

SeekTech ST-305

5 Watt Pipe and Cable Line Transmitter



⚠ WARNING!

Read this Operator's Manual carefully before using this tool. Failure to understand and follow the contents of this manual may result in electrical shock, fire and/or serious personal injury.

SeekTech ST-305

Record product serial number below as it appears on the nameplate.

Serial
No.

Table of Contents

Recording Form for Machine Serial Number	1
Safety Symbols	3
General Safety Rules	3
Work Area Safety	3
Electrical Safety	3
Personal Safety.....	3
Equipment Use and Care	3
Battery Precautions.....	4
Service	4
Specific Safety Information	4
ST-305 Safety	4
Description, Specifications and Standard Equipment	5
Components	5
Installing/Changing Batteries	6
Sounds of the ST-305	6
Powering ON / OFF	6
Machine Inspection	7
Set-Up	7
Select a Frequency on the Transmitter.....	7
Check the Circuit and Adjust Power Level	7
Check the Receiver	8
Operation	8
Useful Operating Tips	8
Direct-Connect Method	8
Dual-Frequency Transmission.....	9
Inductive Clamp Method	9
High Voltage Indicator.....	11
Useful Information	11
Resistance and Impedance	11
Using High and Low Frequencies	11
Cleaning	12
Storage	12
Service and Repair	12
Disposal	12
Battery Disposal	12
Troubleshooting	13

Safety Symbols

In this operator's manual and on the product, safety symbols and signal words are used to communicate important safety information. This section is provided to improve understanding of these signal words and symbols.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

NOTICE indicates information that relates to the protection of property.



This symbol means read the operator's manual carefully before using the equipment. The operator's manual contains important information on the safe and proper operation of the equipment.



This symbol means always wear safety glasses with side shields or goggles when handling or using this equipment to reduce the risk of eye injury.



This symbol indicates the risk of electrical shock.

General Safety Rules

⚠ WARNING

Read all safety warnings and instructions. Failure to follow the warnings and instructions may result in electric shock, fire, and/or serious injury.

SAVE THESE INSTRUCTIONS!

Work Area Safety

- **Keep your work area clean and well lit.** Cluttered or dark areas invite accidents.
- **Do not operate equipment in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** Equipment can create sparks which may ignite the dust or fumes.
- **Keep children and bystanders away while operating equipment.** Distractions can cause you to lose control.
- **Avoid traffic.** Pay close attention to moving vehicles when using on or near roadways. Wear visible clothing or reflector vests.

Electrical Safety

- **Avoid body contact with earthed or grounded surfaces such as pipes, radiators, ranges, and refrigerators.** There is an increased risk of electrical shock if your body is earthed or grounded.
- **Do not expose equipment to rain or wet conditions.** Water entering equipment will increase the risk of electrical shock.
- **Do not abuse the cord.** Never use the cord for carrying, pulling, or unplugging the power tool. Keep cord away from heat, oil, sharp edges, and moving parts. Damaged or entangled cords increase the risk of electric shock.
- **If operating equipment in a damp location is unavoidable, use a ground fault circuit interrupter protected supply to reduce the risk of electric shock.**

- **Keep all electrical connections dry and off the ground.** Do not touch equipment or plugs with wet hands to reduce the risk of electrical shock.

Personal Safety

- **Stay alert, watch what you are doing, and use common sense when operating equipment.** Do not use equipment while you are tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating equipment may result in serious personal injury.
- **Use personal protective equipment.** Always wear eye protection. The appropriate use of protective equipment such as a dust mask, non-skid safety shoes, a hard hat, and hearing protection will reduce personal injuries.
- **Do not overreach.** Keep proper footing and balance at all times. This enables better control of the equipment in unexpected situations.
- **Dress properly.** Do not wear loose clothing or jewelry. Keep your hair, clothing, and gloves away from moving parts. Loose clothes, jewelry, and long hair can be caught in moving parts.

Equipment Use and Care

- **Do not force equipment.** Use the correct equipment for your application. The correct equipment will do the job better and safer at the rate for which it is designed.
- **Do not use equipment if the power switch does not turn it ON and OFF.** Any equipment that cannot be controlled with the power switch is dangerous and must be repaired.
- **Disconnect the plug from the power source and/or the battery pack from the equipment before making adjustments, changing accessories, or storing.** Preventive safety measures reduce the risk of injury.
- **Store idle equipment out of the reach of children and do not allow persons unfamiliar with the equipment or**

these instructions to operate the equipment. Equipment can be dangerous in the hands of untrained users.

- **Maintain equipment.** Check for misalignment or binding of moving parts, missing parts, breakage of parts, and any other condition that may affect the equipment's operation. If damaged, have the equipment repaired before use. Many accidents are caused by poorly maintained equipment.
- **Use the equipment and accessories in accordance with these instructions; taking into account the working conditions and the work to be performed.** Use of the equipment for operations different from those intended could result in a hazardous situation.
- **Use only accessories that are recommended by the manufacturer for your equipment.** Accessories that may be suitable for one piece of equipment may become hazardous when used with other equipment.
- **Keep handles dry, clean, and free from oil and grease.** This allows for better control of the equipment.

Battery Precautions

- **Use only the size and type of battery specified.** Do not mix cell types (e.g. do not use alkaline with rechargeable). Do not use partly discharged and fully charged cells together (e.g. do not mix old and new).
- **Recharge batteries with charging units specified by the battery manufacturer.** Using an improper charger can overheat and rupture the battery.

Service

Ensure a qualified repair person services your equipment using only identical replacement parts to maintain the safety of the tool. Remove the batteries and refer servicing to qualified service personnel under any of the following conditions:

- If liquid has been spilled or objects have fallen into product.
- If the product does not operate normally when following the operating instructions.
- If the product has been dropped or damaged.
- When the product exhibits a distinct change in performance.

Specific Safety Information

WARNING

This section contains important safety information that is specific to the SeekTech ST-305. Read these precautions carefully before using the SeekTech ST-305 to reduce the risk of electrical shock, fire, or other serious personal injury.

SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE!

Keep this manual with the equipment for use by the operator.

ST-305 Safety

- **The SeekTech ST-305 is intended for use with a SeekTech locator/receiver.** The locator is a diagnostic tool that senses electromagnetic fields emitted by objects underground.

- **Use equipment only as directed.** Do not use the transmitter and related equipment unless proper training has been completed and the operator's manual or instructions read.
- **ALWAYS HOOK UP LEADS FIRST BEFORE POWERING THE UNIT ON TO AVOID SHOCK.** ALWAYS TURN UNIT OFF BEFORE DISCONNECTING LEADS. ELECTRIC SHOCK MAY RESULT FROM FAILURE TO CONNECT LEADS BEFORE POWERING THE UNIT ON.
- **Do not handle the transmitter while you are connected directly to ground yourself.**
- **Wear appropriate heavy soled footwear as you would when working with any high-voltage equipment.**
- **Prevent object and liquid entry.** Never spill liquid of any kind on the product. Liquid increases the risk of electrical shock and damage to the product.
- **Do not immerse the antennas or case in water.** Store in a dry place. Such measures reduce the risk of electric shock and equipment damage.
- **Do not use where a danger of high voltage contact is present.**
- **The user is cautioned not to deliberately connect to live power lines.** If the transmitter indicates the presence of high voltage, use high voltage precautions to carefully disconnect the line transmitter from the high voltage source.
- **As electromagnetic field lines can be distorted and interfered with it is important to verify the location of underground objects before digging.**
- **Exposing the utility is the only way to verify its existence, location, and depth.** Several utilities may be underground in the same area. Be sure to follow local guidelines and one-call service procedures.
- **Battery power is the sole power option available on the ST-305 line transmitter.** The transmitter is designed to protect the user from voltages up to 250 VAC that may be accidentally encountered. The High Voltage LED will light if the unit encounters more than approximately 62 VAC (RMS).
- **The unit must be disconnected from any external conductors before attempting to access the battery case or change the batteries.** The ST-305 line transmitter is protected by an interlock which isolates the unit when the battery case is opened, but standard safety awareness dictates disconnecting the leads rather than relying solely on this feature.

The information supplied with this product cannot cover all possible conditions and situations that may occur, and should be used in conjunction with appropriate training, sound judgment, and good work practices. These factors cannot be built into the product, but must be supplied by the operator.

The EC Declaration of Conformity (890-011-320.10) will accompany this manual as a separate booklet when required.

Description, Specifications and Standard Equipment

The SeekTech ST-305 line transmitter is part of Ridgid's SeekTech cable and pipe locating system. The ST-305 is used to energize a pipe or line with an "active" electrical signal, so that the underground line may be traced with a compatible receiver (such as the SeekTech SR-20). This allows the line's location to be correctly marked so it can be exposed for repair or avoided during excavation.

The ST-305 line transmitter can apply an active tracing signal to a target conductor in three ways:

- **Direct Connect.** The transmitter's leads are connected directly to the target conductor and a suitable ground. The ST-305 line transmitter is capable of dual-frequency transmission (sending two frequencies onto a line simultaneously) in direct-connect mode.
- **Inductive Clamp (optional accessory).** The jaws of the inductive clamp encircle the target conductor; there is no metal-to-metal contact.
- **Inductive Mode (internal coils).** The transmitter is placed over, and in-line with, a conductor. Its internal antenna generates a dipole field which energizes the target conductor below ground, inducing a current into the target conductor.

FCC Limits

47 CFR 15.213 requires that from 9 kHz up to (but not including) 45 kHz, peak output power shall not exceed 10 W. From 45 kHz to 490 kHz, it must not exceed 1 W. When the ST-305 is set to 262 kHz (European version: 93 kHz), the power output levels are limited:

Low:	0.3 watt
Medium:	0.6 watt
High:	1.0 watt

These values assume a nominal load of 320 ohms.

In compliance with Federal Standard EN-50249, the ST-305 line transmitter is designed to withstand up to 250 VAC 50/60 Hz excitation between the two leads.

Table 1
ST-305 Specifications

Weight:	
without batteries	1.6 lb [0.772 kg]
with batteries	2.5 lb [1.1 kg]
Dimensions:	
Depth	4.7 in [11.9 cm]
Width	7.75 in [19.6 cm]
Height	3 in [7.6 cm]
Power Source	6 C-Cell Batteries Alkaline or rechargeable
Power Settings	25 mA to 5 W
Output Power	Nominal 5 watts
Default Settings	62 V Maximum (RMS). 1 kHz, 8 kHz, 33 kHz, 262 kHz selectable frequencies (93 kHz maximum in Europe).

Standard Equipment

- ST-305
- Direct connect leads and clips
- Operator's Manual
- 6 C-cell batteries (Alkaline)

Components

Keypad and
LED Indicators



Figure 1 – ST-305 Components

Inductive
Clamp Jack



Figure 2 – ST-305 Components



Figure 3 – Keypad and LED Indicators

- **Frequency Indicator.** Indicates frequency in use; indicates when dual-frequency mode is activated.
- **Power Indicator.** Indicates the relative level of output power; displays estimated battery power level on start-up.
- **Frequency/Mode Selection.** Selects desired frequency; used to initiate dual-frequency mode.
- **Power ON/OFF.** Used to power the ST-305 on and off and to set current level.
- **Induction Mode Toggle.** Used to switch the ST-305 into Inductive Mode.
- **Induction Mode Indicator.** Flashes when unit is connected to an Inductive Clamp. Illuminated in Inductive Mode.
- **High Voltage Warning.** Warning light when high voltage is encountered (> ~62V AC RMS).

Installing/Changing Batteries

To install batteries into the ST-305 line transmitter rotate the knob on the battery holder counter-clockwise until the battery cover unscrews. Pull straight back on the knob to remove the cover. Insert the 6 C batteries as shown on the inside decals.



Figure 4 – Removing the Battery Cover

Fit the cover into the case and screw down the knob while firmly pushing in to close. Ensure the cover is firmly screwed into place.

NOTE: When replacing batteries, use 6 C cells that are the same type. Do not mix Alkaline with NiCd (NiCad or Nickel Cadmium) for example. Be sure to replace with batteries where all of the cells have the same amount of charge. Do not mix half used alkalines with brand new ones.

Operation Time

Typical operation time varies for the ST-305, depending on factors such as load, environment, and current transmitted. Operation at low temperatures will also reduce battery life.

Batteries often recover after being subjected to high loads. If time is allowed, batteries may recover enough to offer additional hours of operation.

Battery Check

At start-up, the ST-305 will check available power and will indicate estimated battery levels by lighting one, two, or three LEDs in the right hand column (power level) on the control panel. One LED indicates low batteries, two indicate medium charge, and three LEDs indicate full battery charge is available. These levels are only estimates based on a rapid internal check. A rapid series of beeps will sound if the battery levels run low in operation.

Sounds of the ST-305

Sounds are associated with specific events or states; they include:

- Beeps – Beeps when current is flowing; rate increases with current increase.
- Beeps – Turn ON (4 beeps)/OFF (3 beeps).
- Short Double Tone – Inductive Clamp connected.
- Long-Short-Short Tone – Inductive Mode.
- Rapid series of beeps – Low Battery Warning.

The sound may be toggled on or off by pressing the Frequency and Power buttons simultaneously.

Powering ON / OFF

Turn the unit ON by pressing the Power Key. The current frequency and power-level LEDs will light up.

Turn the unit OFF by pressing and holding the Power Key for 2 seconds. Three tones will sound.

Automatic Shut Down

To save energy, the ST-305 will automatically shutdown after an interval which varies with the power setting:

Low Power	4 hours
Medium Power	2 hours
High Power	1 hour

Machine Inspection

⚠ WARNING



Before each use, inspect your ST-305 and correct any problems to reduce the risk of serious injury from electric shock and other causes and prevent clamp damage.

1. Clean any oil, grease or dirt from all equipment handles and controls. This helps prevent the machine or control from slipping from your grip and aids inspection.
2. Inspect the ST-305 for any broken, worn, missing, misaligned or binding parts or any other condition which may prevent safe and normal operation. Make sure that handles move smoothly between positions. If any problems are found, do not use ST-305 until repaired.
3. Inspect any other equipment being used per its instructions to make sure it is in good usable condition.

Set-Up

⚠ WARNING



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

Set up and operate the ST-305 and work area according to these procedures to reduce the risk of injury from electric shock, and other causes, and prevent ST-305 damage.

1. Check work area for:
 - Adequate lighting.
 - Flammable liquids, vapors or dust that may ignite. If present, do not work in area until sources have been identified and corrected. The ST-305 is not explosion proof and can cause sparks.
 - Clear, level, stable dry place for equipment and operator. Do not use the equipment while standing in water.
2. Inspect the line to have a signal applied to it.
 - The transmitter should only be used on insulated conductors. When using the transmitter, 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. Make sure equipment has been properly inspected.
4. Be sure the conductor to be traced is grounded at both ends.

Select a Frequency on the Transmitter

The ST-305 line transmitter offers four choices of frequency. Frequency is chosen by pressing on the Frequency Select Key which will light the LEDs in sequence.

Available frequencies are:

- 1 kHz
- 8 kHz
- 33 kHz
- 262 kHz
- European version: 93 kHz (93,623 Hz.)

The selected frequency is shown by a lit LED. The 262 kHz is shown by a rapid flashing of the 33 kHz LED (European version: 93 kHz).

To set the unit on 262 kHz, press the Frequency Key for more than one second (long press). The 33 kHz LED will start flashing rapidly, indicating a 262 kHz frequency. For the European version: a long press will select 93 kHz, causing the 33 kHz LED to flash rapidly).

Check the Circuit and Adjust Power Level

Confirm the circuit is grounded by checking the connection to the ground stake is secure and the stake is firmly embedded in the ground. To adjust the power level, press the power button briefly. The ST-305 will cycle through the low, medium and high power levels.

NOTE: Higher power settings produce more current, which 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 will produce a stronger signal received by the receiver.

Use only as much current as is needed to get a strong reading on the receiver.

Generally the lower the resistance the more efficiently current can be added. A lower resistance indicates an efficient circuit and requires less voltage to charge the line. Things that increase resistance include paint or dirt on the connection points, very dry soil, poor ground connection, poor insulation on a wire, or breaks in the conductor.

The transmitter's maximum current output depends on the amount of resistance in the circuit.

CAUTION

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

Check the Receiver

Confirm that the transmitter and receiver are set to the same frequency. Hold the receiver near the transmitter cables and confirm a signal is being received.

Operation

⚠ WARNING



Useful Operating Tips

- The lower the resistance, the more current will be put on the line. A good circuit is one that allows enough current to flow so that the locator gets a solid, clear signal.
- To help lower the resistance of the circuit, scrape away dirt, paint, and corrosion before connecting to the target conductor or to the grounding spike.
- A good ground has lower resistance, which allows more current and a stronger signal. For a better connection to ground, insert the grounding spike as far as possible. Moist ground is a better conductor than dry soil, so try wetting the area if necessary.
- The transmitter's leads can act as antennas, broadcasting a strong signal. If locating close to the transmitter, keep the leads short by stowing the excess length on the transmitter's body. This will reduce the amount of interfering signals from the leads.
- Where possible, place the transmitter away from the area of the intended locate. This is especially true in Inductive Mode, to avoid coupling through the air with the receiver.
- Start by using the lowest frequency and the least amount of current needed to effectively illuminate the line. Lower frequencies travel farther because they do not dissipate as quickly. Higher frequencies generally make it easier to illuminate a line, but they don't travel as far and are much more likely to couple onto other utility lines, distorting the signal and reducing the accuracy.

Direct-Connect Method

1. Attach the ST-305 line transmitter to ground and to the target line.
2. Remove the ground stake from the end of the unit and insert it into the ground. Connect one of the cable leads to the grounding spike. The leads are universal, so either may be used for the ground connect the other lead to the target conductor.

3. Power the ST-305 ON by pressing the Power Key. A multiple-tone will sound on powering up. After a short silence, the unit will begin beeping regularly indicating current is flowing.



Figure 5 – Connecting the ST-305 Ground Stake



Figure 6 – Connecting the ST-305 using the clip



Figure 7 – Connecting the ST-305 using the magnet



Figure 8 – Alternative hookup method

⚠ WARNING

NEVER CONNECT TO LINES KNOWN TO BE ENERGIZED WITH A POTENTIALLY DANGEROUS ELECTRICAL CURRENT. To increase safety, the ground lead should be attached first. If there were an unknown high voltage running through the target line, this would allow a means of redirecting the current away from the transmitter and operator.

NOTE: Installations which use plastic pipes will typically have a trace wire installed along the pipe for tracing purposes. Simply clip the transmitter lead to the trace wire.

Dual-Frequency Transmission

The ST-305 line transmitter can be placed in Dual-Frequency mode by pressing the Frequency Key for over 1 second (long press). To exit Dual-Frequency mode, simply repeat the long press on the Frequency Key.

When in Dual Frequency mode the Frequency Key will cycle with short presses through the following frequency settings:

1. 262 kHz only (rapid flashing 33 kHz LED) (European version: 93 kHz).
2. 33 kHz and 1 kHz dual-frequency transmission (LEDs for 33 kHz and 1 kHz both lit).
3. 33 kHz and 8 kHz dual-frequency transmission (LEDs for 33 kHz and 8 kHz both lit).

Dual-Frequency transmission is available only in direct connect mode.

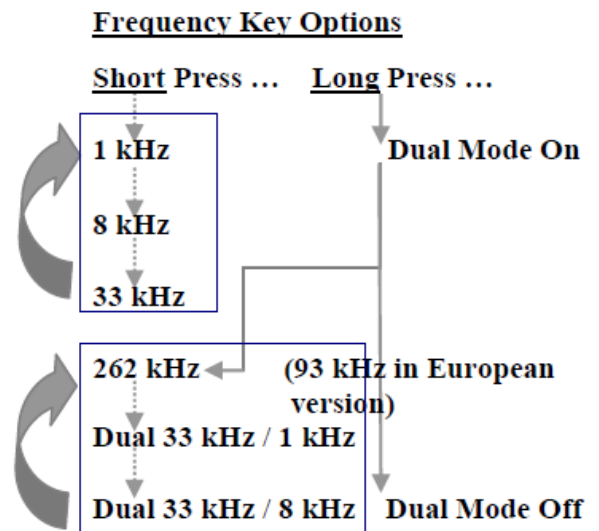


Figure 9 – Frequency Key Options

Inductive Clamp Method



Figure 10 – ST-305 used with an Inductive Clamp

When using an inductive clamp, plug the inductive clamp jack into the receptacle provided at the end of the transmitter. The Inductive Mode LED will flash rapidly when a clamp is connected. Clips and leads are not used. Note that for a clear signal using an inductive clamp, both ends of the utility should be grounded.

Clamp the inductive clamp around an accessible portion of the line chosen to trace. The clamp will induce a signal into the conductor when the transmitter is powered on.

Select frequency and power as with the Direct Connect Method. Operational frequency choices for use with an Inductive Clamp are 1 kHz, 8 kHz, and 33 kHz.



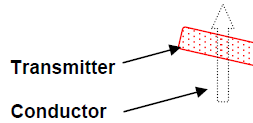
Figure 11 – Inductive Clamp in use

To use the ST-305 in Inductive Mode do the following:

1. Be sure that the transmitter is positioned correctly over the line.



Figure 12 – Orientation to the Line - Inductive Mode



NOTE: A slight tilt to the axis of the conductor can help reduce the probability of air-coupling

2. Power the transmitter ON. Push the Inductive Mode switch to induce a signal onto the line without a direct connection. A long beep will sound when entering Inductive Mode and the Inductive Mode LED will light .
3. Clips and leads are not used. Note that for a clear signal using induction, both ends of the utility should be grounded.
4. The transmitter will emit a series of regular beeps as long as it is in Inductive Mode.
5. Lower frequencies couple poorly. Therefore, the ST-305 transmitter in Inductive Mode defaults to 33 kHz. Higher power is usually required for a clear signal in Inductive Mode. Pressing the power key will cycle through the three available power levels: low, medium, and high.

NOTE: If using the ST-305 in Inductive Mode, be certain to switch Inductive Mode off if you are going to use the unit in direct connect mode. Air coupling can create very confusing signals if you inadvertently have the unit set to Inductive Mode and are trying to use it in direct connect mode.

Coupling through Air

When a line transmitter is set to Inductive Mode, it energizes a wire or pipe under it by emitting a wave of energy rising and falling at the selected frequency. This forms an electromagnetic field which induces a current into the conductor (the pipe or wire) underneath it. The field builds and collapses at the frequency generated by the transmitter.

A secondary field is set up around the pipe or wire by the current induced into it. This secondary field is normally round in shape, just as it would be if the transmitter were connected directly. But the primary field from the transmitter, which does the inducing, is not round, and is not the same as the field set up on the pipe or wire.

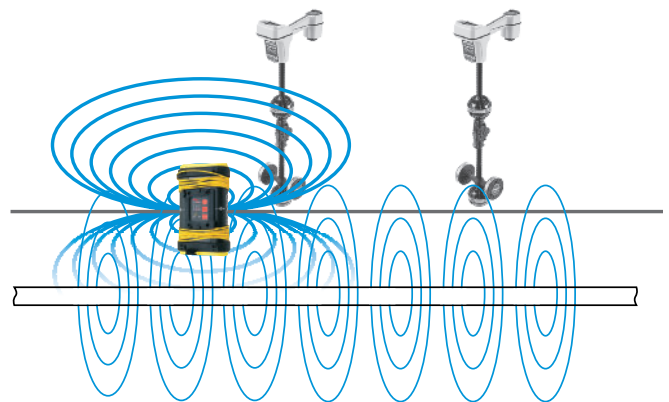


Figure 13 – Air Coupling

The field generated by the transmitter has a shape something like a football. When the transmitter is sitting on the

ground, roughly half of that field extends below it. The ends of the “football” extend out past the central axis of the transmitter.

If the receiver is within this field, it will read clearly and well on it, rather than on the field around the pipe or wire being traced. The transmitter and the receiver will couple through the air for a limited distance around the transmitter. This problem does not occur with direct connection, and is not important when using an inductive clamp. But it can be an issue when using the transmitter in purely Inductive Mode (i.e., without a clamp).

It is important to set up the transmitter, when using the Inductive Mode, a good 20 or 30 feet [8 to 10 m] away from the region where tracing occurs, and to be aware of the difference between the transmitter’s field and the induced field being traced. They will both have the same frequency, but the transmitter’s field is limited to the region around the transmitter itself.

High Voltage Indicator

Whenever the line transmitter encounters a live voltage on the line higher than 62 VAC, it will flash a red LED at the top of the keypad. Should this occur, carefully disconnect the transmitter using high-voltage precautions.

NOTE: The inductor core of the ST-305 emits the signal when the unit is transmitting in inductive mode. A hard hit or a drop could possibly damage the core. To test that the core is intact using a SeekTech SR-20 receiver:

- Power transmitter on
- Set frequency output to 33 kHz
- Set power level to high power
- Power receiver on
- Set to receive 33 kHz
- Move receiver 12 inches from transmitter

If the inductor core is undamaged, the receiver should show a Signal Strength reading larger than 2000.

Useful Information

Resistance and Impedance

A circuit has a certain amount of resistance to current; this is measured in ohms (Ω). Higher resistance reduces the amount of current that can travel along an underground line. Factors that affect resistance in the transmitter circuit are conductivity of the line itself, breaks or faults in the line, insulation problems with the line, and how well the transmitter is grounded. (Poor grounding makes the return path of the circuit more resistive).

Grounding can be affected by soil conditions, length of grounding rod, or how the line transmitter is connected to the grounding rod. Good grounding improves the signal by reducing the total resistance the transmitted current encounters.

Impedance is a form of resistance which is caused by a back-force in the electrical field caused by alternating current (AC). Impedance can be thought of as “AC resistance” and adds to the resistance in the circuit in proportion to the frequency being used (i.e., higher AC frequencies add more impedance than lower ones).

Using High and Low Frequencies

Understanding the behavior of different frequencies under different conditions can be important in doing effective and accurate locates.

In both direct-connect and Inductive Mode, the ST-305 is essentially doing the same thing – imposing a wave of traceable energy onto the target pipe or line. This electrical energy rises and falls a certain number of times per second, which in turn causes a magnetic field to build and collapse around the conductor at a regular rate. This rate is known as the frequency of the generated current and of its consequent magnetic field.

Frequency is expressed in terms of hertz (Hz), which means cycles per second, or kilohertz (kHz), thousands of cycles per second.

Low Frequencies

The ST-305 will generate frequencies as low as 1 kilohertz. Low frequencies are especially useful for several reasons. First, they will travel farther at a detectable level along a continuous pipe or wire conductor than a high frequency will. Secondly, lower frequency fields lose less energy to the area around the conductor. If you can get a clear signal on your receiver using a low frequency it is generally preferable because you will be able to trace it further and it will tend to confine itself to the original conductor more than a high-frequency signal will. But a low-frequency signal is more likely to be interrupted by gaps in the line, poor insulation or hidden by other magnetic fields in the area. It is a “weaker” signal in that respect. While it doesn’t jump as readily onto other lines, it will dissipate if traveling on a line with poor insulation, bare-concentric cable, or bare pipe exposed to earth, and will follow the path of least resistance, which is not always the path intended by the operator. This can make tracing the original conductor difficult.

High Frequencies

The ST-305 will generate frequencies as high as 262 kilohertz (93 kHz in European version). There are certain conditions where only higher frequencies will serve. High-frequency signals are especially valuable when you are tracing a line that has some sort of interruption—such as a gasket, or decayed insulation – in the continuity of the conductor. The reason is that a high-frequency signal can “jump” some barriers and continue without dissipating as much signal as a lower frequency would.

A high-frequency signal can also be valuable in getting a signal on a receiver when there is a poorly grounded circuit, compared to the signal the same receiver will detect at a lower frequency. While all currents tend to follow the path

of least resistance, a high-frequency current will buck this tendency to some degree, reaching across incidental barriers.

The disadvantage to higher frequencies is that they also jump onto other conductors. If you have two wires side by side in a trench, a higher frequency used to trace one of them may illuminate both of them. Additionally, nearby metallic objects, or even highly metalized soil, may pick up a higher frequency and distort the picture seen by the locator. If a gas line is being "illuminated" with a high frequency current, it may bleed over onto a water line or a power cable running nearby, confusing the picture of where the original line is.

As a general rule, detecting with lower frequencies is more reliable for the reasons given above, IF you can get a good signal.

Cleaning

⚠ WARNING

Make sure ST-305 is unplugged from transmitter before cleaning.

The plastic housing may be cleaned with mild cleaner applied to a cloth. Never submerge the clamp in liquid.

Clean the metal core where the jaws clamp together so no debris or dirt gets between the jaws.

Storage

Store the ST-305 in a dry, secured, locked area that is out of reach of children and people unfamiliar with the SeekTech ST-305.

To avoid tangled cords, wrap the cords back around the ends of the ST-305 when storing, lead end last, and secure the ends under the prongs provided on the transmitter. The ST-305 should be stored in a cool dry place.

If storing the ST-305 for an extended period of time, the batteries should be removed.

Service and Repair

⚠ WARNING

Improper service or repair can make machine unsafe to operate.

Service and repair of the ST-305 must be performed at 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 the RIDGID Technical Services Department at rttechservices@emerson.com or, in the U.S.A. and Canada, call 800-519-3456.

Disposal

Parts of the unit contain valuable materials that 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.

Battery Disposal



RIDGID is licensed with the Call2Recycle® program, operated by the Rechargeable Battery Recycling Corporation (RBRC™). As a licensee, RIDGID pays the cost of recycling RIDGID rechargeable batteries.

In the U.S. and Canada, RIDGID and other battery suppliers use the Call2Recycle® program network of over 30,000 collection locations to collect and recycle rechargeable batteries. Return used batteries to a collection location for recycling. Call 800-822-8837 or visit www.call2recycle.org to find a collection location.

For EC countries: Defective or used battery packs/batteries must be recycled according to the guideline 2006/66/EC.

**Table 2
Troubleshooting**

Problem	Remedy
LEDs appear completely dark, or completely light when unit is ON.	Try Powering the unit OFF and then back ON.
	Allow the unit to cool if it has been exposed to excessive heat from sunlight.
Receiver will not pick up the line transmitter's signal.	Check that the correct frequency has been selected on both units (See manual for the specific receiver). Higher or lower frequencies may be tried.
	Check to make sure that the receiver and the line transmitter are in the same mode.
	Make sure that the proper functions are activated on the receiver. e.g. activating the line trace function for line tracing (See manual for the receiver).
	Adjust power upward if possible.
	Ensure grounding is adequate.
	If using inductive mode, check for core damage using test described in the High Voltage Indicator section.
Unit will not turn ON.	Check orientation of batteries.
	Check that the batteries are fresh or charged.
	Check to see that the battery contacts are OK.
93 kHz signal not received	Check that receiver is set to the actual 93kHz frequency of 93,622.9 Hz. Some receivers use a different frequency for 93 kHz (93,696). Update SeekTech locator software.

NOTES

Ridge Tool Company

400 Clark Street
Elyria, Ohio 44035-6001
U.S.A.

www.RIDGID.com
1-800-474-3443

Ridge Tool Europe

Research Park Haasrode
3001 Leuven
Belgium

www.RIDGID.eu
+ 32 (0)16 380 280

**We
Build
Reputations™** | **RIDGID®**


EMERSON™
Professional Tools

RIDGID reserves the right to change the specifications of the hardware, software, or both as described in this manual without notice. Visit www.seesnake.com for current updates and supplemental information pertaining to this product. Due to product development, the photos and other presentations specified in this manual may differ from the actual product.

Other trademarks or registered trademarks mentioned in this manual are the property of their respective owners.