

Earth leakage clamp applications

Causes of leakage currents

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 dependant 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. However the amount of current that is required to cause distress or harm to a human

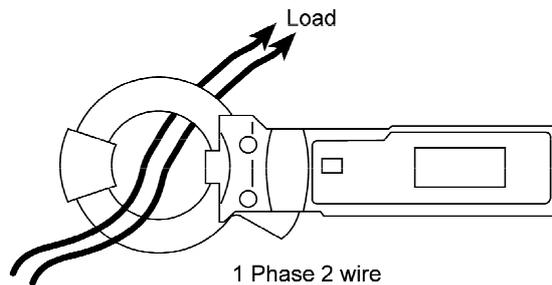
being or animal is also small, these currents must be limited by circuit design to safe values. If this is not possible then an RCD (residual current device) is fitted for personal protection.

An earth leakage clamp is generally a lightweight pocket size clamp meter designed to measure a.c. earth leakage 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 a.c. current tests like any normal clamp meter.

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

The following applications show positions of conductors in respect to the jaws of the clamp.

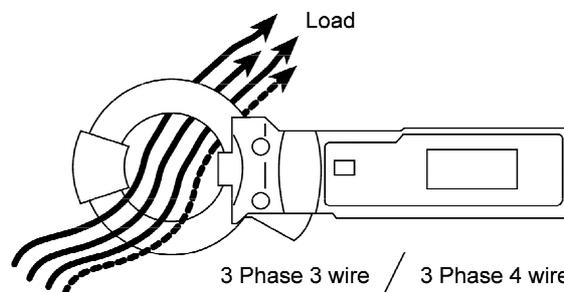
Single Phase / Two Wire Circuits



This diagram illustrates the method of leakage measurement utilising the live and neutral.

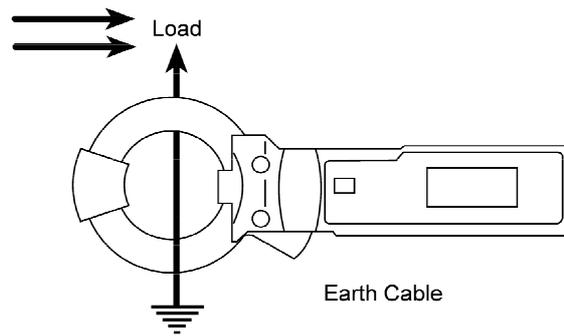
The phase and neutral currents should ideally cancel each other out, showing zero leakage..

3 Phase circuits



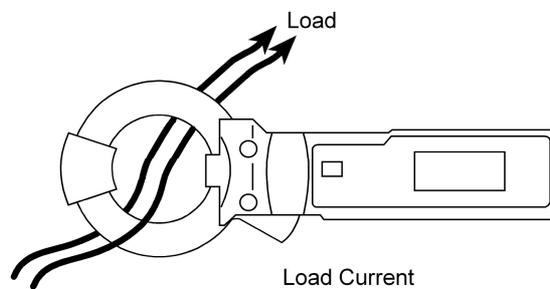
3 phase circuit leakage can be conducted using a similar test to the single phase application.

For 3 wire circuits, clamp all 3 phases. For 4 wire circuits, include the neutral in the jaws.

Earth Conductors

The diagram above illustrates earth leakage measurement by utilising the earth conductor only. The same principle can be used for 3 phase circuits.

It should be mentioned that this method will only measure the leakage current in the earth conductor, not the total leakage on the system.

A.C. Current

As previously mentioned some earth leakage clamps can be used as a standard current clamp meter by simply clamping the phase in the jaws.