



Shop Tech Talk March 2009

Q. What Are Stray/Ghost Voltages ?

Years ago when the electronic digital multi meter(DMM) came on the scene these stray/ghost voltages started appearing and the phenomenon was largely due to the high input impedance of the new DMM. The input impedance was of the order of 1 meg ohm or higher(10 meg ohm on modern Fluke meters) .



This had to be compared to the predecessor to the DMM, namely the Simpson 260 analog multi meter, which had an input sensitivity of $5K\Omega$ per volt when measuring AC voltage. If we were measuring on the 250v scale then the input resistance would be $5K \times 250 = 1.25 M\Omega$ and on the 50v scale it would be $5K \times 50 = 250K\Omega$

The importance of this input impedance/resistance is because when we measure voltage we do not want our meter's resistance to affect our reading of the voltage ie to make our reading less accurate, by drawing too much current from the circuit being measured.

Stray/Ghost voltages occur from capacitive coupling between energized circuits and non energized , non connected adjacent wiring. Because of this coupling effect and the DMM's high impedance it is not always possible to determine if the circuit under test is energized or de-energized.

The confusion can be removed by comparing the measured voltage using both a DMM and an analog meter like the 260. If the voltage disappears when using the 260 then the voltage was in effect a stray/ghost voltage.

Typically this measured ghost voltage reading may be as high as 50% of the energized voltage in the same proximity.

This ghost voltage is real but it is a static voltage, containing no real energy or current flow

Certain Fluke meters have what is called a LoZ range selection feature that allows a switching from high impedance to a lower impedance value. These meters are the 114,116,117 and the latest 289 meter.



Fluke also sells an accessory that works for all their other meters, the Fluke SV225 part of the Fluke TL 225 stray voltage adapter test lead kit, that allows the same capability. On energized circuits the meter will indicate the real voltage and on non-energized circuits the meter will read close to zero, even if there are stray voltages.