

Earth Leakage Protection

Commonly known as RCDs (Residual Current Devices), ELCBs (Earth Leakage Circuit-Breakers), CBRs (Core Balance Relays) or GFIs (Ground Fault Interrupts) earth leakage devices are a crucial component in your electrical safety scheme.

Let's look at what they do, how they do it and how we can use them to improve safety without causing too many unnecessary disruptions to what we do. Whilst overload circuit breakers are designed to protect the power distribution system, earth leakage devices are only useful for protecting people from electrocution. An overload circuit breaker is designed to interrupt a circuit when the current exceeds a preset limit.

As the current necessary for fatal electrocution is less than a couple of Amps for a duration of less than a couple of seconds, an overload breaker offers virtually no protection from electrocution. Earth leakage protection devices are designed to trip for fault currents between 10 and 100 mA and for interrupt times between 40 and 100 milliseconds after a fault current is sensed.

Earth leakage devices are based on the principle that the amount of current entering a device should be exactly the same as the amount of current leaving the device and that any discrepancy is due to current flowing somewhere that it shouldn't, which is a bad thing. If an electrical appliance such as a luminaire is working properly all electrons entering the luminaire will flow in down the active wire, around through the filament of the lamp and out again down the neutral wire.

If there is a fault in the wiring which somehow allows the body of the appliance to become connected to the active line, then when someone touches the appliance, by being electrocuted they provide a path to earth for the current which is not via the neutral; this is the situation for which an earth leakage protection device is employed. An overload circuit breaker will not care that a small, albeit fatal, additional current is now flowing.

Earth leakage protection is an important part of the electrical safety scheme for any system, although it may present some implementation difficulties where there are conflicts between the safety ideal and the operational reality.