



# ALL METALS LOCATOR HIGHLY ADVANCED PI TECHNOLOGY



# OPERATIONS MANUAL

ISSUED: MAY 2022  
PN 1532700 REV E

**GARRETT**<sup>®</sup>  
METAL DETECTORS

## SAFETY

Operators must fully read this *RECON-PRO* Operations Manual before using this detector, must always follow the Standard Operating Procedures of their governing organization and must be fully trained in hazardous search operations. The operational procedures described in this manual are general guidelines for the use of the *RECON-PRO* All Metals Locator and are not intended to be substituted for the Standard Operating Procedures provided by the user's governing organization.



### WARNING

The *RECON-PRO* is an electronic instrument that detects targets which contain metallic components only. Detection is limited by the size, shape, material and distance of a metallic object. Any item without metal components WILL NOT be detected. Very small metal parts containing "specialized" metal alloys may not be detectable (a pre-test of such samples is recommended before field searching).



### WARNING

When searching for targets in hazardous areas extreme care must be practiced to avoid physical contact with devices that contain activation mechanisms (example: tripwires, detonators, pressure fuses). Be aware that the actual buried target may be larger in size than the detected metal component.



### WARNING

Under NO CIRCUMSTANCES should the *RECON-PRO* detector be used as a probing device or as a digging tool. Once a buried target is detected, trained specialists with proper tools are recommended for the excavation of the detected target.



### WARNING

There are numerous Improvised Explosive Devices (IEDs) that can be hidden in various containers, some disguised in normal looking consumer items. Extreme caution must be taken when approaching such devices as they may contain unknown components. The use of a metal detector as the primary means of detecting such targets may not be the appropriate procedure as the magnetic influence of the detector could possibly cause activation. This precaution may apply to undocumented conventional type munitions and mines with magnetically influenced triggering devices.



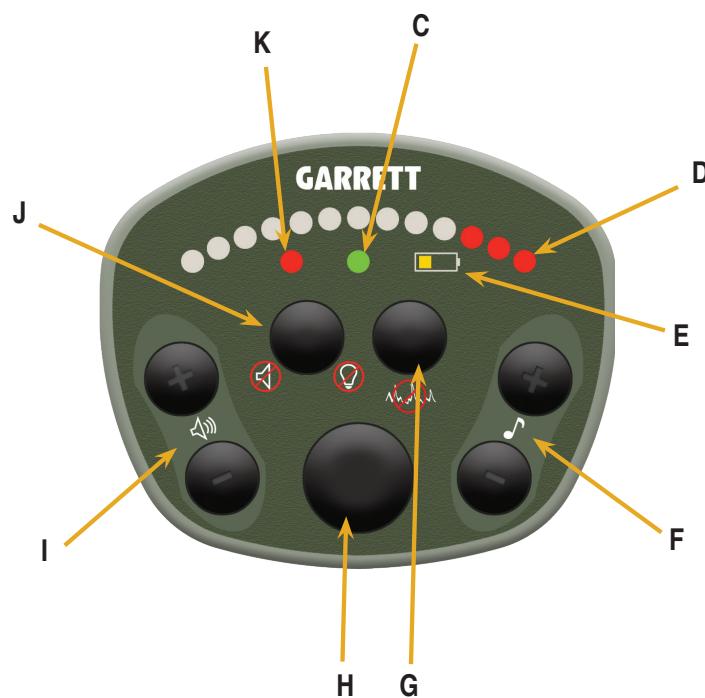
### WARNING

Battery Safety: The *RECON-PRO* is supplied with rechargeable batteries that may contain small amounts of harmful substances.

- **Caution:** Always fully charge batteries before use.
- **Caution:** Do not short circuit. Serious burns may result.
- **Caution:** Do not dispose of batteries in a fire. They may explode.
- **Caution:** Do not open or mutilate batteries. They may contain an electrolyte which is toxic and harmful to the skin and eyes.
- **Caution:** The battery charger supplied is intended for use with nickel metal hydride batteries only. Do not attempt to charge other types of batteries.
- This equipment may be used with high quality alkaline or lithium batteries.
- Do not put the batteries in trash that is disposed of in landfills. When disposing of the battery, comply with local ordinances or regulations and your company's safety standards.
- Recycling centers and retailers with recycling programs may be found at [www.rbr.org](http://www.rbr.org).



## OPERATING CONTROLS (Functional Layout Guide)



### PRIMARY FUNCTIONS

- A: Power Switch ON/OFF
- B: Headset Connector
- C: Power ON LED Indicator
- D: Signal Strength LED Indicator
- E: Low Battery LED Indicator
- F: Threshold Level ( +, - )
- G: RFI Noise Cancellation (Quick Press)
- G: Ground Cancellation (Hold Down)
- H: Audio Reset (Quick Press)
- H: Pinpoint Function (Hold Down)
- I: Volume Level ( +, - )
- J: Secondary Functions
- K: Speaker OFF LED Indicator

### SECONDARY FUNCTIONS (Two-Button Combination)

- J+A: Switch ON in Discreet Mode (i.e. No Speaker, No LED's, No Threshold)
- J+G: Switch LED's Off/On
- J+I: Switch Speaker Off/On ( -, + )
- J+F: Decrease / Increase Sensitivity ( -, + )
- A+F(-): Switch on in Salt Elimination Mode (i.e. reduce response to saltwater)

Note: The RFI setting (G) remains in memory after each new calibration. All other control changes will revert to the detector's default settings when the unit is turned Off.

### RECON-PRO Default Settings

LEDs:	ON
Speaker:	ON
Volume Level:	75%
Threshold Level:	0%
Ground Balance:	Neutral
Sensitivity:	Maximum



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# ***RECON-PRO AML-1000 OPERATIONS MANUAL***

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## 1.0 GENERAL DESCRIPTION OF THE *RECON-PRO* AML-1000

The *RECON-PRO AML-1000* (All Metals Locator) has been purpose-designed for professional user groups worldwide. Garrett's innovative Advanced Pulse Technology allows the *RECON-PRO* to be used in all soil and all shallow water conditions.

The unit's advanced pulse induction technology assures consistent and high sensitivity detection in most soils without the need for ground balancing. For areas with highly mineralized soils, an accurate ground balance function is provided. This addresses areas with conductive and magnetic stones such as Magnetite and Hematite. With this feature, operator performance and safety is optimized.

Compact, lightweight, well-balanced, and rugged the *RECON-PRO* is highly suited for the most challenging work conditions. Simple controls allow the user to fully concentrate on the detection tasks. A built-in low battery warning alarm provides the operator approximately 30 minutes to return to a safety zone with a fully functional detector.

The *RECON-PRO* is delivered with a low profile tactical Headset. This design fits easily under protective helmets and provides audio to both ears without covering the ear passages. When using the headset, the user can choose to turn the detector's main speaker on or off.

Further enhancements include:

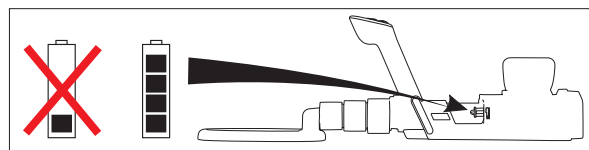
- a precise automated Radio Frequency Interference (RFI) cancellation function;
- a pinpoint function to precisely locate targets;
- static operation that maintains target detection even when the search head is stationary;
- a fully collapsible telescoping shaft;
- one-hand operation;
- adjustable volume level;
- adjustable audio threshold level;
- adjustable sensitivity control (7 preset positions); and
- standard AA-battery operation. (TWO sets of rechargeable batteries are supplied with each *RECON-PRO*.)

## 2.0 FIELD GUIDE

This Field Guide is intended to serve as a reference guide for the recommended *RECON-PRO* operational procedures. However, **all operators must completely read and understand the ENTIRE manual BEFORE commencing search operations.** This section is only intended as a reminder.

### 2.1 Install batteries.

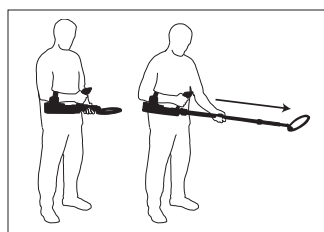
Insert a set of fully charged batteries at the start of each day's work.



See Section 5.1.2 for more details.

### 2.2 Adjust coil, shaft and armrest.

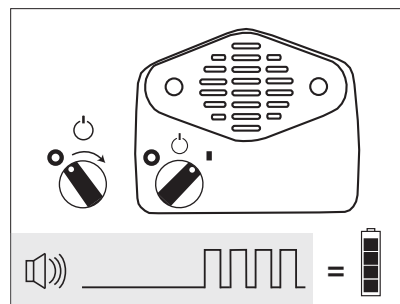
Disengage the armrest, shaft rotation lock and shaft nuts and adjust to desired position.



See Section 5.1.3 for more details.

### 2.3 Switch on the detector and check batteries.

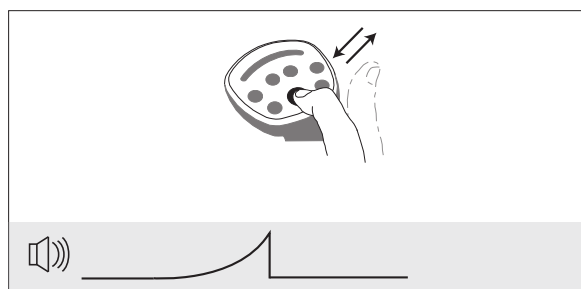
Switch on and listen for four audio beeps indicating fully-charged batteries.



See Section 5.1.6–5.1.7 for more details.

2.4 **Verify audio reset function.**

Press and release center Audio Reset button to quickly cancel out unwanted ambient signals.

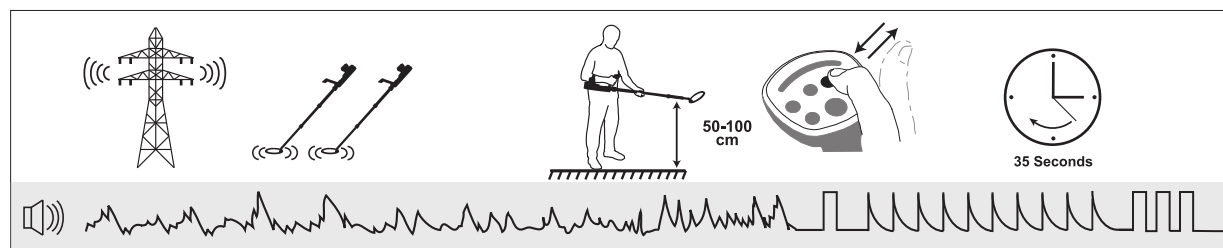


See Section 5.1.9 for more details.

2.5 **Perform RFI cancellation (if needed).**

Operating near power lines, etc. may cause interference. To check, hold search head stationary 50–100 cm above ground and listen for signal interference. If present, press and release RFI noise cancellation button. The noise cancellation function lasts for 35 seconds as indicated by the scanning LEDs and audio pings. Completion is indicated by a triple-beep.

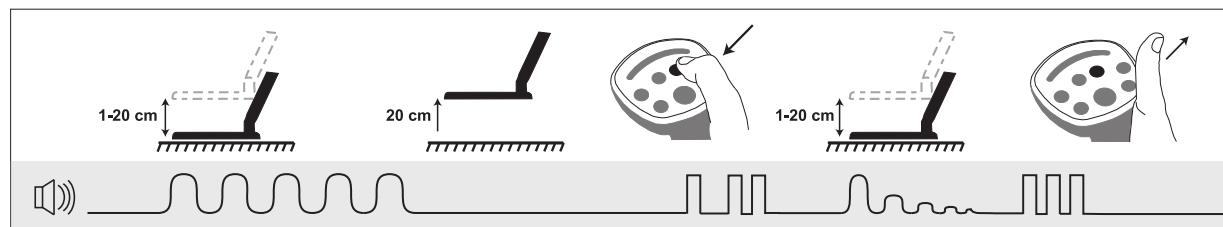
*(In urban areas with high levels of mixed RFI sources, it may be necessary to reduce the detector's sensitivity level by one or more steps below maximum sensitivity. In this case, target detection sensitivity will be reduced.)*



See Section 5.1.8 for more details.

2.6 **Check ground response and perform ground cancellation (if needed).**

Locate an area free of metal objects and check ground response by repeatedly raising and lowering the search head to the ground from approximately 1 cm to 20 cm. If there is a repeatable sound variation, initiate ground cancellation. Raise the search head 20 cm above the ground and press and hold the Ground Cancellation button. Wait for the double beep; then slowly lower and raise the search head to the ground from approximately 1 cm to 20 cm repeatedly until the ground cancellation is completed as indicated by a triple-beep. Release the button.

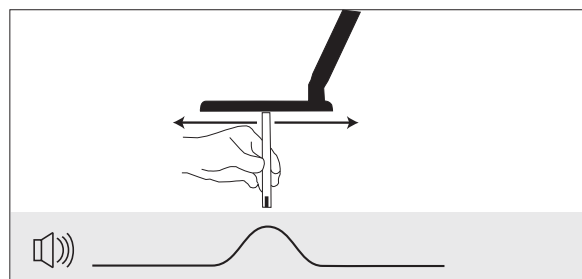


See Section 5.1.12 for more details.

**2.7 Perform detector sensitivity check.**

Pass test piece under center of the search head with unmarked end of test piece even with the bottom of the search head. Verify audible and LED response.

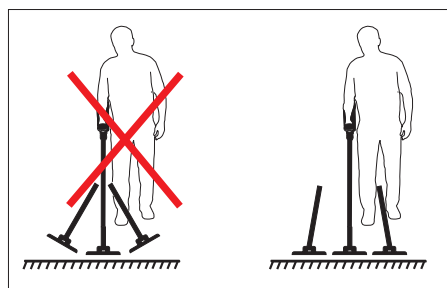
*(The test piece is to be used only at the default setting—highest sensitivity level.)*



See Section 5.1.13 for more details.

**2.8 Use proper sweep of search head.**

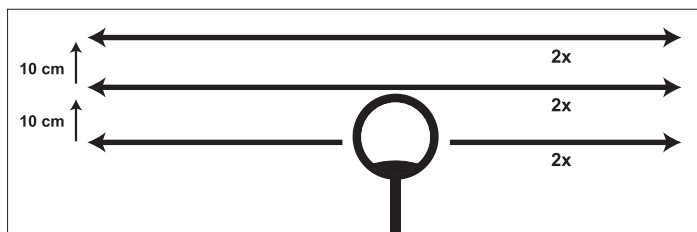
Sweep with search head 1-2 cm above the ground. Keep the search head parallel to the ground surface; do not raise or tilt search head at the ends of the swing.



See Section 5.2.1 for more details.

**2.9 Overlap sweeps.**

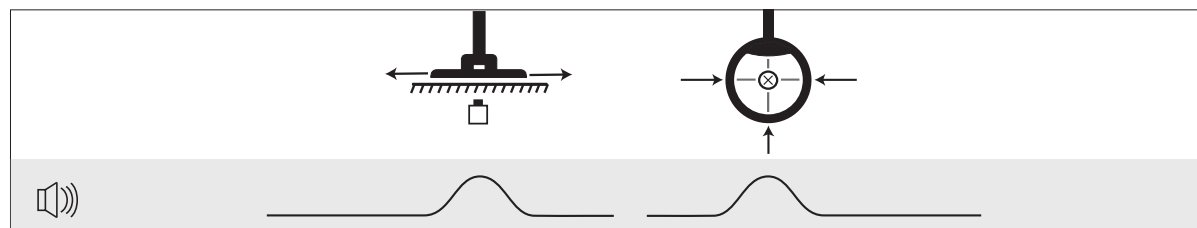
Repeat each swing at least 2 times in each direction. Advance search head forward by half its width and repeat sweep pattern to assure full search coverage.



See Section 5.2.1 for more details.

**2.10 Locate normal-sized target.**

For most targets, the peak response will occur at the center of the search head. Use side-to-side and front-to-back sweeps over the target to facilitate a crosshair indication of the target location.



See Section 5.3.1 for more details.

2.11 **Locate large target.**

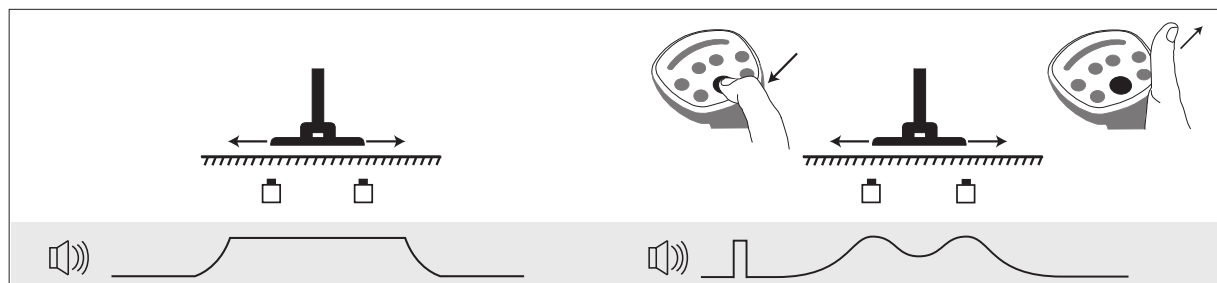
Large targets often produce a flat, wide response. To precisely locate a large target, position the search head to the side of the target's suspected location. Press and hold the center Pinpoint button and sweep search head completely over target in side-to-side and front-to-back motions. A noticeable peak response occurs over the center of the large target. Release button after target is located.



See Section 5.3.2 for more details.

2.12 **Separating adjacent targets.**

Multiple targets in close proximity often respond as one large target. To determine if two targets exist and to separate the two targets, position search head to the side of the target's location. Press and hold Pinpoint button and sweep back and forth over target's entire location. Multiple targets will produce separate peak responses.



See Section 5.4.1 for more details.

### 3.0 RECON-PRO AML-1000 MAIN COMPONENTS

The RECON-PRO AML-1000 detector includes the following items (see Figure 3-A).

- A. Hard transportation case
- B. Detector
- C. Backpack
- D. Headset
- E. Two sets of eight (8) AA rechargeable batteries
- F. Battery recharger with adaptors
- G. Operations manual
- H. Field Guide
- I. Instructional DVD
- J. Test piece



Figure 3-A

### 3.1 Electronics Housing

All electronics are contained in the electronics housing (see Figure 3-B). The battery packs are sealed in separate compartments to provide additional protection of the electronics.

### 3.2 Search Head and Telescopic Shaft

This view of the RECON-PRO (see Figure 3-B) shows the round, open search head, which is waterproof and can be rotated (+) or (-) 90 degrees and tilted if desired. The search head's open loop design ensures uniform sensitivity around the perimeter of the coil and provides clear visibility beneath the search head.

The RECON-PRO's telescopic shaft allows the unit to be collapsed to as short as 20 inches (508 mm) from its fully extended length of 63 inches (1600 mm). The cable for the search head is contained within this telescopic shaft to prevent damage. The detector shaft is made of a rigid fiberglass material to prevent twisting or flexing of the shaft during operation.

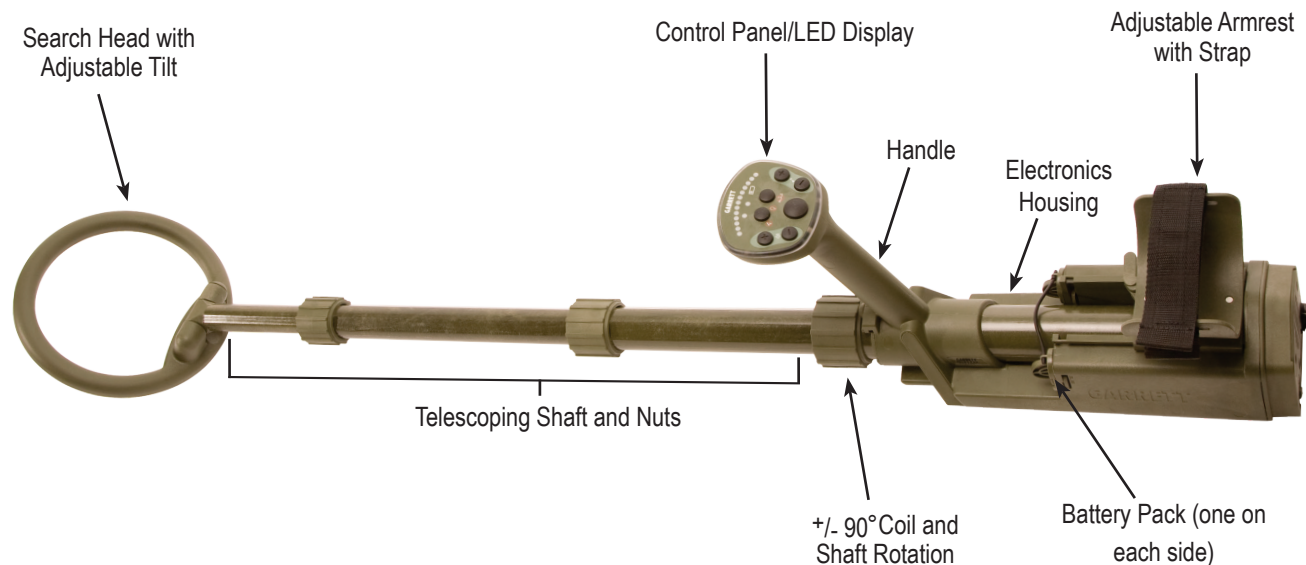
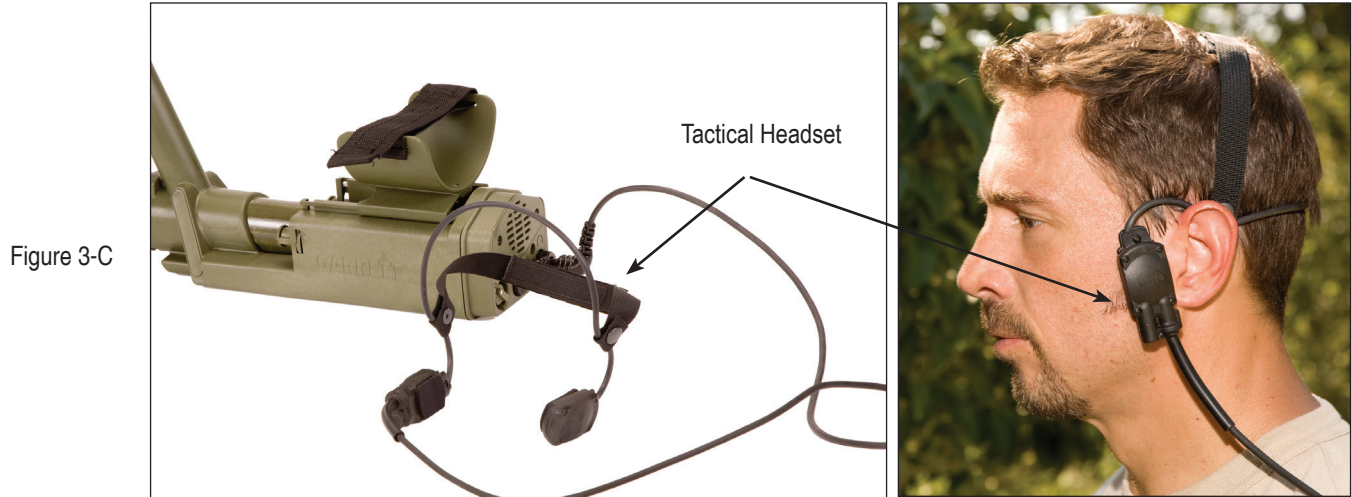


Figure 3-B

**3.3 Headset, Loudspeaker and LED Display**

A waterproof tactical headset is included with some versions of the *RECON-PRO* detector. The sound is bone conductive and does not block the operator's hearing channels. It is designed to be worn snugly on the operator's head just in front of the ear (see *Figure 3-C*). The headset connects securely to the back of the *RECON-PRO* just below the loudspeaker.



The loudspeaker is located on the back of the electronics housing (see *Figure 3-D*). Audio signals are broadcast through this speaker (with the headset connected or not connected). To mute the loudspeaker, press the Secondary Functions button in combination with the (-) Volume button.

In addition to audio alerts of metallic objects, the LED Display on the control panel shows a series of red lights to indicate the signal strength of a metallic object (see *Figure 3-E*).

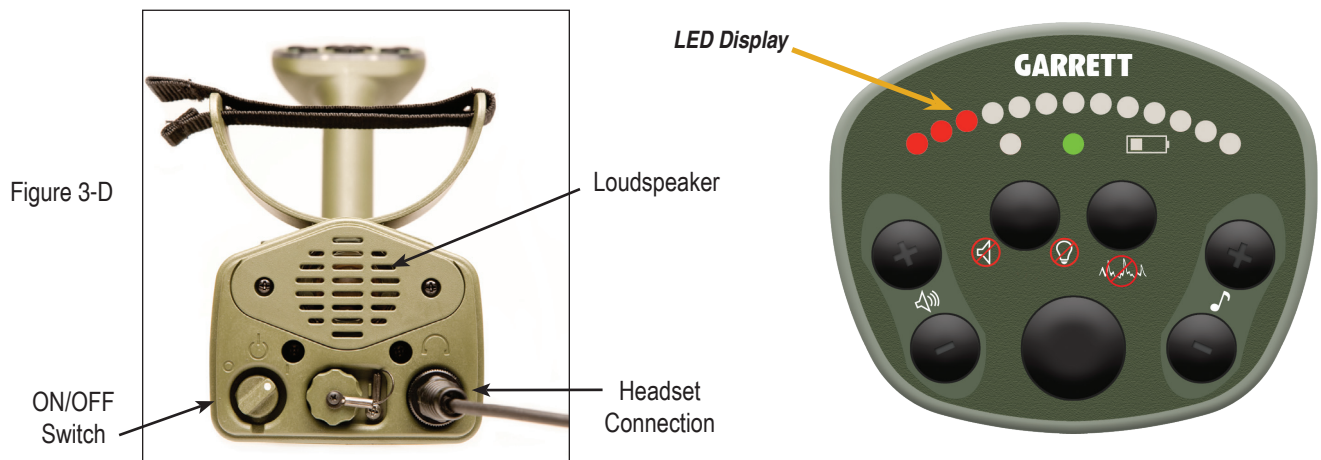


Figure 3-E

### 3.4 Backpack and Transportation Case

Each *RECON-PRO* is equipped with both a cloth backpack and a hard transportation case for travel. The backpack (see *Figure 3-F*) can easily contain a collapsed detector and its accessories to allow the operator to move comfortably through rough terrain.



Figure 3-F

Properly packed *RECON-PRO* backpack.

Use the padded transportation case (see *Figure 3-G*) to protect the *RECON-PRO* and all accessories during road or air transportation. It is recommended that the *RECON-PRO* be stored in this protective case when not in use. The warranty could be voided if the detector is not transported in its transportation case.



Figure 3-G

## 4.0 RECON-PRO FEATURES AND FUNCTIONS

### 4.1 Power Switch ON/OFF (A)

The unit's main power ON/OFF switch is located on the electronic housing's back panel (see Figure 4-A).

Figure 4-A



### 4.2 Control Panel Functions

Each of the control panel's functions and buttons are described below (see Figure 4-B).

#### 4.2.1 Power ON Indicator (C)

This green LED indicates the detector has been powered on. The LED will blink when certain functions are enabled.

#### 4.2.2 Signal Strength Indicators (D)

Three LEDs light up in red from left to right to indicate the strength of a metallic target's signal. No lighted LEDs indicates zero signal response; three LEDs at far right indicate full signal response.

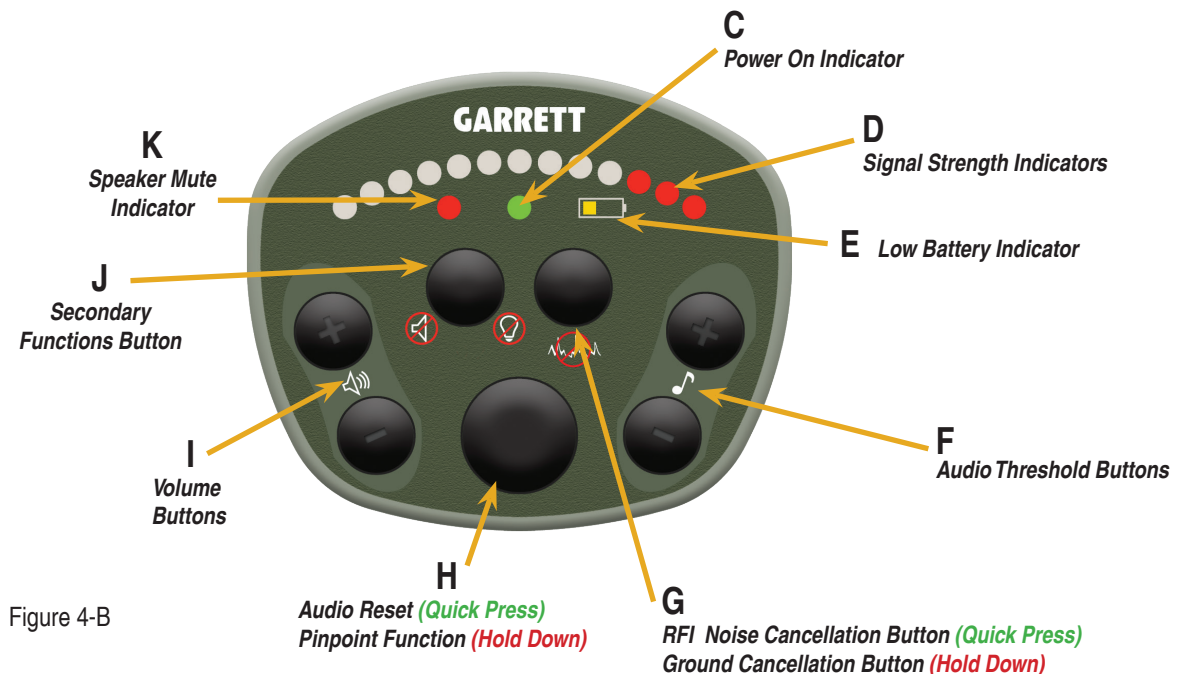


Figure 4-B

**4.2.3 Low Battery LED Indicator (E)**

This yellow LED will begin blinking when the detector has approximately 30 minutes of battery life remaining. Refer to Section 5.1.7 for details on the Low Battery LED Indicator.

**4.2.4 Audio Threshold Buttons (F)**

Use the Threshold (+, -) buttons to increase and decrease the detector's background audio threshold level.

**4.2.5 RFI Noise Cancellation/Ground Cancellation Button (G)**

This button is used for two purposes, RFI Noise Cancellation and Ground Cancellation. For RFI Noise Cancellation, quickly press and release this button (see Section 5.1.8 for details). For Ground Cancellation, hold down this button (see details in Section 5.1.12).

**4.2.6 Audio Reset/Pinpoint Function Button (H)**

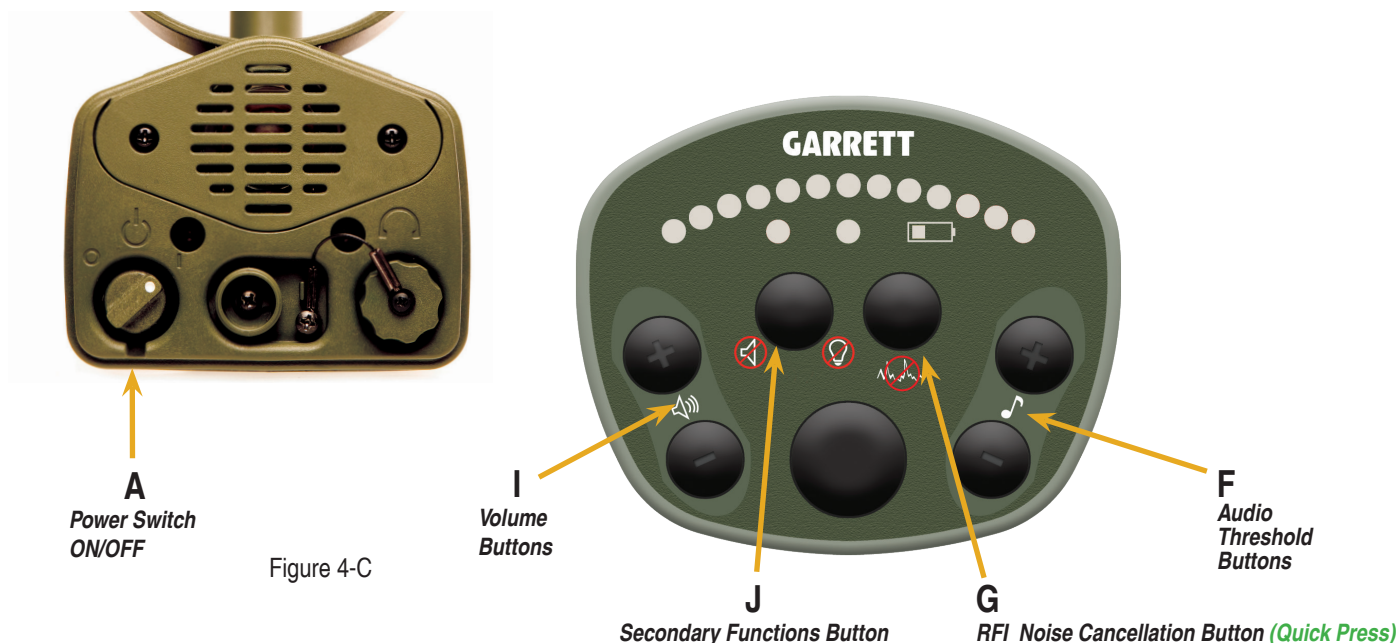
This button is used for two purposes, audio reset and pinpoint. To reset the audio/LED response to zero, quickly press and release this button (see Section 5.1.9). For the Pinpoint Function, hold down this button (see details on Pinpointing in Section 5.3.2).

**4.2.7 Volume Level Buttons (I)**

Use the Volume (+, -) buttons to increase and decrease the detector's volume level. Note that the volume adjustment only controls the maximum audio level produced by a large target and does not affect the audio level or sensitivity of a faint signal.

**4.2.8 Speaker Mute Indicator (K)**

This red LED will light to indicate the detector's speaker has been muted.



#### 4.2.9 Secondary Functions Button (J)

The Secondary Functions button, pressed in conjunction with another button, will change the detector's operating mode. The following special settings can be achieved using two-button combinations (see Figure 4-C). The detector returns to the default settings when the power is switched off and back on.

- **Discreet Mode:** **J + A buttons** (no speaker, no LEDs, no threshold)  
Press and hold the Secondary Functions button while switching power On.
- **LEDs Off or On:** **J + G buttons**  
Press the Secondary Functions button and the RFI Cancellation button at the same time.
- **Speaker Off or On:** **OFF = J + I(-) buttons** or **ON = J + I(+) buttons**  
Press the Secondary Functions button and the Volume (-) button to switch off the speaker. Press the Secondary Function button and the Volume (+) button to switch the speaker back on.
- **Sensitivity Adjustment:** **Decrease = J + F(-) buttons** or **Increase = J + F(+) buttons**  
This function is provided for certain UXO and urban IED search activities where maximum sensitivity is not appropriate. There are seven sensitivity levels.

To adjust sensitivity, press and hold the Secondary Functions button and use the Audio Threshold (-, +) buttons to decrease and increase sensitivity.

The signal strength LEDs will temporarily indicate new sensitivity level (see Figure 4-D).

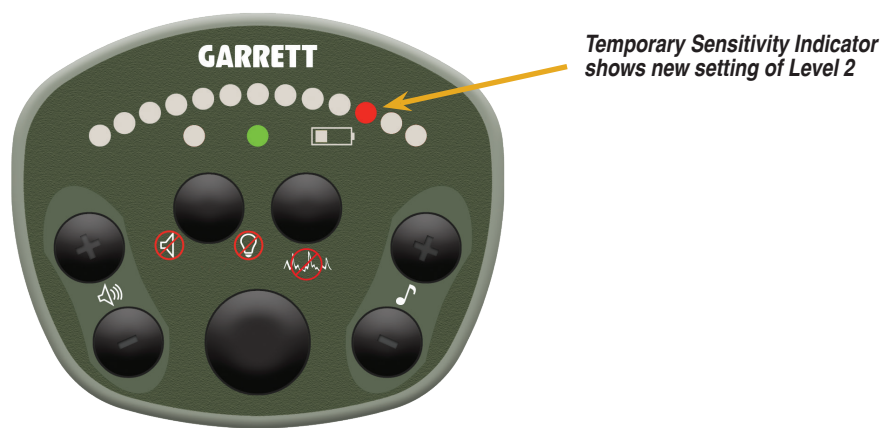
The Green Power On LED indicator will blink to indicate the detection sensitivity has been reduced.

### Sensitivity Adjustment With 20cm Search Head

The reduction in detection depth will vary with the size of target. Typical reductions for medium sized targets are:

Level 1 (LED # 13 indicated)	= 100% detection depth	<b>Default Setting</b>
Level 2 (LED #11 indicated)	= 92% detection depth	
Level 3 (LED # 9 indicated)	= 84% detection depth	
Level 4 (LED # 7 indicated)	= 76% detection depth	
Level 5 (LED # 5 indicated)	= 68% detection depth	
Level 6 (LED # 3 indicated)	= 59% detection depth	
Level 7 (LED # 1 indicated)	= 50% detection depth	

Figure 4-D



### SENSITIVITY ADJUSTMENT WITH THE 38x50 Cm UXO SEARCH HEAD

- Level 1 – Maximum sensitivity to all objects including thin metals and foil.
- Level 2 – High sensitivity with reduced response to thin metals and foil.
- Level 3 – Moderate sensitivity with reduced response to thin metals and foil.
- Level 4 – Medium sensitivity – **Default setting** for large and medium size objects with reduced response to thin metal, foil and surface clutter.
- Level 5 – Decreased sensitivity.
- Level 6 – Decreased sensitivity.
- Level 7 – Minimum sensitivity - Use for large objects near the surface with minimum detection of surface clutter.

Note: The Green Power On LED will blink to indicate the sensitivity has been reduced below the default setting.

Note: The Sensitivity Control Function will not affect the AudioThreshold function.

Note: The detector returns to the default setting sensitivity when the power is switched off and back on.

- **Salt Elimination Mode: A + F(-) buttons**  
 This function is provided to reduce the response produced by saltwater. To activate, press and hold Audio Threshold (-) button while switching power on.  
 Note: This function will decrease ability to detect small and lower conductivity metals.  
 Note: The detector returns to the default mode when the power is switched off and back on.

## 5.0 OPERATIONAL PROCEDURES

Garrett recommends using the following operational procedure each time the *RECON-PRO* is deployed for search operations. In addition to these instructions, the Standard Operating Procedures (SOPs) provided by the local authority may take priority. In cases where the operator has donned heavy protective clothing, the headset should always be used.

### 5.1 Setup and System Check for Operation

#### 5.1.1 Unpack the unit.

Remove the *RECON-PRO* from the transportation case (see *Figure 5-A*) and inspect for any physical damages. See Section 3.0 to make certain all parts in the kit are included.

Figure 5-A



#### 5.1.2 Install batteries.

Insert a set of batteries; Garrett recommends fully charged batteries at the start of each day's work. The *RECON-PRO* uses eight AA batteries and is delivered with TWO sets of rechargeable batteries and a battery charger. One set of batteries can be recharged while the other set is in use. The *RECON-PRO* also accepts alkaline or lithium AA batteries if a charging source is not available. (See Section 7.2 for complete details on battery replacement and battery charging.)

#### 5.1.3 Adjust the search head and shaft.

Fold open the search head. Disengage the armrest and the shaft rotation locks. Rotate the shaft assembly to level and release the spring-loaded rotation lock to allow it to automatically reengage. Next, loosen the shaft nuts, extend the telescopic shaft to the desired operating length and tighten the shaft nuts (see *Figure 5-B*). Tilt the search head so that it is parallel to the ground surface.

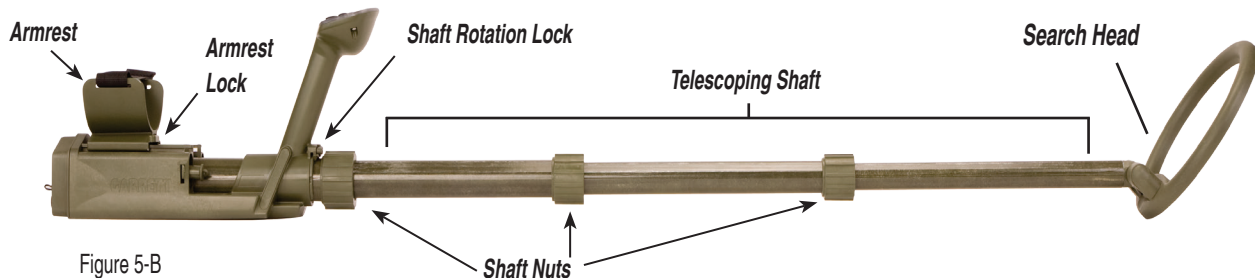


Figure 5-B

5.1.4 **Adjust the armrest.**

Adjust the armrest to a comfortable position and use the armstrap if desired. To move the armrest forward or backward, open the armrest locking lever by aligning it parallel to the detector shaft. Slide the armrest to the desired position and lock the lever by swinging it perpendicular to the detector shaft (see Figure 5-C).

Figure 5-C  
(series)



Open armrest locking lever and slide armrest.



Lock armrest locking lever perpendicular to shaft.

5.1.5 **Attach the headset (if used).**

Remove the dust cap from the headset connector on the back panel (see Figure 5-D). Insure the headset connector is clean. Align the headset plug with the connector pins in the proper orientation. If the detector will be submerged, be sure to lubricate the O-ring on the headset connector with silicone grease.

Fully insert the connector until it snaps snugly into place. Slide the metal locking collar onto the threads and tighten by hand (see Figure 5-E). DO NOT over tighten.

Figure 5-D  
(series)

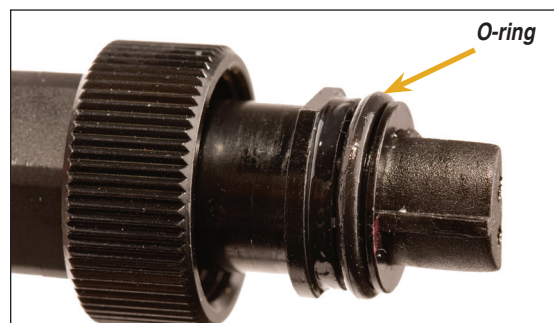


Remove dust cap on back panel.



Align and fully insert connector.

Figure 5-E  
(series)



Lubricate O-ring for underwater operation.



Hand-tighten connector collar.

5.1.6 Switch on the detector.

Take the *RECON-PRO* to an area clear of electrical interference and metallic objects. Raise the search head approximately one meter above the ground, away from metal objects. The On/Off switch is located on the back of the electronics housing (see *Figure 5-F*).

Figure 5-F  
Detector shown  
in power On  
position.



5.1.7 Verify battery level.

Immediately after switching on the detector, listen for one to four audio beeps indicating the charge level of the batteries. Four (4) beeps indicates fully charged. Three (3) beeps indicates approximately 75% battery charge. Two (2) beeps indicates approximately 50% battery charge. One (1) beep and a flashing low battery warning light indicates low charge and the batteries must be replaced before commencing search operations. If no beep is heard after switching the detector on, verify the batteries have been properly installed.

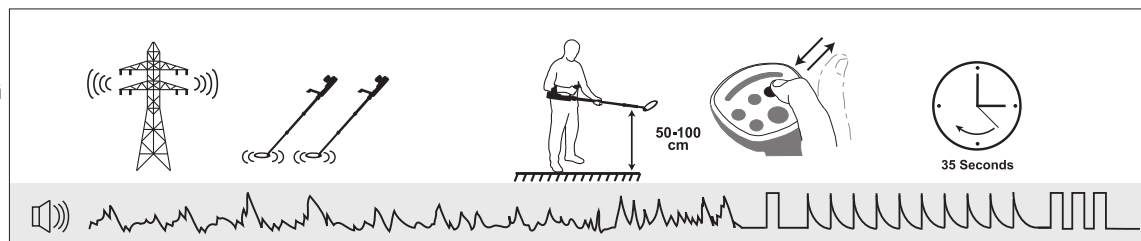
5.1.8 Perform RFI cancellation (if needed).

Operating near power lines, other detectors, etc. may cause interference. To check for interference, hold the search head stationary approximately one meter above the ground and listen for variations in signal response. If there are fluctuations in the response (i.e. noise), press and release the RFI button to activate the RFI noise cancellation function (see *Figure 5-G*).

The noise cancellation function lasts for 35 seconds and is indicated by the scanning LED display and audio pings. The search head must remain stationary during the entire noise cancellation function. The scanning LED display will cease and the detector will produce a triple-beep indicating the noise cancellation function is complete. The RFI setting remains in the detector’s memory until the next time this function is performed, even after power is switched off and the batteries are removed. This same RFI procedure can be used to allow multiple detectors to work in close proximity—as close as four meters. Refer to Section 5.4.2 for detailed instructions.

Note: If you have accidentally activated the RFI cancellation function and wish to abort, press the RFI button again to stop the function. The RFI setting will return to its previous value.

Figure 5-G

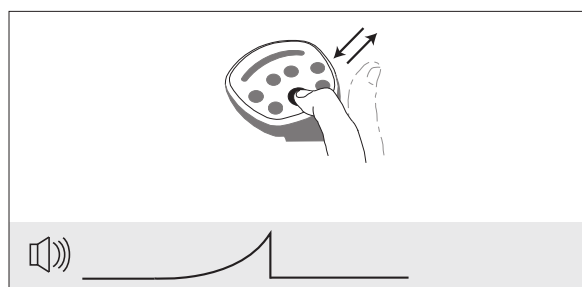


**5.1.9 Verify audio reset function.**

Press and release the center Audio Reset button (see Figure 5-H) to instantly reset the audio/LED response to zero. Use this function to quickly cancel out unwanted ambient signals such as when the detector's audio/LED response has drifted to an elevated level. For optimum detection, the ambient audio response should be silent with no LED lights showing before initiating a search procedure.

This function can also be used to cancel out the ambient response produced by large metallic objects (e.g. metal fencing, rail lines), allowing the operator to search for smaller objects in the vicinity. This is a learned skill and the operator must be trained to become proficient in this technique. Refer to Section 5.4.3 for detailed instructions.

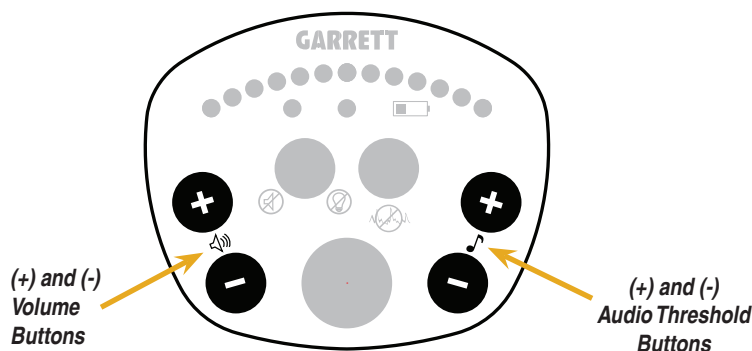
Figure 5-H



**5.1.10 Adjust Audio Volume.**

Adjust audio volume to your preferred level using the volume (+) and (-) buttons (see Figure 5-I). Note that the Volume adjustment only controls the maximum audio level produced by a large target and does not affect the audio level or sensitivity of a faint signal. Use the Secondary Function button in conjunction with the Volume (+) and (-) buttons to switch the speaker on or off. (See Section 4.2.9 for details.)

Figure 5-I



**5.1.11 Adjust Audio Threshold.**

Adjust the audio threshold to your preferred level using the Threshold (+) and (-) buttons (see Figure 5-I). The default threshold setting is zero. It is recommended the threshold be set to a barely audible level, or just below, based on hearing ability and surrounding audio conditions. This will provide optimum perception of target response.

When a weak signal response is indicated from a low metal content target or deeper buried target, the operator can increase the background Audio Threshold by pressing the (+) threshold button. This will increase the audible response from the target for a better detection result. The operator can adjust the Audio Threshold to the most desired working setting (this setting adjustment is beneficial in mitigating background sounds).

The audio threshold will return to the default setting once the detector is switched off/on.

5.1.12 Check ground response and perform ground cancellation (if needed).

The RECON-PRO's highly advanced Pulse Induction technology enables this unit to ignore mineralization such as magnetite and laterite soils. In more difficult soils, magnetic or conductive stones may be encountered. A magnetic or conductive stone ("hot rock") can be described as a concentration of iron mineral that causes a detector to recognize it as metal. The advanced technology of the RECON-PRO allows it to ignore nearly all hot rocks; only the most extreme hot rocks will produce a response.

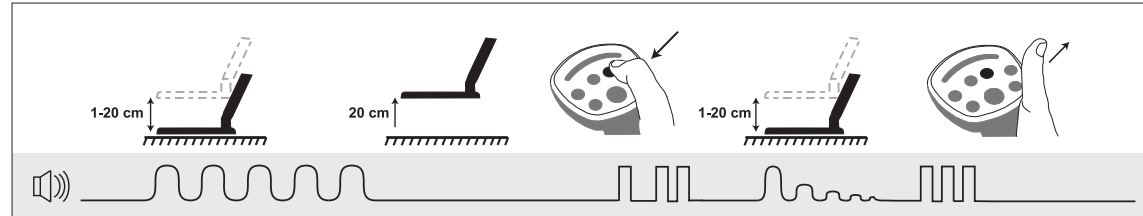
To determine if extreme ground conditions exist, locate an area free of metal objects by sweeping the search head back and forth several times at 1-2 cm above the ground. Now check the ground response by slowly (one second in each direction) raising and lowering the search head to the ground several times from approximately 1 cm to 20 cm. If the signal response is steady or unchanged, the preset ground balance is correct and the RECON-PRO is ready for search operations.

If there is a repeatable sound variation during the ground check procedure, initiate the ground cancellation as follows (see Figure 5-J).

Raise the search head approximately 20 cm above the ground and press and hold the RFI/Ground Cancellation button. After one second, a double beep will occur indicating the ground cancellation mode. While continuing to hold the button, slowly lower and raise the search head to the ground from approximately 1 cm to 20 cm, repeatedly. Continue to lower and raise the search head repeatedly as the ground response decreases until the ground cancellation function is completed as indicated by triple-beeps. Release the RFI/Ground Cancellation button.

The ground balance returns to a preset level once the detector has been switched off and back on.

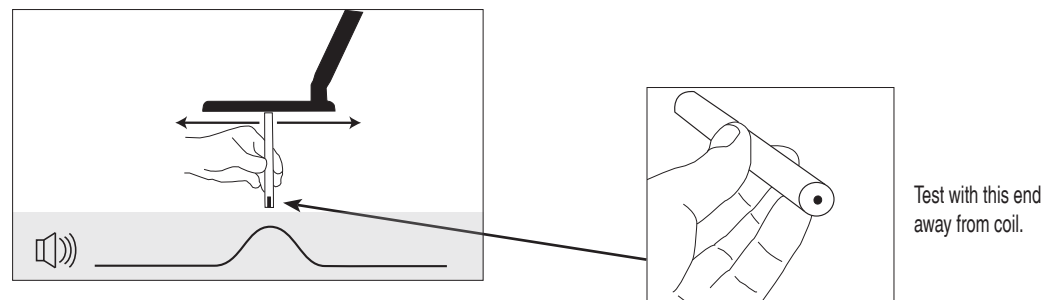
Figure 5-J



5.1.13 Perform detector sensitivity check.

Verify proper detection using the test piece provided in the detector kit. Pass the test piece across the center of the search head—with the unmarked end of the test piece even with the bottom of the search head—and verify an audible response is heard and indicated on the LED bar graph (see Figure 5-K). If needed, adjust the Audio Threshold to where the response is clearly audible. If there is NO SIGNAL response from this test target, DO NOT place the detector into operation. *Have it checked for service or repair!*

Figure 5-K



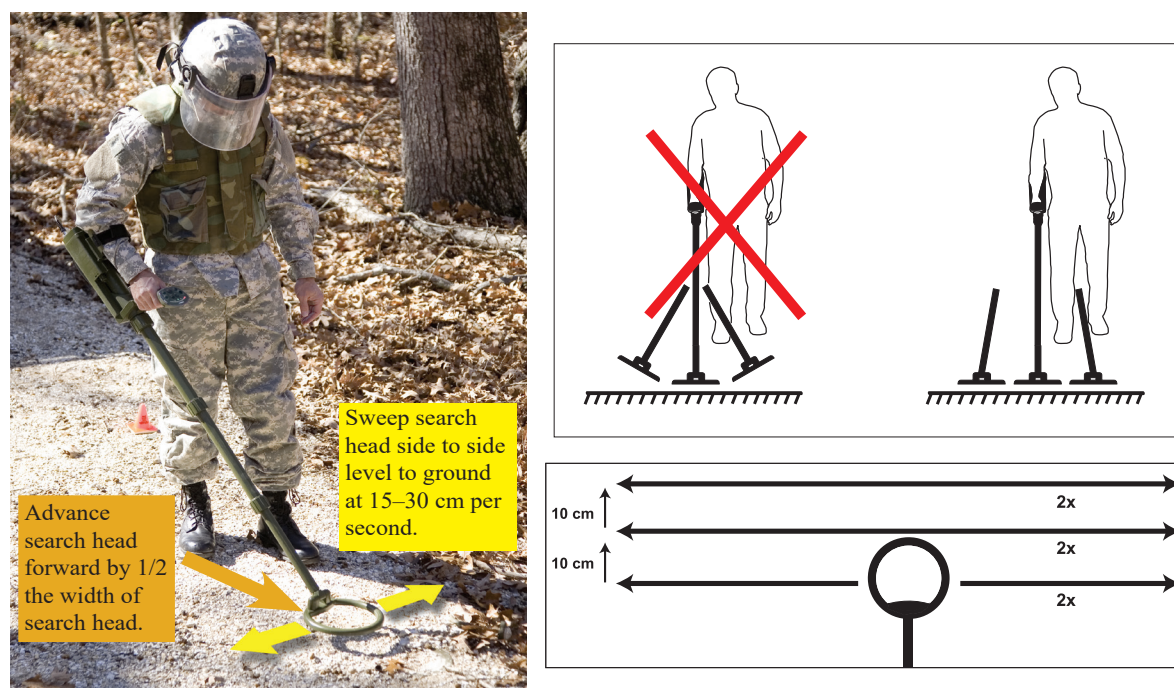
## 5.2 Target Search Procedures

### 5.2.1 Use proper sweep of search head.

For optimum detection depth, the search head should be swept as close to the ground surface as possible (approximately 1-2 cm) without making continuous contact with the ground. Sweep your search head in a straight line from side to side at a speed of about 15 to 30 cm per second (see Figure 5-L).

Always keep the search head parallel to the ground surface along the entire sweep pattern, being careful not to raise or tilt the search head, especially at the ends of the swing. Raising or tilting the search head may result in reduced detection of buried targets.

Figure 5-L



### 5.2.2 Overlap sweeps.

Each sweep should be repeated several times in the same location (see Figure 5-L). If no target is detected, advance the search head forward by half the width of the search head and repeat the sweep pattern. This is a progressive search technique to assure full search coverage in patterned areas of operation.

### 5.2.3 Do not contact targets.

In conditions where targets may protrude above the surface, first perform the sweep pattern with the search head higher above the ground surface (approximately 5–10 cm) or where the operator can visually assure there is no contact between the search head and foreign objects. If no target is detected, then repeat the sweep in the same location with the search head closer to the ground surface (approximately 1-2 cm if possible). Proceed forward using this “higher” then “lower” search technique progressively. **AT NO TIME should the Detector or Search Head come in contact with any hazardous objects!**

5.2.4 Watch for hazards.

Operators are also advised to use visual observation while conducting the detector sweep procedures. Some hazards (e.g. trip wires) can be identified visually in advance of the search head sweeping procedure.

5.2.5 Observe warning alarms.

During operation, the yellow low-battery warning light will begin flashing when there is approximately thirty (30) minutes of battery life remaining (see Figure 5-M). In addition to the flashing LED, a brief audio alarm will sound every 60 seconds. The purpose of this early-warning feature is to provide sufficient time to exit the search area to a safety zone, while maintaining full detector operation. (See Section 7.2 for information on battery management options.)

Any other warning alarm indicates a possible failure with the detector. This alarm is indicated by a unique and continuous pulsating audio and flashing LED display. With such an alarm, the detector must not be used until the error is corrected.

Figure 5-M



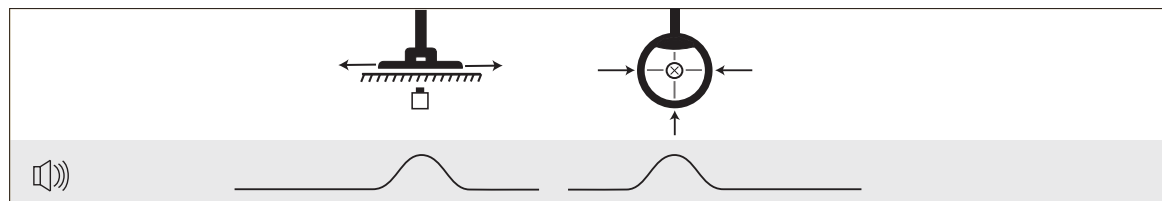
5.3 Determine Target Location and Metal Type

Once a target is detected by the RECON-PRO, the operator is alerted by both audio and visual signals. The operator should then determine the precise location and approximate size and depth of the object. In addition, the tone of the audio signal provides an indication of possible metal type.

5.3.1 Locate normal-sized target.

For most targets, the peak response will occur at the center of the search head. By performing a slow sweeping motion over the target, the operator will be able to precisely locate the target by the peak response at the center of the search head (see Figure 5-N). Side-to-side and front-to-back sweeps over the target will facilitate a crosshair indication of the target location. For example, first scan side-to-side over the target and note the location of the peak response. Then scan front-to-back over this peak response to locate the overall maximum response (i.e. form a crosshair).

Figure 5-N

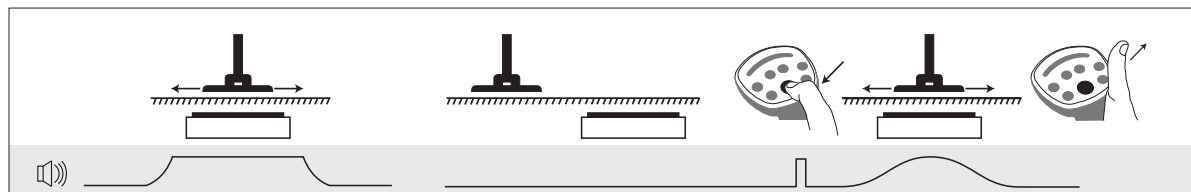


5.3.2 Locate large target.

Large targets often produce a flat, wide response, making it difficult to precisely locate its position using the method described above. To precisely locate large targets, use either of the following alternative methods. These methods are for large targets only.

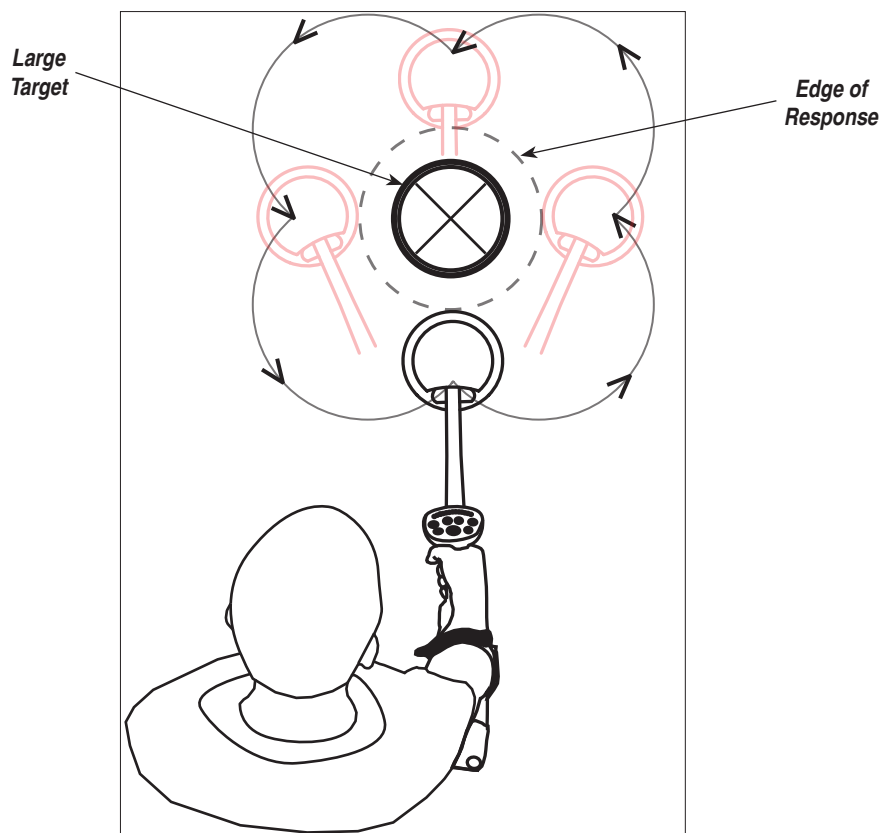
1. Position the search head to the side of the target's suspected location. Press and hold the center button to activate the Pinpoint function (see Figure 5-O). While continuing to hold the Pinpoint button, sweep the search head over the entire target in side-to-side and front-to-back motions. The detector will automatically adjust the response so that a noticeable peak occurs over the center of the large target. Once the target is located, release the Pinpoint button to return to normal operation.

Figure 5-O



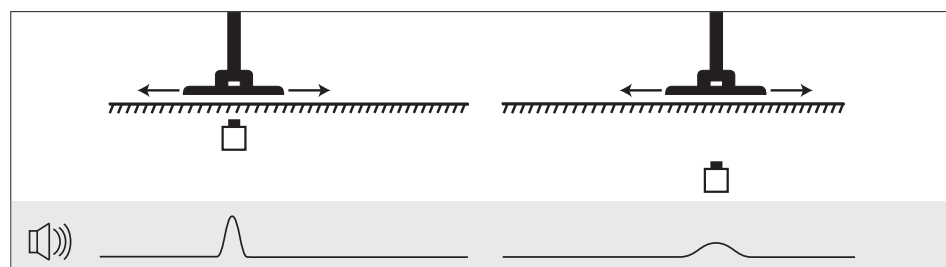
2. Without pressing the Pinpoint button, approach the target with the search head and note the location where the audio/LED response just reaches full-scale. Repeat this approach from all sides of the target to determine the edges of the target's response (see Figure 5-P). At the center of this outlined pattern will be the target's central mass.

Figure 5-P



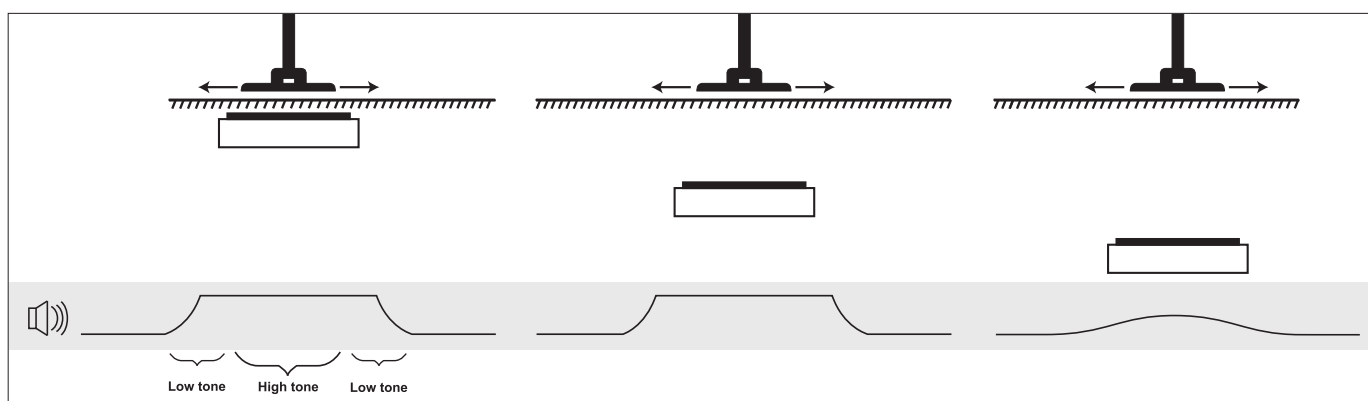
**5.3.3 Determine size and depth.**

The target's approximate size and depth can be estimated based on the magnitude and width of its response (see Figure 5-Q for illustrations). This is a learned skill with the following general guidelines:



- A. Small target near the surface will produce an abrupt, narrow response with a magnitude up to full-scale.
- B. Small target at medium depth will produce a smooth response and faint magnitude.

Figure 5-Q



- C. Large target near the surface will produce a wide, full-scale response, often switching tone polarity as the search head passes over the target.
- D. Large target at medium depth will produce a wide, full-scale response.
- E. Large target deeply buried will produce a wide, smooth response with magnitude up to full-scale.

**5.3.4 Determine metal type.**

The tone (i.e. pitch) of the audio response indicates the target's possible metal type. Most, but not all ferrous targets produce a LOW tone and most, but not all non-ferrous targets produce a HIGH tone.

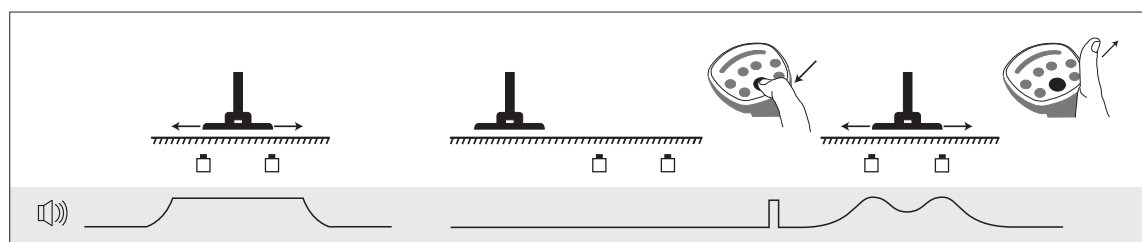
## 5.4 Advanced Search Procedures

### 5.4.1 Separating Adjacent Targets

Multiple targets in close proximity will often respond as one large target (see Figure 5-R). Perform the following procedure to determine if two targets exist and to separate the two targets:

1. Position the search head to the side of the target's location.
2. Activate the Pinpoint function and slowly sweep back and forth over the target's entire location, keeping the Pinpoint button pressed.
3. Multiple targets will produce separate peak responses.
4. Targets as close as 20cm can be separated, depending on the size of the targets.
5. Note that a thin, flat non-ferrous object (e.g. coin) on edge or a narrow, elongated ferrous object (e.g. bolt) laying flat may also produce two separate peak responses.

Figure 5-R

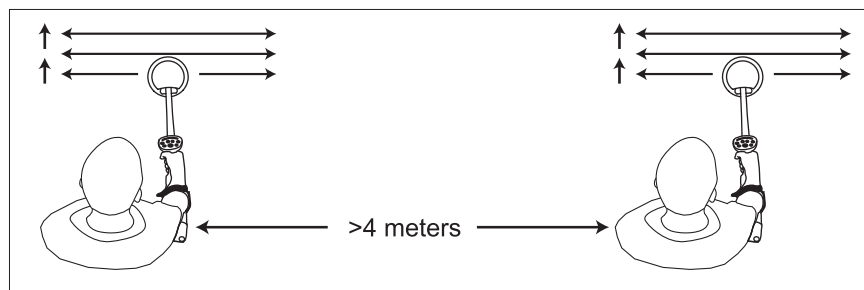


### 5.4.2 Operating Multiple Units

Multiple detectors are capable of operating simultaneously to within four meters of each other (see Figure 5-S). Perform the following procedure to achieve compatible operation of two or more detectors:

1. Switch on the first detector only, perform the RFI Cancellation process and leave the detector switched on and stationary.
2. Position the second detector 2 to 3 meters away from the first detector.
3. Switch on the second detector and perform the RFI Cancellation process while maintaining the 2 to 3 meter separation.
4. The detectors will now operate to within 4 meters of each other without significant crosstalk interference. If crosstalk interference remains significant then either repeat steps 1 to 3 or increase the separation between detectors during operation.
5. Repeat steps 2 to 4 for additional detectors.

Figure 5-S

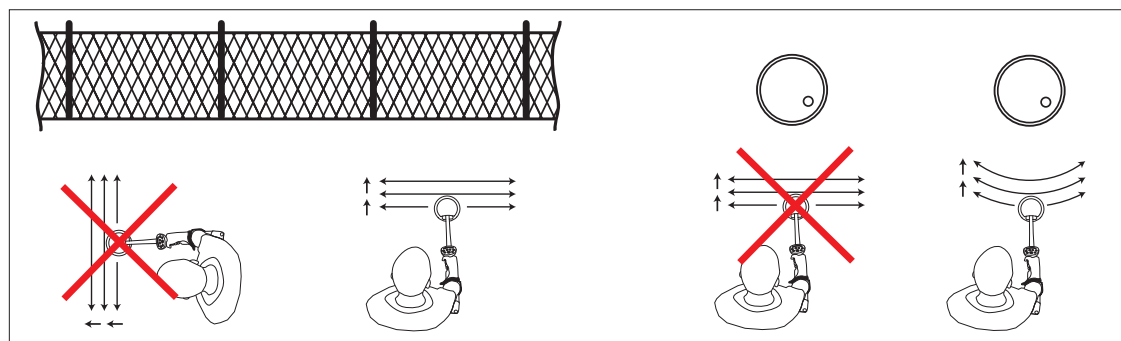


### 5.4.3 Operating Near Large Metal Structures

Large metal structures such as metal fencing, rail lines, etc. produce very large detection signals, making it difficult to operate in the vicinity. However, with rigorous training and precise technique the operator can become proficient at operating the detector in these conditions. Observe the following procedure and guidelines when operating near a Large Metal Structure (LMS):

1. Begin the scanning process at a distance sufficient to not detect the LMS.
2. Precisely sweep the search head such that it maintains a constant distance from the LMS. As examples, for a straight elongated object such as a fence, sweep in straight line parallel to the fence; for a circular object such as barrel, sweep in circular arc around the barrel (see *Figure 5-S*).
3. After completing the sweep at that position, advance the search head forward by half its width and press the Reset button to cancel the response produced by the LMS.
4. Repeat steps 2 and 3 in order to advance the search head towards the LMS.
5. Note, as the search head advances closer to the LMS it becomes more important to precisely maintain a constant distance from the LMS during each sweep. In addition, it may be necessary to advance the search head in increments smaller than half its width.

Figure 5-S



### 5.5 Operational Error Avoidance

The *RECON-PRO* is designed to eliminate operator errors.

- By placing the On/Off switch on the main electronic unit, it cannot accidentally be switched off by control panel functions.
- Detection sensitivity is fixed and cannot be decreased. Adjusting volume and threshold do not affect sensitivity.
- The ground cancellation feature of the *RECON-PRO* will not void any metallic targets.
- Low battery alert provides approximately 30 minutes of full operation to return to a safety zone.

## 6.0 OPERATOR WORKING POSITIONS

### 6.1 Standing Position

In the normal standing position, the operator should extend the telescoping shaft to a comfortable distance (see *Figure 6-A*).

### 6.2 Kneeling Position

For precision scanning of a tight search area, it is often preferable for the operator to sweep the ground while in a kneeling position. Collapse the length of the telescoping shaft so that the search head can be comfortably swept at a 1-2 cm height above the ground while kneeling (see *Figure 6-B*).



Figure 6-A



Figure 6-B

### 6.3 Prone Position

When pinpointing a metallic target, it is often preferable for the operator to assume a prone position on the ground. Collapse the length of the telescoping shaft so that the search head can be comfortably swept at a 1-2 cm height above the ground while the operator is in a prone position (see *Figure 6-C*). Note that the *RECON-PRO* can be operated with the telescopic shaft fully collapsed.



Figure 6-C

## 7.0 CARE AND MAINTENANCE

### 7.1 Cleaning and Storage

7.1.1 Once the operational mission is completed, the exterior of the detector should be cleaned of mud, saltwater and other debris. Clean the search head, telescopic shaft (fully extended), and the electronics housing, using clean water and soap if needed. Do not apply any chemicals or oils to the detector.

In some cases it may be necessary to remove the entire shaft assembly from the electronics housing for additional cleaning. See section 7.3 for instructions to remove and reinstall telescopic shaft. Once removed, fully extend the telescopic shaft and flush the inside of the shaft using clean water and a spray nozzle if needed. Clean the areas of the electronics housing that hold the shaft. Clean the search head connectors if needed. Once the electronics housing and shaft have dried (inside and out), reinstall the search head/shaft assembly.

7.1.2 Dry the detector completely before collapsing the extension shaft. Protect your detector from dust and sand as much as possible. Do not store it in a vehicle trunk or any outdoor storage device during hot summer months or outdoors in sub-freezing weather.

7.1.3 For long term storage, remove batteries and close battery covers.

7.1.4 Using the Field Guide, take an account that all parts are present for storage. The key to prolonging the life of the *RECON-PRO* is the correct stowage of the detector into its hard transportation case whenever the detector is not in use.

### 7.2 Battery Management Options

#### 7.2.1 Battery Replacement

The *RECON-PRO* uses eight AA batteries and is delivered with TWO sets of rechargeable batteries and a battery charger. One set of batteries can be recharged from AC power or a 12-Volt DC power source while the other set is in use. The *RECON-PRO* also accepts alkaline or lithium AA batteries if a charging source is not available.

The *RECON-PRO*'s battery compartments are located on either side of the detector's arm-rest (see *Figure 7-A*). Press in the battery cover and give it a quarter turn counter-clockwise

Figure 7-A



Figure 7-B



to release the lock and pull to remove (see Figure 7-B). Tip the detector forward to allow the battery pack to slide out (see Figure 7-C).

When installing the individual batteries into the battery pack, ensure they are aligned with the correct polarity, as indicated by the plus and minus markings on the inside of the battery pack. Reinstall the battery pack with the correct polarity as indicated by the plus and minus markings on the side of the detector (see Figure 7-D); then slide it in. Replace the battery cover and give it a quarter-turn clockwise to lock into place. Repeat this process for the batteries on the opposite side of the detector. If the detector will be submerged, be sure to lubricate the O-rings on each battery cover (see Figure 7-E).



Figure 7-C

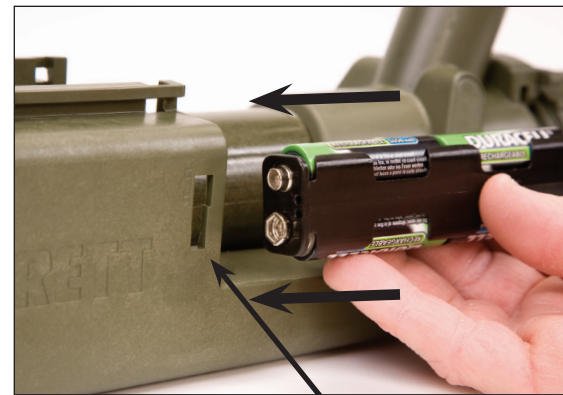


Figure 7-D (see inset below)

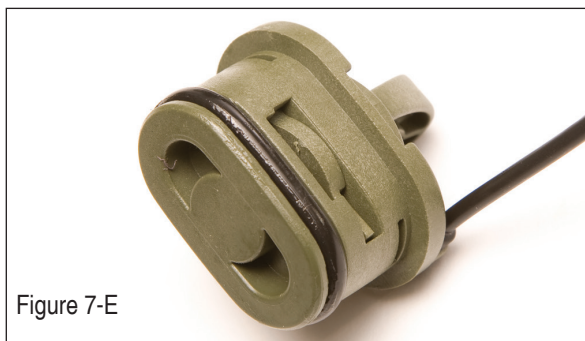
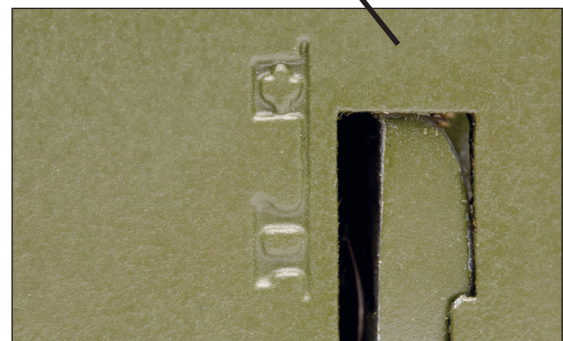


Figure 7-E



### 7.2.2 Battery Charging

Two sets of rechargeable batteries are included with the *RECON-PRO* to allow one set to be charged while the other set is in use. Use the charger included in the detector's Transportation Case to recharge batteries. The charger accepts from one to eight AA batteries at a time for charging (see *Figure 7-F*).

Figure 7-F



- Note: Use only Ni-MH type batteries on this charger.  
 Caution: Do not attempt to recharge lithium, alkaline or carbon batteries.

Eight independent channels with individual LEDs indicate charging status for each battery. Red LED indicates rapid charging in progress. Green LED indicates the battery is fully charged. Flashing Red LED indicates the battery is faulty or not suitable for charging. A flashing Green LED indicates the battery is undergoing a discharge cycle.

A special solar charging kit is also available as an option. See Section 9 for information.

### 7.3 Search Head/Shaft Assembly Removal and Installation

- 7.3.1 Perform the following procedure to remove the search head/shaft assembly.
1. Fully collapse the telescopic shaft and tighten the shaft nuts (see *Figure 7-G*).
  2. Remove the armrest by disengaging the armrest lock and sliding the armrest forward and off (see *Figure 7-H*). It will be necessary to remove one battery cover to allow the cuff to fully slide forward.



Figure 7-G



Figure 7-H



3. Disengage the shaft rotation lock (see Figure 7-I) and, while continuing to hold the lock open, rotate the shaft 180° such that the coil is upside down (see Figure 7-J).

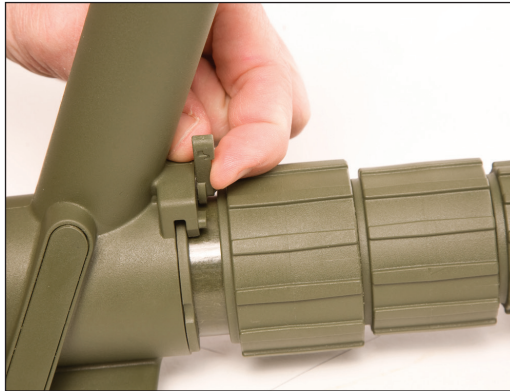


Figure 7-I



Figure 7-J

4. Partially slide the shaft assembly out to access the search head connector.
5. Slide the connector cover down the cable to expose the connector. Loosen and disconnect from the electronics housing by hand (see Figures 7-K).



Figure 7-K

6. Remove the search head/shaft assembly from the electronics housing (see Figures 7-L).



Figure 7-L

7.3.2 Perform the following procedure to install the search head/shaft assembly.

1. Fully collapse the telescopic shaft and tighten the shaft nuts.
2. Partially slide the shaft into the electronics housing.
3. Reattach the search head connector by properly aligning the pins (see *Figure 7-M*), fully inserting the connector and tightening the collar by hand.

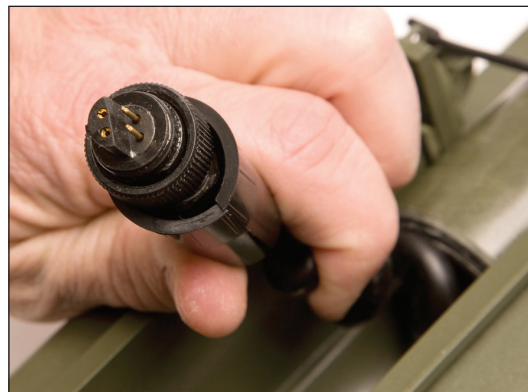


Figure 7-M

4. Note that it may be necessary to rewind the coiled cable so that it will properly fit inside the shaft assembly. To do so, spin the shaft assembly counterclockwise (when viewing from the search head looking toward the detector) a few revolutions such that the shaft assembly easily slides over the coiled cable; two to four revolutions is usually sufficient.
5. Rotate the shaft assembly to the 180° position (i.e. coil upside down) and fully insert into the electronics housing.
6. Disengage the shaft rotation lock, rotate the shaft to the desired position and release the spring-loaded rotation lock to automatically reengage.

#### 7.4 Search Head Tension Adjustment

The operator can adjust the search head to desired tension using a coin or a flat-head screwdriver. Turn the screw clockwise to increase tension (see *Figure 7-N*). When properly tightened, the search head should maintain its position while still allowing tilting during operation. **Do not overtighten.**

Figure 7-N



## 8.0 PARTS LIST—RECON-PRO AML-1000

<b>Standard Parts</b>	<b>Part Number</b>	<b>Quantity</b>
Detector Assembly (without search head/shaft)	2233901	1
Cuff Assembly	2266500	1
Battery Cover Assembly	2266600	1
Search Head/Shaft Assembly, 20 cm.	2234000	1
Headset, Tactical	1624500	1
Transportation Case (holds 1 detector)	1624000	1
Backpack, Green	1624100	1
Test Piece	1624600	1
Charger Kit (includes charger pack, 110/240 VAC and 12 VDC adaptors)	1624300	1
Battery NiMH "AA"	9434200	16
Battery Holder, 4 "AA"	9434100	4
User Manual	153270x	1
Field Guide	1532800	1
<b>Optional Parts</b>	<b>Part Number</b>	<b>Quantity</b>
Search Head/Shaft Assembly, 38x50 cm. UXO	2234100	Optional item
Headphone, Acoustic Underwater	2202101	Optional item
Backpack, Desert Tan	1624101	Optional item
Transportation Case (holds 3 detectors)	1625000	Optional item
Solar Charger	1624700	Optional item
<b>Service Items</b>	<b>Part Number</b>	<b>Quantity</b>
Tool Kit	1625100	Service item
Shaft Nut Spanner Wrench	1625200	Service item
Star Pin Driver	1625700	Service item
Shaft Assembly	2346200	Service item
Search Head, 20 cm	2345600	Service item
Search Head, 38x50 cm	2346000	Service item
Shaft Lock Replacement Kit	2266900	Service item
Rotation Lock Replacement Kit	2267000	Service item
Power Knob with Wrench	2266700	Service item
Speaker, 45mm	9432000	Service item
Screw Assortment	2267100	Service item
O-Ring Kit	2267200	Service item
Cuff Strap	9851300	Service item

## 9.0 OPTIONAL ITEMS

### Solar Charger, "AA" Part No. 1624700

This innovative charger allows the operator to charge the *RECON-PRO*'s extra set of eight AA batteries while in the field. Note: Charging with the solar charger will require 10 to 12 hours in bright sunlight conditions. Additional time will be required when the sky is overcast. Indoor charging of batteries with the solar charger is not effective.



### Tool Kit Part No. 1625100

This field repair kit includes the tools required to service the *RECON-PRO*. Includes tamper proof screw driver, spanner wrench for stem maintenance and silicon grease for o-ring seals.



### Underwater Headset Part No. 2202101

Heavy duty submersible headphones. Large ear cushions provide comfort while blocking environmental sounds.



### UXO Search Head/Shaft Assembly Part No. 2234100

The 38x50 cm UXO search head is ideal for the detection of sub-munitions, UXO and deeply-buried caches. This search head provides a larger search pattern and ignores unwanted metallic surface debris, helping to reduce the mission search time. Fits in standard field backpack and transportation case.



## 10.0 SPECIFICATIONS

<b>Detector Weight:</b> (Operational with batteries)	6.25 Lbs (2.83 Kg)
<b>Detector Weight:</b> (with backpack, extra batteries, charger, headset, test piece, manual)	12 Lbs (5.44 Kg)
<b>Detector Weight:</b> (with backpack, headset, test piece, manual)	10.56 Lbs (4.79 Kg)
<b>Detector Weight:</b> (complete with transportation case)	24.15 Lbs (10.95 Kg)
<b>Detector Length:</b> (folded for storage)	19.8 in (504 mm)
<b>Detector Length:</b> (fully retracted-in operation)	24.5 in (620mm)
<b>Detector Length:</b> (fully extended-in operation)	63 in (1600 mm)
<b>Operating Temperature:</b>	-10 F to 149 F (-23 C to 65 C) ; Alkaline, NiMH batteries -40 F to 149 F (-40 C to 65 C) ; Lithium batteries -72 F to 158 F (-58 C to 70 C) ; Storage temperature (without batteries)
<b>Power Source:</b>	2 sets of eight NiMH "AA" batteries supplied; (Alkaline or Lithium acceptable)
<b>Warranty:</b>	24 Month, limited parts and labor

## 11.0 CONTACT INFORMATION:

### Garrett Countermine/ERW Division

**Phone:** 1-972-494-6151  
**Email:** [cm-erw@garrett.com](mailto:cm-erw@garrett.com)  
**Web:** [www.garrett.com](http://www.garrett.com)

## 12.0 WARRANTY INFORMATION:

Garrett Electronics, Inc. (“Garrett”) warrants that each piece of equipment manufactured by Garrett is protected by the following limited parts and labor warranty for a period of 24 (twenty-four) months (the “Warranty”). During this 24-month period Garrett will inspect and evaluate all equipment returned to its authorized repair station or factory to determine if the equipment meets Garrett’s performance specifications. Garrett will repair or replace at no charge to the owner all parts determined faulty. This Warranty does not cover batteries nor any and all failures caused by abuse, tampering, theft, battery acid or other contaminants and equipment repairs made by an unauthorized party.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE BUYER ACKNOWLEDGES THAT ANY ORAL STATEMENTS ABOUT THE MERCHANDISE DESCRIBED IN THIS CONTRACT MADE BY SELLERS’ REPRESENTATIVES, IF ANY SUCH STATEMENTS WERE MADE, DO NOT CONSTITUTE WARRANTIES, SHALL NOT BE RELIED UPON BY THE BUYER, AND ARE NOT A PART OF THIS CONTRACT FOR SALE. THE ENTIRE CONTRACT IS EMBODIED IN THIS WRITING. THIS WRITING CONSTITUTES THE FINAL EXPRESSION OF THE PARTIES’ AGREEMENT AND IS A COMPLETE AND EXCLUSIVE STATEMENT OF THE TERMS OF THIS AGREEMENT.

The parties agree that the Buyers’ sole and exclusive remedy against Seller shall be for the repair and replacement of defective parts. The Buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost sales, lost profits, injury to person or property) shall be available to him.

**Special Notice to Foreign Customers:** Terms of this Warranty may vary depending on the country in which this equipment was purchased and delivered. Any claims based on this Warranty must be made to Garrett’s local representative or agent. Do not attempt to return any Garrett equipment to the factory in the United States without written authorization from Garrett’s local agent or representative.



**RECON-PRO AML-1000 OPERATIONS MANUAL**

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## ***RECON-PRO AML-1000 OPERATIONS MANUAL***

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# **GARRETT<sup>®</sup>**

## **METAL DETECTORS**



Made in the USA