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Find the *Keithley 213* at our website: *Click HERE*

# 230

# Programmable Voltage Source



- ±2mA, ±20mA, ±100mA programmable I-LIMIT
- Remote sensing
- 100-point source memory
- Programmable Digital I/O

## Ordering Information

**230** Programmable Voltage Source

**Extended warranty, service, and calibration contracts are available.**

The Model 230 Voltage Source is a programmable solution for precision sourcing of low-level DC voltage.

| RANGE | MAXIMUM OUTPUT | ACCURACY (1 Year) 18°–28°C | STEP SIZE | TEMPERATURE COEFFICIENT/°C 0°–18°C & 28°–50°C |
|---|---|---|---|---|
| 100 V | ±101.00 V | 0.05 % + 50mV | 50 mV | 0.005% + 0.5 mV |
| 10 V | ±19.995 V | 0.05 % + 10mV | 5 mV | 0.005% + 100 µV |
| 1 V | ±1.9995 V | 0.05 % + 1mV | 500 µV | 0.005% + 25 µV |
| 100 mV | ±199.9 mV | 0.075% + 300µV | 50 µV | 0.01 % + 25 µV |

**SELECTABLE CURRENT LIMIT:** ±100mA, ±20mA, ±2mA (–0, +20%).

**NOISE:** (150µV + 50ppm range) p-p, 0.1Hz to 300Hz; 5mV p-p, 0.1Hz to 300kHz. Specification applies for local sensing only, typical.

**RESPONSE TIME, TRANSIENT RECOVERY TIME:** <3ms.

**OUTPUT IMPEDANCE:** 1mΩ.

**EXTERNAL TRIGGER:** TTL-compatible.

**OUTPUT CONNECTIONS:** Five-way binding posts for OUTPUT, OUTPUT SENSE, COMMON, COMMON SENSE, and CHASSIS GROUND; BNC for EXTERNAL TRIGGER INPUT and OUTPUT.

### ACCESSORIES AVAILABLE

| | |
|---|---|
| 7008-* | IEEE-488 Digital Cable |
| 1019A-* | Single or Dual Fixed Rack Kit |
| 4288-4 | Rack Mount Kit |

### GENERAL

**SYSTEMS COMPATIBILITY:** IEEE-488-1978.

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

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

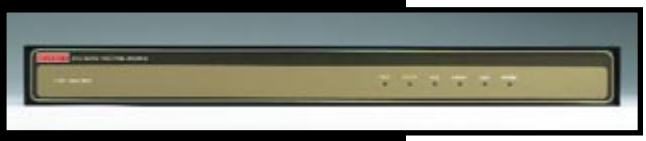
**SAFETY:** Conforms to European Union Directive 73/23/EEC (meets EN61010-1/IEC 1010).

**POWER:** 105–125 or 210–250VAC, 50 or 60Hz (80VA). 90–105 or 180–210V AC operation available.

**DIMENSIONS, WEIGHT:** 127mm high × 216mm wide × 359mm deep (5 in × 8½ in × 14⅛ in). Net weight 4.4kg (9 lb 11 oz).

# 213

# Quad Voltage Source



- GPIB controlled
- Autoranging or programmable ±1V, ±5V, or ±10V ranges
- 10mA output current per channel
- Fast waveform buffers

## Ordering Information

**213** Quad Voltage Source

**Extended warranty, service, and calibration contracts are available.**

The Model 213 Quad Voltage Source (QVS) is a convenient and cost-effective instrument for sourcing voltage. Each of four fully independent and stackable channels provides up to ±10V of bias at 10mA.

### Digital I/O with 100mA Drive Current

The Model 213 QVS also provides 8 bits each of TTL compatible digital input and output on a DB25 female connector for driving relays and similar applications.

| VOLTAGE RANGE | MAXIMUM OUTPUT | STEP SIZE | ACCURACY 18°- 28°C $I_{OUT}$ = 1mA | NOISE (p-p, typical) 0.1–10Hz |
|---|---|---|---|---|
| 1 V | ±1.02375 V | 250 µV | ±(0.05% + 1 mV) | <5ppm of range |
| 5 V | ±5.11875 V | 1.25 mV | ±(0.05% + 3 mV) | <3ppm of range |
| 10 V | ±10.2375 V | 2.5 mV | ±(0.05% + 10 mV) | <3ppm of range |

**TEMPERATURE COEFFICIENT OF ACCURACY (0°-18°C & 28°-50°C):** ±(0.002% of setting + 100µV)/°C.

**INTERNAL BUFFER:** An 8192-location internal buffer is used to store values for waveform generation as fast as 1ms per point.

**DIGITAL I/O:** 8 TTL compatible level sensitive inputs. 8 outputs, internally selectable TTL compatible or open collector with 100mA drive and capable of withstanding 50V (for driving relays or other devices from an external voltage supply).

**RANGING:** Autorange or select one of three fixed ranges.

**OUTPUT RESISTANCE:** <500mΩ, typical.

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

### ACCESSORIES AVAILABLE

| | |
|---|---|
| 213-CON | Analog Output Connector |
| C126-1 | DB25 Male to DB25 Female with 1.5m (5 ft) Cable |
| CS-400 | DB25 Male Solder Cup |

### GENERAL

**CHANNEL-TO-CHANNEL, CHANNEL TO DIGITAL LOW ISOLATION:** 500V or 105V-Hz, whichever is less.

**POWER:** 90–125 or 180–250V AC (internally switch selectable); 50–60Hz, 70VA max.

**DIMENSIONS, WEIGHT:** 425mm wide × 45mm high × 309mm deep (16¾ in × 1¾ in × 12 in). Net weight 3.52kg (7.75 lb).



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