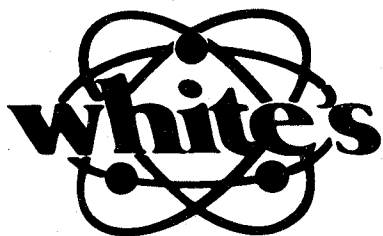
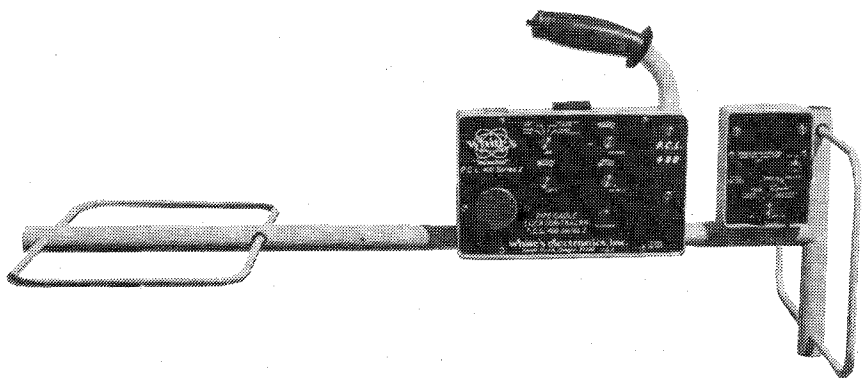


OPERATOR'S
INSTRUCTIONS

INDUSTRIAL PCL400 SERIES 2



A WORD FROM MR. KENNETH WHITE, SR.

Congratulations on the purchase of our all new PCL400 Series 2 metal detector.

We here at White's have worked very hard over the past thirty years to bring you the finest metal detectors money can buy. We have some of the finest engineers and technicians, using the latest in computers and test equipment, developing new products. Our assembly personnel are true craftsmen, carefully building each detector by hand and testing their workmanship for quality through every phase of construction. Our service personnel, including those at the factory and those trained at the factory to work in the field at White's National Warranty Service Centers, are highly skilled at repairing our instruments. And, White's management staff is constantly in touch with users in the field so we will know the needs and problems of our customers. By understanding the needs of the user, we are able to produce metal detectors that are unsurpassed in the field. Today, we are working harder than ever for you!

A handwritten signature in black ink that reads "Kenneth White". The script is fluid and cursive, with the first letters of "Kenneth" and "White" being capitalized and prominent.

Kenneth White, Sr.
President/White's Electronics, Inc.

ASSEMBLY

Slide the receiver section onto the front control box sleeve and the transmitter onto the rear control box sleeve as shown on the front cover.

THEORY OF OPERATION

The PCL400 S2 operates on the principle of an electromagnetic field either produced or detected by the instrument.

The PCL400 S2 consists of two main sections, the RECEIVER (referred to as the front section) and the TRANSMITTER (referred to as the rear section).

The two main requirements that a pipe or cable must have to be located are: 1) It must be made of metal, or have a metallic tracer strip buried with it, and 2) It must be buried.

It will also "detect" large metal objects such as manhole covers, valve boxes, re-bar in concrete, etc. However, it does so at a reduced efficiency because it was designed specifically to locate buried pipes or cables. It was NOT designed to locate small objects such as coins or rings.

FEATURES

A. GROUND REJECT CIRCUIT

In the LOCATE mode, signals are processed to extract only those coming from the pipe or cable. Signals coming from other sources are greatly reduced or eliminated.

Examples of other sources fall in two categories:

- 1) Mineralized or conductive ground which in turn acts like a long piece of metal, and
- 2) External sources of interference such as high voltage power lines, industrial electrical noise, radio and television transmitters, automobile ignition noise.

B. PUSH BUTTON CONTROL

The PCL400 S2 Push Button control, mounted in the handle, simplifies many adjustments.

The operator may simply pre-set the controls, turn the instrument on, MOMENTARILY depress the Push Button control and all calibration is done instantly - electronically.

DESCRIPTION OF FEATURES

RECEIVER - Front Unit

PWR OFF/TONE ADJUST: This control has two functions:

1. Power on/off.
2. It adjusts the volume of the threshold or standby audio tone.

A low tone may be selected for use in quiet environments or when headphones are being used. Higher tones are selected for noisier environments. The tone volume will be adequate for most applications if the control is set at the center of the "normal" band. Generally, the lower the tone setting the better.

MODE SWITCH: This control selects the "mode of operation" for the PCL400 S2. Three modes of operation can be selected by this control. (Both mode switches, front and rear, work in conjunction with each other and **MUST BE SET IN THE SAME MODE**).

1. Bat. Ck. (Rear) Trans: In this position the condition of the rear or transmitter section battery, is checked on the meter.
2. Bat. Ck. (Front) Rec: In this position the condition of the front, or receiver section battery, is checked on the meter.
3. LOCATE: This position is selected when the instrument is to be used for initial location of pipe or cable.

SENSITIVITY CONTROL: This control is used to adjust operating sensitivity. Positioning of the control to the center of the "normal" band is usually adequate for most locate-trace operations. Maximum sensitivity is with control adjusted fully clockwise, and should only be used when difficult TRACE conditions are encountered.

GROUND REJECT CONTROL: This control is used in the LOCATE mode only and is adjusted to desensitize the locator to highly mineralized soil conditions. Adjustment of this control to the center of the "normal" band will be adequate for most soil conditions.

HEADPHONE JACK: This jack is used with optional headphones. The speaker is automatically turned off when headphones are plugged in.

PUSH BUTTON CONTROL: The Push Button control is conveniently located at the tip of the carrying handle. The control is pressed and held **MOMENTARILY** to instantly set up the PCL400 S2 to its optimum operating conditions. The Push Button control is used in **ALL MODES** of operation.

TRANSMITTER - Rear Unit

MODE SWITCH: This control selects one of the four modes of operation for the instrument. (Both mode switches, front and rear,

work in conjunction with each other and **MUST BE SET IN THE SAME MODE**).

1. **LOCATE (Pwr Off)**: This position is selected when the instrument is to be used for the initial location of the buried pipe or cable. Also in this position the internal battery in the Transmit section is switched off. The Transmit battery is used only when the Transmitter and Receiver units are separated.

THE REAR MODE SWITCH MUST REMAIN IN THE LOCATE (Pwr Off) POSITION WHEN THE INSTRUMENT IS NOT IN USE TO PREVENT THE DISCHARGE OF THE TRANSMITTER BATTERIES.

2. **INDUCE Position**: In this position the Transmitter is being powered by its own battery. **IN ANY TRACE MODE THE TRANSMITTER AND RECEIVER UNITS ARE SEPARATED.** The word "induce" means that there is no wire connection between the transmitter and the pipe or cable. The transmit loop is producing a magnetic field which is energizing the buried pipe or cable.
3. **CLIP/NO GROUND**: In this position the transmitter is powered by its own battery. The transmit loop is no longer producing a magnetic field. In this position the buried pipe or cable is energized by a high voltage source and is physically connected to the pipe or cable by the clips supplied. The clips are plugged directly into the Clip ON/Accessory jack in the transmitter front panel.
4. **CLIP GROUNDED/ACCESSORY**: This position differs from the CLIP/NO GROUND position only in that the source is a high current source rather than a high voltage source.

CLIP ON/ACCESSORY JACK: This jack is used in the TRACE mode only. The clip-on adapter is plugged directly into this jack and is energized when either Clip On Mode is selected by the mode switch.

BATTERY CHECK PROCEDURE

Turn instrument power on by moving the Pwr/Off Tone Adjust Control to the center of the normal band. Set Front Mode Switch to Bat. Ck. (Rear) Trans position. Set Rear Mode Switch to Induce position. Read condition of the rear batteries on the meter. Set Front Mode Switch to Bat. Ck. (Front) Rec. position. Read condition of front batteries on meter. If the meter needle is out of the red area the batteries are close to being "Dead". It is good practice to check batteries every time the instrument is used. Return rear Mode Switch to the Locate (Pwr/Off) position.

OPERATION IN THE LOCATE MODE

(Units Together)

OPERATING PROCEDURE:

Position all controls to the center of their "NORMAL" bands. Position both front and rear MODE switches to the LOCATE position. Momentarily depress the Push Button control. An audio tone should be heard coming from the speaker and the meter should read approximately 10. At this time the TONE ADJUST control may be adjusted for a tone level acceptable to the operator. Generally, low tone levels are best.

GROUND REJECT PROCEDURE:

(Stay away from all metal objects, such as: cars, pipe, concrete rebar, etc.)

Once initial operating conditions are set, the instrument is adjusted to reject most mineral responses caused by the ground itself. This adjustment is not critical and most of the ground responses are rejected with the GROUND REJECT control centered in the "Normal" band. To check the "Ground Rejection", hold the instrument at arms length (approximately 18" above the ground) and momentarily depress the Push Button control. The tone will be heard, and the meter will indicate about 10. Raise the instrument approximately 6" more above the ground. If the tone changes little or none at all, then the GROUND REJECT control setting is adequate. If, however, the tone change is substantial, the control must be readjusted in the following manner:

1. If the tone level and meter reading decreased when the instrument was raised, the GROUND REJECT control needs to be moved slightly in the counterclockwise direction.

Lower unit back to arm's length position, momentarily depress the Push Button control and again raise the instrument another 6" above the ground. If the tone level and meter reading still decrease, then repeat this procedure until the tone level and meter reading remain more or less the same as the instrument is raised.

If the tone level and meter reading increase when the instrument is raised then you have turned the GROUND REJECT control too far to the left.

2. If the tone and meter reading increase, then adjust the GROUND REJECT control slightly in the clockwise direction. Again repeat this procedure until the tone level and meter reading change little or none at all as the instrument is raised.

The ground reject becomes more critical as the sensitivity is increased. THE SENSITIVITY control need not be advanced past the "Normal" band for most Locate operations. The additional sen-

Handle-mounted Push Button control calibrates locator instantly, electronically.

Bubble level is used in Trace Mode to help make accurate depth measurements.

A multi-purpose, sensitive meter is used to monitor received target signals, and to check batteries.

Battery check and mode change are accomplished with a single switch adjustment. Mode Select Control sets to either TRACE or LOCATE, and is also used to check all batteries.

2 1/2 inch speaker.

Sensitivity control allows operator to adjust locator depth of detection.

Headphone jack is used in highly noisy environments and to hear even the faintest responses from the deepest targets.

(Power On-Off) Tone adjust control sets the level of the threshold tone desired and is independent of meter readings.

Ground Reject Control is adjusted to eliminate false responses due to changing ground conditions.

RECEIVER SECTION BATTERY COMPARTMENT: Contains a battery pack with 8 "AA" Alkaline batteries. Battery life is 20 hours.

To access batteries for replacement, remove thumbscrews on this panel.

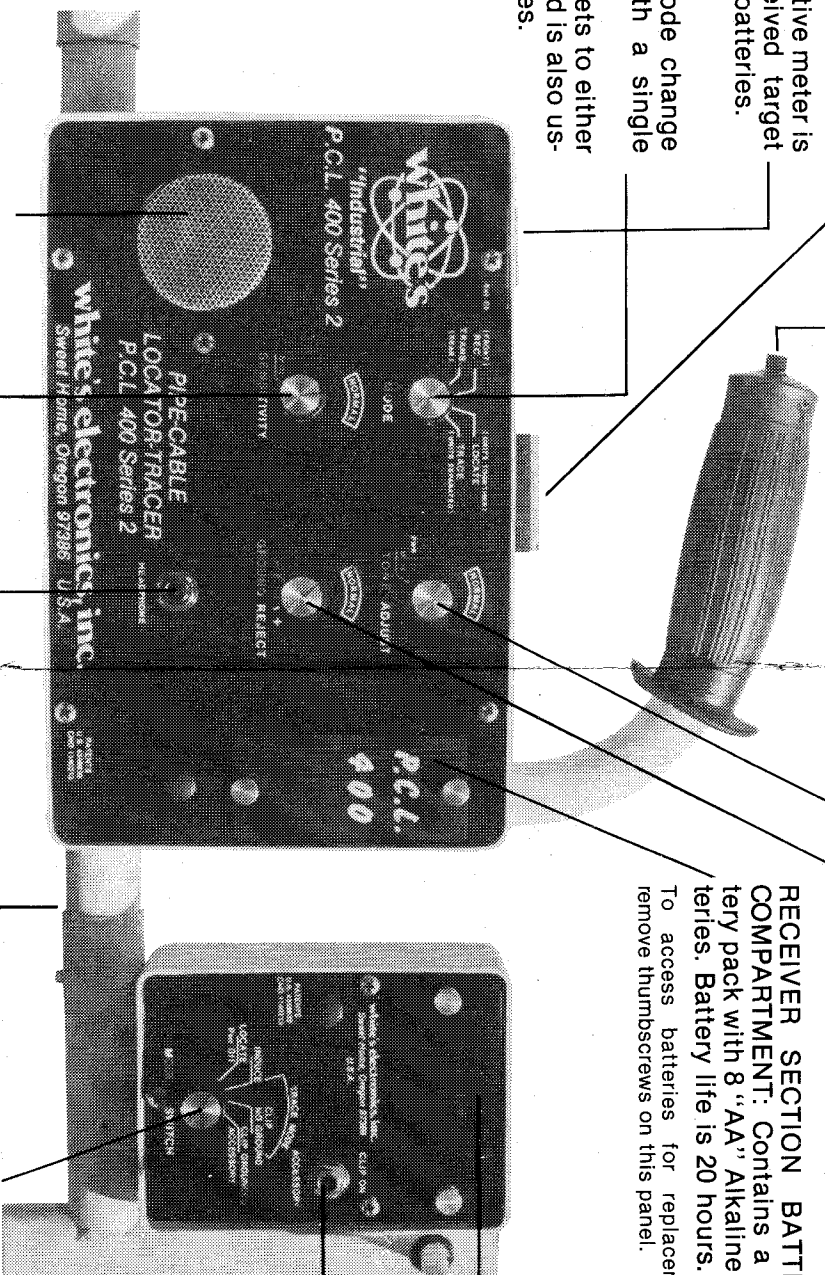
TRANSMITTER SECTION BATTERY COMPARTMENT: Contains a battery pack with 6 "AA" Alkaline batteries. Battery life is 20 hours.

To access batteries for replacement, remove thumbscrews on this panel.

Snap together solid aluminum construction allows easy field assembly. (All connections are made when units are assembled.)

Mode Select Control: Set to match Mode Select Control position on the receiver.

Clip On/Accessory Jack: Used to plug in clips for tracing and for optional inductive probes.



sitivity is not required during Trace or Depth Measurement operations. If the GROUND REJECT procedure cannot be accomplished as set out above, try moving to a different location as you may be over a buried pipe or cable or other metallic object.

SEARCH TECHNIQUE

The most effective way to search an area is to use a grid like pattern over the area selected. Try to keep the grid lines no more than 6 feet apart. Make several passes in one direction, then turn 90° and make several more passes to ensure that you have not missed any buried pipe or cable.

The best detection of a pipe or cable is accomplished when the instrument is at a right angle to the pipe or cable. The approximate center of the pipe or cable is directly below the rear Section.

The volume will increase and the meter will read higher when the instrument is passed over a buried pipe or cable. When the pipe is close to the surface, the meter may go off scale and the tone will no longer increase in volume. The pipe will appear to be VERY large. This is normal. Now the pipe's position must be "narrowed down" to determine its location more accurately.

Start to pass over the pipe from one direction. When the meter goes "off scale", momentarily depress the Push Button control to bring the meter back on scale. Continue to cross the pipe or cable in the same direction as started, momentarily depressing the Push Button control to keep the meter pointing "on scale". There will be a point where the meter reading and speaker tone will "peak" out and start to drop back down. It is at this peak that the Rear Loop is over the buried pipe or cable.

Once you have found the pipe or cable in the LOCATE Mode, you may need to find the direction of the run. There are three ways to do this.

1. After locating the pipe or cable, place a marker at this spot, then move 5 to 10 feet in the direction that you think the pipe or cable is running. (Along the road, property line, fence row, etc.) Using the LOCATE mode, mark spots where the pipe or cable is found.
2. Once you have located the pipe or cable, turn the instrument to the Rear Loop as your center point. You will again get a "peak" signal, both sound and meter. When this "peak" is found, the pipe or cable is running in the direction of the WIDEST part of the Rear Loop.

3. After you have located the pipe or cable, turn the instrument, using the middle of the Rear Loop as your center point. As the Rear Loop comes to a right angle to the pipe, the sound will stop and the meter will read 0. The pipe or cable is now running in the direction of the LENGTH of the ENTIRE instrument.

These operations will verify that the pipe or cable is either running straight, is bending, or has come to a dead end. Mark as many locations as are needed to keep "track" of the buried pipe or cable.

Be sure to keep away from large known metal objects such as cars, fences, etc. to prevent false responses from affecting the accuracy of the desired location operation. Pipes placed on the surface are very hard to detect unless they are very long (in excess of 100 feet).

DETECTING LARGE METAL OBJECTS:

Large buried metal objects, such as manhole covers and large valve boxes, can be located with this instrument. Although not specifically designed to locate isolated objects, the PCL400 S2 can be used very effectively to "pinpoint" the larger objects.

Isolated metal objects "peak" under the center BETWEEN the Front and Rear Loops. Pipes and cables "peak" under the Rear Loop only. The operator should practice with isolated objects on the surface of the ground to become familiar with the responses of both kinds of objects.

OPERATION IN THE TRACE MODE

(Units Separated)

There are four methods for using the PCL400 S2 with the units separated.

1. **TRACE INDUCE:** Energizes the pipe or cable by inducing a current in the suspected pipe or cable without any direct connection.
2. **CLIP/NO GROUND:** When there is access to the pipe or cable, a high Voltage source is available for a particular tracing operation. CLIP/NO GROUND is used when a "Ground Point" is not available.
3. **CLIP/GROUNDED:** When there is access to the pipe or cable a high Current source is available for a particular tracing operation. CLIP GROUNDED is selected when a ground source IS available.
4. **DEPTH MEASUREMENT:** One of the Trace Modes is selected, preferably either of the "Clip-On Modes", and the front and main assemblies are used in conjunction with the Push Button control and bubble level to accurately measure how deep the pipe or cable is buried in the ground.

TRACE INDUCE OPERATION PROCEDURE

Position controls as follows: Front MODE switch to TRACE (Units Separated) position, Rear MODE switch to INDUCE position. Separate Rear Unit from Front Unit. (Leave the Front Loop attached to the Control Box). In this mode the Rear Unit TRANSMITTER Loop is producing a powerful magnetic field. To avoid false responses, the Front Unit MUST be operated at least 30 feet away from the rear unit.

Once the pipe or cable location has been approximated in the Locate Mode, the Rear Unit is laid down flat on the ground with the longer side parallel and about 2 feet away from the located center line of the pipe, with the stem pointing up.

The Front is used to "Trace" the direction of the pipe or cable. The Receiver unit is held upright with one hand on the handle and the other on the pipe stub where the Rear Unit was attached. The whole assembly is kept as close as possible to straight up and down.

As the Front Loop is brought close to the energized pipe or cable the meter reading and tone level will increase again. If the pointer goes "Off Scale" it is returned to "On Scale" by the use of the Push Button control.

The closer the Receiver Loop gets to the center line of the pipe or cable the higher the meter reading and the audio tone level. At some point, as the Loop is brought towards the center line of the pipe or cable, the meter reading and tone level will "peak" and start to fall off. This "peak" will be off slightly from the exact center if the Loop is not held straight up and down as it is swept over the pipe. The Receiver Unit must be as vertical as possible.

The direction of the run of the pipe or cable may be obtained by rotating the Loop. The "peak" again indicates when the Loop is in line with the direction of the pipe. Continuous location and direction can be made along the length of the pipe or cable.

The Push Button control is used whenever the meter pointer goes off scale. If the operator moves the Receiver Unit too far from the Transmitter Unit in tracing — the meter may fall to zero and not reset.

The Sensitivity control may be advanced if the Push Button control fails to reset the meter and tone level. The Rear unit can be moved along the pipe or cable to a spot previously marked, being sure not to get any closer than 30 feet to the Receiver unit. The remainder of the pipe or cable may be traced this way by moving the Transmitter Unit closer every time the Push Button control fails to reset the tone and meter. If a second operator is available he may move along with the first operator using the Receiver Unit. The inductive method should ONLY be used when direct surface access to the pipe or cable being traced is not available.

TRACE CLIP/ON GROUND AND CLIP/GROUND OPERATING PROCEDURE:

Operation in these two modes is very similar to the trace induce operation with the following exceptions:

Plug the clip-on leads (the clip-on leads have two long black wires with a plug on one end and copper clips on the other end) into the CLIP ON/ACCESSORY jack of the Transmitter Unit.

Position the Rear Mode switch to the CLIP/ON GROUND position. The pipe or cable is energized directly by a signal present at the CLIP ON/ACCESSORY jack, so the Receiver Unit can be used close to the Transmitter with little or no false responses. This is very useful when only a short length of pipe or cable is to be traced.

The CLIP/NO GROUND mode is selected when no suitable grounding point exists. The RED lead is connected to pipe or cable to be traced and the BLACK lead is NOT connected to anything but is left laying on the ground away from the Rear Unit. This lead and the Rear (Transmitter) Unit case acts like an artificial ground. Both should be kept as far away from pipe or cable being traced as the RED lead will allow.

The CLIP/GROUNDED mode is selected when a suitable GROUND is available. A good ground being something buried in the ground such as a metal fence, large piece of metal laying on the ground, or short piece (6" to 10") of metal (such as a screwdriver) driven into the ground. In this mode the better the ground, the stronger the energizing signal. Try to keep the grounding source as far away from the energized pipe or cable as possible. The more the separation the better the pipe or cable will become energized by the clipped on signal.

OPERATIONS TO DETERMINE THE DEPTH OF A BURIED PIPE OR CABLE

Select one of the Trace Modes, preferably either of the clip on modes.

The Receiver Unit is used in conjunction with the bubble level to accurately determine how deep the pipe or cable is buried as follows:

1. Energize the pipe or cable by one of the Trace Modes.

If TRACE INDUCE MODE is used to energize the pipe or cable be sure the Receiver is at least 30 feet from the Transmitter to avoid false responses.

2. Make a suitable mark on the surface at the center of the located cable or pipe.
3. Place the Receiver Loop flat on the ground with the Depth-Center of the Loop directly over the mark made in the Locate operation. (Paragraph 2)
4. Momentarily depress the Push Button control to bring meter pointer "on scale".

5. To determine depth: Back the Receiver Loop away from the located mark (Paragraph 2) at a right angle from the run of the pipe or cable. Continue to "back off" until the meter reading and tone level "peak", as they did in the Trace Mode.

During the "backing off" procedure the Receiver Unit is kept as close to the ground and as level as possible using the bubble level located directly below the meter.

6. When the "peak" is reached, (being sure to keep the meter pointer "on scale" with the Push Button control) make another mark at the Depth-Center of the Loop.
7. Now measure the distance between the first mark which is the center of the pipe or cable and the second mark which is the "peak" maximum. THIS DISTANCE IS THE DEPTH THE PIPE OR CABLE IS BURIED IN THE GROUND.

To check for accuracy, make this measurement from both sides of the pipe or cable to be sure that no errors have taken place. Both measurements should be within an inch or so of each other.

TWO MEASUREMENTS ARE REQUIRED IF THE PIPE OR CABLE IS LOCATED ON A SLOPE, one from the uphill side and one from the downhill side. The two measurements will be different. They are then added together and divided by two to get an average depth.

All depth measurements MUST be made with the Receiver Loop as close to a right angle with the pipe or cable as possible. Very accurate depth measurements are possible with the PCL400 S2 if care is taken to keep the unit level and you have accurately located the pipe or cable.

This instrument will find buried pipe or cable if used in a proper manner. HOWEVER, THE ABILITY TO FIND THE PIPE OR CABLE IS DEPENDENT UPON THE SKILL OF THE OPERATOR. AS WHITE'S ELECTRONICS, INC. HAS NO CONTROL OVER THE OPERATOR WE CANNOT ASSUME LIABILITY FOR ANY DAMAGE THAT MIGHT RESULT BECAUSE OF THE FAILURE OF THE OPERATOR TO FIND A PARTICULAR PIPE OR CABLE.

SERVICE

If a problem occurs with your metal detector, first contact the White's dealer who sold it to you. In many cases your dealer can solve the problem. If not, the dealer will have your detector repaired.

TO LEARN THE NAME AND LOCATION OF YOUR NEAREST WHITE'S DEALER CALL:

TOLL FREE — 1-800-547-6911

WHITE'S ELECTRONICS' LIMITED WARRANTY

If within one year (12 months) from the original date of purchase your White's detector fails through normal use or due to defects in either material or workmanship, White's Electronics will repair or replace, at its option, all necessary parts without charge for parts or labor.

Simply return the detector to the dealer where you purchased it. The unit must be accompanied by a completed service coupon provided by your dealer. You must provide proof of date of purchase before the unit is shipped.

If the unit has failed within the first 90 days of purchase, shipping will be prepaid.

If the unit fails after the first 90-day period, the customer is responsible for shipping costs. Please also include \$5.00 for return postage, handling and insurance.

Items excluded from this warranty are non-rechargeable batteries, headphones and other accessories.

The warranty is not transferable. Nor is it valid unless the Warranty Registration Card is returned to the factory address below within ten (10) days of original purchase for the purpose of recording that date, which is the actual commencement date of the warranty.

The warranty does not cover damage to detectors caused by accident, misuse, neglect, alterations, modifications or unauthorized service.

Duration of any implied warranties (e.g., merchantability and fitness for a particular purpose) shall not be longer than the stated warranty.

Neither the manufacturer nor the retailer shall be liable for any incidental or consequential damages resulting from defects or failures of the instrument to perform.

Some states however, do not allow limitations on the length of implied warranties, or the exclusion of incidental or consequential damages. Therefore, the above limitations and exclusions may not apply to you.

In addition, the stated warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

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