

# TRIED & TESTED

## A GUIDE TO INSPECTING & TESTING LOW VOLTAGE INSTALLATIONS



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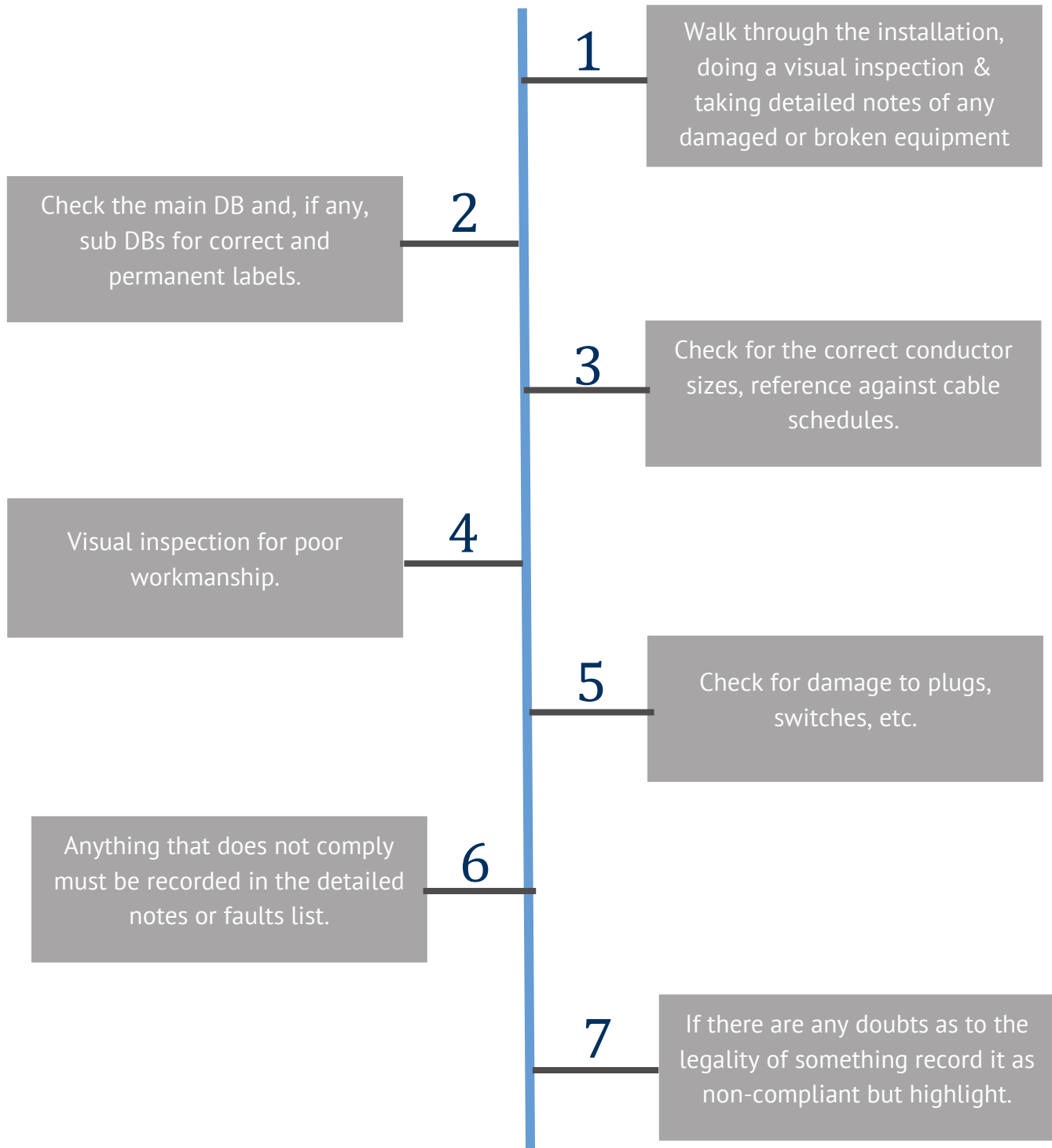
<https://www.maintworld.com/Asset-Management/Using-Ultrasound-and-Infrared-for-Electrical-Inspections-Examples>

The objective of ensuring efficient and correct inspection and testing methods is to determine the condition of an electrical installation and to ensure that any work that has been carried out complies with SANS 10142-1 and that in older installations the installation is still safe.

This article serves as a guide to inspections and testing methods that can be followed.

# INSPECTION PROCESS

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# TESTING

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## PSC (Prospective Short Circuit Current)

- This test is done to determine the approximate current that will flow through the supply circuit in the event of a dead short.
- In a domestic installation connect the red and black test leads after the main switch, but before the earth leakage and the green lead to the earth terminal
- In an industrial or 3 phase installation connect the red test lead to a phase conductor after the main switch or on to the bus bars, the black lead to the neutral bar and green lead to earth.
- Set the test instrument to PSC and the highest test setting and press the test button.
- If necessary, turn the test setting down to get a more accurate reading
- Record the tested reading.
- Disconnect all the test leads.

## Earth Loop Impedance Test

- Earth Loop Impedance, or Loop Impedance test, is done to determine the impedance or resistance of the earth fault path i.e. The sum of transformer windings resistance, and phase, and earth conductor resistances from transformer to DB.
- Connect the test leads in the same manner as for the PSC test.
- Set the test instrument to Loop Impedance and the highest test setting and press the test button.
- If necessary, turn the test setting down to get a more accurate reading.
- Record the tested reading.
- Disconnect all the test leads.

# TESTING

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## Earth Leakage Test

- The Earth Leakage test is done to determine the functionality of the earth leakage unit.
- Plug the Earth Leakage Tester into the socket outlet, taking note of the polarity indicators on the tester.
- Turn the setting to 20mA and press the test button. Continue turning the rotary control on the tester and pressing the test button until the Earth leakage trips.
- Continue with this until all plugs have been checked.
- Record the tested reading.
- Plugs whose polarity or earthing is incorrect should be marked for repair later and recorded on the faults list.

## Elevated Voltage on Neutral

- This test is done to determine the voltage flowing, if any, in the Neutral conductor.
- Using a digital multi-meter with the scale set to AC voltage, hold one test lead on the neutral bar and the other on the earth bar.
- Record the tested reading.
- The elevated voltage on neutral shall not exceed 25V.
- If the voltage is higher than 50V, the installation should be disconnected, and the problem recorded on the faults list.

# TESTING

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## Insulation Resistance Test

- This test is done to determine the resistance of the conductor insulation before the circuit or installation is energised.
- Using an insulation resistance tester (Megger) set the instrument to twice the nominal voltage.
- Connect one test lead to the phase conductor and the other to the neutral conductor of a circuit, and press the test button.
- Connect one test lead to the phase conductor and the other to the earth conductor of a circuit, and press the test button.
- Follow these same two procedures for a 3 phase installation but testing between phase conductors as well.
- Readings of greater than  $1M\Omega$  achieved.
- Record the tested reading.
- Readings of less than  $1M\Omega$  should, for an existing installation, be recorded on the faults list, and in the case of a new installation the fault must be found and corrected.