

Cable And Pipe Signal Receiver

Part 17-300R
CABLE AND PIPE SIGNAL RECEIVER

Part 17-300RTK
CABLE AND PIPE SIGNAL RECEIVER
WITH TRANSMITTER



Part 17-500T
TRANSMITTER



General Information

Jameson's 17-300R Cable and Pipe Signal Receiver has an ergonomic design for one-hand operation and highly visible display. Works with transmitter to detect active frequencies, adjusting to work at different sites and applications. Locate any continuous metal run - iron, steel and copper water lines, gas lines, tracer wire by plastic pipe, telephone/TV cables, copper and aluminum wire, conduit, power lines and Duct Hunter™ Traceable Rodders.
4 Frequencies: 512 Hz, 8 KHz, 33KHz and 82 KHz.

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WARNING

Electric Shock Hazard



- Tool is designed to detect electromagnetic field emitted from camera sondes and buried metallic utilities. There are buried cables, pipes and utilities this instrument CANNOT detect.
- Locating is not an exact science. The only certain way to be sure of the existence, location or depth of buried utilities is to carefully expose (dig up) the utility.
- De-energize any circuits in or around the work area.
- Do not expose tool to rain or moisture.
- Use tool only for intended purpose as described in this manual.

Failure to observe these warnings could result in severe injury, death or property damage.

Disclaimer Of Liability

Jameson shall not be liable to distributor, reseller or any other person for any incidental, indirect, special, exemplary or consequential damages, or injury of any type whatsoever and caused directly or indirectly by products sold or supplied by Jameson.

Warranty

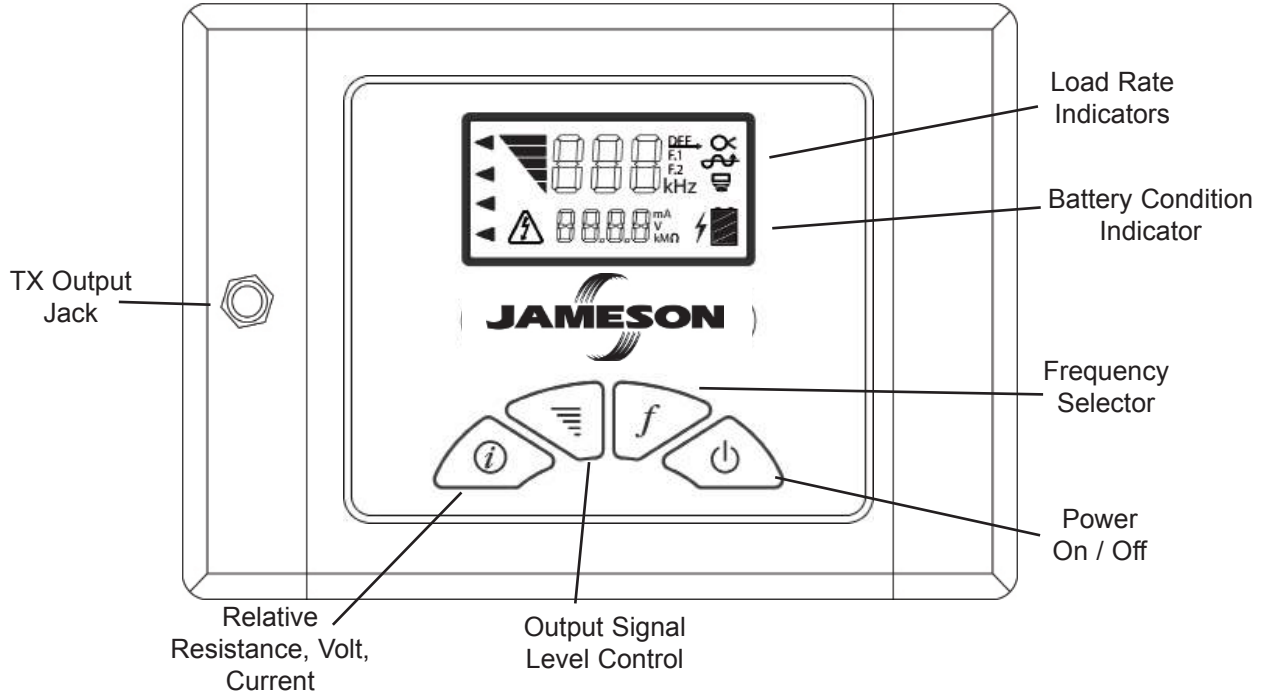
Jameson products carry a warranty against any defect in material and workmanship for a period of one year from date of shipment unless failure is due to misuse or improper application. Jameson shall in no event be responsible or liable for modifications, alterations, misapplications or repairs made to its products by purchaser or others. This warranty is limited to repair or replacement of the product and does not include reimbursement for shipping or other expenses incurred. Jameson disclaims any other express or implied warranty.

Prepare For Use

Unpack Locator and make sure there is no shipping damage and all the parts are included.

Locate battery compartment on back of the “head” of Receiver. Open compartment using a phillips screwdriver. Install six “C” batteries as marked.

Transmitter (“TX”) Controls and Indicators



TX OUTPUT JACK

The Red/Black Cord, Coupler and Flexicoupler connects here to create a circuit on the buried utility.

TX ON

A Frequency light and Output level light indicates unit is on.

FREQUENCY SELECTOR

The 82 kHz reading indicates the 82 kHz frequency is in use. This frequency is the higher of the four. The 82 kHz frequency is often used to locate sharp corners in cables or pipes and is capable of jumping disconnected shield bonds or grounds. The 512 Hz reading indicates the 512 Hz frequency is in use. The 512 Hz is the lower frequency. It is less susceptible to locating errors caused by adjacent cables or pipes. Also, by using the 512 Hz frequency, the locating range is greater. The 8 kHz and 33kHz are mid-range frequencies used when the 512Hz is too weak and the 82 kHz is bleeding off too easily.

LOAD RATE INDICATOR

The Load Rate Indicator symbol flashes to indicate the output circuit impedance. When the indicator blinks 4 times per second, it is indicating a nearly short circuit. When the indicator blinks 1 time every 3 seconds, it is indicating a nearly open circuit.

Note: Holding down the Power Output button for 2 Seconds will Mute the Audio Load Rate indicator.

OUTPUT SIGNAL LEVEL CONTROL

The Output Signal Level Control adjusts power output from the Transmitter. The selections include Low, Medium, High.



CAUTION

DO NOT CONNECT TO LIVE OR ENERGIZED POWER CABLES

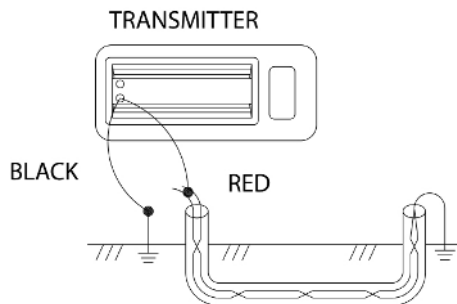


Direct Connection

Direct Connection is the most reliable method of signal application. This method is relatively free of interference. The greatest amount of signal strength can be achieved by this method. Low, mid and high frequency may be used. The far end of the utility must be grounded.

Connect the Red Test Cord to an existing ground point or an exposed metallic section of the utility. Place the Ground Rod approximately 10 feet from this point, at an angle of 90° to the buried cable or pipe. Push the Ground Rod into the ground 8 to 10 inches. Connect Black Test Cord to Ground Rod.

Plug Red/Black Test Cord into TX Output Jack. Press Frequency Button for 512 Hz, 8 kHz, 33 kHz or 82 kHz. The Power Output Indicator and Frequency light of the chosen frequency will light up.



Inductive Connection

This method is convenient and services are not interrupted. No test cords or connections are needed. Cable or pipe must have good insulation or non-conductive coating, otherwise operating range will be short.

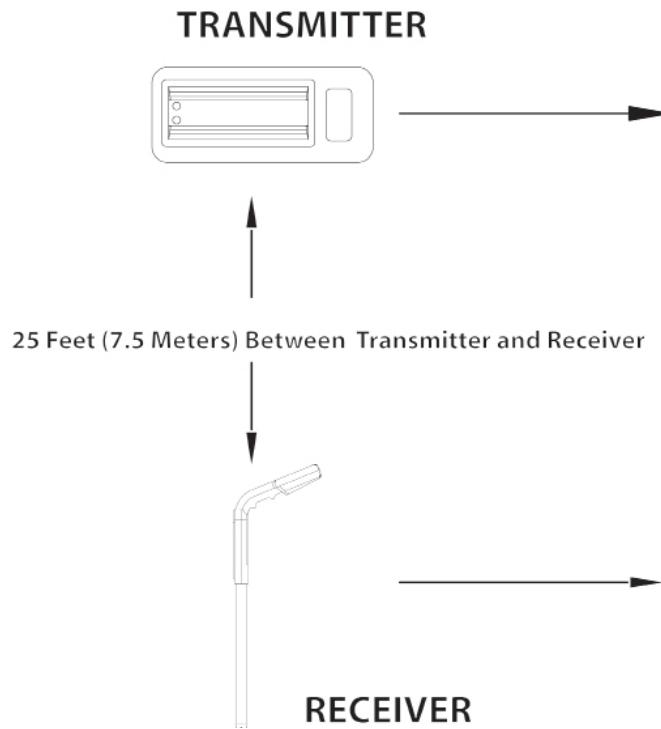
Turn Transmitter ON. Press 82 kHz button. Place Transmitter on its side as close as possible to path of cable or pipe. Align arrows on side of Transmitter with cable or pipe. First, locate broad Transmitter Null, then move toward expected cable path while looking for signal carried by the cable.

Start tracing path with Receiver 25 feet from Transmitter. Locate cable or pipe and follow path. If signal becomes weak, move Transmitter to a point 25 feet behind the last strong signal and continue searching.



Blind Search

The Blind Search locating technique is used if the operator is not aware if a buried utility exists. Two people are needed for this technique. The Transmitter and Receiver are held 25 feet away from each other. Each operator walks at the same speed keeping a distance of 25 feet from each other. When the receiver gives an audio response, a buried utility is present between the Receiver and Transmitter.



Selecting Trace Signal

The choice of 512 Hz, 8 kHz, 33kHz or 82 kHz Frequency is dependent on conditions of the locate.

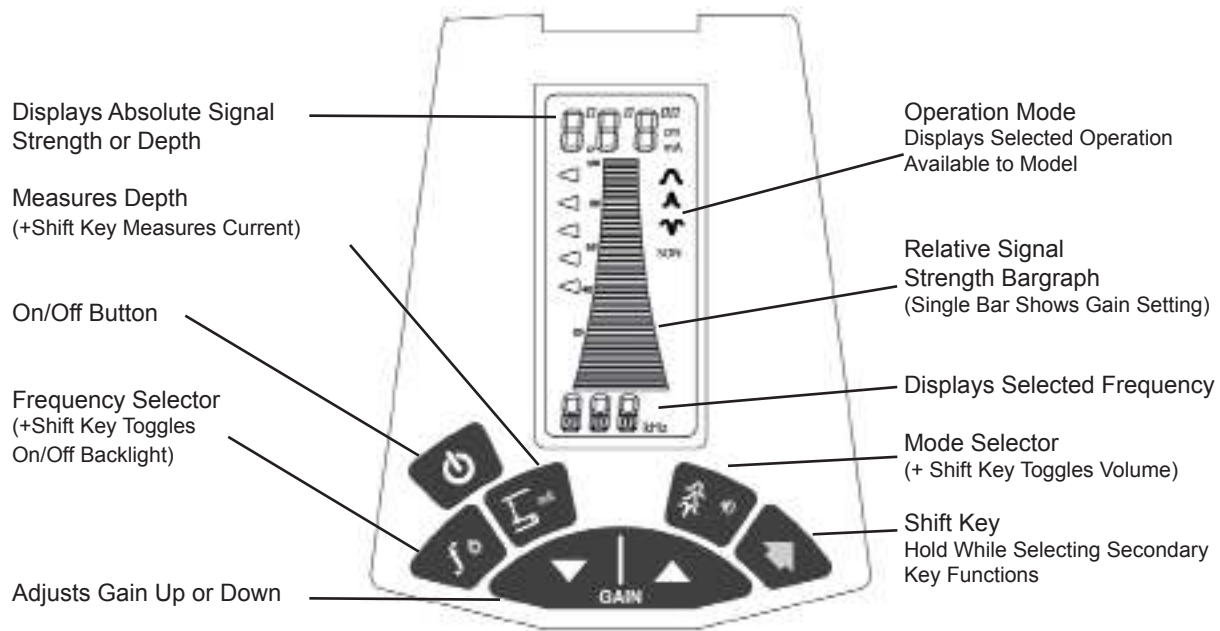
It is recommended to begin by using the 512 Hz signal, and continue as long as you are confident in the results. If the signal is very weak adjust the connection or grounding. If there is no improvement in signal, try 8 kHz. Repeat adjustments of ground and connection point before switching to 33 kHz and then 82 kHz.

512 Hz (lower frequency) signal is usually preferred to 8 kHz (mid-range frequency) and 82 kHz (high frequency) signal, because it is less susceptible to locating errors caused by nearby cables or pipes. The 512 Hz locating range is also longer than the 82 kHz signal. The 512 Hz signal will not travel well through disconnected shield bonds or insulated pipe bushing.

8 kHz and 33kHz take the best of high and low frequency. This mid range frequency is not very susceptible to bleed off or coupling, but it can jump impedance on the utility better than the 512 Hz. It is still best to use 512 Hz, but 8 kHz is one of the most common frequencies used to locate coaxial cable and telecom pairs.

82 kHz (higher frequency) is sometimes better than 512 Hz (lower frequency) for locating sharp corners in cables or pipes. The 82 kHz signal is also better for “jumping” disconnected shield bonds or grounds, or tracing signal may indicate one of these characteristics. The locating range is quite short for the 82 kHz signal so Transmitter must be repositioned more often during tracing operation. Also useful for applying a signal to the Jameson Duct Hunter™.

Receiver Controls and Indicators



ON/OFF

The unit will load settings from previous usage. Automatic shut off after 10 minutes of no activity.

FREQUENCY

Toggles through available active and passive frequencies: 82 kHz, 33kHz , 8 kHz, 512 Hz, 60Hz.

MODE

Toggle through available locating mode: Peak, Pinpoint Peak, Null and Sonde.

DEPTH & CURRENT

Depth function will first momentarily display the depth mode (Line [LIN] or Sonde [SON]) and then display depth measurement at the top of LCD. To change Depth Measurement from English to Metric, hold Depth Key ten seconds. Current measures relative amount of transmitted current and is displayed at bottom of LCD.

GAIN

Adjusts Gain up or down. If signal strength shows as " --- " on display, pressing Gain will automatically adjust to 85% on scale display.

VOLUME (SHIFT Button + MODE Button)

Toggle volume through High, Medium, Low and Off.

BACKLIGHT (SHIFT Button + FREQUENCY Button)

Hold Shift key and press Current key to toggle back light on and off.

LOW BATTERY

Indicates low battery condition by displaying "LO BAT" in the three-digit Signal Strength Display at top of LCD screen.

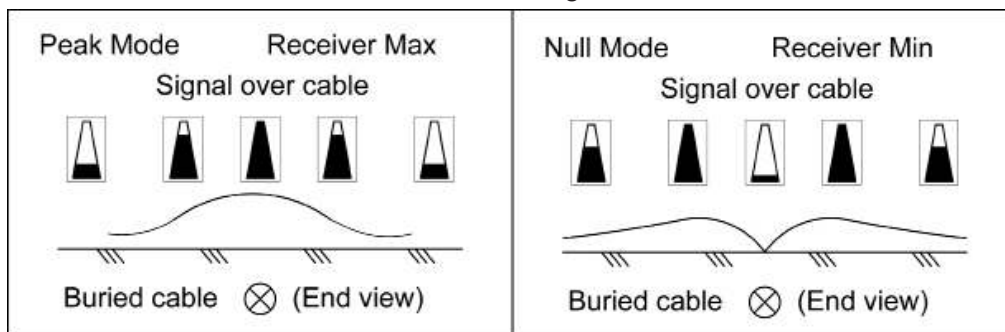
Locating Cable or Pipe

Make sure Transmitter is connected and in the ON position. Move approximately 15 feet (4.5 meters) away from Transmitter along the path. (Move about 25 feet (7.5 meters) for Inductive search mode.)

Hold Receiver so you can see LCD bargraph and controls easily. Make sure Receiver and Transmitter frequency are set for the same frequency, either 512 Hz (lower), 8 kHz, 33kHz or 82 kHz (higher). Or select the passive locating mode which does not require the Transmitter.

Selecting the Locating Mode (Peak or Null)

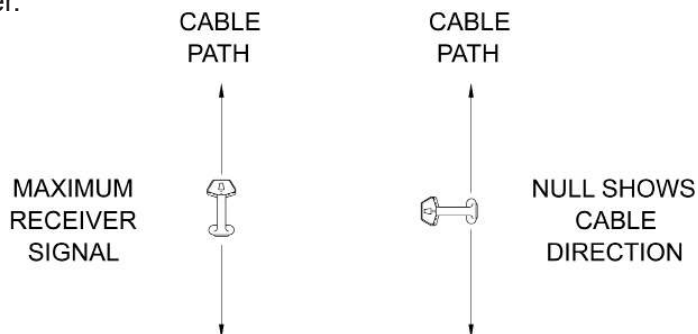
Press Mode button to select desired Peak or Null locating method.



Peak Mode Locating

Keep Receiver in vertical position. Move Receiver left to right across path. When Receiver is directly above cable or pipe, rotate for maximum signal. As Receiver is moved away from cable path, the meter reading (and audio frequency response) will drop off.

If Receiver is rotated while over the cable, a sharp NULL will identify the cable's direction. It is aligned with the flat side of the Receiver.



Trace path by walking away from Transmitter at a moderate pace. Move Receiver to the left and right while walking, following the Peak indications. As you trace path, the Peak meter reading may slowly fade as you move away from the Transmitter. Press and release Gain buttons as needed to compensate for changes in level (higher or lower). One of the following may occur:

- Junction where the signal divides and goes several directions.
- Break in the cable or shield.
- Change in the depth of the cable or pipe.
- Insulated pipe fitting.
- Slack loop of cable.

If you can no longer trace the path, even with Gain set to maximum, connect Transmitter to far end of path and trace back to the point where you lost the signal.

Mark straight sections of the path every few feet. Mark sharp curves, loops and cable bundles every few inches. Sharp changes in the path cause the Receiver Peak and Null indications to behave differently than when tracing a straight path. Practice on a path you know has turns and laterals in it to help you recognize conditions within the field.

Null Mode Locating

Move Receiver left to right across cable path. When Receiver is directly above cable or pipe, a Null (lowest meter reading and lowest audio tone) will occur. When moving Receiver left or right of Null point, meter reading will rise to a maximum point (Peak). The audio tone will also be at its highest pitch. When Receiver is moved beyond Peak, meter reading will begin to fade.

Trace path by walking away from Transmitter at a moderate pace. Move Receiver to the left and right when walking, following Null indications.

As you trace path, Peak meter reading may slowly fade as you move away from the Transmitter. Press and release Gain buttons as needed to compensate for changes in signal level. If Peak meter readings suddenly changes in level (higher or lower), one of the following may have occurred:

- a) Junction where the signal divides and goes several directions.
- b) Break in the cable or shield.
- c) Change in the depth of the cable or pipe.
- d) Insulated pipe fitting.
- e) Slack loop of cable.

If you can no longer trace path, even with Gain control set to maximum, connect Transmitter to far end of path and begin tracing path back.

Mark straight section of path every few feet. Mark sharp curves, loops and cable bundles every few inches. Sharp changes in the path cause Receiver Peak and Null indicators to behave differently than when tracing a straight path. Practice on a path you know has turns and laterals in it to help you recognize conditions within the field.

Absolute Signal Strength

The Receiver's signal strength measurement is displayed with three numerical digits (ex: 485) located at the top of the LCD display. The measurement range is from 0 to 999 indicating a very weak signal (0) to a very strong signal (999). Absolute Signal Strength is independent of the Gain setting or meter reading. It gives the operator information about the actual amount of signal being radiated from the conductor and received by the Receiver.

Measuring Absolute Signal Strength at any time is done by reading the number at the top of the LCD display. The Absolute Signal Strength will not be displayed if the meter reading is too high or too low. Adjust Gain to move meter reading to mid-scale. The numerical display will change from '---' to a valid measurement.

Absolute Signal Strength measurements are more sensitive to signal changes than the meter display. Peaks and Nulls can be more precisely pinpointed. This measurement can also be used to monitor signal loss as the conductor is being traced.

Gain Change Indication

The Gain up and down buttons are used to increase and decrease gain in small amounts. If the meter reading is very low, pressing the Gain up button will center the meter reading to mid-scale. Likewise, if the meter reading is very high, pressing the Gain down button will center the meter reading to mid-scale.

Passive 50/60 Hz Locating

The Receiver is capable of locating power utility frequencies. This Mode is useful for locating underground primary and secondary power utilities. In certain circumstances, this Mode will also locate water pipes, sewer lines, cable television and telephone. The reason is that common electrical grounds are sometimes found among these various utilities. Select the 50/60~ (Hz) frequency on the Receiver. Select Peak mode. Locate the conductor using the Peak mode.

This method is useful because of its speed and convenience. Start at a known reference point and keep in mind other conductors in the area may produce this same locating signal.

The Transmitter is not required to locate in this mode.

Push Button Depth

The only way to be sure of a utility's depth is to expose the utility. At any time, the depth readout may be inaccurate.

The Receiver can measure depth with the push of a button. Depth is displayed at the top of the LCD display in meters and centimeters. Push button depth is useful to quickly determine the depth of the conductor during path locating.

Begin this measurement by locating the path of a cable or pipe. Move to the location where you want to measure the depth. Stay at least 15 feet (4.6 meters) away from the Transmitter. Pinpoint this location as accurately as possible (see *Peak Mode Locating*, *Null Mode Locating* and *Absolute Signal Strength*). Place Receiver vertically over conductor and rest foot of locator on ground. While holding Receiver vertical, press and release Depth button. The Receiver will briefly indicate a measurement is being performed and then display depth at the top of the LCD display.

Exercise caution when using the push button depth feature, as tilted magnetic fields and adjacent conductors can significantly influence this measurement. The operator should periodically check for adjacent conductors and tilted magnetic fields when taking push button depth readings. For information on identifying tilted magnetic fields, refer to Tilted Magnetic Field Identification and Depth Measurement 45° Method.

Note:

Locator is designed to alert operator of potential current and depth measurement errors. If display reads 'Err' during a current and depth measurement, the Receiver has detected a condition that could produce inaccurate readings.

Errors can exist when the conductor signal flow is too small. Check Transmitter hookup and far end access point for poor connections. This cause of error can be identified by a high Gain setting (80 or greater on the bar graph display).

Receiver also may be detecting adjacent cables or is not directly over target conductor. Verify target conductor path precisely before measuring current again.

If at anytime the display reads 'CAL', contact Jameson.

Current Measurement

The Receiver contains a feature very useful in identifying a desired cable in a field of various conductors and/or utilities. It is not unusual for the target conductor (the conductor connected to the transmitter) to induce a signal into nearby conductors in a crowded field. In these instances, the radiated signal on the conductors close to the surface of the earth, may be stronger than the Transmitter signal on the target conductor buried deep in the ground. The operator will find two or more paths and must determine which is the target conductor. By using the current measurement feature of the Receiver, the operator can determine the amount of 512 Hz, 8 kHz, 33kHz or 82 kHz current flowing on the conductors, regardless of depth. The highest current flow indicates the target conductor.

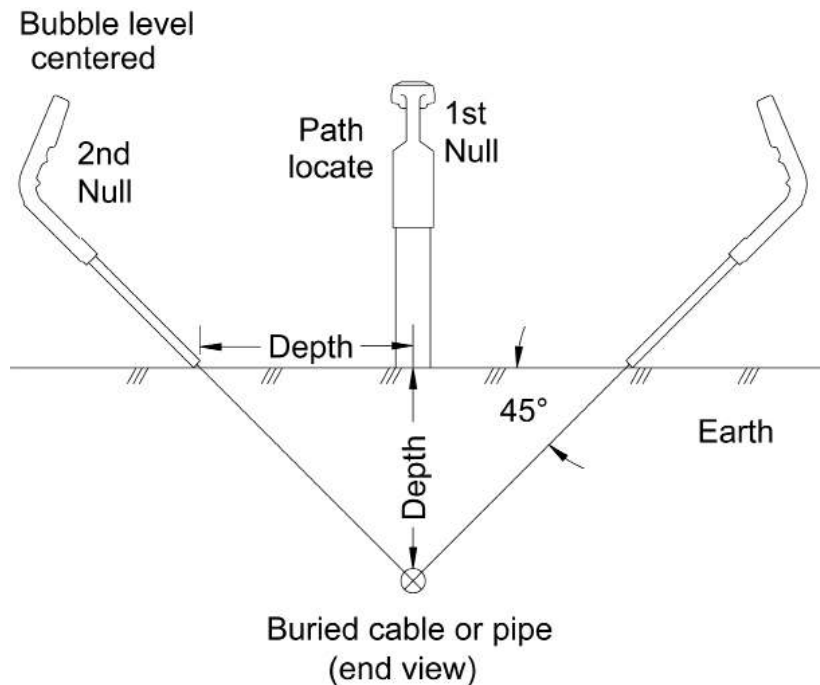
Place Receiver vertically over one of the conductor marks and rest foot of the locator on the ground. Holding Receiver vertical, press and release Shift Button and Depth button simultaneously. When meter changes from a "thermometer" type display to a "bar" type display, hold Receiver the still until measurement stabilizes. The blinking bar indicates the signal level on the cable (adjusted for depth). Next, move to the second cable and repeat the measurement. The blinking bar will show the signal level on the conductor. The previous reading is shown as a solid bar. The higher of these two readings will show which conductor is carrying the greatest locating signal.

Depth Measurement 45° Angle Method

Move to a location where you want to measure depth. Stay at least 15 feet away from Transmitter. Move Receiver left to right across path until cable is located. Mark path on the ground as precisely as possible using the Null Method.

Place Receiver on the ground with LCD meter facing up. Position unit so the Bubble Level on top of meter is centered (45°). Pull Receiver away from cable path (at 90° to the cable path) keeping Bubble Level centered. When Receiver indicates a Null reading, mark the location of the Receiver's foot. The distance between the Receiver and the cable path is the depth of the pipe or cable.

A false depth reading may be caused by nearby buried metallic objects, such as a second cable, pipe, sewer, fence or railroad track. Confirm depth measurement by repeating the above steps on opposite side of pipe or cable. A variance greater than 5 inches in depth measurement may indicate the presence of additional buried cables, pipes or other objects.



Tilted Magnetic Field Identification

When adjacent cables or pipes are present, they will sometimes create locating errors. Some of the Transmitter signal is picked up by adjacent conductors and is redirected so it combines with the original signal. The result is a Tilted Magnetic Field. This is often the reason that numeric depth readouts are sometimes created in error.

The operator can verify the accuracy of path locate by performing the 45° Angle Method locate on both sides of the cable path. If the right and left side depth readings agree to within 5 inches, the path locate is accurate. If the two depth readings do not agree, then **dig with care**. A closer locate would be halfway between the two outside depth locate marks.

This is an important technique that should be used to ensure the most accurate location possible.

Specifications

Transmitter

Operating Frequency	82 kHz • 33kHz • 8 kHz • 512 Hz
Operating Temperature	-4°F to 133° (-20°C to +55°C)
Hook-up Method	Direct Connection Inductive Coupling (with optional coupler) Transmitter Induction
Load Matching	Automatic from 5 Ω to 20,000 Ω
Output Power	1 Watt (High) 500 Milliwatts (Low)
Battery Types	8 - "C" alkaline batteries
Battery Life	Greater than 30 hours*
Dimensions	8.4" x 5.57" x 2.6"
Weight	2.2 lbs (2.8kg)

*Depending on load, frequency and power setting

Receiver

Operating Frequency	82 kHz • 33kHz • 8 kHz • 512 Hz • 50/60 Hz
Antenna Mode	Null (vertical coil) • Peak (horizontal coil)
Audio Indication	Variable pitch audio
Operating Temperature	-4°F to 133° (-20°C to +55°C)
Battery Type	6 - "C" alkaline batteries
Battery Life Continuous Intermittent	40 hours 82 hours (10 minute auto shut off)
Dimensions	30.3" x 3.75" x 9.4"
Weight	3 pounds
Signal Strength	LCD bar graph Absolute Signal Strength readout 0-999
Gain Control	Up/down button for automatic centering and manual control
Dynamic Range	126 dB
Depth Measurement Automatic Manual	Digital depth readout to 15 feet (feet/ inches & metric) Triangulation for verification of automatic readout in congested environments



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