

White's Electronics, Inc.

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SWEET HOME, OREGON 97386

OPERATORS INSTRUCTIONS



Manufacturers of The World's Largest Line of Mineral and Metal Detectors

MINERAL AND METAL
DETECTORS

ELECTRONIC
MAGNETOMETERS

SUPER GEIGER AND
SCINTILLATION COUNTERS

ULTRA VIOLET
LIGHTS

OPERATING INSTRUCTIONS

LONG RANGER OREMASTER SUPER GEIGER COUNTER

Model L3TSM-57ZB (Bismuth)

INSTRUCTIONS:

Your instrument is the finest scientific apparatus built available for the detection of radio-active materials. It is well designed, carefully constructed to our usual high-standard of quality. Years of work and research have gone into this instrument you now own.

It is a useful, reliable detector, but its life depends, to a large extent, on the personal care you give it and the manner in which you operate it. Therefore, if you will carefully read the instructions, you will be able to obtain the maximum efficiency possible. If, after you have read these instructions, there are questions you may have, write us in detail and our engineering department will be glad to be of assistance.

Your OREMASTER SUPER GEIGER COUNTER Model L3TSM-57ZB consists of:

Three tubes:

1. Two thin wall Bismuth Geiger Tubes (6306 Victoreen)
2. One thin wall Thyrode Geiger Tube (1B85 Victoreen)

B. The instrument contains:

1. Five-tube electronic circuit
2. Highest quality 4" indicating meter.
3. Five batteries (2-90 volt, 2-1½ volt, and 1-22½ volt)
4. Seven controls
5. Speaker
6. Time constant circuit
7. Zero control circuit
8. Meter light
9. Battery test circuit

C. With accessories:

1. External meter for mobile prospecting
2. Carrying strap
3. Ore sample
4. Instructions

FUNCTION OF CONTROLS:

A. Sensitivity control:

1. Turning the control to the IO position you are using one geiger tube. (Thyrode Counter, 1B85)

B. Range Control:

1. Control to HI prospect position, Sensitive control to HI, full scale reading is approximately .015 MR/HR.
2. Control to LO prospect position, Sensitivity control on HI, full scale reading is approximately .027 MR/HR.
3. Control to HI prospect position, Sensitivity control on LO, full scale reading is approximately .045 MR/HR.
4. Control to LO prospect position, Sensitivity control on LO, full scale reading is approximately .05 MR/HR.
5. Control to .2 position, Sensitivity control on HI, full scale reading is approximately .07 MR/HR.
6. Control to .2 position, Sensitivity control on LO, full scale reading .2 MR/HR.
7. Control to 2 position, Sensitivity control on HI, full scale reading is approximately .7 MR/HR.
8. Control to 2 position, Sensitivity control on LO, full scale reading is 2 MR/HR.
9. Control to 20 position, Sensitivity control on HI, full scale reading is approximately 7 MR/HR.
10. Control to 20 position, Sensitivity control on HI, full scale reading is 20 MR/HR.
11. Control to SPEAKER, Sensitivity control on HI, divide counts per minute by 3.
12. Control to SPEAKER, Sensitivity control on LO, true counts per minute.

C. Meter Speed Control:

1. Control to 1 (Fast)
 - a. mobile prospecting
 - b. aerial prospecting
2. Control to 2 (Medium)
 - a. mobile prospecting
3. Control to 3 (Slow)
 - a. calibration
 - b. mobile prospecting, very slow driving
4. Control to 4 (Extra slow)
 - a. walking
 - b. sample testing

D. Calibration Control:

1. Adjusts instrument for accurate measurement of radio-activity in $\mu\text{R}/\text{HR}$.

CALIBRATION PROCEDURE:

1. Turn the sensitivity control to the HI position.
2. Turn range control to the .2 position.
3. Turn the meter speed control to the #3 position.
4. Turn zero control to the ORE position.
5. Turn power switch to ON position.

Unscrew the chrome cap marked CALIB. and turn the shaft until the meter hand averages a zero reading. It is permissible for the meter hand to vary and to raise two divisions above zero, to the right, then drop the same distance below zero so that your average reading is zero.

Turning the shaft to the right raises the meter reading and to the left lowers it. After adjusting the meter hand, replace the chrome cap.

E. Power Switch:

1. Turns instrument to on and off position.

F. Zero control:

1. Control to ORE:
 - a. zeros out background for prospecting for radio-active minerals.
 - b. calibration position.
2. Control to OIL:
 - a. background is indicated on LETER.

Listen for the response or count in the speaker. It may be TOO fast, which may be the case until the automatic voltage regulator tube cuts in. At times it takes a few seconds for the tube to start operating, the count will drop to normal, which is approximately 40 to 50 counts per minute. In rare cases the regulator tube may NOT cut in as readily as it should and if this happens, turn the OFF-ON switch to OFF position for ten seconds or so; then back ON. Do this a few times if necessary, and this will start the Automatic voltage regulator tube.

- f. Calibrate: See Calibration Procedure.
 - 1. Since background count differs in each area it must be calibrated for accurate measurement and for maximum sensitivity.
- g. Turn Sensitivity control to HI.
- h. Turn Range Control to .2
- i. Turn Range Control to HI-Prospect.
 - 1. Always use the HI position first when you start out. Any increase at all in the radiation present will give you a definite increased reading, and the meter needle will hold a higher position.

NOW YOU ARE READY TO PROSPECT

Remember OREMASTERS are supersensitive, so sensitive that they can detect deep radioactive deposits for you. If the deposit is deep, the reading will most likely be low unless there are cracks or crevices in the rocks to make an easy path for the radiation to follow to find its way to the surface. If the formation you are prospecting is rocky, check all cracks and crevices in the outcropping. In the event that there is radiation below, the reading above or against these openings in the formation will increase to $\frac{1}{2}$ or full scale deflection on the meter and remain there on your PROSPECT setting. If a deposit is below, every foot of overburden that is removed will give you a higher reading, as each foot is removed lessens the path of resistance for the rays to reach the surface, which results in more radiation and a higher reading. In case the deposit is quite deep, the meter needle may fall back momentarily, but it should return to the higher reading position at once and should never fall back to the point of the regular reading or count at which you started.

When your meter needle goes full-scale and stays there (to the right side of the scale) turn the Range Control from the HI prospect to the IO position. Now try to find the exact spot where you get the highest reading on the LOW position.

If you cannot tell from which direction the radiation is coming proceed as follows:

1. Hold the OREMASTER level with your waist with the meter and pointed away from you and the battery end (called the back) flat against your stomach.

2. Make a complete turn (pivot) very very slowly watching the meter reading very closely. Your highest reading will occur when you are pointing the front of the OREMASTER in the direction of the deposit. To test the accuracy of this reading, move the Meter speed control to the #3 position and repeat the procedure (pivot). If these two readings do not check, repeat, using the #2 position and if necessary the #1 position (repeating same). In case the deposit is quite weak or deep, it will register more noticeably on the faster settings (#1 being the fastest).

Now that you have located the direction in which you get the highest reading, move the Meter Speed Control back to the #4 position, and walk in that direction. As you come closer to the deposit or source of radiation, you will notice that the meter reading becomes higher, and the needle may go off scale to the right, then turn the range control to IO. When you again receive a full scale reading, turn the range control to the HI position, and the sensitivity control to IO. When you again receive a full scale reading, turn the range control to IO. If you again receive a full scale reading turn the range control to .2. By this time you are very close to the deposit or source of radiation.

If there is much overburden, you may be right over it, but as long as you can still follow toward the direction from which you secure your high reading and still get a higher reading yet, you are still not over the vein or heart of the deposit. In the event that the meter needle again swings off scale (to the right), switch the range control to #2. (The radiation must be quite high to take the needle off scale to the right on the #2 position, but if it does, switch to the #20 position). Continue in the direction for which you received your highest reading until you secure the highest possible reading.

You receive your very highest reading when you are over the center of the vein. Mark this place with rocks or other material at hand. As you move away from the deposit, you will notice the meter needle drop to the left, and the reading becomes lower. You can follow the direction (surface pattern) of a radio-active vein or deposit by going in the direction of the highest reading and marking with small monuments of rock those places where you obtain the highest readings. Put your markers to each side and in the center of those places. This will give you some idea of the size of the vein or deposit and the direction in which it runs.

LOCATING ORE SAMPLES IN THE VEIN:

To locate the richest ore samples in the vein, locate the spot of the highest radiation, and dig in at this point until you find the ore that is giving the highest reading. Be sure the Sensitivity switch is on the LO position. Turn the Range Control to the #20 position. If the meter does not respond, turn to the #2 position; and if it still does not respond, turn to the .2 position. The instrument responds to the weaker ores on the .2 setting, the medium-ores on the 2 setting and the strongest ones on the 20 setting of the Range Control. Remember that the HIGHEST reading does NOT ALWAYS indicate the most valuable deposit. Some deposits such as pitchblend - can be worth a fortune even though they have a weaker radiation and yield a lower grade ore than other deposits of a different type of mineral having an extremely high radiation. This is one very important reason that OREMASTERS are built to be so super-sensitive in order to detect these weakly radioactive RICH deposits not detectable with less sensitive instruments. Always check carefully any area that shows a steady above-normal background reading or count. Do not be fooled by looking only for high readings and neglecting the low above-normal readings. Some valuable ores have a weak radiation - not a high radiation.

USING THE SPEAKER

Always note the meter reading immediately before turning on the speaker so that you can compare that reading with the one obtained when you switch back from speaker to meter. Any increase or decrease in the latter reading when compared with the former indicated increased or decreased radiation in the area.

The speaker should be used whenever the surroundings are such that it is unsafe to watch the meter. This is particularly true in rough terrain or "snake country". Rattle snakes have a habit of laying asleep in trails and on rocks where you may either step or lay your hand while prospecting, and while they are not usually aggressive, to step on him is to make him fighting mad. They also lay in the shade of the trees, rocks and bushes and blend in so closely with the surrounding colors that it is very difficult to see them and the prospector should have his eyes free for his own safety while prospecting in these areas. Some of the best uranium country has lots of snakes, as well as being very rugged, where you definitely need the speaker. You may be easily saved from a bad fall, a twisted ankle, or a snake bite with the OREMASTERS powerful, supersensitive speaker you need not watch the meter at all. Any increase in radiation will be heard INSTANTLY on the speaker and alert you to the presence of radio-active matter. Your eyes are free to look for promising formations, outcroppings, etc., that may carry other non-radio-active minerals while your OREMASTER searches for radio-active minerals. On hunting and fishing trips you can concentrate on these sporting activities, and the speaker will tell you instantly if you come near a radio-active deposit. There is no need to concentrate on the instrument-just turn it on and forget it.

When the speaker is on, the OREMASTER is about five times as sensitive as a standard counter. When the meter is on, it is over 100 times as sensitive even when using only one geiger tube.

AERIAL AND MOBILE PROSPECTING

For aerial prospecting you may have to shield the instrument from the radiation from the plane's instrument panel. We have lead shields that fit OREMASTERS for this purpose. Also when used in a plane you may have to recalibrate the instrument when you are in the air and approximately 100' or so from the ground, as you are getting away from the earth's natural radiation. To do this, follow the calibration instructions. No radio-active sample is needed to do this. You can recalibrate the instrument again after you return to the ground, for ground use, as it takes less than a minute. Customers report much better results from the air with OREMASTERS than with the regular airborne equipment costing thousands of dollars.

In general the aerial prospector should fly as low and as slow as possible-within safe limits for best results in locating ore veins. Speed makes no difference in locating blanket or sedimentary deposits. The following instructions apply to both mobile and aerial prospecting.

1. Turn the range control to PROSPECT - HI
2. Turn the Meter Speed Control to #1 for very fast driving, #2 for fast, to #3 (Slow) for standard driving, and to #4 (Ex. Slow) for slow driving- this will give you a STEADIER METER MOVEMENT.
3. Turn the Sensitivity switch to HI
4. Turn the zero control to the ORE position
5. Turn the OFF-ON switch to ON
6. NOTE YOUR BACKGROUND READING (Do this after you are in your plane or car).

Remember that you do not need to open your car windows since the OREMASTER is so sensitive that it can detect through the glass and metal of your car. (You can, if you wish, switch to the SPEAKER and follow the directions for speaker use if you are traveling alone and cannot watch the meter.)

Any area you enter where the meter reading increases and holds a steady above the normal background should be carefully investigated.

DELAYED - ACTION METER SETTING

1. Turn the Range Control to PROSPECT - HI
2. Turn the Meter speed control to $\frac{1}{4}$ (Ex. SLOW)
3. Turn the Sensitivity switch to HI
4. Turn the zero control to the ORE position
5. Turn the OFF-ON switch to ON

In this position the meter will hold any good, strong, radiation count for a longer period time-41 seconds-before the circuit will release the meter needle from its high-full scale-reading. If you are traveling at sixty miles per hour and pass over a good, strong radio-active deposit, the meter needle will go FULL SCALE AND STAY THERE for three-fourths of a mile AFTER you have passed the deposit - before the needle will start to drop back again.

SUB-NORMAL READINGS

Areas where the radiation readings are below normal should be investigated for possible oil deposits. It is reported that theoretically the radiation is exceptionally low over oil deposits, lower than the normal background reading. Any drop in radiation is instantly detected on the OREMASTER because it is a super-sensitive instrument.

To check for oil, turn the zero control to the OIL position, as we know that oil deposits absorb the background or a part of the background radiation and that this causes a drop in your reading, any specific area which has a major drop in reading below your background is an indication of an oil deposit.

ERRONEOUS READINGS

OREMASTERS are so sensitive that they will instantly detect luminous dial watches, compasses, etc. on the user's person or on anyone near by; this will result in erroneous readings. All luminous articles should be kept away from the instrument, If your car or plane has a luminous instrument panel which effects the instrument, it may be necessary to order from our factory an external meter to be attached to the counter.

BATTERY REPLACEMENTS

There are two 90-volt B batteries and two flashlight cells located in the back of the OREMASTER. When the instrument becomes sluggish or the volume weak, unsnap the two snaps holding the rear hinged door closed. The door will swing down. First replace the two flashlight batteries. These two batteries should be replaced after approximately 15 hours of operation. A number of sets of flashlight cells will be used before it is necessary to replace the two 90-volt batteries. If replacing the flashlight cells does not bring the operating of the counter back to normal, replace the two #N60 90-volt B. batteries. The life of the B. batteries is approximately 100 to 200 hours.

If you are going to store your OREMASTER for a long period of time, be SURE TO REMOVE THE BATTERIES. The small 22½-volt battery lasts approximately 1000 hours.

This instrument is the same as using 3 of the model LLTSMZ-57, plus the combined sensitivity of all 3 instruments, when using all 3 tubes.

You have 5 Ranges of Sensitivity of each tube setting, so even when using just 1 tube - you have a Super Sensitive instrument, that is very flexible.

This model has both short and Long Range tubes. The short range tube (1B85) responded better to float and small ore samples and the Long Range tubes (6306) to distant and deep deposits.

The Short range tubes will detect small pieces of float that may have been carried or tumbled down a mountain side so that you can detect it, and be alerted, to carefully look for a deposit nearby. Without the short range tubes, you could pass the float and not detect it.

SAMPLE TESTING

To test ore sample that you suspect to contain any radio-active mineral, proceed as follows:

Turn Sensitivity control to LO
Turn Range Control to Prospect HI
Turn meter speed to #1 position.

Hold ore sample about ¼ inch, from the red dot, directly in front of the instrument.

Any radio-active content at all will easily be read on the meter. Good radio-active samples as small as a match head, or less, when held against this Red dot, will easily be read on the big 1½" Super-Sensitive meter.

CAUTION!!!!

Be careful in checking in old mines or tunnels, as many have not been used for years and may be very dangerous to enter. If you feel it is safe to enter, and there are two in the party-one should always remain outside, just in case of an accident, so he can go for help. If you were both caught inside, no one could go for help.

Jacks for using an external meter, and probes are located on the right side of the instrument.

This instrument is designed, so that as new improvements and developments through our engineering department are perfected, can be added to your instrument at a nominal charge, and to prevent it from becoming obsolete.

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SENSITIVITY CONTROL
(LO-1 Tube HI-2 Tubes)

CALIBRATION CONTROL

RANGE CONTROL

METER SPEED CONTROL

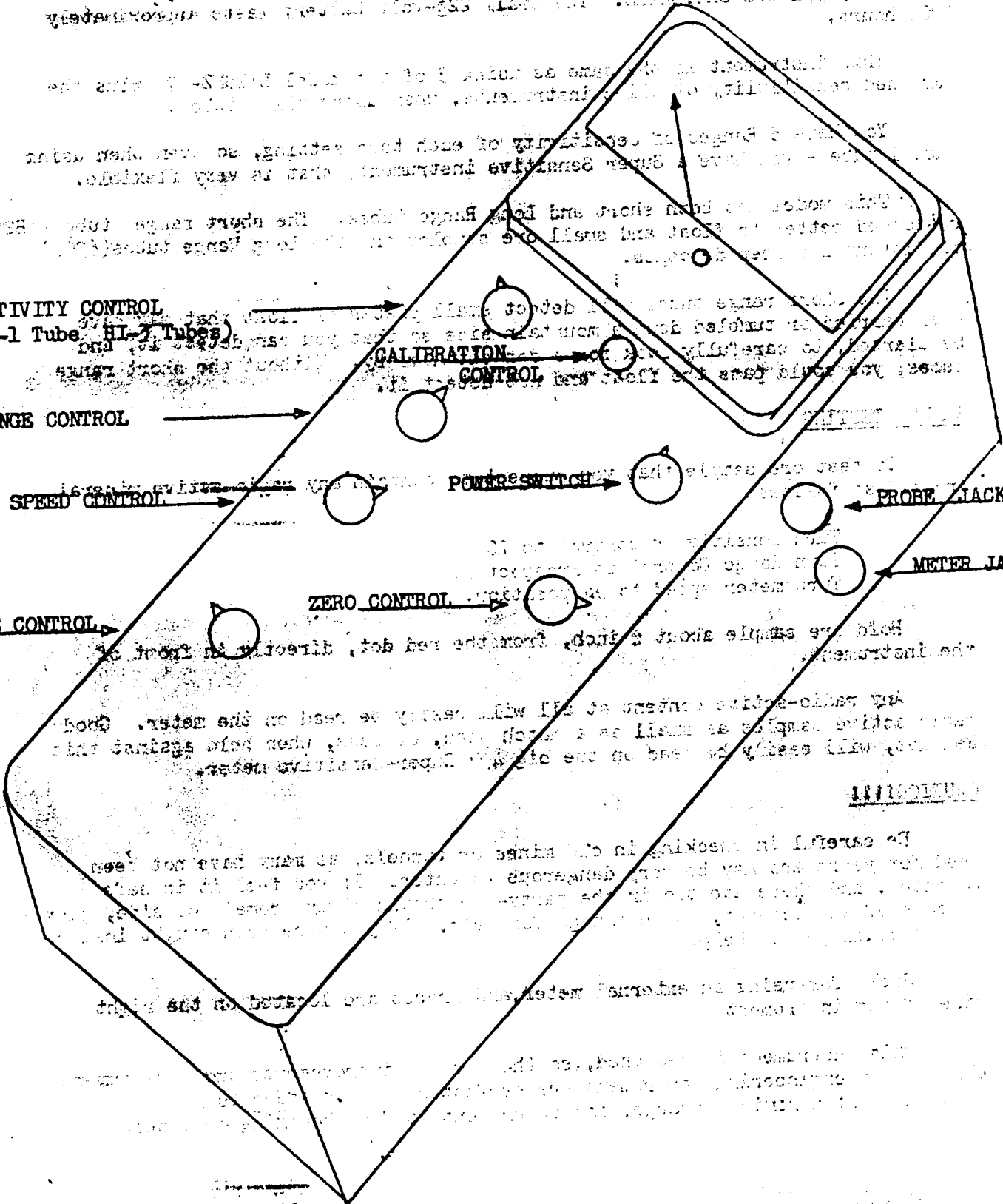
POWER SWITCH

PROBE JACK

PROBE CONTROL

ZERO CONTROL

METER JACK



111101010

3. Control to 1.5

- a. entire meter scale indicates 2 volts
- b. testing $1\frac{1}{2}$ -volt battery, must be replaced when voltage drops to 1 volt.

4. Control to 90

- a. entire meter scale indicates 100 volts.
- b. testing 90-volt battery must be replaced when voltage drops to 60-volts.

G. Probe Jack Control

- 1. Turning probe control to probe position cuts tubes in Geiger counter and uses tubes in the probe, pitmaster or 360° detection head, which are accessories available for all OREMASTERS.

OPERATING INSTRUCTIONS FOR GENERAL PROSPECTING:

1. Turn the range control to speaker.

- A. If the range control is not first turned to the speaker position, and instead is turned to the meter setting and the voltage regulator has not yet cut in, it will over load the meter and may damage or shorten its life, as well as to also shorten the life of the geiger tubes.

2. Turn sensitivity control to 10.

3. Turn the meter speed control to #4.

4. Turn the zero control to the ORE position.

5. Turn the OFF-ON power switch to ON position.

Proper Care of Your Detector

The following are precautions you should take to protect your instrument from harm, insure its long life, and avoid nullifying the warranty.

Cleaning: The loop and rod or probe are waterproof. They can be cleaned with fresh water and a mild cleanser. After cleaning, however, dry the instrument thoroughly. Caution! The instrument case is not waterproof, and water—if allowed to enter it—may damage electronic components.

Weather Conditions: Protect your detector from excessively cold weather. Freezing can damage the electronic components, the case and/or the batteries. Excessive heat can also damage the instrument. Never leave it in the sun. It's best to lay it in the shade when temporarily not in use. If it's left in a car on a hot day, cover it with a blanket or something similar to protect it from the direct rays of the sun, and then leave the windows slightly open to permit ventilation. Needless to say, protect your detector if you operate it in the rain, as water may get into the instrument case.

Salt Water: Salt water is very corrosive! Immediately after your detector has been exposed to salt water, rinse it thoroughly with fresh water, being careful not to allow water to enter the instrument case. Then wipe it with a cloth dampened with fresh water and dry it thoroughly.

Storage: If you plan to store your detector for any length of time, unsnap the battery and remove it from the instrument. Whenever your detector is not in use, turn the **VOLUME** knob all the way to the "**PWR OFF**" position.

Service And Warranty Information: If your new metal detector is ever in need of service, ship it to us at the factory address below or to one of the Service Centers listed on the back of the warranty statement. Insure it fully, prepay the charges, and enclose a letter describing the nature of the problem. As long as your detector is under warranty there is no charge other than a small handling and postage fee.

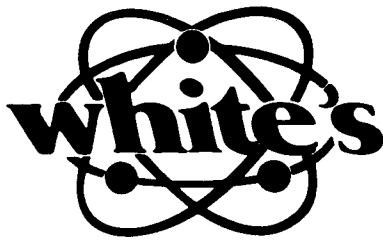
Read your warranty card carefully. It describes completely what is covered and the length of the coverage. If you have any questions don't hesitate to write us. We will be happy to answer any questions you may have.

HELPFUL HINTS AND TIPS

1. "How deep will it go?" Detection depth is determined by five main factors.
 - a. The **SIZE** of the object.
 - b. The **SIZE** of the loop.
 - c. The **LENGTH OF TIME** the object has been buried.
 - d. The **SKILL** of the operator.
 - e. The ground **MINERAL CONTENT**.

The longer an object has been buried, the better you will be able to detect it. A chemical reaction called a "halo effect" between such objects as silver or copper coins and the surrounding soil may cause your detector to register a much larger increase in volume than might otherwise be expected for a small coin. If the halo effect is strong enough, your detector may continue to register even after you have dug up the coin.

2. "What will my detector locate?" Silver, lead, copper, bottle caps, tin foil, pull tabs, cartridge cases, rings, brass and tin cans are just a few of the conductive objects that can be detected. Your detector will not locate sticks, rags, bones, paper, wood or other non-metallic objects.
3. Learn how to interpret the different types of responses from your detector. A nail lying flat in the ground will sometimes produce a double or single reading depending upon whether your loop passed across it lengthwise or across its width. So it's a good idea to sweep your finds from several different directions to try to learn as much as possible about the object you have located. Coins will usually only produce one reading regardless of sweep direction.
4. Rather than waste time, check around the trees for junk items such as foil, pull tabs, bottle caps, etc. This will frequently indicate whether or not someone has already been in the area with a detector.
5. Always "criss-cross" an area when hunting it.
6. After you have dug up a coin, always check the hole again for more. As many as 10 coins have been found in one hole!
7. When beachcombing the best place to look for coins is near the concession stands.
8. Check the shallow water in swimming areas. Most rings and coins are lost when people enter the water.
9. If you make plans for coinshooting, check the history records of the area.
10. Always carry a plastic bag for your detector in case you get caught in the rain.
11. Never ask permission to treasure hunt over the phone. People tend to visualize you using a pick and shovel, making large holes.
12. Join a local historical society or get acquainted with its members.
13. In lawn areas, use a screwdriver of no more than eight inches as your tool. Limit the size of the hole to a **MAXIMUM** of two inches in diameter. Don't forget to fill in the hole. Public and private officials and property owners will be more likely to allow continued treasure hunting if you do no environmental damage.



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