

New TDR-410 for finding cable faults



A Time Domain Reflectometer (TDR) provides a fast and accurate method of locating faults in metallic cabling. If a cable has a minimum of two conductors separated by a dielectric (i.e. twisted pair or multi-core cable) or a conductor and screen (i.e. Coaxial cable) it can be tested by the Sonel TDR-410. TDR's will measure cable length and identify faults in the cable.

TDR's work on a simple principle; a pulse is injected into the cable and it propagates along the cable at roughly the speed of light until it hits the end, or encounters a change in impedance, and bounces back. Impedance changes could be due to reaching the end of the cable, or a fault such as a break, loose connection, a short-circuit, or a splice or tap, or moisture has got into the insulator sheathing.

The TDR analyzes the time to receive the return pulse and the change in shape of the return pulse. From these characteristics the TDR can tell how far along the cable the "fault" is located and what the nature of the fault could be.

In addition TDR's can be used to test cable quality on reels to inspect for shipping or storage damage, cable length shortages, suitability for usage, inventory management, and to identify quality problems with the manufacturing process

So the basic operating principle of the TDR is similar to that of RADAR. Pulses of energy are sent out and are reflected back. To properly analyze the returned pulse and calculate distance, the TDR requires the input of certain information on the characteristics of the cable being tested, such as the cable impedance, and the velocity of propagation (VP).

The time it takes for the pulse to travel and be reflected back, whether from the end of the cable or from a fault, must be multiplied by the constant (VP) which is specific to the type of cable under test. This is because different cable types due to their construction will propagate pulses at different speeds. Tables have been established for values of VP for different cable types.

The returned pulse is displayed as a waveform on the LCD. This waveform is known as the "signature" of the cable. The shape or signature is unique to the type of fault, and thus gives a strong clue to identifying the type of fault on the cable. The TDR-410 has a moveable cursor that the user aligns at the base of the rising edge of the pulse waveform, and the distance to the fault or end of cable can be read from the LCD in feet or meters.

Shorted conductor



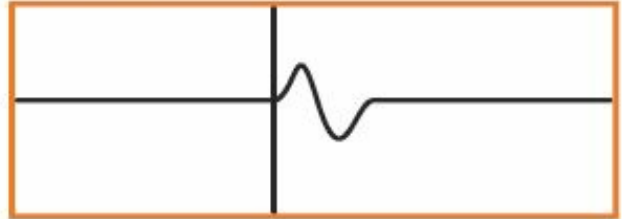
Open conductor



Tap



Splice



Frayed cable



Bridge tap



Water ingress



Wet splice / water



Splitter



Split / resplit

