MIKRON
METAL DETECTORS

STINGER

User's Operating Manual

Made in Bulgaria

In order to use the device for a maximum long time and without problems, as well as to be able to use all of its options, please read carefully the whole instruction manual and observe the directions in it.

The standard set of **STINGER** comprises:

- searching frame of 1x1m.
- monitor unit with built in accumulators;
- automatic recharge device for 220 V;
- detailed instruction manual for operation.

If any of these items are missing, immediately inform us, or our autorized dealer where you purchased your detector.

⇨ "**STINGER**" is an impulse metal detector with an LCD – Display, digital and graphical presentation of the level of signal and parameters of discrimination and working modes, as well as of the state of temperature of the storage battery;

⇨ Full automatic balance to ground conditions with memorizing and adapting to the level and parameters of the background of soil and their elimination by the general signal.

⇨ Reporting of the influence of earth magnetic field and its isolation from the general signal

⇨ Reporting of side disturbances and their full elimination during work

⇨ Possibility for work in premises and in proximity to electric networks – full suppression of 50 Hz disturbances.

⇨ 12 regimes of work - 6 dynamic and 6 static - for correct localization of the object.

⇨ Mode of work for all metals.

⇨ Three modes of discrimination - 1 for normal soil, 1 for soil with high mineralization, and 1 for high mineralized soils with changing background within wide ranges + outer disturbances.

⇨ Choice of 2 types of sound indication - VCO (multi – frequency one) or two-tonal indication, low tone for magnetic and high tone for non – magnetic

(non - ferrous metals).

⇨ Built – in storage battery, providing 10-20 hours of constant work depending on chosen power

⇨ Automatic charge of the battery – measuring of charged capacity and tracking of temperature during charging;

⇨ Tracking of the capacity of the storage battery and automatic signal and turning off at achieving of a critical minimum.

⇨ Possibility for setting of over 30 working and service parameters providing comfortable and effective work under various conditions of work.

⇨ Possibility for quick and easy access to all settings in the menu;

⇨ All these possibilities allow „**STINGER**“ to work perfectly under any ground conditions, including at high mineralized and polluted sites!

„**STINGER**“ has the following parts for control:

Switcher "**ON – OFF**" for turning on and turning off

Buttons "**SELECT**", "◄ and ►" serve for work with the menu and the settings, selecting of a mode of discrimination and motion.

Button "**CLEAR GND**" – serves for automatic setting of the device to ground conditions of terrain where it works.

Button "**MODE**" — used at the modes of discrimination and serves for momentary switching into „**ALL METALS**" mode for precise localization of object without losing of the value of memorized balance to the ground in the discrimination modes, as well as for balancing to the conditions of the soil through pressing and holding of the "**MODE**" and momentary pressing of "**CLEAR GND**"

- Button "**DISCR**" – serves for turning on and off of the discrimination modes.

1. Setting and way of work:

Searching frame is assembled and is placed on the ground paying attention to the range and there don't have to be any metal objects.

The cable is sub - connected to the device. The device is turned on by "**ON – OFF**" and you see „**Start Detector**“ on the display. Nullification starts and balancing to ground conditions during which time the display shows "**CLEAR**" and you can hear a single sound. This lasts for 3 – 4 sec., then it is followed by a double short sound

and the device is turned on in general mode of "**ALL METALS**". If you wish to work in a mode of discrimination "**DISCR**", the you have to push the button "**DISCR**", at which the device is switched into discrimination mode and the display shows "**DISCR.1**". Its next pushing switches again the device into "**ALL METALS**" mode.

Working with the device in "**ALL METALS**" mode

In this mode the display shows "**ALL METALS**". Constantly shown aer the level of signal in graphical and digital look, the capacity of the storage battery, chosen power, the level of co – working of the sound and the working mode, as follows:

- 1st row to the right – capacity of the battery in percent: **0% - 100%**
- 2nd row to the right – chosen profile of work - "**Prof1**" or " **Prof2**". At both profiles the device works with different searching coils or frames - " **Prof1**" – program for small round coils – 28cm. 36cm. 45cm. or "**Prof2**" – program for searching frames – 1x1m or 2x2m.
- 3rd row to the right – threshold of sound, level after passing of which a sound appears
- 4th row to the right – the level of signal from the registered metal in figures – from **0 – 400**. If there is signal of metal within the range of the coil, disturbances or influence by soil, upon pressing of "**CLEAR GND**" indication will become "**0**". After removal of the source of the signal from the coil range, indication will become of negative value. In order to be nullified, you have to push again "**CLEAR GND**". Upon pushing and holding of "**CLEAR GND**" for more than 4 sec the devices is restarted.

The device can work in 12 modes of speed of searching – 6 static (for precise localization of object) - "**FIX0**"- "**FIX5**", and 6 dynamic (for searching with motion) – "**MOV0**" – "**MOV5**".

"**FIX**" are static modes of searching, i. e., the device constantly reacts to a metal located within the range of the coil. They are suitable for localization of the exact place of an already fixed metal, and one may constantly work in this mode.

Fastest one is the "**FIX0**" mode, and slowest one is "**FIX5**".

"**MOV**" are dynamic modes of work with a various speed of searching. The difference among these modes is in the time for automatic nullification of appeared signals, i. e. the device is constantly set additionally, but with a various speed at individual modes. Fastest one is the "**MOV0**" mode, and "**MOV5**" is slowest among the dynamic modes. At these modes the device reacts to metal objects within the range of the coil only at motion of the coil above them.

On the 2nd and 4th row of the display to the left graphical indicators are depicted of the level for more comfortable tracking of the changes in the signal. Indicators can show positive or negative levels respectively increasing to the right or to the left from the dividing zero point of each of them.

The indicator on the 2nd row is indicator of the momentary signal. At a "**FIX**" mode it repeats the indicator of the general signal. In "**MOV**" mode it only shows the change in the signal.

The indicator on the 4th row is an indicator of the general signal. It shows the summary signal of the coil without processing.

Normally, both indicators show positive values at a presence of a signal, after its disappearance they show "**0**" or hesitate **(-1...0...+1**).

Should within the coil range there falls in a metal object, it provokes a signal which is depicted on the 2nd level of the indicator and of the digital indication of the signal. Should this signal is louder than the chosen threshold of the sound "**TRSa**", a sound is heard with a frequency which depends on the level of the signal. The more louder the signal, the more higher the sound frequency.

Should the general signal becomes higher than "**90**", level indicators show "**>>>>>>>>**", and the digital indication continues to track the increase, the sound is also changed. If the level of overfill is achieved, he sound is changed to a very loud signal tone, and „**OVERFLOW**“ appears on the 4th row of the display.

3. Setting of working parameters in "**ALL METALS**" mode:

setting of the threshold of co – working of the sound "**TRSa**" – this is the level of signal after passing of which a sound is heard. The device may be set at such strength of signal to react with sound. This is done with change in the parameter "**TRSa**". For this purpose the arrow is moved through "**SELECT**" to be against „**TRSa**" and through the buttons "◄ and ►" desired value can be chosen. For end you press "**SELECT**" and the arrow goes down again on the 4th row for choice of "**FIX**" or "**MOV**" modes. The lower the value of „**TRSa**", the greater the sensitivity of the device. For instance, if at a balanced device the constant signal from soil is "**1**" and we have chosen for "**TRSa**" a value of "**1**", then a sound signal is going to appear when the general signal becomes greater than "**1**". If for example for "**TRSa**" a value of "**6**" has been chosen, then the device is going to react with sound at a considerably stronger signal – value greater than "**6**". Greater values of "**TRSa**" can be selected if the general signal from the background of soil changes within wider limits, in order the device to be calm, aiming a sound signal not to ne produced which is not due to detected metal, but the greater the value of **"TRSa"**, the more sensitivity of the device decreases!

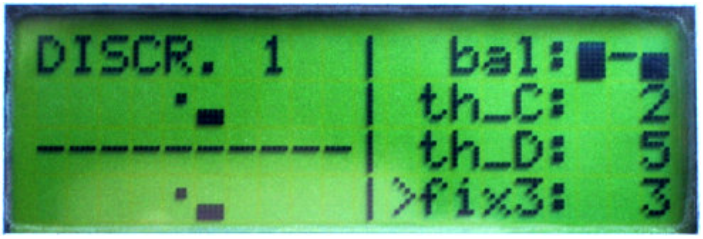
- change of working power - the device can work with different coils or frames "**Prof1**" is program for small round coils, **Prof2**"is program for frames 1x1m. or 2x2m.

Selection of the one or of the other profile is done through pressing of "**SELECT**" until the arrow is fixed on the 2nd row to the right before "**Prof**" and through the "◄ and ►" buttons the desired coil is chosen " **Prof1**" or " **Prof 2**".

It is necessary to have it in mind that at every switching of "**Prof1**" or "**Prof2**" the device restarts, in order to define all working parameters in accordance with the coil chosen.

In case of disbalance you should push "**GND CLEAR**" and the search coil should at the same time be close to the ground.

4.Setting up the working parameters in "**DISCR**" mode

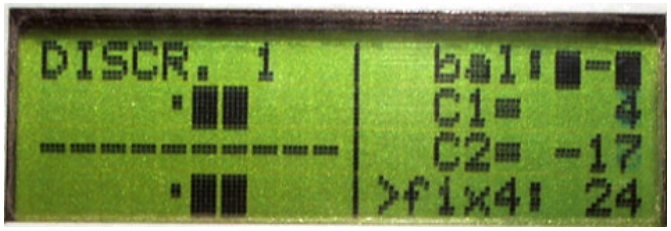


"**STINGER**" has 3 discrimination modes - "**DISCR.1**", "**DISCR.2**" and "**DISCR.3**", that are chosen by pushing the "**SELECT**" button, until the arrow points the discrimination indication - 1st line and the "**DISCR**" mode should be on.

When discrimination is on, besides the signal strength two more values light up **C1** and **C2**, which when a ferrous (magnetic) metal is registered have negative values , and in case of a non-ferrous (non-magnetic) metal – have positive values. "**C1**" is the value for chromaticity of metal, and "**C2**" - is a value for its magnetism.

Most often when a non-ferrous metal is detected **C1** has a very big value, e.g. **+8 +15**, while the value of **C2** is around zero.

When foil, aluminium and iron that is not rusty, **C1** and **C2** have negative values, and their values are big and positive, when the non-ferrous metal is pure, without alloys – gold, bronze, copper, silver. When a highly rusted iron is detected, **C2** has a high negative value, e.g. **-15 -20**, and **C1** is around zero.



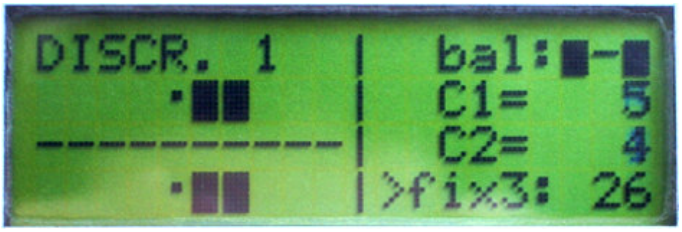
C1 and **C2** can have different values if ferrous and non-ferrous metal is present within the coil range.

The values **C1** and **C2** appear only when metal is detected, and when the signal is missing , "**TRSc**" and "**TRSd**" light up in their place, as:

"**TRSc**" is the threshold of sound change from low to high tone. It expresses

the value of **C1**, before which the signal is a low tone and after it - a high tone. For example if "**TRSc**" is **5** , signals with levels lower than **5** will be registred with a low tone, and in case of signals exceeding **5**, a high tone will be heard. Usually "**TRSc**" should be **1** so that signals with positive "**C1**" are registred with a high tone, or non-ferrous.

"**TRSd**" is the threshold of sound harmonisation in discrimination mode. It determines the minimum rate of signal, after which the calculation of the **C1** and **C2** values begins. The "**TRSd**" setting lights up on the 3d line at the right side and is analogical to "**TRSa**". Smaller values of "**TRSd**" will ensure the beginning of the discrimination in case of weaker signals, but that could lead to more unstable indications or fake signals. "**TRSd**" can change between 5-20.



The balance indicator "**I - I**" regarding the soil background lights up on the 1st line at the right side and shows if the device is balanced when the signal is missing. When the device is balanced and there are no metal objects within the reach of the coil, the indicator should have two equal levels to the right and to the left of the "**-**" symbol. If there is a difference between the two levels the device should be balanced again, by pressing the "**CLEAR GND**" button. The level of the two columns of the balance indicator shows also the power of the signal from the soil. The higher the level, the stronger the signal and thus the operator can get orientated which discrimination mode to use – when the signal is weak (low indicator level) it is recommended to work at "**DISCR.1**", whet it is at average level - "**DISCR.2**", and at high levels (strong signal from the soil) - "**DISCR.3**"

When the "**SELECT**" button is pushed at a discrimination mode and movement of the arrow (>) at 1st line, the type of discrimination can be chosen "**DISCR.1**", "**DISCR.2**" or "**DISCR.3**".

"**DISCR.1**" is an appropriate mode when the soil background is disparagingly small and does not significantly change the signal, received when a metal object is detected.

-When the salt is more mineralised, it transmits a signal that can increase significantly, especially when the frame is close to the ground surface. The highly mineralised soils, especially if they have high moisture content, additionally increase the total signal and it can have high values. If there is a non-ferrous metal in this type of soil, it will invert the overall signal to more positive values, thus the sensitivity will decrease because of the soil background.

-For cases like that the "**DISCR.2**" mode is appropriate, where the average background levels are assumed to be equal to zero and each instant increase of the signal detected from a metal object will be signalised.

The sensitivity at this mode is greater, because the signal appears before the soil background is totally compensated. For example if the soil background is "**C1= - 7**", in case of increasing to **- 6 , - 5** the device will make a signal, while at a normal discrimination, the signal should increase over 0, in order for a sound signal to appear.

Somewhat a flaw of this mode is, that it can give a signal when even when a ferrous metal is detected, with its own coefficient, more positive than that of soil. For example if the signal from the soil is **- 7**, and that of metal is **- 3**, the device will make a sound signal. In this case, the values of **C1** and **C2** should be observed, and thus the operator can make a conclusion regarding the type of the metal.

-In the "**DISCR.3**" mode the signal is analysed and in case of change, it is calculated what part of it is a result of the overal soil background and to what extend it is a result of the impact of another object. Thus it is calculated what the signal coming from the object itself, it is close to this, if the soil does not have its own background or if the object is in the air. For example if we have a signal from a metal object with its own coefficient "**C1= - 3**" located in soil, that has its own background "**- 7**", at this mode there will be no signal, because after obtaining the signal of the metal from the soil background and its discrimination, the result will be negative ("**C1= - 3**"). Similar to the "**DISCR.1**" there will be a signal only when the values are positive. The difference between "**DISCR.3**" and "**DISCR.1**" is that with "**DISCR.3**" the signal from the object does not have to compensate the soil background fully in order to react with sound. From the overal signal the soil background signal separates and only the useful signal stays. If discriminated non-ferrous metal, the

device will react with sound although the soil background could have high negative value. The sensitivity with "**DISCR.3**" is higher than with "**DISCR.1**" but it is better to use "**DISCR.3**" on soils with increased mineralization and a background changing within large limits and also upon presence of outer disturbances.

One should bare in mind that the efficiency of the discrimination depends quite on the size of the metal object and the depth it is situated in the soil. It could be 100% accurate for small and middle-sized objects situated on the surface layer (with depth approximately 50-100 cm in the soil), up to 50-60% accurate for big metal utensil (1x1m for instance) buried at 2-3 m in the soil. That is to say the bigger the object the deeper it is buried in the soil and the harder it is to be discriminated. Smaller coils have better opportunities for discrimination.

5. Balancing towards the soil background in discrimination modes.

For adaption to the soil in "**DISCR.2**" or "**DISCR.3**" press the "**CLEAR GND**" button. On the first row of the display you will see "**Get ground**" and the device will make a continued sound for adaptation start. After that you must bring close the search coil to the ground surface within the range of normal searching distances. The devices analyses the receiving signal from soil. After the successful balancing, you will hear a confirmative double short sound for successful balancing of the soil background. At the some times on the first row on the right side of the display you will see the accepted by the appliance average value for soil background, "**gnd: -27**" for instance. This value is considered to be the conditional environment ("**0**") of discrimination. The value of "**C1**" becomes "**0**" and every signal with more positive value will be signalized with high sound. Then you release the "**CLEAR GND**" button.

If the parameters of the soil background exceed the range of the current chosen background, adaptation shall be restarted and the device will make that long sound again.

If you release the "**CLEAR GND**" button before the successful balance of the

device you will see "**gnd ???**" - signalization for missing tone and it will constantly release short sounds.

If the soil signal varies in wide limits a constant restarting of the soil balance is possible. In that case you should increase the acceptable tolerance of adaptation as you increase the parameter "**ggt1**". In "**DISCR.2**" at the 2d line "**ggt1**" will light up. "**ggt1**" is "Get ground tolerance for **C1".** By them the possible range of signals is chosen when it is balanced to the soil conditions.

For example: if a soil with coefficients „**gnd**: **-10"** has been memorized and for „**ggt1"** a value of **„3"** has been chosen, the device will eliminate only soils (ceramics, stones) with signals from „**gnd: -7**" to „**gnd: -13",** or the ranges of elimination will be 3 unit under and 3 unit above the memorized value **„gnd: -10"**.
If the value of „**ggt1"** increase to **„10",** the device will eliminate the soils signals of **„gnd: -20**" to „**gnd: 0",** i. e., the range increases with 10 more units under the memorized value and 10 units over it. "**ggt1**" can change between "2-10".

If after successful balancing during search the signal from the soil background fades away sufficiently and gets even quieter than the remembered minimum a signalization for missing background will appear - "**gnd: ???**" In that case you should either bring the coil closer to the soil during search or repeat the balancing.

- "**DISCR.3**" is the mode in which one can successfully register non – magnetic metal objects between iron items or under active stones and highly mineralized soils. In this case, if, for example, an object (stone, ceramics or some iron) has been memorized, with own signal of **„gnd: -22"**, the device will not react to any signals smaller than **„gnd: -22"**, and each signal greater than **„gnd: -22"** will be registered with sound, as the objects „with more positive signal" (from „-**21**" to „**0"**) will be signalized with a low tone, and all positive ones – with high tone.

When locating a metal object in the soil during search in discrimination modes the device makes a short sound with one frequency. That makes it harder to find the exact location of the object in the soil than it is with a sound with changing frequency. For the purpose an opportunity is provided for transitory changing into "**ALL METALS**" mode for locating during discrimination search. This is done by pressing and holding the "**MODE**" button and on the display you will see "**ALL**

METALS" and the device switches to a mode of multi-frequency sound indication for the easier locating of the object. After releasing the "**MODE**" button the device returns to the discrimination mode and the balance settings he had before. If you switch off "**DISCR**" and go to "**ALL METALS**" mode the object could be located as well but after that when you switch on to "**DISCR**" again you will have to perform soil background balancing again whereas if you press and hold the "**MODE**" button for locating the device keeps the settings it had before the discrimination mode.

The discrimination mode "**MODE**" could also be used for balancing the device to the soil conditions by pressing and holding "**MODE**" and transitory pressing "**CLEAR GND**". Normally when working in discrimination mode the pressing of "**CLEAR GND**" is not maintained by the software.

6. The detection depth depends on the following:

- size, shape and location of the object in the soil. The bigger the reflecting surface of the object the deeper it is to be found;

-soil composition and mineralization level – the drier and more homogeneous the soil the easier it will be to adapt the device and for the device to detect deeper. Under stones, dry sand or in clay utensil, metals are easier to be found than in freshly dug out or damp soil.

-the longer the object has been in the soil the easier it will be to be found as a result of the good contact with the soil.

- type of detecting coil. The bigger the diameter of the coill the deeper it will be able to detect metals.

- operator's experience and skills.

You can do field tests by yourself using the device if you bury different metal objects in different depth but you should leave them **in the ground for at least 3 months**. Thus the test results will be more reliable. You should mind the soil type and the moisture composition in it. Best results are received when the soil is dry.

7.Charging storage batteries and indications for their status.

"**STINGER**" has a built-in storage package **18V/2,3Ah**, which is able to provide 10-20 hours of working process without any interruption depending on the chosen

power and the type of the used search coil. Bigger coils consume more power and thus the working time is shorter.

The accumulators' status is shown on the first row on the right as per cents of the capacity (**0%-100%**). When the capacity decreases below **0%** it will show "**---**" and if fully charged batteries or if using external supplying block with higher voltage it will show "**+++**". If it shows "**---**" on the forth row of the display it will say "**SIGNAL ERROR**".

The charging is automatic and begins when the device is **SWITCHED OFF** and you plug the charger into the charging jack of the back panel of the device. The jack cage is "**-**" and the middle terminal is "**+**". During charging on the display you will see transitory and maximum voltage of storage batteries, their temperature, as well as the charged so far capacity and on the lower row of the display "**Charging**".

The charging continues till the moment when the batteries reach their maximum capacity which also reflects in increase in the temperature. When reaching their full capacity and increase in the temperature up to **40ºC** the charging stops and down on the display you will see "**FULL**". At the same time the device will start to make short sound signals.

Always charge device's storage batteries ONLY with the paired chargers to it. Thus you will prevent damages or confusion between "+" and "-" because the use of other chargers or adaptors may lead to irretrievable damages in the batteries!

Possible problems during exploitation of "**STINGER**":

1.When switching it on you can not hear a sound, there is no information on the display, no indication that the device is switched on. It might indicate for:

-storage batteries are dead (usually after a long period of time). Charge the batteries with the charger. If the problem is not solved contact the service-station (office) of the company manufacturer or the local distributor.

-the accumulator block consists of 15 elements **1,2V/2,2Ah** connected in series. If just one of them is damaged the connection between them will be destroyed and practically the device will be left without power supply.

2. The working depth is significantly shallower than the normal. It might indicate for:

- storage batteries could be dead – pay attention to the shown % for the capacity of the storage batteries. If it is "**---**" charge the batteries with the automatic charger. If you can not solve the problem contact the service-station (office) of the company manufacturer or the local distributor.

3. During detection the device does not work stable, makes strange sounds which are not due to a metal detection. It might indicate for:

- irregular electromagnetic external interruptions.
- problems with the coil cable – disconnected conductor, a shot circuit or bad connection in the coupling.

It is possible after continuance work and many times of switching on and off the cable's coupling to the jack box the contact between them to be destroyed. There are 2 terminals with sightholes in the jack of the back panel of the device. Put something sharp like a knife or a screwdriver in the sightholes and make them wider. Thus the coupling will fit better into the jack which will improve the contact between them. It is possible in the presence of some kind of dirty like dust or moisture to clean the terminals with cotton-wool and alcohol. If you can not solve the problem contact the service-station (office) of the company manufacturer or the local distributor.

4. The device works only with headset and when working with amplifier you can not hear a sound. Usually that happens when the headset jack is damaged. In that case contact the service-station (office) of the company manufacturer or the local distributor to change the jack.

5. When switching on the charger to charge the storage batteries you will see on the display "**FULL**". Usually that happens when the device was kept in the cold and the battery temperature is around or below **0ºC**. If the microprocessor can not define the batteries temperature you can not strat the charging and on the display you will see "**FULL**". Leave the device in a warm premise and wait till the

temperature of the batteries increases up to **5- 6**ºC.

If you can not solve the problem contact the service-station (office) of the company manufacturer or the local distributor and **do not charge** with any other devices or ordinary adaptors.

6. Batteries charge quickly and after that during the working process they go dead quickly. Usually that happens when the batteries are really old and need replacement. Contact the service-station (office) of the company manufacturer or the local distributor for change of the storage batteries.

The Manufacturer (trader) does not bear any responsibility if you use the device in violation of the law, on archaeological or forbidden for search places as well as on private property without the knowledge or the permission of the owner.

Protect the environment and always fill back in the holes you have dugged out!

7. GUARANTEE

The detector **ULF21** is offered with 2 years of guarantee of electronics, labor and materials used, for harms which are not caused on purpose or irresponsibly.

We can upkeep your device after period of guarantee if it is necessary.

8. Protecting your investment

Often detectorists are disappointed when their new detector slowly becomes less and less responsive and seems to have lost some of its original peak performance. You can help avoid this from happening to your detector by following these basic care and protection guidelines:

⇨ Operate your detector exactly as recommended in this Operator Instruction Manual.

⇨ The search coil cable is hard-wired to the search coil and protected by a strain relief. It is very important that the strain relief remains intact and should *never* be adjusted or tampered with.

⇨ Keep cables properly wound around the pole stems and protect them during use. Floppy, pinched, or cables that become snagged during use may short, causing erratic noises or unnecessary replacement of the search coil.

⇨ Sweep the search coil carefully, especially when using around rocks and building

foundations. Avoid hitting the search coil against hard, solid objects and surfaces.

⇨ Keep your search coil slightly off of the ground during the sweep, especially when using in gravel or hard, rocky dirt.

⇨ Remove and clean out scuff covers periodically to avoid buildup of mineralized dirt particles which will affect performance.

⇨ The search coil is waterproof and can be submerged in either fresh or salt water. After the search coil is used in salt water, rinse it and the lower stem assembly well with fresh water to prevent corrosion of the metal parts.

⇨ The search coil is waterproof but *the electronics are not,* so always prevent any moisture or water from entering the control housing and never allow the cable connector to become submerged in water.

⇨ If working in or near water, or if there is a possibility of rain, use a protective weather resistant pouch or plastic bag to cover the control housing. Make sure it can "breathe" in order to ensure
against condensation buildup inside.

⇨ After each use, clean the detector with a soft cloth to remove dust, moisture, or other contaminants.

⇨ When transporting the detector in a car during hot weather, store it on the floor of the passenger compartment if possible. Using a carry bag gives additional protection. In any case, never allow the detector to roll around unprotected in the trunk or back of a pickup truck.

⇨ Protect your detector from dust, moisture, and extreme temperatures during storage.

⇨ Treat your detector as you would any sensitive electronic instrument. Though ruggedly constructed and designed to withstand the demands of normal treasure hunting, proper care is essential.