



hybrid  
electronics



# INNOVATION NEWSLETTER

Hybrid Electronics Australia Pty. Ltd.

924 Mountain Highway, Bayswater, Victoria, 3153, Australia.

Ph: 61 3 9729 2177 Fax: 61 3 9729 8014

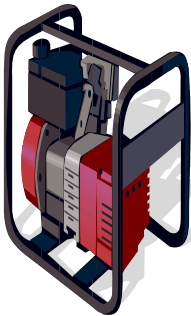
E-mail: [hybrid@hybrid-electronics.com](mailto:hybrid@hybrid-electronics.com) [www.hybrid-electronics.com](http://www.hybrid-electronics.com)

Volume 10, Issue 1

July, 2009

## How does it work?

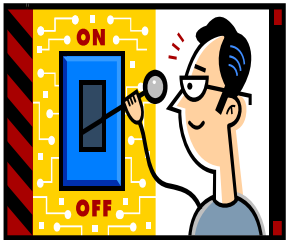
### Electrical Safety using a Hybrid



Protectelec Pty. Ltd. and Hybrid Electronics have developed a unique “Breaker Release” technology designed for electric shock and equipment leakage protection with isolated power supplies.

The safety component called Protex isolates electrical faults up to four times faster than traditional safety switches. Protex is used in generators and industrial power outlets, where it has improved electrical safety by removing the need for earth staking.

### Why use a Hybrid in Electrical safety?



The hybrid is small in size, high in reliability, allows for a more precise resistor tolerances, and can withstand up to 10,000 volts (a PCB wouldn't be able to do this).

The hybrid allows the unit to be self testing all the time. The hybrid is designed for regular testing and regular turning back on.

The hybrid is heat resistant, shatter proof and water resistant.

Protex does not draw any power until a fault is detected. Then Protex quickly isolates the electricity, which remains isolated until the fault has been removed. When the fault has been removed the appliance is simply turned on again and Protex gets back to the business of detecting the next fault. For example: If Protex is wired into an isolated supply home, it protects bathing children from hair driers dropped into their bath and electrocuting them.



Protex solves the expensive “Solid Earth” requirement for environments such as building construction generators where electric shock protection is achieved using RCD's (residual current detectors).

The Protex unit supplies a reference “connection wire” that is connected to the equipment chassis. It senses current in that “connection wire” referenced to either one arm of the isolated transformer or to the centre tap of the isolation transformer. When the sensed current exceeds the “Breaker Release” calibrated trigger current (usually 5mA) a circuit breaker is triggered. The circuit breaker is triggered in under 10 milliseconds after the high current occurs.

The Protex also does much more;

- ◆ It is as close as possible to being “fail safe” so any circuit failure triggers the circuit breaker.
- ◆ It fully “self tests” regularly without the circuit breaker triggering and monitors the test result.
- ◆ It turns the breaker off if the self testing fails.
- ◆ Two separate circuits (in communication) and two power supplies are used independently for the self testing to provide redundancy in the case of one testing circuit (or power supply) failing.
- ◆ The testing circuits are independent of the current sensing and triggering and are only involved with the regular self testing.
- ◆ It limits the current in the sensing “connection wire” to under 10mA so that, should a person receive an electric shock, the current received will be insufficient to prevent them from letting go. This is the ultimate “fail safe” feature of the development.
- ◆ It uses encapsulated ceramic thick hybrid circuit modules for maximum calibration accuracy, wide temperature operation, environment protection, high transient voltage performance and high reliability.