION: Line: $<0.01\%$ of range.

Load: $<0.01\%$ of range.

VOLTAGE LIMIT (Compliance): Bipolar voltage limit set with single value. 0.1V to 105V in 0.01V programmable steps. Accuracy for 0.1V to 20V: 0.1% + 20mV, accuracy for 20V to 105V: 0.1% + 100mV

MAX. OUTPUT POWER: 11W, four quadrant source or sink operation.

GUARD OUTPUT:

Maximum Load Capacitance: 10nF.

Maximum Load Current: 1mA for rated accuracy.

Accuracy: $\pm 1\text{mV}$ for output currents $<2\text{mA}$. (excluding output lead voltage drop).

PROGRAM MEMORY: (offers point-by-point control and triggering, e.g. Sweeps)

Number of Locations: 64K.

EXTERNAL TRIGGER: TTL-compatible EXTERNAL TRIGGER INPUT and OUTPUT.

Max Trigger Rate: 1000/s.

6220 – 2182 MEASUREMENT FUNCTIONS

DUT RESISTANCE: Up to 1GΩ (1 nSiemen).

DELTA MODE RESISTANCE MEASUREMENTS and DIFFERENTIAL CONDUCTANCE: Controls Keithley Model 2182A Nanovoltmeter at up to 24Hz reversal rate (2182 at up to 12Hz).

Source Notes

- 1 Settling times are specified into a resistive load, with a maximum resistance equal to $2\text{V} / I_{\text{fullscale}}$ of range. See manual for other load conditions.
- 2 Settling times to 0.1% of final value are typically $<2\text{x}$ of 1% settling times.
- 3 Noise current into $<100\Omega$.
- 4 RMS Noise 10Hz-20MHz (2nA – 20mA Range) Less than 1mVrms, 5mVp-p (into 50Ω load).
- 5 Typical values are non-warranted, apply at 23°C, represent the 50th percentile, and are provided solely as useful information.

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GENERAL SPECIFICATIONS

COMMON MODE VOLTAGE: 250V rms, DC to 60Hz.

COMMON MODE ISOLATION: $>10^9\Omega$, $<2\text{nF}$.

SOURCE OUTPUT MODES: Fixed DC level, Memory List.

REMOTE INTERFACE:

IEEE-488 and RS-232C.

SCPI (Standard Commands for Programmable Instruments)

DDC (command language compatible with Keithley Model 220)

PASSWORD PROTECTION: 11 characters.

DIGITAL INTERFACE:

Handler Interface: Start of test, end of test, 3 category bits, +5V@300mA supply.

Digital I/O: 1 trigger input, 4 TTL/Relay Drive outputs (33V@500mA, diode clamped).

OUTPUT CONNECTIONS:

- Teflon insulated 3-lug triax connector for output.
- Banana Safety Jack for GUARD, OUTPUT LO
- Screw Terminal for CHASSIS
- DB-9 connector for EXTERNAL TRIGGER INPUT, OUTPUT, and DIGITAL I/O
- Two position Screw Terminal for INTERLOCK

INTERLOCK: Maximum 10Ω external circuit impedance.

POWER SUPPLY: 100V to 240V rms, 50-60Hz.

POWER CONSUMPTION: 120VA.

WARRANTY: 1 Year.

ENVIRONMENT:

For Indoor Use Only: Maximum 2000m above Sea Level.

Operating: 0° - 50°C , 70%R.H. up to 35°C . Derate 3% R.H./ $^{\circ}\text{C}$, 35° - 50°C .

Storage: -25°C to 65°C , guaranteed by design.

EMC: Conforms to European Union Directive 89/336/EEC, EN 61326-1.

SAFETY: Conforms to European Union Directive 73/23/EEC, EN61010-1.

VIBRATION: MIL-PRF-28800F Class 3, Random.

WARMUP: 1 hour to rated accuracies.

Passive Cooling: No fan.

DIMENSIONS:

Rack Mounting: 89mm high x 213mm wide x 370mm deep (3.5 in. x 8.375 in. x 14.563 in.).

Bench configuration (with handle and feet): 104mm high x 238mm wide x 370mm deep (4.125 in. x 9.375 in. x 14.563 in.).

SHIPPING WEIGHT: 4.75kg (10 lbs).

ACCESSORIES SUPPLIED: Model 237-ALG-2 Triaxial Test Lead (6.6ft), Trigger Link cable, RS-232 (Null Modem) cable, Interlock terminal block, User's Manual, CD Manual, LabVIEW Drivers.