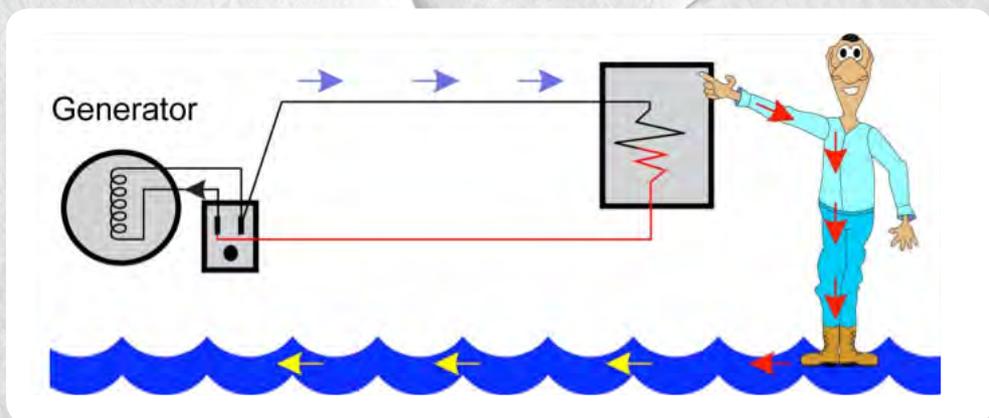


DUO SAFETY FOR GENERATORS, IT AND MEN TYPE SYSTEMS – WHEN SAFETY COUNTS.

DID YOU KNOW THAT AN RCD DOES NOT OFFER PROTECTION IN MOST PORTABLE GENERATORS OR IT TYPE SYSTEMS?

In normal mains connected system (MEN) the Earth is connected to the neutral so if there is an electrical fault to Earth there is a path for the flow of electricity. In a “normal” situation the RCD will see that there is an imbalance of flow between Active and Neutral (as current is flowing to Earth) and the RCD will trip isolating power. Most Portable Generators are NOT fitted with an RCD as they use an IT type system.



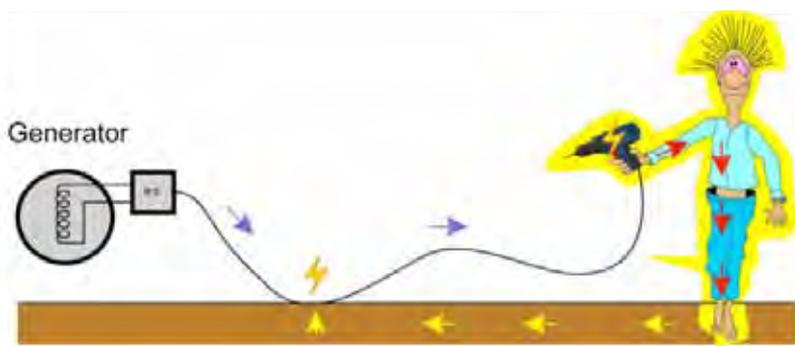
“Bird on the wire effect” – The person here has voltage potential but as there is no current flow then he is not able to be electrocuted. “Potential without current flow” as there is **no Earth wire to ground**.

When you connect to a portable generator, a non MEN generator or an IT transformer then there is no path to Earth, so if a fault occurs on the circuit the user is like a “bird on the wire” and as such current cannot flow. The risk here, is the user will not even be aware that there is potential voltage.

(A common example of this is where an RCD is fitted to a generator and is RCD tested using a tester that creates a fault to earth. The RCD will not trip as there is no current flow even though the voltage on the earth has now risen and has potential.)

But if a second fault occurs there is potential for an electrocution to occur.

There are a lot of scenarios where this could occur. We have illustrated a few here.



There is a large amount of confusion within different industries about generator connection.

Should the generator be earthed or have an earth stake and what is required to comply with Australian Standards which can differ from some manufacturers instructions.

For example, AEG Generators for a portable compact generator clearly state that the generator is to be grounded to an "Approved earth ground" yet the Australian Standards call for no earth stake.

On a lot of the generators tested there were some fitted with RCDs but were not MEN connected (neutral connection to the Earth).

Under AS2790 this type of generator should not be earthed and this type of configuration should not have an earthing system to the generator, an Earth Electrode is not required or recommended.*

On the Honda EU generator (one of the most popular generators on the market) the instructions simply state "Be sure to ground the generator when the connected equipment is grounded" (Refer to AS2790 – Electrical Generating Sets & AS3012 Electrical Installations – Construction and Demolition Sites).

Both of these generators are fitted with circuit breakers but not RCDs as they are primarily an IT type system. By grounding the generator it is also giving more potential for a flow of current in a first fault scenario to Earth but it has no RCD system fitted to prevent electrocution.

So the issues are:

1. No Earth, and in the first fault situation there is no flow of electricity – No electrocution – But the user will not be aware that they are in a life threatening situation
2. On a second fault to Earth there is now a path of flow through the person if he is making part of the circuit without protection
3. RCDs will only protect if there is a Earthing system in place. Earthing systems allow more potential for the flow of current to earth in a first fault situation
4. Numerous portable generators do not have RCDs fitted so there is no protection if an earth fault occurs and current flows to earth

So, generally speaking it can be a confusing issue – to Earth, not to Earth, does the RCD protect the user in a fault, is the system an IT type system or MEN system?

What does the DUO actually do?

The DUO employs a ESD (Earth sensing device) and an RCD into one module.

The RCD will protect the user in the event there is a flow of power to earth creating an imbalance of flow through the Active and Neutral side of the RCD.

Basically it will protect against Earth faults where there is an earthed circuit.

The ESD monitors the Earth circuit, and on the rise of voltage on the earth (the potential to create electrocution) the ESD will isolate the power supply.

The ESD will also monitor the current flow on the earth sensor and on current flow and Earth voltage it will trip the circuit. The voltage and current flow trip point is an inverse relationship to each other. As voltage increases the current flow required to trip becomes less. Generally at 40 volts (the potential point to electrocute) the device will trip at 10mA. This can be altered to suit different customer needs (at the point of assembly).

Why so high a voltage- 40 Volts?

In some situations on IT systems the residual voltage can cause nuisance tripping of the device. It is set to be high enough not to trip on residual voltage but low enough to protect on voltage that has the potential to cause electrocution to a person.

Can the ESD sensitivity be altered?

Yes if you require it to be a lower voltage sensing unit or a lower MA current flow to trip the device we can do this at the time of ordering the unit. Once in the field it cannot be altered.

Why the ESD? Are there not other earth monitoring devices on the market?

Yes there a lot of different earth monitoring devices on the market. Few of those are combined with an RCD that allows the device to protect in various types of electrical systems. We designed our system with the thought in mind that our unit has to be able to survive tough Australian industry conditions. **Our control circuit has no relays or coils with moving parts and therefore is not subject to vibrations caused from generators and transportation. Also as we do not have a coil as part of our circuit low voltage will not cause premature failure – One device on the market actually chatters at 187 volts but fails to trip.**

We offer a plug and play solution.

As we are a Power Board Manufacturer, we offer the device in numerous Power Boards that are Australian certified and fully approved. This means you simply purchase a Power Board that utilizes the DUO and plug n play.

The ESD has Australian Certification and has been independently tested.

This documentation is not offered as an electrical solution and is not offered as a substitute for correct electrical connection – Refer to a licensed electrician for connection to ensure that the electrical system is connected as required under Australian Standards.

Floating Neutral Generator

No Connection between
Neutral & Ground.

