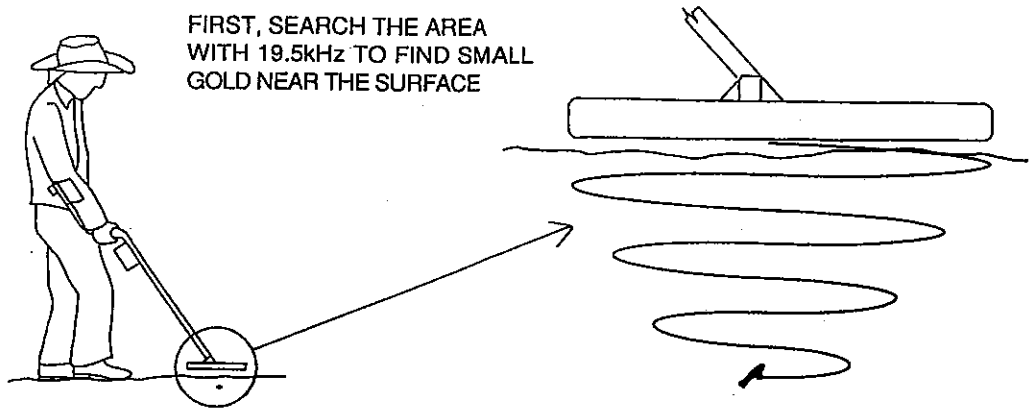
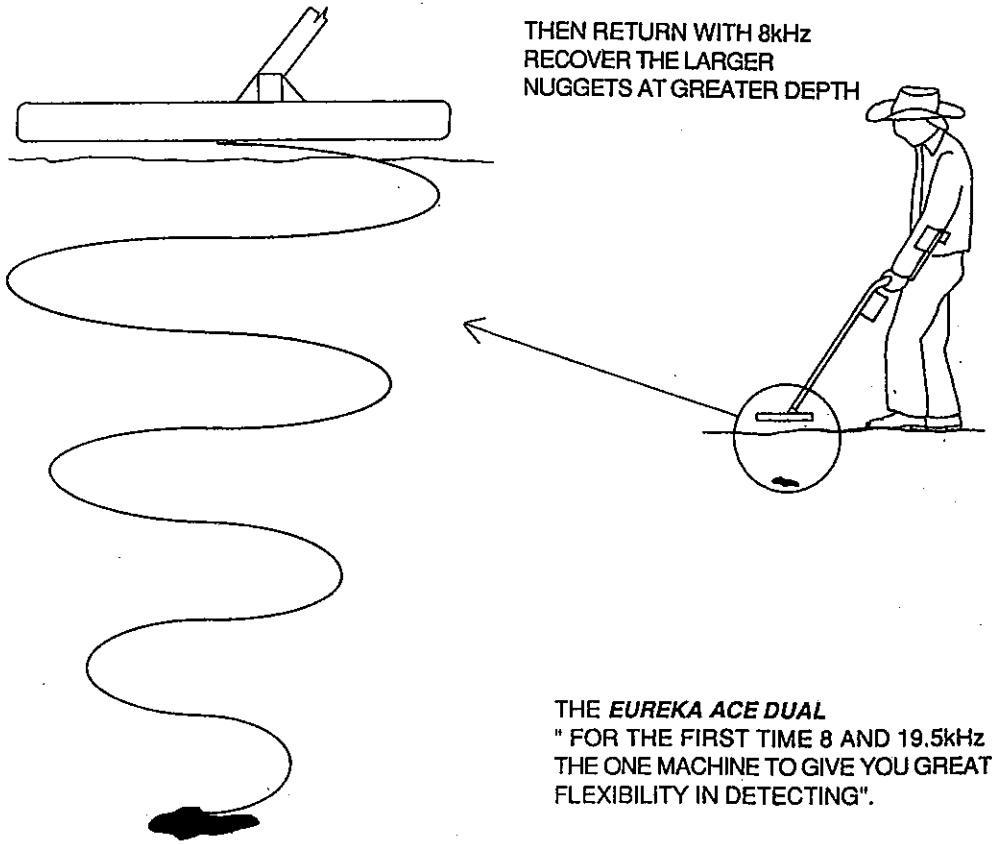
EUREKA ACE DUAL FREQUENCY

FIRST, SEARCH THE AREA
WITH 19.5kHz TO FIND SMALL
GOLD NEAR THE SURFACE



THEN RETURN WITH 8kHz
RECOVER THE LARGER
NUGGETS AT GREATER DEPTH



THE ***EUREKA ACE DUAL***
" FOR THE FIRST TIME 8 AND 19.5kHz IN
THE ONE MACHINE TO GIVE YOU GREATER
FLEXIBILITY IN DETECTING".

TABLE OF CONTENTS

EUREKA ACE Instruction Manual:
Version 1.0 November, 1989.

1. GENERAL DESCRIPTION

1.1 The Eureka Ace represents another innovation from Minelab Electronics Pty Limited. It is the only currently available metal detector that offers two operating frequencies in the one machine. This gives you the choice of 19.5 kHz which is optomised for the detection of smaller objects near the surface and 8 kHz for the deep detection of larger objects at the flick of a switch.. The Eureka Ace is a manual ground balance machine with automatic threshold level set. The ten-turn ground balance control allows accurate setting of the Eureka Ace to the prevailing ground conditions.

There are three selectable gain settings and a variable sensitivity control to enable the detectors gain to be matched to the ground for peak performance.

The Eureka Ace is designed primarily as an electronic gold prospecting tool. Accordingly it has no discrimination ability. When searching for gold, discriminators can be misleading. There may be situations where a discriminator will correctly tell you there is junk or trash present, but under the junk or trash may lie a gold nugget or nuggets. In this situation, if one believes the discriminator the nugget(s) will be missed. When prospecting for gold we recommend that you dig all targets.

The Eureka Ace comes as a convertible machine that can quickly be changed from a shaftmount to a hipmounted mode of operation.

DESIGNED AND MANUFACTURED IN AUSTRALIA

REG. TM

2. ASSEMBLY PROCEDURE

2.1 Unpack the detector and check that the following parts are included: Instruction Manual, Warranty Card, Control Box, Main Shaft, Arm-rest, Search Coil and Cable, Lower Shaft, Bag, Skid Plate.
Keep the packing carton in case you need to repack the unit at any time in the future.

2.2 Fill in the Warranty Card and mail it within 14 days. This is essential to validate your warranty.

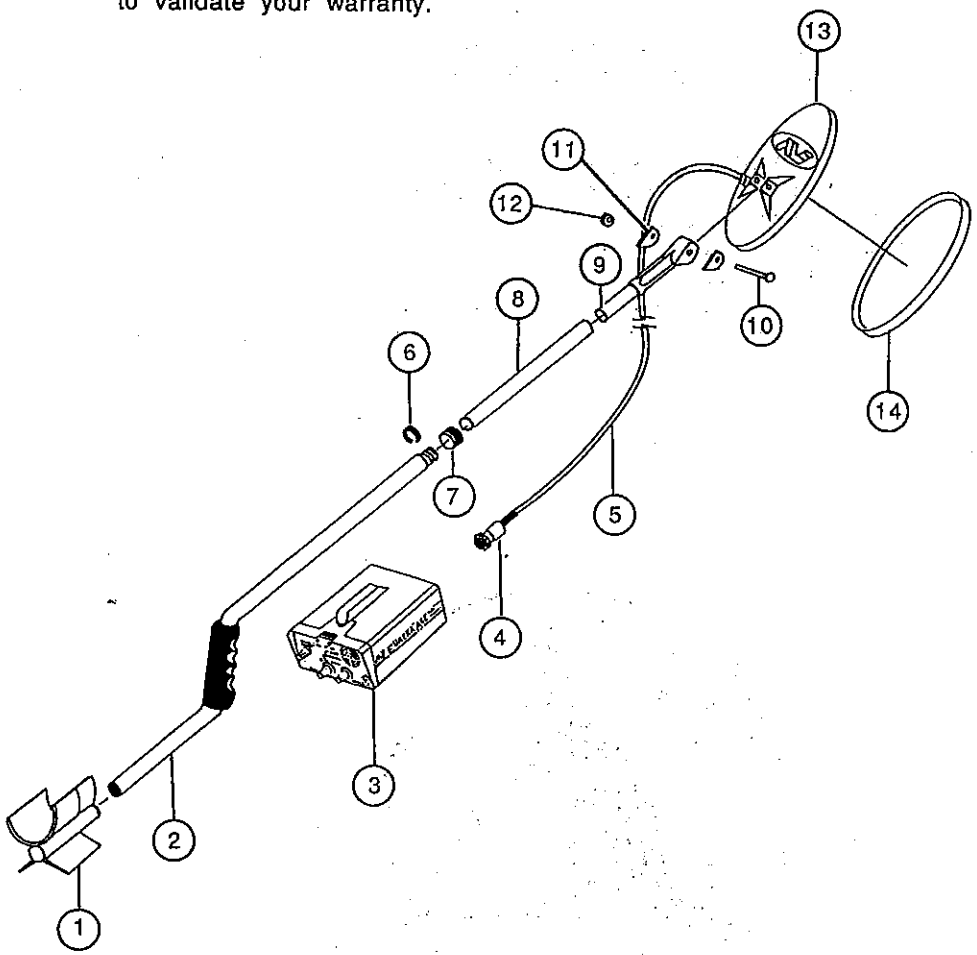


Figure 1: Eureka Ace Assembly Diagram

2.3 Slide the Lower Shaft (8) containing the Search Coil and Cable into the Main Shaft (2) to a convenient length and make sure it "clicks" into place. Tighten the locking nut (7) by hand to make the connection firm.

2.4 Slide the Arm-rest (1) (with support fins towards the rear) over the back of the Main Shaft (2) so that it "clicks" firmly at a convenient position. You can tighten or loosen it about the forearm by bending the fins. (You can buy an optional Velcro armstrap to provide extra firmness during operation).

2.5 Attach the Control Box (3) to the Main Shaft (2) at a distance from the hand-grip convenient for you. Ensure that the surfaces at the connection are free from grit. **(Do not twist the control box when removing it** - grip it firmly and pull it straight off in line with the shaft.)

2.6 Wind the Cable (5) from the Search Coil (13) around the shaft fairly tightly (but without strain) and connect and screw the Cable plug (4) to the socket on the Control Box (3). Experienced operators recommend that you use heavy - duty insulating tape to secure the Cable to the Shaft to prevent unnecessary movement and snagging on objects.

2.7 Attach the Skid Plate (14) to the Search Coil to prevent abrasion and wear. It will "click" firmly into place.

2.8 Install the batteries (see Section 4.2 below) and you are ready to start searching.

2.9 You should use quality headphones for serious detecting as without headphones your ears are not protected from stray noises.

2.10 **Hipmounting or Strapmounting** is easily achieved by putting the control box into its protective Bag, which can be threaded onto your belt, or suspended from a strap. Experienced users have found strapmounting most convenient as they would otherwise spend a lot of time putting down and picking up the detector while working.

3. EXPLANATION OF CONTROLS

3.1 ON/OFF SWITCH

The ON/OFF SWITCH is the upper right toggle switch located on the control panel. In the ON position power is connected from the batteries to the Eureka Ace and the machine will function. Always have the ON/OFF SWITCH in the OFF position when changing the batteries.

3.2 FREQUENCY SELECTOR SWITCH

The FREQUENCY SELECTOR SWITCH is the top left switch on the control panel. It will select the operating frequency of the Eureka Ace. There is a choice of 8kHz or 19.5kHz, the audio frequency will also change slightly so you can hear which frequency has been selected. The GROUND BALANCE CONTROL may need to be adjusted after a change in frequency. We recommend that you cover each area searched with both frequencies so as not to miss any objects. NOTE: When operating this switch a large signal may be heard, which may cause discomfort when headphones are used.

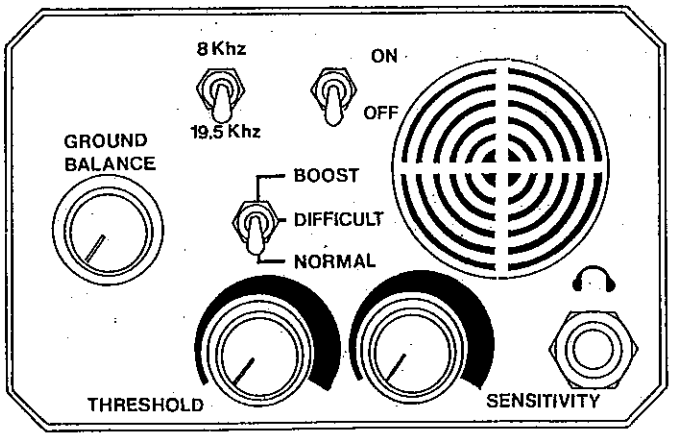


Figure 2: Control Panel Eureka Ace

3.3 GAIN SELECTOR SWITCH

The GAIN SELECTOR SWITCH is the toggle switch in the centre of the control panel. It has three positions; NORMAL, DIFFICULT and BOOST. The position of this switch should be set according to the mineralisation of the ground. The Eureka Ace can not be overloaded which makes setting this switch more difficult than conventional detectors. Switch to a lower gain setting when ground noises become excessive. As a general rule the more mineralised the ground the less of the available gain will be able to be used. We recommend that you follow these guide lines;

NORMAL:	general use in most soils
DIFFICULT:	highly mineralised ground and "Ironstone"
BOOST:	very "quiet" soil such as dry sand.

However personal experience will be your most valuable tool in setting this switch. NOTE: When the Gain Selector Switch is shifted from one position to another, a loud signal may be heard, which may cause discomfort when headphones are used.

3.4 GROUND BALANCE CONTROL

The GROUND BALANCE CONTROL is the knob on the centre left of the control panel. This is used to cancel out the effects of ground mineralisation on the Eureka Ace. It is a ten-turn control, that is there are ten full rotations of the knob from one extreme to the other. To set the ground balance the coil should be raised and lowered from about 1" above the ground to 4". There will be a signal from the loudspeaker when the search coil is either moved toward the ground or away from it. If the signal occurs as the coil is moving toward the ground, rotate the GROUND BALANCE CONTROL anti-clockwise. If the signal occurs as the coil is moved away from the ground turn the GROUND BALANCE CONTROL clockwise. There will be a point when the signal level diminishes almost completely and may become a quiet signal when the head is moved to and from the ground. The Eureka Ace is now "ground balanced" to that particular patch of ground. As the constitution of the ground changes from place to place it will be necessary to re-adjust the ground balance control to keep the detector tuned to the ground.

3.5 THRESHOLD CONTROL

The THRESHOLD CONTROL is the lower left knob on the control panel. It should be set so the audio tone is just heard through the small speaker or headphones. If it is set too loud you may miss the small audio signals that indicate small targets.

3.6 SENSITIVITY CONTROL

The SENSITIVITY CONTROL is the lower right knob on the control panel. It should be used in conjunction with the GAIN SELECTOR SWITCH to match the gain of the Eureka Ace to the ground mineralisation. If the SENSITIVITY CONTROL is turned fully anti-clockwise the Eureka Ace will not respond to any targets at all.

3.7 HEADPHONE SOCKET

The HEADPHONE SOCKET is located in the lower right hand corner of the control panel. Only stereo headphones with an impedance of 8 ohms or more should be used with the Eureka Ace. Mono headphones may not work at all. We recommend that for serious prospecting headphones be used as the loudspeaker is less sensitive than headphones and does not shield your ears from external noises.

4. BATTERIES

4.1 The Eureka Ace operates from eight 1.5v penlight or 'AA' size batteries. When the charge level of the batteries becomes critically low a distinct "pip" will be heard through the loudspeaker or headphones approximately every 20 seconds. The batteries are contained in two battery holders. Both banks of batteries are connected in series, so both must be changed at the same time. Changing one bank at a time or swapping the batteries over will have no effect. **Alkaline batteries only** should be used at all times. **Do not use carbon or ni-cad batteries.** Battery life of about 60 hours can be expected from a new set of alkaline batteries. Always check the "use by date" when buying batteries. Always dispose of batteries thoughtfully and safely.

4.2 The Battery Replacement Procedure is as follows:

4.3 Turn the detector off.

4.4 The battery compartment is located at the bottom of the Control Box. To remove the battery lid, press down on the end of lid nearest the front panel and slide out.

4.5 Take out the two battery packs, taking care not to damage the connecting wires.

4.6 Remove the batteries from the packs and replace them with new ones. Be certain to replace them in their correct positions. Diagrams displaying polarity are on the packs. **Incorrect polarity will damage the detector.**

4.7 Carefully replace the loaded battery packs and slide the lid shut until it "clicks" firmly into place.

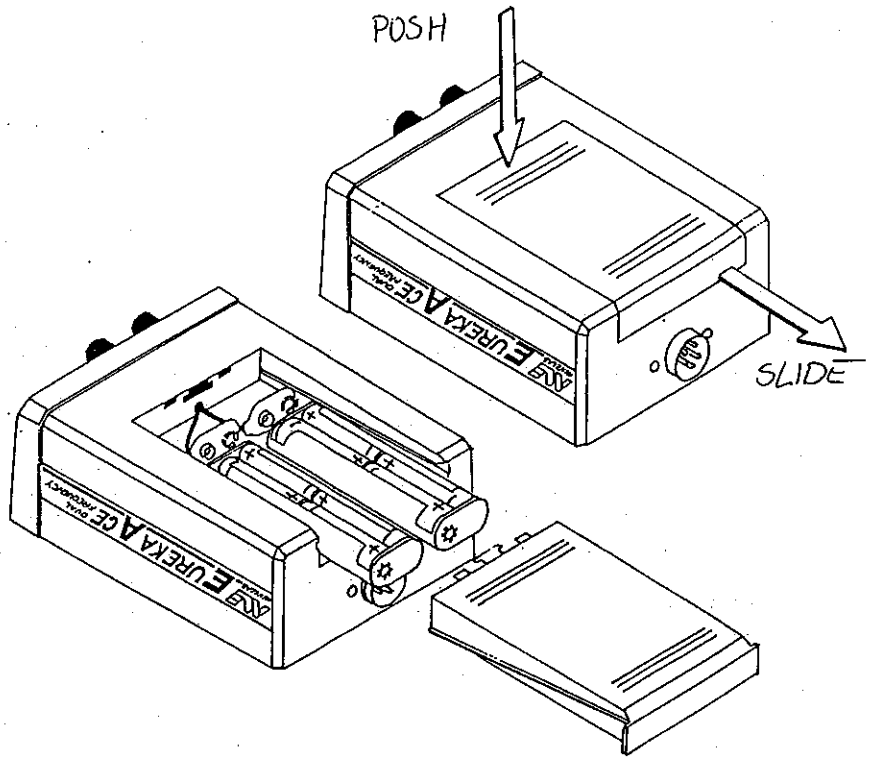


Figure 3: Battery Removal and Installation

5. OPERATING INSTRUCTIONS

5.1 Check that the batteries are properly installed. See the section on "batteries" for more detail.

5.2 Check all cables for serviceability and ensure the connectors are secured tightly. Adjust shafts for comfortable length and move the coil so it will be parallel to the ground in normal operation.

5.3 Switch the GAIN CONTROL SWITCH to NORMAL.

5.4 Select the desired operating frequency.

5.5 Turn the THRESHOLD CONTROL fully anti-clockwise.

5.6 Turn the SENSITIVITY CONTROL fully clockwise.

5.7 Switch the detector ON.

5.8 If headphones are to be used insert the headphone jack fully into the HEADPHONE SOCKET.

5.9 Set the threshold by holding the detector so the search coil is about waist high and far away from metal objects. Adjust the THRESHOLD CONTROL until a soft tone is heard.

5.10 Ground balance the detector. The ground balancing operation should be carried out in the area you wish to search in a spot that contains no metal objects. Ground balance is achieved by raising and lowering the search coil from about 1" to 4" above the ground. While doing this listen to the threshold of the detector. As the coil moves one way the volume of the threshold tone will increase, as it moves the other way it will decrease. If the tone becomes louder as the coil is raised adjust the GROUND BALANCE CONTROL clockwise, if the tone becomes louder as the coil is lowered adjust the control anti-clockwise. Continue this until the best balance is achieved. Remember it will be necessary to adjust the GROUND BALANCE CONTROL periodically when the soil changes and after a change in operating frequency. It is very important to maintain correct ground balance at all times as this will enable the Eureka Ace to ignore ground noises that may mask the presence of good targets.

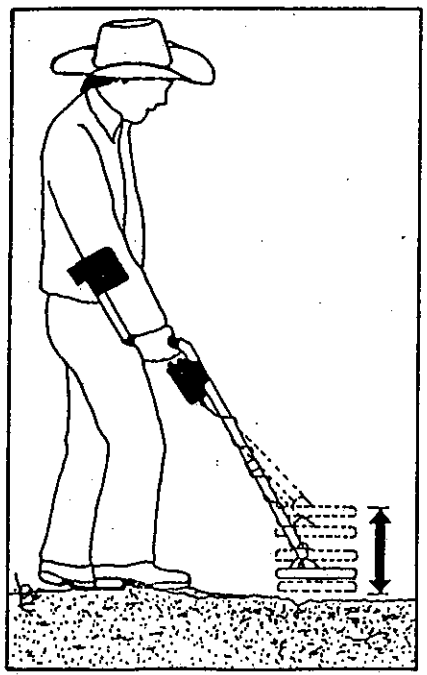


Figure 4: Ground Balancing Action

5.11 Your Eureka Ace is now ready for operation. While you are searching the ground it is important to keep the search coil parallel to, and an even distance from the ground, about 1/4 to 1" above the ground is recommended. Don't waste "depth" by holding the coil too high. If ground noises are a problem decreasing the gain with the GAIN SELECTOR SWITCH or the SENSITIVITY CONTROL will help reduce them. Always try to ground balance them out first as reducing the gain will also reduce the depth of the search. Move slowly and thoroughly as you search. Remember, patience and your Eureka Ace, are two or your best gold prospecting tools. See the section on detecting tips for more information.

6. FAULT FINDING

6.1 In the event that your EUREKA ACE does not work the following points should be checked before seeking repair.

6.2 Are the batteries installed correctly?

6.3 Are the batteries sufficiently charged?

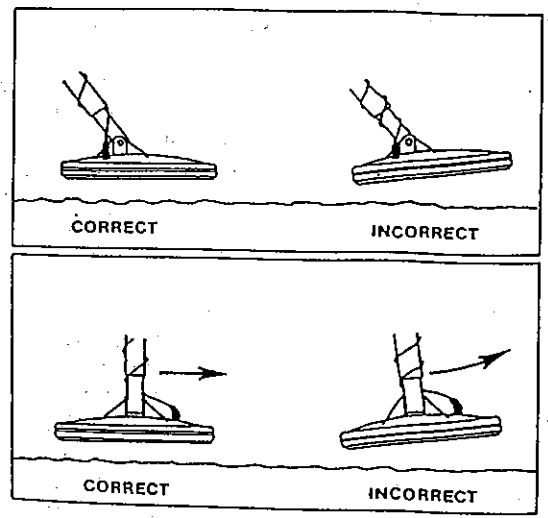
6.4 Is the search coil connected?

6.5 If an extension cable is used is it serviceable?

6.6 Is the SENSITIVITY CONTROL turned up from fully anti-clockwise?

7. DETECTION TIPS

7.1 General



The EUREKA ACE will perform best when it is ground balanced to approximately 2cm (1 inch) above the ground and kept at that search height. If you are not yet an experienced operator, you should practise maintaining constant coil height at the extremity of each swing. (Variation in coil height at the end of each swing can cause confusing sounds and will cause loss of depth.)

Figure 5: Maintaining Search Coil parallel to ground.

After making an appraisal of the target's position, best results will be gained by removing the top 3 or 4 centimetres of soil for approximately 14cm radius of the target point and by spreading out the removed soil to one side of the cleared area. By passing the coil over the flattened soil, your detector will signal if the object is small and contained in the top layer. It can be found more readily by this method than by digging a large hole. If it is not in the flattened soil, continue to dig and follow the same procedure. Do not leave sharp edges around the hole perimeter, because the detector could give a false reading on the edges of the hole.

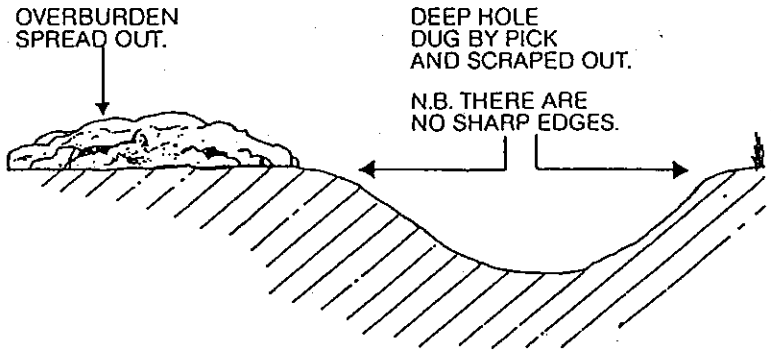


Figure 6: Hole and Overburden

It is better to go slowly because otherwise the object may be lost by spreading it too far away from the area being worked, or if it is a small find, you may end up burying it even deeper than it was when first detected.

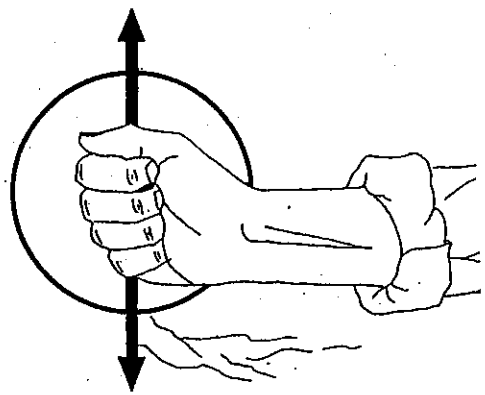


Figure 7: Finding an object

When the object has been removed from the hole lay the detector down with the coil on its side, close by the hole. Gather a handful of soil at a time and pass it across the coil. The handful containing the object will emit a clear signal. Then halve that material into two hands and pass one at a time across the coil to further eliminate waste soil. The procedure is continued until the object can be seen in the hand.

Detect again over the hole to make sure that there are no other objects to be found (it wouldn't be the first time that gold nuggets have been found one under the other). Remember, fill in all holes you have dug: they are dangerous, unsightly and environmentally unacceptable.

7.2 Recommended Technique

It is important to scan an area with a broad even sweep of the detector head, keeping it at a constant height above the ground (approximately 2 - 3 cm depending on the ground conditions and obstacles such as rocks and pieces of wood and leaves).

Each sweep of the head should slightly overlap the previous sweep. However, unlike most other search coils, the Eureka Ace head is sensitive across its full width and therefore only a slight overlap is required.

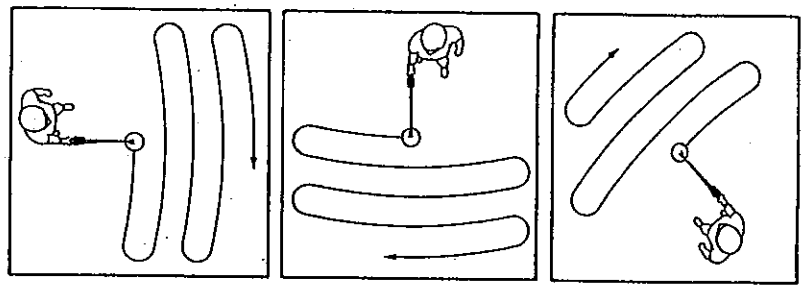


Figure 8: Recommended searching technique

If a nugget of gold has been found there are likely to be others and a thorough search of the area from three different directions is recommended, as indicated in the above figures. This is because ground noises can vary depending on the direction the head passes across the ground. In one direction ground noises may mask out the sound of a nugget, whereas in another direction the sound may be readily discernible.

7.3 Ground Noises

There is nothing more annoying than getting a signal and digging but finding nothing. This can confuse the inexperienced operator and even destroy his confidence. It will take time and practice until you can learn to recognise which signal to pay attention to or to ignore.

Typically **mineralized ground** can make a detector respond with an indication that there might be an object reasonably deep beneath the surface. The sound could be rather broad and not very loud, or sometimes crisp and reasonably sharp.

Charcoal can sound loud at times and rather like a metallic object when close to the surface. Again, experience will teach the operator how to read the ground efficiently and gain understanding of the detector's response to the ground. Charcoal is usually created by farmers burning off tree stumps or by bushfires. The growth is burnt below the ground level, so it is not always obvious what the sounds are until you have actually dug up the causes of these noises a few times.

Other noises which most affect detectors are **"hot" rocks**. These are rocks rich in iron which have very strong audio signals. Some are strong and others are weak. With the strong ones, some detectors have problems in tuning them out, but with the Eureka Ace signals from hot rocks are not as great a problem. If you are still not sure, switch the GAIN Switch to "Difficult" and reduce the SENSITIVITY knob anti-clockwise. If the signal continues, there is a good chance that there could be at least some gold in that hot rock. Breaking the rock in two, then passing both sections of the rock across the coil, one after the other, will determine which piece contains the gold.

Sometimes "negative" hot rocks or ground "holes" are encountered. In this case the sound from the detector is reduced as it passes over the rock or "hole". Nevertheless the detector, on recovering from this loss of sound, can give an audible signal which to the beginner may be confused with the sound of an object. Experience will soon enable the operator to recognize this characteristic sound which is in fact quite different from an object.

7.4 Clay Domes

A common occurrence in nugget bearing country is soil mineralisation which is commonly known as "clay domes". These are regions of rather broad sound which could be confused with the sound which would come from a deep large nugget.

The following procedure will quickly establish whether or not the sound comes from clay or a metal object. Remove about 4cm (1.5") of soil in a broad 30cm diameter circle with no sharp edges. This will allow the Search Coil to approach the "object" by about 4cm. Now with the coil in this lowered position over the hole attempt to ground balance the signal. If ground balance can be achieved then this source of sound is probably clay, since it is not possible to ground balance a metal object which has been brought closer the the coil. In addition, the signal from a metal object is greatly enhanced when the object is brought even slightly closer to the head, whereas the clay, because it is not concentrated, does not produce a greatly enhanced signal even

when the head can be lowered. Be careful that the edges of the shallow hole are not producing spurious signals. The technique requires practice and experience but it is essential to develop a good technique to avoid digging many deep holes unnecessarily.

7.5 Searching for Gold

To have a good chance of detecting gold, it is necessary to search out areas where "coarse gold" is known to have been found, or other areas where it is likely to occur. The term "coarse gold" refers to gold ranging in size from a grain of wheat to many grams and in some cases hundreds of grams.

Many nugget-bearing areas are the result of broken down gold reefs containing quartz and ironstone. Experienced prospectors learn to "read the ground" and look for tell-tale signs indicating potential gold bearing fields. It is a fascinating and exciting hobby to learn some of these skills and apply them in your search for gold.

The modern metal detector has given today's prospector enormous advantages over the prospectors of old. The ground can be rapidly scanned until a small piece of gold is found and then a study of the area made to decide where other gold nuggets are likely to be located. It is then best to make a systematic search of the area as indicated in 5.3 above.

The main problem encountered while using metal detectors is the presence of heavy concentrations of ironstone. This is particularly the case in some of the richest known fields in Australia or the "black sands" areas of North America. It appears that gold nuggets and ironstone often go together, and in fact many gold nuggets have ironstone embedded in them or are encased in ironstone and others show strong ironstone staining. Some of these fields have only been superficially worked because of the interference to the detector caused by the ironstone. Usually only the most persistent professional or dedicated hobbist is prepared to spend the time and energy necessary to cope with these conditions.

8 SPECIFICATIONS EUREKA ACE

These are subject to modification without notice.

Length	Extended	1350mm (53")
	Un-assembled	840mm (33")
Weight	Complete (excluding battery)	1620 g
	Control Box (excluding battery)	620 g
	Shaft and Search Coil	
Frequency	VLF search	8kHz and 19.5kHz
Ground Rejection		
Search Modes		
Discrimination	NO	
Controls	Threshold adjustment ("tuning")	1 Turn
	Discriminator	NO
	Sensitivity	1 Turn
	Volume	NO
	Ground balance	10 Turn
	Gain	3 pos. switch
Search Coil	Type	Double D
	Size	8" round
	Weight	475 g
	Interchangeable	Yes
	Cable length	2.4 m
Audio Output	Audio booster	NO
	Enhance	NO
	Speaker	51mm (2"), moisture resistent
	Headphone Jack	1/4", 8 ohms, stereo/mono
	Tone	Preset
Built in Arm Rest & Detector Stand		Yes
Type	Shaftmount	Yes
	Hipmount	Yes
	Strapmount	Yes
Batteries	Type	'AA' penlight cells
	Number	8
	Life - Alkaline	60 hrs. approx.
	- Rechargeable NiCads	NOT TO BE USED
	Battery low alert	Automatic
Warranty	Control Box - 24 months parts and labour, limited	
	Search Coil - 12 months parts and labour, limited	

9. PROPER CARE OF YOUR DETECTOR

The Eureka Ace is a high quality electronic instrument, finely engineered and packaged in a durable and rugged housing. Taking proper care is mostly common sense.

9.1 Do not leave batteries in the Control Box when the detector is not in use for a period exceeding two weeks. Damage caused by leaking batteries can be severe and would void the warranty through user negligence.

9.2 If temperatures are very high, do not leave the detector in the sun longer than necessary. Covering it from direct sunlight will help protect it. Try to avoid leaving it in a closed trunk of the car sitting in the sunlight.

9.3 The Search Coil housing will wear through if you scrub the ground with it while searching. We recommend that you use an easily replaceable skid plate to protect it, and replace the skid plate before it wears out.

9.4 The Bag is designed to protect the Control Box, especially from dust, mist and rain. It will also cushion potentially dangerous knocks. Use the Bag where possible.

9.5 Whilst the Control Box has been designed to be water resistant, it is not waterproof. Avoid wetting it unnecessarily. Never allow the box to come into contact with petrol or other oil base liquids.

9.6 Should the Search Coil be used in salt water, it must be washed with fresh water immediately after use.

9.7 Keep the unit dry and clean and avoid getting sand and grit into the shafts or the tightening nuts. Do not use solvents to clean the detector. Use a damp cloth with mild soap detergent.

10. PRODUCT WARRANTY

Electronic and Mechanical Components
Minelab Electronics Pty. Limited warrants that it will, **for a period of 24 months** from the date of the original retail sale, at its discretion either repair or replace any components (except external leads) found to be defective in materials or workmanship, under normal use and operations provided that the repair or replacement is carried out by Minelab Electronics Pty. Limited or an authorised Minelab Electronics Pty. Limited Service Centre, and the defective component at the request of Minelab Electronics Pty. Limited or an authorised Minelab Electronics Pty. Limited Service Centre, be returned, freight prepaid.

Search Coil
Minelab Electronics Pty. Limited warrants with respect to each new metal detector that **for a period of 12 months** from the date of the original retail sale, will replace free of charge the search coil of the detector in the event that it is found to be defective in materials or workmanship under normal use and operation, and the defective coil at the request of Minelab Electronics Pty. Limited is returned to Minelab Electronics Pty. Limited or an authorised Minelab Electronics Pty. Limited Service Centre. Items excluded from this warranty are headphones, batteries and other accessories.

This warranty is not transferable, nor is it valid unless the attached Warranty Registration Card is returned to Minelab Electronics Pty. Limited or an authorised Minelab Electronics Pty. Limited Regional Distributor **within 14 days of the original purchase** for the purpose of recording that date, which is the actual commencement date of the warranty.
This warranty does not cover damage caused by accident, misuse, neglect, alterations, modifications, or unauthorised service.
This warranty does not extend to any consequential loss or damage howsoever caused or arising, including failure in operation or performance of the detector sold or repaired or replacement work or service performed thereon or thereto. Other than is provided above, no warranty, guarantee or representation as to Minelab Electronics Pty. Limited products, other than as contained herein, is made or given by Minelab Electronics Pty. Limited.