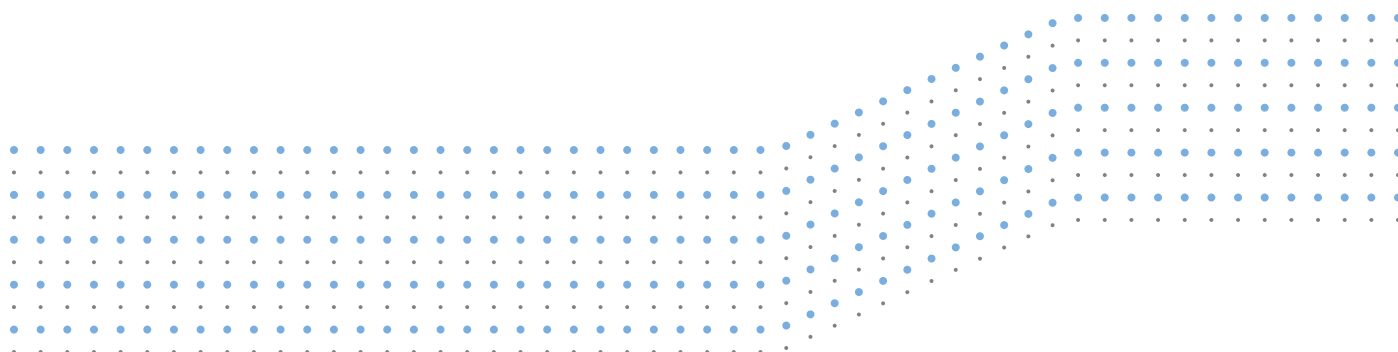


APPLICATION NOTE

Open Short Check Function of Chroma Safety Analyzers



Abstract

In electrical safety, many of the tests performed are put in place to assure that there is no connection between the current-carrying wires of a product and the chassis or the grounding. However, in a production setting, it is possible that a device under test, or DUT, is not connected properly to the test fixture, producing false positive results and potentially dangerous products.

This App Note will call attention to the Open Short Check (OSC) function available with Chroma’s hipot testers and safety analyzers. These safety analyzers and hipot testers can detect an open or short connection to the DUT by analyzing its architecture and comparing to a golden sample.



19036 AC/DC/IR Hipot Analyzer with Scanning Box

INSTRUMENTS

19020 - Multi-Channel Hipot Tester

19032 – Electrical Safety Analyzer

19035 – Wound Component EST Scanner

19036 – Wound Component EST Analyzer

19050– DC/IR Hipot Tester

19055 – AC/DC/IR Hipot Analyzer

19056/19057 – AC/DC/IR Hipot Analyzer

19070 – AC/DC/IR Hipot Tester

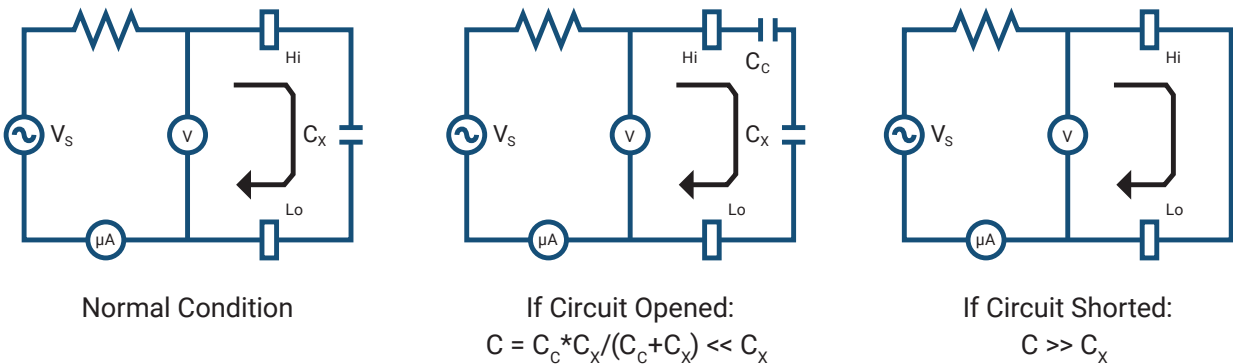
Solution: Open Short Check Function

Chroma has incorporated into hipot testers and safety analyzers the Open Short Check test, which is able to detect an open or shorted connection between the tester and the UUT by comparing the internal capacitance of the unit to a golden sample.

Capacitance of Device Under Test

For nearly any device that has nonconductive metal parts, there will be some capacitance across the space between current-carrying components and nonconductive components of the device. The capacitance depends on the material and physical architecture of the device, but for similar units the capacitance will be similar, within 50% of some average value.

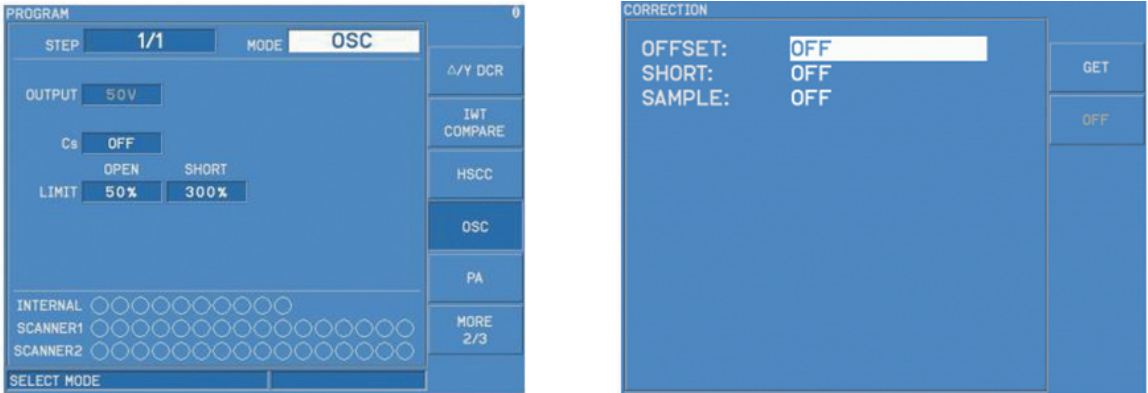
When an open connection occurs between the tester and the DUT, the capacitance measurement across the terminals will be zero, and if the terminals are shorted, the capacitance will be extremely high. Due to this effect, the Chroma safety test equipment can detect open and shorted connections by applying a low-voltage, high-frequency signal and measuring the response of the unit.



Using the Open Short Check Function

The Open Short Check can be performed at the beginning of a sequence of tests, which can produce early indications of a faulty connection. This means that the test can be stopped before the actual test is performed, saving time in production, as well as reducing the total number of false positive units that are put into production. Using the 19036 Wound Component Analyzer as an example, we will walk through the process for programming the OSC test on a device.

In the Program menu, set the mode to OSC for Open Short Check. Scroll down to the Cs entry field.



The 19036 allows you to enter your standard capacitance manually (0.1 – 40 nF) on this screen. Alternatively, the unit can take a sample measurement from a golden unit and use that value.

From the Test screen, enter the Correction menu. Enter the Sample screen.

Attach your golden unit and press Start. The 19036 Wound Component Analyzer will determine the capacitance of the unit and use it as the standard setting for the unit. Then enter the values for Open and Short to determine the tolerance of the test



Open Short Check - Pass

Open Short Check - Short Fail

Open Short Check - Open Fail

The 19036 Wound Component Analyzer can be set to either stop or continue the test when it encounters a device failure. This means that the test can be stopped before the high voltage is applied for a hipot test, which can protect your device and the operator.

Chroma offers effective and accurate safety analyzers that have a patented Open Short Check feature, saving time and preventing mistakes in a production setting. If you have any questions or would like more information on the Chroma series of safety testers, or any of the Chroma power test and measurement equipment, please visit our website chromausa.com.