



**POWER  
SAFE**  
P R O D U C T S

DUO Safety for generators, IT  
and MEN type systems

# THE NEXT GENERATION IN EARTH LEAKAGE PROTECTION EXPLAINED



Quality  
ISO 9001

SAI GLOBAL

# WHEN SAFETY COUNTS

## What does the RCD DUO actually do?

Basically, it will protect people and equipment against Earth faults where there is an earthed circuit – which can include a caravan, or while using power from a generator or inverter.

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

The RCD will protect the user and equipment 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.

**With the RCD DUO installed, you can enjoy the same peace of mind when using devices powered by generators or in IT systems, that you do in your home.**

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).



## Frequently asked questions

### 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 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 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 to survive tough Australian industry conditions, therefore the control circuit has no relays or coils with moving parts and therefore 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.

## 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 residual-current device (RCD) will detect that there is an imbalance of flow between Active and Neutral (as current is flowing to Earth) and will trip isolating power.

Most portable generators are NOT fitted with an RCD as they use an IT type system.

In an IT system, the electrical distribution system has no connection to earth at all, or it has only a high impedance connection, making it less safe.

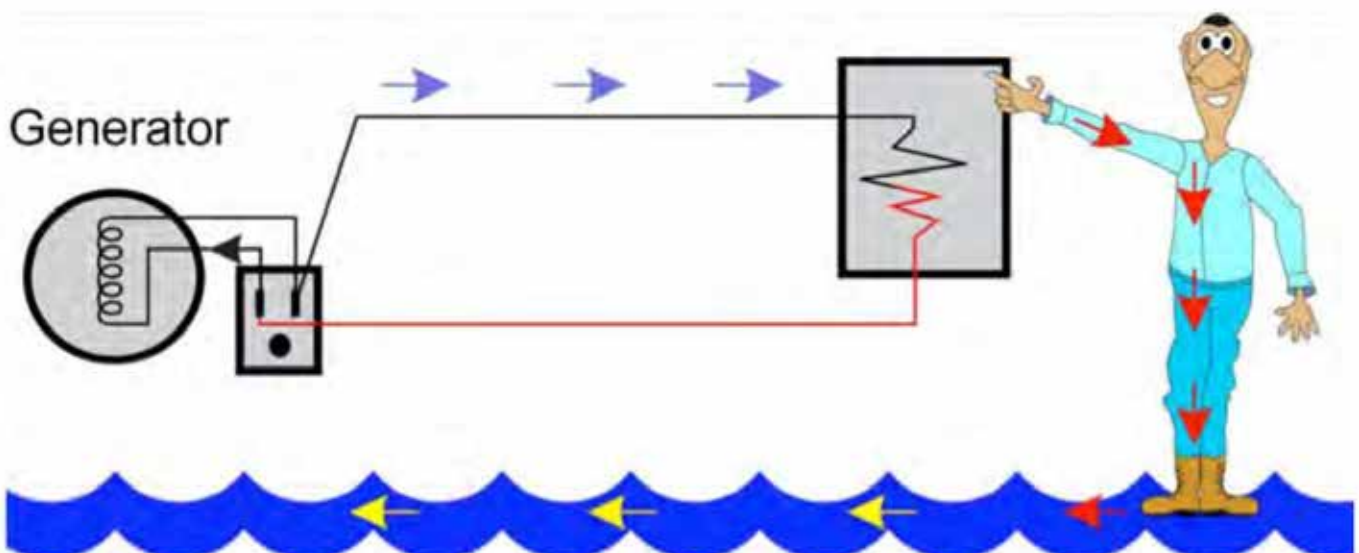
### “Bird on the wire” effect

The person depicted below has voltage potential, but as there is no current flow, he is not electrocuted. It is “potential without current flow” as there is no Earth wire to ground.

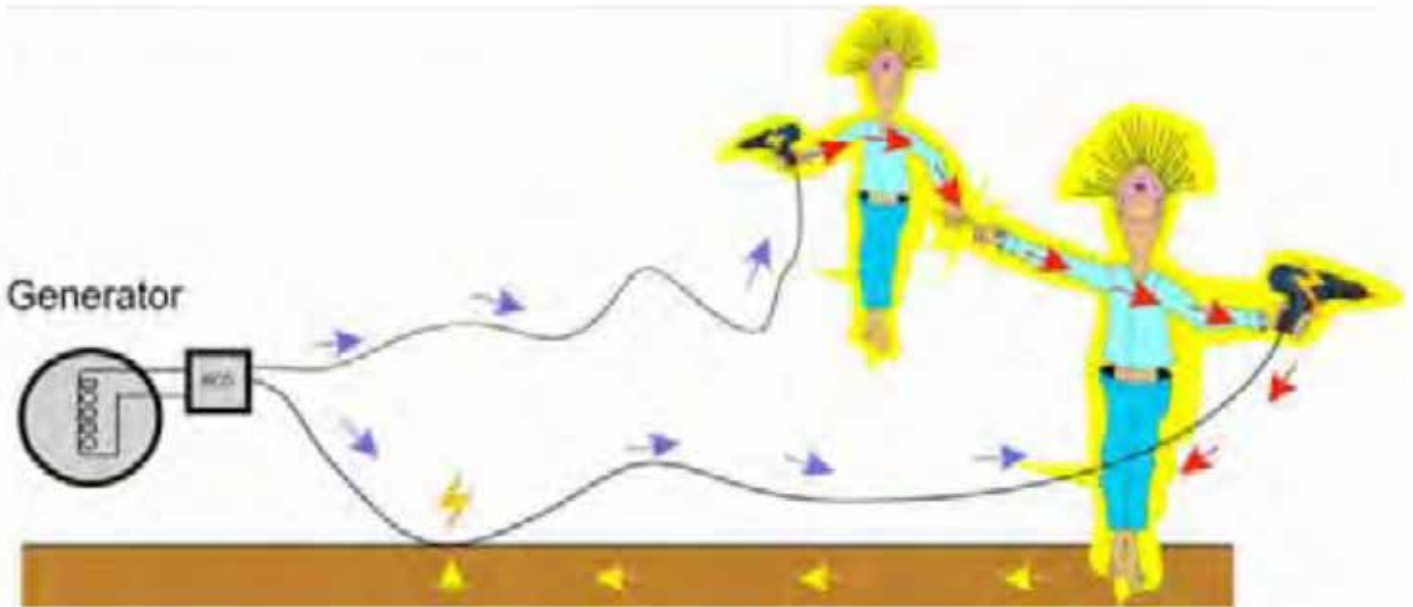
When working with a portable generator, a non-MEN generator or an IT transformer, there is no path to Earth. If a fault occurs on the circuit the user is like a “bird on the wire” and as such current cannot flow. The user will be unaware of the potential voltage.

A common example of this is where an RCD is fitted to a generator. When the RCD is 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.

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



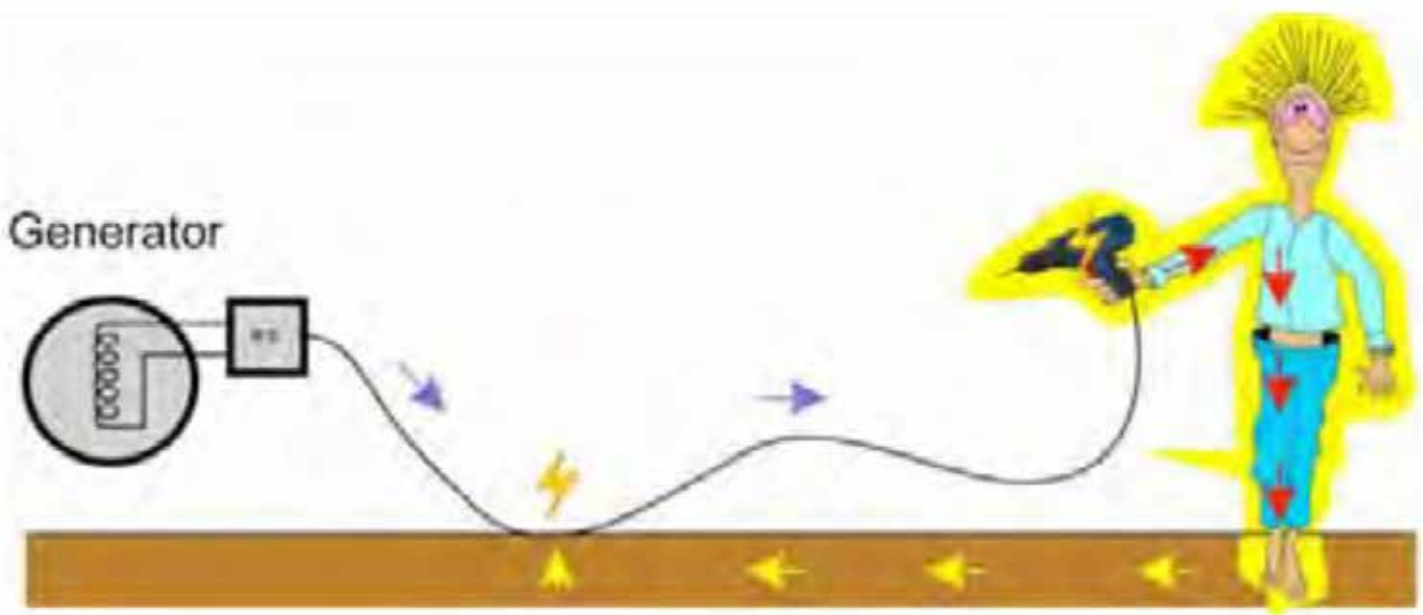
There are a lot of scenarios where not installing a RCD DUO call lead to high stakes electrical risk. We have illustrated two here.



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.

On a second fault to Earth (for example, touching

another user with a faulty tool, or the lead being severed and earthed) there is now a path of flow through the person if he is making part of the circuit without protection.





## The truth about safe use of generators

RCDs will only protect if there is an Earthing system in place. Earthing systems allow more potential for the flow of current to earth in a first fault situation

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 manufacturer's instructions.

For example, AEG Generators state that their portable compact 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 Australian Standards (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"\*.

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

*\* Refer to AS2790 – Electrical Generating Sets & AS3012 Electrical Installations – Construction and Demolition Sites.*



**RCD DUO -  
single phase  
protection:  
10kA**

**RCD DUO -  
three phase  
protection:  
10kA**



**PLUG AND PLAY SOLUTION  
RB4 DUO and RB6 DUO  
240V Single Phase Power Boards fitted  
with RCD DUO**



These heavy duty IP66 power boards come fitted with the RCD DUO Earth Safety Device. Plug and go design - no hardwiring required. Australian certified and fully approved.

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.



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