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FAULT LOCATING JACKETED PRIMARY WITH YOUR LOW VOLTAGE CABLE FAULT LOCATOR

High voltage cable fault locating is different than low voltage cable fault locating for two reasons. 1. On high voltage cables, the distance from the conductor to the soil is greater. 2. The concentric neutral that wraps around the outside of the cable.

The typical method for fault locating a high voltage cable is connecting a large capacitor (Thumper) to the conductor and concentric neutral. Charge up the capacitor to a high voltage that will arc from the conductor to the neutral. This arc will ionize the air, creating an explosion. This explosion or "thump" is what we listen for. The jury is still out as to how much damage a thumper creates when trying to locate a cable failure, but we do know thumpers do not lengthen the life of a cable.

Low voltage cable fault locators are used on insulated conductors that do not have a neutral wrapped around the outside of the cable. Low-voltage fault locators are called Earth Gradient Cable Fault Locators. The two types on the market are low voltage D.C. impulse and low frequency tone. The signal transmitter is connected to the faulted conductor and a ground rod. The injected signal arcs from the conductor to the earth and travels back to the ground rod in the soil. The gradient current flowing in the soil is what the detector measures to pinpoint the fault.

The definition of an earth gradient cable fault is when "FAULT CURRENT ENTERS THE SOIL FROM A CONDUCTOR". This is why low voltage fault locators are not used on high voltage cables. The low voltage will not be enough to arc the large distance from the conductor to the neutral or soil because of the thickness of the insulation. If the signal can't get to the earth, there is no gradient field to be found.

A direct buried primary cable without a insulating jacket around the neutral cannot be fault located with a low voltage cable fault locator because the neutral is in

contact with soil over its entire length, however, a jacketed primary could be located with your low voltage fault locator under some conditions.

Telephone cables have a metallic sheath on the outside of a multi-pair cable. Over the outside of the metallic sheath is a very thin rubber insulation. The telephone company uses what is called a "sheath-to-ground" cable fault locator to locate damage in the outer jacket. This damage is then repaired to keep moisture out of the cable. A "sheath-to-ground" fault locator is same earth gradient cable fault locator an electric utility would use on its low voltage cable fault locating.

When a jacketed primary cable has a fault, the operating voltage will arc to the neutral at the point of failure. When this happens, the arc will also damage the thin insulating jacket around the neutral. This damaged jacket is what can be fault located with a low voltage fault locator.

If a jacketed primary cable fault locate is treated as a sheath to ground fault, the fault locate can be made with an earth gradient cable fault locator, but we have a great big "IF" that we need to observe. Since a radiated electric field can induce voltage into a conductor that is in its moving magnetic wave path, a neutral should never be disconnected unless the cable is first checked for neutral current flow. Lifting a neutral that has neutral current flow would elevate that conductor to some voltage level that might not be healthy to touch.

If the neutral has no current flowing in it, the following method can be used to make the fault locate.

Isolate the conductor and the neutral at both ends of the cable. Connect the earth gradient fault-locating transmitter to the isolated neutral. Since the conductor is isolated at both ends, there is no way the transmitter signal can arc to the conductor. The only way for the signal to get back to the transmitter is to arc through the thin outer jacket around the neutral to the soil. The signal then travels through the soil back to the ground rod placed at the transmitter.

The down side to this fault locate is that if the jacket has small pin holes, or some other damage to the outer jacket, they will show up as a cable fault.

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