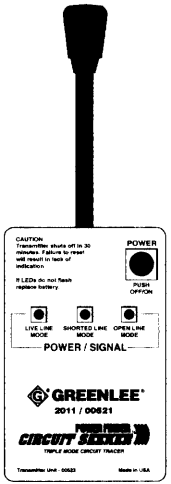
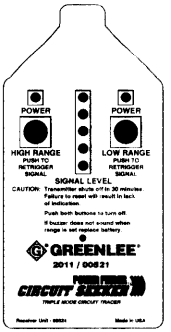
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OPERATION, MAINTENANCE AND SAFETY INSTRUCTIONS





TRANSMITTER **RECEIVER**

GREENLEE® 2011/00521

POWER FINDER™ CIRCUIT SEEKER

Read and **understand** this material before operating. Failure to understand how to safely operate the tester could result in an accident causing serious injury or death. This tester should only be operated by qualified personnel.

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Designed for experienced electricians, the **2011 Power Finder Circuit Seeker™** identifies and traces either live or unenergized circuits. It also locates faults or opens in a circuit, identifies specific breakers and traces circuits shorted to ground. The Circuit Seeker™ consists of two primary components: a Receiver and a Transmitter. The transmitter is connected to the circuit being traced or identified and will contact line voltage if circuit is energized. The transmitter is designed to plug into a standard 120V AC outlet and may be used with circuits up to 600V AC, by using the plug adapters and receptacle blades included with this kit.



SAFETY ALERT SYMBOL

The symbol above is used to call your attention to instructions concerning your personal safety. Watch for this symbol. It points out important safety precautions. It means **"ATTENTION! Become alert! Your personal safety is involved!"** Read the message that follows and be alert to the possibility of personal injury or death.

⚠DANGER

Immediate hazards which WILL result in severe personal injury or death.

⚠WARNING

Hazards or unsafe practices which COULD result in severe personal injury or death.

⚠CAUTION

Hazards or unsafe practices which COULD result in minor personal injury or property damage.

SAFETY INFORMATION

Follow operating instructions carefully.



⚠DANGER

Electrical Shock Hazard:

Contact with live circuits can result in severe injury or death. Use only the plug and adapters provided with the Circuit Seeker™ when tracing circuits.

⚠WARNING

Inspect units and accessories before use. Do not use if wet or damaged.

Failure to observe this warning could result in severe injury or death.

⚠WARNING

- Do not connect to voltage greater than 600 V AC/DC. Check circuit voltage before plugging in transmitter. (Use Greenlee Voltage Testers or Multimeters. Follow instructions provided with test instruments.)
- Connect ground or neutral first when using clip leads or adapters. Current flows through both the hot and ground or neutral transmitter lead.

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

⚠CAUTION

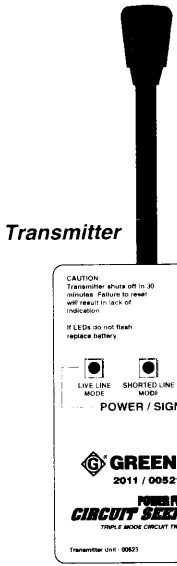
Transmitter shuts off in 30 minutes.

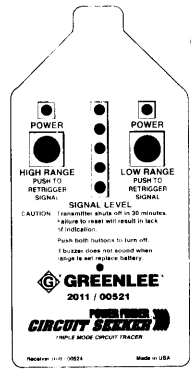
Failure to reset will result in lack of indication.

Packing List

The following items should be included with the 2011 Circuit Seeker™:

Item #	Cat./UPC No.	Qty.	Description
1	00524	1	Receiver Unit
2	00523	1	Transmitter Unit
3	00520	1	Carrying Case
4	00562	1	Adapter, 120V Female Receptacle & Clip
5	36929	2	Blade, AC
6	00522	1	Lead, Test
7	—	2	Batteries, 9V
8	00525	1	Ear Phone/Tube
9	999 1957.5	1	IM-1237, Instruction Manual
10	00624	1	Instructional Video - MA-2858





Specifications

Transmitter

Operating Voltage:	0-600 V AC/DC
Current:	8mA Avg.
Frequency:	33.3 kHz
Operating Temperature:	0° to 120° F (-17° to +50° C)
Dimensions:	5.5 x 2.75 x 1 in. (140 x 69.9 x 25.4 mm)
Power Source:	Line power or 9V battery
Auto Off:	After approximately 30 minutes

Receiver

Operating Temperature:	0° to 120° F (-17° to +50° C)
Dimensions:	5.5 x 2.75 x 1 in. (140 x 69.9 x 25.4 mm)
Power Source:	9V battery
Range from Receiver to Item with Signal:	Live Line Mode - up to 20 ft. (6 M) from circuit Open Line Mode - normally 1 to 3 ft. (.3 to .9 M), up to 10 ft. (3 M) with proper ground
Auto Off:	After 1 minute without signal
Audio Indicators:	
Low Battery	No Beep
Low Range Setting	One Beep
High Range Setting	Two Beeps
Unit Off	Four Beeps

How the 2011 Circuit Seeker™ Operates (Video Location 3:05)

The Circuit Seeker™ is composed of two primary components: the *Receiver* and the *Transmitter*. When the transmitter is connected to any electrical line (up to 600 volts), it induces or draws a very small current in a unique manner depending on line conditions. The signal used is a crystal-controlled, precision combination of four separate frequencies. This composite signal gives it a specialized *signature*.

To be received, the signal must have this exact combination of frequencies.

This feature greatly reduces the possibility of interference from electrical *noise*, which is often caused by lamps, appliances, fluorescent fixtures or machinery that is on the same line.

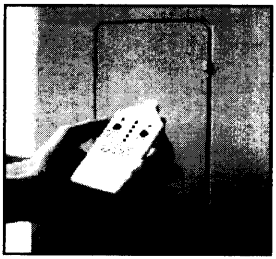
The signal produced by the transmitter generates a magnetic or electrostatic field *signature* around the conductor being traced, which matches that of the signal itself. This signature is present the entire length of the current path, including through breakers, fuses, switchgear and transformers.

The Circuit Seeker™ receiver is tuned to pick up only that signature produced by the transmitter. Both the transmitter and the receiver are microprocessor-controlled for maximum ease of use and accuracy.

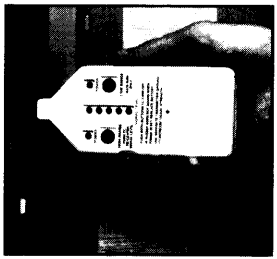
The transmitter will turn off its own power after approximately 30 minutes. To save battery life, the receiver also uses an Auto Power Off feature and will turn off after approximately 1 minute without signal. The transmitter can be manually turned off using the OFF/ON button. The receiver may also be turned off manually by pushing the HIGH and LOW RANGE buttons simultaneously.

The Polysig™ Composite Signal

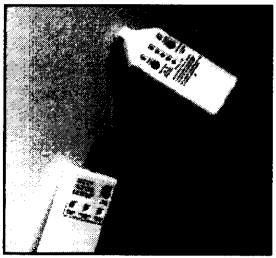
Most circuit tracers rely on a single transmitter frequency for tracing. This means that any noise in that frequency range will be received as a signal, causing confusion and possibly indicating the wrong breaker or other false reading. The Polysig™ composite signal in combination with a unique tone sequence makes it almost impossible to receive anything other than the true signal. The Polysig™ provides a much longer range capability than a single frequency. The transmitter operates with a very low signal current. This low current will not disrupt voltage-sensitive equipment such as computers.



Finding Breaker Panel



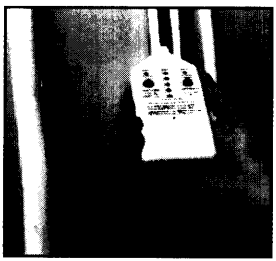
Identifying Circuit Breakers



Tracing Wires in Walls



Finding Neutral Wires



Tracing Metal Conduit



Wire Sorting

Operation

The Transmitter - Plug into a 120V AC circuit for locating circuit breakers. Use plug adapters and receptacle blades for set-ups other than 120V outlets and other tracing applications. Throughout this manual you will be instructed to use a **"separate or earth ground." A "separate or earth ground" must be used for many applications.** A separate ground simply means connecting the transmitter to a ground that is physically separated from the area of the wire to be traced. Conduit, outlet boxes, and wire trays carrying the trace line do not create a separate ground path. For further details, see pages 14 and 15 of this manual.



⚠DANGER

Electrical Shock Hazard:
Contact with live circuits can result in severe injury or death. Use only the plug and adapters provided with the Circuit Seeker™ when tracing circuits.

⚠WARNING

- Do not connect to voltage greater than 600 V AC/DC. Check circuit voltage before plugging in transmitter. (Use Greenlee Voltage Testers or Multimeters. Follow instructions provided with test instruments.)
- Connect ground or neutral first when using clip leads or adapters. Current flows through both the hot and ground or neutral transmitter lead.

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

To use adapter and blades: **1.** When using leads, always connect to ground or neutral first. **2.** Connect one alligator clip of the adapter plug to one of the receptacle blades by opening the clip slightly and sliding the jaws over the protected prong of the adapter plug. If connecting to a receptacle, such as a twist-lock, connect the second clip to blade in the same manner. If set-up does not require use of second blade, attach second adapter clip to appropriate ground (see applicable usage instructions). **3.** Insert receptacle blades and/or connect to ground per usage instructions. **4.** Plug transmitter plug into adapter plug. **5.** Turn on the unit. The LEDs will flash simultaneously, indicating a good battery. Next, only one LED will flash, indicating the line mode and that the transmitter is working.

The Receiver - Turn the unit on by pushing the HIGH RANGE or LOW RANGE button. The corresponding LED will light to show the unit is operating. Use the LOW RANGE setting anytime you can physically touch the receiver tip to the wire or breaker. For all other applications the HIGH RANGE setting is typically used. It is important to note there is a distance overlap between high and LOW RANGE settings. If you do not receive a signal on the LOW RANGE setting, simply use the HIGH RANGE instead. If the receiver is too close to a line in the HIGH RANGE setting, and it does not automatically turn gain down, then use the LOW RANGE setting. Select the range desired and operate as discussed in the following instructions.

Noisy Environments: This unit has been supplied with an auxiliary *Ear Phone/Tube* for use with the receiver. The small plug at one end of the tube snaps into the opening on the front of the receiver case. The large end fits in the ear. The tube carries the sound from the unit to the ear so it can be heard when working in noisy environments.

NOTE: This unit works best when held in your hand, because your hand and body act as a *ground plane* reference which improves the sensitivity of the receiver. Without this ground plane reference, the range of the receiver can be cut in half.

Locating a Circuit Breaker (Live Circuit) (Video Location 10:42)



⚠DANGER

Electrical Shock Hazard:

Contact with live circuits can result in severe injury or death. Use only the plug and adapters provided with the Circuit Seeker™ when tracing circuits.

⚠WARNING

- Do not connect to voltage greater than 600 V AC/DC. Check circuit voltage before plugging in transmitter. (Use Greenlee Voltage Testers or Multimeters. Follow instructions provided with test instruments.)
- Connect ground or neutral first when using clip leads or adapters. Current flows through both the hot and ground or neutral transmitter lead.

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

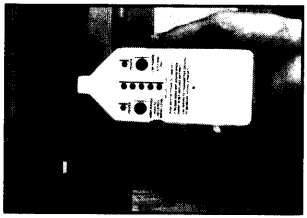
1. Plug transmitter into the receptacle or connect to higher voltage circuit (max. 600V) using plug adapters and receptacle blades (see instructions under OPERATION). When using leads, always connect ground or neutral first. Push the POWER button and green LEDs will flash 3 times. This indicates a good battery. The unit will then flash the LED that indicates the type of line you are connected to and send the appropriate signal on the line.
2. Push the receiver HIGH RANGE button. The unit will beep twice and the green power LED above the button will glow. (If the unit does not beep, remove and replace the 9V battery.) The receiver also indicates a signal if within tracing range.
3. Move the receiver to within range of the transmitter. All five LEDs should flash and the unit will emit a beeping sound.

4. Take the receiver to the vicinity of the circuit breaker panel and press the HIGH RANGE button. If a signal is received, move the receiver toward the panel to produce an increase in signal strength. (The receiver will pick up the signal within 12 to 18 inches of a panel, even with the panel cover closed.) If there is more than one panel, check all panels without re-setting the receiver to find the strongest signal. The panel with the strongest signal contains the circuit breaker.

5. Open the panel door, push the LOW RANGE button and move the receiver over all the breakers in the panel as shown. Next, move the receiver slowly down the row of breakers until the LEDs flash.

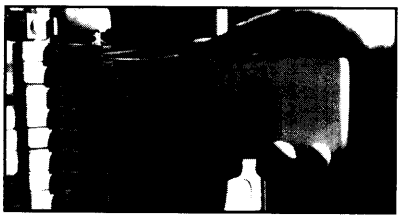
   The breaker or fuse providing the strongest signal (lighting the most red LEDs) is the one powering the transmitter, and therefore, the receptacle or device to which it is connected.

   NOTE: The receiver must be held in the position shown (relative to the set-up of the breakers) to be aligned with the magnetic field.



   If there is any doubt as to which is the correct breaker or fuse (due to unusual breaker design, wiring or the possibility that two breakers are feeding the same circuit), remove the panel trim and check the wires as shown below.

   You can also continue to follow the power line by locating the remote main breaker in the same fashion. Since the signal is on a single-phase circuit, you can even find which leg of the breaker is feeding the transmitter.

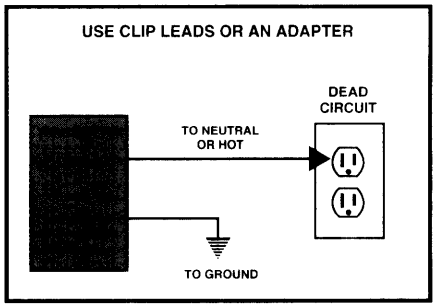


If there is any doubt of which breaker is active, remove the breaker panel trim and test wires as shown.

Locating a Circuit Breaker (Dead Circuit)

(Video Location 12:42)

A dead circuit caused by a tripped breaker can be located by following the circuit's neutral or hot line. Connect one side of the transmitter adapter plug to separate or earth ground. Plug the transmitter into the transmitter adapter plug. Connect the other clip to neutral or hot. You can then trace the wire to the panel as described under ***Locating a Circuit Breaker (Live Circuit).*** In the case of multiple panels, (locating a circuit breaker, step 4) open all panel doors and check all panels (without resetting), to find the panel with the strongest signal.



Tracing the Path of a Hidden Wire (Live Circuit)

(Video Location 15:23)



⚠DANGER

Electrical Shock Hazard:

Contact with live circuits can result in severe injury or death. Use only the plug and adapters provided with the Circuit Seeker™ when tracing circuits.

⚠WARNING

- Do not connect to voltage greater than 600 V AC/DC. Check circuit voltage before plugging in transmitter. (Use Greenlee Voltage Testers or Multimeters. Follow instructions provided with test instruments.)
- Connect ground or neutral first when using clip leads or adapters. Current flows through both the hot and ground or neutral transmitter lead.

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

Follow steps 1 through 3, using separate or earth ground, under *Locating a Circuit Breaker (Live Circuit)*, page 10, to set up Transmitter. Then:

4. Beginning at transmitter, scan the area with a sweeping motion parallel to the wall until you locate the signal. The signal will indicate the wire path.

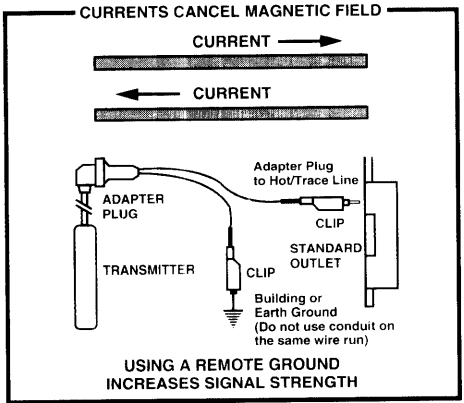
   In HIGH RANGE the receiver will indicate you are within tracing distance by initially flashing all five LEDs. It will then automatically turn the signal level down to three LEDs. If the signal is lost, push the HIGH RANGE button again and return to where you last picked up the signal. This will re-set the signal level at three lights. The signal level will automatically turn down as you get closer to the signal wire. This creates the most accurate reading possible, based on the receiver's distance from the signal wire.

Using A Separate Ground — Do not use a separate ground when tracing GFCI-protected circuits. The transmitter load will trip the GFCI.

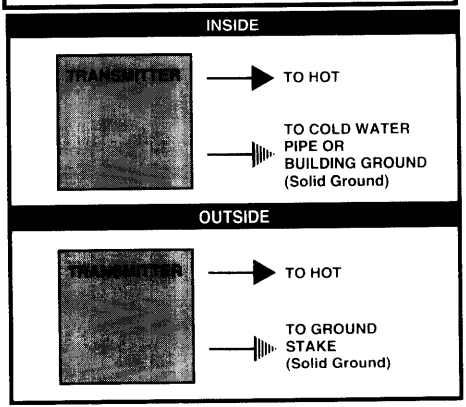
Any wire carrying the load from the transmitter will have the magnetic signature around it. This means that both the hot and neutral wires will carry the signal. If hot and neutral are close together as in a cable or conduit, they tend to cancel each other out.

Although the Circuit Seeker™ is powerful enough to trace these signals at short distances from cable or conduit, **maximum range is obtained by separating the current paths.**

Separating the current path simply means drawing current through the cable or conduit in one direction by using a remote path. Set up transmitter using adapter plug and receptacle blade to separate current paths. Connect one clip to separate or earth ground and the other to blade and insert in hot side of outlet. Proceed with step 4 (on page 13) to trace path.



USING A REMOTE GROUND INCREASES SIGNAL STRENGTH



By using these or similar methods, wiring can be traced with the receiver up to 20 feet away from the signal path.

NOTE: If the LIVE LINE MODE LED doesn't flash with the above connection you may have a poor ground.

To *Trace the Path of a Hidden Wire (Dead Circuit)* see instructions for *Locating a Break in an Open Line* on page 18.

Tracing the Path of a Low Voltage Line (Video Location 18:18)



⚠DANGER

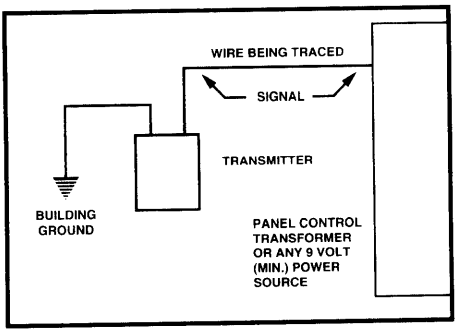
Electrical Shock Hazard:
Contact with live circuits can result in severe injury or death. Use only the plug and adapters provided with the Circuit Seeker™ when tracing circuits.

⚠WARNING

- Do not connect to voltage greater than 600 V AC/DC. Check circuit voltage before plugging in transmitter. (Use Greenlee Voltage Testers or Multimeters. Follow instructions provided with test instruments.)
- Connect ground or neutral first when using clip leads or adapters. Current flows through both the hot and ground or neutral transmitter lead.

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

To trace low voltage circuits (those typically of 50 volts or less), connect one side of the transmitter adapter plug to a known separate or earth ground. Plug the transmitter into the transmitter adapter plug. Connect the other clip to the low voltage conductor and turn the transmitter ON.



Trace path by following Step 4 under ***Tracing the Path of a Hidden Wire (Live Circuit)*** on page 13.

Tracing Coax Cable (Video Location 20:43)

1. Connect one side of transmitter adapter to a separate or earth ground. Plug the transmitter into the transmitter adapter plug. Connect the other clip to the shield of the coax you need to trace.
2. Follow the prior instructions for tracing circuits - under ***Tracing the Path of a Hidden Wire (Live Circuit)***. This method will work whether the coax is grounded (SHORTED LINE MODE LED will flash on transmitter) or ungrounded (OPEN LINE MODE LED will flash on transmitter) at the other end.

Tracing Metallic Conduit (Video Location 22:55)

The Circuit Seeker™ can trace metal conduit if the conduit is grounded only at the circuit breaker panel. Conduit in contact with metal will create multiple ground paths which cannot be traced.

1. Connect one clip of the transmitter adapter plug to a separate or earth ground. Plug the transmitter into the transmitter adapter plug. Connect the other clip of the transmitter adapter to the conduit, as shown under ***Tracing the Path of a Hidden Wire (Live Circuit)***. (See illustration at bottom of page 14.)
2. Turn the transmitter ON. The SHORTED LINE MODE LED will pulse when the transmitter is working.
3. Estimate the average distance from the conduit that the receiver will be held while tracing. Hold the receiver at that distance and turn the receiver on by pressing the HIGH RANGE button. The gain will automatically adjust so that three LEDs light.
4. To trace conduit in the wall, sweep the receiver slowly side to side, noting when the signal is strongest. Move in the direction of the strongest signal until the end of the conduit run is reached. If you lose the signal, go back to where you last picked up the signal. Push the HIGH RANGE button to reset signal, and continue scanning.

Locating the Break in an Open Line (Video Location 25:16)

The Circuit Seeker™ is unable to find opens in metal shielded flexible or rigid metal conduit. It can find an open in unshielded circuits like Romex or wires run through PVC conduit.

Use a *separate or earth* ground, as shown under ***Tracing the Path of a Hidden Wire (Live Circuit)*** when tracing open circuits. (See illustration on page 14.)

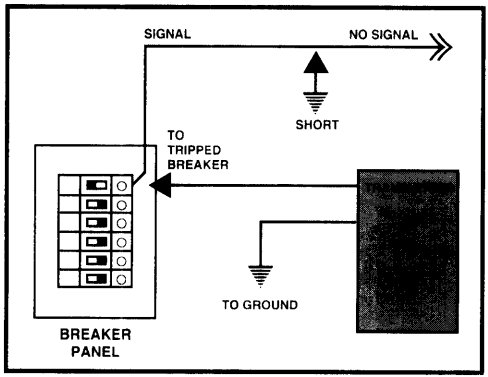
1. Attach one clip from the transmitter adapter plug to a separate or earth ground. If a separate or earth ground is not easily available, a *soft* ground to a metal chair or table may be used, but sensitivity and range are reduced. You can check to see if you have a *separate or earth* ground by checking the ground wire for signal. The receiver will not detect a strong signal on the ground wire if properly grounded.
2. Plug the transmitter into the transmitter adapter plug. Attach the other clip from the transmitter adapter plug to the conductor of the wire being traced. Turn the transmitter ON. The transmitter will indicate OPEN LINE MODE.
3. Taking into consideration the path of the circuit being tested, hold the receiver away from the wire at the distance you will keep it initially while tracing, then set to HIGH RANGE. If you are within signal range, all 5 LEDs will flash and automatically set the signal level to 3 LEDs.
4. Find the open wire by moving the receiver slowly along the circuit at the same distance, while watching for a decrease in signal strength as indicated by fewer LEDs lighting. The open is at the point that the signal decreases just before the signal is lost completely. To more specifically pinpoint the location, set the receiver to LOW RANGE and scan the area.

NOTE: The Circuit Seeker™ works best on opens when held in your hand, because your hand and body act as a *ground plane* reference. This improves the sensitivity of the receiver. Without this ground plane reference, the signal range will be reduced.

Finding a Short to Ground (Video Location 27:51)

1. Connect one side of the transmitter adapter plug to ground. Plug the transmitter into the transmitter adapter plug. Attach the other clip from the transmitter adapter plug to the wire that is shorted (see illustration on page 20). If an outlet has a shorted wire, simply plug the transmitter into the outlet.
2. Confirm that the transmitter SHORTED LINE MODE LED is flashing.
3. Follow the wire until the signal disappears, indicating the location of the short. Use the same method as described under ***Tracing the Path of a Hidden Wire (Live Circuit)*** on page 13.

   NOTE: When using HIGH RANGE to locate hidden shorts, you can pinpoint the location by using the LOW RANGE setting.



Transmitter set-up for Finding a Short to Ground.

Sorting Bundled Wires (Video Location 29:57)

Make sure that all wires in the bundle are unenergized.

1. Connect one clip of the transmitter adapter plug to separate or earth ground. Plug the transmitter into the transmitter adapter plug. Connect the other clip of the transmitter adapter plug to the trace wire. Turn the transmitter ON. The OPEN LINE MODE LED should pulse, indicating that a signal is being sent.



2. Proceed to the other end of the bundle. Set the receiver to LOW RANGE and place it at a right angle to each wire in turn. Hold the receiver against every wire, even if a signal is indicated.
3. Go through the wires a second time with the receiver. The receiver should only show a strong signal on one wire. This is the wire powered by the transmitter.

NOTE: When wires are bundled together, the signal may couple to other wires so that the receiver indicates more than one wire. The wire providing the strongest signal is the one connected to the transmitter. If you are unable to locate a single wire, return to the transmitter end of the bundle and connect all the wires together except the one being sorted. Then connect the bundled wires to the separate or earth ground. This will reduce coupling of the transmitter signal.

MAINTENANCE

Battery Replacement

⚠WARNING

Disconnect the transmitter from circuit before changing battery.
Failure to observe this warning can result in severe injury or death.

The batteries for both the transmitter and receiver are found in the lower portion of the case on the back side of the unit. Make sure the unit is turned off. Slide the battery cover down and remove. Lift out the battery and unsnap the battery from its connector. Replace the battery and close the cover before using.

There are no other serviceable parts in either the receiver or the transmitter. Do not open the case, other than to change the battery. Return unit for servicing if any problems arise. See **Warranty** for additional information.

Always store transmitter, receiver and other parts in carrying case to avoid loss or damage. Do not use units or plugs if wet or damaged. Replace damaged parts through your Greenlee distributor.

Warranty

The 2011/00521 Power Finder Circuit Seeker™ has a limited lifetime warranty. Greenlee warrants to the original purchaser for use that Greenlee Power Finder Circuit Seeker™ by Greenlee Textron Inc. will be free from defects in workmanship and material for the useful life of the tool excepting abuse and normal wear. This warranty does not cover damage due to tampering, misuse, loss, unauthorized alterations or repairs. To avoid service charges, always check battery before sending tester in for warranty service or repair.

The above limited warranty covers repair and replacement of the instrument only. No other obligation is stated or implied.

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