

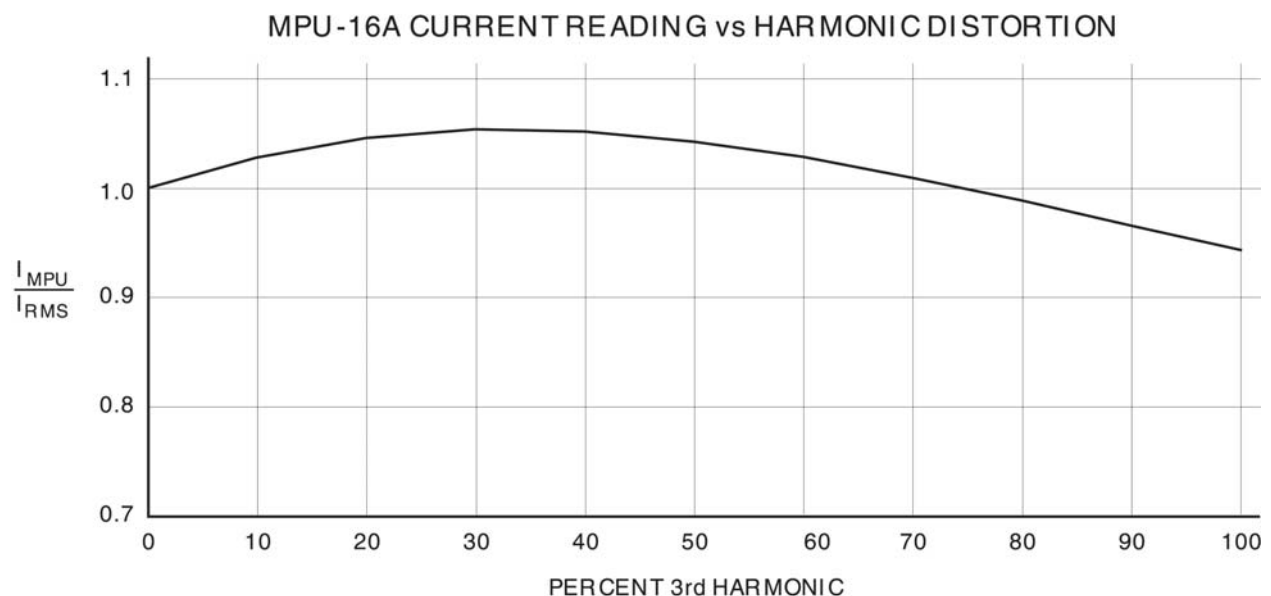


TECHNICAL INFORMATION

TITLE: INFLUENCE OF HARMONIC DISTORTION ON MPU-16A CURRENT MEASUREMENT

The MPU-16A completes four program scans per second. In 60-Hz applications, each scan has an eleven-cycle sampling interval followed by a four-cycle calculation interval. In each sampling interval, the multiplexed A/D converter obtains 960 samples of the earth-fault and phase-current signals. The multiplexer sequences these four signals so that 240 samples of each current signal are uniformly spaced throughout the sampling interval. In each calculation interval, each set of 240 samples is digitally integrated to determine the average value of each current. The average value of each signal is converted to an equivalent rms value of a sinusoidal signal at the fundamental frequency. This measurement technique is referred to as "average responding—rms calibrated".

A sinusoidal signal has a rms-to-average value ratio (form factor) of 1.11 and a peak-to-rms value ratio (crest factor) of 1.41. When harmonics are present, these ratios change and the rms calibration of the MPU-16A will be in error. The following graph shows the MPU-16A reading relative to the rms value of a signal containing the 3rd harmonic.



A maximum reading error of 5.5% occurs for harmonic distortion up to 100% for the 3rd harmonic. Since the sampling frequency per signal is 21.8 times the fundamental frequency, harmonics up to and including the 10th harmonic will influence the MPU-16A reading.

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