New Method for Measurement of AC Voltages Above 1 V Using TVC and Voltage Divider

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Abstract: In this paper, a new method is introduced for AC voltage ranges that are higher than 1 V by using the thermal converters. It can be used in laboratories in case of unavailability of the whole ranges of multiplier range resistors set. The introduced method depends on dividing the AC voltage of the unit under test to 1 V by using AC voltage divider. The divided AC voltage is then measured using 1 V thermal converter. The measured AC voltages are 10 V and 30 V at different frequencies. The expanded uncertainty is evaluated for the measurement results. The presented method is evaluated by comparing its obtained results and the results obtained by using the conventional thermal voltage converter, which consists of multiplier resistors, with the actual values of the AC voltages. The comparison proves that the new method is reliable and dependable for accurate measurements of AC voltages.

Keywords: AC voltage measurement; Thermal converter; Thermal voltage converter; Multiplier range resistor; AC voltage divider; Uncertainty