Installing Batteries

To install batteries in the ST-510 Line Transmitter, turn the knob on the battery holder counter clockwise until the holder is loose. Slide the holder straight back to remove from the transmitter. *(See Figure 6.)*



Figure 6 – Removing Battery Holder

Install eight "D" size batteries into the battery holder as indicated on the decal on the holder.

NOTICE Use batteries that are all of the same type (example – all Alkaline or all NiCd). Do not mix battery types. Do not mix used and new batteries. Mixing batteries can cause over heating and battery leakage.

Fit the battery holder back into the transmitter case and slide in. Push slightly on the holder and turn the knob clockwise to secure the holder in the case. The battery holder can be installed in either orientation.

Always remove batteries before shipping unit.

Operation Time

Typical operation time for transmitter with batteries varies depending on battery type, transmitter settings (load), backlight use, Battery Saver Mode use, operating temperature and other factors. When using alkaline batteries, under average conditions, the batteries will supply about 12.5 hours of operation. *See Estimated Battery Operating Times Chart for more information.*

Estimated Alkaline Battery Operating Times	
Current	**Est. Time to Depletion**
400 mA	1.8 hours
200 mA	3.6 hours
100 mA	7.25 hours
50 mA	14 hours
25 mA	28 hours

The ST-510 Line Transmitter also includes an auto shut-off feature to help prevent batteries from running down if the unit is left on inadvertently. Batteries used in high-current applications may recover and still be usable if allowed to rest overnight prior to being used again.

Alternate Power Supply

1. Using the transmitter with battery power provides the highest level of electrical isolation and is the recommended power source. However, the Transmitter can be used with an external power source, such as a vehicle power jack or a standard outlet. In those cases, the following isolated adapters are recommended.

   - Use only a power supply approved to IEC 61010-1 or IEC 60950. Output must be isolated, SELV and Limited-Energy Circuit per IEC 61010-1 or LPS per IEC 60950, 12-15VDC, 30W minimum. Output connection is standard barrel plug, 2.1mm pin, tip positive.

NOTE: Adapters are sold separately.

If used with an adapter, it is very important that the above-specified adapter be used to insure appropriate power is supplied to the transmitter. Be sure to read and keep the adapter instructions. Make sure the adapter cord has a clear, dry path without any potential source of damage. Use dry hands when plugging cords in. **Do not turn the transmitter on at this time.**

⚠ WARNING If the transmitter is used with an external power source, you must make sure that the external

power source is fully isolated from ground and power mains. If the transmitter is not isolated, the transmitter is not protected from connection to energized (live) power lines. This could cause electrical shock and damage the transmitter. **Do not use a non-isolated power supply with the transmitter.**

If using the transmitter with a 12V DC adapter from a vehicle power jack while connected to a power line, the vehicle is connected to the power line. If that power line is energized (live), the vehicle now is at the line voltage, and if the vehicle is grounded, could cause electrical shock or property damage to both the transmitter and vehicle.

Pre-Operation Inspection

⚠ WARNING





Before each use, inspect your transmitter and correct any problems to reduce the risk of serious injury from electric shock and other causes and prevent transmitter damage.

1. Make sure that the transmitter is unplugged and inspect the cords and plug for damage or modification.
2. Clean any oil, grease or dirt from equipment handles and controls. This aids inspection.
3. Inspect the transmitter for any broken, worn, missing, mis-aligned or binding parts or any other condition which may prevent safe and normal operation.
4. Check that the warning label is present, firmly attached and readable.
5. If any issues are found during the inspection, do not use the transmitter until it has been properly serviced.
6. Inspect any other equipment being used per its instructions to make sure it is in good usable condition.

Set-Up and Operation

⚠ WARNING





Always wear eye protection to protect your eyes against dirt and other foreign objects.

Set up and operate the transmitter and work area according to these procedures to reduce the risk of injury from electric shock, and other causes, and prevent transmitter damage.

1. Check for an appropriate work area as indicated in the *General Safety Section page 2*.
2. Inspect the line to have a signal applied to it. The line must be metal. If the line is not metallic, it will not be able to be located with this equipment.

   When using the transmitter on insulated conductors, the target conductor should be grounded at each end. Otherwise, the signal may not be strong enough to locate.

   The transmitter is not designed to provide high voltage isolation and protection. Do not use where a danger of high voltage contact is present.
3. Determine the correct equipment for the application. Using incorrect equipment for an application can cause injury or damage the equipment.
   - Equipment for other applications can be found by consulting the Ridge Tool Catalog, online at www.RIDGID.com or www.RIDGID.eu.
4. Make sure all equipment has been properly inspected.
5. The ST-510 line transmitter can apply an active tracing signal to a conductor in three ways:
   - Direct Connect – The transmitter's leads are connected directly to the target conductor and a suitable ground. This method is most commonly used when the target utility is accessible. Direct connect should not be used for energized (live) conductors.
   - Inductive Clamp (optional accessory) – the jaws of the inductive clamp encircle the target conductor; if the conductor is insulated, there is no metal to metal contact. This method is commonly used when the target utility is accessible but direct connect is not possible on an insulated cable for example. *(See Page 9)*

- Inductive Mode – The transmitter generates a field, which in turn induces a current in the target conductor. There is no direct connection between the transmitter and the target conductor. The transmitter is placed over and inline with the target conductor. The transmitter's internal antenna induces a signal onto the target conductor. This method is most commonly used when the target utility is not accessible. *(See page 9).*

Direct Connect Method

1. Confirm that the target conductor is NOT energized (live). The transmitter is not designed to be connected to energized (live) conductors.
2. Choose ground spike and target conductor connection locations. The transmitter leads extend up to 48 feet to give flexibility in choosing connection points. The leads can act as antennas, and the further they are extended, the more incidental signal they can send out. The further the leads are extended, the further the receiver should be used from the transmitter to avoid misleading signals from the cable leads. If locating close to the transmitter, keep the leads as short as possible with the excess in the transmitter's side pockets.



Figure 7 – Attaching Lead To Ground Stake

3. Remove the ground spike from the bottom of the transmitter and insert it into the earth. A good ground results in a stronger tracing signal. To get a good ground, insert the ground spike as far as possible into the earth. Moist earth will give a better ground than dry earth. Wetting the earth around the ground spike can improve grounding. This lowers the resistance of the circuit. Connect either cable lead to the ground stake. **Always connect to the ground first.** If the target conductor has an unknown voltage on it, this may allow the current to be directed away from the user. *(See Figure 7).*

   Grounding can also be accomplished by attaching the cable lead to things like shovel blades or larger rods sunk into the earth. These can improve grounding by increasing area/depth in contact with the Earth.

4. Scrape away any dirt, paint, corrosion or other coatings on the target conductor to insure good contact with the cable lead. Again, this lowers the resistance of the circuit and results in a stronger tracing signal. Connect the other cable lead to the target conductor. *(See Figure 8).*



Figure 8 – Connecting Cable Lead To Target Conductor.

5. Press the POWER ON/OFF button on the keypad to turn the transmitter on. As the power comes on, the transmitter will emit ascending beeps. The transmitter will pause to measure how much current is flowing onto the target conductor. The faster the beeping, the higher the detected current. To turn the beeping off, press the sound key. *(See Figure 4).*

⚠ WARNING The line transmitter is designed to withstand up to 240V AC between the two leads. The protection is NOT intended to be used continuously. If the transmitter encounters a target conductor voltage higher than approximately 42 volts (RMS), a red LED next to the High Voltage Present Indicator will flash and the LCD screen will display the safety alert symbol and "HV MODE" *(See Figure 9).* If this happens, DO NOT TOUCH THE TRANSMITTER, CORDS OR CONNECTIONS. The target conductor is energized and there is the risk of electrical shock. Use high voltage precautions to disconnect.



Figure 9 – High Voltage Indicator

6. Select a frequency, check the circuit and adjust current. See *pages 10 and 11 for more information.*
7. Turn on the receiver/locator and follow the instructions for the receiver. Make sure the receiver's frequency is set to match that on the transmitter. Confirm the receiver is picking up the transmitted frequency by holding it near the transmitter and observing the increase in receiver signal.
8 Once the locating is completed, press the POWER ON/OFF button on the keypad to turn the transmitter off. **Always turn the unit off before disconnecting the cable leads to reduce the risk of electrical shock.** Remove the cable lead from the target conductor first. Always disconnect the cable lead from the target conductor first before removing the cable lead from the ground spike to reduce the risk of electrical shock. Disconnect the cable lead from the ground spike. Store the cables and ground spike for transportation.

Inductive Clamp Method

1. This method requires an inductive clamp that is not supplied with the transmitter. Read and follow all instruction for the use of the inductive clamp.
2. Confirm that the target conductor is NOT energized (live). The transmitter is not designed to be connected to energized (live) conductors.
3. Confirm that the transmitter is OFF. If needed, press the POWER ON/OFF button on the keypad to turn the transmitter off. Never turn the transmitter on before attaching the inductive clamp.
4. Insert the plug of the inductive clamp into the jack on the transmitter (above the battery holder). When the inductive clamp plug is in place, the transmitter will automatically be in Inductive Clamp mode, the cable leads will be disabled, and "Clamp" will be displayed on the screen. *(See Figure 11).*



Figure 10 – ST-510 with Inductive Clamp



Figure 11 – Transmitter In Inductive Clamp Mode

5. Clamp the jaws of the inductive clamp around the target conductor. Make sure that the jaws of the clamp are fully closed. *(See Figure 12).*



Figure 12 – Inductive Clamp Attached to a Conductor

6. Turn the transmitter on and select a frequency for locating, check the circuit and adjust current. *(See page 11).* Be sure that the receiver is set to the same frequency. The inductive clamp typically works best with frequencies around 33 kHz.
7. Once locating is complete, turn the transmitter power OFF before disconnecting the clamp.

Inductive Mode

1. Properly place the transmitter relative to the target conductor. On the top of the transmitter is an orientation mark. The orientation mark needs to be aligned with the target conductor. *(See Figure 13).*



Figure 13 – Orientation to the Line – Inductive Mode

2. Press the POWER ON/OFF button on the keypad to turn the transmitter ON. As the power comes on, the transmitter will emit ascending beeps. Press the Inductive Mode Key. The display screen will read “INDUCTIVE MODE”. *(See Figure 14).* The transmitter will make a short buzzing sound when shifting into Inductive Mode, and after that, will make double beeps during inductive mode operation. If desired turn the beeping off by pressing the sound key *(See Figure 4)*.

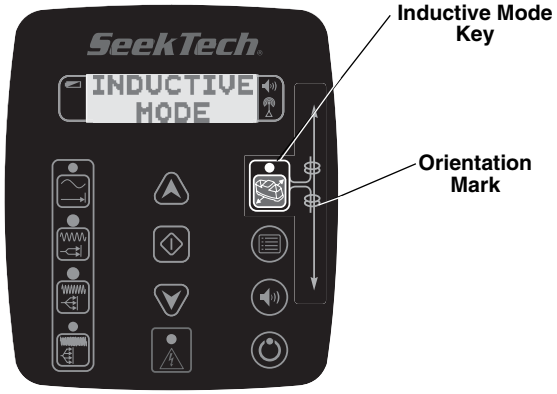


Figure 14 – Inductive Mode Key

3. Select a frequency as described in this manual. When using Inductive Mode, higher frequencies tend to get a better signal at the receiver.

4. Turn on the receiver/locator and follow its instructions. Make sure to set the receiver to the same frequency as the transmitter.

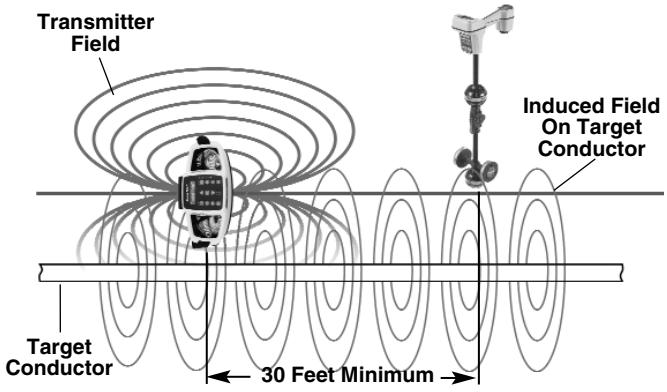


Figure 15 – In Inductive Mode, Locate At Least 30 Feet From Transmitter To Insure Tracing Target Conductor

When the transmitter is in inductive mode, it generates a field around the transmitter. This field is in both the ground (towards the target conductor) and into the air around the transmitter. When the receiver is within approximately 30 feet (10 meters) of the transmitter, it will measure the field directly from the transmitter and not the signal induced on the target conductor. This is called “Air Coupling”. Operate the receiver at least 30 feet from the transmitter to prevent this. *(See Figure 15).*

One way to confirm that you are tracing the target conductor and not the transmitter field is to look for a strong, stable proximity signal and a valid depth measurement on the receiver. While directly over the energized line you can also raise the receiver a set distance off of the ground, and verify that the depth reading on the display equals the distance that you raised the receiver.

5. Once the locating is completed, press the inductive mode key again to exit inductive mode, then press the POWER ON/OFF button on the keypad to turn the transmitter OFF.

Selecting A Frequency

Select a frequency for locating by pressing a frequency key on the keypad *(See Figure 16)*. The frequency will be shown in the display. For 262 kHz, press the 33 kHz key twice. (In European versions, this will set the frequency to 93 kHz.) The frequency selected will show on the display.

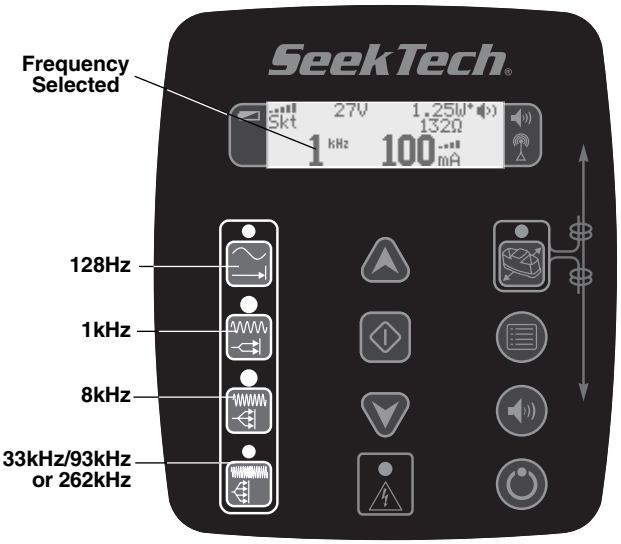


Figure 16 – Frequency Display

It is usually best to use the lowest frequency needed to induce a signal on the target conductor. Lower frequencies usually travel farther. Higher frequencies generally make it easier to induce a signal on the target conductor but are more likely to cause signals on adjacent, non-target conductors causing distortion and reducing accuracy.

The default ST-510 frequency settings are for use with a RIDGID receiver/locator. If using another manufacturer’s receiver compatible frequencies will need to be loaded. The ST-510 transmitter has the appropriate frequencies for a variety of other receiver/locator units available by using the manufacturer menu in the main menu. For available

manufacturers and frequencies, *see the Manufacturers Frequency Table on page 16.* Consult your receiver/locator operator's manual or manufacturer for more information on those products.

To load other manufacturers frequency information

- Press the menu key *(Figure 4).*
- Use the UP/DOWN keys to scroll to "Manf. Menu" and press the select key. This will bring up the list of manufacturers. *(Figure 17).*
- Use the UP/DOWN keys to scroll to the appropriate option and press the select key. *(Figure 18).*



Figure 17 – Manufacturers Menu Selection

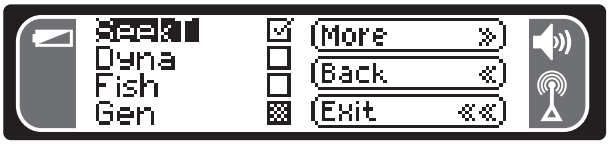


Figure 18 – List of Manufacturers (First Screen)

When using the frequency keys while set up for a different manufacturers receiver/locator, the lowest frequency is controlled by the top (closest to the readout) frequency key. The frequency moves higher with each key further away from the readout. If there are more than four frequencies, pushing the frequency key furthest from the readout multiple times will increment the frequency to the next higher frequency. *(See Figure 19.)* As always, the frequency selected is displayed on the readout.

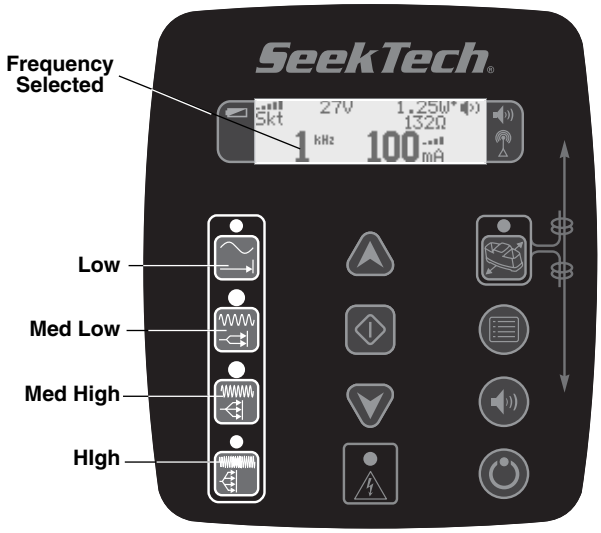


Figure 19 – Frequency Buttons – Other Manufacturer Receiver/Locator

Check The Circuit

Look at the resistance (Ω - ohms), the voltage (V) and the current (mA) displayed on the screen *(See Figure 20)*. Display numbers are approximate. Generally the lower the ohms (total resistance) the more efficiently current can be added. Lower total resistance indicates an efficient circuit and requires less voltage to induce a signal in the line.

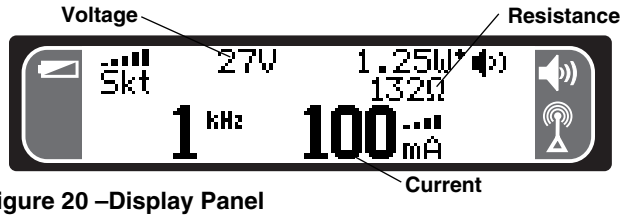


Figure 20 –Display Panel

The transmitter will beep faster if the resistance is lower and slower if the resistance is higher.

Adjust Current

Use the up and down keys to adjust the amount of current in milliamps (mA) *(Figure 21)*.

More current gives a stronger signal. Less current prolongs battery life. Signal strength measured by the receiver is directly proportional to the amount of current on the line. More current means a stronger signal will be received by the receiver.

To prolong battery life and reduce the chance of the signal "bleeding over" onto adjacent lines, use the minimum amount of current needed to get a clear reading on the receiver.



Figure 21 – Current Selection (Up and Down Keys)

There are 7 current levels that the user can choose from: 5, 25, 50, 100, 200 or 400 mA.

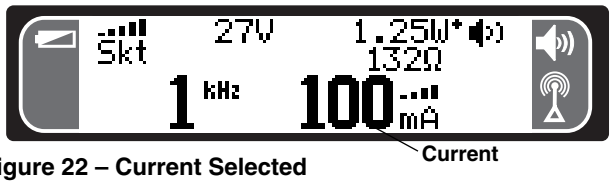


Figure 22 – Current Selected

When a current level is chosen, the transmitter will adjust the voltage to try and produce the selected current and lock it in. *If the transmitter cannot produce the current selected, it will adjust down to the next level.*

The transmitter's maximum current output depends on the amount of resistance in the circuit. When the transmitter is putting out the *maximum current possible* for internal and external conditions, **MAX** will be displayed in place of the current strength number.



Figure 23 – MAX Current

MAX will also appear if the power output of the transmitter is at its allowable limit.

When the current drops below 5 mA, "LO" will appear instead of a number.



Figure 24 – LO Current

If the desired current output cannot be produced, the voltage and ohms (resistance) readings can give useful information. For example, if the transmitter is putting out a high voltage, the resistance of the circuit is probably too high. If the voltage is lower (30V max) and the ohms (resistance) reading is also low, the line transmitter may be constrained by power restrictions. *(See FCC limits information on page 4.)*

⚠ WARNING If the transmitter is showing low or no current, the signal may be too low to be detected by the receiver locator and inadequate for tracing.

Main Menu

To access the main menu, press the menu key *(See Figure 25)*. The Up and Down keys can be used to scroll through the main menu choices *(See Figure 26)* in either direction.

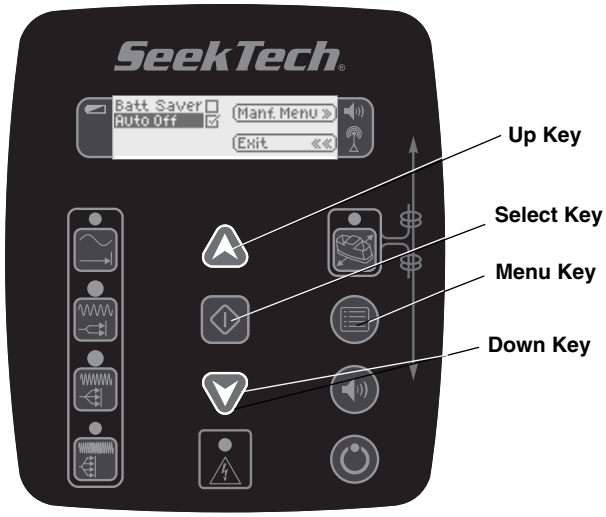


Figure 25 – Menu, Up and Down and Select Keys



Figure 26 – Main Menu Choices

To accept the highlighted choices, press the select key.

Battery Saver Mode

This allows the user to limit the power output of the ST-510 line transmitter to approximately 1 watt in order to prolong the life of the batteries. In many cases 1 watt of power is all that is needed. Using the unit with up to 10 watts allows for more power to be used, but consumes the batteries much faster. Battery Saver is off by default.



Figure 27 – Battery Saver and Auto-Off Options

Auto Shut Off Adjustment

Check this box to have an automatic shut OFF of the transmitter. When checked, using the select key, the ST-510 will automatically shutdown to help conserve batteries. Shutdown time using this feature varies with current draw. The approximate values are:

8 hrs	25mA output or less
4 hrs	50-100mA
2 hrs	200-400mA
1hr	>400mA

This feature prevents the batteries from running down if the unit is inadvertently left on. Auto Shutoff is on by default. *(See Figure 27).*

Auto Back Light

The SeekTech is equipped with an automatic LCD backlight. Whenever a key is pressed, the backlight is activated to aid viewing for 80 seconds.

Adjusting the LCD Screen Contrast

LCD contrast is set at the factory and should not normally require adjustment. Optimal contrast is set when the background remains white, while the black pixels are set to be as dark as possible.The LCD can be adjusted to completely white or completely black, which will affect readability.

LCD contrast may change with extremes in temperature. When the screen is exposed to high heat from direct sunlight it may darken. It is recommended that the screen be shaded if it is to be exposed to excessive sunlight. Use the shoulder strap to cover the screen if needed.

If the display appears too dark or too light when it is on, it is likely that the LCD contrast has become misadjusted. First try powering the unit OFF and then back ON. If the problem persists adjust the LCD contrast darker or lighter as needed.

To adjust the LCD Contrast:

1. Press and **hold** down the select key.
2. Simultaneously press the up arrow key to lighten the display or press the down arrow key to darken the display.



Figure 28 – Adjusting LCD Contrast

Cleaning Instructions

⚠ WARNING

Remove batteries before cleaning.

1. Keep the ST-510 line transmitter clean with a damp cloth and some mild detergent. Do not immerse in water.
2. When cleaning, do not use scraping tools or abrasives as they may permanently scratch the display. NEVER USE SOLVENTS to clean any part of the system. Substances like acetone and other harsh chemicals can cause cracking of the case.

Accessories

⚠ WARNING

The following accessories have been designed to function with the ST-510 line transmitter. Other accessories suitable for use with other equipment may become hazardous when used with the ST-510 line transmitter. To reduce the risk of serious injury, only use accessories specifically designed and recommended for use with the ST-510 line transmitter, such as those listed below.

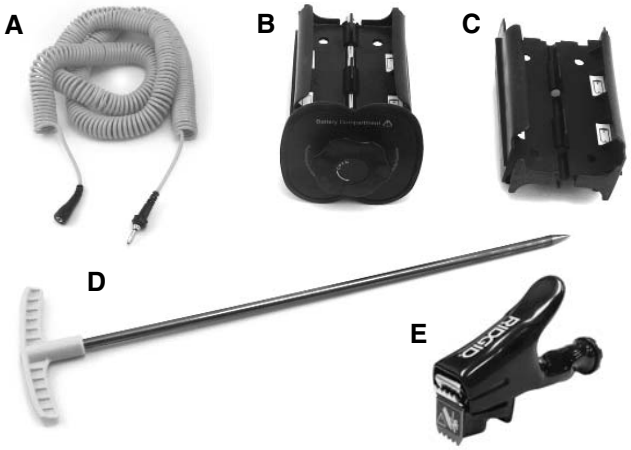
- **Receivers: RIDGID SeekTech SR-20 (Cat#21893), or SR-60 (Cat#22163)**
- **Inductive Clamp (Cat# 20973)**



SR-20 **SR-60** **Inductive Clamp**

Replacement Parts

Parts are available from your local RIDGID Distributor.



A. Direct Connect Lead(48ft./16m) (Cat. #18423)
B. Battery Holder Cover Assembly (Cat. #18428)
C. Battery Holder (Cat. #18433)
D. Ground Spike (Cat. #18438)
E. Direct Connect Lead Clip (Cat. #18443)

Transport And Storage

Remove batteries before shipping. Do not expose to heavy shocks or impacts during transport. If storing for an extended period, remove batteries. Store in environments within temperature range of 14°F to 158°F (-10°C to 70°C).

Service And Repair

⚠ WARNING

Improper service or repair can make machine unsafe to operate.

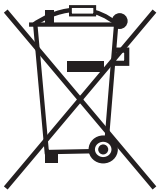
Service and repair of the SeekTech ST-510 must be performed by a RIDGID Independent Authorized Service Center.

For information on your nearest RIDGID Independent Service Center or any service or repair questions:

- Contact your local RIDGID distributor.
- Visit www.RIDGID.com or www.RIDGID.eu to find your local Ridge Tool contact point.
- Contact Ridge Tool Technical Services Department at rtctechservices@emerson.com, or in the U.S. and Canada call (800) 519-3456

Disposal

Parts of the SeekTech ST-510 Line Transmitter contain valuable materials and can be recycled. There are companies that specialize in recycling that may be found locally. Dispose of the components in compliance with all applicable regulations. Contact your local waste management authority for more information.



For EC countries: Do not dispose of electrical equipment with household waste!

According to the European Guideline 2002/96/EC for Waste Electrical and Electronic Equipment and its implementation into national legislation, electrical equipment that is no longer usable must be collected separately and disposed of in an environmentally correct manner.