



## Model 511 DC Source/Calibrator

- Absolute Accuracy:  $\pm 10$ ppm
- Voltage Range:  $\pm 100$ nVdc to  $\pm 10$ Vdc
- Resolution: 1ppm of Range
- Wideband Noise:  $< 5\mu$ Vrms
- 3 Voltage Ranges
- Max. Current: 100mA
- Impedance:  $10\mu$  ohm all ranges
- Floating Output
- Certified to N.I.S.T.

### DESCRIPTION

Continuing with Electronic Development's (EDC) tradition, the NEW Krohn-Hite Model 511 Precision DC Source/Calibrator is a secondary standard that is highly stable and repeatable from  $\pm 100$ nVdc to  $\pm 10$ Vdc, providing N.I.S.T. traceable voltages for use in production, calibration labs, QA and QC departments, design labs, or any place where an accurate voltage is needed.

Using Krohn-Hite's state-of-the-art reference, the 511 provides extremely accurate ( $\pm 10$ ppm) and stable ( $\pm 2$ ppm for 24 hours) voltages over 3 ranges, allowing the output to be set from  $\pm 100$ nVdc to  $\pm 11.11110$ Vdc with a resolution of 1ppm of range.

The Model 511 is an extremely quiet source with  $< 5\mu$ V of noise measured from 0.1Hz to 100kHz. Maximum load current is 100mA on all ranges.

### RANGES

The 511 also provides 3 voltage ranges,  $\pm 100$ mV,  $\pm 1.0$ V and  $\pm 10$ V allowing the user to set the output from  $\pm 100$ nVdc to  $\pm 11.11110$ Vdc. Resolutions are 100nV,  $1\mu$ V and  $10\mu$ V respectively.

### APPLICATIONS

The Model 511 can be used in many applications including the calibration of precision A/D converters, strip chart recorders and calibration of Kaye Instruments Data Logging Systems.

### SPECIFICATIONS

#### OUTPUT

Specifications apply at  $23^\circ\text{C} \pm 1^\circ\text{C}$ ,  $< 70\%$  relative humidity.

| Range (dc)   | Full Scale (dc)   | Resolution (dc) | Absolute Accuracy $\pm$ (ppm of setting + $\mu$ V) |
|--|-------------------|-----------------|--|
|  |                   |                 | 1Year  |
| 100mV  | $\pm 111.1110$ mV | 100nV           | 10 + 2   |
| 1.0V   | $\pm 1.111110$ V  | $1\mu$ V        | 10 + 6   |
| 10V  | $\pm 11.11110$ V  | $10\mu$ V       | 10 + 42  |
| Above specifications include stability, line regulation and load regulation. |                   |                 |  |

#### Noise and Ripple:

| Range  | 0.1Hz-10Hz       | 10Hz-100kHz  | Max. Load | Zo           |
|--|------------------|--------------|-----------|--------------|
| 100mV  | $2\mu$ Vp-p max. | $5\mu$ Vrms  | 100mA     | $10\mu$ ohms |
| 1V   | $2\mu$ Vp-p max. | $5\mu$ Vrms  |           |              |
| 10V  | $2\mu$ Vp-p max. | $10\mu$ Vrms |           |              |
| Above specifications include stability, line regulation and load regulation. |                  |              |           |              |

**Temperature Coefficient,  $\pm$ (ppm of setting +  $\mu$ V)/ $^{\circ}$ C:**

|                                    |       |
|------------------------------------|-------|
| 0 $^{\circ}$ C to 10 $^{\circ}$ C  | 3 + 2 |
| 10 $^{\circ}$ C to 40 $^{\circ}$ C | 2 + 1 |

**Stability:**

24hrs,  $\pm$ (2ppm of setting + 1 $\mu$ V).

1 year,  $\pm$ (10ppm of setting + 2 $\mu$ V).

**Settling Time:** 100ms max., typically 60ms.

**Load Regulation (all ranges):**  $\pm$ 1 $\mu$ V for a change from no load to full load.

**Line Regulation (all ranges):**  $\pm$ (1ppm + 1 $\mu$ V of range) for a  $\pm$ 10% change from normal line voltage.

**GENERAL**

**Calibration Interval:** 1 year for  $\pm$ 10ppm accuracy.

**Warm-Up Time:** 1 hour to rated accuracy.

**Isolation:** Floating 500V from chassis.

**Protection:** Will drive a short-circuit indefinitely.

**Temperature:**

|                    |   |
|--------------------|---|
| <b>Calibration</b> | 23 $^{\circ}$ C $\pm$ 1 $^{\circ}$ C.   |
| <b>Operating</b>   | 0 $^{\circ}$ C to 50 $^{\circ}$ C.<br>Accuracy is de-rated above 40 $^{\circ}$ C due to loss of oven control. |
| <b>Storage</b>     | -30 $^{\circ}$ C to 70 $^{\circ}$ C.  |

**Power Requirements:** 105-125 or 210-250 volts ac, single phase, 50Hz-400Hz, 20 watts.

**Dimensions:** 3.5" (9cm) high, 14" (36cm) wide, 12.5" (32.1cm) deep.

**Weight:** 12 lbs (5.4kg) net; 14 lbs (6.3kg) shipping.

**Controls:** Six decade rotary switches with indicator knobs from 0 to 10 and 10% over-range; 3 position range and polarity rotary switches; push-button power on, sense and ground switches.

**Indicators:** LEDs indicate voltage range, power on and overload.

**Terminals:** Output terminals are safety, low thermal, gold plated type, mounted on the front panel. Terminal sets are configured for remote sensing of the output as follows:

High Output and High Sense

Low Output and Low Sense

Case Ground

Output terminals conform to European Standard Specifications.

**SAFETY**

The Model 523 is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control and laboratory use: IEC61010-1, EN61010-1.

**ELECTROMAGNETIC COMPATIBILITY**

Emissions and Immunity: EN61326-1, EMC, 61000-4-2; ESD, 61000-4-3; Radiated Immunity, 61000-4-4; EFT, 61000-4-5; Surge, 61000-4-6; Conducted Immunity, 61000-4-8; Magnetic Immunity, 61000-4-11; Voltage Interruption EN61010-1. CE Compliant for Class B Equipment.

**OPTIONS**

**Option 003:** Provides both front and rear panel terminals for instrument outputs. Only one output set of terminals may be used at one time.

**Option 004:** Provide CE regulation safety terminals.

**Rack Mount Kit:** Part number RK-314 permits installation of the Model 511 into a 19" rack spacing.

**Extended 1 Year Warranty:** Part No. EX511

**OPTIONAL ACCESSORIES**

**CAB-005:** Cable, Two Conductor Shielded Balance Line

**CAB-018:** Cable, Multi-stacking Double Banana plug

**CAB-023:** Cable Set, Low Thermal EMF Retractable Banana

**CAB-024:** Cable Set, Low Thermal EMF Spade Lug

Specifications are subject to change without notice.