

F3Ci

Lightweight Compact Metal Detector

Operations Manual

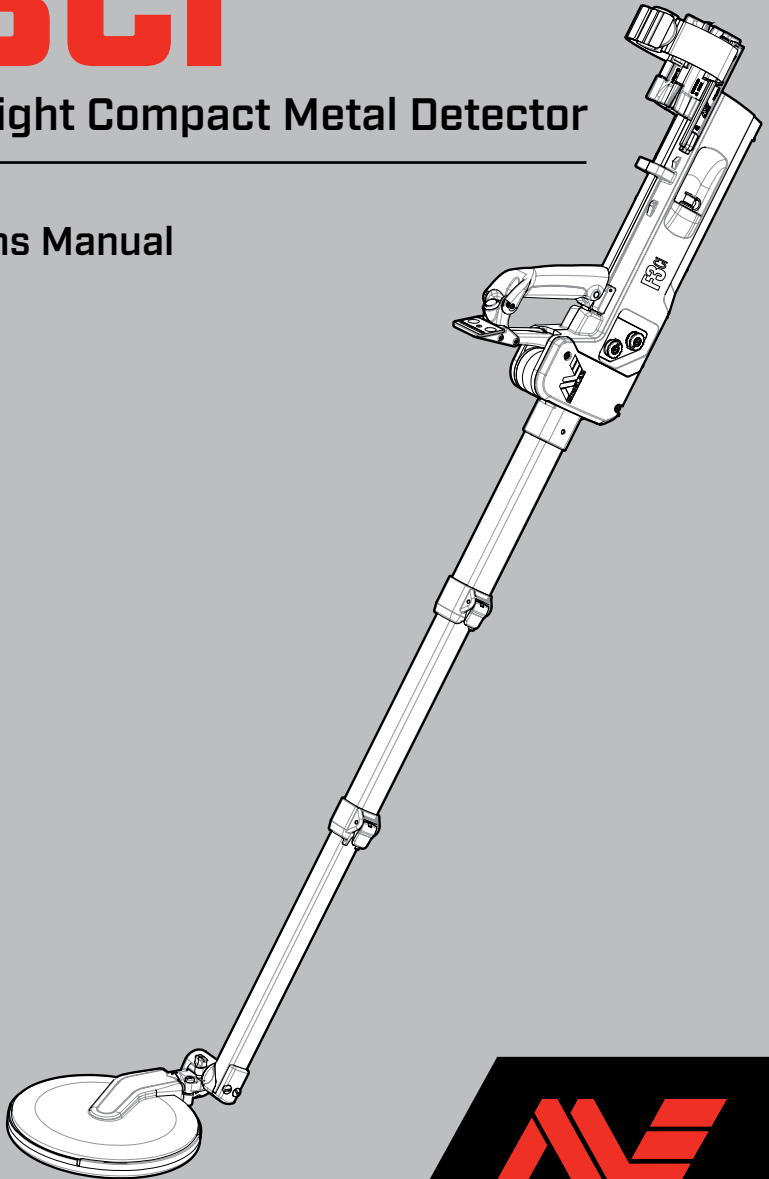


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1. Introduction

Since 1996, Minelab has designed, developed and manufactured its range of detectors to meet the requirements of mine and unexploded ordnance clearance operations throughout the world. Through its patented and unique technology, Minelab has emphasised equipment capability and operator safety in its products.

The F3Ci is a lightweight, compact detector that includes a uniquely designed mechanical platform thereby providing superior ergonomics. It is a robust detector that is extremely simple to operate.

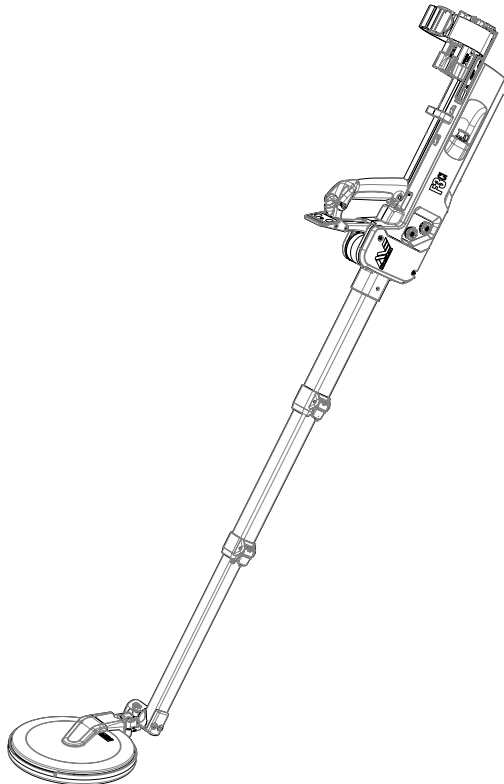


Figure 1: F3Ci mine detector

The F3Ci is designed to detect all types of metal targets and carbon rods. Additionally, under certain circumstances and using various tones, the F3Ci can assist an operator to identify specific targets.

The F3Ci incorporates several safety features such as Low Battery and System Fault warnings, audible confirmation at the completion of specific operational procedures, and continuous microprocessor controlled internal self-testing. The inclusion of a Test Piece provides the operator with a quick and easy check to ensure the detector is working at its operational capability.

The F3Ci provides a visual indication of detection via a Light Emitting Diode (LED) display. If required, the F3Ci also provides vibrations to alert the operator to a target. Sensitivity and volume settings can be changed through seven preset selections.

Components of the F3Ci are manufactured within tightly controlled parameters so that they can be interchanged in the field without any requirement for calibration.

The F3Ci is designed to satisfy MIL STD 810G.

NOTE

Although the F3Ci can withstand immersion to a depth of three metres for short periods of time, it is NOT designed for use as an underwater detector.

2. General Description and Preparation

2.1 Mine Detecting Set

The F3Ci is supplied as a mine detecting set (Figure 2) comprising:

- Hard Case (optional)
- Detector
- Soft Carry Bag
- Earset (Speaker On and Speaker Off variants)
- Operations Manual
- Field Guide
- Test Piece
- Four C Cell Batteries (Alkaline or Rechargeable)

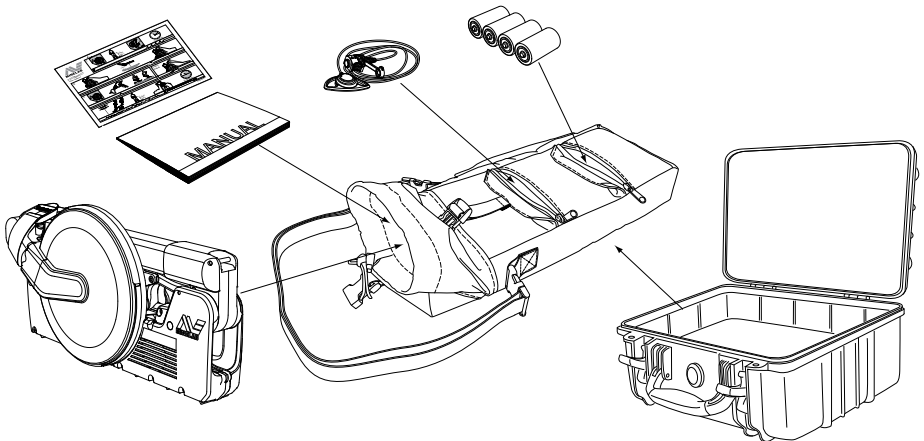


Figure 2: F3Ci mine detecting set

The optional Hard Case permits the storage of the detector inside the Soft Carry Bag and provides protection for the detector when in transit or placed in storage.

The Soft Carry Bag allows the operator to comfortably carry the detector when use of the Hard Case is impractical. The Soft Carry Bag is not suitable for use when transporting the detector by road or air. For added protection during road or air transport, it is recommended that the detector be packed in the Hard Case.

2.2 F3Ci Main Components

Figure 3 identifies the main components of the F3Ci.

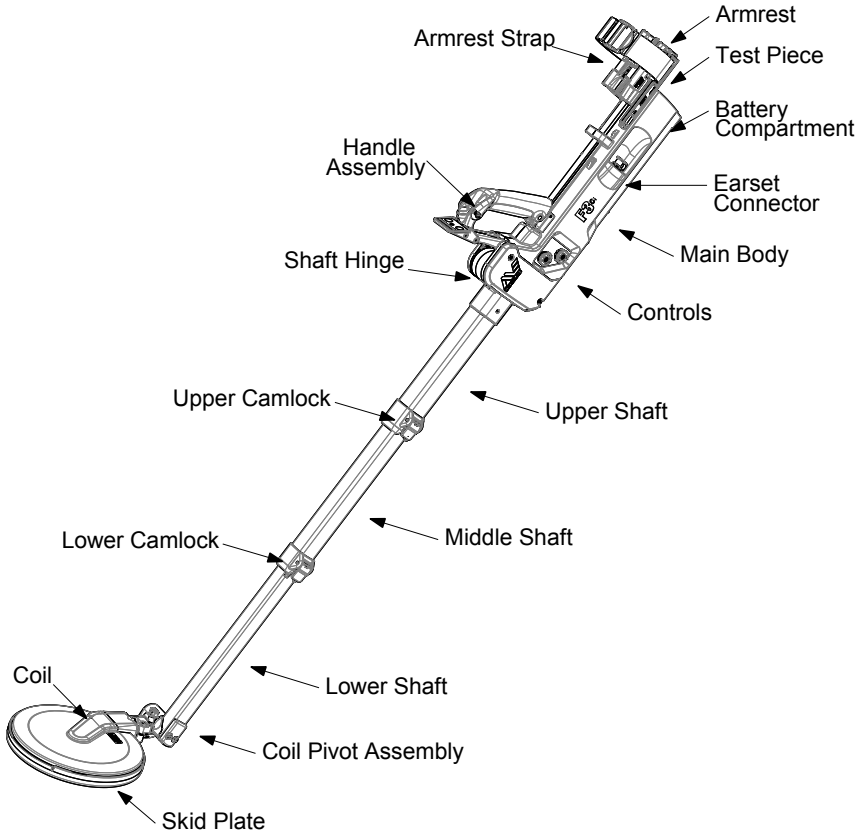


Figure 3: F3Ci main components

Battery Compartment – contains 4 x C cell alkaline or rechargeable batteries. A battery map is provided to indicate correct alignment of batteries when inserted into the compartment.

Armrest and Strap – provided for operator comfort when the detector is used for prolonged periods. The Armrest can be extended for operator comfort.

Test Piece – conveniently stowed on the Armrest to allow the operator to ensure the detector is working at its operational capability.

Earset Connector – provides connection for the Earset.

Main Body – waterproof housing containing the detector electronics and batteries.

Handle Assembly – collapsible handle that also contains user interface buttons and LED display.

Controls – On/Off and Volume/Sensitivity selection knobs – both controls cannot be accidentally rotated.

Shaft Hinge – pivot point for unfolding or folding the shafts. The hinge is only locked in position when the Handle Assembly is in its deployed position.

Upper, Middle, Lower Shafts – carbon fibre shafts that are adjustable for operator comfort and for changes in demining positions.

Upper and Lower Camlocks – self-cleaning locking mechanisms to secure middle and lower shafts.

Coil Pivot Assembly – permits the tilt and rotation of the coil and provides a tension screw for adjustment as required.

Coil – waterproof enclosed coil to eliminate possible interference from vegetation. The coil can be rotated 180 degrees.

Skid Plate – removable disk that protects and prolongs the life of the coil thereby reducing maintenance costs.

2.3 F3Ci Preparation

To prepare the detector for use, conduct the following procedure:

- a. Open the Hard Case and/or Soft Carry Bag.
- b. Remove the detector and inspect for obvious signs of damage. If damage is evident, report to the supervisor/team leader.
- c. Unlock the Battery Compartment Lid by twisting the Battery Lock Lever counter clockwise one-quarter turn. Once unlocked, pull the lid away from the Battery Compartment (the lid will stay attached by a tether as shown in Figure 4).
- d. Using the battery map located on the side of the Main Body, insert four C cell batteries. Taking care not to snag or trap the tether, replace the Battery Compartment Lid and rotate the Battery Lock Lever clockwise one-quarter turn. If the batteries are inserted incorrectly, the detector will fail to function when switched on.
- e. Using Figure 5 as a guide, unfold and adjust the F3Ci.

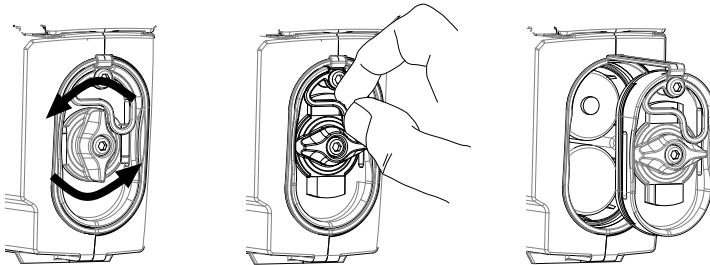
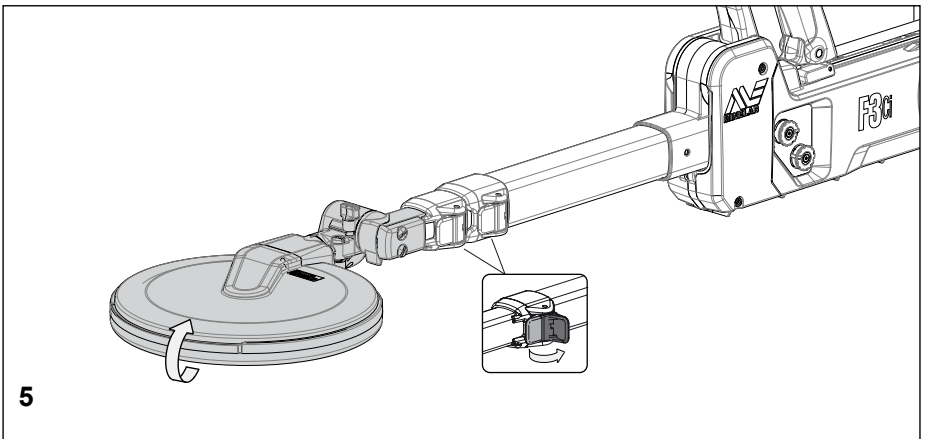
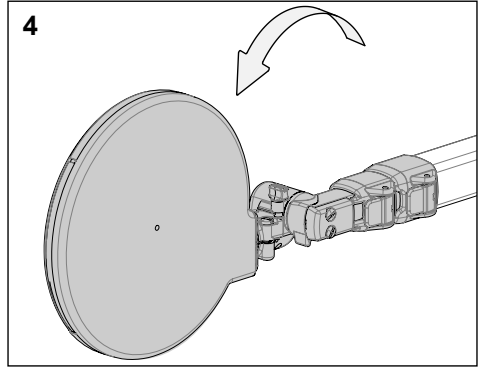
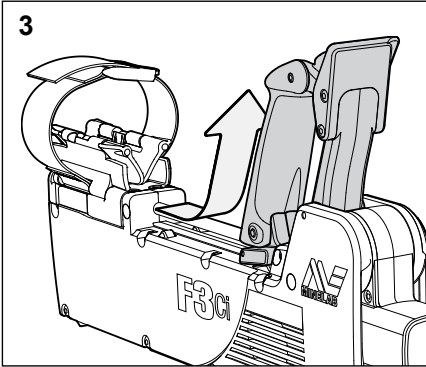
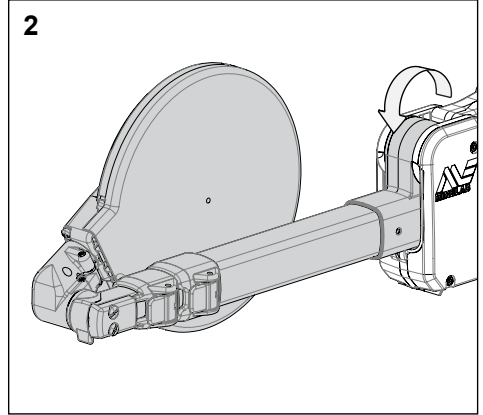
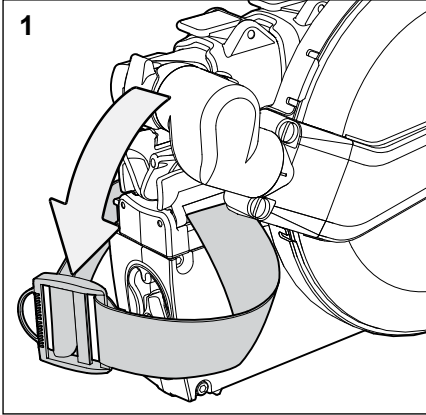


Figure 4: Removing the Battery Compartment Lid

NOTE

The F3Ci requires 4 C cell batteries for operation. Use only high quality alkaline or rechargeable batteries. Minelab recommends that only rechargeable batteries with a capacity of 5000 mAh or greater be used with the F3Ci. Rechargeable batteries have specific charge/discharge maintenance requirements, which should be strictly followed to ensure maximum battery life.



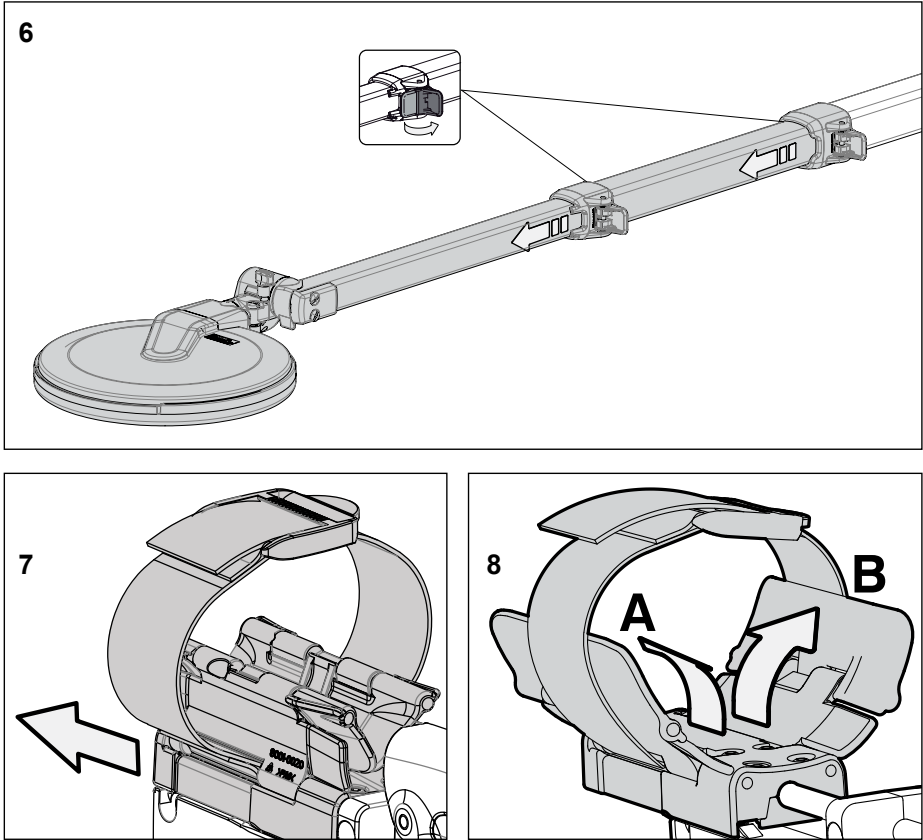


Figure 5: Guide to unfolding and adjusting the F3Ci

NOTE

When the Handle Assembly is locked into position (Frame 3), it will also lock the Upper Shaft in position. To unlock the Handle Assembly and to allow the Upper Shaft to rotate when repacking the detector, gently but firmly impact the base of the palm against the top of the handle behind the LED display.

- f. Extend the Lower and Middle Shafts to suit the selected demining position as shown in Figure 6.

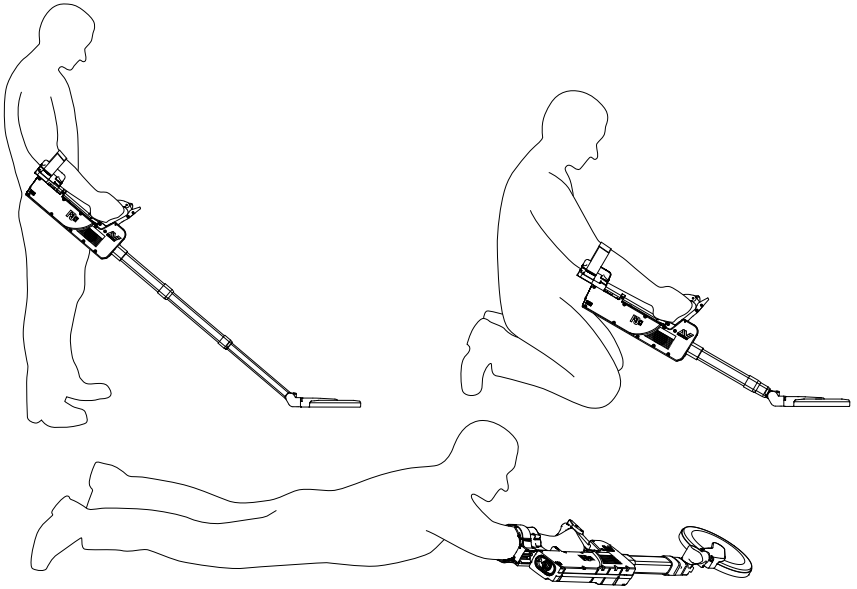


Figure 6: F3Ci in the standing, kneeling or prone positions

- g.** Undo the dust caps from the Earset Plug and Earset Socket on the detector. Gently hold the Earset by the rubber collar using thumb and index finger, the raised double arrow should be uppermost (see Figure 7). Align the plug with the Earset Socket and firmly slide the collar onto the socket.

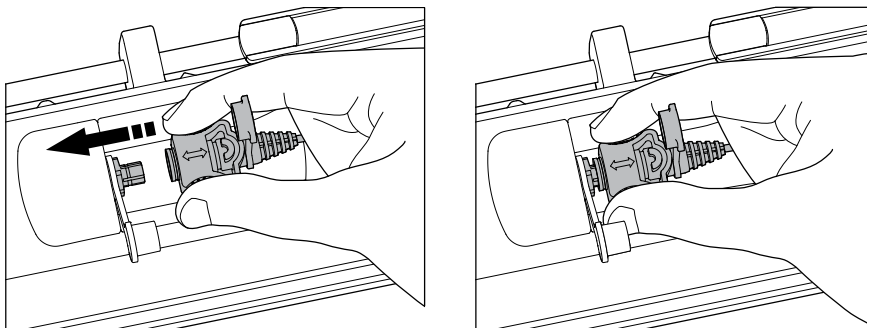


Figure 7: Connecting the Earset

NOTE

The Earset Connector is waterproof and must be connected and disconnected from the Earset Socket by holding the rubber collar. Do not attempt to connect or disconnect the Earset by pushing or pulling on the strain relief or wire at the rear of the rubber collar.

The F3Ci is now ready for use. Refer to Chapter 3 for Functional Description, and Chapter 4 for Operating Procedures.

To repack the F3Ci, this preparation procedure should be reversed.

3. Functional Description

3.1 Functional Controls and Displays

For ease of use, all controls and displays for the F3Ci are located on the Handle Assembly and Main Body. Figure 8 illustrates the location of all controls.

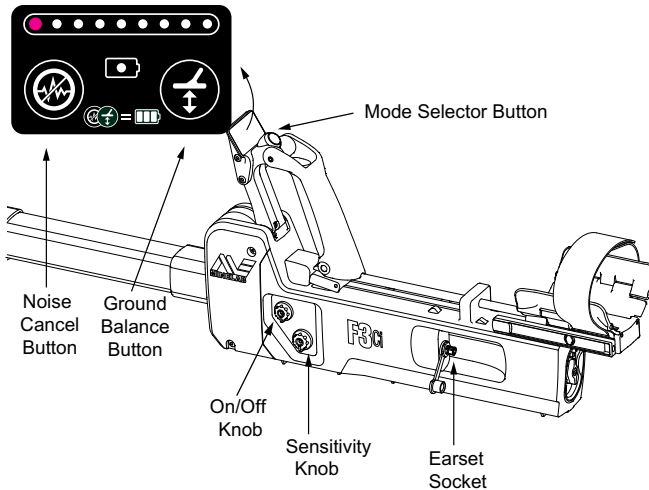


Figure 8: F3Ci controls

3.1.1 On/Off Knob

To switch the F3Ci on, gently pull out the On/Off Knob and rotate clockwise. Once in the On position release the knob back to the locked position (refer Figure 9).

When switched on, the F3Ci completes a series of internal start-up functions including initialisation of the microprocessor and self-tests, which check internal power supplies, transmitter etc.

On completion of internal diagnostic tests, the F3Ci will emit a “heart beat” beep every four seconds (unless targets are detected). If the LED is switched on, the first LED will illuminate at the same time as the heart beat.

During operation, continuous internal self-testing continues and an alarm tone is triggered on detection of any fault condition (refer to section 3.2 for a description of the alarm tones).

To turn the F3Ci off, pull out the On/Off Knob and rotate counter-clockwise to the Off position. Release the switch back to the locked position.

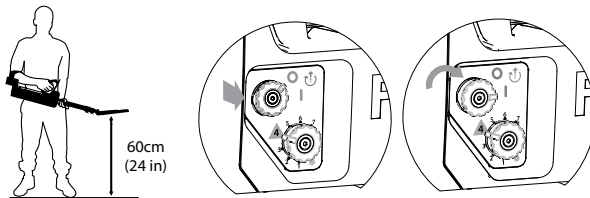


Figure 9: Switching on the detector

3.1.2 Sensitivity Knob

The F3Ci can be operated using seven preset volume and sensitivity settings. Position 4 is the default position and should always be selected when switching on the detector and conducting the Test Piece procedure (refer to section 4.2.3).

If the F3Ci Sensitivity Knob is rotated to the Yellow Dot position, the detector will operate at maximum sensitivity. When Interrogation Mode (see Section 3.1.5) is selected, under certain conditions, the detector will emit one tone for carbon rods, and another tone for all other targets.

The Yellow Dot on the decal indicates the position that, when selected, places the detector into a mode that is optimised to detect targets that are often used in the construction of improvised explosive devices.

*** WARNING ***

When detecting targets with low metal signatures, the F3Ci should not be used on a selection lower than the default setting (Position 4). Where possible, Free From Explosive targets should be buried at the required detection depth. Sensitivity options (Positions 4 to 7) should then be tested to determine the most suitable sensitivity to ensure detection of the target.

3.1.3 Ground Balance

Located on the right hand side of the LED display, when pressed and released the detector will commence its Ground Balancing sequence to remove the effects of mineralised soils.

3.1.4 Noise Cancel Button

Using the Noise Cancel button located on the left of the LED display, the operator can initiate an automatic frequency scanning sequence. As a result the F3Ci will select an operating frequency that minimises the effects from sources of electrical interference.

3.1.5 Mode Select Button

The yellow Mode Select button can be used to toggle between:

- a. Detection Mode. This mode is the default mode for the detector and will provide a similar tone to all types of metal targets. The tone will vary in volume depending on the size or proximity of the target.
- b. Interrogation Mode. When selected, this mode will provide different tones for various targets.
- c. Pinpoint Mode. By selecting Pinpoint Mode, the detector provides a single tone that assists in determining the accurate location of the target.

*** WARNING ***

Detection Mode is always more sensitive than Interrogation or Pinpoint modes. This means that, on occasion, when a very small target is detected in Detection Mode, it is possible the target will not be detected when selecting Interrogation or Pinpoint modes. In this instance, the detector should remain in Detection Mode to locate and mark the target position.

3.1.6 LED Display

A display of nine red LEDs provides a visual indication of target size and proximity. The display can be switched On and Off by simultaneously pressing the yellow Mode Select button and the Ground Balance button.

When the LED display is switched on but no targets are detected, then the first LED will flash, representing the heart beat.

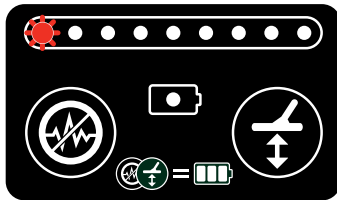
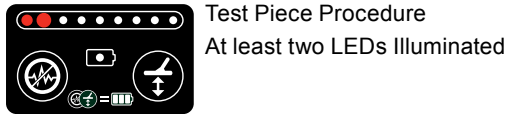
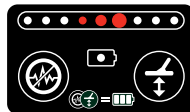


Figure 10: LED Display with no target response

Other typical illuminations of the LED display, including Battery Low Alarm LED are illustrated in Figure 11.



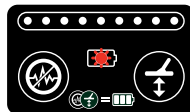
Small/deep target response



Medium target response



Large/shallow target response



Low battery alarm

Figure 11: Typical LED responses

NOTE

The LED display will always be off when the detector is first switched on.

3.1.7 Battery Status

Battery status can be checked at anytime by pressing and holding down the Noise Cancel button and then pressing and immediately releasing the Ground Balance button. Once completed the LED display will indicate the battery status for a period of three seconds.

3.1.8 Earset Socket

The F3Ci has an internal speaker located inside the Main Body, however, it can also be fitted with an Earset via the Earset Socket. The procedure for connecting the Earset is described in section 2.3.g.

A standard humanitarian demining Earset (Earset Speaker On) permits the detector's internal speaker to continue to function even when the Earset is connected.

For military countermine applications, an Earset that mutes the F3Ci's internal speaker when the Earset is connected is available (Earset Speaker Off). The Earset Speaker Off is identified by a short length of green tubing located at the rear of the Earset Plug.

*** WARNING ***

Minelab strongly recommends that an operator always wears an Earset when using the F3Ci detector.

3.2 Functional Tones

The F3Ci emits tones that vary in pitch and volume to alert the operator to targets, automatic detector functions or equipment alarm conditions. The following table summarises the tones that an F3Ci can produce.

Tones	Event	Description
Start-Up	Internal diagnostic checks when the F3Ci is switched on	A single rising tone followed by two beeps.
Heart Beat	Signifies correct operation of detector	Single or double beep every four seconds (only occurs in the absence of detection audio).
Ground Balance	Indicates successful Ground Balance procedure completed	Single beep followed by three beeps at completion.
Target	Indicates metal target detected	Increases volume and high or low pitch depending on target metal composition and depth.
Battery Low	Indicates batteries do not have enough charge to continue detection	High pitched fast continuous oscillating tone PLUS blinking Battery Low LED provided the LED display is switched on.
Equipment Fault	Indicates failure of detector component	Low pitched slow oscillating tone (ee-aww, ee-aww).
Coil Fault	Indicates coil not connected or not receiving sufficient current	Low pitched double tone every five seconds.
Noise Cancel	Indicates Noise Cancel procedure is occurring	A single beep followed by 20 seconds of a two-beep series and completed with three beeps.
Default Sensitivity Selected	Confirms to operator that Sensitivity knob is at Position 4 (Default) when the detector is switched on or Position 4 is selected when the detector is in use	Double mid pitched beep.

Tones	Event	Description
Default Sensitivity Not Selected	Indicates that the default sensitivity is not selected when detector is switched on	Single low pitched beep if sensitivity lower than default (Position 4) and single high pitched beep if sensitivity higher than default.
Changing Sensitivity	Increasing or reducing sensitivity	When increasing sensitivity a single high pitched beep. When decreasing sensitivity a single low pitched beep.

Table 1: Functional tones

NOTE

Electronics within the F3Ci ensure that its performance remains consistent as the charge state of the batteries begins to reduce. When the batteries can no longer supply the necessary power to sustain correct performance of the detector, a Battery Low Alarm will alert the operator.

*** WARNING ***

When Battery Low Alarm occurs the operator must immediately STOP operations. The F3Ci should be switched off and new or recharged batteries inserted into the Battery Compartment.

3.3 Test Piece – Functional Test

The F3Ci is supplied with a Test Piece designed to confirm that the detector is working to correct specifications. The sensitivity of the detector should be checked with the Test Piece when the Sensitivity Knob is at Position 4 (default). In some instances, a user may prefer to use inert mines or targets as test pieces because they represent the local threat. Minelab recommends that the detector is always first tested with the supplied Test Piece before local test pieces are used for testing.

*** WARNING ***

The Test Piece functional test must be conducted with the Sensitivity Knob set to Position 4 (Default) and should be conducted whenever the detector is switched on to confirm correct functionality of the detector.

NOTE

After switching on the detector, the LEDs will always be disabled.

If an Earset Speaker OFF is connected to the detector, the LED display will be automatically disabled for tactical reasons. However, if required the LED display can be enabled by pressing the Mode Select button and the Ground Balance button.

4. Operating Procedures

4.1 Introduction

The F3Ci is designed to ensure that operation of the detector is as simple as possible. Additionally, the F3Ci is extremely capable, robust and safe to use, eliminating the need for lengthy training requirements. This chapter describes procedures for safe and effective operation of the F3Ci. Where these procedures contravene local Standard Operating Procedures, local procedures should take precedence provided that all Minelab recommended safety procedures are followed.

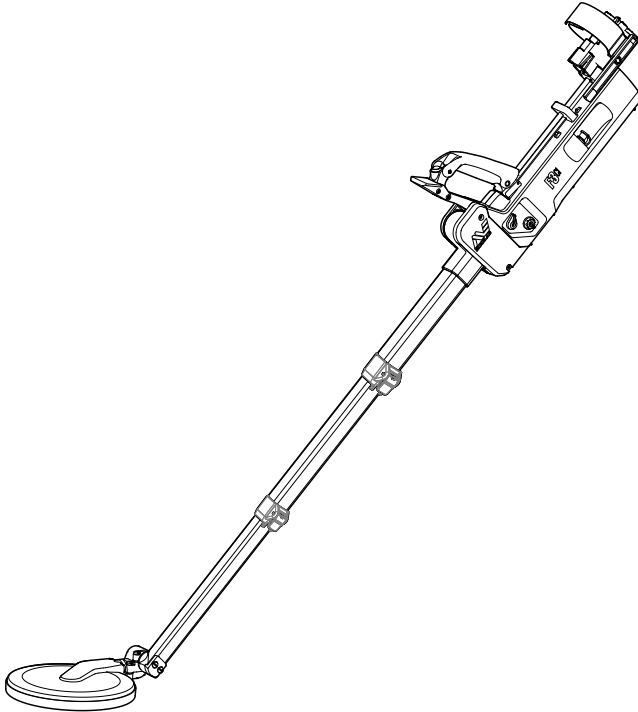


Figure 12: F3Ci detector

4.2 Standard Procedure

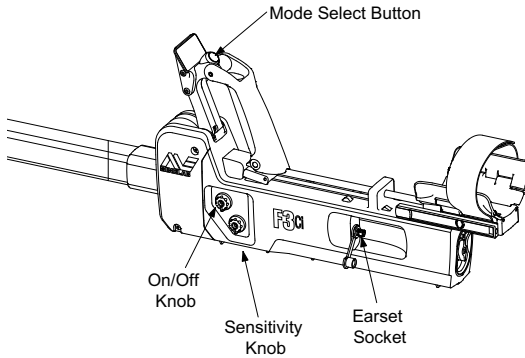


Figure 13: F3Ci controls

After unpacking the detector and preparing it for use as described in chapter 2, complete the following THREE step standard procedure.

4.2.1 STEP 1 Switch ON

- a. Hold the coil at least 600 mm (24 ins) from the ground, and away from any metallic objects. Ensure Sensitivity is set to Position 4 (default) and then turn the detector on by lifting and rotating the On/Off Knob clockwise.

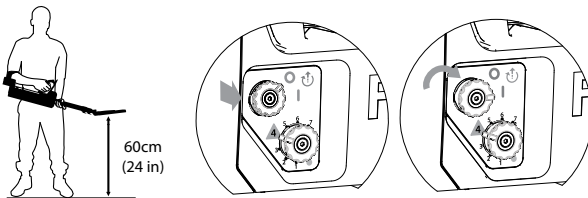


Figure 14: Switching on the detector

The F3Ci will emit a rising tone for approximately 2 seconds followed by two beeps. At the completion, the heart beat will commence.

- b. If the detector is affected by interference, perform a Noise Cancel (section 4.3.1).

NOTE

The detector will be in detection mode and should remain in detection mode during this procedure.

4.2.2 STEP 2 Ground Balance

Ensure this procedure is carried out on ground free of metal and hold the coil about 150 mm (6 ins) above the ground.

- a. Press and release the Ground Balance button. Slowly lower the coil directly to the ground then lift the coil up again 150 mm (6 ins). Refer to Figure 15.
- b. Continue to slowly lower and raise the coil until the 'Ground Balance OK' tone is heard. ('Ground Balance OK' tone consists of a three-tone sequence which occurs after approximately 7 seconds.)

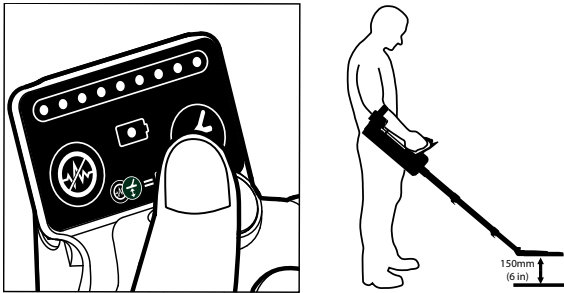


Figure 15: Ground Balance procedure

4.2.3 STEP 3 Test Piece

Ensure the operator's hands and arms are free of metallic objects (watches, rings etc.), and that no other metallic objects are near the coil.

- a. Remove the Test Piece from its stowed position on the Armrest by extending the Armrest and rotating the Test Piece clockwise. Hold the Test Piece above the middle of the coil with the end containing metal AWAY from the coil.
- b. Move the Test Piece towards the centre of the coil until it lightly touches the surface then move it away in the same direction.

NOTE

The detector should always be set to position 4 and in Detection Mode when conducting STEP 3.

A faint but clear response should be heard indicating the sensitivity of the detector is correct.

With the LED display enabled, the Test Piece Procedure will result in the illumination of at least two LEDs.

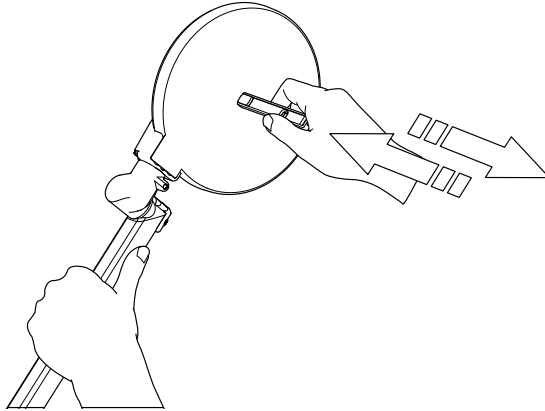


Figure 16: Test Piece procedure

4.3 Optional Procedures

After Step ONE, three optional procedures can be conducted if required. Each procedure can be conducted at any time during operations.

4.3.1 Noise Cancel

If the detector is affected by interference, conduct Noise Cancel as follows:

- a. Holding the coil stationary and at least 600 mm (24 ins) above the ground **press and immediately release** the Noise Cancel button (see Figure 17).

Noise Cancel will commence with a single beep followed by 20 seconds of a series of two beeps and finishing with a three-beep sequence.

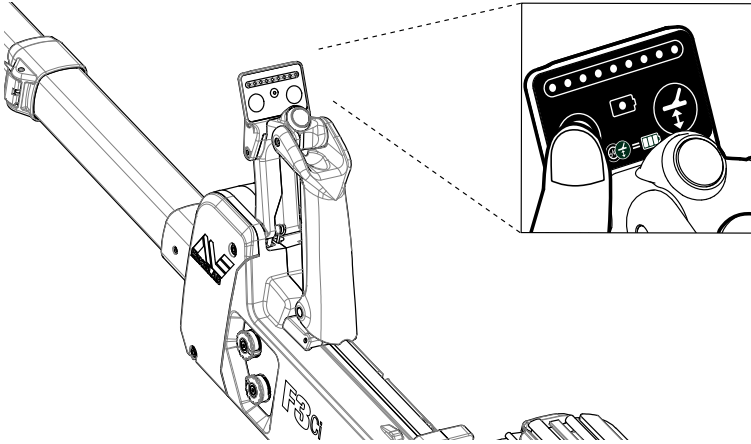


Figure 17: Noise Cancel

During the 20 seconds, the detector scans the environment searching for any electrical interference. Once detected, the F3Ci will automatically select a different operating frequency to eliminate or reduce the interference.

NOTE

The detector cannot be used for clearing operations during Noise Cancel. The coil should not be moved during this procedure nor should metallic objects be brought near the coil.

4.3.2 Activate/Deactivate LEDs

When the detector is first switched on the LEDs are deactivated. If required, the LED display can be activated by pressing and holding the Mode Select button and then pressing the Ground Balance button. Upon the LEDs illuminating release both buttons. To extinguish the LED display, repeat the process.

4.3.3 Activate/Deactivate Vibration

The detector incorporates a vibration feature to give an operator a tactile response during the detection of a target. When the detector is first switched on the vibration is deactivated. To activate vibration press and hold the Mode Select button and then press the Noise Cancel button. Once activated release both buttons. To deactivate the vibration, repeat the process.

NOTE

Vibrations, if activated, will not occur during the test piece procedure.

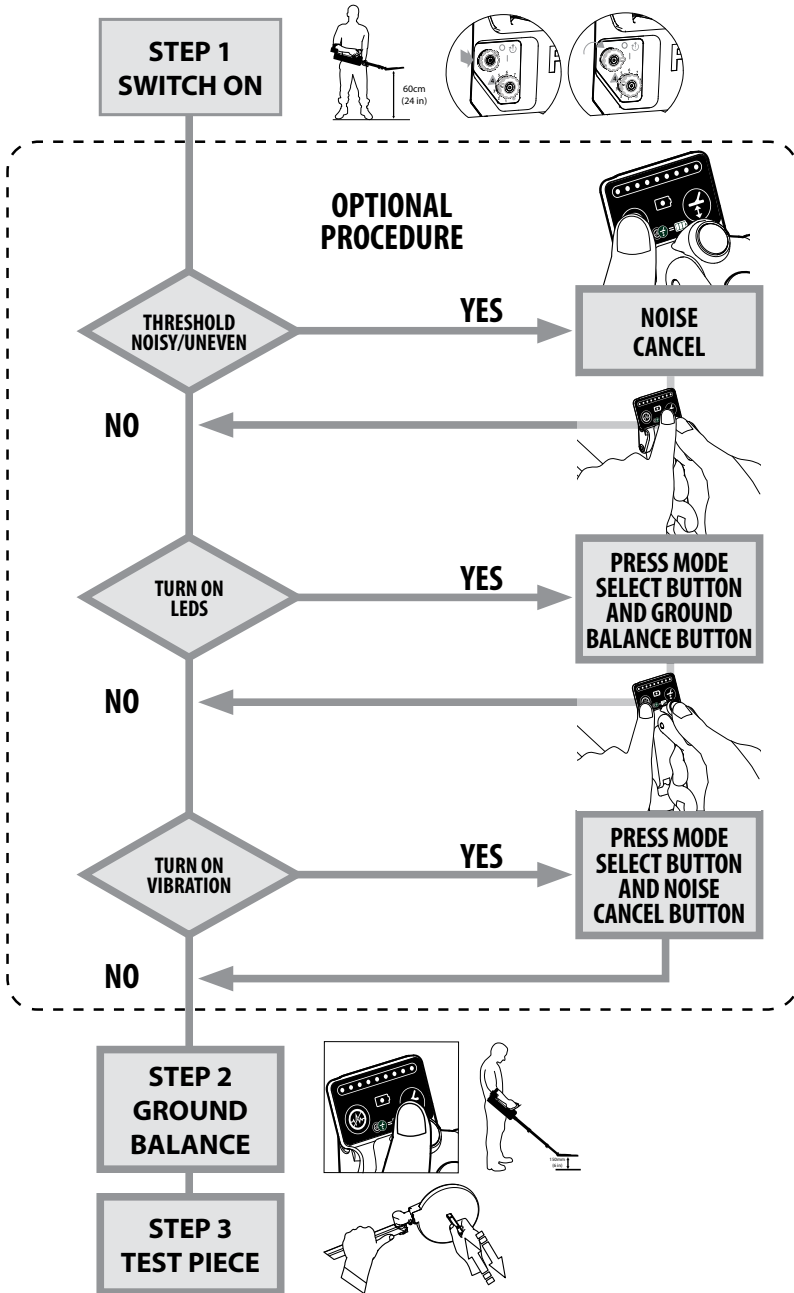


Figure 18: Standard and optional procedures

Once Noise Cancel is complete, continue with Standard Procedure steps 2 and 3. Figure 18 illustrates this sequence. Once completed, the F3Ci can commence operations in compliance with local Standard Operating Procedures.

NOTE

Having completed STEPS 1, 2 and 3 the F3Ci remembers the Ground Balance setting even after the detector has been switched off.

After Noise Cancel is completed the F3Ci remembers the frequency selected to minimise interference, even if the detector is switched off.

4.4 Sweeping Procedure

The F3Ci has three sweeping modes as follows:

- a.** Detection Mode. This is the default mode and will provide a similar alarm for all types of targets. The volume of the alarm will vary depending on the size and proximity of the target.
- b.** Interrogation Mode. Once a target has been found, it can be analysed by selecting Interrogation Mode. This is achieved by pressing and releasing the Mode Select button which will toggle between Detection and Interrogation modes. Interrogation Mode will provide different tones for different targets, thereby assisting the operator to identify a specific target of interest.

NOTE

When in Detection or Interrogation modes, the F3Ci operates as a “dynamic” detector which means the coil must be moving relative to the target for the target to be detected.

Two beeps will occur when the detector returns to Detection Mode.

- c. Pinpoint Mode. By pressing and holding down the Mode Select button, the F3Ci will enter Pinpoint Mode. In this mode, the tone will be the loudest when the centre of the coil is directly above the target.

NOTE

When in Pinpoint Mode, the F3Ci operates as a “static” detector which means an alarm will sound even when the coil is stationary above the target.

NOTE

Pressing and releasing the yellow Mode Select button will toggle between Detection and Interrogation modes.

When pinpointing is completed and the Mode Select button is released, the detector will return to the Detection Mode (default) indicated by a double beep.

*** WARNING ***

Detection Mode is always more sensitive than Interrogation or Pinpoint modes. This means that, on occasion, when a very small target is detected in Detection Mode, it is possible the target will not be detected when selecting Interrogation or Pinpoint modes. In this instance, the detector should remain in Detection Mode to locate and mark the target position.

In Detection Mode (default), the F3Ci should be swept with a smooth even motion. If the detector is swept too fast or too slow, small or deep targets may be missed. The coil should always be kept at the same height above the ground with care taken to ensure that the coil is not inadvertently raised at the end of each sweep (see Figure 19).

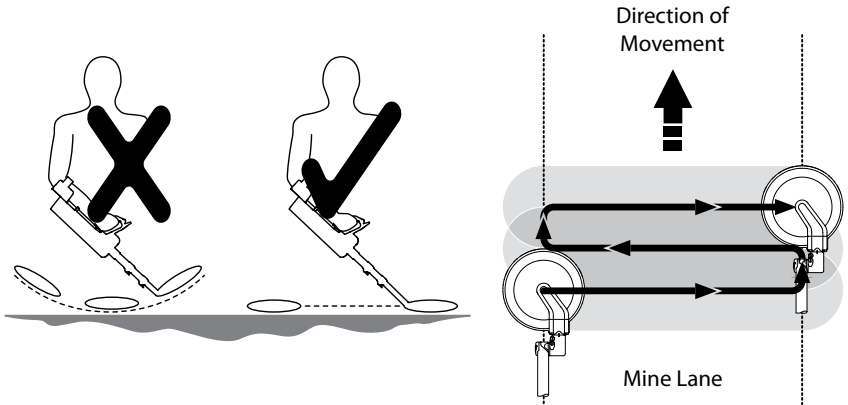


Figure 19: Sweeping procedure

Depth of detection depends on target distance from the coil, not depth of the target under the ground. Therefore, the coil should be swept as close to the ground as possible to maximise detection depth (local Standard Operating Procedures take precedence).

When a target is initially detected in Detection Mode, an operator should stand in place and continue to sweep the F3Ci beyond the target in an attempt to find clear ground. In doing so the operator will:

- a. immediately gain an impression of the size of the target prior to commencing the pinpointing procedure; and
- b. confirm the target is not in close proximity to a second target thereby avoiding a possible booby trap.

NOTE

Minelab recommends a half coil (100 mm/4 inches) overlap on successive sweeps as an operator moves forward in a mine lane.

4.4.1 STEP 1 Mapping the Target

Having detected a target using the sweeping procedure in detection mode and obtained a rough idea of its size and location, the location of the target can be 'mapped' using the F3Ci's 'Edge Detection' technique.

To conduct edge detection, the coil should approach the target location from a variety of angles as shown in Figure 20.

As the coil approaches the target, an alarm tone will occur indicating that coil is in close proximity to the target.

From the alarm tone, the operator should mentally mark the position on the ground, move the coil away, and approach the target from another angle.

This process continues until the operator achieves a mental picture of the target area.

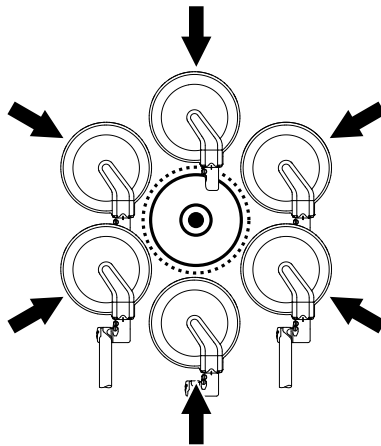


Figure 20: Mapping the target

*** WARNING ***

Extreme care must be taken when mapping the target to ensure the coil does not touch the ground (or any exposed parts of the mine) or snag on any previously undetected trip wires.

For large minimum metal anti-tank mines, it is possible that the area mapped out may be less than the actual area of the mine.

4.4.2 STEP 2 Pinpointing the Target

In Step 1, the area of a target was determined. If the metal in the target is sufficiently small, the area mapped will also be small and therefore it is a relatively simple matter to pinpoint the centre of the target. Move the coil away from the mapped target and select Pinpointing Mode by pressing and holding the yellow Mode Select button.

* WARNING *

Do not select Pinpoint Mode when the coil is above the target as this may result in the target being masked.

To determine the centre, for larger targets, the coil should be slowly moved across the mapped area. As the coil approaches the centre of the target, the alarm tone will increase to a maximum volume. Where maximum volume is achieved, the coil can be considered to be above the centre of the target.

Once confirmed, local Standard Operating Procedures should be followed to mark the target.

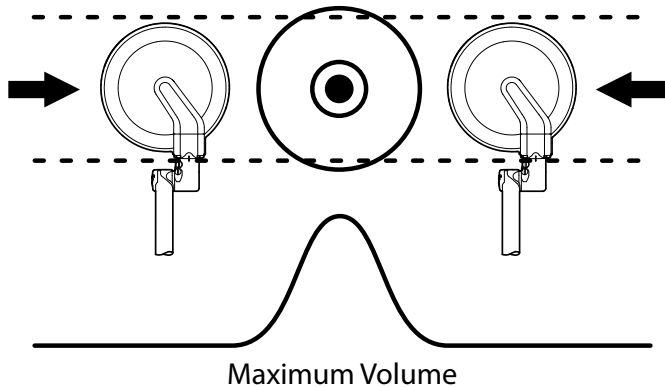


Figure 21: Determine target centre

NOTE

Against small targets, when the coil is above the target, the tone may cease. Movement either side will cause a tone to occur. In this instance, the centre of the target is indicated by the muting of the tone.

4.4.3 STEP 3 Interrogating the Target (Optional)

Having pinpointed the target the Mode Select button should be released, returning the detector to Detection Mode. The selection of detection mode will be indicated by a double beep. If required the target can be analysed by selecting Interrogation Mode.

To change from Detection Mode to Interrogation Mode, press and release the Mode Select button. The selection of Interrogation Mode will be indicated with a single beep. Sweep the coil back and forth across the target location to obtain a specific tone that represents the target.

NOTE

Interrogation Mode will provide a specific tone for a target. However, the tone is not unique and other targets may produce the same type of tone.

In different types of soil, the same target may give a different tone when interrogated.

*** WARNING ***

Depth of detection when in Interrogation or Pinpoint mode may be less than when in Detection Mode.

4.5 Multiple Targets

There may be occasions when an operator will encounter multiple targets. For example, small anti-personnel mines may be laid in a cluster, or a large anti-tank mine may be surrounded by smaller anti-personnel mines or booby-traps.

4.5.1 STEP 1 Mapping the Target

Using the procedure described in section 4.4.1, an area enclosing the multiple targets can be mapped.

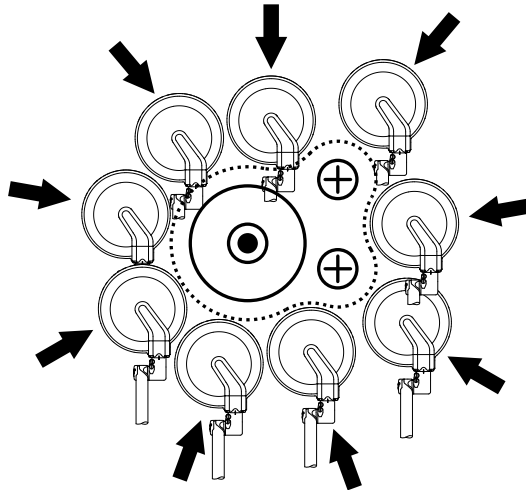


Figure 22: Mapping multiple targets

NOTE

To an experienced operator the shape of the mapped area can indicate whether multiple targets may be present.

4.5.2 STEP 2 Pinpointing Targets

After mapping out a suspicious area that may contain multiple targets, select pinpointing mode and sweep across the area approaching from different angles. In this manner separate alarms may occur indicating the location of different targets.

*** WARNING ***

The volume from a large target may mask that of a small target if the small target is located very close to the large target. Two similar targets located close to each other may result in only one alarm.

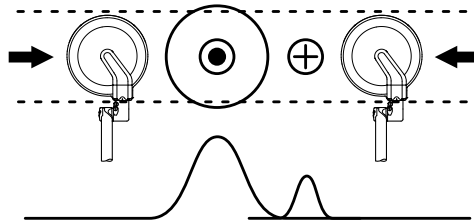


Figure 23: Multiple targets

4.5.3 STEP 3 Interrogating the Targets (Optional)

Once several targets have been pinpointed, each target can be analysed by selecting Interrogation Mode and sweeping the detector over the location of the suspected target. It is possible that different tones will be emitted for different targets thereby providing useful information to the operator.

*** WARNING ***

Detection Mode is always more sensitive than Interrogation or Pinpoint modes. This means that, on occasion, when a very small target is detected in Detection Mode, it is possible the target will not be detected when selecting Interrogation or Pinpoint modes. In this instance, the detector should remain in Detection Mode to locate and mark the target position.

4.6 Operating Multiple Detectors in Close Proximity

On occasion it may be necessary to operate F3Ci detectors in close proximity. In normal circumstances, an F3Ci detector can operate as close as two metres (seven feet) to another without suffering excessive mutual interference. To achieve this minimum operating distance between detectors, Noise Cancel must be conducted as follows:

- a. With all other detectors switched off, switch on the first detector and perform Noise Cancel as described in section 4.3.1.
- b. Once Noise Cancel is finished on the first detector, leave it switched on. Ensure that the second detector is at least two metres away and switch it on. Conduct Noise Cancel using the Noise Cancel button of the second detector.
- c. Continue this process for all detectors being used in close proximity.

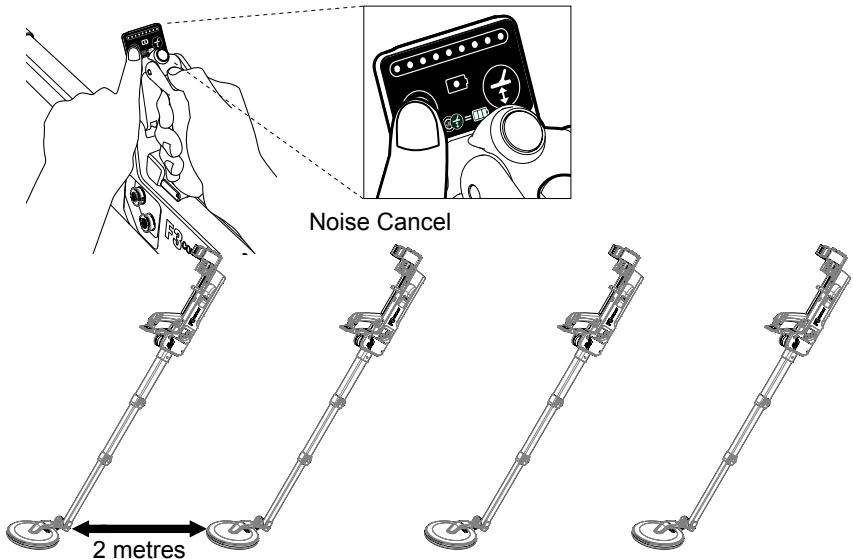


Figure 24: Operating detectors in close proximity

4.7 Completion of Operations

At the completion of operations, the F3Ci should be checked with the Test Piece before switching off to ensure satisfactory performance before being packed away. Once completed:

- a.** Turn the detector off.
- b.** Clean the detector and inspect for any signs of damage.
- c.** Remove the batteries from the Battery Compartment and stow in Soft Carry Bag.
- d.** Disconnect the Earset.
- e.** Retract the Middle and Lower Shafts rotating the coil to the stowed position.
- f.** Collapse Handle and pivot the retracted shafts securing in position with the Armrest Strap.
- g.** Stow the detector in the Soft Carry Bag and Hard Case if available.
- h.** Check all components are accounted for (especially the Test Piece and Earset) and are correctly packed.

5. Care and Troubleshooting

5.1 Routine Care

The F3Ci is designed for lasting use in harsh operating environments. However, proper care and maintenance will ensure long-term reliability. Key to ensuring the durability of the F3Ci is the correct stowage of the detector whenever it is not in use. Additionally, operators of F3Ci detectors should be aware of the following:

- a. During rest periods, wherever possible, the detector should be sheltered from direct sun, rain, snow etc.
- b. On completion of operations, with the F3Ci fully extended, all shafts should be wiped with a damp cloth to remove any dirt or dust before collapsing the shafts.
- c. Do not use solvents to clean the F3Ci. If any part of the detector comes into contact with corrosive substances, wash the detector with clean fresh water and dry with a clean cloth.
- d. Ensure the F3Ci is dry before stowing in the Soft Carry Bag.
- e. Ensure the batteries are removed from the Battery Compartment before stowing the detector.
- f. The Skid Plate is designed to protect the coil and may require replacement after long periods of use. There is no requirement to remove the Skid Plate to clean the inside during routine maintenance. To replace the Skid Plate, remove the original using fingers to lever it from the coil, then push the replacement Skid Plate onto the coil (see Figure 25).

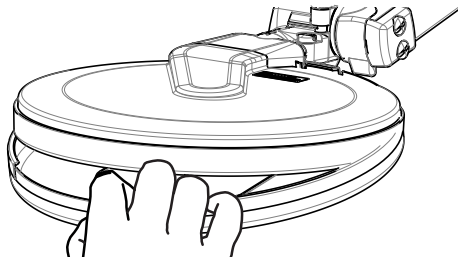


Figure 25: Replacing the Skid Plate

5.2 Troubleshooting

Table 2 provides several troubleshooting procedures in response to a variety of possible problems.

Problem	Recommended Procedure
F3Ci will not switch on	<ol style="list-style-type: none"> 1. Check batteries have been inserted correctly into the Battery Compartment, or 2. Replace batteries.
After switching on, there is excessive background chatter, even with the coil stationary	<ol style="list-style-type: none"> 1. Conduct Noise Cancel 2. Move away from noise source
There is no sound from the Earset	<ol style="list-style-type: none"> 1. Disconnect and reconnect the Earset, or 2. Try a known serviceable Earset (if this solves the problem, the original Earset may be faulty, if this does not solve the problem, the Earset socket may be faulty)
There is no sound from the Speaker	<ol style="list-style-type: none"> 1. Switch off and on, or 2. Disconnect Earset, Switch off and on
Cannot hear the Test Piece.	<ol style="list-style-type: none"> 1. Ensure the sensitivity of the detector is set at Position 4. 2. Ensure detector is operating in Detection Mode.

Table 2: Troubleshooting Specifications

6. Specifications

Length

Operating Length	1490 mm/59 ins – 950 mm/37 ins
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Weight

Operating weight with batteries (complete)	2.51 kg/5.5 lbs
Operating weight without batteries	2.28 kg/5.0 lbs
Shipping weight (in hard case with batteries)	7.4 kg/16.3 lbs

Transmission

Technology	Continuous Wave - VFLEX
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Output

Audio	Internal Loudspeaker
	Earset (various configurations available)
Visual	9 LED Display

Environmental

Temperature (Operating)	-30 deg C to 60 deg C
	-22 deg F to 140 deg F
Temperature (Storage)	-35 deg C to 70 deg C
	-31 deg F to 158 deg F
Environmental Endurance	To MIL STD 810G

Batteries

Alkaline	4 x C cell LR14
Rechargeable	4 x NiCad or NiMh C cell minimum 5000 mAh capacity
Battery Reverse Polarity Protection	Yes

Patents and Trademarks

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Patents: www.minelab.com/patents

Disclaimer

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NOTES

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WARNING

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COMPLIANCE

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

RADIO AND TELEVISION INTERFERENCE

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



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