

Original Paper

A Step-Down Technique to Calibrate AC Current Down to 10 μ A Using a Precision 10 mA Current Shunt

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Abstract

This paper describes a calibration procedure for AC current measurements at 1 mA, 100 μ A and 10 μ A using a NIST-calibrated 10 mA current shunt as a reference standard. The procedure involves a step-down technique using the reference transfer standards (RTS) as a precision current divider. The RTS is used at values of 370 Ω , 3.3 and 30 k Ω to provide the intended currents. Uncertainty calculations are estimated for calibrating the AC current of 10 mA, 1 mA, 100 μ A and 10 μ A at 55 Hz and 1 kHz. The expanded uncertainties are around the values of 37 nA and 1 nA for the ranges of 1 mA–10 μ A respectively.

Keywords

AC current measurements – Thermal current converters – AC-DC difference – Step-down technique – Uncertainty budget