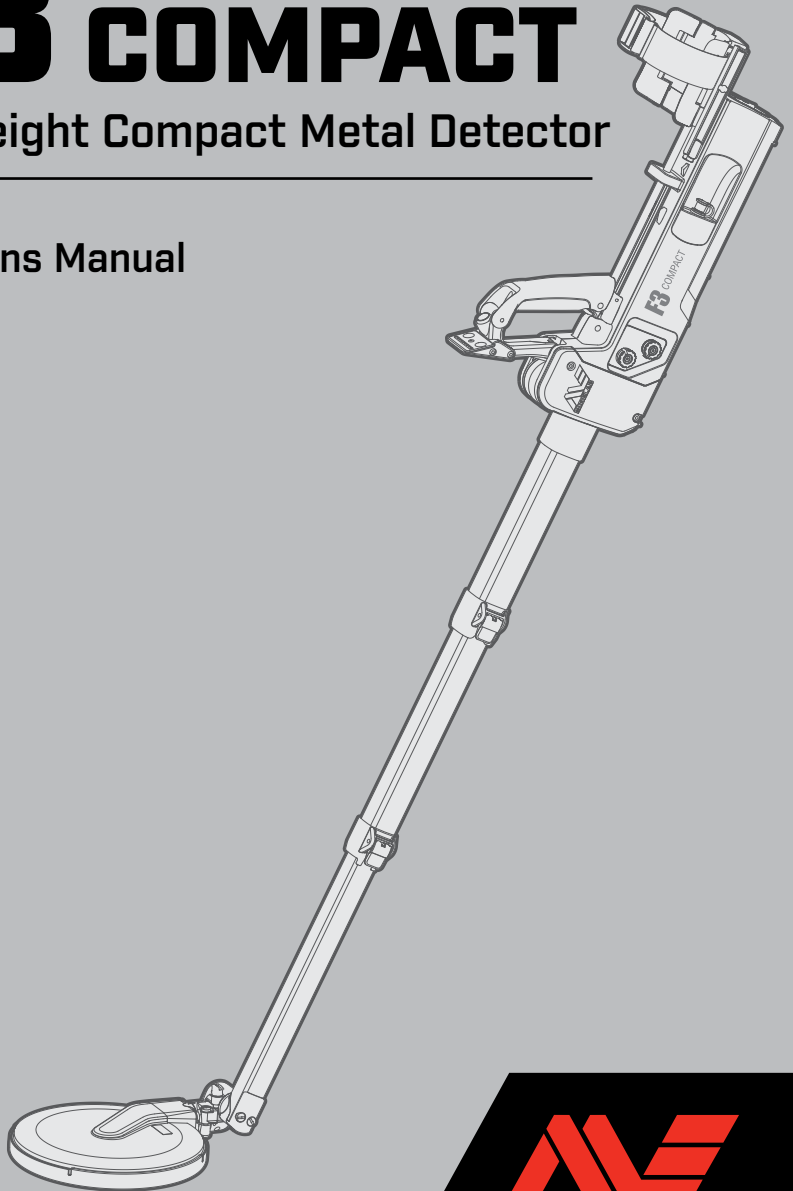


F3 COMPACT

Lightweight Compact Metal Detector

Operations Manual



Disclaimer

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F3 COMPACT

Lightweight Compact Metal Detector

Operations Manual

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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 F3 Compact 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.

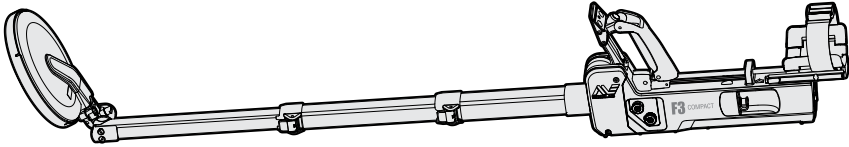


Figure 1: F3 Compact mine detector

The F3 Compact incorporates patented bipolar technology that enhances Minelab's renowned and highly successful Multi-Period Sensing (MPS) technology. Through MPS, the sensitivity of a detector remains consistent regardless of the mineralised content of soil. Bipolar technology also helps to eliminate the possibility of initiating a magnetic influence mine. Combined with 'static coupling' the F3 Compact does not require motion to detect a target thereby making pinpointing techniques fast and accurate.

When working in an environments with highly mineralised ground or electrical interference from overhead power lines or other sources, simple and quick semi-automatic procedures can be initiated by an operator resulting in the detector continuing to perform at maximum capability.

The F3 Compact 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 that the detector is working at its operational capability.

The F3 Compact also provides a visual indication of detection via a Light Emitting Diode (LED) display. Adjustments to sensitivity and volume settings are possible. If required, the F3 Compact can be programmed to user initiated customised volume and sensitivity selections using Minelab's configuration software.

Components of the F3 Compact are manufactured within tightly controlled parameters so that they can be interchanged in the field without any requirement for calibration. The F3 Compact is designed to satisfy MIL-STD-810G.

NOTE

Although the F3 Compact can withstand immersion to a depth of three metres for short periods of time, it is NOT designed for use as an underwater detector.

General Description and Preparation

Mine Detecting Set

The F3 Compact is supplied as a mine detecting set (Figure 2), comprising:

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

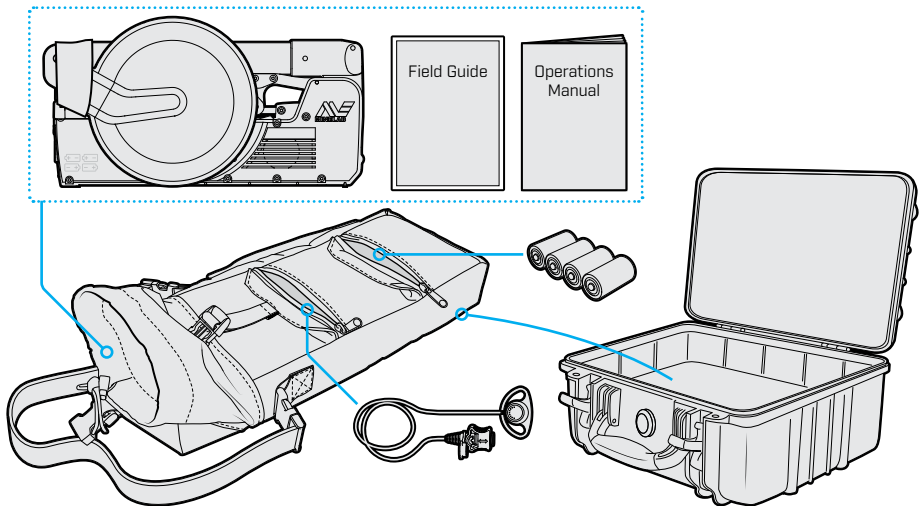


Figure 2: F3 Compact mine detecting set

The optional Hard Case permits the stowage 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.

F3 Compact Main Components

Figure 3 identifies the main components of the F3 Compact.

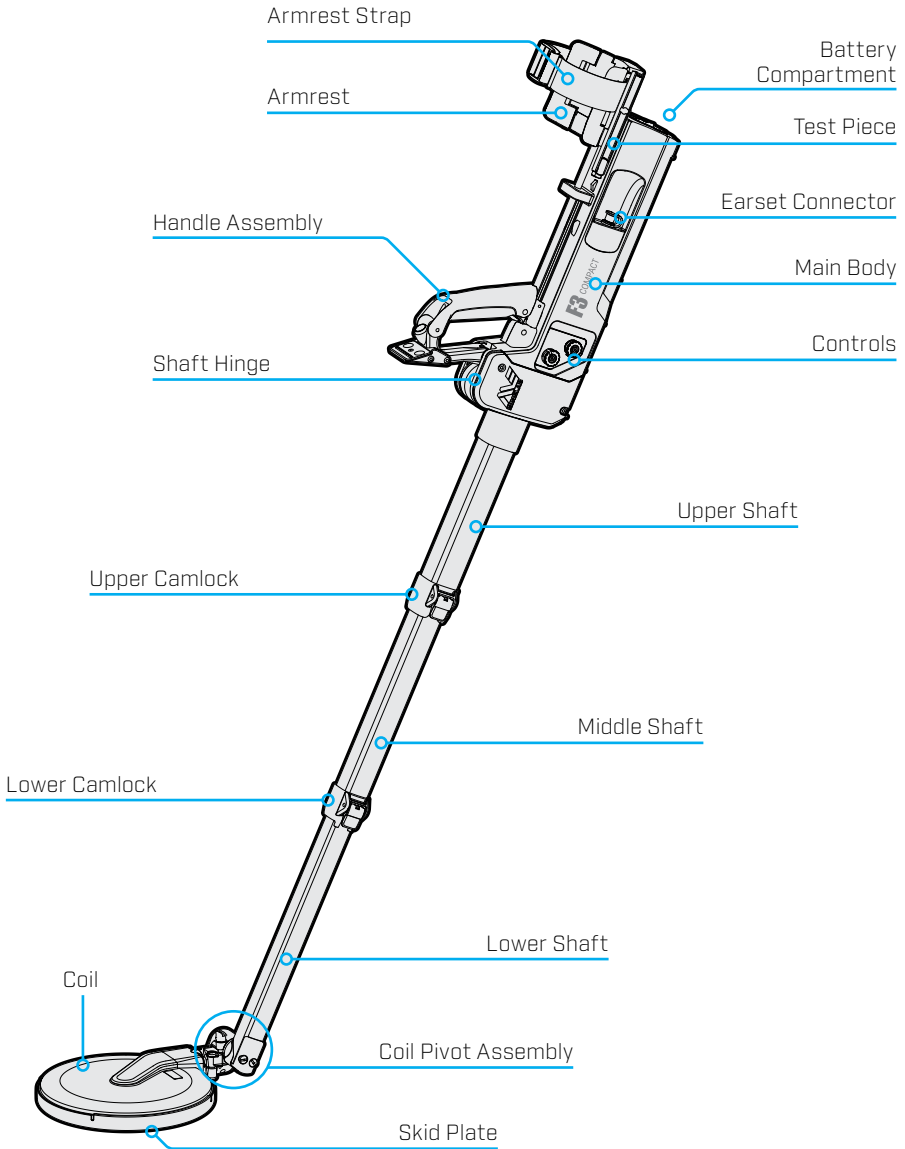


Figure 3: F3 Compact main components

Battery Compartment – contains four 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 and also the programming cable when using the configuration software to customise volume and sensitivity settings.

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

Handle Assembly – collapsible handle that also contains Ground Balance/Audio Reset button, Volume adjustment buttons.

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.

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

F3 Compact 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 detector.
- f. Extend the Lower and Middle Shafts to suit the selected demining position as shown in Figure 7.

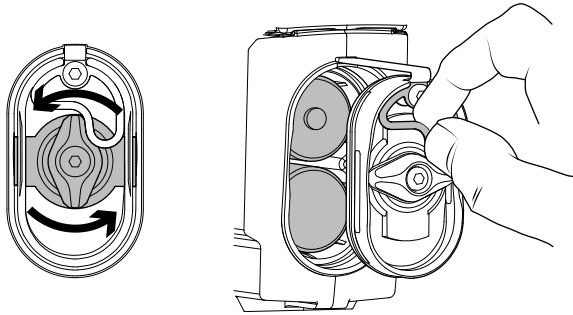


Figure 4: Removing the Battery Compartment Lid

NOTE

The F3 Compact requires four 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 F3 Compact. Rechargeable batteries have specific charge/discharge maintenance requirements, which should be strictly followed to ensure maximum battery life.

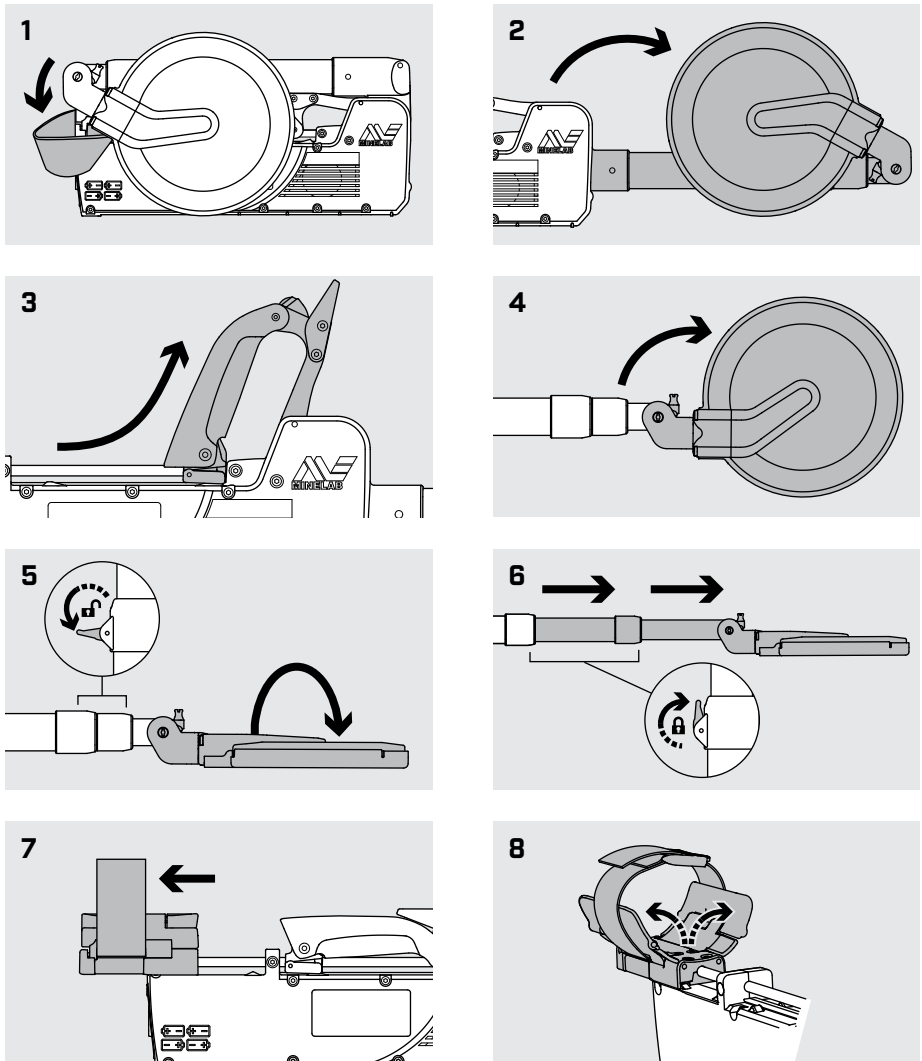


Figure 5: Guide to unfolding and adjusting the F3 Compact

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 fold when repacking the detector, gently but firmly impact the base of the palm against the top of the handle behind the LED display.

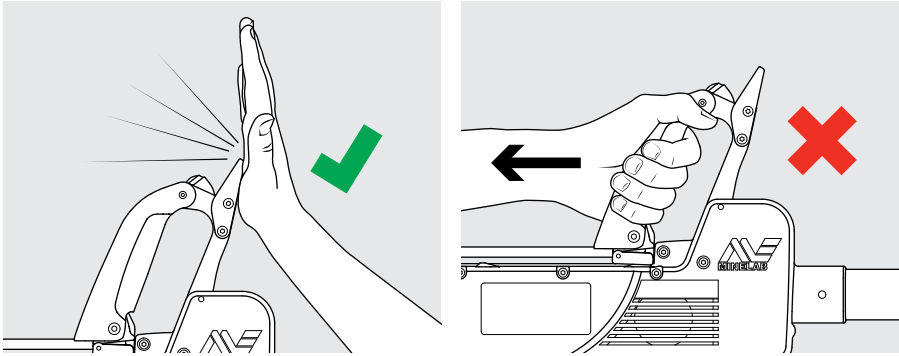


Figure 8: Stowing the handle

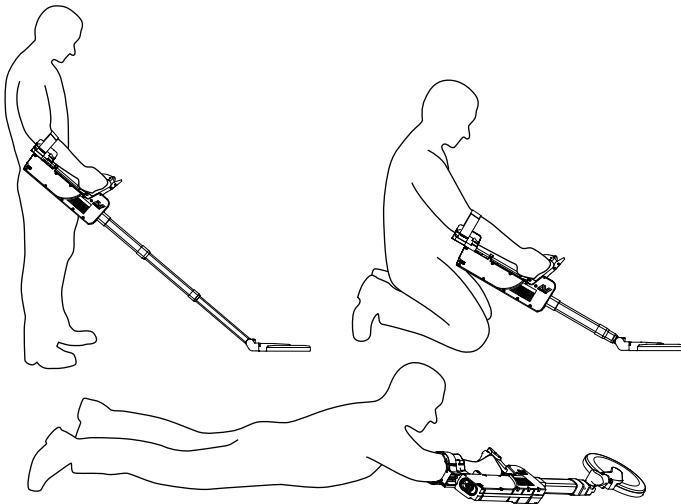


Figure 7: F3 Compact in the standing, kneeling or prone positions

- 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 8). Align the plug with the Earset socket and firmly slide the collar onto the socket.

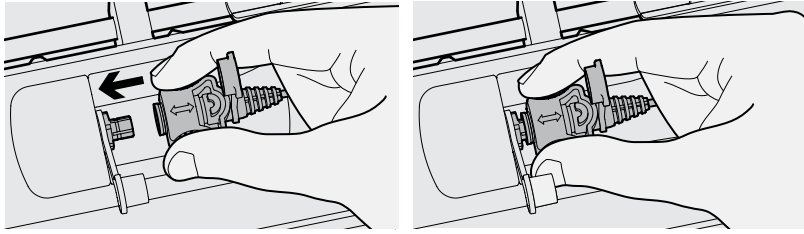


Figure 8: Connecting the Earset

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 F3 Compact is now ready for use. Refer to "Functional Description" on page 14 for controls, display, and functional information. Refer to "Operating Procedures" on page 22 for detailed detector operation guidance.

To repack the F3 Compact, this preparation procedure should be reversed.

Functional Description

Functional Controls and Displays

For ease of use, all controls and displays for the F3 Compact are located on the Handle Assembly and Main Body. Figure 9 illustrates the location of all controls.

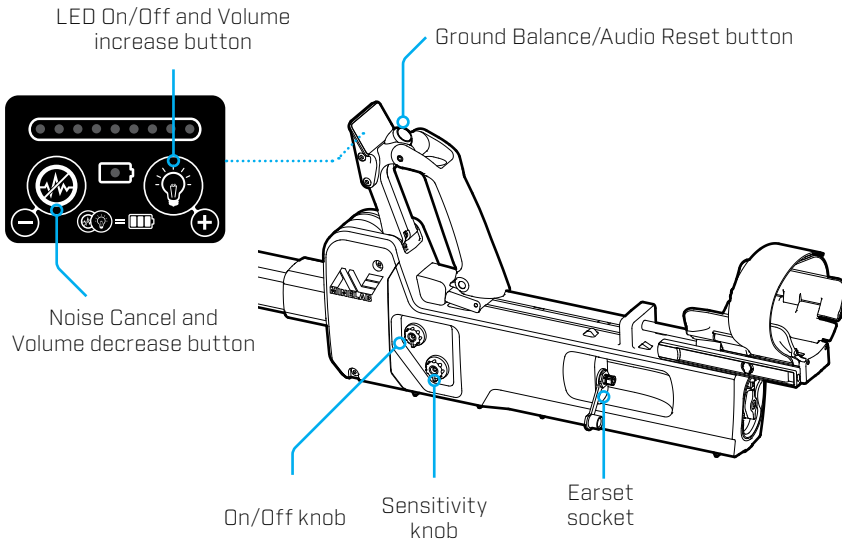


Figure 9: F3 Compact controls

On/Off Switch

To switch the F3 Compact 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 to Figure 10: Switching on the detector).

When switched on, the F3 Compact completes a series of internal start-up functions including initialisation of the microprocessor and self-tests, which check internal power supplies, transmitter etc.

Internal diagnostics take approximately 12 seconds to complete, during which the operator will hear a series of rising tones (known as the Start-Up Tones).

On completion of the Start-Up Tones the F3 Compact begins detecting, when there has been no target detection for 15 seconds the F3 Compact will emit a Heartbeat Tone, which confirms to the operator that the F3 Compact is functioning correctly.

During operation, continuous internal self-testing continues and an alarm tone is triggered on detection of any fault condition (refer to "Functional Tones" on page 20 for a description of the alarm tones).

To turn the F3 Compact off, pull out the On/Off Knob and rotate counter-clockwise to the Off position. Release the switch back to the locked position.

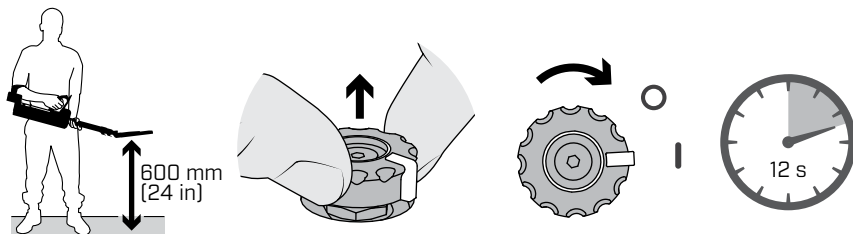


Figure 10: Switching on the detector

Sensitivity Knob

The F3 Compact can be operated using seven preset 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 "STEP 3 Test Piece" on page 25).

The Yellow Dot on the decal indicates the position that, when selected, permits the detector to be customised for specific Sensitivity selections. To customise the detector, Minelab supplied configuration software and cables are required. The detector is shipped with a factory preset for the Yellow Dot selection; this makes the detector operate the same as the default Position 4.

WARNING

When detecting targets with low metal signatures, the F3 Compact should not be operated with a Sensitivity setting 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.

Ground Balance/Audio Reset Button

Easily identifiable as the Green Button located on top of the Handle Assembly, this dual action button carries out the following functions:

- a. Ground Balance.** (Press and hold the Green button) A key feature of the F3 Compact is its ability to detect metallic mines in all ground conditions. False alarms due to mineralised (magnetic/lateritic) soils are automatically removed through the Ground Balance procedure.
- b. Audio Reset.** (Press and immediately release the Green button) On occasion, the F3 Compact may become louder than normal with a constant tone. Holding the coil stationary over a metallic object or over mineralised ground for an extended period of time may cause this. The Audio Reset procedure will remove any constant tone making the F3 Compact quiet (refer to "Audio Reset" on page 27).

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 F3 Compact will select an operating frequency that minimises the effects from sources of electrical interference.

Volume Control

The default volume level of the F3 Compact is close to maximum. However, volume can be lowered or slightly increased using the volume control feature of the F3 Compact.

Volume can be reduced from default in seven steps by pressing and releasing the Noise Cancel button. To initiate noise cancelling, the Noise Cancel button must be held down for two seconds. Volume can be increased from default in one step by pressing and releasing the LED On/Off button.

If the LEDs are switched On, and volume is changed, a temporary visual indication of volume level is provided to the operator.

For each reduction in volume, a low pitched beep will be emitted. For each increase in volume, a high pitched beep will be emitted. Whenever the default volume is re-selected a double deep is emitted notifying the operator that default volume has been selected.

When the volume is adjusted to the extreme upper or lower setting a longer beep is emitted alerting the operator that the maximum or minimum setting has been reached.

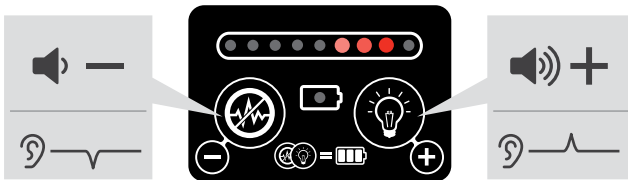


Figure 11: Volume Control buttons

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 pressing and holding the LED On/Off button for 2 seconds.

When the LED display is switched on, a minimum, of one LED will illuminate (see Figure 12).

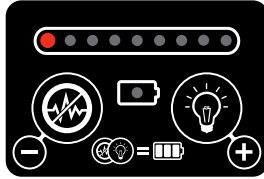


Figure 12: LED Display with no target response

Other typical illuminations of the LED display, including Battery Low Alarm LED are illustrated in Figure 13.



Test piece procedure
Up to three LEDs illuminated



No target



Small/deep target response



Medium target response



Large/shallow target response



Low battery alarm

Figure 13: Typical LED responses

NOTE

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

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 LED On/Off button. Once completed the LED display will indicate the battery status for a period of three seconds.

Earset Socket

The F3 Compact has an internal speaker located inside the Main Body, and can also be fitted with an Earset via the Earset Socket. The procedure for connecting the Earset is described in step 'g' on page 12.

A standard humanitarian demining Earset (Earset Speaker On) permits the F3 Compact's internal speaker to continue to function even when the Earset is connected.

For military countermine applications, an Earset that mutes the F3 Compact'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 F3 Compact detector.

Functional Tones

The F3 Compact 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 F3 Compact can produce.

Tones	Event	Description
Start-Up	Internal diagnostic checks when the F3 Compact is switched on	Four or five rising tones over 12 seconds.
Heartbeat	Signifies correct operation of detector when there is no target detection	High pitched low volume double beep every 15 seconds.
Ground Balance	Indicates successful Ground Balance procedure completed	One fast high pitched double beep.
Target Detection	Indicates metal target detected	Increases volume with high or low pitch depending on target metal composition.
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 abnormal coil current	Low pitched double tone every five seconds.
Noise Cancel	Indicates Noise Cancel procedure is occurring	Two single beeps followed by 45 seconds of short triple beeps finishing with four single 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 high pitched beep.
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	Indicates 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 F3 Compact 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 F3 Compact should be switched off and new or recharged batteries inserted into the Battery Compartment.

Test Piece – Functional Test

The F3 Compact is supplied with a Test Piece designed to confirm that the detector is working to correct specifications. 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 always be first tested with the supplied Test Piece before local test pieces are used for testing.

NOTE

When switched on, maximum sensitivity is available 30 seconds after the completion of the Start-Up tones. Do not test the detector with the Test Piece until 30 seconds after the completion of the Start-Up tones.

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 unless the LED On/Off button is pressed.

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 LED On/Off button.

Operating Procedures

Introduction

The F3 Compact is designed to ensure that operation of the detector is as simple as possible. Additionally, the F3 Compact 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 F3 Compact. Where these procedures contravene local Standard Operating Procedures, local procedures should take precedence provided that all Minelab recommended safety procedures are followed.

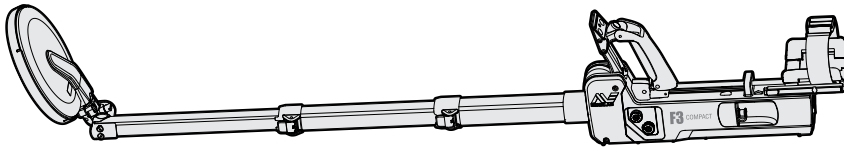


Figure 14: F3 Compact detector

Standard Procedure

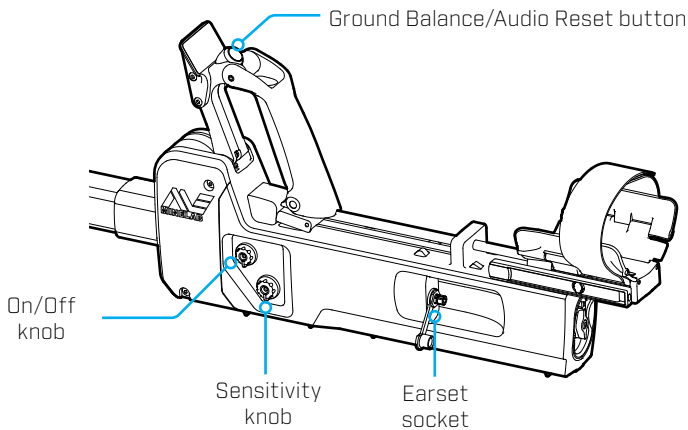


Figure 15: F3 Compact controls

After unpacking the F3 Compact and preparing it for use as described in "F3 Compact Preparation" on page 10, complete the following THREE-step standard procedure.

STEP 1 Switch On

- a. Hold the coil at least 600 mm (24 in) 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.

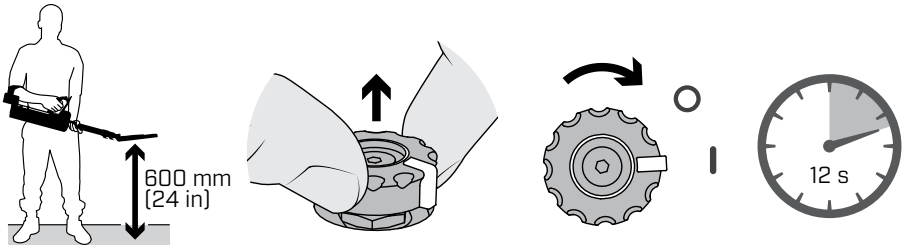


Figure 16: Switching on the detector

The F3 Compact will emit a series of rising tones over 12 seconds (internal diagnostic checks occurring). At the completion of the Start-Up Tones the F3 Compact will begin detecting. The F3 Compact will emit a Heartbeat tone when there have been no target detections for a period of 15 seconds.

- b. If the F3 Compact sounds quiet and steady continue with STEP 2. If the detector is noisy or affected by interference, perform a Noise Cancel (page 26).
- c. If the F3 Compact sounds steady but has a constant tone when the coil is away from the ground and metallic targets, perform an Audio Reset (page 27).

STEP 2 Ground Balance

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

- a. Press down and hold the green Ground Balance button. Lower the coil directly to the ground then lift the coil up again 150 mm (6 in). Refer to Figure 17.
- b. Continue to lower and raise the coil until the 'Ground Balance OK' tone is heard. ('Ground Balance OK' tone consists of a short high-pitched double beep).
- c. Release the Ground Balance button.

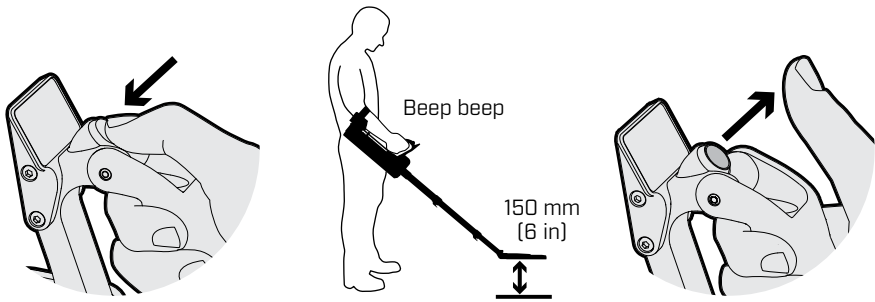


Figure 17: Ground Balance procedure

NOTES

Movement of the coil during the entire Ground Balance procedure should be slow, continuous and smooth and each down and up movement should take three to four seconds.

If the Ground Balance OK tone is not heard within 20 seconds of starting the procedure, release the green Ground Balance button and repeat this procedure.

If there is metal in the ground under the coil whilst Ground Balancing, the detector will not Ground Balance correctly. Move the detector and repeat the Ground Balance over ground that is free of metallic objects.

After the Ground Balance procedure is completed the detector will automatically cancel interference from the ground under the coil. If ground conditions change (changing mineralisation in the ground) this procedure may need to be repeated.

For operator training purposes, once Ground Balance has been successfully completed, the detector can be made to 'forget' the Ground Balance conditions by pressing and holding the green Ground Balance button for five seconds. This will allow the operator to practise the Ground Balance procedures against the same mineralised ground.

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. Ensure Sensitivity is set to Position 4 (default).
- b. 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.
- c. Move the Test Piece towards the centre of the coil until it lightly touches the surface then move it sideways off the coil (the Test Piece should be moved slowly and smoothly during this procedure).

A faint but clear response (rise in volume) 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 one additional LED.

If the Test Piece cannot be heard, conduct an Audio Reset and recheck. If the Test Piece fails to be detected the detector must be considered faulty and must not be used.

NOTES

Maximum sensitivity is only available 30 seconds after the completion of the Start-Up Tones. Do not test the detector with the Test Piece until 30 seconds after the completion of the Start-Up.

The Test Piece not only ensures that the performance of the detector is correct but also gives the operator an example of how a minimum metal mine might sound when deeply buried; for example Type 72A at 150 mm. (Sensitivity knob set to Position 4)

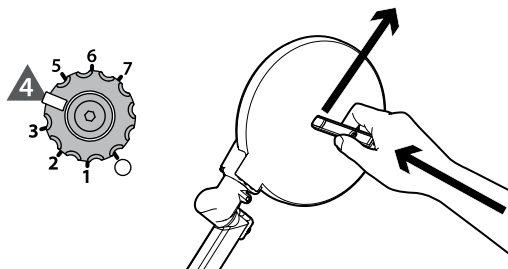


Figure 18: Test Piece procedure

Optional Procedures

If after Step ONE the F3 Compact is not quiet and steady, conduct one or both of the following procedures:

- a. Noise Cancel (page 26)
- b. Audio Reset (page 27)

Noise Cancel

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

- a. Holding the coil stationary and at least 600 mm (24 in) above the ground **press and hold for two seconds** the Noise Cancel button (see Figure 19).

Noise Cancel will commence with two single beeps followed by 45 seconds of sharp triple beeps, finishing with four single beeps.

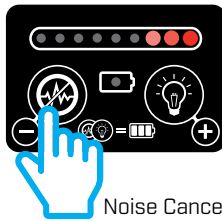


Figure 19: Noise Cancel

During the 45 seconds, the detector scans the environment searching for any electrical interference. Once detected, the F3 Compact 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.

Audio Reset

Whenever the F3 Compact sounds louder than normal with a constant tone perform the Audio Reset procedure as follows:

- a. Hold the coil away from any metallic objects. **Press and immediately release** the green Ground Balance button (green button located on top of the handle).

Within two seconds the detector will return to its correct level (see Figure 20).

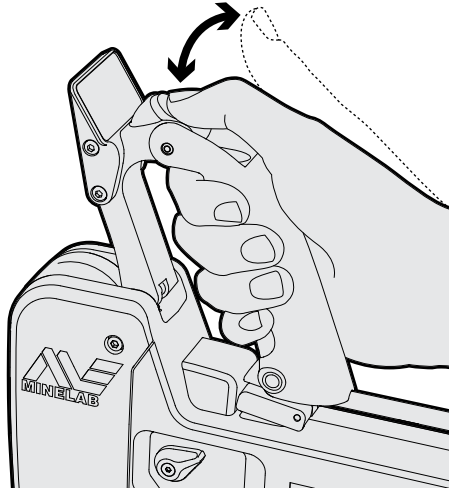


Figure 20: Audio Reset

NOTES

*The detector **cannot** be used for clearing operations during the Audio Reset procedure.*

If the Audio Reset button is held too long, the detector will commence the Ground Balance procedure.

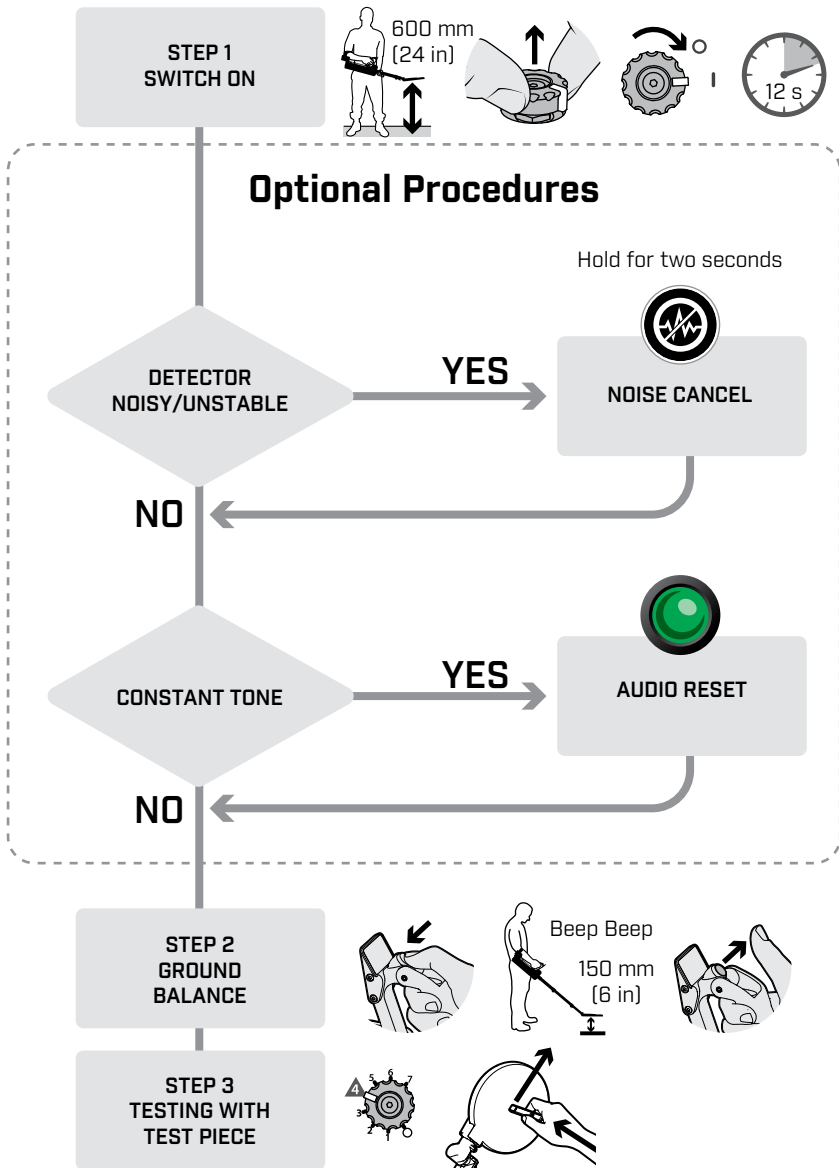


Figure 21: Standard and optional procedures

Noise Cancel and Audio Reset procedures can be performed any time the F3 Compact becomes noisy, uneven or rises in volume.

Once Noise Cancel and/or Audio Reset are complete, continue with Standard Procedure STEPS 2 and 3. Figure 21 illustrates this sequence. Once completed, the F3 Compact can commence operations in compliance with local Standard Operating Procedures.

NOTE

Having completed STEPS 1, 2 and 3 the F3 Compact remembers the Ground Balance setting even after the detector has been switched off.

After Noise Cancel is completed the F3 Compact remembers the frequency selected to minimise interference, even if the detector is switched off.

Sweeping Procedure

The F3 Compact should be swept with a smooth even motion at a speed of 0.6 m/s (2 ft/s). 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 22).

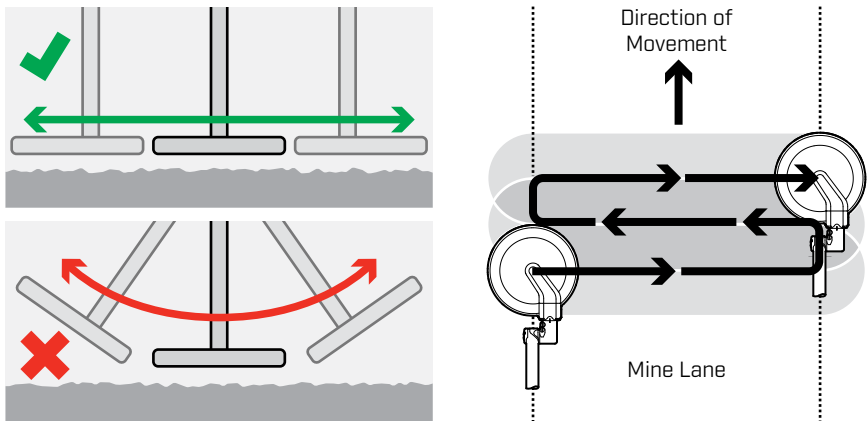


Figure 22: Sweeping procedure

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, an operator should stand in place and continue to sweep the F3 Compact 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 in) overlap on successive sweeps as an operator moves forward in a mine lane.

Pinpointing Procedure

The design of the F3 Compact makes pinpointing accurate and fast. The F3 Compact's monoloop coil means there are no gaps in sensitivity around the coil's circumference or across its surface. Pinpointing is conducted by first mapping the target and then finding its centre.

STEP 1 Mapping the Target

Having detected a target using the sweeping procedure and obtained a rough idea of its size and location, the precise location of the target can be 'mapped' using the F3 Compact's 'Edge Detection' technique.

Edge detection makes use of the coil's consistent sensitivity around its circumference to detect the area of a target. To conduct edge detection, the coil should approach the target location from a variety of angles as shown in Figure 23.

As the coil approaches the target, the volume will increase (target detection) indicating that coil is in close proximity to the target.

At the rise in volume, 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.

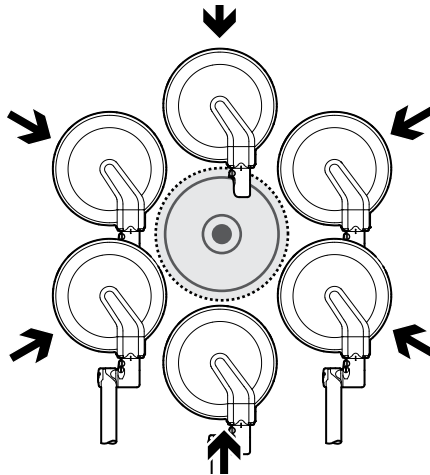


Figure 23: Mapping the target

WARNING

Extreme care must be taken when mapping the target to ensure that 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.

After an initial detection, if the coil is repeatedly swept over a small deeply buried target, the response may fade. If this occurs, move the coil away from the target and perform an Audio Reset procedure (page 26), then return to the target location and continue with the pinpointing procedure.

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.

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 Detection Tone will increase to a maximum volume (pitch may be high or low depending on the composition of the metal). 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.

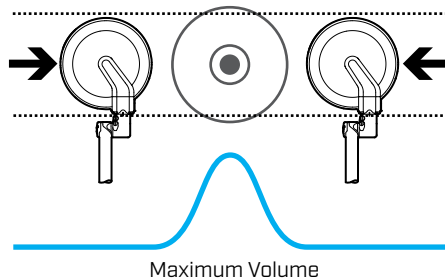


Figure 24: Determine target centre

NOTE

An operator can confirm that the centre of a target has been located by moving the coil slightly in any direction, and returning to the centre. In doing so the volume of the Detection Tone should decrease from maximum, as the coil leaves the centre, and return to maximum as the coil returns to the centre.

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.

STEP 1 Mapping Multiple Targets

Using the procedure described in "STEP 1 Mapping the Target" on page 31, an area enclosing the multiple targets can be mapped.

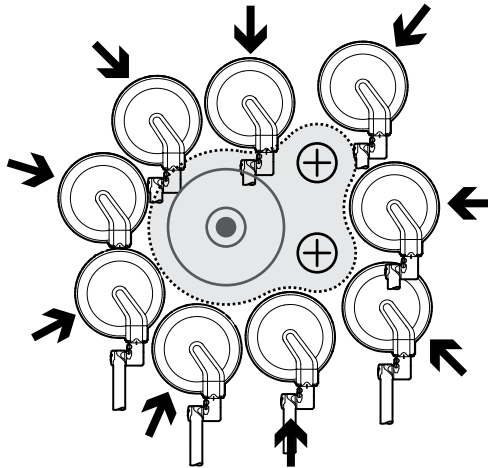


Figure 25: Mapping multiple targets

NOTE

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

STEP 2 Determining the Centre of Target

The pitch of the Target Detection Tone will rise or fall depending on the combination of metals or the composition of metal in a mine. This means that, in some instances, experienced operators may be able to identify one mine against another (Figure 26).

By slowly moving the coil across the mapped area, it may be possible to detect tonal differences indicating multiple 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.

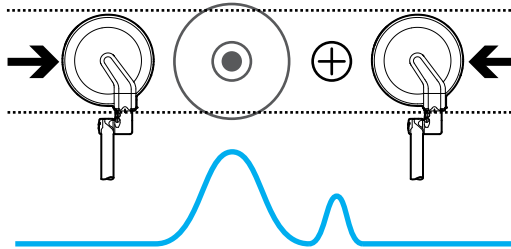


Figure 26: Multiple targets

Operating Multiple Detectors in Close Proximity

On occasion it may be necessary to operate F3 Compact detectors in close proximity. In normal circumstances, an F3 Compact 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 on page 26.
- 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.

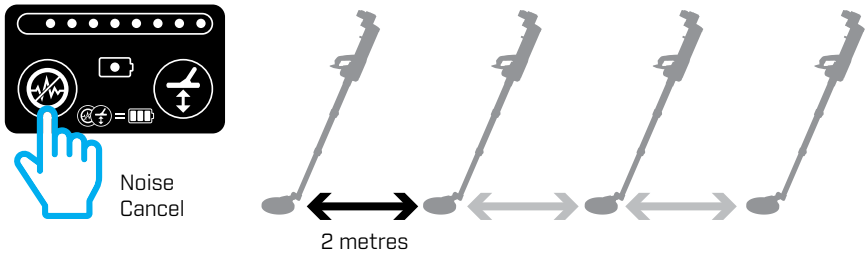


Figure 27: Operating detectors in close proximity

Completion of Operations

At the completion of operations, the F3 Compact 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.

Care and Troubleshooting

Routine Care

The F3 Compact 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 F3 Compact is the correct stowage of the detector when it is not in use.

Additionally, operators of F3 Compact 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 F3 Compact 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 or chemicals to clean the F3 Compact. If any part of the detector comes into contact with corrosive substances (including salt water), wash the detector with clean fresh water and dry with a clean cloth.
- d.** Ensure the F3 Compact 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.
- g.** 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 28).

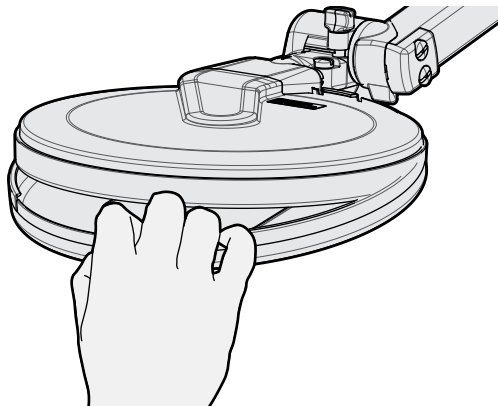


Figure 28: Replacing the Skid Plate

Troubleshooting

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

Problem	Recommended Procedure
F3 Compact will not switch on	<ol style="list-style-type: none">1. Check batteries have been inserted correctly into the Battery Compartment, or2. Replace batteries.
After switching on there is a very loud noise	<ol style="list-style-type: none">1. Conduct Audio Reset.
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, or2. 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, or2. Disconnect Earset, Switch off and on.
Cannot hear the Test Piece.	<ol style="list-style-type: none">1. Ensure that the detector has been turned on for at least 30 seconds.2. Ensure the sensitivity of the detector is set at Position 4.3. Conduct Audio Reset.4. Do not use the detector until it detects the test piece.

Table 2: *Troubleshooting*

Specifications

Length

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

Operating weight with batteries (complete)	2.6 kg/5.7 lbs
Operating weight without batteries	2.4 kg/5.3 lbs
Shipping weight (in hard case with batteries)	7.4 kg/16.3 lbs

Transmission

Technology	Bipolar Multi-Period Sensing
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Output

Audio	Internal Loudspeaker
	Earset (various configurations available)
Visual	9 LED Display
Data Output	RS-232 (bidirectional)

Environmental

Temperature (Operating)	-30°C to +60°C
	-22°F to +140°F
Temperature (Storage)	-35°C to +80°C
	-22°F to +176°F
Environmental Endurance	To MIL-STD-810G

Batteries

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

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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