



## 1017 Multifunction DC V/I/R Calibrator

*Time Electronics*

Calibration, Test & Measurement

- DC Volts 10nV to 100V
- DC Current 100nA to 100mA
- Resistance 10mΩ to 10kΩ
- 0.005% (50ppm) accuracy
- 1 ppm setting resolution
- Noise < 2ppm (0.1 to 1Hz)
- Stability <5ppm/day <25ppm/yr



The **1017** is a high performance portable DC calibrator for use in the field or laboratory. It is constructed in a durable, compact plastic case with a tilt stand/carry handle.

Five DC voltage ranges from 10mV to 100V full scale are available, each with a 6-digit (1ppm) resolution. The DC current range is 100mA full scale with a 100nA (1ppm) resolution. Resistance from 0.01Ω to 10kΩ is available 0.01Ω steps.

The voltage, current and resistance ranges make it suitable for calibrating a wide range of transducers, from thermocouples, 4-20mA and 0-10V transmitters, to Platinum Resistance Thermometers, all in the same instrument.

### **Power**

Mains or rechargeable battery. Battery operation enables good performance where earth loop and noise pick-up occurs.

### **Stability v Temperature and Time**

Outstanding performance is due to the use of special computer selected reference diodes and the latest in resistor technology. The special low-thermal emf terminals reduce errors when working with microvolt signals.

### **Digital Deviation Control**

Allows the output to be increased/decreased in % terms from 0 to +/-0.999%. This provides a direct read-out of error and simplifies the recording results for calibration certificates. It enables the user to immediately see if the unit under test is within specification.

## 1017 Technical Specifications

<b>Voltage Ranges/Accuracy:</b>	0 - 9.99999mV in 10nV steps, $\pm 0.02\%$ of setting $\pm 0.005\%$ of range 0 - 99.9999mV in 100nV steps, $\pm 0.01\%$ of setting $\pm 0.004\%$ of range 0 - 999.999mV in 1 $\mu$ V steps, $\pm 0.005\%$ of setting $\pm 0.002\%$ of range 0 - 9.99999V in 10 $\mu$ V steps, $\pm 0.005\%$ of setting $\pm 0.002\%$ of range 0 - 99.9999V in 100 $\mu$ V steps, $\pm 0.01\%$ of setting $\pm 0.004\%$ of range  <i>The above accuracies are independent of thermal emfs which can be 2<math>\mu</math>V or more depending on the type of leads and connections used.</i>
<b>Output resistance:</b>	10mV & 100mV: 10 $\Omega$ . 1V & 10V: <150m $\Omega$ . 100V: <1 $\Omega$
<b>Drive current max:</b>	10&100mV: as 10 $\Omega$ o/p resistance. 1V&10V: 150mA; 100V: 10mA.
<b>Current Range/Accuracy:</b>	0 - 99.9999mA in 0.1 $\mu$ A steps, $\pm 0.02\%$ of setting + $\pm 0.004\%$ of range. Drive voltage max: 10V
<b>Resistance Range/Accuracy:</b>	0 - 9.99999k $\Omega$ in 0.01 $\Omega$ steps, $\pm 0.05\%$ of setting +/- 0.003% of range. Power rating: 0.25W per resistor End resistance: less than 200m $\Omega$
<b>Deviation Control:</b>	0% to 0.999% in 0.001% steps. Deviation accuracy: V&I output, 0.5%.
<b>Temperature Coefficient:</b>	<5 ppm per $^{\circ}$ C
<b>Long Term Stability:</b>	<5ppm/day, <15ppm/90day, <25ppm/year
<b>Short Term Stability – Noise:</b>	10mV range: <0.2 $\mu$ V/sec, <0.3 $\mu$ V/10sec, <0.4 $\mu$ V/min 100mV range: <0.2 $\mu$ V/sec, <0.4 $\mu$ V/10sec, <0.6 $\mu$ V/min 1V range: <0.2 $\mu$ V/sec, <0.5 $\mu$ V/10sec, <1.5 $\mu$ V/min 10V range: <1.0 $\mu$ V/sec, <2.0 $\mu$ V/10sec, < 8.0 $\mu$ V/min 100V range: <40 $\mu$ V/sec, <100 $\mu$ V/10sec, <500 $\mu$ V/min 100mA range: <0.2 $\mu$ A/sec, <0.4 $\mu$ A/10sec, <1.0 $\mu$ A/min
<b>Warm-up and Settling time:</b>	Warm-up: <10 mins to full accuracy. Settling: < 0.5 secs, 100V range 5 secs.
<b>Output Connections:</b>	The output is via low thermal emf terminals (0.2 $\mu$ V/ $^{\circ}$ C). A mains earth terminal is provided for screening purposes. Output polarity can be selected by a switch on the front panel.
<b>Power Supply:</b>	The 1017 can be powered continuously from a 230V 50/60 Hz (110V to order) mains supply, or from the internal rechargeable NiCad battery pack. A front panel indicator shows the state of charge at all times.
<b>Operating temperature:</b>	0 to 50 $^{\circ}$ C (32 to 120 $^{\circ}$ F). 15 to 25 $^{\circ}$ C for optimum performance.
<b>Operating Humidity:</b>	10 to 90% non-condensing 25 $^{\circ}$ C (77 $^{\circ}$ F)

### General Specification

<b>Dimensions:</b>	290 x 250 x 110mm
<b>Weight:</b>	2.4 kg (5.4 lb)
<b>Optional Extras:</b>	Calibration Certificate traceable to NPL UKAS Calibration Certificate

### Ordering Information

Code	Description
1017	Multifunction DC V/I/R Calibrator
9152	Factory (NPL Traceable) Calibration Certificate
9109	UKAS Calibration Certificate (ISO 17025)

Due to continuous development Time Electronics reserves the right to change specifications without prior notice.

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