MARTINDALE ELECTRIC

Keeping You Safe

Safe isolation procedures & proper equipment save lives

Safe isolation procedures are necessary to ensure that workers on site are not exposed to danger when working on or near live electrical systems. Unfortunately there have been incidents where failure to use safe isolation procedures has resulted in the needless loss of life. One reported incident involved a large UK electrical contractor, where a circuit had been labelled as not in use. The engineer working on the circuit did not have the necessary equipment to prove that it was dead. Tragically he came into contact with a live conductor and was electrocuted. The company in question was found guilty of failing to provide the right equipment and fined £300,000. Much higher fines are not uncommon.

Electrical Safety First in association with other industry bodies such as SELECT has produced a guidance document that covers best practice for safe isolation (Best Practice Guide 2 Iss.3 2015). This includes guidance on proving isolated equipment or circuits are dead by using suitable test lamps and voltage detectors.

Using the right equipment is one of the most important parts of the procedure, as failure to do so can result in a circuit inadvertently remaining live, resulting in injury or death.

With a wide range of voltage detectors and indicators available, we look at what the requirements are and the reasons why some equipment, such as multimeters, should not be used for this process. It's also important to be aware of the changes to the standards for two pole voltage indicators which became mandatory in 2013.

What equipment is required for safe isolation?

Best Practice Guide 2 advises that where using a main switch or distribution board switch disconnector for isolation purposes that "*…The point of isolation should be locked off using a unique key or combination retained by the person carrying out the work or the appointed person, and a caution notice attached to the point of isolation.*

Where more than one operative is working on circuits supplied from an isolated distribution board, a multi-lock hasp can be used to prevent operation…"

Locking off kits are available to ensure you have all the necessary equipment to lock out the circuit being worked on at hand.

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There are a number of locking off kits available on the market, however a basic kit should include the following:

- Selection of MCB & breaker locks
- Padlock with a unique key or combination
- Hasp for when more than one person is working on a system
- Lock out tags & warning labels

MCB Isolation locks

Safety identification tag

Multi-user hasp

Key operated padlock

Martindale LOKKIT1 Lockout Kit

Note that the padlock must have a unique key or combination held by the person carrying out the work to prevent anyone else from removing the lock and inadvertently activating the circuit. Most combination padlocks have a default setting of zeroes, if this type of lock is being used, it's essential to ensure the combination has been changed prior to use. A unique key lock provides the safest solution.

Once the breaker has been locked off correctly, a warning tag should be attached to clearly identify that the circuit has been locked off and is currently being worked on.

Locking off the circuit is just one part of the procedure. Next it's essential to verify that the circuit is definitely dead before carrying out any work. Circuits are frequently mis-labelled so there is no certainty that the correct circuit is locked off. In order to do this, you should use a dedicated voltage indicator and a proving unit.

The guidance makes a number of points in regard to use of voltage indicators to prove dead, some of the key ones are: "*Following isolation of equipment or circuits and before starting work it should be proved that the parts to work on, and those nearby, are dead.*
It should never be assumed that equipment is dead because a particular isolation device has been placed in the OFF position."

So, it is not enough to simply lock off the breaker and assume that the circuit is now dead. There are recorded instances where neutrals are "borrowed" and while this is not permitted in BS 7671:2018 Requirements for Electrical Installations, it is not uncommon. In this instance, although a particular circuit may be locked off, the neutral conductor can become live if an energised load on another circuit is connected to it.

What is the correct equipment for proving dead?
Best Practice Guide 2 advises that you should use a dedicated voltage indicator and a proving unit when carrying out this procedure. Equipment must comply with BS EN61243 which since May 2013 prohibits the use of fuses in two pole voltage indicators. The list of suitable equipment includes test lamps, such as the Drummond MTL10, MTL15 or MTL20, or a two-pole voltage indicator, such as the Martindale VI13800 or VI-15000 which include a high wattage resistor in the probe to limit the current in the event of damage to the cable. The latest Martindale designs offers superior protection to most other products where the only protection is back in the instrument remote from the handheld probe.

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It is important to note that the voltage indicator MUST be able to work without the need for a battery, if you are using a device that needs a battery in order to work and the battery is flat, then you will not be able to prove if the circuit is dead or not!

VI13800
AC/DC Voltage Indicator

MTL20
AC/DC Test Lamp

Classic Voltage Indicators – safety through simplicity, no batteries, ranges or switches

The procedure for proving dead is to take the voltage indicator and check it against a known source, such as a proving unit, then test the circuit, then test the voltage indicator against the known source again to prove the tester has not failed during testing.

Whilst you can use a known live source to test your voltage indicator, we recommend using a dedicated proving unit. The reason is that the known live source will only light some of the LEDs on the tester, whereas a proving unit will ensure that all LEDs on all ranges are working, again safeguarding against incorrect readings due to a faulty LED. In addition there is not always a live source nearby and a dedicated proving unit is safer.

Voltage indicators should be proved using a known source both before and after testing the circuit.

Martindale VI-15000 Voltage Indicator and matching PD690 Proving Unit Kit (VIPD150)

Why can't I use a Multimeter or non-contact voltage detector to prove dead?

Firstly, the use of Multimeters or non-contact voltage detectors is advised against in the HSE guidance and the use of these has resulted in accidents in the past. The reason why a Multimeter is not suitable is that it is all too easy to select the wrong range. In addition the Multimeter relies on battery power to function, thus there is a high risk of making a false "dead" reading on a live circuit.

Non-contact voltage detectors also require a battery in order to work and are often sensitive to other signals, such as static electricity. It's also not possible to prove they are working correctly with a standard proving unit. Whilst these units can be used to detect live cables, they cannot reliably be used to prove dead.

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In conclusion, this article has briefly touched on safe isolation procedures, further information can be found in the HSE's publication Electricity at Work – Safe Working Practices (HSG85) which is available to download free of charge from the HSE website and also the ESF Best Practice Guide 2 (Issue 3 2015) which is available to download from http://www.electricalsafetyfirst.org.uk. With guidelines well established and safe isolation kits readily available, implementing safe isolation procedures is neither difficult nor expensive and has been proven to save lives and avoid injury. It's essential for compliance with Electricity at Work Regulations for safe working when installing and maintaining electrical equipment and systems.

VIPDLOKPRO150 Complete Safe Isolation Kit (1000V)

This article includes quotes from: Guidance on the management of electrical safety and safe isolation procedures for low voltage installations, Best Practice Guide 2 (Issue 3 2015), produced by Electrical Safety First. Direct quotes are marked within " " and in italic. Martindale voltage indicators, proving units and lock off kits are available from electrical wholesalers, catalogues and online distributors.

Specialist Locking Off Devices

LOK6W Fuse carrier lock for Henley and Lucy service cut outs

LOKFS1
Universal fused spur locking off device

LOK6 Red Spot fuse holder lock

VIPDLOK138 Comprehensive Safe Isolation Kit (600V)

For more information:

www.martindale-electric.co.uk

Call: 01923 441717 **email:** sales@martindale-electric.co.uk

Martindale Electric Co. Ltd.
Metrohm House, 12 Imperial Park,
Imperial Way, Watford WD24 4PP.
T: 01923 441717 F: 01923 446900
www.martindale-electric.co.uk
sales@martindale-electric.co.uk

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