

Stray or ghost voltage in Class II LED products

LED technology in lighting lends itself to Class II product design. There are any number of approved Class II drivers with SELV output which can power an appropriate LED array housed in metalwork which then need not be earthed.

In all unearthed metal work which is in proximity to an electrical supply, there exists the possibility of the existence of a stray or ghost voltage. This is due to capacitive coupling and is neither related to a fault in the electrical system nor could it be considered as dangerous.

Provided the voltage applied to the LED array does not exceed 50V ac rms or 120V ripple free D.C. (EN60598-1 1.2.42.2) and that the measurement for touch current on that unearthed metal part does not exceed 0.7mA (EN60598-1 10.3), the product would comply with those clauses for the general requirements and tests.

The figure of 0.7mA has been deemed by the IEC to be the limit of human perception however there are some instances, such as having wet skin and being in contact with a suitable earthing path, it may be possible to perceive a stray or ghost voltage. Whilst it cannot be described as an electric shock, it may cause surprise or alarm.

It is good practice to ensure that instructions sheets indicate that any fixtures are disconnected from the source of power during installation or maintenance. That would exclude the possibility of any such event.

Digital multi meters will show the stray or ghost voltages which can occur due to this capacitive coupling between energized circuits and unconnected metal parts. The high impedance of the input circuits of these meters, measuring between ground and that unconnected part, can indicate the presence of a voltage. Whilst it is a static voltage, containing no real energy, the measurement, which may be up to half of the supply voltage, can raise concerns.

Manufacturers of digital multi meters, do offer adaptor kits (e.g. Fluke TL225 although other brands are available) which offers a lower impedance across the input of such a meter in order to determine if the reading indicated is real voltage or a stray or ghost voltage.

Note: This same phenomena may also occur with respect to non-earthed conductive parts of Class I luminaires, where the safety to these parts has been provided by double/reinforced insulation.