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Find the *Keithley 237* at our website: *Click HERE*

237

High Voltage Source-Measure Unit

- **Four instruments in one (voltage source, voltage measure, current source, current measure)**
- **10fA, 10µV measurement sensitivity**
- **1100V source and measure**
- **Standard and custom sweep capability including pulse**
- **1000 source/measurements per second**
- **Four quadrant source operation**
- **Internal 1000-reading memory**

Ordering Information

237 **High Voltage Source-Measure Unit**

Accessories Supplied

7078-TRX-10 3-Slot Low Noise Triax Cables, 3m (10 ft) (2)

236-ILC-3 Interlock Cable, 3m (10 ft)

237-ALG-2 Low Noise Triax Cable, 2m (6.6 ft)

ACCESSORIES AVAILABLE

237-TRX-NG	3-Slot Triax to 3-Lug Female Triax Connector
1938	Fixed Rack Mount Kit
1939	Slide Rack Mount Kit
7010	GPIB Shielded Extender
7007-1	Shielded GPIB Cable, 1m (3.3 ft.)
7007-2	Shielded GPIB Cable, 2m (6.6 ft.)
7078-TRX-3	3-Slot, Low Noise Triax Cable, 0.9m (3 ft)
7078-TRX-20	3-Slot, Low Noise Triax Cable, 6m (20 ft)
KPCI-488LPA	IEEE-488 Interface/Controller for the PCI Bus
KUSB-488B	USB-to-GPIB Interface Adapter for USB Port (requires 7010 Adapter)

SERVICES AVAILABLE

237-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
C/237-3Y-DATA	3 (Z540-1 compliant) calibrations within 3 years of purchase*

*Not available in all countries



The Model 237 Source-Measure Unit (SMU) is a fully programmable instrument, capable of sourcing and measuring voltage or current simultaneously. This system is really four instruments in one: voltage source, current source, voltage measure, and current measure.

Applications

This instrument addresses a wide variety of applications, including the characterization of semiconductor devices and the measurement of leakage currents or insulation resistance. It can be used standalone on a bench, in a test rack with PC control, or integrated with our Model 4200-SCS for high voltage semiconductor characterization.

Wide Dynamic Range

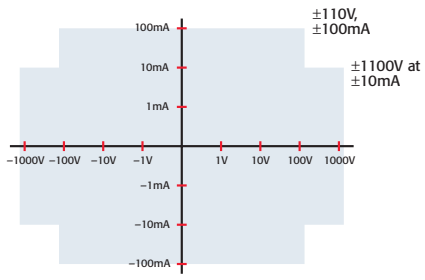
The Model 237 will source voltage from 100µV to 1100V, and current from 100fA to 100mA. It can also measure voltage from 10µV to 110V and current from 10fA to 100mA. In the higher voltage range, current source and measure is 10mA maximum.

Selectable Sweeps of Voltage and Current

The Model 237 can be programmed to perform source-measurements as a function of a stepped voltage or current. Voltage and current can be swept linearly, logarithmically, or pulsed. The START, STOP, STEP method of setting sweep parameters allows operators to become proficient at using the instrument very quickly. Sweep parameters may be appended (APPEND key) to obtain more complex test sequences.

Creating custom sweeps of voltage or current is facilitated by the use of three waveform operations: CREATE, APPEND, and MODIFY. These allow the user to select waveform parameters, combine multiple waveforms, and select and change any points in a waveform previously created or appended.

Model 237 Source Capability



Fully-Guarded Four-Terminal Measurements

The Model 237 outputs and inputs are fully guarded, and the units are configured to allow four-terminal measurements. Two-terminal measurements are also available for more standard test procedures. These outputs can be floated up to ±200V from ground.

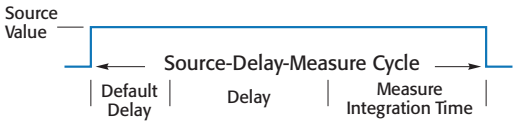
Source and measure voltage and current simultaneously

SOURCE AND MEASURE

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High Voltage Source-Measure Unit

SOURCE-DELAY-MEASURE CYCLE:



Default Delay: Fixed delay for instrument settling.

User Delay: Additional delay for device under test or system capacitance.

MEASURE:

Integration Time

Fast	416	µs	4-digit resolution
Medium	4	ms	5-digit resolution
Line Cycle	16.67	ms (60 Hz)	5-digit resolution
	20.00	ms (50 Hz)	

EXECUTION SPEED

MINIMUM SOURCE-DELAY-MEASURE CYCLE TIME: 1ms.

RESPONSE TO IEEE-488 COMMAND (as a source): 25ms.

MEASUREMENT RATE: 1ms per point into internal buffer.

CONTINUOUS MEASUREMENT SPEED (source DC value over IEEE-488 bus): 110 readings per second.

TRIGGER LATENCY TIME: <2ms.

GENERAL

LOAD CAPACITANCE: Stable into 20,000pF typical.

REMOTE SENSE: Corrects for up to 2V drop in each output lead. Maximum 1kΩ per sense lead for rated accuracy. Residual output resistance (as a voltage source) is 0.5Ω.

GUARD: Output Resistance: ≤12kΩ.

Maximum Output Current: ±2mA.

Offset Relative to Output HI: ±2mV max.

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

MAXIMUM COMMON MODE VOLTAGE: 200V.

CONNECTORS: Outputs: 3-lug triax.

Trigger Input/Output: BNC.

Interlock: 3-pin miniature DIN.

TEMPERATURE COEFFICIENT (0°–18°C and 28°–50°C): ±(0.1 × applicable accuracy specification)/°C.

ENVIRONMENT:

Operating: 0°–50°C, 70% relative humidity up to 35°C. Linearly derate 3% R.H./°C, 35°–50°C.

Storage: –25° to 65°C.

EMC: Conforms to European Union Directive 89/336/EEC.

SAFETY: Conforms to European Union Directive 73/23/EEC (meets EN61010-1/IEC 1010).

WARM-UP: One hour to rated accuracy.

COOLING: Internal fan forced air cooling.

POWER: 105–125 or 210–250V AC (external switch selectable), 90–110V and 180–220V version available. 100VA max.

DIMENSIONS, WEIGHT: 89mm high × 435mm wide × 448mm deep (3½ in × 17⅛ in × 17⅜ in). Net weight 9kg (19.75 lb).

VOLTAGE

Source V			Measure V		
Range (Max. Value)	Step Size	Accuracy (1 Year, 18°–28°C)	Resolution 4-Digit	Resolution 5-Digit	Accuracy (1 Year, 18°–28°C)
±1.1000 V	100 µV	±(0.033% + 650 µV)	100 µV	10 µV	±(0.028% + 300 µV)
±11.000 V	1 mV	±(0.033% + 2.4 mV)	1 mV	100 µV	±(0.025% + 1 mV)
±110.00 V	10 mV	±(0.033% + 24 mV)	10 mV	1 mV	±(0.025% + 10 mV)
±1100.0 V	100 mV	±(0.04 % + 240 mV)	100 mV	10 mV	±(0.035% + 100 mV)

COMPLIANCE: Bipolar current limit set with single value.

Maximum: ±100mA (except ±10mA on 1100V range).

Minimum: ±1% of range, except 0.5% of 1.1V range.

Accuracy, Step Size: Same as current source.

NOISE (p-p):

Range	0.1–10Hz	DC–20MHz
110 V – 1100 V	< 3 ppm of range	40 mV
11 V	< 3 ppm of range	15 mV
1.1 V	<10 ppm of range	15 mV

WIDEBAND NOISE: 0.1 to 20MHz, 8mV p-p typical.

OVERSHOOT: <0.01% (110V step, 10mA range).

SETTLING TIME: <500µs to 0.01% (110V step, 10mA range).

NMRR: >60dB at 50 or 60Hz (LINE CYCLE integration time selected).

CMRR: >120dB at DC, 50 or 60Hz (LINE CYCLE integration time selected).

INPUT IMPEDANCE (as a voltmeter): >10^{14}Ω paralleled by <20pF.

CURRENT

Source I			Measure I		
Range (Max. Value)	Step Size	Accuracy (1 Year, 18°–28°C)	Resolution 4-Digit	Resolution 5-Digit	Accuracy (1 Year, 18°–28°C)
±1.0000 nA	100 fA	±(0.3 % + 450 fA)	100 fA	10 fA	±(0.3 % + 100 fA)[1]
±10.000 nA	1 pA	±(0.3 % + 2 pA)	1 pA	100 fA	±(0.3 % + 1 pA)
±100.00 nA	10 pA	±(0.21% + 20 pA)	10 pA	1 pA	±(0.21 % + 6 pA)
±1.0000 µA	100 pA	±(0.05% + 200 pA)	100 pA	10 pA	±(0.04 % + 60 pA)
±10.000 µA	1 nA	±(0.05% + 2 nA)	1 nA	100 pA	±(0.035 % + 700 pA)
±100.00 µA	10 nA	±(0.05% + 20 nA)	10 nA	1 nA	±(0.035 % + 6 nA)
±1.0000 mA	100 nA	±(0.05% + 200 nA)	100 nA	10 nA	±(0.035 % + 60 nA)
±10.000 mA	1 µA	±(0.05% + 2 µA)	1 µA	100 nA	±(0.038 % + 600 nA)
±100.00 mA	10 µA	±(0.1 % + 20 µA)	10 µA	1 µA	±(0.1 % + 6 µA)

COMPLIANCE: Bipolar voltage limit set with single value.

Maximum: ±1100V (except on 100mA range).

Minimum: ±0.1% of selected current range.

Accuracy, Step Size: Same as voltage source.

NOISE (p-p of range): 0.1–10Hz: <3ppm (<20ppm on 1nA and 10nA ranges).

OVERSHOOT: <0.01% typical (10mA step, R_L = 10kΩ).

SETTLING TIME: <500µs to 0.01% (10mA step, R_L = 10kΩ).

OUTPUT R, C: >10^{14}Ω paralleled by <20pF (on 1nA range).

NOTES

1. Offset specification applies for 23°C ±1°C with suppression. Temperature coefficient 50fA/°C.

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