Time Electronics
1017 Voltage/Current/Resistance Calibrator



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

Stability and Temperature Coefficient

Long-term stability is achieved by the use of high quality components and modern resistor technology. The 1017 features a precision reference diode that provides the input to the units active circuitry. 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 to 20 mA and 0 to 10 V transmitters, and platinum resistance thermometers.

It can also be used for testing ranges on multimeters and electrical test tools with measurement capabilities.

Features

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

Portable Operation

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. An LED indicator on the front panel displays the battery condition.

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Technical Specifications

Voltage ranges / accuracy.....0 to 9.99999 mV in 10 nV steps / ± 0.02 % of setting ± 0.005 % of range.
0 to 99.9999 mV in 100 nV steps / ± 0.01 % of setting ± 0.004 % of range.
0 to 999.999 mV in 1 µV steps / ± 0.005 % of setting ± 0.002 % of range.
0 to 9.99999 V in 10 µV steps / ± 0.005 % of setting ± 0.002 % of range.
0 to 99.9999 V in 100 µV steps / ± 0.01 % of setting ± 0.004 % of range.

The above accuracies are independent of thermal emfs which can be 2 µV or more depending on the type of leads and connections used.

Output resistance.....10 mV and 100 mV: 10 Ω. 1 V and 10 V: < 150 mΩ. 100 V: < 1 Ω.

Drive current max.....10 and 100 mV: as 10 Ω output resistance. 1 V and 10 V: 150 mA; 100 V: 10 mA.

Current range / accuracy.....0 to 99.9999 mA in 0.1 µA steps / ± 0.02 % of setting ± 0.004 % of range.

Drive voltage max.....10 V.

Resistance range / accuracy.....0 to 9.99999 kΩ in 0.01 Ω steps / ± 0.05 % of full scale.

Power rating.....0.25 W per resistor.

Residual resistance.....Less than 200 mΩ.

Deviation control (V&I).....0 % to 0.999 % in 0.001 % steps. Deviation accuracy: V and I output, 0.5 %.

Temperature coefficient.....Voltage and current ranges: < 10 ppm/°C. Resistance ranges: < 30 ppm/°C.

Long term stability.....5 ppm/day, < 15 ppm/90-day, < 25 ppm/year.

Short term stability – noise.....10 mV range: < 0.2 µV/sec, < 0.3 µV/10sec, < 0.4 µV/min.
100 mV range: < 0.2 µV/sec, < 0.4 µV/10 sec, < 0.6 µV/min.
1 V range: < 0.2 µV/sec, < 0.5 µV/10sec, < 1.5 µV/min.
10 V range: < 1.0 µV/sec, < 2.0 µV/10sec, < 8.0 µV/min.
100 V range: <4 0 µV/sec, < 100 µV/10sec, < 500 µV/min.
100 mA range: < 0.2 µA/sec, < 0.4 µA/10sec, < 1.0 µA/min.

Warm-up and settling time.....Warm-up: < 10 mins to full accuracy. Settling: < 0.5 secs, 100 V range: 5 secs.

Output connections.....The output is via low thermal emf terminals (0.2 µV/°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 230 V 50/60 Hz (110 V to order) mains supply, or from the internal rechargeable NiMH battery pack.

Battery level indicator.....A front panel LED provides an indication of the battery condition.

General Specifications

Operating temperature.....0 to 50 °C (32 to 120 °F). Full specification: 23 °C ± 5 °C.

Operating humidity.....10 to 90 % non-condensing 25 °C (77 °F).

Dimensions.....W 250 x H 119 x D 314 mm.

Weight.....2.4 kg.

Optional extras.....Calibration certificates - traceable (factory) or accredited (ISO 17025).

Country of origin.....UK.

Ordering Information

1017.....**Multifunction Voltage/Current/Resistance Calibrator**

C152.....Traceable calibration certificate (Factory)

C109.....Accredited calibration certificate (ISO 17025)

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

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