



SOVEREIGN *GT*



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User Manual

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Disclaimer

The Minelab metal detector discussed in this operating manual has been expressly designed and manufactured as a quality hobbyist metal detector and is recommended for use in coin, treasure and general metal detection in non-hazardous environments. This metal detector has not been designed for use as a mine detector or as a live munitions detection tool.

Please read the operating manual prior to using your new detector.

Warranty and Service

There is a two-year parts and labour warranty for the electronic control box of the Sovereign GT . Conditions apply; Please refer to the Warranty Card for further details.

Note: Please return the enclosed warranty card, correctly filled out, to your dealer or direct to Minelab Electronics. This will assist Minelab to service your needs promptly.

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

FCC Compliance

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna of the radio or television.
- Increase the separation between the equipment and receiver.
- Consult your local dealer or an experienced radio/TV technician for help.

EC Conformity

NOTE:

This product complies with the essential requirements of EMC Directive 89/336/EEC.

Working for a Cleaner, Greener Future



For Consumers within the European Union: Do not dispose of this equipment in general household waste.

The crossed out wheeled bin indicated on this equipment is an indicator that this unit should not be disposed of in general household waste, but recycled in compliance with local government regulations or environmental requirements.

Please dispose of this equipment via a recycling service or centre, or by returning the unit to the respective Minelab or Halcro outlet as appropriate for your unit. This will enable the equipment to be disposed of in an environmentally safe manner.

Disposal of unwanted electronic equipment in landfilled waste may contribute to adverse long term environmental effect due to the leaching of contaminating and toxic substances contained within some electronic equipment.

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Please note:

Since there may be a variety of options available for this detector, equipment may vary according to the Model or items ordered with your detector. Certain descriptions and illustrations may also differ (in this manual) from the exact Model that you purchased. In addition, Minelab reserves the right to respond to ongoing technical progress by introducing changes in design, equipment and technical features at any time.



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 undesired operation.

Item Number: 4901 - 0051
Revision: 1.1

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1. Introduction

Congratulations on purchasing Minelab's Sovereign GT detector. The Sovereign GT metal detector has been designed for general purpose detecting with features to suit the coin and treasure hunter plus automatic ground balance for the gold fields.

The Sovereign GT detector uses Minelab's unique **Broad Band Spectrum (BBS) technology**, which enables the Sovereign GT to automatically transmit simultaneously in multiple frequencies.

The benefits of multiple frequency technology are numerous and include increased depth, greater sensitivity to non-ferrous metal objects, increased accuracy in discrimination and increased accuracy in target identification. Add to this, Minelab's automatic ground balance and the Sovereign GT becomes a very versatile, all-purpose detector.

The Sovereign GT is designed to locate valuable metal objects in high trash areas and in areas of extreme salt or mineralisation, conditions commonly encountered by gold and treasure hunters around the world. When using a single or dual-frequency detector under these conditions, a detectorist may experience a significant loss of detection depth and discrimination accuracy. However, the Sovereign GT, with its BBS technology and automatic ground balance, compensates for interference from these ground conditions and enables you to penetrate deeply and discriminate accurately at full depth.

The Sovereign GT is simple to operate, having very few controls that require adjustment after they have been set. The extremely advanced, yet simple-to-use, discrimination features enable you to accurately select only the types of metal objects that you want to find and to ignore those that you consider junk. The variable signal tone responses enable you to accurately identify the object found before you recover it.

If you have any questions or comments regarding the Sovereign GT or any other Minelab product, then please feel free to contact us via your local Authorised Minelab Dealer or write to us direct.

Minelab Electronics wish you every success in your treasure hunting.

Please Note:

Since there may be a range of options available in this model of detector, equipment may vary according to the product number or the country of purchase. Certain descriptions and illustrations may differ (in this manual) from the exact model that you have purchased. Minelab reserves the right to respond to ongoing technical progress by introducing changes in design, equipment and technical features at any time.

2. BBS Technology

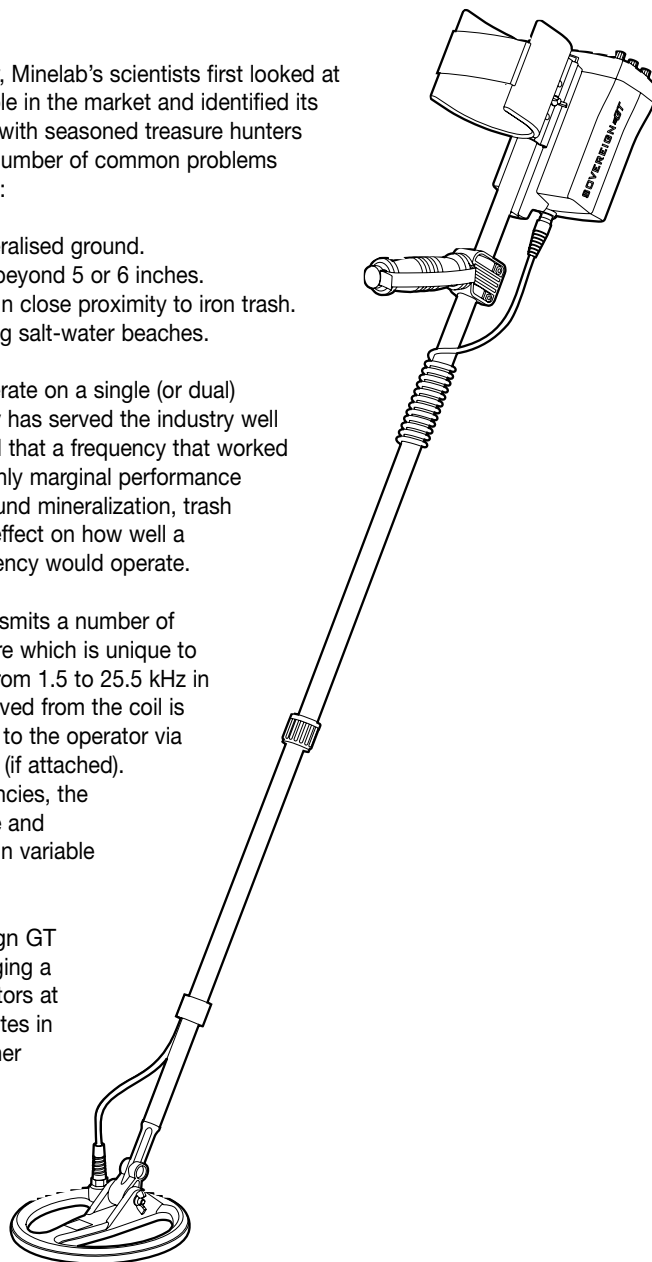
When developing BBS technology, Minelab's scientists first looked at technology that was already available in the market and identified its limitations in field use. Discussions with seasoned treasure hunters from around the world identified a number of common problems facing detector operators including :

- Loss of detection depth in mineralised ground.
- Inaccurate target identification beyond 5 or 6 inches.
- Inability to detect good targets in close proximity to iron trash.
- Erratic operation when searching salt-water beaches.

Most detectors on the market operate on a single (or dual) frequency. Although this technology has served the industry well for years, Minelab's scientists found that a frequency that worked well in one area would often offer only marginal performance when used in another location. Ground mineralization, trash content, and target size all had an effect on how well a detector transmitting a single frequency would operate.

The BBS circuit automatically transmits a number of frequencies simultaneously; a feature which is unique to Minelab metal detectors. Ranging from 1.5 to 25.5 kHz in 1.5 kHz increments, the signal received from the coil is analysed and information is relayed to the operator via the speaker, headphone, and meter (if attached). Through the use of so many frequencies, the Sovereign GT is designed to locate and accurately identify valuable targets in variable ground and high trash areas.

Essentially, when using a Sovereign GT with BBS technology, it is like swinging a number of single-frequency detectors at the same time. Because BBS operates in a number of frequencies that no other detector does, BBS detectors such as the Sovereign GT can find a broad range of objects that no other individual detector has the ability to find.



The Sovereign GT combines Minelab's unique multiple frequency BBS technology with automatic ground balance and improved signal processing to give:

- Greater detecting depth.
- Consistent sensitivity over a wide range of targets.
- Good target identification & discrimination of trash.
- Operation in mineralised ground.

Therefore, the treasure hunter is more likely to detect targets normally missed by other detectors.

One of the major overall benefits of BBS technology is that although it automatically operates at so many frequencies, all at the same time, it is actually easier to use than most of its competitors. Because it is microprocessor controlled, all you need do is set the threshold, discrimination and volume, and the rest is done for you automatically.

Most coin detectors do not work well on saltwater beaches, and Pulse Induction detectors designed for beach use have very little or no Discrimination ability. The Sovereign GT not only performs flawlessly on a saltwater beach, whilst discriminating targets with amazing accuracy, it also has a true ground balancing all-metal mode that allows operators to find very low conductive items such as gold nuggets, and ferrous based relics in mineralised soils.

A BBS detector will penetrate deeply, discriminate accurately and can be used in a variety of ground conditions. The bottom line is that when using a Minelab detector such as the Sovereign GT with its BBS technology, you will find good targets, more often.

3. List of Parts

The box in which the Sovereign GT is shipped should contain the following items.

Please check that all of these items are in the box: - See note

- Control Box
- 10" or 8" Round Tornado coil (inc. skid plate attached)
- 2-Piece Shaft Assembly (inc. Fiberglass lower shaft)
- Black Aluminium Armrest (inc. nuts & bolts) (2 part)
- Arm Rest Neoprene Cover
- Arm Rest Strap (2 part)
- Rear Control Box Bracket
- Battery Pack
- Velcro™ Straps (2 pair)
- Teardrop Washers (2)
- Nylon Nuts and Bolts
- Warranty Card
- Instruction Manual

Note: There may be variations to the items included in different countries so if you believe there may be something missing, check with your dealer/supplier that it is standard issue.

4. Accessories

The following accessories are available to further improve your machine.

- Digital Target Identification Meter
- Alkaline Battery Holder (holds 8 x 'AA' Batteries)
- NiMH rechargeable battery
- Mains Charger (240v/230v or 110v)
- 12V NiMH Vehicle Charger
- Headphones
- Hipmount Bag with Raincoat Protective Cover for Control Box
- Meter Protective Cover & hipmount Bag
- Padded Detector Transport Bag
- Minelab Padded Sleeveless Jacket
- Blue Minelab Polo Shirt
- Blue Minelab Cap

For further information on these and other Minelab products call your nearest Authorised Minelab dealer.

5. Assembling the Detector

Please follow these instructions to assemble the Sovereign GT. Refer to the drawings to identify parts and how they are positioned. Please contact your Minelab dealer for further instructions should any difficulties arise.

5.1. Lower Shaft Assembly

a) Remove the tape on the lower fiberglass tube (3) that is holding the black teardrop washers (12) in place.

Note: Ensure the washers do not fall out after removing the tape.

b) Remove the black nylon wing nut (11), and bolt (10) from the coil (1).

c) With the teardrop washers in place, push the lower tube (3) into the coil bracket so that the holes line up.

Note: Ensure that the black nylon spring clip near the top of the fiberglass tube is pointing toward the rear of the coil.

d) Push the black nylon bolt (10) through the holes in the bracket on the coil from the cable entry side and tighten the wing nut (11) by hand.

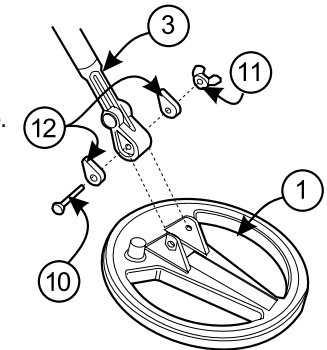


Figure 1 - The coil and lower shaft assembly

5.2. Armrest/Upper Straight Shaft Assembly

Note: In some countries the Sovereign GT is issued with an S-bend upper shaft and in other countries it will have a straight shaft.

a) Slide the handle (5) onto the upper end of the upper shaft (4) and push it on about a foot.

b) Place the two arm rest halves (6) on either side of the upper shaft (4) and ensure that the bolt holes are aligned.

c) Slide the nylon bolts (10) through the bolt holes and screw the nylon wing nuts (11) onto the bolts with a couple of turns (do not tighten).

d) Slide the plastic control box bracket (9) into the runners of the arm rest (6) & tighten the nylon wing nuts by hand.

e) Attach the arm rest straps (8) using the press studs on both sides of the arm rest.

f) Push the arm rest straps through the slots in the arm rest cover (7) and push the cover over the arm rest.

g) Position your arm into the arm rest and slide the handle (5) along the shaft into a comfortable position. Tighten the two screws in the base of the handle with a small screwdriver.

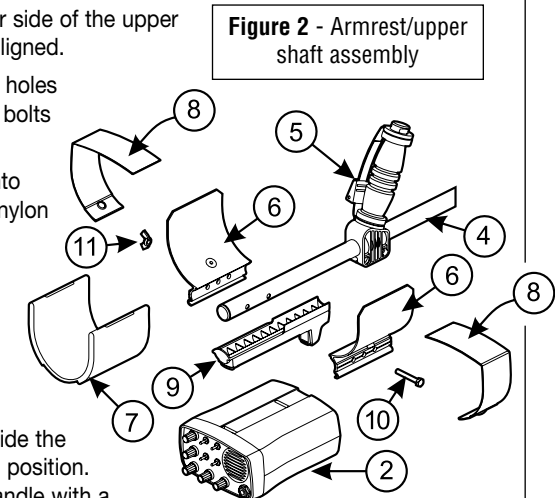


Figure 2 - Armrest/upper shaft assembly

If your detector is supplied with the S-bend shaft, assembly will be identical except that you will not have to assemble the separate handle

5.3. Completing the Shaft Assembly

a) Slide the lower shaft assembly (3) into the Aluminium upper shaft (4).

Note: The black plastic locking nut (13) may need to be loosened to position the lower shaft assembly correctly.

b) Set the length of the shaft by locking the black nylon spring clip into one of the holes provided, then tighten the plastic locking nut by hand.

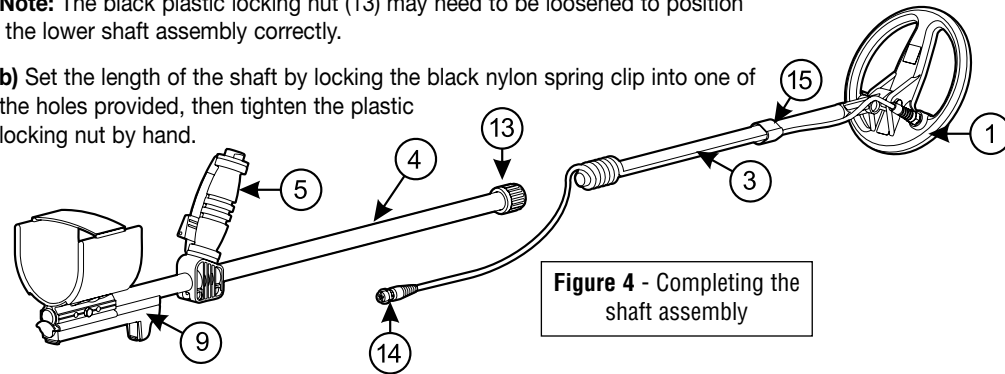


Figure 4 - Completing the shaft assembly

5.4. Shaft Mount the Control Box

a) Position the control box so that the recess in the control box (2) is aligned with the leading edge of the mounting clip (9). Push the forward section of the control box upwards until the trigger 'clicks', indicating that the control box is secured.

b) Firmly wind the cable around the shaft until it reaches the control box.

Note: Leave enough slack at the bottom of the cable near the coil to adjust the coil position without straining the coil cable.

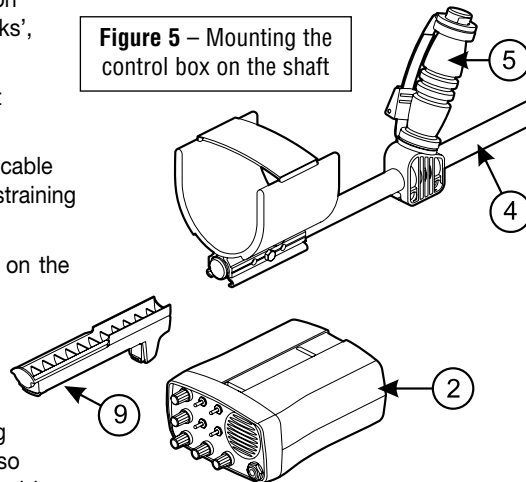
c) Connect the coil connector (14) to the plug on the rear of the control box (2).

d) Use Velcro™ tabs (15) to secure the cable in the correct position on the shaft maintaining slack at coil and control box.

Note: Weather Protection - The hipmount bag (available as an accessory item) is designed so that it can be used to weatherproof your control box while you are detecting in inclement weather. The hipmount bag is designed to protect the control box while still on the shaft as well as in the hipmount configuration.

The control box is positioned into the hipmount bag with the slot for the mounting bracket positioned at the back. The velcroed panel is then wrapped across the top of the stem.

Figure 5 - Mounting the control box on the shaft



5.5. Hipmounting/Chestmount

Hipmounting is an alternative to mounting the detector on the shaft and significantly reduces physical strain, enabling longer search time without undue fatigue. A hipmount bag is available as an accessory item for this purpose.

a) Check that there are charged batteries in the control box.

b) Place the control box into the hipmount bag with its control panel facing outwards (see figure 6).

c) Place the hipmount bag in your preferred working configuration. The hipmount bag can be worn on a waist belt or over the shoulder.

Note: If mounting the hipmount bag on the chest, a belt can be threaded through the belt loop and around your chest to hold the bag in position.

d) Wind enough cable from around the shaft so that it reaches across to the control box and allows enough freedom for a full sweep of the coil.

Note: Leave enough slack at the bottom of the cable near the coil to adjust the coil position without straining the coil cable.

e) Use Velcro™ tabs to secure the cable in position at the base of the shaft and where the cable leaves the shaft.

f) Take the excess loose coil cable and wind it through the belt bracket of the hipmount bag prior to connecting onto the control box (see figure 7).

g) Connect the coil connector (14) to the socket on the rear of the control box and tighten the locking nut.

Figure 6 - Hipmounting the control box

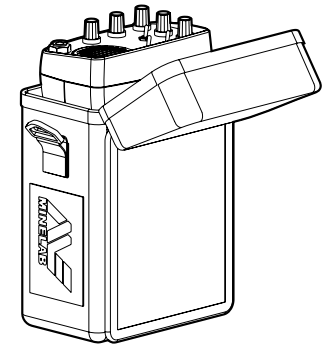
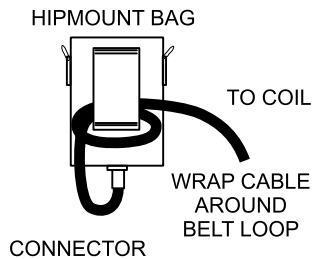


Figure 7 - Hipmounting the control box



6. Batteries

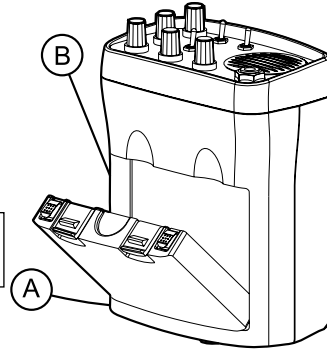
Your Sovereign GT can be powered by either Alkaline batteries (8 x AA) or the Minelab rechargeable NiMH battery pack. A mains charger and/or 12 volt car charger are also available to recharge the NiMH batteries wherever you are. These accessory items are available from your authorised Minelab Dealer.

6.1. Installation of NiMH Battery Pack

- Ensure your NiMH pack is fully charged.
- Place the base of the battery pack at the rear of the battery compartment (A). Push the front edge of the battery pack into position (B). The two battery clips will "click" into position to hold the battery pack in place (see figure 9).

Note: The NiMH battery pack is factory sealed and does not open.

Figure 8 – Installing the battery pack



6.2. Installation of Alkaline Batteries

The 12 Volt Alkaline battery pack is made to hold 8 'AA' alkaline batteries. These can be used as your day-to-day pack or as a back-up if you are using NiMH batteries.

- Ensure the detector is switched "Off" before opening the battery compartment.
- Remove the battery pack housing from the control box by pushing down on the tabs.
- Slide open the lid on the battery pack.
- Place 8 "AA" alkaline batteries (17) into the base of the alkaline pack (16). Ensure they are aligned as shown in figure 10 and as indicated inside the compartment.
- Slide the battery lid closed.
- Place the base of the battery pack at the rear of the battery compartment (A). Push the front edge of the battery pack firmly into position (B). The two battery clips will "click" into position to securely hold your battery pack in place (see figure 8).

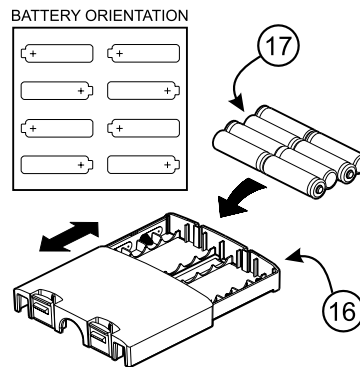


Figure 9 – Installing Alkaline Batteries.

Caution: Good quality alkaline batteries will power the Sovereign GT for about 10 to 15 hours. Using headphones will extend battery life further. Good quality alkaline batteries should always be used instead of standard carbon batteries. Alkaline batteries should be removed from the detector if it is to be stored for extended periods to avoid damage caused by leaking batteries.

6.3. Low Battery Warning and NiMH Recharging

When the batteries are reaching the point at which they will no longer power the detector properly, the Sovereign GT will emit a distinct sharp "pip" from the speaker, approximately every 30 seconds. Shortly after this, the threshold will increase to a loud continuous signal that cannot be reduced by the threshold control. When this tone is heard, it is recommended that the NiMH battery pack be recharged or alkaline batteries be replaced.

The NiMH battery pack can be recharged using either the mains-powered charger or a 12V charger that can be plugged into the cigarette lighter of your vehicle. (both available as accessories)

Caution: Check the mains charger voltage. Only use the appropriate mains charger for the country you are in.

6.4. Using your NiMH Chargers

Plug the charger into the socket on the rechargeable NiMH battery pack, and plug the charger into the power source and then switch the power source on. The car charger has a red light that indicates that it has power. A green light will appear on the battery pack during charging. A completely flat battery will take approximately 12-14 hours to fully charge. The green light on the battery pack will fade/dim once it is charged fully. A fully charged NiMH pack will give between 15 and 20 hours detecting time, depending on the number of targets found and the level of threshold used.

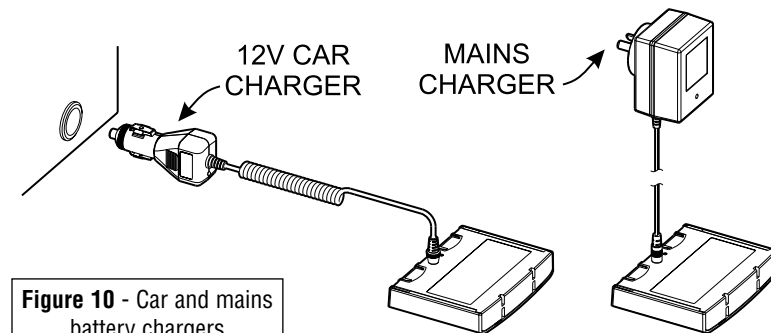


Figure 10 - Car and mains battery chargers

7. Control Panel

This section gives detailed descriptions of the Sovereign GT's controls and functionality. It is important that this section is read carefully as it will provide all the information required to set and adjust these controls. It may be beneficial to refer back to this section in the future.

Figure 11 - The Sovereign GT Control Panel



7.1. Quickstart Operating Instructions

To start detecting as soon as possible, here are some Quickstart settings that you can use.

Quick Operating Instructions

Disc Mode

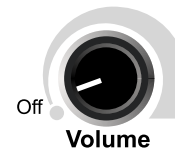
- Install charged batteries.
- Set the Mode switch to Disc. Iron Mask /OFF.
- Set the Ground Balance switch to Pinpoint.
- Turn the Sovereign GT On by turning the Volume control to approximately 3-o'clock.
- Set the Threshold / Silent search switch to Threshold.
- Turn the Threshold control in a clockwise direction until the tone becomes "just" audible.
- Set the Sensitivity control to Auto.
- Set the Disc control to the 3rd dot.
- Set the Notch control to zero until you better understand its appropriate settings.
- You can now start searching.

All Metals Mode

- Install charged battery pack.
- Set the Mode switch to All Metals.
- Turn the Sovereign GT On by turning the Volume control to about 3-o'clock.
- Turn the Threshold control in a clockwise direction until the tone becomes "just" audible.
- Set the Sensitivity control to Auto .
- Put the Ground Balance switch into Track and ground balance the detector by raising and lowering the coil from 2 – 15cm above the ground until the threshold becomes stable.

Note: : Disc. and Notch controls are disabled when the detector is in the All Metal mode.

Once you are familiar with all of the controls, you will gain greater performance and versatility by setting the controls to suit the needs of the area being detected.



7.2. Volume Control and On/Off Switch

This control, located at the bottom left of the control panel, is used to adjust a target's signal volume in addition to switching the Sovereign GT **On** or **Off**.

When in the fully anti-clockwise position, the Sovereign GT is turned **Off**. Turning the control clockwise, will "click" the Sovereign GT **On**. Continuing to turn this control in a clockwise direction will increase the volume of the target signals. At the most clockwise position, the volume will be set at the "maximum" position. Minelab recommends this position for most circumstances. However users should be aware that when using headphones, if a large target is detected close to the surface, the resulting loud signal may cause some hearing discomfort; in areas like this a lower volume should be selected.



7.3. Sensitivity Control

The **Sensitivity** control, located at the bottom of the control panel, allows the level of sensitivity to be adjusted to suit the conditions in which you are detecting. It is often thought of in terms of a depth control and it is, to a point, but more importantly it also makes the unit more or less sensitive to interference caused by ground "mineralisation", and electromagnetic fields.

At the most anti-clockwise position, this control "clicks" into the Auto position. In this setting the Sovereign GT will automatically adjust the level of sensitivity to the most stable level under the prevailing conditions. Beginners should operate the unit in Auto, until they become more competent in its operation.

Turning the control clockwise will "click" the Sovereign GT out of the Auto setting into manual sensitivity. As this control continues to be turned in a clockwise direction the level of sensitivity will be reduced. At the most clockwise position, the Sovereign GT is set at "minimum" sensitivity.

Experienced operators, when detecting in wet sand at the beach, should set the Sensitivity control out of Auto and slowly turn the control clockwise until minimal false signalling is experienced. This will give the maximum sensitivity while maintaining a smooth threshold. In general, the more moist the beach sand, the more clockwise the knob must be turned.

When operating the Sovereign GT in heavily mineralised ground, the operator should again reduce the sensitivity until the ground balance is able to cope with the mineralisation.

NOTE: Often a sensitivity setting that gives a smooth threshold is preferable to a high sensitivity that causes undue noise or instability that makes it difficult to hear subtle target signals. Detecting with a smooth threshold will often mean that you are able to hear targets to a greater depth than with a noisy threshold.

The incidence of false signalling is minimized if the operator concentrates on sweeping the coil as parallel to the ground surface as possible. In summary, for greatest detection depth:

- Keep the coil sweep as parallel to the ground as possible.
- Turn the sensitivity knob as anti-clockwise as possible, (within the manual region) so that minimal false signals occurs.
- This setting will need to be altered, depending on the mineralization or sand moisture level.

Advanced users operating inland, can operate the unit in either Auto or in Manual. In more mineralised soils, a reduced Manual setting is recommended. Note that "hot rocks", "Roman Pennies" or some ancient red/orange/brown pottery or tiles may cause the unit to respond as if the targets are ferrous. This is not a false signal, but the correct response, and indicates that the unit is set at a relatively high sensitivity. It is also highly recommended that a very slow sweep of the coil, across the ground, will reduce false signals.

If detecting non-ferrous items in a high trash area, a beginner may prefer to use Auto sensitivity and Disc – Iron Mask / Off (see chapter 7.5.1) as this setting will provide a smoother operation, and keep "broken" or "chopped" signals to a minimum.

Advanced users operating in non-mineralised soils or areas of high trash concentration should set the sensitivity control out of Auto and into the variable Manual region. The control should be set as anti-clockwise as possible (out of Auto and into the variable manual region), so that minimal false signalling occurs. This setting will depend on the degree of soil mineralisation and metal junk concentration and may need to be altered as the environment changes.



7.4. Threshold Control

Located at the bottom right of the control panel, the **Threshold** control allows for adjustment of the background hum. This background "threshold" or "hum" aids in the location of targets.

Small targets or large, deep targets may not produce a distinct target signal but rather cause only a slight change in the threshold tone.

Ideally, this control should be set to a position where the threshold tone is just audible. At this level, the presence of small or deep targets will be more easily recognised. Turning the **Threshold** control in a clockwise direction will increase the threshold level. At the most clockwise setting, the threshold is at its maximum.

A threshold level that is too high will mask out the small or deep targets, while a "silent" or non-audible threshold may not allow the small change in threshold tone created by small or deep targets to be heard.



7.4.1 Silent Search/Threshold

When in the discriminate mode, the Sovereign GT will vary the tone of an audio signal depending on the conductivity of the target; ie. a highly conductive target will produce a high pitched tone, while a less conductive item (such as foil) will produce a lower pitched tone.

The advantage of the Sovereign GT over other detectors is that the tone of the threshold will also change. After the target signal is heard, the threshold "hum" will return in a pitch similar to the pitch of the signal. When the target signal is nulled due to discrimination or notching, the threshold will again return in the higher or lower pitch of the target conductivity.

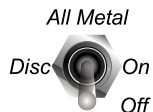
For example, if you are searching in the Discriminate mode and you have just detected a coin, the threshold will remain at the tone of the coin signal, but when you pass over a junk target such as a nail, the Audio will NULL (go silent) over the nail, and the threshold, when it returns, will drop to a lower tone. This can be a useful feature, as unlike other detectors using Silent Search discrimination modes, you still ignore the junk targets, but you know when you have passed over them and can estimate the conductivity that they have. (see 7.6 Discrimination & Notch descriptions)

The other advantage of the threshold-based Discriminate mode is that on occasions, the only thing that may alert you to the presence of a very deep target is a change in threshold pitch. This is a common occurrence in very junky sites, or if you are sweeping faster than normal.

However, for new users of BBS technology, this may initially be a little confusing so, to simplify things a little, Minelab have added a Silent Search discriminate mode option to the Sovereign GT. In this mode, targets will still produce different tones based on conductivity, but you will not hear the changes in threshold tone, or the Nulling of discriminated objects. A slightly faster sweep speed is also possible, which makes the Silent Search mode ideal in areas of low target concentrations, such as the beach, where ground coverage is just as important as recovering the really deep targets. If a rich pocket or area is located, the operator can select the Threshold mode and slow down their sweep to ensure all targets are recovered.

To operate in Silent Search mode, you need to start with the switch in Threshold position and, using the Threshold control, lower the level until it is just audible as you would if you were searching with Threshold. Once you have this level of threshold, flick the switch to Silent Search. The threshold will now disappear but a faint target signal will still sound.

NOTE: If you were to have the threshold level set too low before going into Silent Search, you could find that the very soft target signals may not be audible. If your threshold level is too loud before switching into silent search, the threshold will become softer but still audible.



7.5. Disc/All Metal Switch

This switch is located in the top centre of the control panel and is used to select All Metal or Disc. (Discriminate) with Iron Mask, or Disc. without Iron Mask mode.

In All Metal mode the Sovereign GT will detect both ferrous and non-ferrous objects. In this mode the Disc and Notch controls will have no effect and the Sovereign GT will respond in the same way to all types of metal. All Metal mode should be used in conjunction with Fixed & Tracking ground balance, especially when searching for gold nuggets or other targets in mineralised soils. It is also the required setting when searching for ferrous targets such as relics.

In Disc. mode, the Disc and Notch controls become active and can be used in combination to ignore various unwanted metal objects.

Metal objects fall into two broad categories:- ferrous and non-ferrous. A magnet can be used to determine if an object is a ferrous or non-ferrous metal; ferrous metals are attracted to a magnet while non-ferrous are not.

Note: All Metal mode is also the pinpointing mode. To pinpoint, if you have been detecting in Disc, switch up to All Metal and have the ground balance switch in Pinpoint (see 7.8.3 pinpointing).

In Disc. mode the detector will null or cancel target signals made from unwanted metals. The degree of discrimination is set by using the Disc and Notch control knobs. When the Disc/All Metal Switch is in Disc position and with Disc and Notch control at minimum, the Sovereign GT will cancel all ferrous metals and signal on all non-ferrous targets. As the Disc control is increased (turned clockwise) some non-ferrous metals will be cancelled and as the control is increased further, more non-ferrous metals will be cancelled.

In addition, when in Disc mode, the target signals from non-ferrous objects will vary in tone depending upon their level of conductivity. Effectively, this allows general identification of the type of object detected before recovering it from the ground. For example, a US quarter or Australian \$1 coin will produce a high pitch signal, whereas aluminium foil will produce a low pitched signal. Pull-tabs, rings, and other coins will produce various intermediate tones, depending upon the object's conductivity. The higher an object's conductivity, the higher the signal tone will be.

Also, provided the Threshold / Silent search switch is in the Threshold position, when the Sovereign GT rejects a ferrous or a non-ferrous object, the background threshold tone will momentarily disappear then return again at a pitch similar to the ignored signal. A ferrous object will cause the returning threshold pitch to be much lower than normal, while a pull-tab that is being ignored will cause it to be higher than normal.

If the Sovereign GT produces a high-pitched, rapidly pulsing sound, the detector is being overloaded by a substantially large piece of metal close to the coil. Raise the coil a few inches above the ground and pass it over the area again to check the target. By lifting the coil away from the ground, it enables the Sovereign GT to accurately analyse the object detected.

Note: If a target signal seems to have "blanked", but the threshold hasn't changed to a different tone (assuming the threshold switch is selected) it may in fact be a very deep target on the edge of the detection depth. Digging down an inch or two will get the coil closer and will enable it to be identified.

7.5.1. Iron Mask On/Off

A fundamental problem for most conventional detectors is the inability to recognize a valuable target when it is located near a ferrous item. This is a particular problem in areas heavily littered with trash, which is common on old relic sites.

The Sovereign GT, using Iron Mask / On is particularly good at making the distinction between a non-ferrous target and iron trash, recognizing the non-ferrous target and providing an audio signal.

With Iron Mask / On, the search depth is also a little greater and non-ferrous targets may be located more reliably amongst ferrous trash. However, with Iron Mask /On, the detector may give the occasional "beep" on large ferrous targets and the threshold may not be quite as stable. For this reason, beginners may prefer to detect with Iron Mask / Off. Also, when discriminating in mineralised soil, Iron Mask / Off may be the preferred mode.



7.6. Discrimination Control

The Disc (Discriminate) control is located at the top left-hand side of the control panel and is used when in Disc. Mode to "discriminate" or "ignore" unwanted non-ferrous metal targets. If the Disc control is set to the most anti-clockwise position (ensure the Notch control is also set to this position), then ferrous metals will be "ignored" and the Sovereign GT will not produce a "signal beep" for them, however large ferrous objects may produce short "pops" or "clicks". On the other hand, non-ferrous targets will be "accepted" and elicit a clear "signal beep".

Typical ferrous objects encountered by treasure hunters are nails, screws, washers, bits of wire, etc. These objects are generally not considered to be of value, so it is a distinct advantage to be able to ignore them while detecting. Objects that will cause the Sovereign GT to produce a "signal beep" will be non-ferrous metals, including such items as aluminium foil, most jewellery, pull-tabs, coins, bottle tops, gold, silver, brass, etc.

Not all of these non-ferrous objects are considered valuable. Therefore, by using the Disc control, the Sovereign GT can be adjusted to ignore some of the less valuable non-ferrous objects while still locating most valuable targets. The Disc control is a one-turn potentiometer, continuously variable with numerous graduations as a guide for the setting of the control. Turning the Disc control clockwise will increase the "discrimination" level, and non-ferrous objects of lower conductivity will be ignored.

7.6. Discrimination Control – Continued

The Sovereign GT uses the electrical conductivity of the object to determine the type of metal detected, and based upon the Disc control setting, will either ignore or accept the object. The most effective way to demonstrate this is to consider a number of objects, all of varying conductivity, placed in order of conductivity on the ground. (see figure 12).

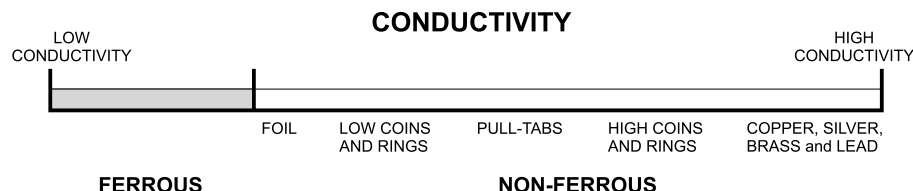


Figure 12 - Target conductivity

Turn the Disc control further clockwise and objects of greater conductivity will be ignored. If the Disc control is set to ignore the pull-tab, this will mean that all objects having a similar or lower conductivity than the pull-tab will be ignored, while objects of higher conductivity will still be accepted (see figure 13).

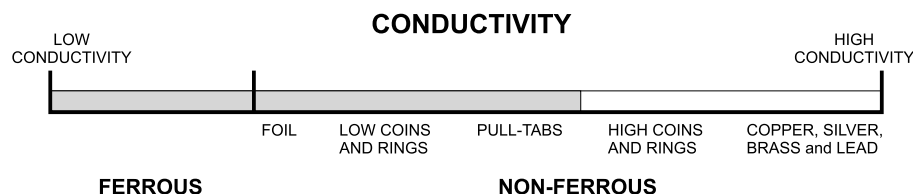


Figure 13- Discriminating targets based on conductivity

Figure 13 shows some common objects and where the Disc control would have to be set to ignore them. As a general rule, the two objects treasure hunters most commonly wish to ignore are aluminium foil and pull-tabs. As can be seen in Figure 13, both of these objects cover a significant range on the Disc control. The conductivities of objects that the user wishes to accept or ignore often overlap, so - setting the Disc control to ignore both foil and pull-tabs will also ignore a large amount of valuable non-ferrous objects including some coins, rings, and other jewellery which have conductivity levels between these junk items.

Example: If hunting for thin rings of white gold, with the Disc control set to position 4 (see figure 14), some types of aluminium foil will also be detected. To avoid old pull tabs, but detect brass buttons and copper coins, the Disc control would need be set higher (approximately at number 13).

At this setting most fine white gold rings, foil, and some yellow gold rings will also be ignored. With experience, setting the Disc control to ignore most unwanted targets (in combination with the Notch control) will become second nature and you will develop a preferred setting for different sites.

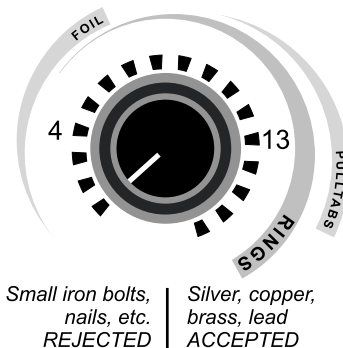


Figure 14- Disc control



7.7. Notch Variable Control

Located on the centre left of the control panel, the Notch control is used in combination with the Disc control to discriminate against, or ignore, certain metal objects. As with the Disc control, this is continuously variable and features numerous graduations as a guide to setting the control.

The main difference between the Notch and Discrimination controls is that Discrimination sets a continuous band of discrimination, whereas the Notch selects a short segment of discrimination which can be moved up or down the scale of conductivity.

Note: The Notch control will only be active, if set to a higher or more clockwise level than the Disc control.

As the Notch control is turned further clockwise, objects with a conductivity, within the width of its band, will be ignored. Turning the Notch control to ignore the pull-tab will mean that only non-ferrous objects having a similar conductivity to the pull-tab will be ignored while all other non-ferrous objects of different conductivity are still accepted.

Note, in Figure 15 the ferrous objects are being ignored due to the Disc. setting on zero.

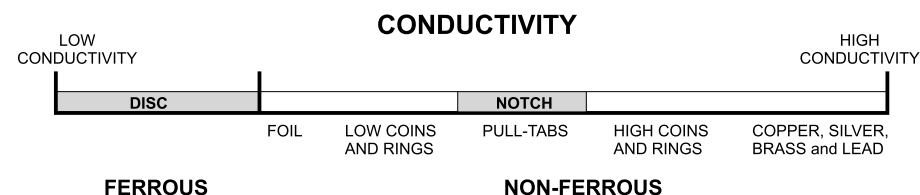


Figure 15 - Ignoring targets using the Notch control

When using the Notch and Disc controls in combination, most unwanted objects can be successfully ignored (see Figure 15). Turning the Notch control to ignore the pull-tab and the Disc control to ignore the aluminium foil will set up the Sovereign GT to ignore most pull-tabs and aluminium foil while still detecting most valuable non-ferrous objects (see figure 16).

Note: Different pull-tabs may require a slight movement of the Notch setting. Obviously, if the amount of pull-tabs is not numerous, then you may decide to leave the notch at minimum, which removes the risk of discriminating a valuable object.

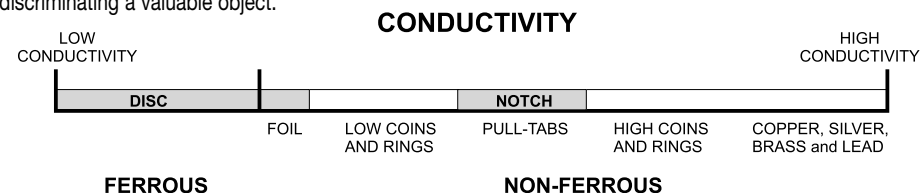
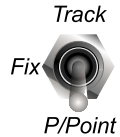


Figure 16 - Ignoring targets using the Disc and Notch controls

TIP: It is very important that you recognize the conductivity level of common coins, jewellery and trash targets so that you know what items will be accepted or rejected at various levels. We recommend that you read and follow Chapter 9 - Practising the Controls to be familiar with common targets in your area.

NOTE: If operating with Threshold, the operator will hear that a target has been discriminated or notched out by the threshold going null (silent) and can determine if it was discriminated or notched by the tone of the returning threshold ie: if the threshold returns in a deep tone, the object was discriminated and if the threshold returns in a higher pitch it was notched out.



7.8. Ground Balance switch (Track/Fix/Pinpoint)

When operating in Disc mode, the Sovereign GT uses digital filtering to compensate for ground effects and the Track / Fix / Pinpoint function is disabled.

When operating in All Metals, Minelab's world-renowned Automatic ground balance is operating to overcome the effects of variable, mineralized soils. This automatic ground balance means that the Sovereign GT can be used for gold prospecting or relic hunting in mineralised soils, as well as coin & treasure hunting in parks, fields or the beach.

Track position, continuously analyses the ground and resets the ground balance to compensate for changes in the mineral content. This position is ideal for areas where the ground mineralization is changing rapidly.

Fixed position, holds the ground balance at the last setting found while in Tracking and is suited to areas where the ground mineralisation is more constant. Fixed position will often give slightly more depth than Track.

Tip: If the Track Mode is unsuccessful at ground balancing in heavily mineralized ground, the operator should reduce the sensitivity setting and slow down the sweep speed.

Note: In most ground the Sovereign GT will ground balance to a slightly positive level (audio level rises when the coil is lowered to the ground). This is to ensure maximum depth, and will help to reduce signals from large hotrocks close to the surface.

7.8.1. To ground balance in mineralized soils

When in the All Metal mode, place the switch into Track and raise and lower the coil between 2 – 15cm above the ground. As the detector compensates for the ground minerals that are present, the threshold will begin to stabilize, producing the same steady tone as you raise and lower the coil. Depending on the mineralisation of the soil, this may take a number of pumps of the coil. It is important that during ground balancing, your coil is positioned parallel to the ground and that there is no metal in the ground or close to the coil. If you cannot achieve a ground balance, try again a few feet away in case there is a metal target under your first location or reduce the sensitivity. Once you have achieved ground balance, switch into Fixed and start detecting. If the area you are searching is variable mineralisation, you will need to periodically switch back to Track to reground balance. In areas of highly variable ground, you can stay in Track mode to search.

Note Be aware that if searching in Track, it is possible, with repeated sweeps across a target, to track out a weak signal, therefore, always switch to Pinpoint or Fixed to recover the target.

7.8.2. To ground balance in non-mineralized soils

If you wish to search in the All Metal mode on a saltwater beach, a better method to ground balance is to start with the sensitivity in Auto and select the Track position. Begin detecting as per normal and after you have covered about 10m of ground, switch into the Fixed position. If the detector remains stable, you can switch out of Auto sensitivity and select a manual setting. This method will ensure maximum stability and depth on most beaches. If the All Metal mode is too erratic, then switch to Disc, with Iron Mask / On and the Disc & Notch both on minimum.

7.8.3. P/Point (pinpoint) is a specialized position for pinpointing the location of a target once found. Pinpoint gives a short signal as the coil passes over the target, which can assist in knowing exactly where to dig your hole.

As you pass repeatedly across the target, you will notice that the target signal becomes shorter and sometimes weaker with repeated passes. This will help you locate the exact position of the target under the coil. If you need to repeat the process, switch out of Pinpoint into Tracking and then back to Pinpoint again.

Note: You should not search in Pinpoint as the ground balance is disabled and the detector can become erratic.

TIP: If you are searching in Disc. and want to locate the position of the target, you can switch into All Metal and use the Pinpoint mode. When operating in Disc. the Pinpoint is disabled until you switch into All Metal.

Band 1
Band 2
Noise Cancel

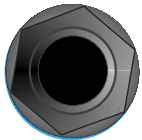
7.9. Noise Cancel

When detecting in some areas, the threshold may become chattery or unstable. This is often caused by electricity or radio transmission and most commonly of all, other detectors. The noise cancel switch on the Sovereign GT allows the operator to select a different search band, which will often overcome this effect.

If detecting in pairs or a group, or when you experience instability due to interference, switch to the other band to see if this overcomes the problem.

The selection of Band 1 or Band 2 doesn't affect the performance, strength or sensitivity of the detector. Its only purpose is to stabilise and lessen the effects of external interference.

Note: If there is no interference in the area, the operator is unlikely to notice any difference between Band 1 and Band 2.



7.10. Audio Output

The Sovereign GT has a built in speaker so that the operator can hear the threshold and target signals. It is however recommended to use headphones as these will allow the operator to hear faint targets better and cut out environmental noise such as traffic, others talking or the wind.

The audio output of the Sovereign GT is available through either the in-built speaker or via a 1/4" stereo headphone jack. When a pair of headphones is plugged in, the loudspeaker is disconnected.

Headphones are recommended for serious treasure hunting for several reasons: they are more sensitive to slight target signals than the loudspeaker and their use will increase battery life. The socket will accept most stereo headphones with a 1/4" jack. If your headphones have a "Stereo/Mono" switch, set it to "Stereo". Minelab recommends headphones to be between 32 and 100 Ohms.

8. digital target indication meter

8. Digital Target Indication Meter (available as accessory)

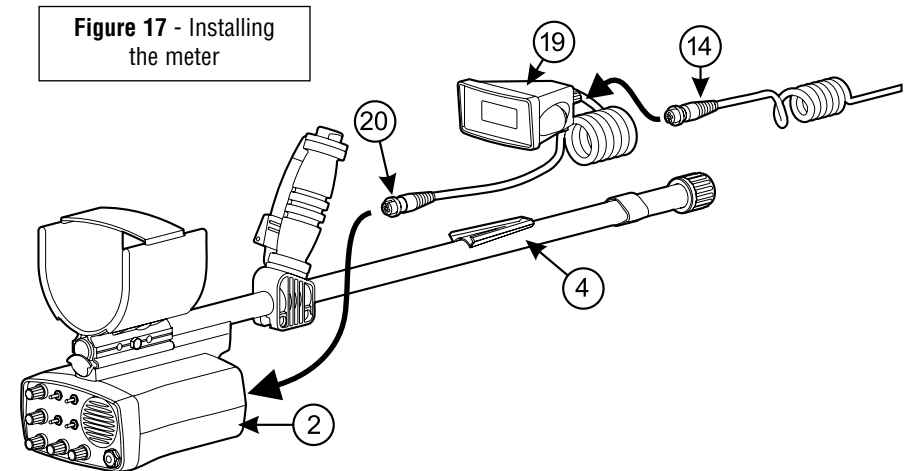
The Digital Target meter has been designed to aid in the identification of metal targets before their recovery. It provides a digital display of the target ID tones produced by the Sovereign GT detector, and connects between the search coil and the control box without requiring any modification to the detector's electronics.

Note: The meter has no negative effect upon the operation or overall performance of the detector; it simply provides easier target recognition. It is also very useful for people with poor hearing.

8.1. Installation of Meter

- Plug the coil connector (14) into the socket (19) on rear of the meter box (19), winding the excess cable around the shaft as close to the meter and away from the coil as possible.
- Plug the meter cable connector (20) into the control box (2) plug, winding the excess cable around the upper shaft (4) (see figure 17).
- If hipmounting the control box, secure the meter cable to the shaft of the detector using the Velcro™ straps provided.
- Loop the meter cable twice through the belt loop of the hipmount bag before connecting it to the control box. This reduces any stresses placed on the meter cable caused by hipmounting and reduces the possibility of failure of the cable. The meter requires no batteries.

Figure 17 - Installing the meter



8.2. Calibration of Meter

Before using the Digital Target Meter, it is necessary to calibrate it as follows:

- a)** Set the Calibration control knob (situated to the rear of the meter) to the center position of its range.
- b)** Place the detector in a stationary position with the coil flat on the ground.
- c)** Set the Sensitivity control on the Control box to Auto (extreme anti-clockwise).
- d)** If the threshold is varying because of electrical interference, adjust Sensitivity clockwise towards minimum until a constant threshold is present.
- e)** Slowly pass a common coin across the coil and finely adjust the Calibration control to the nearest number, divisible by 5 [e.g. US quarter -set to 170 , AUS 20c - set to 165.]
- f)** Slowly pass additional coins and other common targets across the coil and record the results on the target recognition table shown on page 25.

This table will become an excellent guide when used in conjunction with the Digital Target Indicator until the various target responses become familiar. This meter should not be solely relied upon for discrimination. It is important to use the other features of the Sovereign GT to aid in the process of discrimination.

Be aware that some similar objects may vary in Target Indication readings because of changes in composition. For example, gold rings will produce different readings depending upon the purity of the gold and the size of the band. Coins minted in different years may have different alloy combinations and so the reading will differ. The Target Indication readings will also be influenced by an object's orientation, the length of time it has been buried in the ground and different ground conditions.

Target Recognition Table

[illegible]

9. Practising the Controls

Take some time to become familiar with how the Sovereign GT responds to various metal objects.

- Gather a collection of different metal objects such as a rusted nail, pull-tab, brass button, aluminium foil, various coins, and some gold and silver jewellery.
- Take the detector outside, away from known electromagnetic devices or metal objects. Lay the various objects out on an area of ground known to be void of other metal objects.
- Switch the Sovereign GT On and select Disc. Mode.
- Turn the Disc and Notch controls to their most anti-clockwise positions.
- Turn the Sensitivity control to "maximum", the most anti-clockwise position without clicking into Auto. If excessive interference is heard, turn the Sensitivity control clockwise until the threshold tone is stable.
- Pass the coil across the test objects one at a time. The Sovereign GT should "beep" on the non-ferrous objects and ignore the ferrous objects.
- Take note that as the coil passes over the ferrous nail, the threshold tone disappears. As the threshold returns it will have a lower than normal pitch, indicating that the object ignored was ferrous.
- Passing the coil over different non-ferrous objects will produce different signal tones. Objects with high conductivity, such as those of silver or copper, will produce a high-pitched signal tone while objects with lower conductivity, such as aluminium foil, will produce a low-pitched signal tone. With experience it will be possible to use the signal pitch from an object to accurately determine the type of object discovered before recovering it from the ground.
- Turn the Disc control progressively clockwise in small steps and pass the coil over the objects. Take note of when certain objects are rejected; this will enable more accurate discrimination of these objects in the field.
- Turn the Disc control to the position where it ignores the pull-tab. Passing the coil over objects with lower conductivity (such as the aluminium foil) will not produce a signal. Take note of the threshold tone as it disappears, then returns again. It should return at a slightly different pitch than normal. This indicates that the Sovereign GT ignored a non-ferrous object.
- Turn the Disc control back to the most anti-clockwise position.
- Progressively turn the Notch control in a clockwise direction, again passing the coil over the test objects. The Notch control enables the detector to ignore a small number of objects with similar conductivity while still detecting other valuable non-ferrous objects, even if they are of lower conductivity.
- Turn the Notch control to ignore the pull-tab. Objects with similar conductivity to the pull-tab will be ignored. Pass the coil over the aluminium foil and the Sovereign GT will produce a signal. This would not be possible using the Disc control.
- Turn the Disc control to ignore the aluminium foil. The Sovereign GT is now set to ignore the types of objects most commonly unwanted by treasure hunters.

10. Treasure Hunting Tips

The Sovereign GT will perform at its best when its Tornado coil is kept in close proximity to the ground. Inexperienced operators should practice maintaining a constant coil height at the extremity of each swing; maintaining contact with the ground will make this easier. This is important, as variation in coil height at the end of each swing can cause confusing sounds and will reduce detection depth.

NOTE: Each sweep of the coil should overlap the last one. This will ensure good ground coverage. Keeping the Tornado coil in contact with the ground will increase detection depth and improve the audio response to small objects.

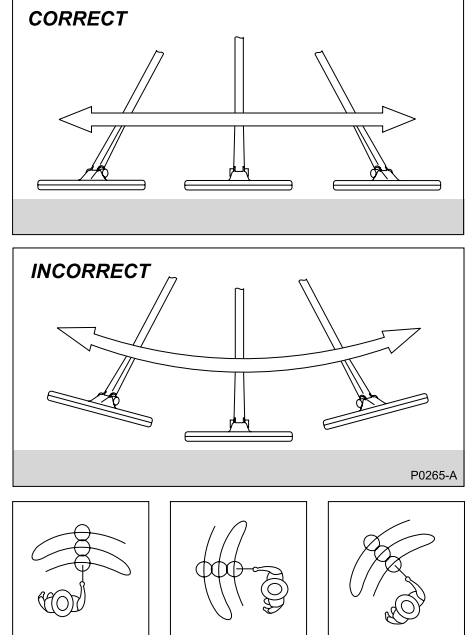


Figure 18 - Sweeping the coil

10.1. Pinpointing the Target

When the approximate location of the target has been determined, move the coil slowly over the target. The audio signal will increase in volume while moving towards the target and decrease in volume as the coil is passed away from it. The signal will be loudest when the coil is directly over the target. Quite often the detector will be producing its maximum volume for a broad area over the target. This generally indicates that the target is near the surface or is quite large.

To receive a sharper, more precise signal over the target, it may also be beneficial to switch to the All Metals and Pinpoint modes as this will produce a narrow response to the target. (see p.21)

The open design of the Tornado coil makes it easy to mark the ground directly above the target to aid recovery.

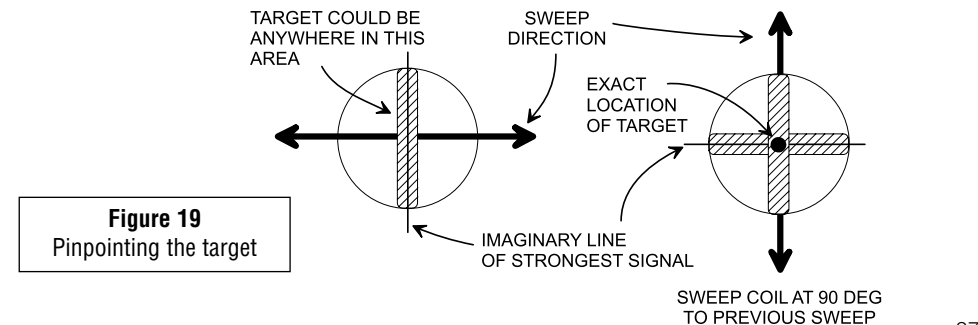


Figure 19
Pinpointing the target

11.2. Recovering the Object

Once the target has been pinpointed, clear the surface of loose material (twigs, leaves, etc...) and check again for the signal. If there is no signal then the target is amongst the surface material. In this case search the surface material until the target is located.

If the target is still in the ground, recheck using the pinpoint mode. For lawned areas, cut a grass plug in a horse-shoe shape leaving one corner attached, then bend the sod back. If you have pinpointed properly your find should be in the middle of the exposed hole. If not, the use of a probe can assist in locating the find exactly and minimize soil disturbance.

If you cannot see the target, but are confident it is still in the hole, remove some soil and place it on a plastic sheet next to the hole. This will enable you to pour back the dirt and leave the surrounding area clean after taking out your find.

Place the coil flat on the ground next to you and gradually remove handfuls of soil from the plastic sheet and pass these over the coil. Keep repeating this procedure until you hear and recover your target. Be sure to recheck the hole and surrounding soil, as several coins can sometimes be found in one hole.

Pour back the loose soil and carefully tread the sod down to its original appearance. This will maintain the pristine nature of your site and help to ensure future access for everyone enjoying this great pastime.

Please note: Dig carefully so as not to gouge or scratch the target, which may be valuable or unique. Be sure to remove any rings or watches from your hands before passing soil across the coil. You may get conflicting signal responses from metal items on or close to you.

Once again, always remember to refill holes.

11. Environmental Concerns

Firstly, it should be pointed out that treasure hunting with a metal detector is the most environmentally friendly way to recover coins, rings, and other treasure items. However, it is important to leave an area searched in the same condition you found it.

When searching parklands or properties where the grassland or lawn is sensitive to disturbance, always use special tools to enable the recovery of targets without digging large holes. This retains the surface "plug" of grass and soil to be returned undisturbed.

All holes that have been dug must be properly refilled. Not only is it environmentally unacceptable to not fill in holes, it is also dangerous.

The use of headphones when detecting will also reduce external noise, sometimes an annoyance for other operators in the area.

Take away and properly dispose of any junk that is found or produced, such as nails, tin cans, or flat batteries. Leaving an area "scarred" can result in action being taken to prevent the use of metal detectors, which will spoil this fascinating hobby.

12. Detector Care

The Sovereign GT is a high-quality electronic instrument, finely engineered and packaged in a durable housing. Taking proper care of the detector is mostly common sense.

• **Do not leave alkaline batteries in the control box when the detector is not in use for any period exceeding two weeks.**

Damage caused by leaking batteries can be severe and will void the warranty through negligence.

• If temperatures are very high, **do not leave the detector in the sun for longer than necessary.** Covering it when not in use will help protect it. Try to avoid leaving it in a closed trunk or in a car sitting in sunlight.

• While the coil of the detector is designed to be waterproof, the control box is quite susceptible to water intrusion. Always protect it when using the detector in rain or on the beach where salt spray is prevalent. Using the accessory hipmount bag to protect the control box will assist this in most weather.

• **Never allow the box to come into contact with gasoline or other oil-based liquids.**

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

• Flat or faulty batteries cause many problems with detectors. Ensure that only quality alkaline batteries are used, and that they are replaced when the low-battery warning signal is heard through the headphones or speaker.

• Ensure that the coil cable is in good condition and not subject to undue stress. Do not undo or loosen the coil connector at the base of the cable where it enters the coil. This should always be firmly tight.

Fault	Solution
No Sound	– Check batteries and battery connections. – Check headphones and their connection.
Erratic Noises	– Check battery charge and battery connections. – Ensure coil connector is tightened firmly. – Reduce the Sensitivity by turning clockwise or return to the Auto position. – Switch Noise Cancel switch to other Band. – Check headphones and their connection. – Check for sand or grit between coil cover and coil.
No Target Response	– Ensure the detector is turned On. – Check battery charge and battery connections. – Check coil connection. – Check headphones and their connection. – Check Disc and Notch settings.

In the unfortunate circumstance that the detector needs to be returned to Minelab for service, please fill out the Minelab Service Repair Form (on page 33, or a photocopy of the same) and enclose it with the detector.

Please supply as much detail about the fault as possible as this will assist our service engineers to rectify the problem quickly and efficiently.

14. Specifications

These specifications are subject to change without notice.

Features:	
Length	Maximum 55in (1400mm)
	Minimum 38in (965mm)
Weight	Control Box* 20.3oz (568gms)
	Tornado 1000 coil 23oz (654gms)
Technology	Broad Band Spectrum (BBS)
Transmit Frequency	17 frequencies (1.5 ...25.5khz)
Ground Balance	Automatic Ground Tracking
Arm Rest	Aluminium with Neoprene cover & strap
Battery System**	Alkaline (8 x 1.5V AA) or NiMH battery pack (12V; 1000mAH)
Mains Charger**	110v (USA);230V (EU); 240V (AUS)
Vehicle Charger**	12V Cigarette Lighter plug
Target ID Meter**	Digital
Audio	Loudspeaker & 1/4 inch headphone jack
Controls:	
On/Off Volume	1 turn pot
Sensitivity	1 turn pot
Threshold	1 turn pot
Discrimination level adjust	1 turn pot
Notch filter	1 turn pot
All Metal/Disc with Iron Mask On /Disc with Iron Mask Off	3 pos. switch
Threshold/Silent Search	2 pos. switch
Ground Track/Fixed/Pin Point	3 pos. switch
Noise Cancel	2 pos. switch
Accessories:	
Tornado 800 Slimline coil	8 inch Double-D waterproof
Tornado 1000 Slimline coil	10 inch Double-D waterproof
Alkaline Battery pack	8 x 1.5v (AA)
NiMH Battery Pack	12V, 1000mAH
Car Charger	12V Cigarette Lighter Plug
Hip Mount Bag	with viewing window & shoulder strap
Rain Cover/Meter Bag	with viewing window
Carry Bag	Protective transport bag
Headphones	32 ohms
Warranty:	
Control Box	2 years
Coil	2 years

* Excluding batteries ** Optional accessories

Note: Minelab reserves the right to make changes without notice and offer different configurations in different countries.



Minelab Service Repair Form

Today's Date:

Detector Model:

Serial No.:

Purchased From:

Purchase Date:

Parts being returned:

Description of Fault:

Owner's Name:

Address:

Phone: Day ()

Home ()

Fax: ()

Email: