

DCM305E Earth Leakage Clamp Meter_AN55

Earth Leakage

Since there is no such thing as perfect insulation, if any conductor is raised to a potential above that of earth some current is bound to flow to earth from that conductor.

The amount of current that flows is dependent on:

- Voltage on the conductor
- The capacitive reactance between the conductor and earth
- Resistance between conductor and earth

Currents that flow to earth are called leakage currents and are usually very small values, typically < 1 mA. However the amount of current that is required to cause distress or harm to a human being or animal is also small, these currents must be limited by circuit design to safe values.

If this is not possible then a 30 mA RCD (residual current device) or 30 mA RCBO (residual current device with overload protection) should be fitted for personal protection.



An earth leakage clamp, such as the Megger DCM305E, is generally a lightweight pocket size clamp meter designed to measure very small AC currents. They enable earth leakage faults to be detected and located without having to isolate and disconnect circuit wiring.

In addition, most of these clamps are capable of performing AC current tests like any normal clamp meter.

The measurement of earth leakage can be conducted on single or three phase systems.

RCD and RCBO operation

These two devices effectively monitor the currents flowing in the phase and neutral conductors. Under normal circumstances, these two conductors will have matching currents. An imbalance between the conductor currents will be detected by the RCD / RCBO sensing circuitry with the supply being disconnected by the RCD / RCBO.

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A similar principle is utilised when using an earth leakage clamp to detect / measure earth leakage. An imbalance between the phase and neutral currents = leakage current.



Earth leakage clamp single phase operation



Earth leakage clamp 3 phase + neutral operation

While it is possible to simply clamp the instrument around the earth conductor this procedure will only indicate leakage current present in the earth conductor. This may not offer a true indication of earth leakage in the entire installation.

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Measuring possible earth leakage in a single appliance



The simple adapter lead pictured above will, when utilised with an earth leakage clamp, allow an indication of possible earth leakage current present in a single domestic / commercial appliance. (Note the earth conductor bypasses the jaw of the clamp) The DCM305E clamp has a compare feature that has 3 pre-set leakage limits (3.5 mA, 0.5 mA, 0.25 mA). The instrument will indicate if the chosen limit is exceeded.

Class I and Class II appliances have 3.5 and 0.25 mA pass limits respectively.

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