Non-contact Voltage Measurement System for Low-Voltage Power-Line

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Abstract

In this paper, a non-contact measurement method of the power line voltage based on capacitive coupling principle is proposed, which realizes the reliable measurement of line voltage waveform. Firstly, the basic principle of the non-contact voltage measurement method is introduced in this paper, which mainly includes self-calibration and online measurement of the sensor. The high frequency voltage signal is injected into the capacitive coupling network of the sensor to implement the self-calibration of the sensor ratio. Then, the digital integration method is used to integrate the output signal of the sensor to achieve the measurement of the line voltage waveform. Secondly, the non-contact voltage sensor prototype and the corresponding signal processing circuit are designed. Finally, the test platform of line voltage measurement is built, and the measurement test of 220V/50Hz line voltage waveform is carried out. The test results show that the relative amplitude error of the voltage measured by the sensor is less than 1.5%, the maximum phase error is less than 2°, and the linearity is better than 0.5%.

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