FLUKE networks

Application Note

CopperPro™ Loop Qualification Tester 3T and 2T Opens Testing

This application note explores the features and technology underlying the CopperPro™ Loop Qualification Tester's opens tests.

What is an opens test?

An opens meter measures capacitance and converts capacitance to distance.

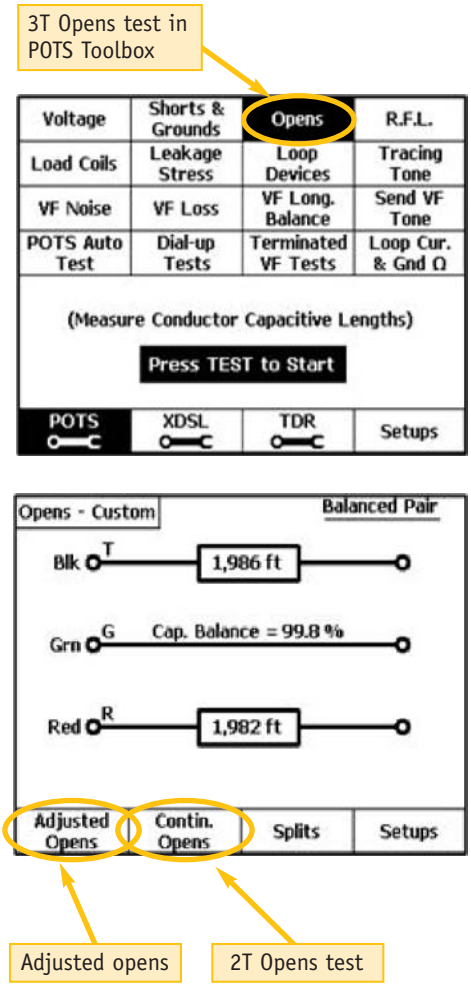
Different test sets measure the same capacitance. However, each test set has a unique algorithm for converting capacitance to distance. Cap Ratio and Cap Ref (mutual capacitance) are two such parameters whose values are set when the user selects a cable type: Jelly Filled, Air Core, Air Core – Pulp, JKT, 5 Pr. Bur. Drop, 2 Pr. Bur. Drop, 1 Pr. Aer. Drop, 2 Pr. Universal, or Custom.

The CopperPro tester utilizes two different opens tests and a unique algorithm to provide the best distance conversion:

1) The 3 terminals opens test (3T) utilizes all three test leads (black, red, and green) to make its measurements.

2) The 2 terminals opens test (2T) utilizes any two of the three test leads (black, red, and green) to make its measurements.

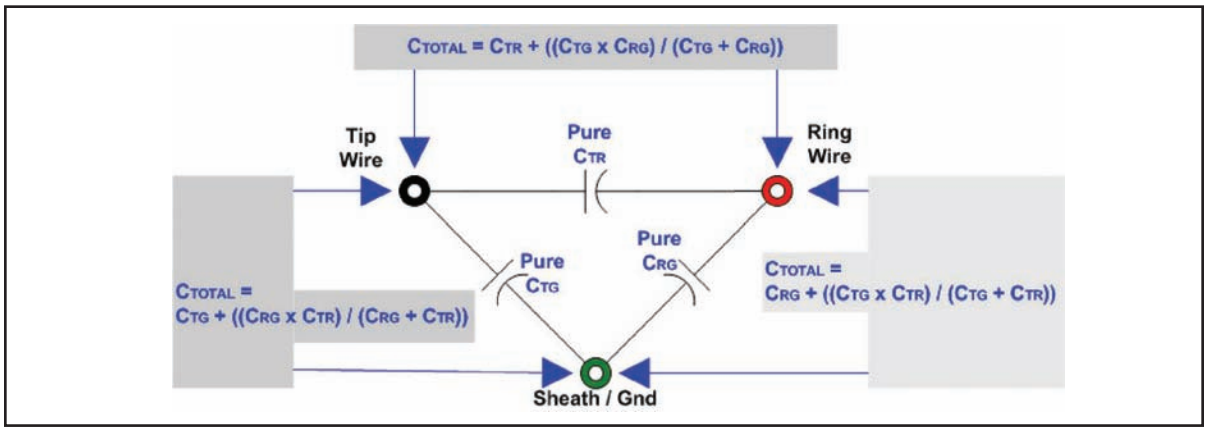
Both the 3T and 2T opens tests are located inside the POTS or XDSL Toolboxes. However, in order to gain access to the 2T opens test, you MUST run the 3T opens test first. By running the 3T opens test first, you can save valuable measurements (adjusted opens) that can be used by the 2T opens test to improve accuracy. If you don't save measurements (adjusted opens), then the 2T opens test can be run independently of the 3T opens test.



3T opens test

The 3T opens test utilizes a special algorithm that is able to measure the pure TR, TG, and RG capacitances regardless of the ground distribution of the cable or the added capacitance of the other pair legs. A stored Cap Ref (mutual capacitance) is used to convert to distance. The diagram on the next page details how the measurement is made.

990DSL CopperPro™
Copper Loop Qualification Tester



How the 3T opens measurement is made.

Adjusted opens

The Adjusted Opens feature allows you to build a custom cable type by entering a unique cable length or unique Cap Ref. This is the procedure for using the Adjusted Opens feature:

1) Perform a 3T opens test on a good reference pair.

2) Use the Adjusted Opens feature to do one of the following:

a) Adjust the cable length value if the length of the good reference pair is known. The measured Cap Ratio will be used unchanged.

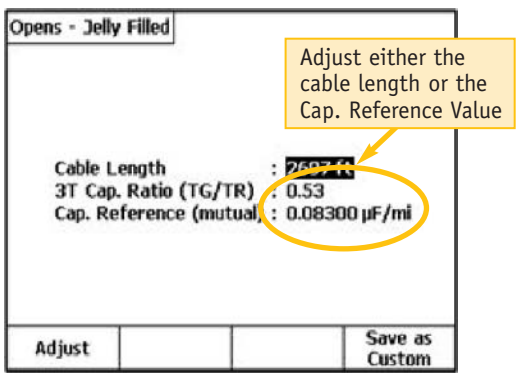
b) Adjust the Cap Ref value if the mutual capacitance of the good reference pair is known. The measured Cap Ratio will be used unchanged.

3) Save this custom cable type by pressing SAVE AS CUSTOM.

If you decide to run the 2T opens test (CONTIN. OPENS), the 2T test will now use the previously stored parameters associated with the Adjusted Opens feature.

If you decide to run the 3T opens test (OPENS), the 3T test will now use the previously stored parameters associated with the Adjusted Opens feature.

Adjusted Opens Feature Screen



2T opens test

If a custom cable type has not been created prior to running the 2T opens test, the 2T test utilizes a stored Cap Ratio (TG or RG to TR) to back out the pure TR, TG, or RG capacitance. However, this stored Cap Ratio assumes something about the ground distribution and added capacitance of the other pair legs in the cable – approximately 20% of the pairs must be working pairs with grounded Tips. A stored Cap Ref (mutual capacitance) is used to convert to distance.

About the CopperPro™ family of loop qualification testers

The CopperPro family of loop testers from Fluke Networks provides all technicians working in the outside plant a full complement of testing, fault locating and qualification capabilities in a single, rugged, handheld test set. CopperPro is easy to use. Fast. And it offers more capability than any other single loop test set.

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Fluke Networks operates in more than 50 countries worldwide. To find your local office contact details, go to **www.flukenetworks.com/contact**.

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