



Time Electronics

1017 Voltage/Current/Resistance Calibrator



- **DC Voltage 10nV to 100V**
- **DC Current 100nA to 100mA**
- **Resistance 10mΩ to 10kΩ**
- **Accuracy 0.005% (50ppm)**
- **1ppm setting resolution**
- **Noise <2ppm (0.1 to 1Hz)**
- **Stability <5ppm/day, <25ppm/yr**
- **Deviation control – voltage and current**
- **Battery or mains operation**

DESCRIPTION

A high performance portable multifunction calibrator with voltage, current, and resistance ranges. The 1017 combines precision with simple operation, making it suitable for use in the workshop or field. Constructed in a compact and durable plastic case with a tilt stand/carry handle it takes up minimal bench space and is easily transportable.

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 1017 can be powered from mains supply or by the internal rechargeable battery pack. Battery operation enables good performance where earth loop and noise pick-up occurs. When the calibrator is plugged into the mains supply the internal batteries will automatically start to recharge. If unplugged from the mains during operation the internal batteries will continue to power the instrument. Full charge allows 12 hours typical use. The battery condition monitored by a meter on the front panel.

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 and 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.

APPLICATIONS

The 1017 is suitable for calibrating and simulating a wide range of instruments including thermocouples, transducers, 4-20mA and 0-10V transmitters, and platinum resistance thermometers.

1017 Specifications

TECHNICAL SPECIFICATION

Voltage Ranges / Accuracy	0 to 9.99999mV in 10nV steps / $\pm 0.02\%$ of setting $\pm 0.005\%$ of range 0 to 99.9999mV in 100nV steps / $\pm 0.01\%$ of setting $\pm 0.004\%$ of range 0 to 999.999mV in 1 μ V steps / $\pm 0.005\%$ of setting $\pm 0.002\%$ of range 0 to 9.99999V in 10 μ V steps / $\pm 0.005\%$ of setting $\pm 0.002\%$ of range 0 to 99.9999V in 100 μ V steps / $\pm 0.01\%$ of setting $\pm 0.004\%$ of range
	<i>The above accuracies are independent of thermal emfs which can be 2μV or more depending on the type of leads and connections used.</i>
Output Resistance	10mV and 100mV: 10 Ω . 1V and 10V: <150m Ω . 100V: <1 Ω .
Drive Current Max	10 and 100mV: as 10 Ω output resistance. 1V and 10V: 150mA; 100V: 10mA.
Current Range / Accuracy	0 to 99.9999mA in 0.1 μ A steps / $\pm 0.02\%$ of setting $\pm 0.004\%$ of range
Drive Voltage Max	10V
Resistance Range / Accuracy	0 to 9.99999k Ω in 0.01 Ω steps / $\pm 0.05\%$ of setting $\pm 0.003\%$ of range
Power Rating	0.25W per resistor
Residual resistance	Less than 200m Ω
Deviation Control (V&I)	0% to 0.999% in 0.001% steps. Deviation accuracy: V and I output, 0.5%.
Temperature Coefficient	<5ppm per $^{\circ}$ C
Long Term Stability	<5ppm/day, <15ppm/90day, <25ppm/year
Short Term Stability – Noise	10mV range: <0.2 μ V/sec, <0.3 μ V/10sec, <0.4 μ V/min 100mV range: <0.2 μ V/sec, <0.4 μ V/10sec, <0.6 μ V/min 1V range: <0.2 μ V/sec, <0.5 μ V/10sec, <1.5 μ V/min 10V range: <1.0 μ V/sec, <2.0 μ V/10sec, <8.0 μ V/min 100V range: <40 μ V/sec, <100 μ V/10sec, <500 μ V/min 100mA range: <0.2 μ A/sec, <0.4 μ A/10sec, <1.0 μ A/min
Warm-up and Settling Time	Warm-up: <10 mins to full accuracy. Settling: < 0.5 secs, 100V range 5 secs.
Output Connections	The output is via low thermal emf terminals (0.2 μ V/ $^{\circ}$ C). A mains earth terminal is provided for screening purposes. Output polarity can be selected by a switch on the front panel.
Power Supply	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.
Battery Level Indicator	A front panel display provides a continuous indication of the battery state.

GENERAL SPECIFICATION

Operating Temperature	0 to 50 $^{\circ}$ C (32 to 120 $^{\circ}$ F). 15 to 25 $^{\circ}$ C for optimum performance.
Operating Humidity	10 to 90% non-condensing 25 $^{\circ}$ C (77 $^{\circ}$ F)
Dimensions	W250x H119 x D314mm
Weight	2.4kg
Optional Extras	Calibration Certificates – traceable to NPL and UKAS
Country of Origin	UK

ORDERING INFORMATION

1017	Multifunction Voltage/Current/Resistance Calibrator
C152	Factory (NPL Traceable) Calibration Certificate
C109	UKAS Calibration Certificate (ISO 17025)

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

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