

ISOLATORS EXPLAINED

For the safety of electricians, tradesmen and home owners, clause 4.8.2.3 of AS/NZS 3000:2018 now states that an independent lockable isolating switch shall be installed on every fixed-wired hot water heater.

The change has been welcomed by electricians throughout the industry, many of whom have anecdotal instances of probable safety issues that an isolator eliminates;

- » Welded contacts resulting in the circuit being live when the hot water switch is OFF;
- » Bumping a rocker switch and turning the circuit ON during maintenance;
- » Face plates being back-lit by an arc if the switch is turned off when the circuit is under load.

As switches have widely been installed by default in the past – and a switch and an isolator have different functions – the question is – What is the difference between a switch and an isolator – and is there one that does both?

SWITCH

A switch is a device to make, break and carry loads according to defined utilisation categories.

Duties such as direct-on-line motor switching (AC-3) and reversing (AC-4) require making and breaking 8 to 10 times the rated current. A switch may have multiple positions, also including an OFF position, but does not have to meet the isolation tests. Resistive loads such as hot water heaters utilize category AC-21.

Utilization Category	Typical Applications
AC-20	Connecting and disconnecting under no load conditions
AC-21	Switching of resistive loads including moderate overloads
AC-22	Switching of mixed resistive and inductive loads including moderate overloads
AC-23	Switching of motor loads or other highly inductive loads
AC-3	Direct starting and switching off of squirrel cage motors during running
AC-4	Motor reversing, inching, plugging

ISOLATOR

AS/NZS 3000:2018 defines an Isolator in Clause 2.3.2.2. A precis follows;

- » Only indicate OFF if the contacts are physically Open - 3F Handle Test
- » OFF position clearly labelled
- » Lockable in OFF
- » Disconnect all Active conductors – see Clause 1.4.5 – do not switch the Neutral
- » Withstand specified impulse voltages
- » Won't close with impact or vibration

An Isolator is a device that ensures all Active Conductors are physically open if the OFF position is indicated. Two stringent tests are required.

STRENGTH OF ACTUATOR TEST – 3F

A contact is welded closed in the ON position and the handle is forced towards OFF with three times the normal operating force (3F). OFF shall not be indicated and it shall not be possible to fit a padlock. The handle shall return to ON when released.

LEAKAGE CURRENT TEST

A leakage current test is the other particular requirement for isolators.

The isolation distances shall be such that the voltage cannot 'jump' between the live parts, and between live parts and earth – even should a fault occur. An Isolator rated for 4.0kV shall have an Impulse Voltage Test at 6.2kV compared to a 'switch' which is tested at 4.8kV.

There are two classifications of Isolators - OFF Load and ON Load isolators.

OFF LOAD ISOLATOR - DISCONNECTOR

An OFF load isolator is rated at AC-20 to carry current in the closed position. It is not rated to switch either resistive or inductive loads. The circuit must include an additional load rated switching device.

ON LOAD ISOLATOR – SWITCH DISCONNECTOR

An ON load isolator (switch disconnecter) meets both the switch requirements and the isolation requirements. It is the 'Isolating Switch' that is intended for installation in water heater circuits.

Q. Is Neutral an active conductor?

Clause 1.4.5 defines active conductors as those maintained at a difference of potential from the neutral or earthed conductor. Therefore the neutral is not an Active Conductor in this application.

Q. Does the Neutral get switched?

No. According to Clause 2.3.2.1.2 section (b), "Active conductors shall be switched..."

The Neutral is not switched.

Q. Is every enclosed switch with a padlock handle an Isolator?

No. There are switches available on the market with padlock handles.

Q. How do I identify the different products?

There are international symbols which shall be shown on the product to identify them.

Switch



Disconnecter



Switch Disconnecter



So the solution is to install a correctly rated switch disconnecter (ON load isolator) from a reputable manufacturer.

**INSTALL A
KRAUS & NAIMER
HOT WATER
ISOLATOR**



and Relax



**ISOLATOR KIT OR ISOLATOR ONLY
20 AND 32 AMP MODELS**

Kraus & Naimer – quality you can trust.....



Kraus & Naimer
BLUE LINE switchgear

Please refer to AS/NZS 3000:2018 and AS/NZS 90947-3 (Low Voltage Switchgear and Control Gear) for complete details and information.