

Live tests - an introduction

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Introduction

- Testing, although on the surface looks relatively simple, in reality experience counts for a lot
- This presentation covers the very basics of live testing and should serve as an aid when studying for your exams
- Always follow a safe system of work and ensure that the safety of yourself and others is always the priority

Safety!

- Remember EAWR applies at all times
- Safe isolation
- Risk assessment
- Permit to work
- Informing all those who may be affected
- Signs, barriers and notices
- **REMEMBER WHEN MEASURING Z_e ,
INSTALLATION EARTH IS DISCONNECTED**

Earth Fault Loop Impedance (Z_e)

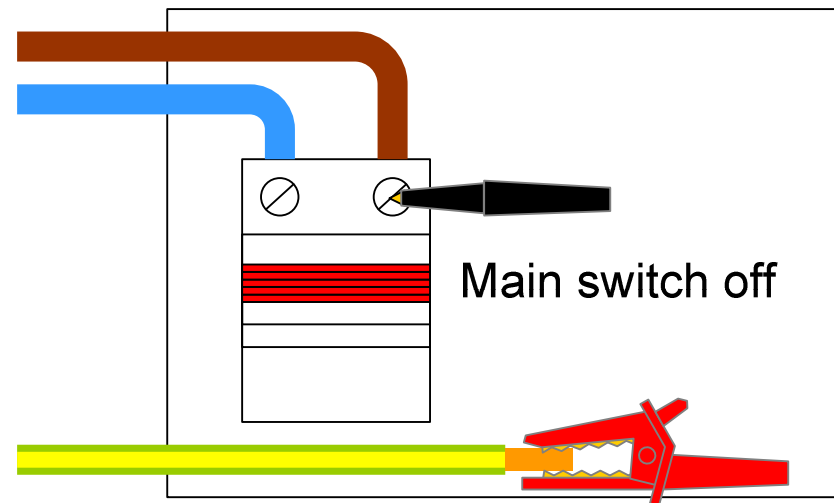
- May be determined by:
 - Direct measurement
 - Enquiry to the supplier
 - Calculation
 - On Site Guide values

Earth Fault Loop Impedance (Z_e)

- Verifies that there is an earth connection into the installation
- Confirms that it is the same or lower reading than that used in the design of the installation

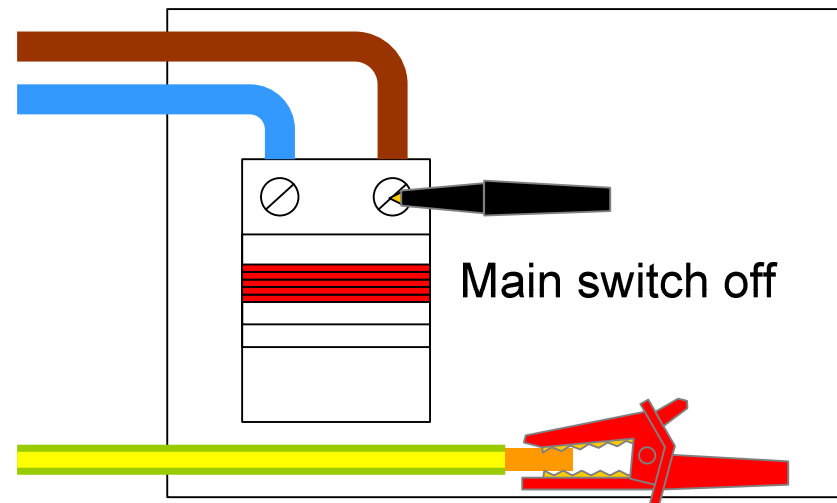
Earth Fault Loop Impedance (Z_e)

- Select an Earth Fault Loop Impedance tester
- Isolate the supply
- **Disconnect the main earth**
- Connect the tester to the main earth and the live conductor
- Record the results on the Schedule of Test Results



Prospective Fault Current (I_{pfc})

- While performing the measurement of Z_e it is convenient to also do the test to measure Prospective Fault Current
- The main earth should be reconnected before the test takes place
- Switch the loop impedance tester to Pfc and record the result on the schedule of test results

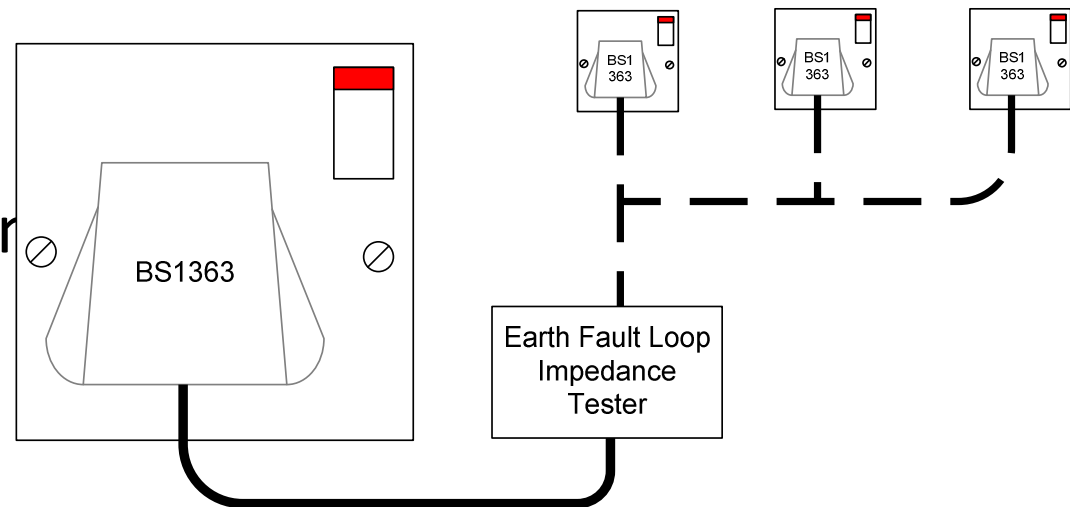


Prospective Fault Current

- Result must be lower than the breaking capacity of the protective device
- For example, a BS1361 type 1 cartridge fuse has a rating of approximately 16.5kA
- The I_{pfc} needs to be lower than this at the origin of the installation

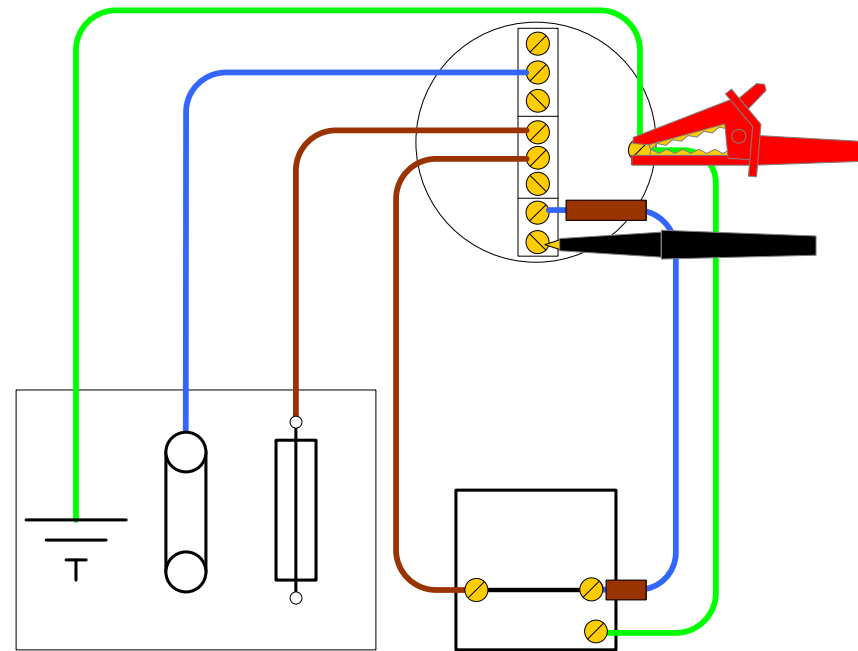
Earth Fault Loop Impedance (Z_s)

- As we know
- $Z_s = Z_e + R_1 + R_2$
- Test furthest point
- Record highest reading



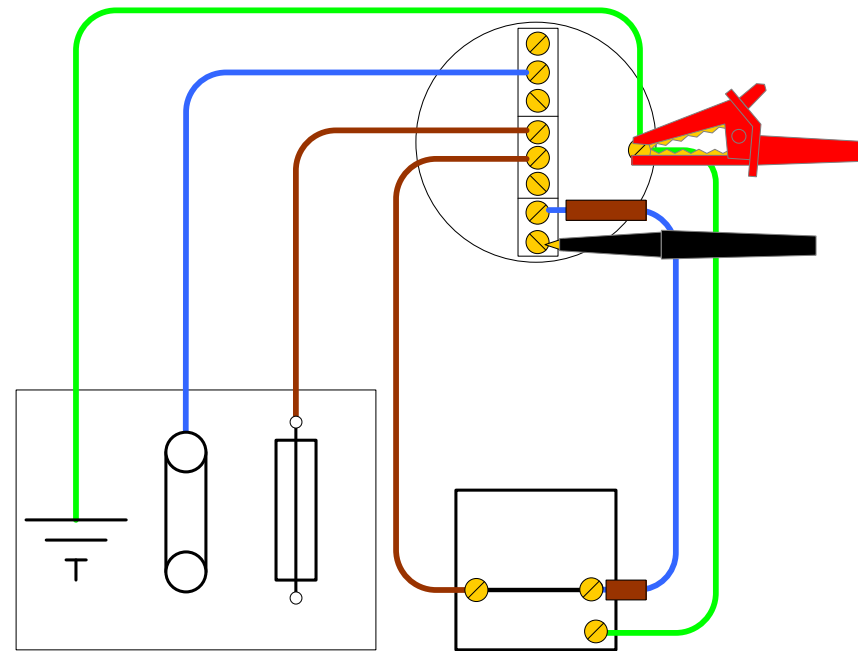
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Earth Fault Loop Impedance (Z_s)

- Result can be affected by parallel paths
- Conduit
- Trunking
- If this is the case, it should be measured during installation



Z_s and RCDs

- Some testers need to connect 3 leads to avoid the tripping of RCDs
 - Connect to L, N and CPC if this is the case
- Some use limited current testing (<15mA)
- Some use d.c. biasing, overloading the core so that it does not detect excess current

Functional Testing

- Functional checks involves 2 parts:
- 1) Checking that RCDs perform
- 2) Ensuring that the installation works as it should (i.e. go round switching everything and checking that it all works)

RCD testing

- In an installation, RCDs/RCBOs needs testing to prove they conform to BS7671
- Performed using an RCD tester

RCD Testing

- RCDs and RCBOs to BS EN 61008 and 61009 should be tested at:
- 1) $\frac{1}{2}$ x rated current (i.e. 100mA would be 50mA) and shouldn't trip
- 2) 1 x rated current and should disconnect within 300ms

RCD Testing

- RCDs used for additional protection rated at 30mA should be tested at
 - 1) $\frac{1}{2}$ x rated current (i.e. 100mA would be 50mA) and shouldn't trip
 - 2) 1 x rated current and should disconnect within 300ms
 - 3) 5 x rated current and should disconnect within 40ms
- That's 15mA, 30mA and 150mA

RCD Testing

- **Important!**
- Should be tested on BOTH cycles, positive and negative cycle
- Button should also be checked initially and then quarterly to check mechanical operation