

LeakTrac 2200 Operators Manual
Draft Copy
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FCC Statements

Booster Receiver

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

SPU Transmitter

This device complies with part 15 of the FCC Rules. Operation is subject to the following conditions: (1) This device may cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

CAUTION STATEMENT

Modifications to this equipment not expressly approved by the manufacturer could void the user's authority to operate this equipment.

B. Regular Maintenance

The brass plate on the Input Float and electrodes on the Sensor Probe may build up some corrosion over time. Regularly clean these parts with steel wool to keep them conductive.

C. Care

As with any electrical equipment, moisture will cause corrosion problems. Do what you can to keep the equipment and the inside of the case dry. When used regularly, we suggest opening the case at night allowing all the components to dry out.

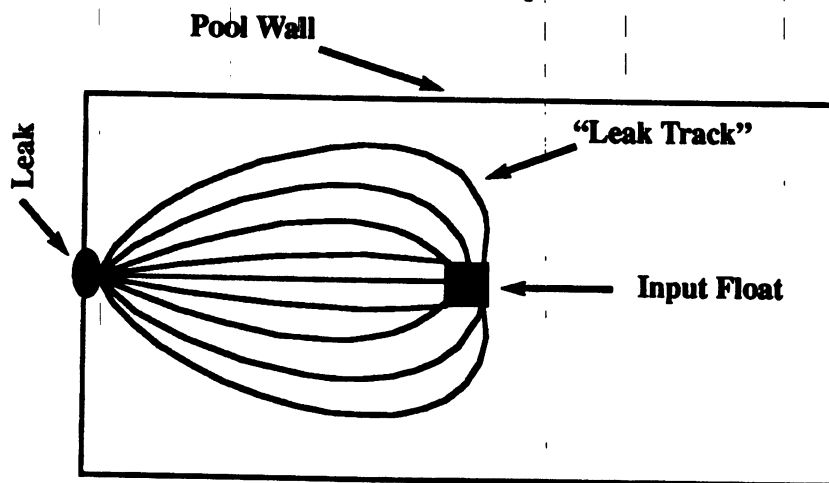
VII. Safety

Because a small electrical charge is being placed in the pool water there is a risk of minor electrical shocks being felt if you become a connection from the pool water to ground. This shock should not be harmful to persons without medical conditions. However, several safety rules should be followed as a precaution:

- Never contact both the pool water and the ground while the LeakTrac 2200 is turned on.
- Always wear rubber soled shoes when using the LeakTrac 2200.
- Never allow swimmers in the pool while the LeakTrac 2200 is turned on.

I. Principle of the LeakTrac 2200

An electrical charge placed into the water of a vinyl lined swimming pool (or other containment vessel with electrically insulating walls) will seek to make the least resistant connections to ground. The electrical current flow from the charge input, to the point of ground connection, creates a detectable current path in the water. We call this detectable current path a "Leak Track."



The sophisticated LeakTrac 2200 probe and signal processing unit detects these "Leak Tracks," by measuring the differential voltage potential at different points in the pool, and translating this information into audible clicking sounds that increase in frequency as the voltage differential increases.

When the probe is aligned with a "Leak Track" a rapid clicking is produced. When it is not aligned the clicking decreases or stops altogether. As the probe is moved toward the point of low resistance the "Leak Track" becomes more focused creating a greater differential voltage and a more rapid clicking. The operator uses the clicking sounds to effectively pinpoint low resistance connections from inside the pool to ground.

II. LeakTrac 2200 Component List

The LeakTrac 2200 consists of 7 components all of which are contained in a foam lined plastic carrying case.

A. The Signal Processing Unit

This 5-1/2" x 5-1/2" x 1" grey plastic case contains two 9 volt batteries and circuitry to convert input from the sensor probe into the audible clicking sound used for leak finding. An adjustable strap allows this to be worn around the operator's neck.

The face of the component has:

1. POWER/ Input Amplification Control: The left knob on the control panel turns the unit on and selects the input amplification. High amplification is generally used for long distance leak detecting in order to find the general area of the leak. Mid and Low settings are used for pinpointing the leak once a general area is determined.

2. Sensitivity Control: The right knob is used to adjust the rate of clicking to a desirable level once an amplification setting has been selected.

3. LED Low Battery Indicator: The Signal Processing Unit has a LED low battery indicator which will light when batteries should be replaced.

The back of the unit has three input/output jacks.

1. Probe - accepts the phono plug from the sensor probe.

2. From Booster - accepts the locking connector from the Booster Patch Cable. This connector is for the optional booster cable that allows the unit to operate in the event of interference with the radio frequency link between the booster and the signal processing unit.

3. Headphones - accepts headphone jack. The speaker on the face of the unit will shut off when headphones are plugged in.

B. The Power Booster

This 3" x 6" x 1-1/2" black plastic box contains the AA batteries and circuitry required to provide an appropriate voltage between the pool water and ground. To protect the external antenna the booster should not be removed from the foam lined case.

The component has three input/output jacks:

1. Red - accepts the banana plug connector from the red Ground Cable.
2. Black - accepts the banana plug connector from the Input Float Cable.
3. Phono Jack - accepts the phono connector from the optional Booster Patch Cable. Used only if radio frequency link problems occur.

Power is turned on by pressing the red button when the Signal Processing Unit's Power Knob is also turned on. A LED indicator lights when the unit is operating. Booster power turns off when signal processing unit is turned off.

C. The Sensor Probe

This "T" shaped PVC configuration picks up the current flow signals from the water. The probe attaches to a standard telescoping pole to allow surveying all parts of the pool. Twenty feet of wire extends from the probe.

Probe extension caps cover the ends of the probe to reduce random signal readings that result from water flow over the electrodes.

D. The Input Float

This brass plate attached to a block of styrofoam floats in the pool and puts the charge into the water. A length of insulated wire to black banana plug is used to connect to the black input jack on the Power Booster.

A lead weight provides a means for anchoring the float in its desired position.

E. The Ground Cable

This clamp is used to make a connection to ground. A length of insulated wire to red banana plug is used to connect to the red input jack on the Power Booster.

F. Booster Patch Cable (optional)

This 80 foot length of 2 conductor wire is used to connect the Power Booster to the Signal Processing Unit if radio frequency interference is encountered. Interference may disrupt communication between the booster and the signal processing unit. One end is a locking connector for attaching to the Signal Processing Unit. The other end has a 90° phono plug for attachment to the Power Booster.

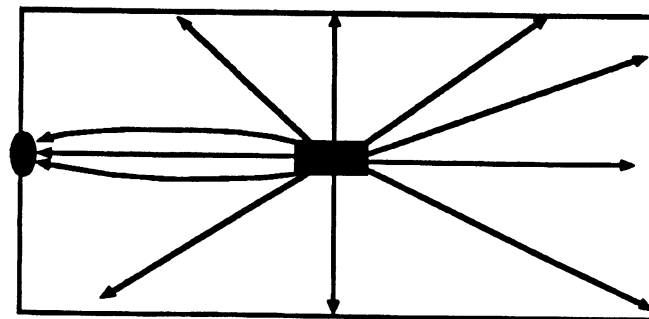
G. Headphones

These standard headphones plug into the back of the Signal Processing Unit.

III. What makes a good Leak Track

Three factors contribute to the quality of the "Leak Track" and your ability to detect it with the LeakTrac 2200.

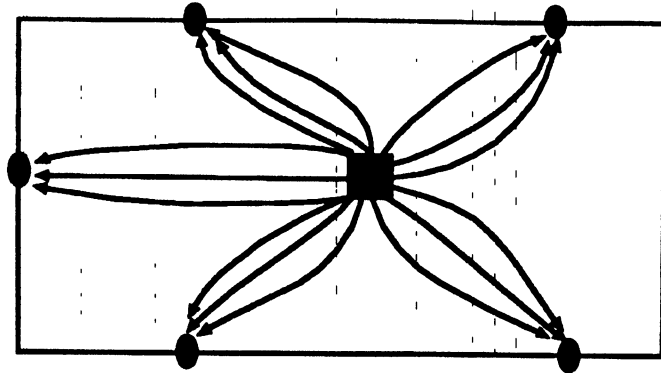
1. Difference in conductivity of the pool shell in comparison to the point of low resistance.



One weak "Leak Track"

The LeakTrac 2200 does not work well in concrete pools because the concrete itself conducts electricity to the ground as well as a leak would.

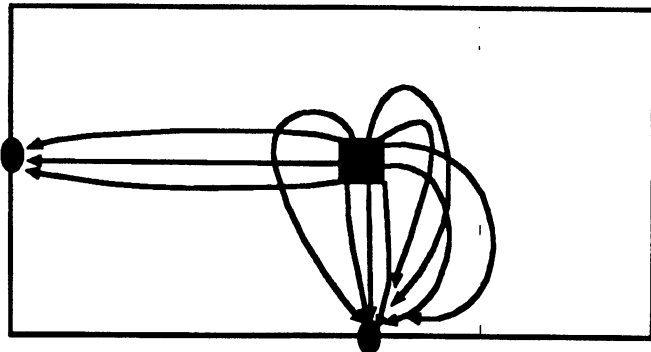
2. Number of points of low resistance in the pool.



Five "Leak Tracks"

Since there is only a limited amount of charge going into the pool the strongest "Leak Track" will be produced when there is only one path for the charge to connect to ground.

3. Relative conductivity of different points of low resistance.



One weak "Leak Track"- One Strong "Leak Track"

A highly conductive connection to ground will take more current flow and thus produce a stronger "Leak Track" than a less conductive point of low resistance in the same pool.

Leaks are often not the only low resistance paths from inside a pool to ground. Other metallic connections such as light niches, fitting screws, and even grounded equipment such as the pool

heater may produce "Leak Tracks." Testing has shown the following approximate ranking of common connections to ground from lowest electrical resistance to highest. Leaks generally fall in the upper end of this ranking depending on size.

High CONDUCTIVITY LEAKS Low	— 1. Metal Light Niches
	— 2. Ladder
	— 3. Some stair anchor screws that extend to ground
	— 4. Main Drain
	— 5. Return and Skimmer Fitting Screws
	— 6. Water through pipes to Grounded Equipment
	— 7. Thin Spots in Liner

To use the LeakTrac 2200 most effectively it is necessary to create the strongest possible "Leak Track" going to the leak, while eliminating or disregarding other connections to ground that are not leaks.

IV. Finding Leaks with the LeakTrac 2200

A. Preliminary Steps

Before using the LeakTrac 2200 first confirm that there is indeed a leak in the pool by doing a bucket test. Next pressure test the plumbing lines and repair any leaking lines. Finally, dye test around the lights, return fittings, skimmers, and stair gasket to assure that these areas are not leaking. (If you are unfamiliar with the bucket test, proper pressure testing or dye testing procedures, contact Anderson Manufacturing Company for more information.)

B. Pool Preparation

1. Make sure circulatory system is turned off and pool is filled to it's normal level assuring that all leaks are underwater.

2. Remove any automatic cleaning devices that may get tangled in the LeakTrac 2200 probe or cables.

3. Remove any connections from inside the pool to ground. This includes ladders, thermometers, vacuum poles leaning up against the coping, or wet pool covers that extend from the water to the ground. If you cannot remove ladders, a plastic trash bag can be put over the ladder effectively insulating it from the pool water.

4. Cover any lights with the light cover provided. Place the cover over the light with the rubber gasket against the pool wall and the hose connections at the bottom. Keep the two hoses above water level. To get the cover to make an initial seal you may need to trap some air in the cover. This is done the same way a diving mask is cleared, by holding the top of the cover against the pool wall and blowing through the hose without the pump. Once a seal is made pump some of the water out of the inside of the light cover with the hand pump. One or two pumps should be enough to get the cover to stay. However, you may wish to pump all of the water out to provide a better seal and more effective electrical insulation of the light. The hoses must be left above water level, but not plugged, for proper seal. The cover can be removed by placing the hose without the pump into the water below the bottom edge of the cover.

Warning: This light cover is not intended for any use where the rubber inner tube gasket contacts the vinyl pool wall for over 2 hours. Oils in some vinyl liners may attack the rubber gasket causing permanent discoloration to the liner. If extended use is required, cut a piece of scrap vinyl to put between the pool wall and gasket.

5. Depending on the pool, fitting screws especially at skimmers and main drains can be connections to ground which create confusing Leak Track signals. With experience you will learn to disregard these signals, (you should have already dye tested these areas eliminating them as a potential leak). Simple methods of covering the fittings can be used if elimination of the signal is preferred. Skimmer and return fitting screws can be covered

with small suction cups (used for hanging signs on windows). The main drain can be covered using the Light Cover modified with longer hoses. An attachment that allows the Light Cover to be positioned over the main drain using your telescoping pole is available from Anderson Mfg. Co.

Note: In most cases plugging return fittings and main drains to eliminate connections back to the grounded equipment is unnecessary. Instead of eliminating these connections, it is possible to disregard the relatively weak "Leak Track" signal they produce.

C. Assembly of The LeakTrac 2200

1. Look for a place to set up your LeakTrac 2200 that has a convenient connection to ground within 20 feet. Open the case and remove all components except the Power Booster.

2. Plug the red banana plug from the Ground cable into the red socket of the Power Booster and attach the clamp to ground.

Note: Good connections to ground include:

Ladder anchor sockets

Diving board anchor bolts

Metal junction box conduit

Any metal rod stuck into the ground

If the ground you choose is painted, you must scrape through the paint to assure an electrical connection is made with the ground clamp.

3. Plug the black banana plug from the Input Float into the black socket on the Power Booster. Unwind enough anchor cord to allow the float anchor to touch the bottom of the pool and toss the anchor and float into the pool so that the brass side of the float is down.

4. Clip the Probe Assembly to the bottom of the telescoping vacuum pole and attach the cord to the side of the pole with tape. Plug the phono plug into the back of the Signal Processing Unit.

Note: If you are using a conductive (aluminum or other metal) telescoping pole it is important that the pole not become a connection to ground as you are looking for leaks. Be careful not to touch the pole to the pool coping. You must also be sure that you are not a connection yourself. Wear rubber soled shoes or insulating gloves when using the LeakTrac 2200 with a conductive telescoping pole. Another option is to use a fiberglass pole.

5. Put the neck strap of the Signal Processing Unit around your neck. If you want to use the headphones plug them into the headphone jack and place them on your head.

D. Using the LeakTrac 2200

1. Move at least 10 feet away from the Input Float and place the probe into the water and shake out any air that is trapped inside.

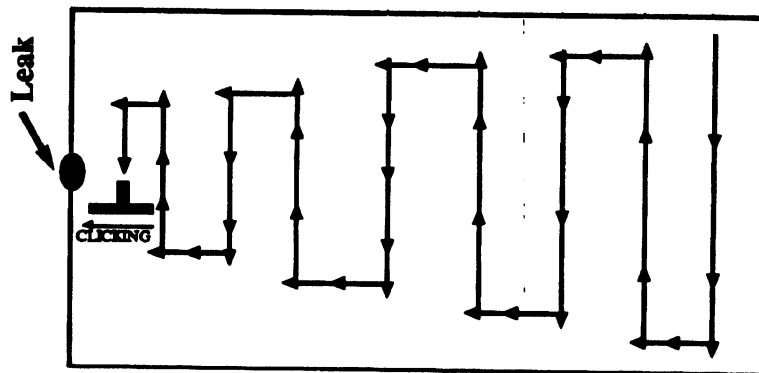
2. Turn the Power Knob to High and press the red button on the black booster. Adjust the sensitivity knob on the signal processing unit to produce a consistent clicking rate of approximately two to three clicks per second.

3. Rotate the probe to determine where the most rapid rate of clicking is experienced. The striped end of the probe will point to the part of the pool where electrical leakage is occurring. If no variation in clicking rate occurs move the probe a few feet and repeat.

E. Tips and suggestions

Generally the signal will be most sharp at the highest possible power and sensitivity setting that gives rapid clicking when pointed toward the leak but no signal when pointed away. When the LeakTrac 2200 moves from a rapid clicking to a "chattering" whine or does not make a sound at all the signal it is receiving is too high for the power setting. Turn the power down and re-adjust the sensitivity control.

To most effectively survey the side or bottom of a pool, point the LeakTrac Probe in the direction of the most intense clicking then move the Probe up and down (along a wall) or back and forth (on the bottom) perpendicular to the direction the probe is pointing, while slowly moving in the direction of the clicking. As you near the leak shorten the perpendicular movements to stay within a range that produces the rapid clicking or whine.



Most leak are discovered as you are moving the probe in the direction producing a whine then all of a sudden the signal stops. This indicates that the probe has passed over the leak and is now pointing away. Turn the probe around and carefully examine the area just passed.

When pointing to a leak in close range the beeping will be so rapid that it will become a squeal. As soon as the probe is pointed away from the leak or passes over it the beeping will stop.

F. Dealing with "Non-Leak Connections to Ground"

Although it is always best to remove connections to ground that are not leaks either physically (as in removing ladders) or by covering (as with light cover), this is not always possible. There will be situations where the strongest "Leak Track" in the pool is actually going to a light or stair gasket screw that is not necessarily leaking. To find leaks in these situations move the probe close to the non-leak connection to ground, then turn the striped end of the probe away and survey the vinyl moving away from the non-leak connection. If you pick up a signal pointing away from the strong non-leak connection it is probably a leak.

In situations where there are other connection to ground such as mentioned above. It will be necessary to survey the entire pool in a tighter pattern than would be necessary if such other connections were not present.

When checking for leaks in close proximity to "non-leak connections" use the "low" setting.

V. Trouble Shooting

Problem: Uniform clicking sound regardless of probe direction.

Possible Cause: No "Leak Track" in the part of the pool you are testing

Solution: Move to a different part of the pool and re-check (when you are close to the Input Float you should always receive a stronger signal when you are pointing away from the Input Float in any direction)

Possible Cause: Signal Processing Unit is not detecting current flow

Solution: - Check all connections especially ground.
- Make sure probe plug is completely inserted into jack on the back of the S.P.U.

- Assure that batteries are good in Booster
- Call Anderson Manufacturing Co.

Problem: Random squeals when probe is in water

Possible Cause: S.P.U. is receiving too much signal

Solution: -Turn Power down and re-adjust Sensitivity
-Check connections
-Call Anderson Manufacturing Co.

Problem: No signal

Possible Cause: S. P. U. receiving too much signal due to "other" ground connections.

Solution: -Turn Power down and re-adjust Sensitivity
-Cover lights, remove ladders, etc.
-Assure liner above water line is not wet creating connection to coping.

Possible Cause: Signal Processing Unit not functioning

Solution: -Check batteries
-Call Anderson Manufacturing Co.

VI. Maintenance

A. Battery Replacement

The Batteries for the LeakTrac 2200 should be replaced whenever the LED light shines bright red on the Signal Processing Unit, or as a first step in problem solving if the unit is behaving poorly.

To replace batteries in either unit remove the screws that hold the cases together. The signal Processing Unit will require two 9 volt batteries. The Power Booster will require 16 AA batteries.

B. Regular Maintenance

The brass plate on the Input Float and electrodes on the Sensor Probe may build up some corrosion over time. Regularly clean these parts with steel wool to keep them conductive.

C. Care

As with any electrical equipment, moisture will cause corrosion problems. Do what you can to keep the equipment and the inside of the case dry. When used regularly, we suggest opening the case at night allowing all the components to dry out.

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