

PATHFINDER II

SERIES

Cable, Pipe and Fault Locator User's Manual

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Warranty

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Remedies provided under Warranty are exclusive and in lieu of all other warranties express or implied. The liability to ComSonics is limited to product repair or replacement at the discretion of ComSonics. ComSonics shall not be held liable for any incidental or consequential damages.

The following are not covered by this warranty:

- 1) Parts or components not supplied by ComSonics, or parts or components that have been modified.
- 2) Any product or part failure that results from accident, abuse, misuse, neglect, or unauthorized repairs or modifications by individuals other than ComSonics personnel.
- 3) Failures caused by use of this product in extreme climates or moisture conditions.
- 4) Batteries or Battery Pack

Technical Support

ComSonics maintains a Technical Support Service for customer convenience. Should the need arise, contact a Technical Support Representative by telephone at 1-800-336-9681 or 1-540-434-5965; Fax at 1-540-432-9794; or Email at tech-support@comsonics.com.

Return Information

Products returned for repair, calibration, etc. must be safely packed. Please enclose information on the reason for return. Ship the material prepaid.

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ComSonics, Inc.
1350 Port Republic Road
Post Office Box 1106
Harrisonburg, Virginia 22801 USA
Phone: (540) 434-5965
USA Toll Free: (800) 336-9681
Fax: (540) 434-9847
Email: marketing@comsonics.com
Internet: www.comsonics.com

Introduction

Congratulations on the purchase of your new PathFinder Series Cable & Pipe Locator. The Path Finder Series is specially designed to detect buried CATV cables, power cables, gas and water pipes, sewer lines, telephone cables, and fiber optic cables with sheath.



WARNING

THE PATHFINDER IS DESIGNED TO DETECT THE ELECTROMAGNETIC FIELD EMITTED FROM BURIED METALLIC UTILITIES. THERE ARE BURIED CABLES, PIPES, AND UTILITIES THIS INSTRUMENT CANNOT DETECT. LOCATING IS NOT AN EXACT SCIENCE. THE ONLY WAY TO BE SURE OF THE EXISTENCE, LOCATION OR DEPTH OF BURIED UTILITIES IS TO EXPOSE THE UTILITY.

DISCLAIMER OF LIABILITY

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The Transmitter applies a tracing signal onto a cable or pipe. The Receiver detects the tracing signal. You can locate the relative position of the buried pipe or cable by following the tracing signal

Part List

Path Finder

Transmitter Unit
Receiver Unit

Common Parts:

Red/Black Test Cord
Ground Rod
User's Manual
8 AA-size Batteries
8 C-size Batteries
Carry Case

Options:

Flexicoupler
Hard Clamp

Prepare for Use

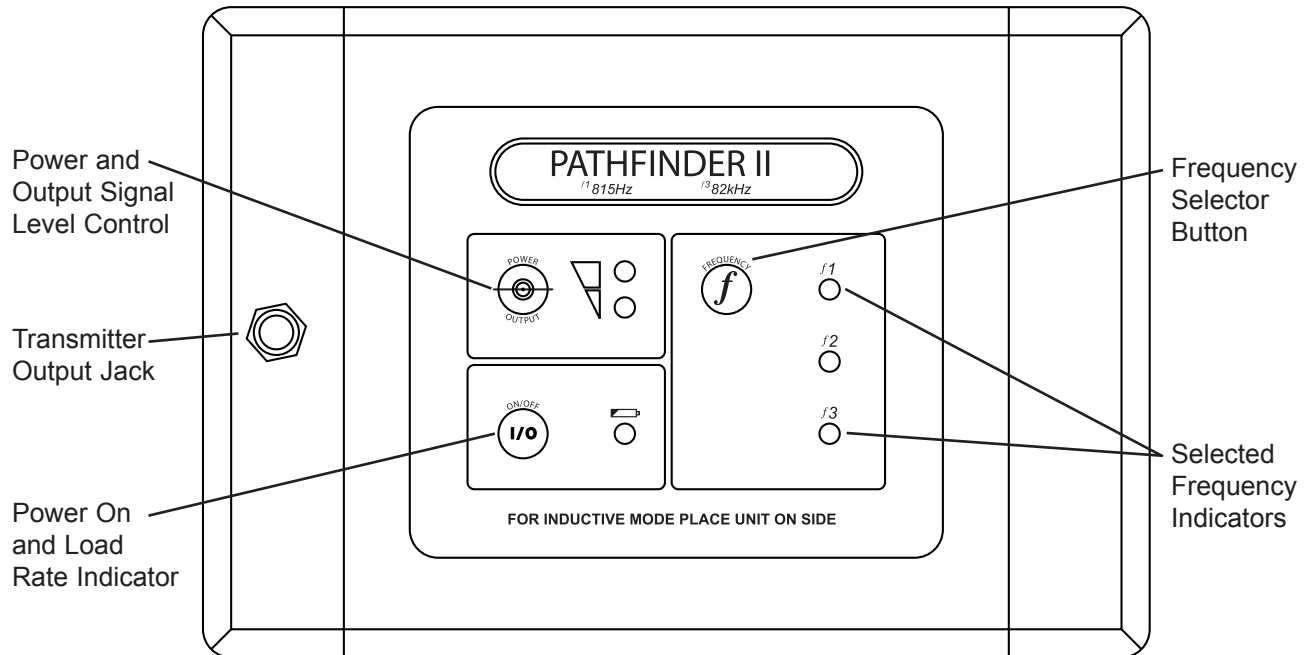
Unpack your new PathFinder locator. Make sure there is no shipping damage and all the parts are included.

Locate the battery compartment on the back of the "head" of the Receiver. Open the compartment using a phillips screwdriver. Install the eight "AA" batteries as marked.

Locate the battery compartment inside the Transmitter. Remove the battery compartment door. Install the eight "C" batteries as marked.

Note: For longer battery life and reliable operation under adverse conditions, use only Duracell® alkaline batteries.

Transmitter Controls and Indicators



TX OUTPUT JACK

The Red/Black Cord, Hard 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 ($f3$) indicates that the higher 82 kHz frequency is in use. 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 815 Hz ($f1$) indicates that the lower 815 Hz frequency is in use. The 815 Hz is less susceptible to locating errors caused by adjacent cables or pipes and the locating range is greater.

Note: The ($f2$) indicator is not used on the Pathfinder II transmitter.

LOAD RATE INDICATOR

Accurate locating requires the transmitter to apply a signal to a utility and that the signal return from the far end of the utility back to the transmitter, creating a circuit. The Frequency light flashes to indicate the output circuit impedance or signal on the utility. The better the circuit, the faster the beep, and the more accurate the results.

- 4 beeps/sec indicates high current and high signal strength on the line
- 1 beep/sec indicates low current and low signal strength on the line
- Fast triple beep indicates no load and no signal on the line

Note: Hold down the Power Output button for 2 seconds to mute the Audio Load Rate indicator.

OUTPUT SIGNAL LEVEL CONTROL

The Output Signal Level Control adjusts the power output from the Transmitter. The two selections include: Low (lower LED) High (upper LED). Soil conditions and conductive qualities of the target utility determine the best power setting to employ. Users are advised to start with the Low power setting to prevent coupling to adjacent utilities. For situations where dry soil, corroded pipes, or other conditions exist that could inhibit the applications and/or return of the tracing signal, it might be necessary to switch to the High power setting.

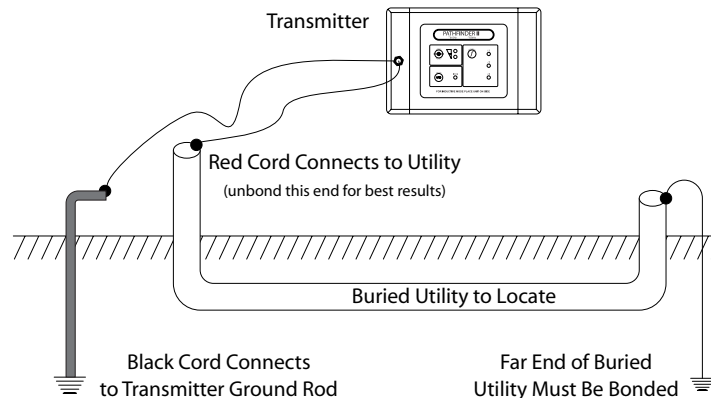
Direct Connection



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 or 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 and at an angle of 90° to the buried cable or pipe. Push the Ground Rod into the ground 8 to 10 inches. Connect the Black Test Cord to the Ground Rod.

Plug the Red/Black Test Cord into the Transmitter Output Jack. Turn the Transmitter on and set the Frequency to 815 Hz ($f1$) or 82 kHz ($f3$). Set the power level to Low or High.



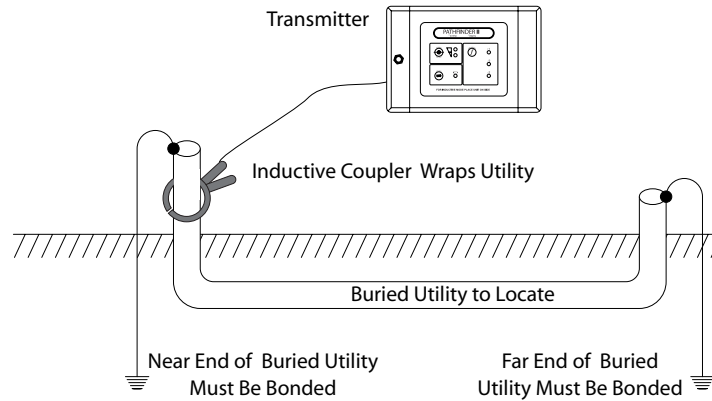
Coupler Connection

The optional Flexicoupler and Hard Coupler are very easy to use, and services do not have to be interrupted. The operation range is shorter than the Direct Connection method. The tracing signal can be affected by neighboring cables and pipes. The Red/Black Test Cord or the Ground Rod are not needed for this method.

Successful Coupler operation requires an insulated conductor that is grounded on both near and far ends.

Loop the Flexicoupler around the cable and connect the two ends, or clamp the Hard Coupler around the cable. It is important to connect the Coupler around the cable needing to be traced. Connect the coupler around the wire closer to the outgoing cable, not near the system ground. The result will be a stronger signal. By connecting near the grounding, the range will also be shorter, and difficulty may arise determining one cable from another.

Plug the Coupler Test Cord into the Transmitter Output Jack. Always use the 82 kHz frequency on the Receiver and the Transmitter.

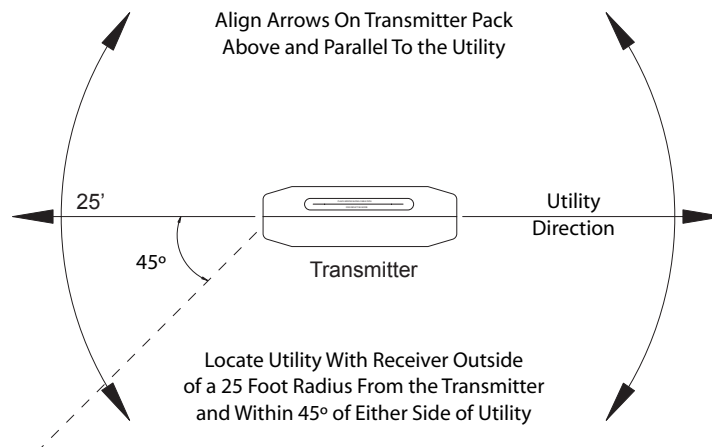


Inductive Connection

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

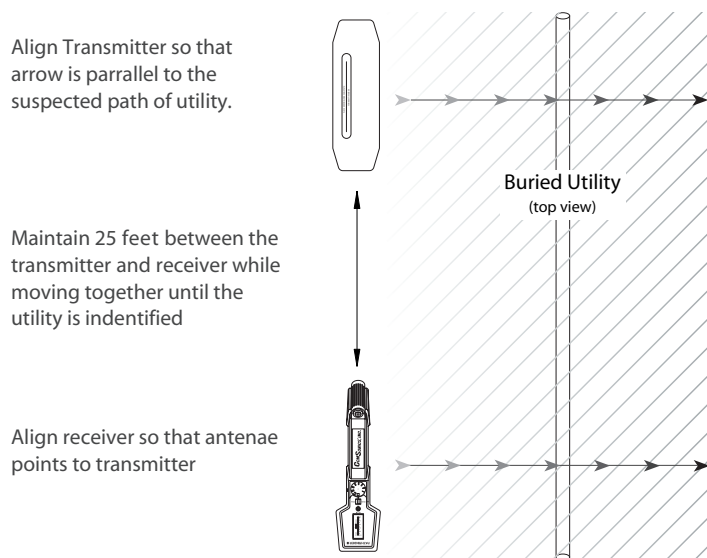
Place the Transmitter on the ground, as close as possible to the path of the cable or pipe. Align the arrows on the Transmitter Control Panel at a moderate angle to the cable or pipe. Set the Frequency to the 82 kHz. First, locate the broad Transmitter Null, then move toward the expected cable path while looking for the signal carried by the cable.

Start tracing the path with the Receiver 25 feet from the Transmitter. Search in the 90° zone as shown. Locate the cable or pipe, and follow the path. If the signal becomes weak, move the 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 the Receiver are placed 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, then a buried utility is present between the Receiver and the Transmitter.



Selecting the Tracing Signal

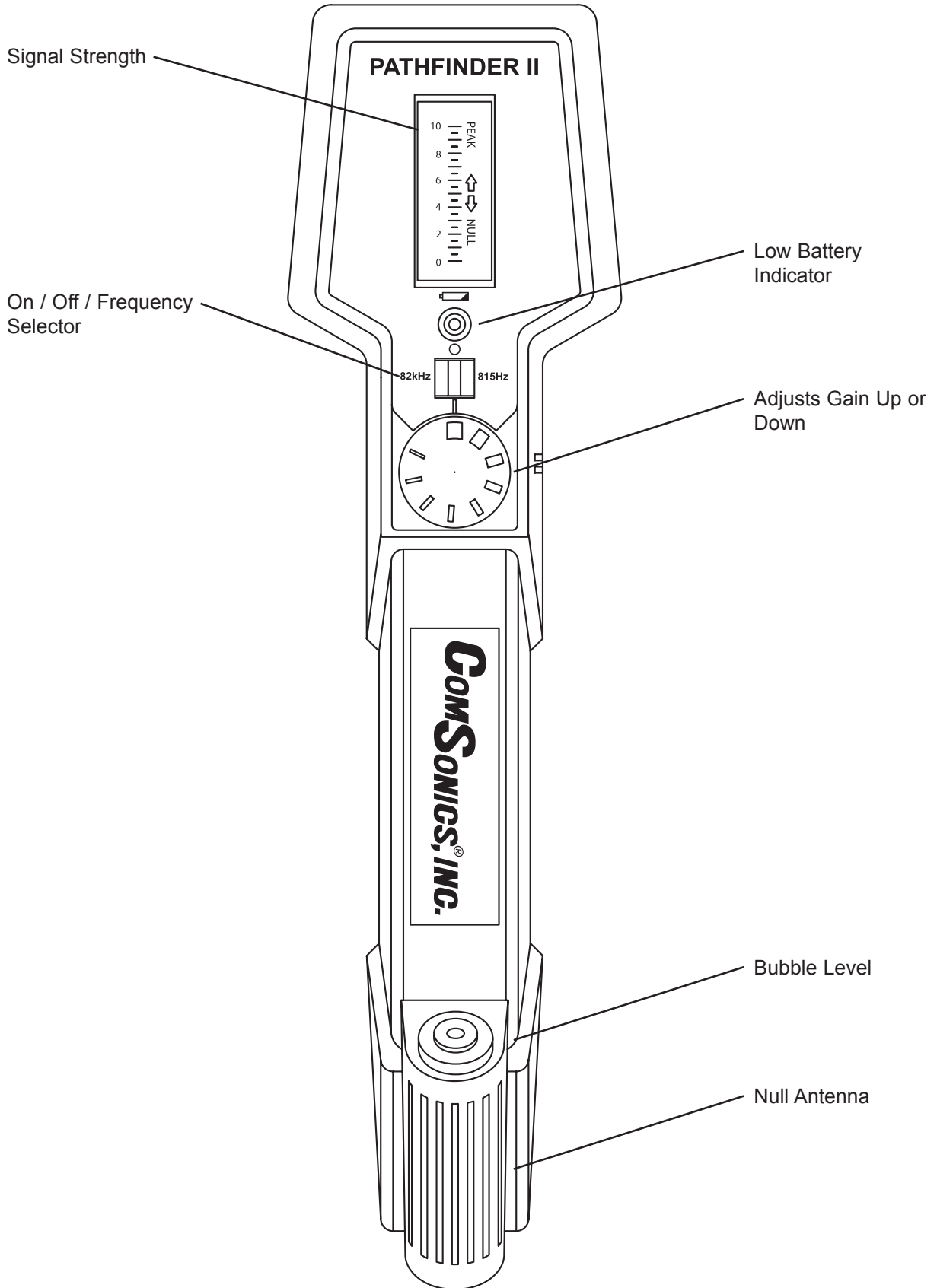
The choice of 815 Hz or 82 kHz frequency is dependent on the conditions of the locate.

The 815 Hz and 82 kHz signals each have their advantages. It is recommended to begin by using the 815 Hz signal, and continue as long as you are confident in the results. If the signal is very weak try to adjust the connection or grounding. Repeat adjustments of ground and connection point again before switching to 82 kHz.

815 Hz (lower frequency) signal is the preferred frequency signal because it is much less susceptible to locating errors such as bleed-off or undesired coupling. The 815 Hz locating range is greater than the 82 kHz signal on well insulated cables. The 815 Hz signal will not travel well through disconnected shield bonds or insulated pipe bushing.

The 82 kHz (higher frequency) may perform better on conductors in direct contact with soil, for locating around sharp corners in cables and pipes, or for "jumping" disconnected shield bonds. The locating range is shorter for the 82 kHz signal so the Transmitter must be repositioned more often during the tracing operation. This frequency is also useful for applying a signal using the Flexicoupler or the Hard Coupler.

PathFinder Series Receiver Controls



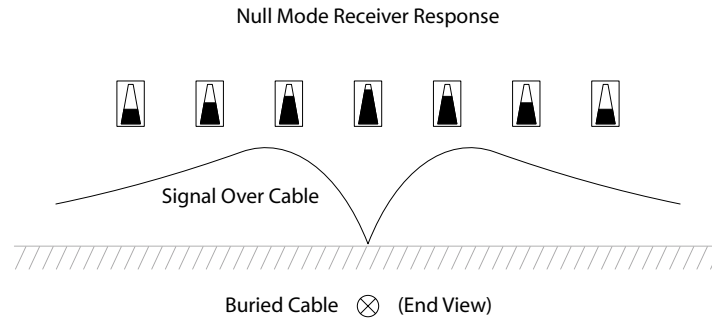
Locating the Cable or Pipe

Make sure the Transmitter is connected and the Power light is illuminated. Then move approximately 15 feet away from the Transmitter along the path. (Move about 25 feet for the Inductive Search Mode.)

Hold the Receiver so that you can see the meter and controls easily. Make sure the Receiver and the Transmitter frequency are both set for the same frequency, either 815 Hz (low) or 82 kHz (high).

Null Mode Locating

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



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

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

- A.) a junction where the signal divides and goes several directions.
- B.) a break in the cable or shield.
- C.) a change in the depth of the cable or pipe.
- D.) an insulated pipe fitting.
- E.) a slack loop of cable.

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

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

Depth Measurement 45° Angle Method (Nulling Unit)



WARNING

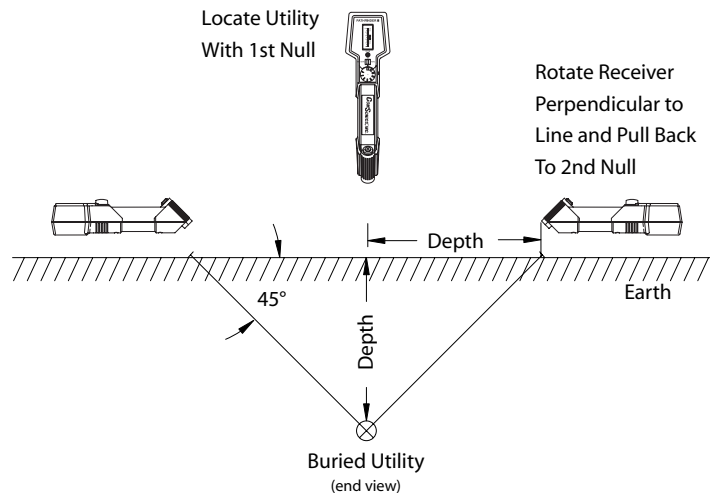
THE ONLY WAY TO BE SURE OF THE EXISTENCE, LOCATION OR DEPTH OF BURIED UTILITIES IS TO EXPOSE THE UTILITY.

Move to the location you want to measure depth. Stay at least 15 feet away from the Transmitter. Move the Receiver left to right across the path until the cable is located and mark the path on the ground as precisely as possible.

Place the Receiver on the mark on the ground with the meter facing up and in line with the utility. Rotate the Receiver 90° to the cable path and pull Receiver along the ground until next Null is found. When the 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 the depth measurement by repeating the above steps on the opposite side of the pipe or cable.

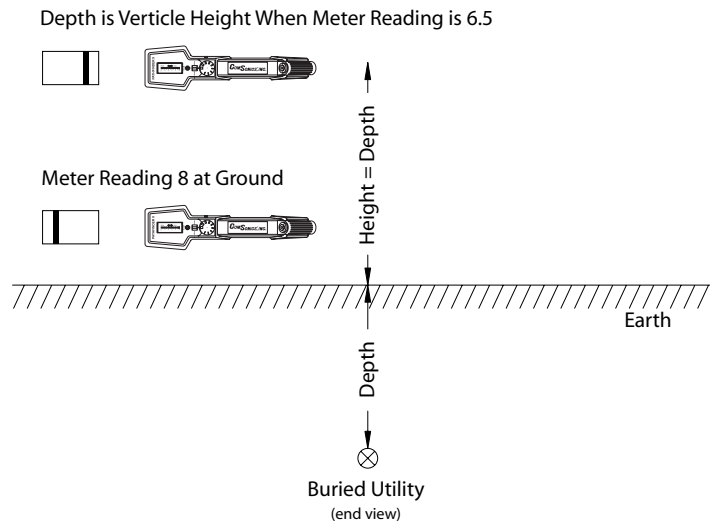
A variance greater than 5 inches in depth measurement may indicate the presence of additional buried cables, pipes or other objects.



Depth Measurement Straight Lift Method (Nulling Unit)

Move to the location where you want to measure the depth of the buried cable or pipe. You must stay at least 15 ft away from the Transmitter. Next, place the Receiver on it's side on the ground. Without moving the Receiver, adjust the Sensitivity control for a Meter Reading of 8.

Lift the Receiver straight up without twisting, turning, or drifting to the left or right of the path. Continue to lift the Receiver until a new meter reading of 6.5 is found. The height of the heel of the Receiver above the ground is the depth of the cable. If you are unable to reach a Meter Reading of 6.5 by using the straight lift method, use the 45° triangular method to determine a depth measurement of the utility.



PathFinder Series Specifications

Receiver	Operating Frequency	82 kHz • 815 Hz
	Antenna Mode	Null (Vertical Coil)
	Audio Indication	Variable Pitch Audio
	Operating Temperature	-4° F to 133° F (-20° C to +55° C)
	Battery Type	8 "AA" alkaline batteries (Duracell® brand recommended)
	Battery Life	80 Hours
	Dimensions	13" x 3" x 3" (33 cm x 7.6 cm x 7.6 cm)
	Weight	1.7 lbs (.77 kg)
	Noise Rejection	116 dB minimum
	Gain Control	126 dB minimum

Transmitter	Operating Frequency	82 kHz • 815 Hz
	Operating Temperature	-4° F to 133° F (-20° C to +55° C)
	Hook-Up Method	Direct Connection Inductive Coupling (optional) Transmitter Induction
	Max Open Voltage	30 V PK-PK AC
	Output Power	Hi Power: 1 watt, Nominal Lo Power: 1/2 watt, Nominal
	Battery Types	8 "C" alkaline batteries (Duracell® brand recommended)
	Battery Life	Greater Than 120 hours*
	Dimensions	16" x 6.32" x 5" (40.64 cm x 16 cm x 12.7 cm)
	Weight	2.1 lbs (1.0 kg)

* *Dependant on load, frequency, and power setting*