Low Voltage Electrical Installation

MODULE 8
Chapter 5: Testing and Inspection

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Module Description

- Expected Outcomes
  - Perform inspection and testing in electrical installation.
  - Apply ethical principles and commit to professional ethics.

- Module Outline
  3. Polarity Test
  4. Residual Current Device Test
  5. Earth Electrode Resistance Test / Earthing Test

3. Polarity Test

- Function of Polarity Test:
  a. To ensure that each fuse and protection device are correctly connected to the phase conductor only.
  b. To ensure that all phase, neutral and earth conductors at each socket outlet are connected at the correct terminals.

3. Polarity Test (cont.)

- Test Equipment – Multimeter (Ohm range) or Ohm meter.
- Test Method:

  - Switch off main switch.

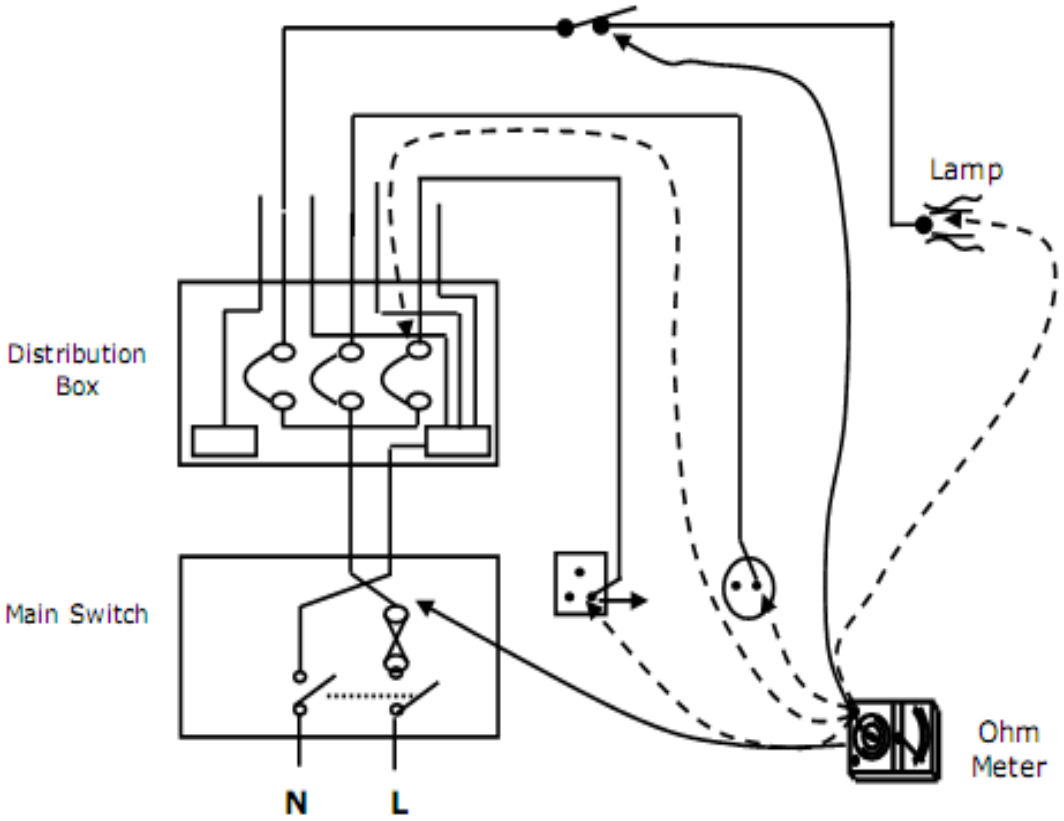
  - Disconnect all loads.

  - Switch on all circuit control switches.

  -Test switches and single phase control devices at the phase conductors.

  -Test socket outlet connection sources.
- Meter shall read a resistance value less than **1 ohm**

3. Polarity Test (cont.)



Polarity Test [1]

4. Residual Current Devices Test

- Function of Residual Current Device (RCD) Test:

  - To make sure that the RCD trips within the set time on the occurrence of current leaks to the ground

- Test Equipment – RCD Tester

- Test Method 1

  - Use the trip test button

  - press the trip button on the RCD to determine if it trips or otherwise.

- Test Method 2

Connect to the RCD tester. Select the RCD sensitivity to be the same as the sensitivity of the RCD to be tested, to determine if the RCD can trip. The time to trip shall not exceed 40 ms

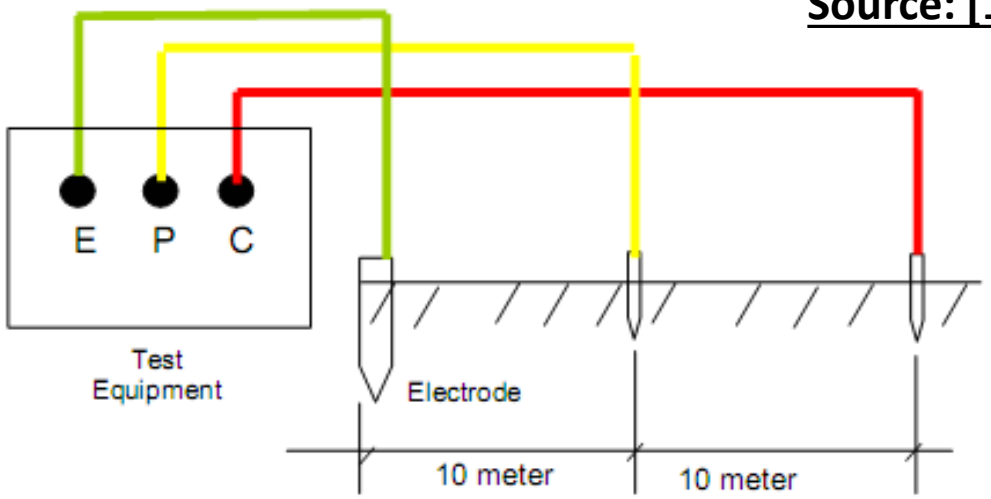
4. Earth Electrode Resistance Test

- **Function of Earthing Test:**
  - To test the earthing resistance.
  - To identify the suitableness of the electrode's location.
  - To assure that two electrodes are not buried together within the same resistance area.
  - Once the earthing is properly facilitated, the damage that may occur from the lightning effect to the building structure could be feasibly minimized.
- **Test equipment** – Earth Resistance Tester.

4. Earthing Electrode Resistance Test

- Test Method:

Source: [1]



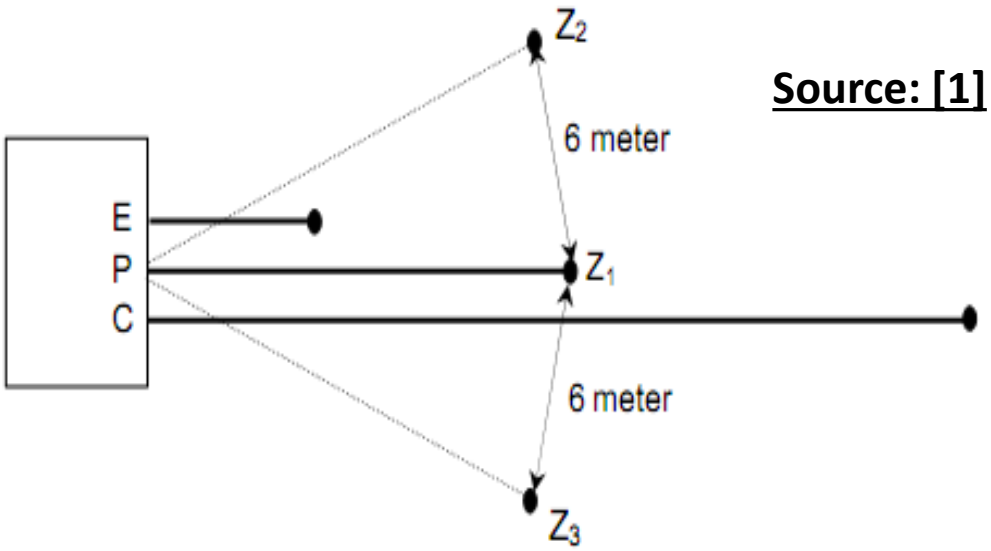
- ❑ The tested electrode (green conductor) is connected to the terminal ‘E’

4. Earthing Electrode Resistance Test

- Test Method:
  - ❑ The potential spike (yellow conductor) is connected to the terminal ‘P’ at a distance of 10 meters from the earth electrode.
  - ❑ The current spike (red conductor) is connected to the terminal ‘C’ at a distance of 20 meters from the earth electrode.

4. Earthing Electrode Resistance Test

- Earth Electrode Resistance Measurement Method



Source: [1]

- This test must be repeated at least three times, to ensure that the reading is not affected by interacting earthing regions.
- Record the first reading (Z1)
  - Example : Z1 = 10 Ω

4. Earthing Electrode Resistance Test

- Move the voltage spike to a distance of 6 meters from the original position. Record the second reading (Z2)
  - Example : Z2 = 10 Ω
- Move the voltage spike to a distance of 6 meters from the original position. Record the third reading (Z3)
  - Example : Z3 = 10 Ω

Result:

Average resistance = (Z1 + Z2 + Z3)/3

= (10 + 10 +10)/3 = 10 ohm

- The good result is below than 10 ohm.

How to Reduce a Resistance

1. Connect in series with additional earth electrode.
2. Connect in parallel the earth electrode.
3. Pouring a water or make the soil salty.

References

[1] Suruhanjaya Tenaga, *Guideline For Electrical Wiiring in Residential Buildings*, 2008.

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