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User's Manual for the Path Finder Family

Cable and Pipe Locators

Model 8840 Path Finder
Model 8850 Path Finder II
Model 8852*
Model 8856*

*Cable, Pipe and Fault Locator

* Model 8852 and Model 8856
Become Fault Locators with the Optional Ground Return Probe

 **RYCOM**®
Instruments, Inc.

Made in the USA

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Warranty

This instrument is under warranty for one year from date of delivery against defects in material and workmanship (EXCEPT BATTERIES). We will repair or replace products that prove to be defective during the warranty period.

This warranty is void if, after having received the instrument in good condition, it is subjected to abuse, unauthorized alterations or casual repair.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. THE WARRANTY DESCRIBED IN THIS PARAGRAPH SHALL BE IN LIEU OF ANY OTHER WARRANTY, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. WE ARE NOT LIABLE FOR CONSEQUENTIAL DAMAGES.

Introduction

Congratulations on the purchase of your new RYCOM Cable Locator. The RYCOM Path Finder locators are used to detect buried power cables, CATV cables, gas and water pipes, sewer lines, telephone cables, fiber optics and all utilities with metallic properties. The 8852 and 8856 Pathfinder models are fault locators, when used with Ground Return Probe. Other accessories are also available for the the 8852 and the 8856.

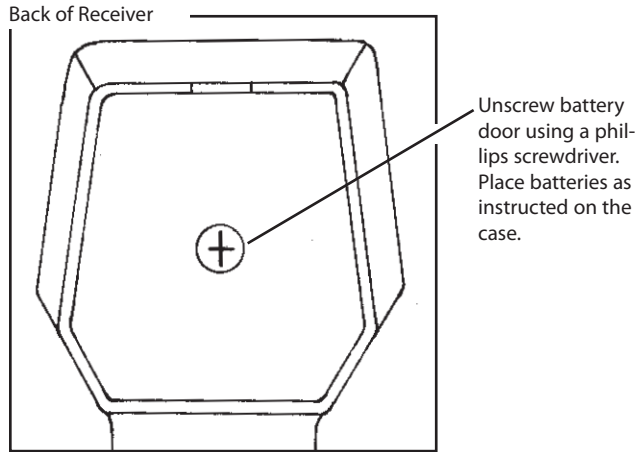
The Path Finder Transmitters apply a tracing signal onto a cable or pipe. The Path Finder Receivers then detect the tracing signal. By following the signal, the user is able to locate the path of the buried utility.

	Path Finder 8840	Path Finder II 8850
Transmitter Unit	001-00104-00	001-00104-01
Receiver Unit	001-00105-00	001-00105-01
Red/Black Test Cord	151-00051-00	151-00051-00
Ground Rod	211-00006-01	211-00006-01
User's Manual	030-00048-00	030-00048-00
8 AA-size Batteries	770-00021-00	770-00021-00
8 D-size Batteries	770-00023-00	770-00023-00
Optional: Flexicoupler		120-00166-00
	8852	8856
Transmitter Unit	001-00125-00	001-00121-00
Receiver Unit	001-00124-00	001-00120-00
Red/Black Test Cord	151-00051-00	151-00051-00
Ground Rod	211-00006-01	211-00006-01
User's Manual	030-00048-00	030-00048-00
8 AA-size Batteries	770-00021-00	770-00021-00
8 D-size Batteries	770-00023-00	770-00023-00
Options:		
Flexicoupler	120-00166-00	120-00166-00
Ground Return Probe	001-00087-04	001-00087-04
Cable Identifier	001-00119-00	001-00119-00
Cable Pair Identifier	120-00300-00	120-00300-00

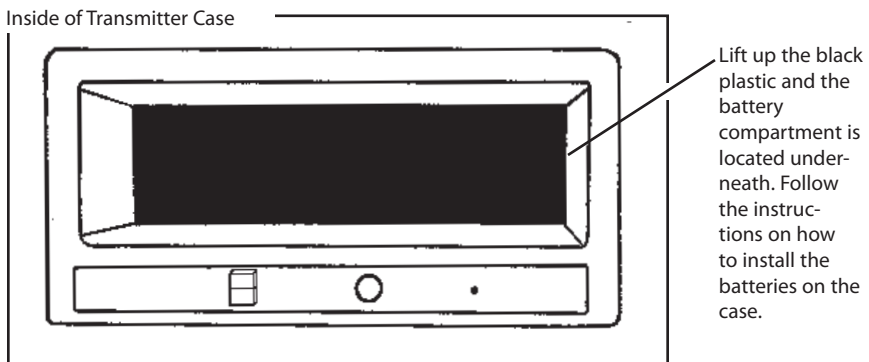
Make-Ready for Use

First, unpack your Path Finder locator. Make sure there is no shipping damage, and all the parts are included: Receiver, Transmitter, Ground Rod, 8 AA-Batteries, 8 D-Batteries and Manual. Also if you order any of the optional accessories, check to see if you received them.

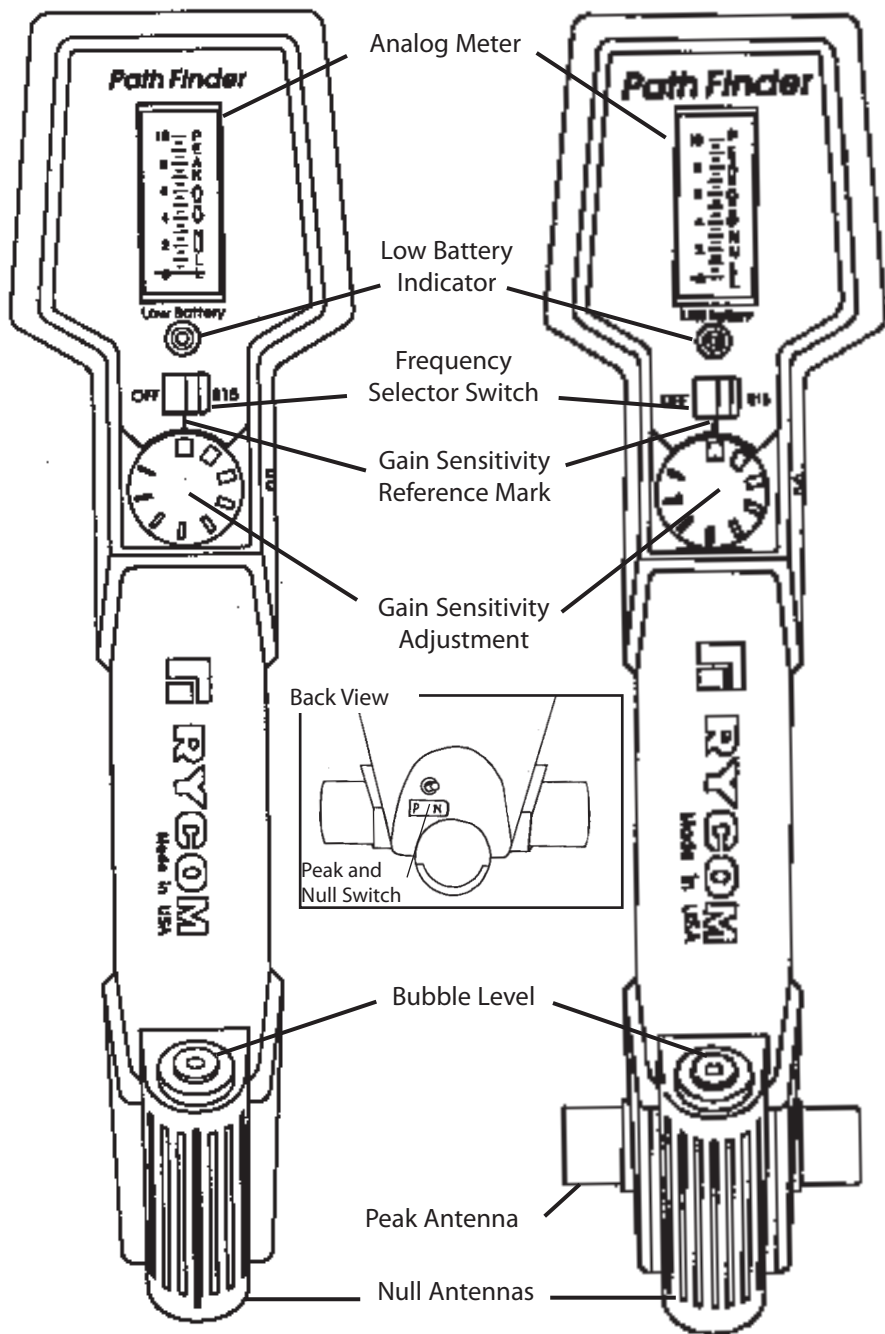
Next, remove the Receiver from the case, and turn it face-down. Locate the battery compartment on the back of the RECEIVER. Unscrew the battery door and install the eight AA-size batteries as marked on the case.



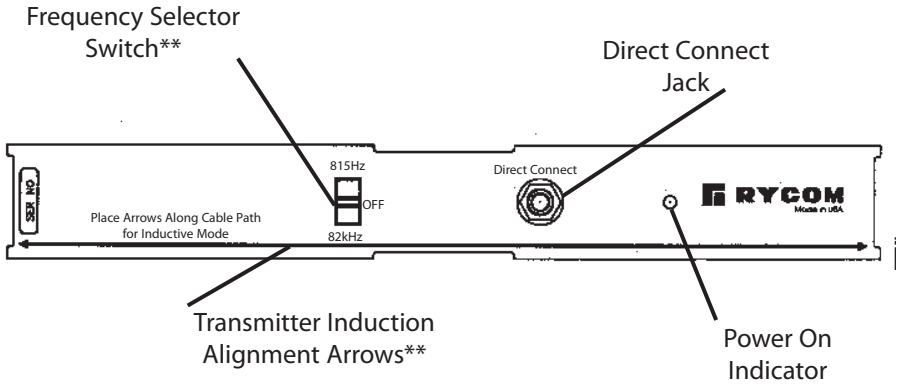
The TRANSMITTER battery compartment is located beneath the RECEIVER storage well (the black plastic), in the bottom of the case. Install the eight D-size batteries as marked on the inside of the case.



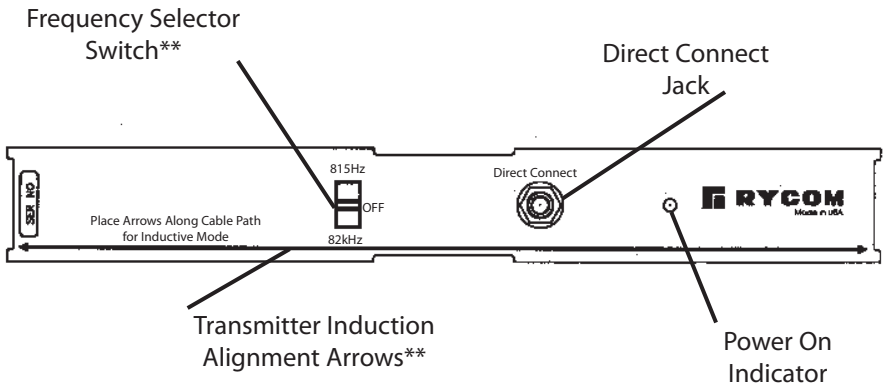
8840 and 8850 Nulling Unit Receiver Controls and Indicators



Path Finder Family Transmitter Controls and Indicators



** These controls or indicators are found only on the 8850 Path Finder II, 8852 and the 8856



** These controls or indicators are found only on the 8850 Path Finder II, 8852 and the 8856

8856

Null and Peak Receiver Controls and Indicators

Select the Locating Method

Electrical Cable and Cable TV (CATV)

Direct Connection	9-10
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Transmitter Inductive Connection**	12
Multiple Grounded Circuit	13-14

Gas and Water Pipe

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Telephone Cable

Multiple Grounded Circuit	13-14
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Telephone Direct Pair Connection	17

Fiber Optic Cables

Transmitter Inductive Connection**	12
Multiple Grounded Circuit	13-14
Continuously Grounded Circuit	15
Telephone Direct Shield Connection	16

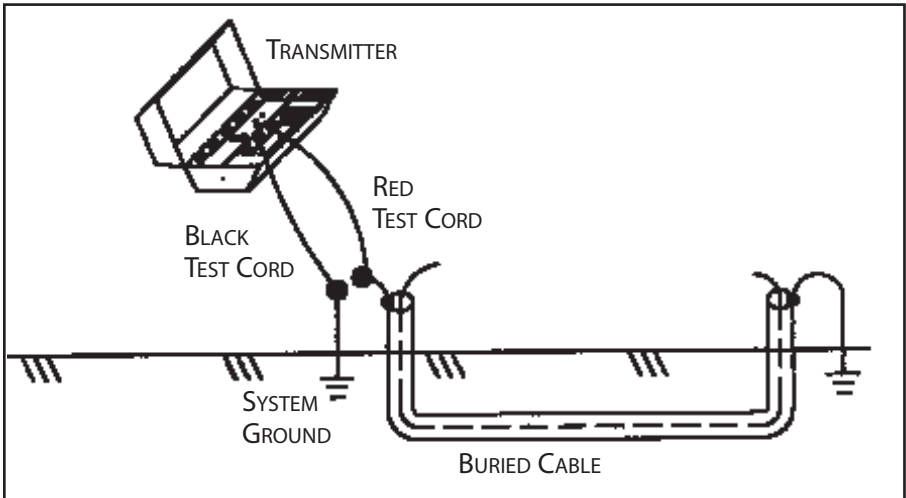
Note: The Flexicoupler and Transmitter Inductive Connection methods require using the 82 kHz frequency setting, available on the 8850 Path Finder II, 8852 and 8856.

**These locating methods cannot be performed by the 8840 Path Finder.

Direct Connection

CAUTION

DO NOT DIRECT CONNECT TO AN ENERGIZED POWER CABLE.



This method is very reliable and free of interference. A GROUND ROD is not needed to use the Direct Connection method. This method is restricted to qualified employees of the service only. The utility services are interrupted. First, disconnect the cable shield or neutral wire. Then, connect the RED TEST CORD to the cable shield or neutral wire. Next, connect the BLACK TEST CORD to the system ground. The system ground is where the cable shield or neutral wire was previously connected.

8840 Path Finder

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT 815Hz JACK. The ON indicator will start blinking.

8850 Path Finder II, 8852 and 8856

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT JACK. Set the 815Hz/OFF/82kHz switch to the 815Hz position. The ON indicator will start blinking.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Direct Connection

Notes on Selecting the Tracer Frequency

The 815Hz and 82kHz frequencies each have their advantages. Use them in combination for the highest confidence in locating the path. Begin by using the lower frequency, 815Hz, and continue as long as you are confident in the results. If the signal suddenly becomes weak, disappears, or takes an unexpected turn, change to the higher frequency, 82kHz, to verify your results.

The 815Hz is usually preferred to the 82kHz. The 815Hz is less susceptible to locating errors caused by adjacent cables or pipes. Also, the locating range is greater. Unlike the 82kHz, the 815Hz is not capable of “jumping” disconnected shield bonds or insulated pipe bushings.

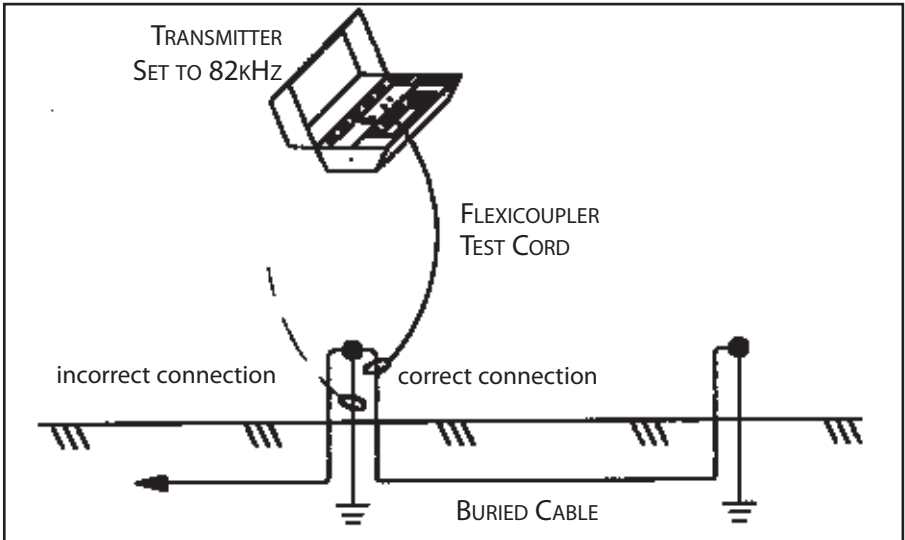
The 82kHz feature on the 8850 Path Finder II, 8852 and 8856 is sometimes better than the 815Hz frequency for locating sharp corners in cables or pipes. The 82kHz is also capable of “jumping” disconnected shield bonds or grounds. When sudden changes in the tracing signal occur, it may indicate one of these characteristics. The range is quite short for this signal and the TRANSMITTER must be repositioned more often during the 82kHz tracing operation than when using the lower frequency (815Hz).

NOTE(8850,8852 and 8856): Depending upon the ground conditions, you might need to use the 82kHz frequency to transmit a strong signal to complete the circuit.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Flexicoupler Connection

(Path Finder 8850, 8852 and 8856)



The optional FLEXICOUPLER is very easy to use, and services do not need to be interrupted during the connection. The operating range is shorter than when using the Direct Connection method. Also the tracing signal can be affected by neighboring cable and pipes. Neither the RED/BLACK TEST CORD nor a GROUND ROD are needed for using the Flexicoupler Connection method.

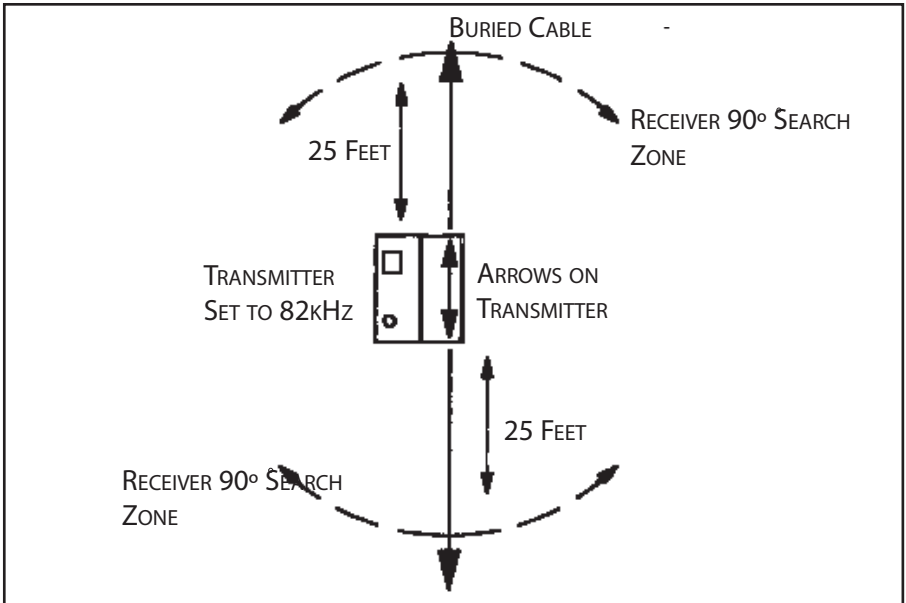
First, loop the FLEXICOUPLER around the cable and connect the two ends together. It is important to connect the FLEXICOUPLER around the cable you want to trace, as shown above. Connecting it incorrectly around a commonly bonded cable (dashed line above), will cause the tracing signal to be weaker. The range will also be shorter, and difficulty will arise in identifying one cable from another when the FLEXICOUPLER is placed incorrectly.

Plug the FLEXICOUPLER TEST CORD into the DIRECT CONNECTION JACK. Set the 815Hz/OFF/82kHz switch to the 82kHz position. The ON indicator will start blinking.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Transmitter Inductive Connection

(Path Finder 8850, 8852 and 8856)



The Transmitter Inductive method is convenient to use, and utility services are not interrupted. Also, no test cords or connections are needed. The cable or pipe must have good insulation or a non-conductive coating, or the operating range will be very short.

Start by placing the TRANSMITTER on the ground. Place it as close as possible to the path of the cable or pipe. Next, align the arrows on the TRANSMITTER control panel with the underground utility. Set the 815Hz/OFF/82kHz switch to the 82kHz position. The ON indicator will start blinking.

Begin tracing the path with the RECEIVER 25 ft from the TRANSMITTER. Search in the 90 degree zone as shown above. When you locate the cable or pipe, follow the path. If the signal becomes weak, move the TRANSMITTER to a point 25 ft behind the last strong signal, and then continue searching for the buried cable or pipe.

*Turn to Page 18 to Begin Locating the Cable or Pipe

This method uses the existing ground points that are already exposed and available to you. It is not necessary to disconnect the service.

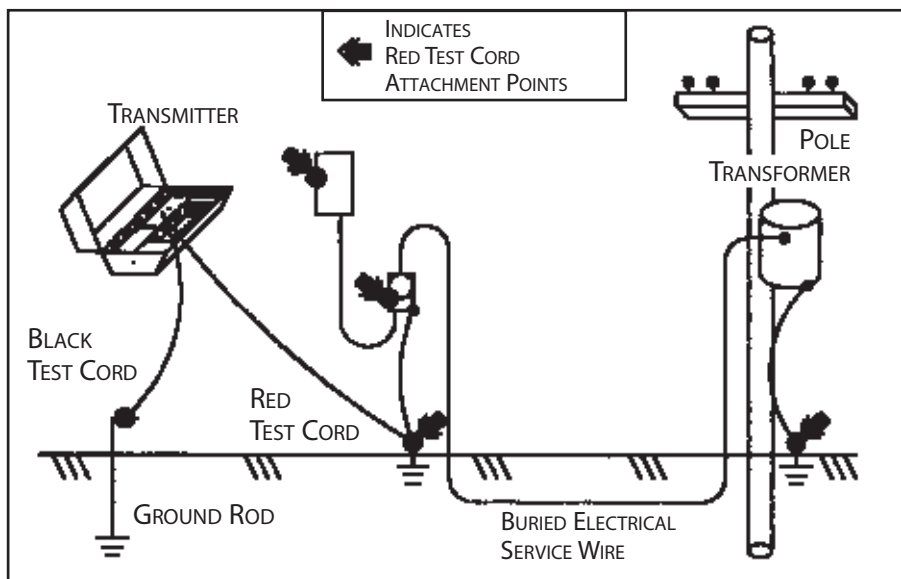
Start by connecting the RED TEST CORD to an existing ground point. Then press the GROUND ROD into the ground at approximately 10 ft from this point. Place the GROUND ROD at an angle of approximately 90 degrees to the buried or pipe. Connect the BLACK TEST CORD to the GROUND ROD.

8840 Path Finder

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT 815Hz JACK. The ON indicator will start blinking.

8850 Path Finder II, 8852 and 8856

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT JACK. Set the 815Hz/OFF/82kHz switch to the 815Hz position. The ON indicator will start blinking.



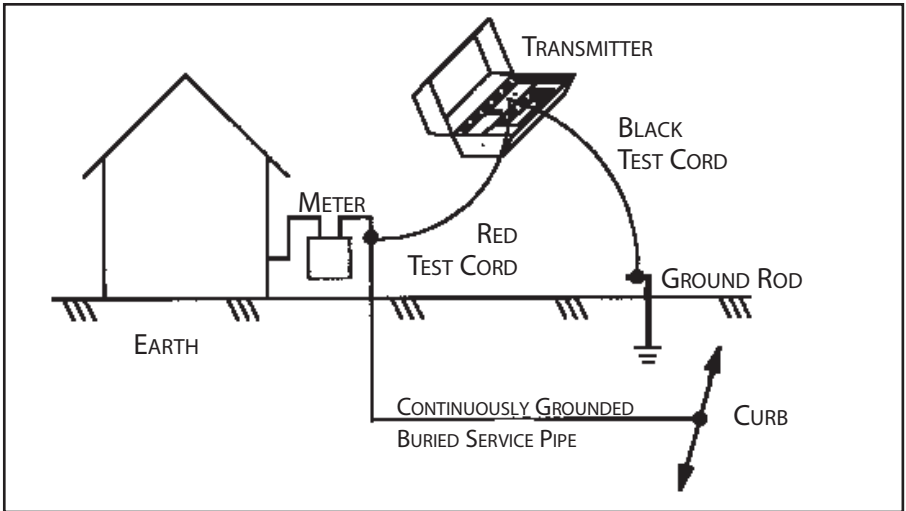
CAUTION

DO NOT DIRECT CONNECT TO AN
ENERGIZED POWER CABLE.

Locating errors due to the signal going the other direction or coupling into other cables are unlikely.

Continuously Grounded Circuit

Cable, Pipe or Conduit



The locating range for a bare uninsulated pipe is approximately 150 ft and may require frequent relocation of the TRANSMITTER. If the locating range seems very short or unreliable, there may be an insulated bushing in the buried pipe. Try to bypass the insulated fitting by using a different connection point.

Start by connecting the RED TEST CORD to the shut-off valve wrench surfaces or union fittings near the gas or water meter. Then press the GROUND ROD into the ground at approximately 10 ft from this point. Place the GROUND ROD at an angle of approximately 90 degrees to the buried or pipe. Connect the BLACK TEST CORD to the GROUND ROD.

8840 Path Finder (may not locate because of low 815Hz frequency)

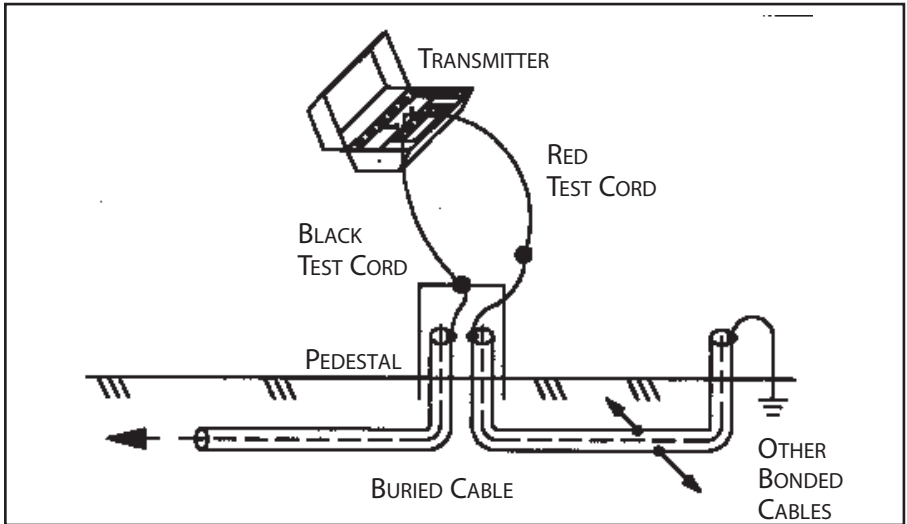
Plug the RED/BLACK TEST CORD into the DIRECT CONNECT 815Hz JACK. The ON indicator will start blinking.

8850 Path Finder II, 8852 and 8856

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT JACK. Set the 815Hz/OFF/82kHz switch to the 815Hz position. The ON indicator will start blinking.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Telephone Direct Shield Connection



The Telephone Direct Shield is the preferred method for the telephone service. There is usually a ground lug available for making the connections, and therefore damage to the cables is unlikely. Only a service company employee is permitted to make the connections. This connection is reliable and the service is not interrupted. The readings may be confusing if several cable shields are bonded together.

Start by disconnecting the shield from the system ground. Then, connect the RED TEST CORD to the cable shield. Next, connect the BLACK TEST CORD to the telephone pedestal or the previous shield attachment point.

8840 Path Finder

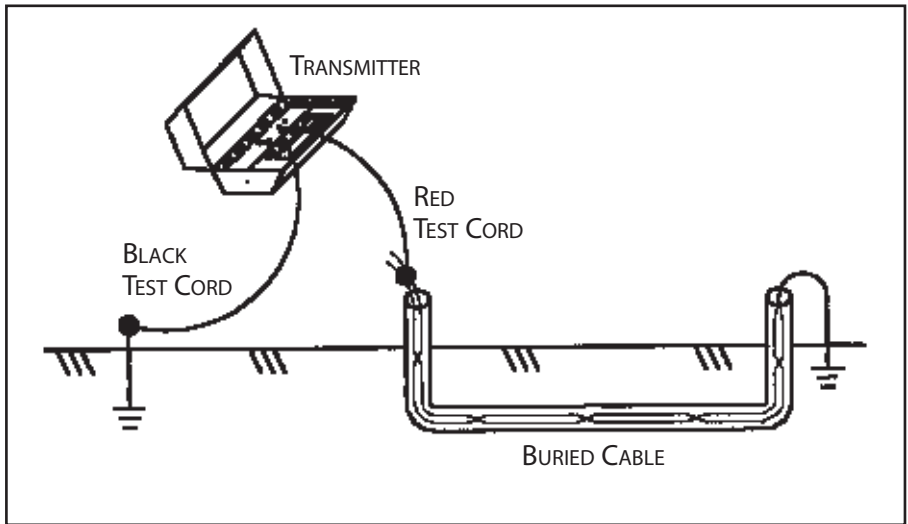
Plug the RED/BLACK TEST CORD into the DIRECT CONNECT 815Hz JACK. The ON indicator will start blinking.

8850 Path Finder II, 8852 and 8856

Plug the RED/BLACK TEST CORD into the Direct Connect Jack. Set the 815Hz/OFF/82kHz switch to the 815Hz position. The ON indicator will start blinking.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Telephone Direct Pair Connection



8840 Path Finder

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT 815Hz JACK. The ON indicator will start blinking.

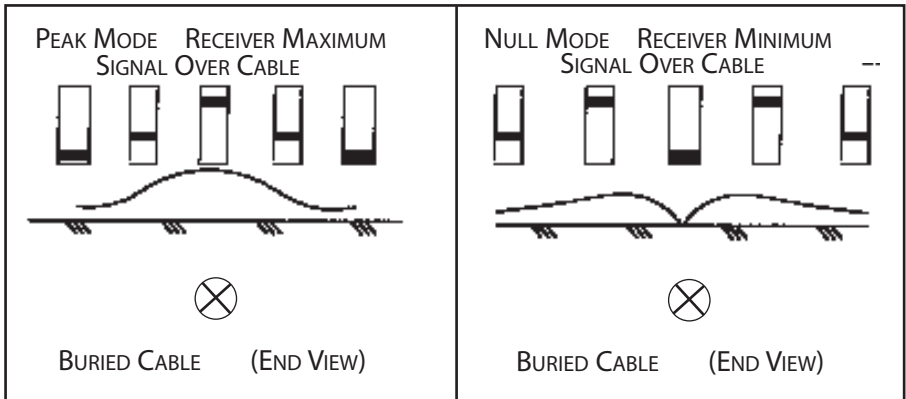
8850 Path Finder II, 8852 and 8856

Plug the RED/BLACK TEST CORD into the DIRECT CONNECT JACK. Set the 815Hz/OFF/82kHz switch to the 815Hz position. The ON indicator will start blinking.

*Turn to Page 18 to Begin Locating the Cable or Pipe

Locating the Cable or Pipe

Now that you have chosen the method you are going to use to locate the cable or pipe, the next step is determining which type of RECEIVER you have (Peak or Null / Peak and Null). This will determine the depth measurement method you will use. All instruments are capable of locating at the 45 degree method or the straight lift method.



Start by making sure the TRANSMITTER is connected and turned on. Then move about 15 ft away from the TRANSMITTER along the path. For the Inductive Search method (used with the 8850 Path Finder II, 8852 and 8856), move about 25 ft away from the Transmitter. Next, hold the RECEIVER so that the BUBBLE LEVEL is approximately centered, and you can see the meter and controls easily. Flip the RECEIVER FREQUENCY SELECTOR switch to the 815Hz position. If you are using the 8850 Path Finder II, 8852, or the 8856, make sure both the RECEIVER and TRANSMITTER FREQUENCY SELECTORS are set for the same frequency (either 815Hz or 82kHz). Then adjust the SENSITIVITY control to receive a METER and audio tone response.

The Path Finders' audio output has a variable tone. This variable tone gives you an indication of the METER READING. As the METER READING increases, the variable tone pitch increases. As the METER READING decreases, the pitch decreases. The variable tone will become silent at any meter setting between 2.0 and 4.5.

Locating the Cable or Pipe

Keep the BUBBLE LEVEL centered at all times. Start by swinging the RECEIVER across the path. When the RECEIVER is directly above the cable or pipe, the variable pitch audio tone and the ANALOG METER will peak (see Peak Mode Illustration on page 18), when using a peaking unit. When using a nulling unit, the variable pitch audio tone and the ANALOG METER will null, when the RECEIVER is directly over the pipe or cable (see Null Mode Illustration on page 18).

Adjust the SENSITIVITY control knob until the METER READING is between 6 and 9.

Next, begin tracing the path by walking away from the TRANSMITTER at a moderate pace. Continue swinging the RECEIVER left to right as you walk. Follow the peak or null METER READING indicator.

When you trace the path, the METER READING may slowly fade as you move away from the TRANSMITTER. Readjust the SENSITIVITY control to maintain a METER READING between 6 and 9. If the METER READING suddenly changes in level (higher or lower), you may have found:

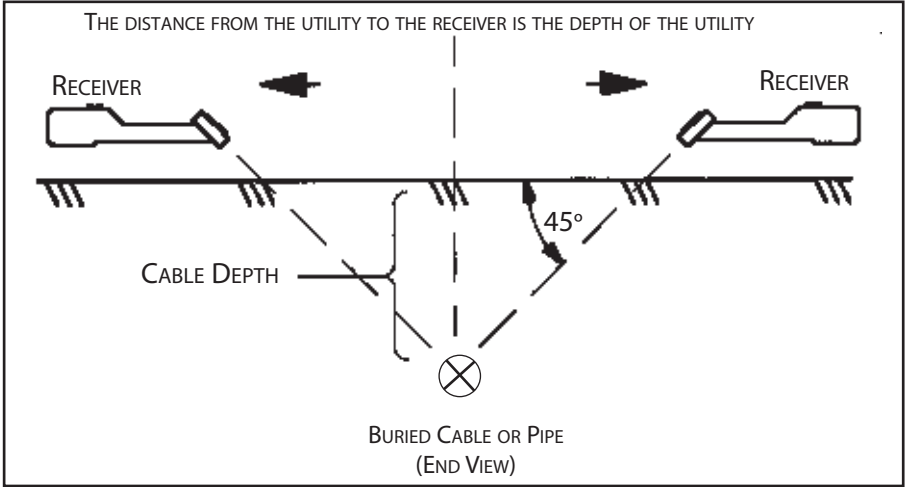
- a) a junction where the signal divides and goes several directions.
- b) a break in the cable or shield.
- c) a change in depth of the cable or pipe.
- d) an insulated pipe fitting.

If you can no longer trace the path, even when the SENSITIVITY control is set at a maximum setting, try connecting the TRANSMITTER to the other end of the path and begin tracing back.

When there are sharp changes in a path, the RECEIVER'S null and peak METER indicators behave differently than when tracing a straight path. Begin by practicing on a path that you know has turns and laterals in it, so that you will be able recognize them.

Depth Measurements ~ Nulling Unit

45 Degree Angle Method



Move to the spot where you want to measure the depth. Stay at least 15 ft away from the TRANSMITTER. Start by swinging the RECEIVER across the path until you locate the null on the METER READING. Then, adjust the SENSITIVITY control for a null METER READING of just below 2. Mark the path on the ground as precisely as possible.

Next lay the RECEIVER on the ground with the meter facing up. Place the heel of the RECEIVER on the path, with the case at a 90 degree angle to the path. The METER will not indicate a null at this time, but do not readjust the SENSITIVITY control.

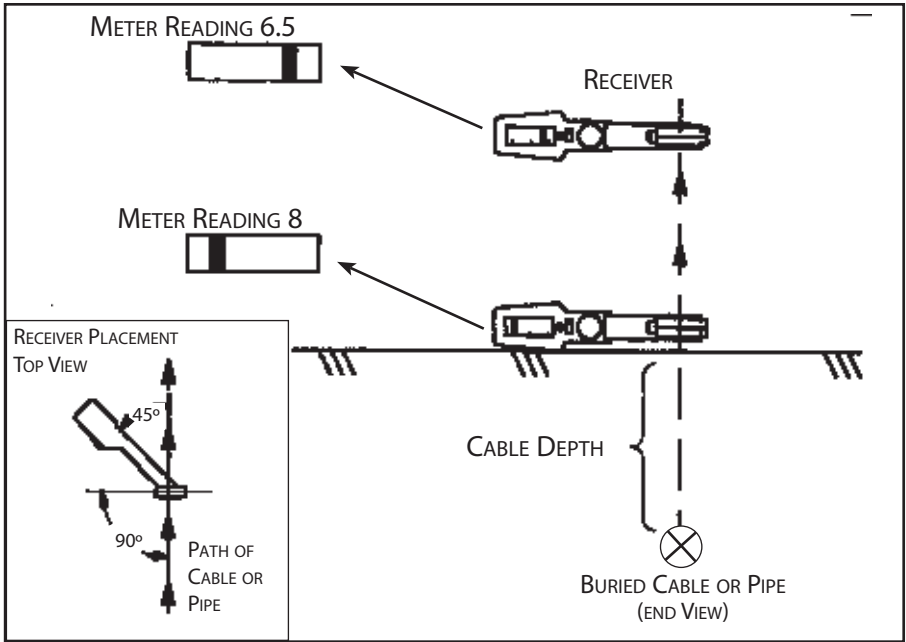
Move the RECEIVER slowly away from the path at a 90 degree angle until you find a new null METER READING. Mark this point. The distance between the RECEIVER and the marked cable path is the approximate depth of the pipe or cable.

A false location can be caused by nearby buried metallic objects, such as a second cable or pipe, sewer, fence, or railroad track. Confirm your depth measurement by repeating the above steps on the opposite side of the pipe or cable.

A difference of more than 5 inches in depth measurements indicates additional buried cables, pipes, or other objects may be present.

Depth Measurements ~ Nulling Unit

Straight Lift Method



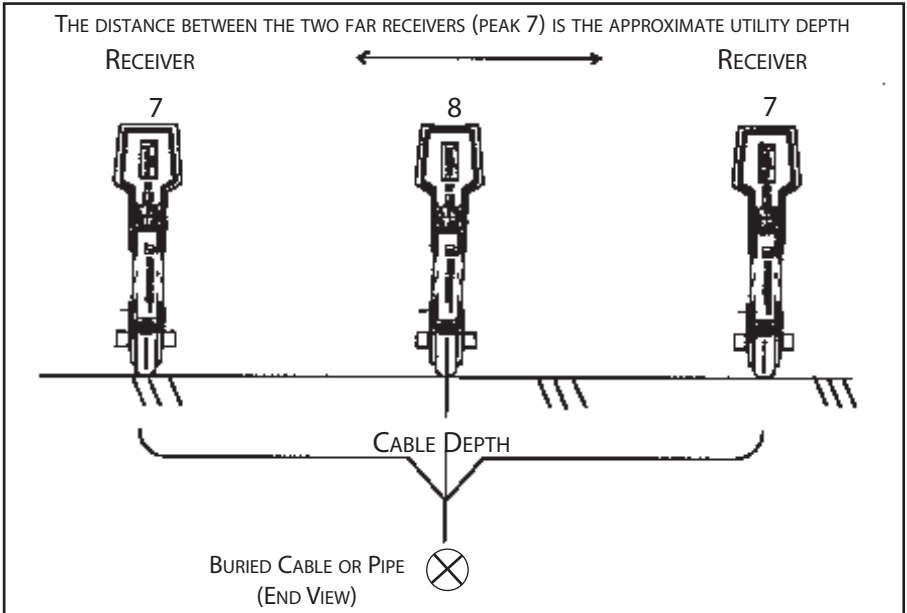
Move to the location where you want to measure the depth of the buried cable or pipe. You must stay at least 15 ft away from the TRANSMITTER. Next, place the RECEIVER on it's side on the ground. With the RECEIVER body over the buried cable or pipe, position the RECEIVER at a 45 degree angle to the path.

Without moving the RECEIVER, adjust the SENSITIVITY control for a METER READING of 8.

Then 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. If you are unable to reach a METER READING of 6.5 by using the straight lift method, use the 45 degree triangular method to determine the depth measurement of the utility (page 20). The height of the heel of the RECEIVER above the ground is the depth of the cable.

Depth Measurements ~ Peaking Unit

45 Degree Angle Method



Move to the spot where you want to measure the depth of the underground utility. Stay at least 15 ft away from the TRANSMITTER. Start by swinging the RECEIVER across the path until the RECEIVER indicates a peak METER READING. Then, adjust the SENSITIVITY control for a peak METER READING of just below 8. Mark the path on the ground as precisely as possible.

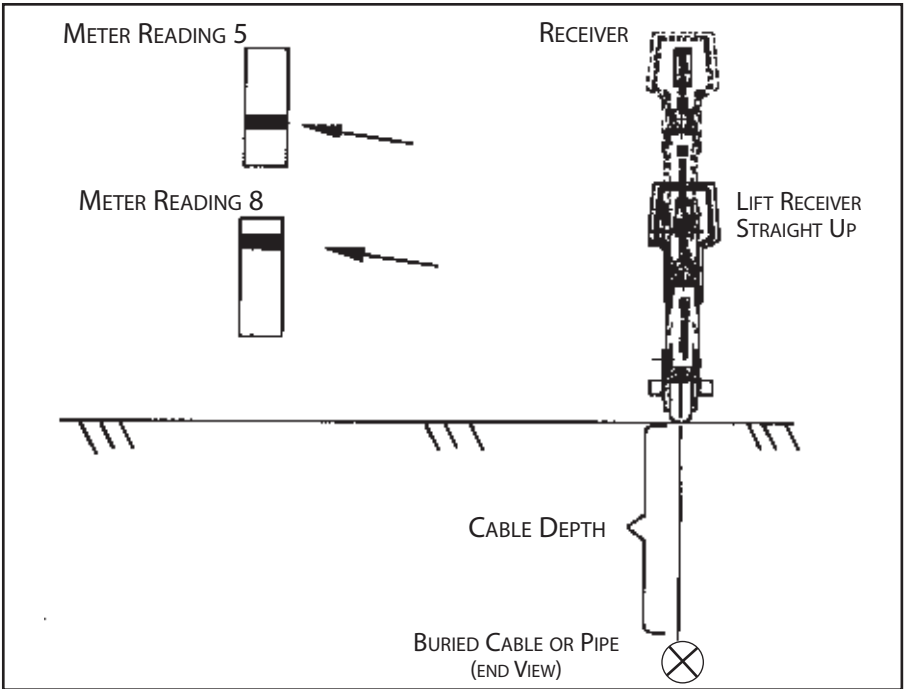
Position the RECEIVER on the ground as shown above. Adjust the SENSITIVITY control for a METER READING of 8.

Move the RECEIVER slowly away from the path at a 90 degree angle until the METER READING drops to 7. Mark this point. Move the RECEIVER back towards the cable until the METER peaks at 8. Next, move to the far side of the cable until the METER reading drops to 7. Measure the distance between the two far RECEIVERS (peak 7's). The distance between these points is the approximate depth of the pipe or cable.

A false location can be caused by having nearby buried metallic objects, such as a second cable or pipe, sewer, fence, or railroad track.

Depth Measurements ~ Peaking Unit

Straight Lift Method



Move to the location where you want to measure the depth of the buried utility. You must stay at least 15 ft away from the TRANSMITTER. Begin by placing the RECEIVER on the ground over the buried cable or pipe.

Without moving the RECEIVER, adjust the SENSITIVITY control for a METER READING of 8.

Start by lifting 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 5 is found. If you are unable to reach a METER READING of 5 by using the straight lift method, use the 45 degree triangular method to determine the depth measurement of the utility (page 22). The height of the RECEIVER ANTENNA above the ground is the depth of the cable.

Product Specifications

Receiver

INPUT FREQUENCY

Path Finder 8840

815Hz

Path Finder 8850

High 82,315Hz

Low 815Hz

NOISE REJECTION

116 dB minimum

116 dB minimum

GAIN CONTROL

126 dB minimum

126 dB minimum

METER OUTPUT

Analog, Peak/Null

Analog Peak/Null

SPEAKER OUTPUT

Variable Pitch Tone

Variable Pitch Tone

POWER SOURCE

8-AA Duracell Batteries

8-AA Duracell Batteries

BATTERY LIFE

Greater than 80 hrs

Greater than 80 hrs

OPERATING TEMPERATURE

-4 to +133F

-4 to +133F

(-20 to +55C)

(-20 to +55C)

SIZE

13x3x3"

13x3x3"

(33x7.6x7.6cm)

(33x7.6x7.6cm)

WEIGHT

1.7 lbs

1.8 lbs

(.77kg)

(.8kg)

Transmitter

tone FREQUENCY

Path Finder 8840

815Hz

Path Finder 8850

High 82,315Hz

Low 8158Hz

HOOK-UP METHOD

Direct Connection

Direct Connection

Inductive Coupling

(with Optional Flexicoupler)

(Inductive Coupling)

OUTPUT POWER

100 Milliwatts, Nominal

100 Milliwatts, Nominal

MAXIMUM OPEN CIRCUIT VOLTAGE

30 V PK-PK AC

30 V PK-PK AC

OPERATING TEMPERATURE

-4 to +133F

-4 to +133F

(-20 to +55C)

(-20 to +55C)

POWER SOURCE

8-D Duracell Batteries

8-D Duracell Batteries

BATTERY LIFE

Greater than 120 hrs

Greater than 120 hrs

SIZE

17x7.5x6.5"

17x7.5x6.5"

(43x19x16cm)

(43x19x16cm)

WEIGHT

6.2 lbs

6.2 lbs

(2.8kg)

(2.8kg)

Product Specifications

Receiver	8852	8856
INPUT FREQUENCY	High 82,315Hz Low 815Hz	High 82,315Hz Low 815Hz
NOISE REJECTION	116 dB minimum	116 dB minimum
GAIN CONTROL	126 dB minimum	126 dB minimum
METER OUTPUT	Analog, Peak/Null	Analog Peak and Null
SPEAKER OUTPUT	Variable Pitch Tone	Variable Pitch Tone
POWER SOURCE	8-AA Duracell Batteries	8-AA Duracell Batteries
BATTERY LIFE	Greater than 80 hrs	Greater than 80 hrs
OPERATING TEMPERATURE	-4 to +133F (-20 to +55C)	-4 to +133F (-20 to +55C)
SIZE	13x3x3" (33x7.6x7.6cm)	13x3x3" (33x7.6x7.6cm)
WEIGHT	1.7 lbs (.77kg)	1.8 lbs (.8kg)

Transmitter	8852	8856
TONE FREQUENCY	High 82,315Hz Low 815Hz	High 82,315Hz Low 815Hz
HOO-K-UP METHOD	Direct Connection Inductive Coupling (with Optional Flexicoupler)	Direct Connection Inductive Coupling (with Optional Flexicoupler)
	(from Transmitter Case) Inductive Coupling	(from Transmitter Case) Inductive Coupling
OUTPUT POWER	100 Milliwats, Nominal	100 Milliwats, Nominal
MAXIMUM OPEN CIRCUIT VOLTAGE	30 V PK-PK AC	30 V PK-PK AC
OPERATING TEMPERATURE	-4 to +133F (-20 to +55C)	-4 to +133F (-20 to +55C)
POWER SOURCE	8-D Duracell Batteries	8-D Duracell Batteries
BATTERY LIFE	Greater than 120 hrs	Greater than 120 hrs
SIZE	17x7.5x6.5" (43x19x16cm)	17x7.5x6.5" (43x19x16cm)
WEIGHT	6.2 lbs (2.8kg)	6.2 lbs (2.8kg)
OPTIONS	Flexicoupler GRP Cable Identifier	Flexicoupler GRP Cable Identifier

Accessories Available

Flexicoupler

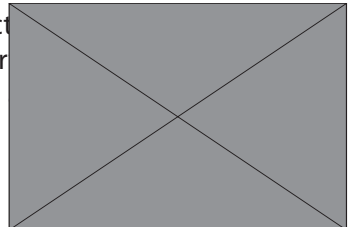
(Use with the 8850, 8852 and 8856)

A flexible coupling for inducing the transmitted signal on a pipe or cable when direct connection can not be used.

Cable Identifier

(Use with the 8852 and 8856)

A thin, cylinder shaped device connected to the Receiver through the Accessory Jack and is used to locate a cable within a bundle of cables.



Factory Service

RYCOM, Instruments, Inc. Products are Made in the USA

The RYCOM Path Finder family locators were designed for dependable operation with recommended yearly adjustment or calibration. If, however, your Path Finder is not working properly, return it to the factory for repair. Send it prepaid to:

RYCOM Instruments, Inc.
9351 E. 59th Street
Raytown, MO 64133 USA
Telephone: 816-353-2100 or 1-800-851-7347
Fax: 816-353-5050

We will repair and ship the instrument back within 10 working days, or advise you if the instrument is unrepairable.

****NOTE** There is a minimum charge for repair and handling.

When shipping your Path Finder for service, be sure to include:

- a) the name, address, and phone number of your contact
- b) a brief description of the trouble
- c) the return shipping address and department mail address, along with any special shipping instruction
- d) or contact us for a "Return for Service Form"

Packing Instruction

Remove all batteries, and place the Receiver in the Transmitter case. Use the original shipping carton, or equivalent sturdy container. Add packing material around all sides of the unit. Seal the shipping container with strong tape. Mark the shipping container:

FRAGILE ELECTRONIC EQUIPMENT