

Компьютеризированный селективный
двухчастотный металлодетектор

SELENIUM MFT INTRONIKA

Инструкция по эксплуатации





General Information

The Selenium MFD 8956M GT metal detector is designed for searching and identifying metallic objects in dielectric (dry sand, wood, etc.) and low-conducting environments (soil, brick walls, etc.).

The manufacturer of the metal detector is the AKA company, and the center for metal detector repair and maintenance is located only in Russia. For export, we have developed a more reliable metal detector, specially for sale to the foreign market. Based on the "classic version", our specialists have released a special version Selenium MFD 8956M GT upgraded. This is a more reliable model of the metal detector with an improved element base. Additional protection against dust and moisture has been implemented.

Product Specifications

Selenium is a pulse induction coil metal detector operating at low frequencies. This is the top professional model in the best-selling Selenium family.

This unit incorporates the best hardware and software solutions tested on previous models. The device has been updated with a range of new key features that have increased search performance and made this device one of the most versatile detectors in the world.

Selenium is a variable frequency device. The battery of this model is configured with a Vietnamese model of the acid type.

Function

The Selenium MFT is a PULSE-INDUCTION (PI) system which incorporates a large search coil (one meter by one meter as standard equipment) for the main purpose of finding large objects at great depths. These detection depths can almost be compared with those of magnetometers, which can detect nothing but ferromagnetic objects. Another great advantage of using the Selenium MFT together with the large search coil is being able to cover a large area in a short period of time. The actual search coil is encased in a square plastic frame (PVC tubing) and can be carried by one or two persons. Using the PI-principle offers some decisive advantages. First, the search coil is not part of a resonant circuit as it is the case with VLF detectors and can, therefore, be of almost any size and shape. This is absolutely necessary in order to increase the location depth considerably. In the second place there is a temporary decoupling between the transmitting and the receiving phase which makes it possible to work with far greater transmission power. A further advantage is that small objects like bottle caps, pull tabs, pieces of aluminum foil, but also single coins are naturally rejected while using the large search coils. But still the Selenium MFT is an easy-to-operate metal detector: you only have to deal with four simple controls, of which you only need one during normal operation. Objects are simultaneously indicated by a meter and by an audio signal which increases in frequency while approaching the object. The audio response has a very wide frequency range in order to avoid signal saturation when the search coil approaches a very close object. This makes it easy to pinpoint the exact location.

The configuration of this metal detector allows the use of any search coil produced by the AKA company, regardless of its size or operating frequency.

As always, this device is not based on the original two-channel pattern but is designed as a single-channel device, the reason for being single-channel is to upgrade this model for greater depth in all soils.

This model has many discrepancies compared to other models, Selenium does not search in dynamic mode, in all Very low frequency models the search coil must always be in motion, but in Selenium there is no need for momentary coil changes.

Dynamic search mode is also available. It is designed to accurately detect the position of the target.

Selenium MFT has a comprehensive audio and visual detection system. First of all, this system includes our indirect holographic visual identification of search objects, which is very popular and is considered the most informative method for determining the value of an object or worthless.

1. Selenium MFT is capable of processing signals with 4 independent algorithms. The first one is Deep mode. This is a traditional method and is widely used in previous models, this algorithm is for deep objects. In this method, the detection of deep objects is easily detectable and is suitable for conditions with very low metal pollution. It is fully harmonized for environments with rich mineral materials

2. The second is Mineral. The main feature of this algorithm is better detection and elimination of small objects, including small iron objects that have been in the soil for a long time. Other features include the elimination of iron-, nickel-, volcanic-, and adrin-rich mineral rocks.
3. The third changeable algorithm is Sample (sampling of return signals). By changing this algorithm, the effect of the soil can be eliminated. In some areas with soils that include a high density of tree roots and also when the ground effect is so high that interfering signals are detected when the search coil is brought close to the ground, increasing it can lead to a better search
4. The fourth changeable algorithm Mineral (changing the ground sampling time) with this algorithm it is possible to increase the ground sampling time, this algorithm will be useful for urban environments with very high pollution. Selenium MFT is a detector with a frequency range of 100Hz to 1kHz. It has a wide range of coils of different sizes and frequencies and has several main changeable signal algorithms. Processing that allows the device to be adjusted for different search conditions: In Deepmode mode with the Mono17-1kHz search coil, it may detect an ancient sword up to 1.8 meters. The device is lightweight (about 1.5 kg without the search coil). With all these features, the Selenium MFT becomes one of the most versatile. In addition, we are pleased to inform you that this model has been updated to simplify its use and increase search comfort.

1. We have updated the ground balance system. From now on the GB phase is executed. Right after the search coil is matched, it should be set to 0 by default. Ground balance calculations can be seen on the chart on the all-metal page. The balance chart can be set to zero in all environmental conditions.
2. Selenium MFT has a fully automatic search coil matching system. This means that the device will automatically start a new search with the installation of the search coil of any size and will match itself with its different frequencies. The device identifies and initializes any type of search coil
3. Selenium MFT is the first device in the line with different search programs and changeable while the coil is moving. There is no need to reset the device during the search
4. Also with the Mode key you can enter the Manual mode page where all points of the unit can be controlled
5. The device's menu layout is professionally designed. Unlike previous models, this device has a three-page menu with instant access to each page. All pages are based on these topics: All Metal and Deeper Depth menu, Metal Discrimination menu, Fully Manual Settings menu
6. If you haven't used your device for a long time and forget the status of its settings, we have the "Quick Settings Check" option for you. When you press and

hold the appropriate button, the selected mode and settings are displayed.

Delivery Set:

- Electronic module: 1 item
- Search coil Mono 17" - 1kHz with rod: 1 item
- 1m frame search coil×1m: 1 item
- Shaft: 1 item
- Armrest: 1 item
- Bracket: 1 item
- Headphones: 1 item
- Carrying case: 1 item
- Search coil protector: 1 item
- Vest: 1 item

Additional accessories and search coils can be purchased at the following address:

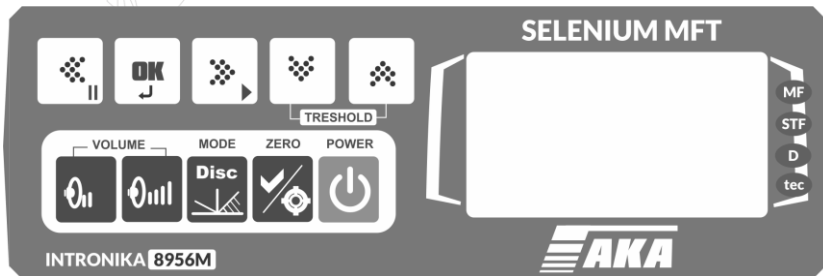
akametaldetectors.com

Technical Specifications:

- 1) Maximum detection range for metal objects (in air, 17" Mono kHz search coil):
 - a) Deep mode channel:
 - i) \varnothing 25mm coin (brass), without electromagnetic interference - 57 cm
- 1) Operating frequency range:
 - a) 100Hz – 1KHz
- 2) Power supply (number of batteries, type, voltage):
 - a) Seald lead acid, 13.2V
- 3) Runtime:
 - a) 1 x 4500 mAh Seald lead acid battery
- 4) Dimensions (packed), mm:
 - a) 125 * 120 * 78
- 5) Weight (without battery):
 - a) 1.2Kg



DISPLAY BUTTONS:



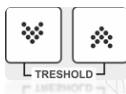
To switch between metal discrimination mode, all metals mode, and manual menu, press the "Discrimination" button.



"Ground Balance - Menu A" automatically balances the ground and zeroes the depth chart in all metals mode.



This device has two audio outputs: a 7mm stereo jack for headphones and a built-in 5cm speaker for clear sound. The two volume knobs allow you to adjust the volume of both outputs.



"Threshold - Up/Down" sets the threshold level in discrimination and all metals modes when using manual mode. Use the Up/Down buttons to change settings (select a mode or algorithm).



The "OK" button is used to confirm changes to settings and to select different algorithms and modes, including switching between deep mode and mineral mode.



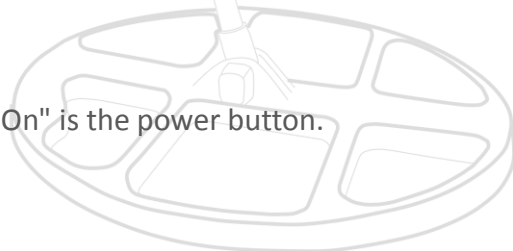
«plus» button. Change values in settings mode. Warning! In the search mode is used as control button with pre-assigned mode



"minus" Change values in settings mode. Warning! In search mode is used for the on the fly switch between "norm" and "metal trash" modes.



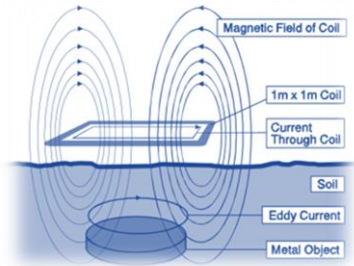
"Off / On" is the power button.



Selenium MFT metal detector function type:

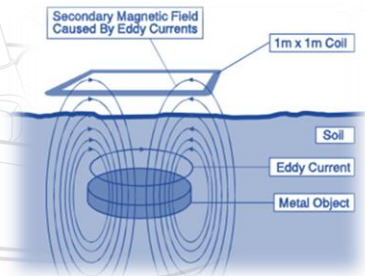
Transmission Phase

A strong duty current is flowing through the search coil about 600 times per second. The linearly increasing current builds up a primary magnetic field which radiates as shown in Fig. 2. The current is abruptly cut off after a certain time, so that the primary magnetic field collapses quickly causing so-called eddy currents in the metal object. Strength and duration of these eddy currents depend on the electrical conductivity, size and shape of the object. After a short time delay the search coil is connected to the receiver input.



Receiving phase

The decay of the eddy currents in the object produces a secondary magnetic field, which is radiated by the object. This secondary magnetic field has its effect also on the coil and here induces very low voltages, which are amplified and displayed by a meter and an audio signal. Obviously the detection range has physical limits, because these voltages



are extremely weak and can be obscured by external magnetic fields.

In general, the possible detection range will increase quickly with increasing target size. This is especially true for the PI-principle. But the electrical conductivity and the shape of the object are also important factors. Related to this, ferromagnetic metals take a special position. If these metals are exposed to the magnetic fields of a PI-detector, they will be momentarily magnetized. Although the electrical conductivity of these metals is poor and, therefore, the decay of the eddy currents is very short, the strength and the slow decay of the magnetization causes a strong signal. This is why PI-detectors are very sensitive to even small ferrous objects. The Selenium MFT offers you the possibility of reducing the sensitivity to these objects (some smaller ferrous objects can even be completely rejected), while still being sensitive to most non-ferrous metals. With a rather complicated electronic analysis of the decay of the objects magnetic fields we were able to provide the Selenium MFT with a metal discrimination. Since the signals that have to be analyzed are even smaller than the normal detection signals, the discrimination range is limited to about 60 to 80 % of the normal detection range. Additionally, motion of the search coil is required in order to receive a ferrous or non-ferrous indication. Also, the discrimination can only function with objects of a minimum size of about 10cm (4 inches) in diameter. The influence of shape and position is too large when detecting small objects. The Selenium MFT measures the electrical conductivity of the metal object. As

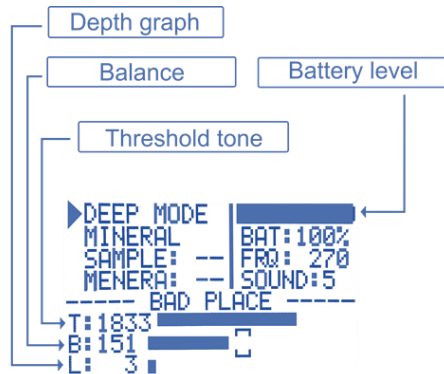
ferrous metals have, compared to most non-ferrous metals, a poor conductivity it is possible to differentiate. However, you have to pay attention to the following: almost all objects smaller than previously mentioned will cause a ferrous reading. The same applies to thin foils (e.g. large aluminium foils). An accumulation of several smaller non-ferrous objects (for example some silver coins) have not the same characteristics as one bigger single piece, so that again a ferrous metal may be indicated. Additionally, the conductivity of some non-ferrous metals, like lead or tin, as well as of some alloys is even lower than that of iron, so that they may be classified as ferrous objects. However, for large objects there will rarely be an anomaly effect (a non-ferrous indication although it is a ferrous metal) which plagues most VLF/TR detectors. If there are both ferrous and non-ferrous metals in the detection range (e.g. non-ferrous metals in an iron box), usually the larger one of these objects will be indicated. VLF/TR detectors do offer excellent discrimination features for small objects. The Selenium MFT has the greatest advantage of detecting and discriminating medium and large size objects. Brief summary of the advantages and capabilities of the Selenium MFT metal detector:

- The PI-principle allows to enlarge the search coils and to use a high transmission power in order to achieve extraordinary detecting capabilities.

- Using large search coils will allow the operator a fast search covering larger areas. Many different coils (various sizes and shapes) can be connected to the Selenium MFT (1m x 1m is standard equipment):
- The 25cm (10 inches) search coil is very effective for exact location and can also be successfully used in overgrown and bushy areas.
- The cylindrical coil may be used for cracks, gaps, drilling holes, wells and also works with metal discrimination.
- The 2m x 2m (80 inches x 80 inches) search coil covers four times as much ground as the standard coil and achieves even 30 to 40 percent more depth on large objects. However, sensitivity to smaller objects will be reduced.
- The Universal Search-Loop can be used to build up coils of different shapes and sizes. Additionally, a compensated coil is possible which eliminates interferences.
- All search coils are waterproof and can, therefore, be used in shallow water.
- The Selenium MFT offers a metal discrimination for larger objects.
- Operation is very simple and the internal adjustments are performed automatically each time the Selenium MFT is turned on.
- Retuning during operation requires nothing more than pressing a switch

Device display:

The device display shows a graphic of the detected object and operational information in search modes.



Balance:

- This graph shows the height of the search coil above the ground.
- The value decreases when finding metals or bringing the coil closer to the ground.
- When moving the coil's height, the graph changes steadily.
- When finding metals, the value decreases only when passing over a point.

Battery level:

- Indicates the battery level.

- Power save mode activates at 10.2 volts (25%).
- A full charge (100%) indicates that the battery voltage is 12 volts.

Threshold tone:

1. "No Metal Junk": The threshold value in dielectric and low-conductive soils is automatically set between 1000 and 2000.
2. "Iron Polluted Environment": The threshold value in a heavily polluted area is between 500 and 1000.
3. "Not Working": If the threshold value is below 500, a very large metal object is near the search coil and the device should be turned off.

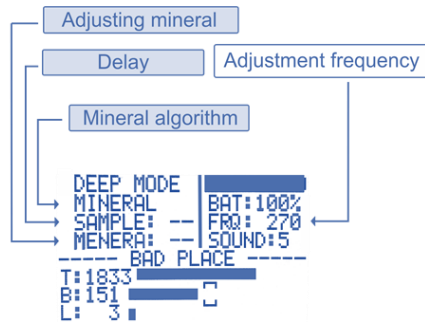
Depth graph:

1. "0 to 2": A metal object is probably buried very deep, or the device may be moved between these values to eliminate ground effects.
2. "2 to 7": Metals larger than 10 centimeters will be deeper than 1 meter, or a very small metal (smaller than a BB) is on the surface.
3. "More than 7": Surface trash up to 50 centimeters.



Adjusting algorithm:

- Used in environments where ground effects cause sudden changes in the B graph.
- Use this option if the (B) graph value changes randomly when moving the search coil over the ground.



Delay:

- In some areas, manual depth penetration adjustment will be required.
- If the soil is sandy, windblown, or mineral-free, you may want to use the maximum power of the device for greater depth.
- Decrease the "sample" value to increase both depth and sensitivity.

Adjusting mineral:

- Manual adjustment for less sensitivity to minerals.
- Increase the "mineral" value to reduce potential errors for minerals.

Adjustment frequency:

- High-voltage power transmission lines, mobile phone waves, booster transformers, simultaneous use of two metal detectors, car coils, etc. will cause interference in the device.
- This is a new method to eliminate this distortion.
- By changing the frequency, it is possible to use two metal detectors simultaneously.
- Wave shadows are the main cause of this distortion in metal detectors.
- Changing the frequency of the device will eliminate all interference.

Warning: Set the frequency to less than 300 when near factors such as high-voltage power lines.

Ground balancing:

- Ground balancing is the most important aspect of the device's search settings.
- Improper balance can reduce the search capabilities of the device and cause unstable operation and incorrect responses.

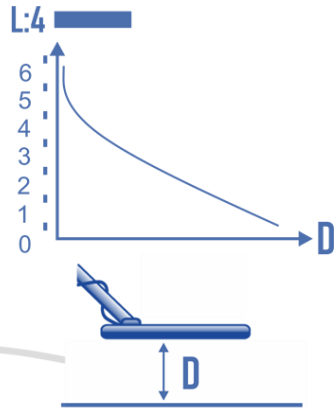
Automatic balancing:

- Ground balancing in the Selenium MFT is done differently.

- To do this, first place the search coil on the ground on the All metal screen.
- Press the Zero button.
- You will see the sentence "Please wait" on the display.
- Wait until you hear a frequency sound from the speaker.
- Then raise the search coil 2 to 10 cm as shown in the picture.
- Balancing is complete.

Tips:

- The less contaminated the ground, the less the (L) graph will change after raising the search coil.
- However, if the ground is more contaminated, the (L) graph value will decrease.
- Raise the coil until you can hear the output frequency sound.
- When raising, the output sound may decrease until it is cut off.





- The sound being cut off means that the coil is at the appropriate height above the ground.
- It is best to use the point where the sound is cut off as the reference for the distance of the coil from the ground and start searching at that distance.


Additional notes:

- If the (B) graph value is less than 170 after raising the coil, the balance is correct.
- However, if the graph value is greater than 170, it means that you have balanced the coil over a ferrous metal object. If this happens, move the coil to a different location and repeat the balancing procedure.
- After balancing, the (T) graph value should be between 1000 and 2000. If not:
 - Less than 1000: The location is not suitable for using the metal detector. There is a large amount of metal near the metal detector.





The keys   are provided to achieve manual balance. These two keys play an important role in search speed.

First, place the loop at a height of 2 to 15 cm. Then, pay attention to the (L) graph value. If the L value is zero, hold the key  until the L graph starts to change. After the L graph changes and passes ($L = 1$), the frequency sound can be heard from the speaker of the detector unit.

If L is greater than 1, hold  the key until $L = 1$.

Note: If L is greater than 0 in the All Metal menu, the frequency sound will be heard from the speaker in any case. Manual balance is achieved when $L = 1$.

Note: If L in the "All metal" menu is greater than 0, the frequency sound will be heard from the speaker in any case.

When $L = 1$, manual balancing has been completed.



Search method:

Differential:

1. Perform the automatic or manual balancing steps.
2. Then find all metals using only the B graph.
3. Assume that after ground balancing, the (B) graph value is 150.

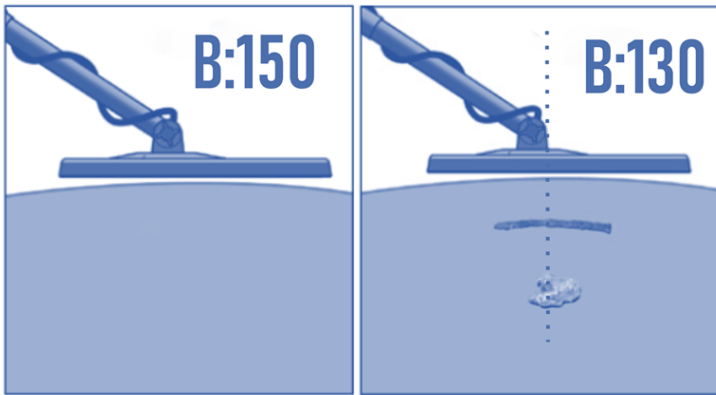
B: 150 

Note: The B value may have any value between 100 and 500 after balancing, depending on the ground conditions. If the value is 0, you have definitely chosen an unsuitable location for using the detector.



Starting the search:


A metal is detected when the search coil is directly above the metal, forming a vertical line (represented by the dashed line in the image). At this point, the (B) graph will decrease.




Once the search coil is no longer above the metal, the (B) graph will return to its original state, meaning that (B) will be 150.

In differential search, there is no need to hear a sound. You can easily experience a very high-precision search without the need for sound.

Frequency tone search:

Perform manual ground balancing. Try to adjust the sound exactly to the threshold using the two keys .



Setting the sound to the threshold means that the (L) graph value is 0. In this case, a frequency sound can be heard by pressing the  button 1 to 3 times.

For better performance, adjust the Treshold buttons so that L=1. In this case, you will hear a very low frequency sound.

Attention: This search method is suitable for dielectric soils without mineral contaminants and ferrous debris. It is recommended to practice the differential method for faster search.

Metal Discrimination:

Automatic Metal Discrimination:

To enter discrimination mode, press button . Then press button  to switch between modes. Mod1, Mod2, Mod3, and Mod4 are each algorithms for separating different types of metals.



Mod1:

- Purpose: This mode is specifically designed to discriminate against magnetic metals, allowing you to focus on finding valuable non-magnetic metals like gold, silver, and copper.
- Application: Mod1 is ideal for areas where you anticipate encountering a mix of magnetic and non-magnetic metals, such as old parks, relic sites, or areas with a history of mining or industrial activity.

Mod2:

- Purpose: This mode effectively isolates iron from other metals, minimizing the detection of unwanted iron objects and saving you time and effort.
- Application: Mod2 is particularly useful in areas with high iron mineralization, such as construction sites, old landfills, or areas with a history of ironworking.

Mod3:

- Purpose: This mode specifically targets magnetic metals, including iron, steel, and galvanized materials, while excluding non-magnetic metals like gold.

- Application: Mod3 is suitable for situations where you want to prioritize the recovery of magnetic metals, such as in scrap metal detection or historical research involving ferrous objects.


Mod4:

- Purpose: This mode expands the range of non-magnetic metals it detects, including gold, silver, copper, brass, stainless steel, white gold, and bronze.
- Application: Mod4 is ideal for general treasure hunting in areas where you expect a diverse range of non-magnetic metals, such as old homesteads, beaches, or recreational areas.


Mode	Purpose	Detected Metals	Excluded Metals
Mode 1	Gold, Silver, Copper (Non-Magnetic)	Gold, Silver, Copper	Magnetic Metals
Mode 2	Isolate Iron	Isolate Iron	Iron
Mode 3	Magnetic Metals (Iron, Steel, Galvanized)	Metals (Iron, Steel, Galvanized)	Non-Magnetic Metals (e.g., Gold)
Mod 4	Gold, Silver, Copper, Brass, Stainless Steel, White Gold, Bronze (Non-Magnetic)	Gold, Silver, Copper, Brass, Stainless Steel, White Gold, Bronze	Magnetic Metals

Manual Discrimination:


Entering Discrimination Mode:

1. Press the  button to enter discrimination mode. This will activate the discrimination settings on your metal detector.

Switching between Discrimination Options:

1. Once in discrimination mode, press the  button to cycle through the available discrimination options. This may include options like "Mod1," "Mod2," "Mod3," "Mod4," and "Sample."

Selecting the Sample Option:

1. When you reach the "Sample" option, press the  button to select it. This will allow you to adjust the discrimination settings using a numerical scale.

Adjusting the Sample Setting:

1. The Sample setting typically ranges from 45 to 100.
 - 45: This setting is optimized for detecting non-magnetic metals, such as gold.
 - 100: This setting is optimized for detecting magnetic metals, such as iron.

- As you increase the Sample setting number, you are essentially adding more metals to the discrimination range, including both non-magnetic and magnetic metals based on their conductivity levels.

How to Use Discrimination in Metal Detecting:

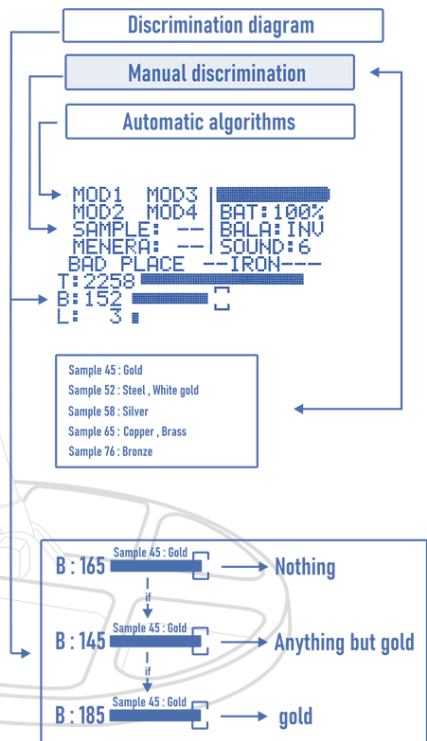
Chart B on the discrimination page indicates whether or not our selected metal is present underground. On the All Metal page, pinpoint the location of the metal.

Step away from that spot and press the  button to enter the discrimination screen.

Based on the explanations in Manual and Automatic Discrimination, choose an appropriate number for Sample or a suitable Mod.

Pay attention to the number on Chart B. For example, it is 165.

Move towards the spot where the metal is



located. If the number increases, it means that the detected metal is the one you were looking for.

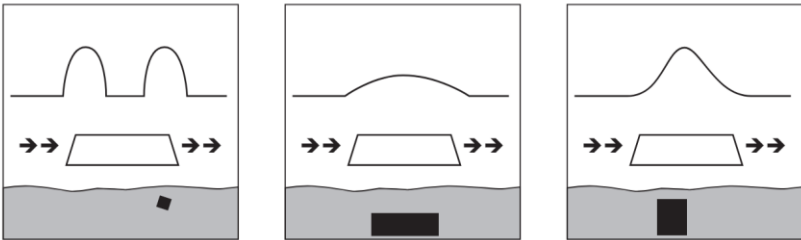
However, if the number on Chart B decreases, it indicates that the metal is different from the one selected in the discrimination options.

Signal intensity:

Small object at the surface:

Consider a small object buried shallowly under the ground.

When scanning with the All Metal mode, if this object is detected, it will not be detected directly in the center of the



small object at the surface

large object buried deep

medium size object

search coil.

Instead, the detector will respond when the object is under the edge of the coil.

As the coil passes over the metal, two beeps will be heard, one at each edge.

Large object buried deep:

Large buried objects exhibit a consistent pattern of detection behavior.

Consider a large 50-centimeter object buried at a depth of 2 meters.

Before reaching the object's center, the detector will respond, and you'll hear a sound.

Upon reaching the object's center, the loudest sound will be emitted.

Even after passing the object, you may still hear the detector's sound for up to one meter beyond it.

The sound output will gradually fade as you move further away.

Medium size object:

When detecting medium-sized objects buried at shallow depths, the output sound is typically heard at the center of the object.

Operating Procedures

Now you are familiar with the controls and capabilities of the Selenium MFT. In this and the following chapter you will learn how to operate the unit in actual practice.

To ease transportation and storage, the one meter by one meter search coil is constructed detachable.

With a few simple steps, your search coil is ready for use:

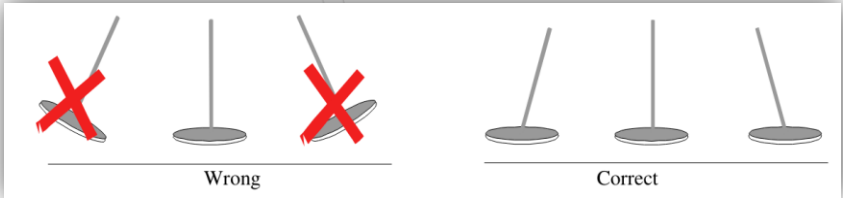
1. Unfold all four PVC tube sections.
2. Align all corners.
3. Ensure that the cable is pushed inside the tube.
4. Secure each corner with a slight nudge with palm of hand. All four corners must fit snugly so as not to come apart while searching.

Coil disassembly:

To disassemble the one meter by one meter search coil, pull on each corner without twisting or bending each tube to prevent warping it. If you have any difficulties disconnecting any corner, then slightly hit inside the corner with your hand. Before packing and storing the search coil, make sure that the connector plug is clean, dry, and free of dirt. The plug should always be closed with the dust cap. The search coil should be cleaned and dried as well before it is stored. Please avoid sharp pulls on the connecting cable of the coil.



The search coil should not touch the ground during your sweep. The pole length should be adjusted to allow this without having to lift the detector with your elbow or shoulder. The search coil should rest about one inch above the ground while you are standing erect. The angle of the search coil should allow the bottom to be parallel to the ground.



Important! Must be read!

With the Selenium MFT you have acquired an efficient metal detector which enables you to detect any metallic object buried. However, please take into consideration that you could possibly meet with war material which is dangerous even now. Ammunition often contains ogives of projectiles or cartridge cases made of brass and, therefore, it can be indicated as non-ferrous metal. In case that the detected object is very large, special caution is advisable: it is possible that you met a bomb. On principle, you should not try to dig out the object in case of doubt. If you still intend to do it, you should never approach to object directly with the digging implement from above, but carefully from the side. If there is any suspicion about the existence of a bomb, shell or munition, immediately call the police or the bomb disposal unit. The digging place or dangerous objects already dug out may not to be left without supervision, because they could be located by children. Digging out and the salvage of a find is completely at your own risk. Manufacturer and seller are not liable for damages. In any case, the use of metal detectors by children must be supervised by adults. Only adult persons are allowed to dig. By all means, observe the existing statutes and decrees. Also the search of archeological objects is generally subject to authorisation or, in several countries, strictly forbidden. Please also consider that discovered objects do not automatically belong to you but are subject to the find right of the respective country. The Selenium MFT produces intensively pulsed magnetic fields. For reasons of safety, persons with an implanted pacemaker should not stay in the direct near of the search coil during operation.