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Repot on the Calibration of a Hewlett-Packard 3458A

Multimeter, Serial Number 2823A11212

Report N0. Electrical/2014/s21937, 01 May 2014

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Report on the Calibration of a Hewlett-Packard 3458A Multimeter

**Description**

A Hewlett-Packard model 3458A Multimeter.

**Identification**

Serial Number: 2823A11212

**Client**

Light Standards, Measurement standards Laboratory of New Zealand,

69 Gracefield Rd, Lower Hutt.

**Date of Calibration**

01 May 2014.

**Conditions of Calibration**

The ambient temperature during the measurement was 20.1°C ± 1.0°C and the relative humidity was 49% ± 15%.

The internal temperature reported by the instrument prior to the Temperature measurements described here was 33.8°C. This value was obtained by executing the command TEMP? with no signal applied.

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**Method**

The instrument power was switched on for a period of at least 4 hours before measurements were taken using the front terminals only. All measurements were made following procedure MSLT.E.025.003.

The internal calibration temperatures reported by the instrument provide a means to ensure the instrument has not been adjusted since the report. The calibration temperatures reported during these measurements are:

Input Offset Adjustment (CAL? 58) 36.2663158 °C

DC Gain Adjustment (CAL? 59) 37.1292459 °C

Resistance and DC Current Adjustment (CAL? 60) 36.3736867 °C

The command ACAL, ALL, 3458 was executed prior to performing the measurements.

All instrument readings quoted are the mean of 10 or more individual readings taken using the IEEE bus. The instrument was reset before taking the readings.

**Results**

**DC Voltage**

The instrument was configured by executing the commands DCV, NPLC 100 and TRIG AUTO.

**1 DC Voltage Offset**

The DCV function offset was measured for each range using a low thermal short consisting of freshly scraped copper connected between the HI and LO terminals. The expanded uncertainty in the results includes a contribution for small deviations from 0V associated with the low thermal short.

Measurements were made in the order given in the table of results. The 100 mV measurements were made following a delay of at least 5 minutes after making the connection to the low thermal short and setting the range. The results were:

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The Expanded uncertainties quoted above are calculated using a coverage factor of 2.2.

**2 DC Voltage Gain**

For each range, the change in DC voltage required to go from a reading of zero volts to the indicated instrument reading was determined.

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**Note 1:** The 1000 V measurements were made at least 3 minutes after application of the voltage.

The expanded uncertainties quoted above are calculated using a coverage factor of 2.0.

**3 DC Voltage Linearity**

The DCV linearity was determined by applying known voltages to the instrument on the 10 V range.

The true voltages required to produce the following readings were determined. The relative values are calculated by linearly scaling the true voltages so that the relative values corresponding to readouts of 0.000 000 0 and 10.000 000 0 are exactly 0.000 000 0 and 10.000 000 0.

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The expanded uncertainties quoted above are calculated using a coverage factor of 2.1.

**Uncertainties**

The uncertainties re at a 95% level of confidence. See the “Guide to the Expression of Uncertainty in Measurement” (ISO, 1995) for an explanation of terms.

All Uncertainties are estimated by combining the uncertainties of reference standards of this laboratory together with the uncertainties associated with the short-term behaviour of the instrument.

The uncertainties quoted do not include a contribution from the from the resolution of the front panel display that would be necessary for the measurements that are manually recorded.

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Murray Early Bruce McLennan

Senior Research Scientist Senior Technician

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Tim Armstrong

Chief Metrologist