

Monday, August 2, 2010

Power Supply Leakage Current Testing to IEC60990

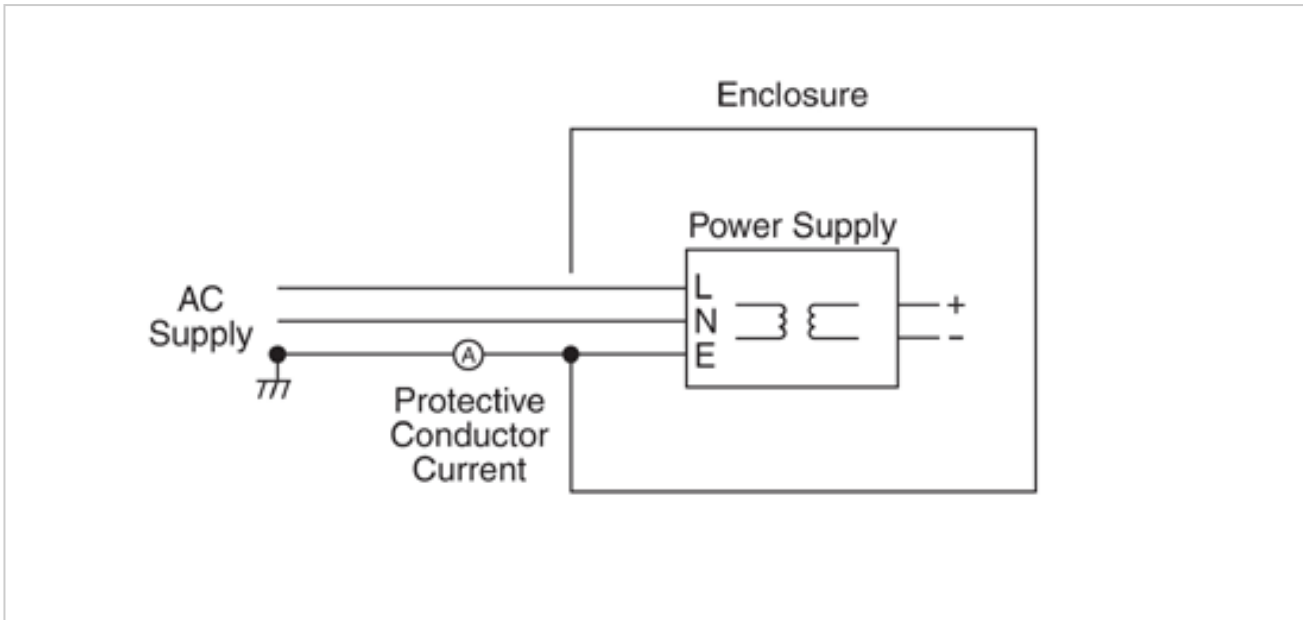
A customer recently asked me why we specify leakage current on a Class II power supply, when a Class II power supply has no ground terminal. A good question, but first some background.

As part of the testing for IEC60950, power supply manufacturers measure leakage current to the IEC60990 standard.

To be more accurate, the terms "Touch Current" and "Protective Conductor Current" replace the term "Leakage Current".

Protective Conductor Current (PCC)

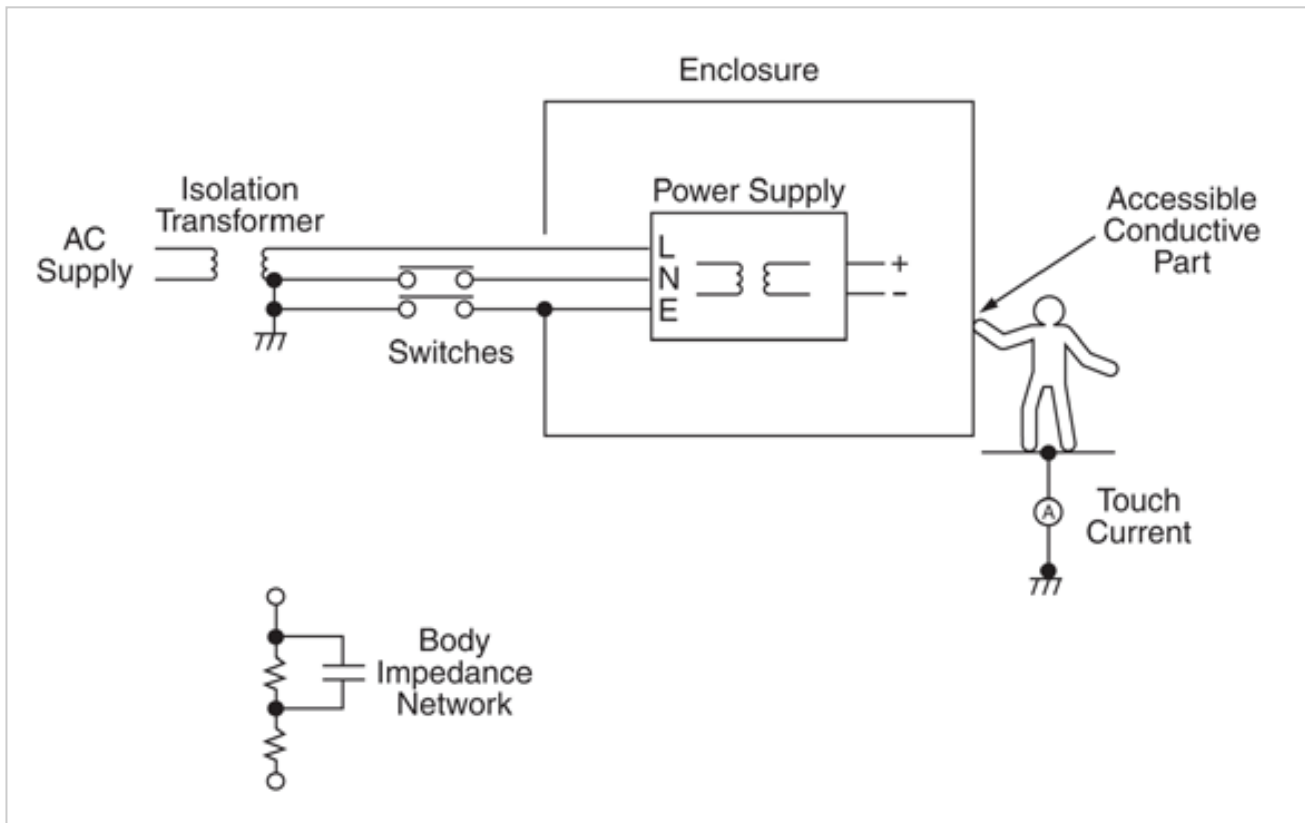
Is the current that flows through the protective conductor; commonly referred to as the ground connection.



As a note, the withstand voltage and *insulation* resistance tests measure the current flowing through the insulation of the unit under test.

Touch Current (TC)

Is the current that flows when a human body touches the equipment, simulated by a body impedance network.



The switches are used to simulate a line, neutral or ground fault, referred to as a single fault condition (S.F.C.). Usually there is a polarity reversal switch to reverse the line and neutral connections to the power supply.

So back to the original customer question, if a Class II power supply is used, there will be current that flows through a human body upon touching conductive parts in a system (like a USB port or a conductive product case). That measured current is usually listed on the power supply datasheet.

Here is an excerpt from a CB report showing the test, input voltage, frequency and the measured touch current. Note half the tests conducted were with the simulated human body touching the "output connector" or pins of the power supply.

Enclosure leakage current (normal conditions, normal polarity)	264 V~	63 Hz	5,3 μ A
Enclosure leakage current (normal conditions, reverse polarity)	264 V~	63 Hz	4,1 μ A
Enclosure leakage current measured on output connector (normal conditions, normal polarity)	264 V~	63 Hz	89,0 μ A
Enclosure leakage current measured on output connector (normal conditions, reverse polarity)	264 V~	63 Hz	87,0 μ A
Enclosure leakage current (single fault conditions, neutral open, normal polarity)	264 V~	63 Hz	4,1 μ A
Enclosure leakage current (single			

fault conditions, neutral open, reverse polarity)	264 V~	63 Hz	6,0 μ A
Enclosure leakage current measured on output connector (single fault conditions, neutral open, normal polarity)	264 V~	63 Hz	3,0 μ A
Enclosure leakage current measured on output connector (single fault conditions, neutral open, reverse polarity)	264 V~	63 Hz	129,0 μ A

The ammeter used is a specialized meter; do not use a regular hand-held multi-meter!

For more details, including the limits of the measured currents, please consult a professional safety engineer.

Get the [product brochure](#) from TDK-Lambda Americas for product descriptions.

Posted by [Power Guy](#)