

Energised or de-energised! Checking isolation of low voltage circuits

Neon testers (screwdriver type)



The neon screwdriver type of voltage tester has been used by many electricians over the years as a means of checking whether a circuit is live or dead. They are low cost devices being simply a small screwdriver with a clear hollow handle

connected to a dropper resistor in series with a neon lamp connected to an exposed conductive metal end cap.

If the circuit is live then upon touching the screwdriver tip to the phase of the circuit while touching the end cap the neon will glow; the operator's body providing the return path to ground.

The recommended voltage for these testers is approximately 90 to 250 volts.

During testing, the actual current flowing through the body is so small that perception of any current is very minimal.

Unfortunately these devices can be subject to abuse like any other screwdriver and ultimately the IP rating of the hollow handle becomes compromised; water seeps into the device shorting either or both resistor and neon resulting in virtually a direct connection of the end cap to the live phase.

This form of tester is generally not approved for checking for checking the isolation of a circuit.

Non-contact volt sticks



The non-contact volt stick can provide the electrical contractor with a simple means of checking whether a circuit is live or dead by holding the tip close to the phase conductor of the circuit under test.

The device requires no direct connection to the conductors utilising capacitive coupling to sense the live conductor. A built in LED illuminates when in the tip is close to a live conductor. In addition, some devices have an accompanying audio buzzer. Volt stick voltage ranges are generally in the region of 100 to 600 V a.c.

The device can be useful to locate a break in an insulated cable but has the tendency to intermittently couple to adjacent live conductors when cables are bunched or run together through holes in floor and ceiling joists. This can give false indication which can result in complacency with inexperienced users which may result in a possible shock hazard when working on a 'supposedly dead circuit'.

Although the device is a useful tool it is not generally approved for checking the isolation of a circuit.

It should be mentioned that neither of the above devices are suitable for checking total isolation of circuits that are protected by a double pole isolating device.

Multimeters or Installation testers with a voltage range



While most of these units are generally capable of indicating or even measuring voltages up to 1000 or 500 V a.c./d.c. they are not approved for confirming whether a circuit is live or dead because they do not have fixed test leads.

The problem with detachable test leads is that it is possible to perform a check on a known live source prior to testing and then, unnoticed, a

lead could accidentally become disconnected from the tester resulting in a false indication with possible fatal consequences.

In addition the leads may have fuses fitted and unless the unit is checked or 'proved' on a known live source a blown fuse may lead the user to think the circuit under test is safe erroneously.

A fixed lead tester with internal protection is the ideal option.

By their very nature multimeters and installation testers are equipped other functions, such as continuity, which could be accidentally selected resulting in damage to the instrument.

For more information and assistance call +44 (0)1304 502 102

Test lamp voltage testers



For many years an approved means of checking live circuit on 110, 230 and 415 volt supplies has been a fused test lamp. These are available in different voltage ranges so caution

has to be exercised that the correct device is used on different supplies.

These testers have a main body, with a fixed test prod, connected by a fixed umbilical cable to a remote test

prod. The main body generally houses a high stability resistor (to limit current) and fuse connected to a 15 watt pygmy bulb that is in turn connected to the remote prod. While some have means of indicating a blown bulb the fragile nature of the bulb can be a nuisance even though rough handling bulbs are available.

These testers have GS38 compliant 4mm exposed tips and have to be checked with a known live source, before and after testing the circuit under test, to verify correct operation.

2 Pole voltage testers



Electronic versions of the test lamp voltage tester are now very common and are generally divided into two variants. One has a LED ladder display that is divided into set voltages while the other has a LCD display that can display voltages in 1 volt increments. The ranges of these units are usually from 6 to 1000 V a.c. / d.c.

Like the test lamp tester, both units have a fixed umbilical lead that joins the master unit to the remote prod and both have internal current limiting.

These testers usually have addition functions that include a self test function, continuity, 2 pole phase rotation, RCD test function and a built in torch. In addition, an audio buzzer accompanies > 35 volt tests and the continuity tests.

The units default to voltage measurement automatically upon a voltage detected on their test prods so a function cannot be accidentally selected.

The units are supplied with shrouds to make the tips of the prods GS38 4mm exposed tip compliant and have a safety rating up to CATIV 1000V.

Most have a feature that can indicate exhausted batteries while testing.

Although 2 pole testers have a self test function, this only checks the batteries are functioning; a test on a known live source, before and after testing, is required to verify correct operation of the voltage range.

The Megger TPT210 LED and TPT220 LCD voltage testers both have the all of the above mentioned features that make the units extremely versatile instruments.

Proving units



As stated, the self test on a 2 pole voltage tester only checks the unit is functioning so a test on a known live source has to be conducted. A proving unit is a palm sized battery operated device that can provide a substitute known voltage source to verify 2 pole testers. The unit is automatically energised when the voltage tester prods are inserted into the output terminals. The device generates a either a 240 or 690 volt output to test the voltage range of the voltage tester. Some proving units have the capability to generate multiple voltages and a few have the power to test the test lamp testers.

The Megger MPU690 proving unit generates automatically stepped voltages from 690 down to 50 volts and can output 10 watts; enough to successfully test the test lamp type voltage tester.

