

Underground Cable Location: Basic Techniques



high voltage
testing equipment

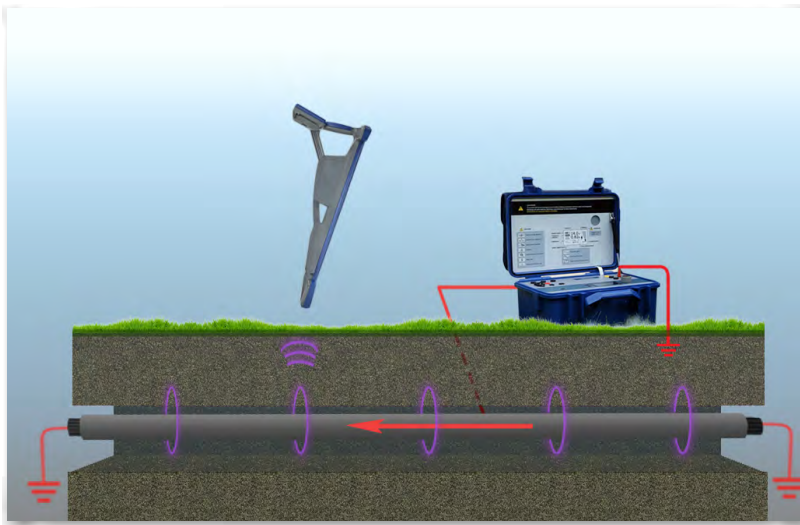


Underground Cable Location: Basic Techniques

Knowing the basics of cable location, you will be able to make the best use of cable locating equipment, accurately trace the cable route and identify the cable depth. Below you will find the main cable locating methods along with their advantages and disadvantages.

There are two primary types of cable locating: active and passive. Essentially, the target cable is traced by picking up the signal that is either induced (active location) or already exists (passive location) in the cable being located.

Active locating



Active cable locating involves charging the target cable with electricity and then using a receiver to pick up the generated signal. For this type of location an electrical circuit, which will enable current to flow, is created according to one of three connection methods: conductive (direct), inductive clamp or inductive.

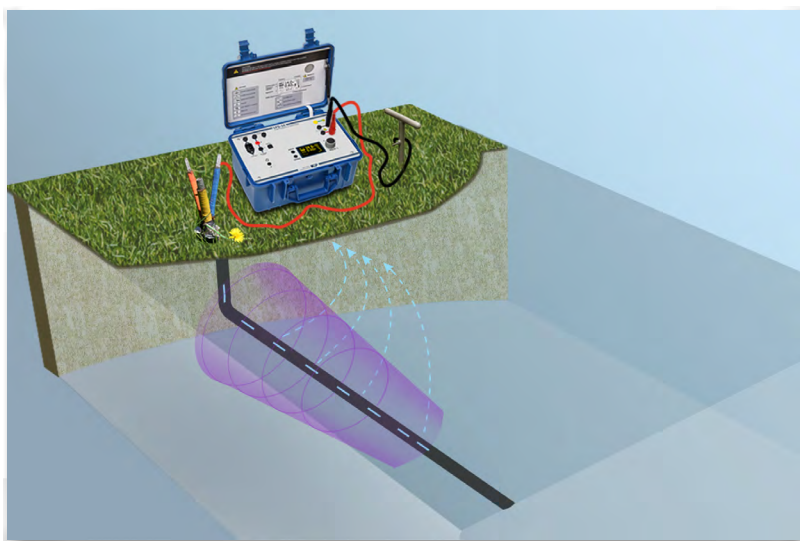
Conductive locating

The most effective connection method is conductive, also known as direct connection because it generates the strongest signal compared to the other two active locating methods, and therefore improves locating results. As it is

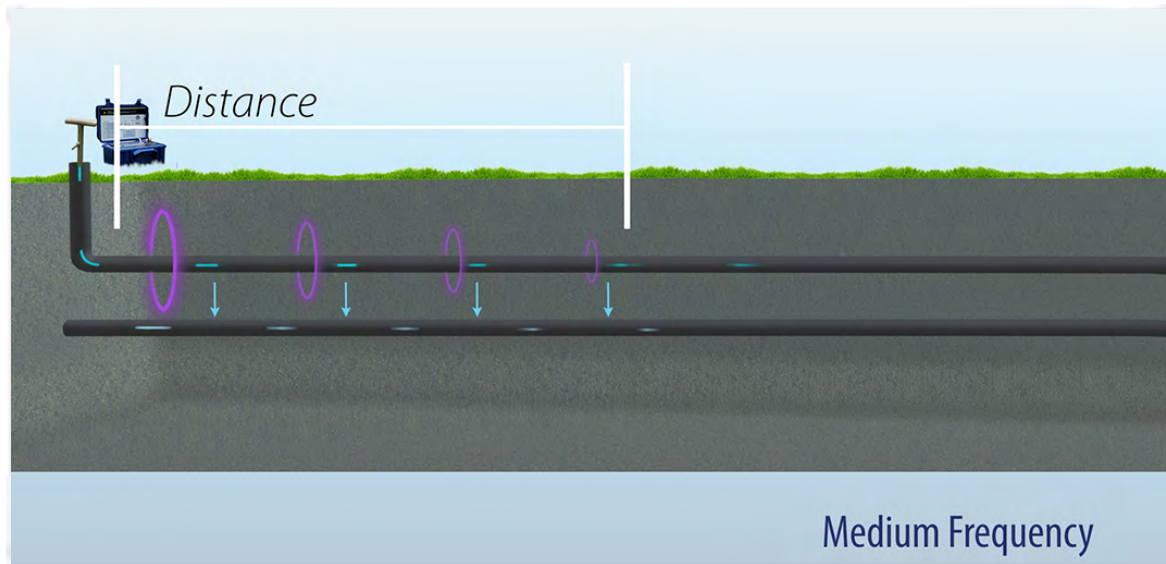
implied in the method's name, the target cable is located through a direct connection, which concentrates the signal transmitted by the audio frequency generator on the target line.

For this method, first connect the clip of the red cable to the target cable ensuring there is good conductor contact.

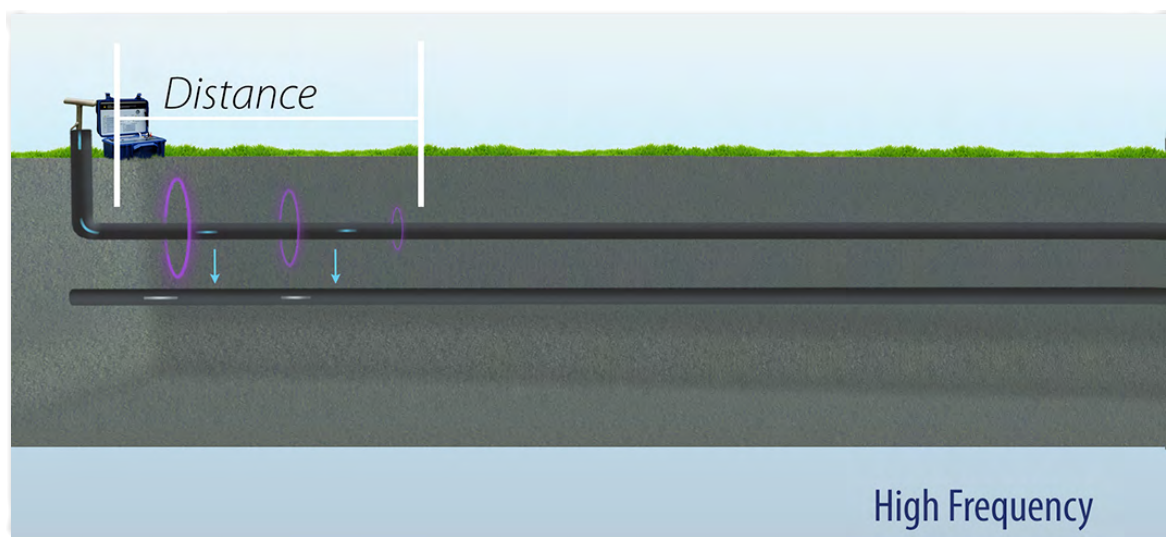
After that you should position the ground stake perpendicular to the anticipated cable route.



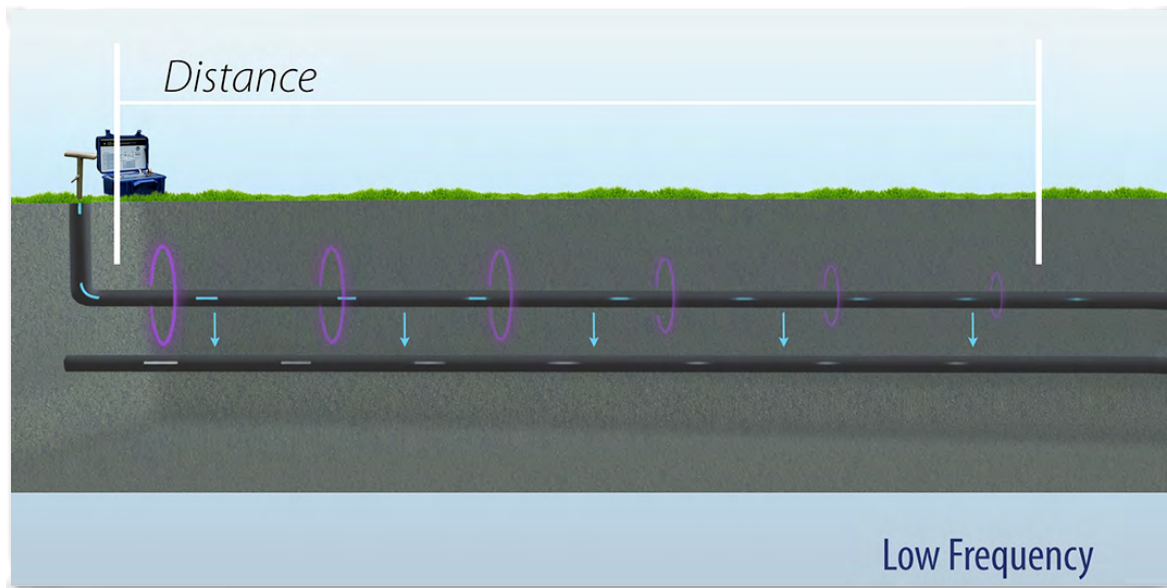
The stake should be buried deep in the ground as it will increase surface contact with the soil. Take care to implement proper earthing as the intensity of the signal depends on it. Following this, connect the black cable clip to the ground stake, which will complete the electrical circuit and start the current flow along the cable being located. The farther the signal travels away from the transmitter, the weaker it becomes due to leaking into the ground. To deal with this issue, it is important to adjust the frequency properly.



The choice of frequency depends on the locating conditions. In the best case scenario, with proper conductor connection and favourable soil conditions, it is a good idea to use the lowest frequency since the lower the frequency is, the farther the current will flow and the smaller the signal leakage to neighbouring objects will be.



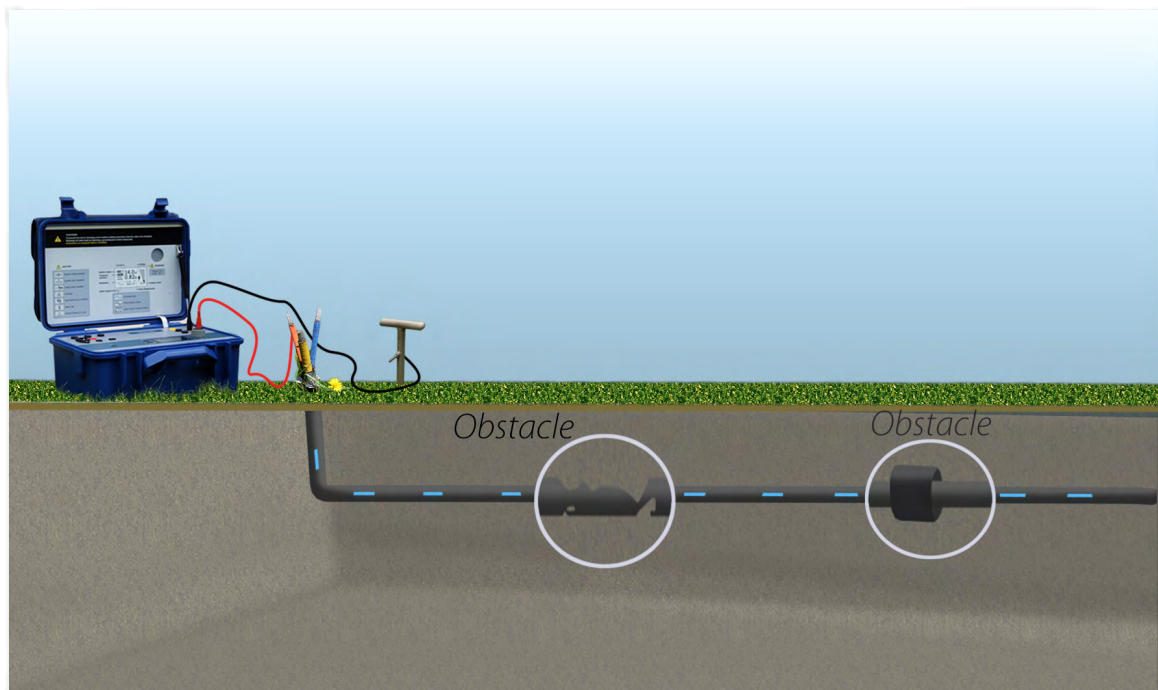
If you increase the frequency, the current will travel a smaller distance due to faster leaking, with a negative effect on the locating outcomes.



Therefore, in most cases it makes sense to start at the lowest possible frequency level and gradually increase the frequency as long as it is necessary.

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■ CABLE ROUTE TRACING ■

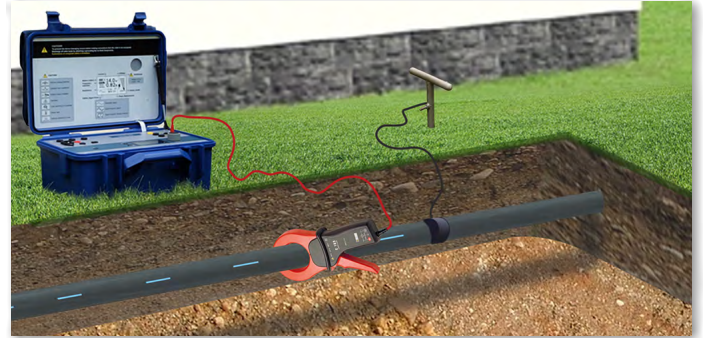


If locating conditions are not so good, with poor conductor connection, non-conductive elements, corrosion and other obstacles to the current flow, you will have to use a higher frequency to overcome these barriers.

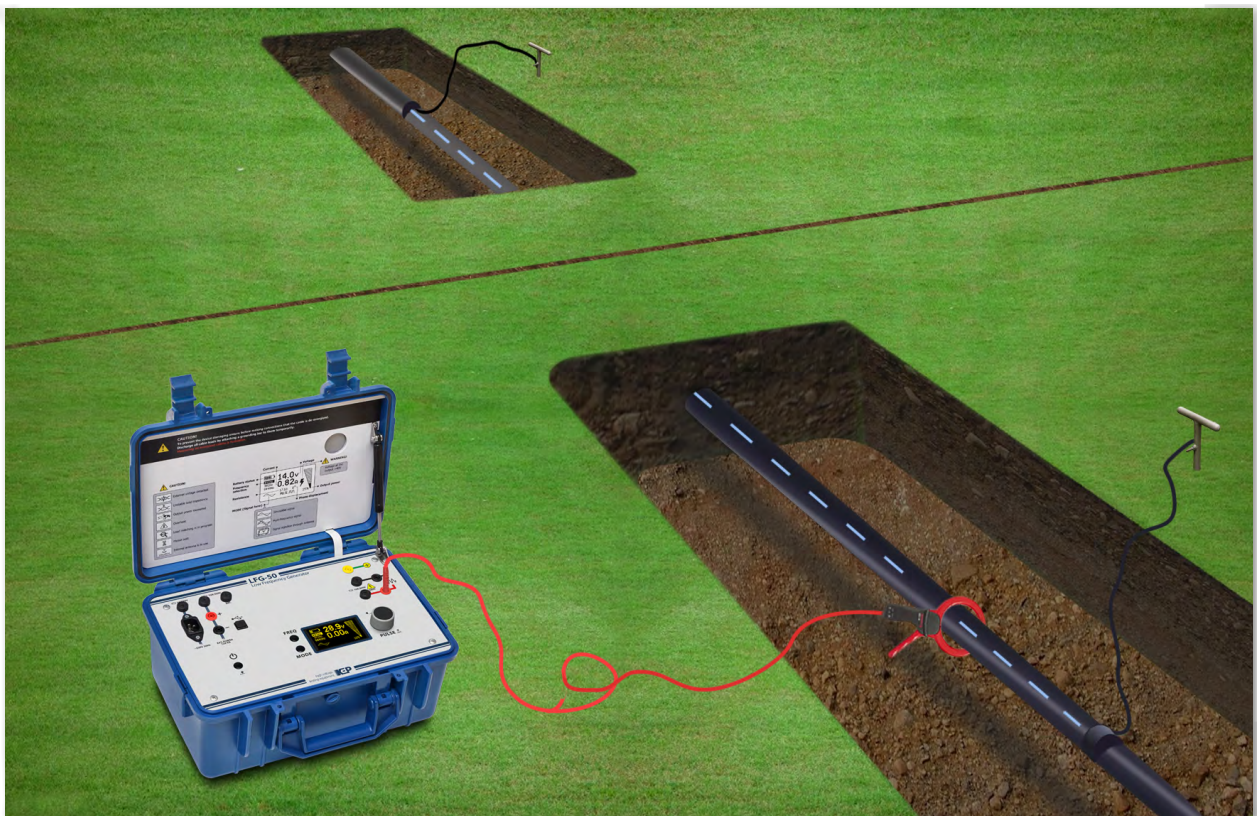
However, the conductive connection method may not always be convenient or possible to use, for example, when there is limited access to the target cable.

Inductive clamping

In the inductive clamp method less current is generated, but this technique is not an appropriate solution when the access to the cable is restricted.



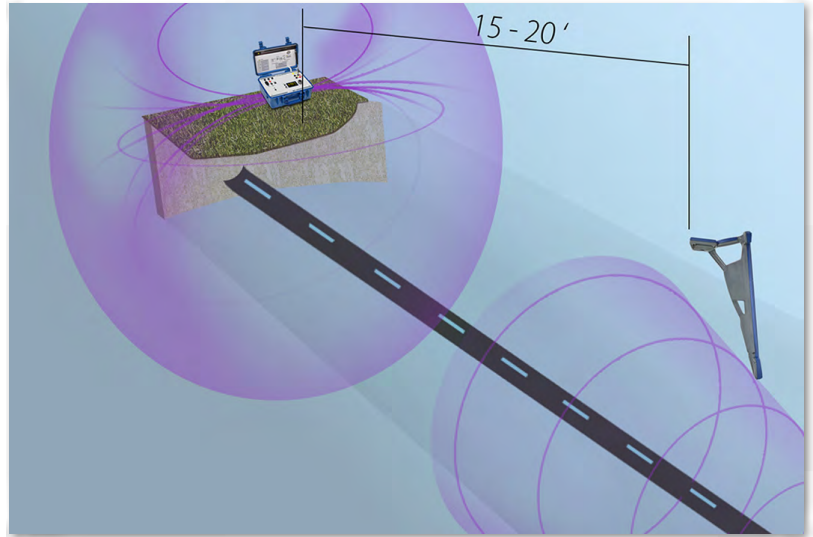
For this connection type you should close a clamp around the cable being located, which can typically be found near buildings or on utility poles; in some cases to apply the clamp you might have to dig around the cable.



Fully close the clamp around the conductor at least on one end, but applying the clamp on both ends would make for better locating results. The line should also be earthed on both ends, otherwise the signal will be too low for cable locating. In case only one end of the cable can be earthed, it should be the far section of the cable. If not, the signal will travel to the near earthed end in a short time.

Inductive locating

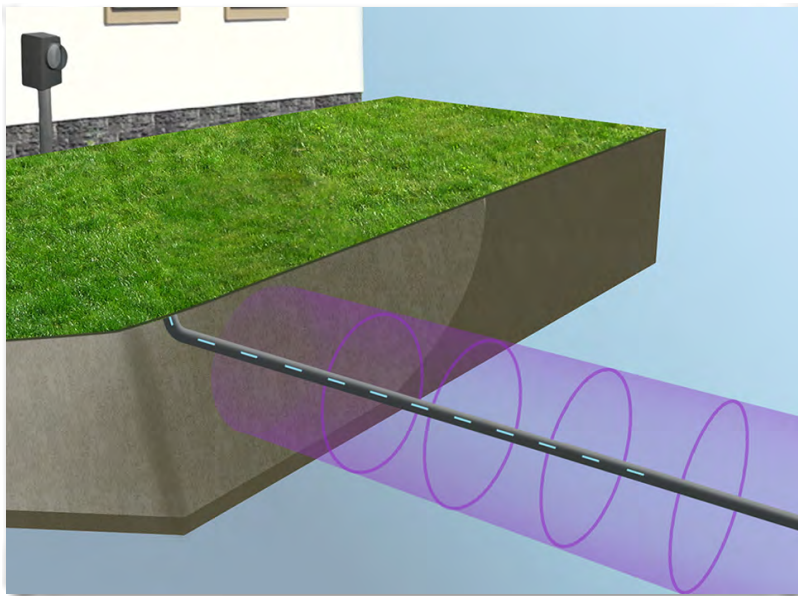
The inductive cable locating is conducted with the help of a transmitter box. For this cable locating approach, make sure that you position the transmitter box on the ground immediately over the target cable. If you fail to place the box properly, most probably the signal will not be strong enough. The antenna of the transmitter box will start inducing current on the cable. Move about 5-6 meters away from the transmitter box and use the receiver to locate the cable; if you are any closer to the transmitter box, you will end up receiving the signal from the antenna rather than from the cable being located.



The problem with this method is that the signal it generates is considerably weaker than that produced in the conductive and inductive clamp methods. Also, nearby structures like cables located in the close proximity are likely to pick up the signal from the antenna and thus make the use of this method more difficult. This means that it is only sensible to resort to inductive locating if the other two active locating approaches cannot be applied.

All the active locating methods can also be applied for locating metal pipes.

Passive locating



Passive cable locating is applied if the target cable is already electrically charged, in which case a transmitter is obviously not needed.

To locate a cable that carries a current, for example, a power line, you can use the passive locating. For this method the target cable must be powered with a network distribution electrical current. The difficulty associated with this method is that it cannot be used if the target cable is not energized. Also, the load of the line will define how strong or weak the signal is, which significantly affects the location process. So, you should take care when using this locating method and apply it only provided that you cannot use any of the active locating methods described above.