DESIGNED AND MANUFACTURED IN AUSTRALIA

REG. TM

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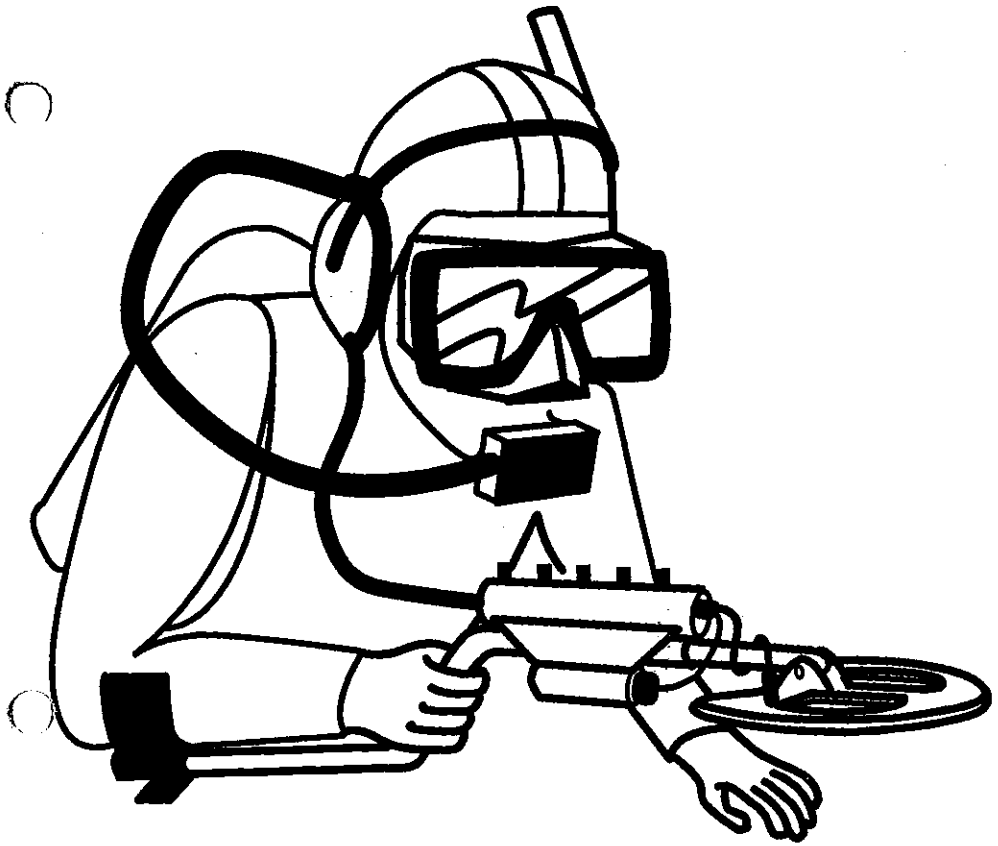
THE EXCALIBUR



INSTRUCTION MANUAL

MINELAB

OPERATORS MANUAL FOR THE "MINELAB EXCALIBUR"

Contents

Excalibur Operators Manual Version 2.2, May 1997

1.0 INTRODUCTION

Congratulations on buying Minelab's underwater treasure hunting detector, the Excalibur. The Minelab Excalibur is the highest performing and most reliable underwater discriminating detector available in the world today. We thank you for buying the Excalibur and wish you the best of success and enjoyment with your future detecting!

The Excalibur has been designed to be a practical underwater detector for the diver and wader producing few false signals, particularly in the presence of salt water and can be operated to a depth of 200 feet.

Able to be used under the water just as easily as on land, the Excalibur utilises the most advanced treasure hunting technology available, known as Broad Band Spectrum or BBS.

BBS technology is unique to Minelab and enables the Excalibur to operate over a broad range of frequencies between 1.5 kHz and 25.5 kHz.

The result is a clear and distinct signal with ground interference from salt and mineralisation being removed by the microprocessor.

Each object which is detected is then analysed by the microprocessor. The Excalibur will then produce a signal tone which is unique to the object detected. Therefore the signal for a gold coin will sound distinctly different to the signal for a silver ring.

One of the Excalibur's unique features is its capability to discriminate between metal objects. This provides you with the ability to select which objects are detected and which are ignored. This is extremely useful when hunting in areas with a large amount of unwanted objects.

2.0 CONTENTS OF THE BOX

To unpack the contents of the box, firstly remove the brown inner cardboard liner which will lift the entire contents out of the box so that it can be easily accessed.

Now remove the contents of your box and lay them out so that each piece can be seen and assembly can easily be carried out.

Your new Excalibur should contain the following parts in the box. If any parts are missing then please contact your dealer.

- Electronic control cylinder
- Battery cylinder
- Headphones
- 3 Piece shaft assembly
- Seasearch Coil
- Battery charger
- Black armrest
- Warranty card

Please now complete your warranty card and mail it to Minelab. It is extremely important that we receive your warranty card as it will ensure that your Excalibur has been registered on our warranty files.

3.0 ASSEMBLING THE EXCALIBUR

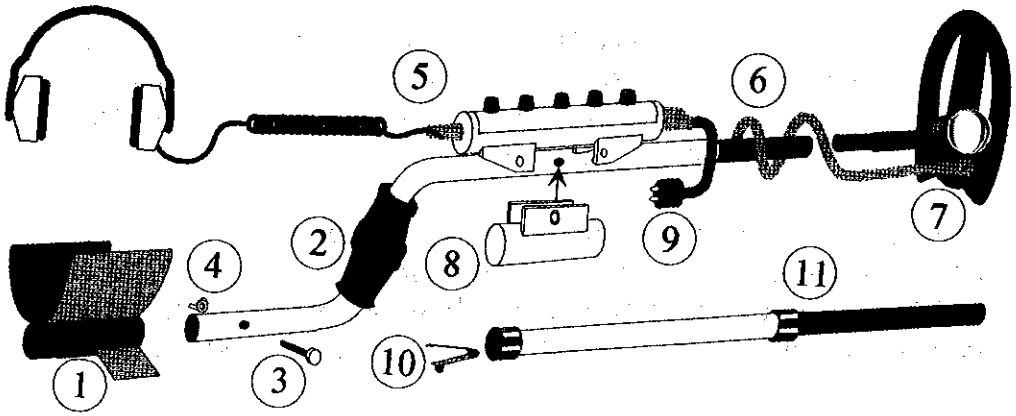


Figure 1 - Excalibur Assembly Diagram

Please follow these simple instructions to assemble your new Excalibur. If you encounter any difficulties then please call your dealer for further instructions.

3.1. Armrest Assembly

A. Remove the black nylon bolt (3) and black wing nut (4) from the armrest (1).

B. Slide the armrest (1) (with support fins toward the front and pointing to the ground) onto the end of the grey main shaft (2). Line up the holes at a comfortable position for the length of your arm.

Push the black nylon bolt (3) through the holes and tighten the black nylon wing nut (4) by hand.

3.2. Main Shaft Assembly

A. The electronics cylinder (5) and battery cylinder (8) should already be clipped onto the main shaft (2).

B. If this is not the case then first clip the electronics cylinder onto the main shaft, as shown in figure 1. Ensure that the headphones cable end is nearest the handgrip and that the cylinder locks into place correctly.

C. Next, clip the battery cylinder (8) onto the main shaft in the space provided by the electronics cylinder, as shown in figure 1. Ensure that the cable connection side faces away from the handgrip.

D. Connect the battery cable (9) to the battery cylinder. The connection uses a water exclusion seal that needs to be firmly tightened by hand, otherwise salt water may enter the connection causing instability and corrosion of contacts.

3.3. Divers Mode

A. Remove the spring clip (10) from the main shaft by pressing down on the button and pulling the cable tie.This is located at the opposite end of the shaft to the handgrip.

B. To ensure that this does not get lost whilst using divers mode, push it into one of the holes in the middle shaft (11).

C. Wrap the search coil cable (6) around the bottom of the main shaft. Leave enough slack cable to be able to slide the search coil (7) into the black fibreglass tube bottom of the main shaft.

D. Rotate the search coil to wind up the remaining cable around the shaft firmly but without strain. Ensure that the clip on the search coil rod "clicks" into the hole in the fibreglass tube.

3.4. Land and Waders Mode

A. Ensure that the spring clip (10) is pushed into the hole in the black fibreglass tube at the end of the main shaft so that the button clicks into place in the hole.

B. Push the grey middle shaft (11) on to the black fibreglass tube at the end of the main shaft. Ensure that the single spring clip clicks into place in the first hole on the middle shaft. Tighten the black plastic locking ring by hand to prevent any shaft movement.

C. Wrap the search coil cable (6) around the complete shaft assembly allowing enough slack cable to slide the search coil (7) onto the end of the complete shaft assembly.

D. Rotate the search coil to wind up the remaining cable around the shaft firmly but without strain. Ensure that the clip on the search coil rod "clicks" into the hole in the fibreglass tube.

E. Set the length of the Excalibur by moving up or down the black fibreglass tube in the middle shaft. Ensure that it is correctly clicked into place. To prevent any shaft movement tighten by hand the black plastic locking ring.

4.0 BATTERIES

The Excalibur comes equipped with one battery cylinder which contains a Nickel-Cadmium (NiCad) rechargeable battery pack, and also a 240V battery charger.

Under most circumstances the battery pack can be used and recharged without ever removing it from the battery cylinder. Using these rechargeable batteries will save you a significant amount of money .

Extra battery packs and cylinders are available for purchase from Minelab which can be carried whilst detecting to ensure that no loss of detecting time occurs if batteries go flat.

Note: Fully charged battery pods should not be taken underwater as they will discharge and the battery terminals will corrode.

When the NiCad pack has reached the point at which they will no longer operate the Excalibur, instability will occur and it is recommended the NiCad be recharged or replaced to avoid missing any targets.

4.1 Charging Batteries

To recharge the NiCad battery pack unplug and remove the battery cylinder from the main shaft and connect it to the 240V charger.

Plug the charger into the wall socket .

Batteries should be charged for 12-14 hours.

Before initially using the Excalibur, it is recommended that you charge the NiCad batteries for 12-14 hours in order to ensure peak performance in the field.

It is extremely important that your NiCad batteries are completely flat or discharged before being recharged again for maximum life. NiCad batteries may develop a memory and will require replacing if not used correctly.

The NiCad batteries will provide you with 10-15 hours of use per charge. If you go out searching for 30 minutes or one hour, do not recharge your batteries after use because they will gain a memory and begin to provide you with only a short operating period.

It is recommended that at least once every five charges you leave your detector turned on overnight in order to fully discharge the batteries prior to recharging. This will prevent a memory from developing and provide you with hundreds of recharge cycles.

4.2 Switching Battery Cylinder

1. Unplug the discharged battery cylinder and then un-clip it from the shaft.

2. Snap a new battery cylinder onto the shaft and plug the cable into the connector

Switching battery cylinders is an extremely simple and efficient way to change batteries. Opening the actual battery cylinder can cause damage to the battery and is not recommended.

Note: Battery cylinders can not be changed under the water.

4.3 Changing batteries in the cylinder

Warning! To ensure a watertight seal on the battery cylinder this procedure must be done by an authorised Minelab service agent.

5.0 MAINTENANCE AND CLEANING

Your Excalibur has been designed to provide you with years of trouble free operation. Basic maintenance is very simple to perform but should not be neglected due to the corrosive nature of the underwater environment.

Salt deposits, very fine sand and grit will accumulate everywhere on the Excalibur and must be removed after each use for best performance.

Following these simple instructions will ensure that your Excalibur performs at its peak for many, many years.

1. Avoid rapid changes in temperature. Gradual warming and cooling will keep the internal atmosphere stable. Extreme temperature swings may cause a light condensation to appear on the cylinder walls for a short time. Wait for the condensation to disappear before using your Excalibur.

2. Visually check the lower end of both cylinders after entering the water. If any water droplets or condensation are visible inside your Excalibur, turn it off and remove it from the water immediately. Remove your batteries and contact your Minelab dealer immediately.

3. Always thoroughly rinse your Excalibur with fresh water after each use. Disconnect the shafts, battery compartment, and armrest and flush out all salt and sand, especially in the battery terminals. Failure to do so could cause the shafts to permanently stick together.

4. The headphones need only be rinsed off. The earcups can be removed, rinsed and squeezed flat to remove all traces of salt water. If used for diving it is critical that the vent hole in each diaphragm be kept clear to allow ear equalization.

5. Never open or tamper with the sealed electronics compartment as this will void warranty. This was sealed and pressure tested at the factory.

6. Never subject your Excalibur to rough or abusive treatment. The Excalibur is a sophisticated piece of equipment and must be treated with care.

7. Never leave your Excalibur in direct sunlight. The black search coil, when left in direct sunlight can reach temperatures of in excess of 150°C causing irreparable damage to your coil.

8. Never allow any of the cables to be jerked or snagged. Excessive tension could cause the watertight seals to fail. When disconnecting batteries always grip the plug body, never the cord.

9. Always keep the disconnected battery compartments above the water's surface. Your battery compartment is designed for rapid changes while wet but not under water. It is not designed to be carried under water. If submerged while disconnected, the battery will discharge and corrode the contacts.

10. Ensure that the complete detector is fully dry before storing away.

6.0 THE CONTROLS

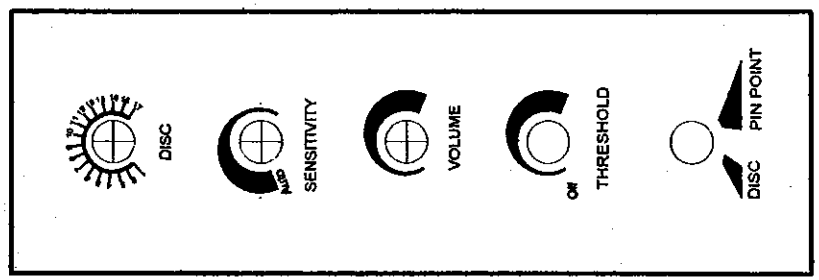


Figure 2 - The Control Panel

6.1 DISC / PIN-POINT Control

This switch determines the Excalibur's mode of operation; DISC or PIN-POINT.

6.1.1 DISC Mode

When set to the DISC mode the Excalibur will ignore ferrous objects and will detect or "beep" for non-ferrous objects which are detected.

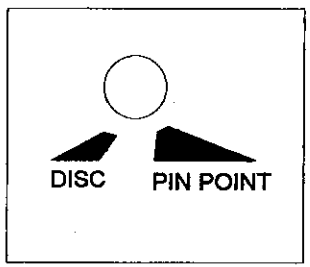


Figure 3

In this mode, the tone of the "beep" will vary according to the type of object detected. The higher the conductivity of the object, the higher the tone. This feature is extremely useful as it will help you to determine the type of object detected before it is recovered.

When in the DISC mode the "DISC" control is also operational.

6.1.2 PIN-POINT Mode

When in the PIN-POINT mode the Excalibur will detect both ferrous and non-ferrous objects. The signal which is produced is a single toned, sharp, clear "beep" as the search coil passes directly over the target.

This mode enables the target to be retrieved with minimum disturbance to the ground saving time and energy.

When in this mode the DISC control does not operate.

6.2 THRESHOLD Control

The Threshold control is used to turn the Excalibur "on" and "off" and to also set the level of background audio tone.

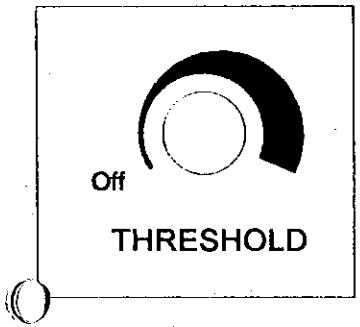


Figure 4

When turned fully counter-clockwise it "clicks" into the "off" position. To switch the Excalibur "on" turn the threshold control clockwise and the Excalibur will "click on".

As the threshold control is turned in a clockwise direction the loudness of threshold audio will increase.

Objects which are deep or extremely small will sometimes not produce a clear distinct signal but rather a change in the threshold tone. To ensure no objects are missed the threshold audio should be set to a level which is just audible.

6.3 VOLUME Control

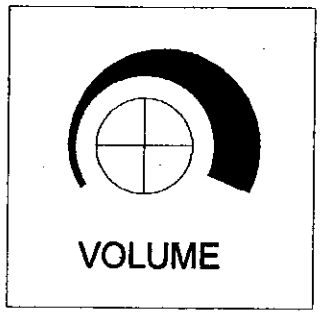


Figure 5

The Volume control sets the volume of target signals produced by the Excalibur. As the volume control is turned in a clockwise direction, target signals will become louder .

This control provides you with the ability to adapt target signal volume for your personal comfort level and particularly useful when diving with a wetsuit hood.

The volume should be set so that a "beep" from a large object close to the search coil is not uncomfortable.

6.4 SENSITIVITY Control

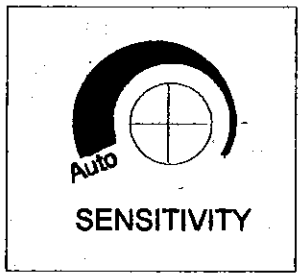


Figure 6

The sensitivity control adjusts the detection range of the Excalibur and should be set to suit the local conditions.

The sensitivity of the Excalibur increases as the control is turned in a counter-clockwise direction.

If you are detecting in areas of either high electrical interference or high mineralisation the Excalibur may produce false signals. To reduce these false signals it is necessary to reduce the sensitivity by turning the control in a clockwise direction until the number of false signals reduces.

For the best results and maximum depth the sensitivity should be turned as counter-clockwise as possible without causing too many false signals.

In the extreme counter-clockwise position, the Sensitivity "clicks" into the "Auto" position. When in this position the Excalibur automatically sets the sensitivity to maximum for the present conditions.

Auto Setting	Manual
- Beaches with Black sand - Mineralised Soil	- Most beaches - Areas with a large amount of metal junk

6.5 DISC Control

The DISC control determines the types of non-ferrous objects which are accepted and ignored by the Excalibur.

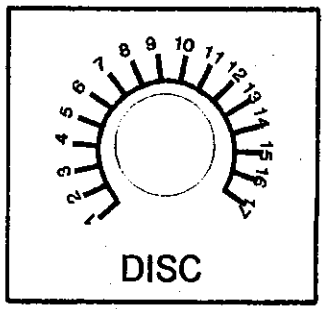


Figure 7

The DISC control operates only when the Excalibur is in the "DISC Mode" of operation and is inoperative when in the "PIN-POINT Mode".

When the DISC control is at the fully counter-clockwise position the Excalibur will accept non-ferrous objects and ignore ferrous objects.

The DISC control is a 1 turn pot with 17 graduations. As it is turned clockwise objects of a certain level of conductivity and less are ignored and no signal is given.

Figure 8 shows the DISC control and the position of certain objects. You will notice that aluminium foil is located between the range of 1 and 6, rings from 5 to 17, the Australian 5c piece between 9 and 10, and the US 5c piece between 12 and 13.

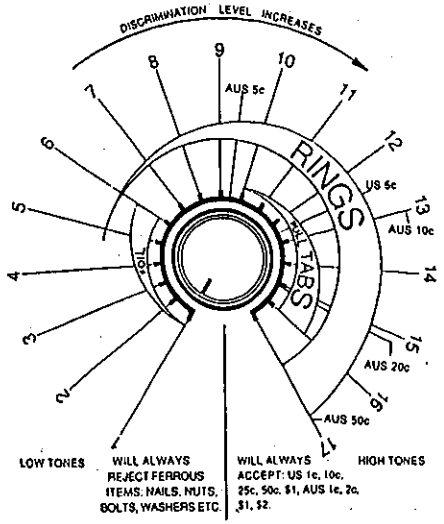


Figure 8 - Ignoring selected non-ferrous objects

You will also notice that there are a large number of objects which cannot be ignored, including AUS $1, $2, 1c & 2c and US 1c, 10c, 25c, 50c & $1.

The two most undesired types of non-ferrous objects are aluminium foil and pull tabs. To ignore aluminium foil and other similar small bits of metal, set the DISC control to setting 6 (As seen in figure 9). The Excalibur will then ignore objects with a conductivity of less than setting 6 but accept and give a signal for objects with a conductivity of greater than setting 6.

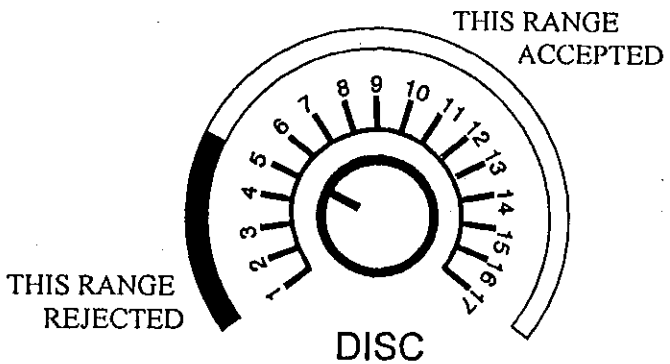


Figure 9 - DISC Accept / Ignore

Pull tabs fall in the range of settings 10 to 16. There are a number of different types of pull tab which have different levels of conductivity.

It is essential to be aware that if you set your DISC control to setting 16 to ignore all pull tabs, a large number of coins and rings will also be ignored.

With experience, setting the DISC control will become second nature and you will be able to set it to ignore the majority of unwanted targets

In the DISC Mode the Excalibur's signal tone will vary depending upon the type of object which is detected. The pitch of an object corresponds to its position on the DISC Control seen in figure 8.

The higher the object is on the control, the higher its tone will be. Therefore, a AUS 5c will have higher tone than aluminium foil, and a US 5c will have a higher tone than a AUS 5c.

With practice you will become accustomed to the various tones produced by different objects which will aid you in the identification of detected objects before you recover them.

In addition, when in the DISC mode, any ferrous objects which the Excalibur encounters will cause a momentary loss of threshold audio and it will then return at a lower pitch. Do not be alarmed when this occurs as it is an indication as to the type of object being ignored.

Also, non-ferrous objects which are being ignored will also cause the threshold audio to disappear momentarily, however it will return to a pitch similar to the objects normal signal pitch. This enables you to identify the type of object which was just ignored.

7.0 PRACTICING THE CONTROLS

The Excalibur has been designed to be an easy to use detector producing powerful performance. It is advisable, however, to practice the controls before you attempt to use the Excalibur in the field so that you become familiar with the noises which it makes and what each control does.

To carry out the practice exercise you will need:

- Some iron nails
- A small ball of foil (from a cigarette packet or cooking foil)
- A pull tab
- A number of coins
- A silver ring
- A gold ring

Firstly place the Excalibur on a table with the coil at least 3 feet from all metal objects and then set the controls.

This should be done as follows:

1. Turn the Volume control fully clockwise to turn the detector on.
2. Turn the sensitivity control to the "Auto" position
3. Turn the Threshold control clockwise until the threshold audio can be just heard.
4. Switch to the "DISC" mode
5. Set the DISC control to the fully counter-clockwise position so that non-ferrous objects are accepted.

7.1 Basic Detection

To begin, take all jewellery off hands & wrists. Then pass each of the above objects over the coil. You will expect to receive a number of various toned signals except for the nail which should not give a signal.

Note the momentary loss in threshold sound and then its returning pitch.

7.2 DISC Control

Now turn the DISC control to the position 6 and pass all objects over the coil once again. This time you will notice that all objects will produce a different signal except for the nail and aluminium foil which should not produce a signal.

Again, note the momentary loss in threshold sound and then its returning pitch.

As you continue to practice turn the DISC control more clockwise and notice how some objects are ignored whilst others produce a signal.

7.3 PIN-POINT Mode

Switch to the "PIN-POINT" mode and pass various objects over the coil. Notice that the signal you receive is a very fast "Blip" of the same tone. This mode is excellent for pin pointing objects.

Continue to practice the various modes and controls passing objects at various distances over the coil. Take notice of the distance from the coil at which each object is detected and remember that when in the field you will find that the Excalibur will actually detect objects in the ground at a greater distance from the coil than during your practice.

8.0 GENERAL DETECTING TECHNIQUES

Now that you are somewhat familiar with the operation of your new Excalibur, it is essential to learn some basic detecting techniques.

8.1 Sweeping

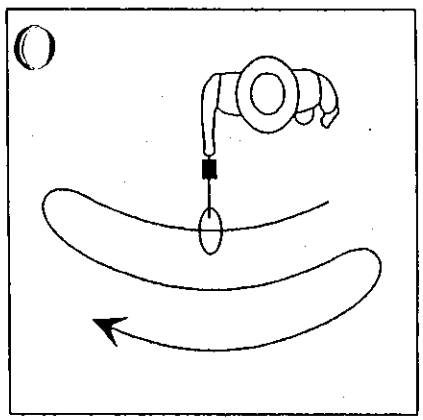


Figure 10

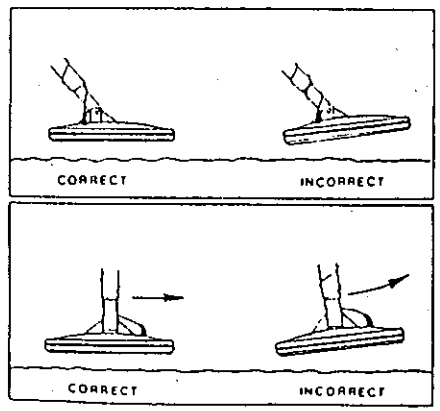


Figure 11

One of the most important detecting techniques, and perhaps one of the hardest to perfect is the sweeping of the coil across the surface of the ground or seabed.

The sweeping motion to cover the ground or seabed is shown in figure 10. It is essential that the coil sweeps are overlapped in order to ensure that all ground is searched.

Sweeping is carried out in a snaking motion along the ground or seabed to cover the area being searched.

To gain the maximum depth penetration it is essential to keep the coil parallel and as close to the ground or seabed as possible. Figure 11 shows the correct sweeping technique.

It is important to remember to keep the coil parallel at all times and be aware that there is a tendency for the coil to be raised at the end of each sweep across the body.

Each sweep from one side of the body to the other should take between 2 and 4 seconds to complete. This speed will depend upon the soil conditions and area which you are in.

The Excalibur is a "Motion" detector which means that in order to detect an object the coil must be moving.

8.2 Pin Pointing The Target

After an object has been detected it is necessary to accurately determine its position to enable it to be recovered in the shortest possible time and causing the least amount of damage to the environment.

The Excalibur has an 8" Double D coil which is sensitive across its complete length enabling a large amount of ground / seabed to be searched with each sweep of the coil.

Figure 12 shows the actual detection pattern of the 8" Double D coil of the Excalibur, compared to that of an 8" concentric coil used in some coils.

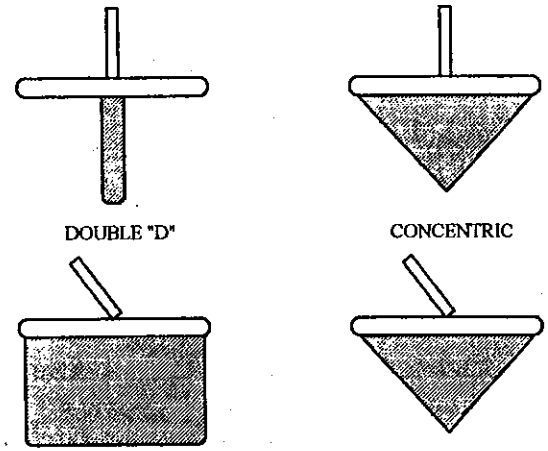


Figure 12 - DD Versus Concentric

To pin point the actual location of the object detected, sweep the coil over the general area taking note of where the strongest signal is received as the coil is moved over the object. By decreasing the length of the sweep it should be possible to draw an imaginary line in the ground where the strongest signal is located (seen in figure 13).

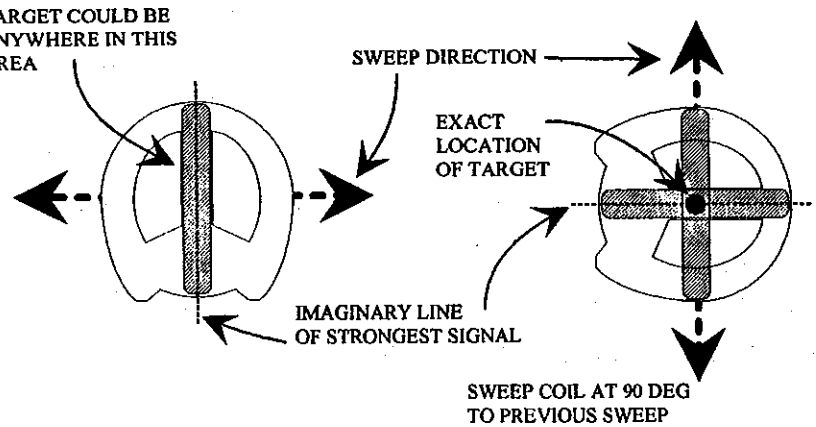


Figure 13 - Pin Pointing

The object could be anywhere across the length of the coil so in order to pin point its exact location it will be necessary for you to turn at a 90 degree angle and repeat the sweep across the target.

Again take note of the point where the strongest signal is and draw another imaginary line in the ground. Where the two imaginary lines cross is where the object is located.

8.3 Tips For Where To Search

There are a large number of areas in which you can search for old coins and treasures. The best idea is to research as to where people have been in the past and what type of objects they may have had with them.

Alternatively you can go to areas which people still go to such as the beach or park and look for lost jewellery and coins.

The following is a list of excellent places to search, but be sure to get permission before going onto any private property and to check legislation if hunting ship wrecks.

- -Your own house
- At the beach
- Showgrounds
- Picnic areas
- Old abandoned buildings
- Camping ground
- Swimming Holes
- Around unprotected ship wrecks
- Your backyard
- Parks and playgrounds
- Ghost Towns
- Old abandoned homes
- Old Gold Mining sites
- Sporting grounds
- Under jetties / Piers

In addition to having permission to go onto private property it is important to check local regulations.

9.0 Trouble Shooting Guide

Due to the unique nature of the Excalibur some signals and general operation may be confusing.
If you are having difficulty with your Excalibur Minelab recommends that you read this section or phone your dealer or Minelab for advice. Please do not send your detector back for repair unless you have checked this guide and contacted your dealer or Minelab directly.

Common Problems Encountered

1. **Noisy when swinging the detector**

   May be a loose connector or cable not tightly wound around the shaft. Tighten the cable on the shaft and also connector.

2. **Starts with a loud noise when first turned on and then fades away to nothing.**

   May be a flat battery. Check that the battery is charged and is connected correctly.

   Please note that batteries are flat when shipped from the factory and must be charged for approximately 12 hours before use.

3. **No Noise when turned on**

   Check that the battery is charged and connected and that the threshold control is turned up.

4. **Constant false signals.**

   May be a loose connector or being caused by a large amount of electrical interference or high mineralisation in the soil. Tighten and clean the battery connector and turn the sensitivity down until the number of false signals reduces.

5. **Broad signal when pin pointing.**

   May still be in the "DISC" mode. Switch to "PIN-POINT" mode and try once again.

6. Short beep every 30 seconds

This is the low battery warning. Disconnect the battery and recharge the pack.

10.0 WARRANTY AND SERVICE

There is a one-year parts and labour warranty on the Excalibur. Refer to your Warranty Card for further details.

Do not open the Excalibur control cylinder as this will void your warranty. The Excalibur has been adjusted, sealed and pressure tested at the factory. Tampering with the cylinder without proper tools and training could result in an expensive leak.

We strongly recommend that you return your Excalibur to your dealer for service on an annual basis to ensure that it maintains its watertight integrity.

Note: This warranty is not transferable, nor is it valid unless the enclosed warranty registration card is returned to Minelab Electronics Pty Ltd or an authorised Minelab Electronics Pty Ltd Regional Distributor for the purpose of recording the original purchase date, which is the commencement of the warranty.

The warranty does not cover damage caused by accident, misuse, neglect, alteration, modifications or unauthorised service.

11.0 SPECIFICATIONS AND PATENTS

These are subject to modification without notice.

Length	Dive Config.	31" / 790mm
	Wader Max.	52" / 1320mm
	Wader Min.	47" / 1200mm
Weight	Dive Config.	4.1 lbs / 1860gm
Depth		200ft / 60M
Transmission	Broad Band	Multiple Frequency
	Spectrum	1.5,3...25.5 kHz
Search Mode	PIN-POINT	All Metals
	DISC	Ferrous reject, Variable
		Non - Ferrous reject
Controls	Mode Switch	Rotary
	Threshold	1 Turn + Switch to Off
	Volume	1 Turn
	Sensitivity	1 Turn + Switch to Auto
	DISC	1 Turn
Audio Output	Built in Headphones	Waterproof
Batteries	NiCad	12V 600mAHR or More
	Duration	10 Hours
	Battery Low Warning	Beep every 30 sec
Search Coil	Configuration	Double D
	Size	8" / 200mm
	Weight	1.6lbs / 760gm
Patents	US4942360, AUS593139, US4890064, US4894618, AUS595835, CAN1260146 and others pending	