

Simplifying Resistive Fault Location

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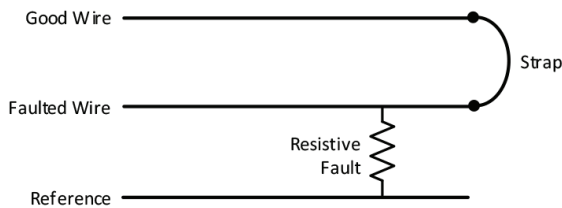
Resistive Fault Location (RFL) is a powerful measurement technique used to locate high resistive faults on voice and broadband cable pairs. High resistive faults are normally caused by damage or deterioration of the cable insulation or sheath protecting the copper pair wires. In most cases, water or moisture, and the resultant corrosion, are the leading causes of resistive faults.

There are several variants of RFL which are used according to the severity of the issue the technician is faced with. These include:

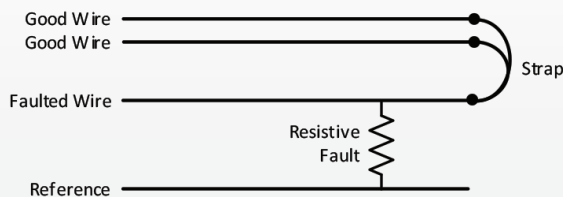


EXFO MaxTester 600

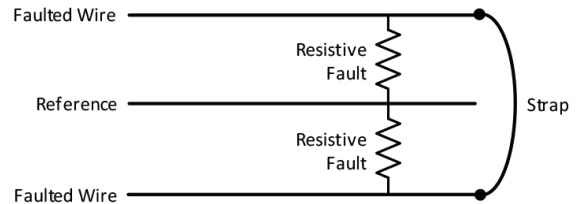
2 Wire (2W) or Single Pair RFL to locate resistive faults on a copper pair where the fault is between one wire of the pair and ground or sheath. A strap is added at the far end of the circuit to create an electrical short circuit between the good wire and faulty wire.



4 Wire (4W) or Separate Good Pair RFL to locate high resistive faults on a copper pair where the fault is between the wires; and a separate, dry copper pair with no faults is available for use as a reference. A strap is added at the far end of the circuit to create an electrical short circuit between the wires of the good pair and the faulty wire.



Küpfmüller or RFL K-Test to locate high resistive faults between each wire of the copper pair, occurring at the same location; and no separate, dry copper pair is available for reference. The RFL K-test requires the use of both open and short states at the far end of the circuit during the test progression.



To perform an RFL measurement, the technician needs to apply a short or a strap at the far end of the circuit. If the technician will be conducting other tests that may require an open circuit at the far end, the technician must walk or drive between the customer location and the end of the copper pair circuit several times to change the state of the line.

A more cost-effective solution for RFL and K-test measurements is to make use of the TS125 Far End Device (FED) to remotely change the state at the far end of the circuit. This speeds up the tests and cuts down on travel-related expenses. Coupled with the EXFO MaxTester 600 series, the TS125 FED changes the state of the line to perfectly match the RFL or K-test measurements.



Telettech TS125 FED

Under typical copper pair quality testing, an isolation resistance or leakage test is performed against an open circuit. This is the first positive confirmation that a high resistive fault exists and which wire(s) is impacted.

Pair	Resistance	Soak Counter (s)	P/F
①	951 kΩ	5	✖
②	≥ 1 GΩ	5	✔
③	≥ 1 GΩ	5	✔

Test Status: Ready

Example of a T-R Fault

Pair	Resistance	Soak Counter (s)	P/F
1	≥1 GΩ	5	✓
2	951 kΩ	5	✗
3	≥1 GΩ	5	✓

Example of a T-G Fault

Pair	Resistance	Soak Counter (s)	P/F
1	≥1 GΩ	5	✓
2	951 kΩ	5	✗
3	≥1 GΩ	5	✓

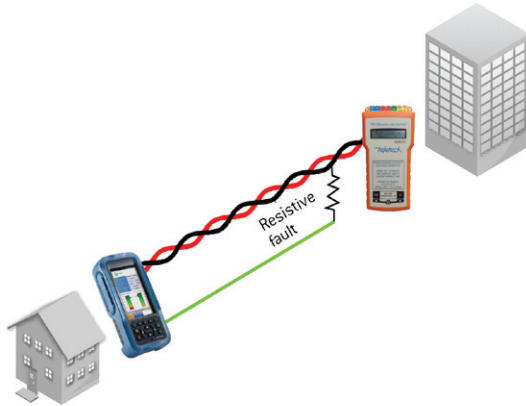
Example of a R-G Fault

In situations where the fault lies at the same location on both wires of the cable, the use of the K-test is required to acquire accurate results. As previously mentioned, a K-test requires both an open-circuit state and a shorted-circuit state to occur during test progression. This is where the TS125 FED perfectly fits in a K-test.



Example of a K-test

To locate the fault, connect the MaxTester and the TS125 FED to the line following the on-screen instructional diagram provided by the MaxTester.



Example of a single-pair / 2-wire RFL test

Running the single-pair RFL test we are able to see the distance (in kilofeet or meters) to the fault and the distance to the TS125 (referred to as the strap in this test) as well as the size of the fault.

Open Ratio	Closed Ratio	Lx/L
33.2	92.4	0.8961

The K-test provides, as the RFL test does, the distance (in kilofeet or meters) to the fault and the distance to the TS125 (referred to as the strap in this test) as well as the size of the fault.

Open Ratio	Closed Ratio	Lx/L
33.2	92.4	0.8961