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Find the *Keithley 427* at our website: *Click HERE*

Current Amplifier

- **High speed—as fast as 15μs**
- **Current suppression**
- **Low noise**



The Keithley Model 427 amplifier provides high speed combined with low noise and selectable gain, current suppression, and rise time. It is the fastest Keithley picoammeter, with rise times as fast as 15μs at 10^8V/A gain. Rise times as fast as 1.5ms at the maximum gain of 10^{11}V/A may be selected.

By selecting slower rise times, wider dynamic range and lower noise are obtained: at 10^{11}V/A gain, noise of 3×10^{-15}A rms is achieved, with a dynamic range of 13,000:1.

The built-in current suppression with 10-turn resolution permits compensation of large steady-state currents to observe small changes on a more sensitive range. Eight decade ranges of current suppression are provided, from 10^{-10} to 10^{-3}A.

Transient overloads up to 1000V are absorbed without damage, and to prevent unrecognized distortion, the 427 gives visible indication of all overloads.

These features, plus the 427's combination of speed, dynamic range, and sensitivity, make it extremely useful with scanning electron microscopes, sensitive spectrum analyzers, mass spectrometers, and photomultiplier systems. It is also widely used for measurement of photo effects in biological systems and membrane transport studies, as well as measurement of beam currents and semiconductor properties.

RANGE: 10^4 to 10^{11}V/A in eight decade ranges. (10^{-13}A resolution to 10^{-3}A full output.)

OUTPUT: ±10V at up to 3mA.

OUTPUT RESISTANCE: <10Ω dc to 30kHz.

OUTPUT ACCURACY: ±2% reading up to 10^9V/A range, ±4% of reading on the 10^{10} and 10^{11}V/A ranges exclusive of noise, drift, and current offset.

RISE TIME (10% to 90%): Adjustable in 1× and 3.3× steps from "Fast Rise Time" listed below to 330ms.

NOISE vs. RISE TIME*:

	FAST RISE TIME			WIDE DYNAMIC RANGE		
GAIN V/A	RISE TIME (10%-90%)	DYNAMIC RANGE	NOISE (A RMS)	DYNAMIC RANGE	NOISE (A RMS)	RISE TIME (10%-90%)
10^{11}	1.5 ms	100	4×10^{-13}	1.3×10^4	3×10^{-15}	330 ms
10^{10}	400 μs	200	2×10^{-12}	2×10^4	2×10^{-14}	100 ms
10^9	200 μs	400	1×10^{-11}	2×10^4	2×10^{-13}	10 ms
10^8	60 μs	800	5×10^{-11}	2×10^4	2×10^{-12}	1 ms
10^7	40 μs	2000	2×10^{-10}	2×10^4	2×10^{-11}	100 μs
10^6-10^4	15 μs	2000	—	2×10^4	—	100 μs

*With ≤100pF input shunt capacitance. Noise and/or rise time increase as input shunt capacitance increases (1000pF maximum).

OFFSET CURRENT: $<10^{-12}$A at 25°C and up to 70% relative humidity.

STABILITY: Current offset doubles per 10°C above 25°C. Voltage drift is <0.005%/°C and <0.005% per day of full output after 1-hour warmup.

CURRENT SUPPRESSION: 10^{-10}A to 10^{-3}A in eight decade ranges with 0.1% resolution (10-turn potentiometer). Stability is ±0.2% of suppressed value per °C, ±0.2% per day.

INPUT VOLTAGE DROP: <400μV for full-scale output on 10^6 to 10^{11}V/A ranges when properly zeroed.

EFFECTIVE INPUT RESISTANCE: <15Ω on 10^4 and 10^5 V/A ranges, increasing to <4MΩ on 10^{11}V/A range.

MAXIMUM INPUT OVERLOAD: Transient: 1000V on any range for up to 3 seconds using a Keithley (or other 10mA-limited) high voltage supply. **Continuous:** 500V on 10^{11} to 10^7V/A ranges, decreasing to 200 on 10^6, 70 on 10^5, and 20V on 10^4V/A ranges.

OVERLOAD INDICATION: Lamp indicates pre-filter or post-filter overload.

DYNAMIC RESERVE: 10 (20dB).

CONNECTORS: Input (front): BNC. Output (front and rear): BNC.

POWER: 90-125V or 180-250V (switch selected), 50-60Hz, 5W.

DIMENSIONS, WEIGHT: 100mm high × 220mm wide × 315mm deep (4 in. × 8¾ in. × 12½ in.). Net weight 3kg (7 lbs.).

ACCESSORIES AVAILABLE: See Selector Guide on page 49.

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