Berkut-5

VERSION 5.01

DISCRIMINATING METAL DETECTOR

OPERATING INSTRUCTIONS

GENERAL INFORMATION

Metal detector BERKUT 5 is designed to search for and identify metal objects in the dielectric (dry sand, wood, etc.) and low conducting media (soil, brick walls, etc.).

Some applications of use are:

• Criminal;

• Engineering;

• Housing and community services, construction and fire-fighters to search for underground utilities, pipelines, cables, manhole wells etc.

•   Archaeology and treasure search.

The device is designed to operate under the following conditions:

-Ambient temperature from -20 up to +50°c (-4 to 122 F);

-Relative humidity up to 98 per cent at temperature of 25°c (77 F);

-Atmospheric pressure from 630 to 800 mm Hg.

INCLUDED IN THE BOX

☐   CONTROL BOX
☐   COIL
☐   TELESCOPIC POLE
☐   INSTRUCTIONS
☐   SHIPPING CONTAINER
☐   HEADPHONES [*]
☐   CARRY BAG[*]
☐   COVER FOR CONTROL BOX[*]

[*] - if purchased seperately

TECHNICAL CHARACTERISTICS

The maximum range Detection:	Brass disk in diameter of 25 mm - 45 cm;
	Large objects - 250 cm;
Indication modes:	Audio with up to 91 tones;
	Visual (the LCD display with the permission 128x64 points);
Search modes:	All metal;
	Discrimination;
	Pinpoint
Power supplies:	4 elements (or the accumulator) **AA**; a
Consumption current, мA:	current of the gauge 1 - 100;
	Current of the gauge 2 (TURBO) - 220;
The maximum time Continuous work, Hour:	Current of the gauge 1 - 27;
	Current of the gauge 2 (TURBO) - 12;
Overall dimensions, mm: a	telescopic bar - 1100-1300 X 200;
	The electronic block - 110 X 105 X 68;
Weight of the device, kg:	-1,3.

Notes.

- The Maximum range of detection - the greatest possible distance Detection of object in the absence of external hindrances for the gauge DD260 - 7кГц.
- The Current of consumption and time of continuous work - in the absence of sound Indications and with the switched off illumination of the display at use of accumulators, capacity **2700 mA-ch**.
- Weight of the device with stock coil

INTRODUCTION

What is the hodograph and why is it so important? The received signal is characterized not only by its amplitude and phase, but it is also a vector quantity. Amplitude and phase depend on the electro physical parameters of objects such as conductivity, magnetic permeability, depth, geometry, etc.

In order to accurately describe the nature of the received signal from an object is very difficult, given the variety of influencing factors. However, it is possible to point out some general patterns. Earlier, we mentioned that the signal is a vector quantity characterized by amplitude and phase. If you hold any metal object to the coil it is evident that the magnitude of this vector will vary. The end of the vector will describe, on a coordinate plane, some shapes (lines, loops, etc.). These shapes are called Hodographs. The latter most closely describes the complex interactions of the coil with metal objects.

When analyzing the hodographs remember a few general rules:

• Hodographs of small and medium-sized ferromagnetic objects are in the left quadrant (i.e. have a negative vector angle);
• Hodographs of objects of non-ferrous metals and large ferromagnetic objects lie in the right quadrant (positive vector angle);
• The larger the area of the surface of an object the higher the electrical conductivity, hence the greater the slope of the hodograph to the right;
• Travel times of medium and large ferrous objects, as a rule, have the shape of a loop;
• Hodographs of non-ferrous metal objects are mainly straight;
• A properly ground balanced unit will have a vector along the horizontal axis. Examples of the hodographs of some objects are shown in Fig. 14. Thus, analyzing the shape and position of the hodograph, along the coordinate plane, there can be a certain degree of probability as to the identity of the object type.

Examples some objects are resulted in a Fig. 1:
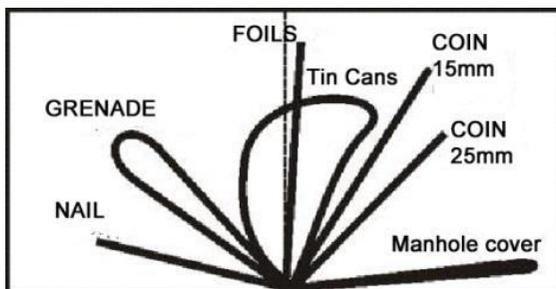
Fig. 1

It should be noted that the hodograph examples given are idealized and do not take into account the effect ground mineralization.

In actual practice the shape of the graph will be defined as the vector sum of signals from the ground and detected object. For example, a coin taking into account the influence of ground minerals can look as follows (a Fig. 2):

Реальный годограф

Сигнал объекта

Сигнал грунта

Fig. 2

The stronger the ground minerals the greater the affect and deformation it will have on the targets signal and shape on the Hodograph (loops verses a straight line or arrow)

ASSEMBLING YOUR BERKUT 5

Remove the detector from the box. When shipped the detector and parts should look like Fig. 3.

Fig. 3

Assemble the Detector. For this purpose:

- Remove the detector rod from the box;
- Remove the electronic control box from the shipping box;
- Install control box on upper portion of the rod by sliding onto the installed tab;
- Install supplied coil on the lower rod. Tighten coil bolts snug. Do not over tighten;
- Wrap the coil wire around the rod insuring the wire does not hang lose. Loose coil wires may cause false responses.
- Connect the coil to the socket on the rear of the control housing.
- Remove battery compartment cover and install batteries;
- Close back cover.

ATTENTION! DO not over tighten the plastic locking collars on the rod as well as the plastic Coil bolt.

Once assembled your detector should look like Fig. 4.
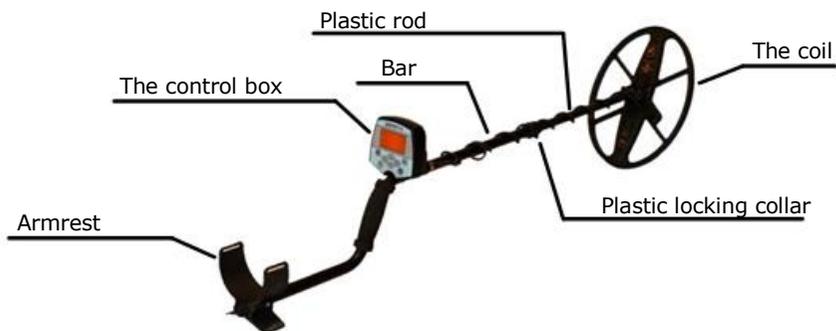
Fig. 4

THE FRONT PANEL

Appearance of the front panel is shown in a Fig. **5**.

Fig. 5

Buttons have following appointment:

The	Short pressing	Long pressing
PR MENU	Switch between User programs	Access main menu.
GB	Access Ground Balance Mode	Access Coil Menu for selecting and adjusting installed coils.
⬆	In the standard search mode activates Pinpoint mode. In Menu operations moves cursor up.	Access the Menu "Display"
AM DISC	Turns Discrimination Mode On/Off	Access the Menu "Discrimination"
⬇	In the standard search mode used to quick access the key parameters in the menu "search". In Menu mode used to move cursor down.	Access to Menu "Other"
-	In standard search mode decreases value of last key parameter accessed. In Menu decreases the value of the current selection	Access the menu "Audio"
+	In standard search mode increase the value of the last key parameter accessed. In menu increases value of current selected parameter. In the case of Equalizer + will access settings	Access the Menu "Search"
Fn	User assigned functions to this button. Analog mode, Turbo, Economy mode, Backlight	Input in the menu of adjustment of action of the button [**Fn**].

THE BACK PANEL

On the back panel of the electronic block (Fig. **6**) are located:

- The battery compartment;
- On/Off switch;
- Coil connector socket;
- Headphone Jack;
- Serial Number.

Battery Compartment

Headphone jack 1/8"

On/Off switch

Coil Socket

№23394

Serial number

Fig. 6

The on/off switch has multiple function other than just turning the detector on and off. These "other" functions can be set in menu "Other".

THE DISPLAY

The Berkut 5 LCD display as shown in fig 7

S K M An   TURBO   -003

+47

A
T

3 sensitivity: 15
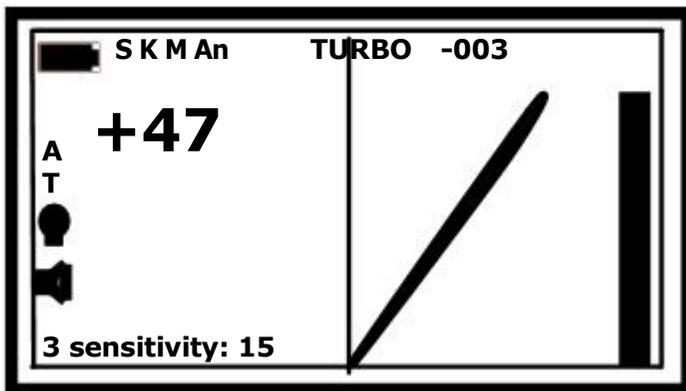
Fig. 7

In normal operating modes the display will indicate the following:

- Hodograph of the detected object;
- Current User Program in use;
- device operating mode:

- **A** - a mode **all metals**
- **D** - the discrimination mode is enabled
- **V** – When discrimination mode is enabled will indicate when Visual discrimination is on

▬ Level of a charge of the battery;
- **T** – Indicates AGB is enabled (at fine tuning carrying out With some time it is replaced on **R**);
- Index number of target VDI;
- Level of a signal from object (a column on the right);
- The menu of key parameters;
- **S** - filter SFT is enabled;
- **K** - the suppression filter of large objects is enabled;
- **M** - the suppression filter of small objects is enabled;
- **An** – Analog mode is enabled;
- **TURBO** - the **TURBO** mode is enabled;
- Indicates headphones installed.
- Indication of value of current ground balance (**-003**)

STARTING UP THE DEVICE

Prior to turning on your detector please read the instructions thoroughly. Upon every startup of the detector there is a calibration of the detector in air. It is necessary for fine tuning of electronic parameters to the surrounding environment. Therefore it is crucial to perform the following on every startup:

- Hold the device firmly in your hand and if possible use the supplied armstrap to steady the device
- Lift the coil to waist level;
- Be sure you are clear of any large metal objects within 6 feet;
- Turn the power switch [ON].

Upon powering up on the display there will be information regarding the currently installed coil, quantity of available calibrated coils, the version and date of the software, and as the help on functions of buttons in the inclusion menu (a Fig. **8**):

```
The gauge: D6x10-14    1


The version    : 5.00
Date      :   28.05.2012


[ПР]-RESET
[+]–COIL-SETUP
[Fn] – START MENU
```

Fig. 8

If device startup has passed successfully, the device will play a melody and will enter into the search mode (a Fig. **9**):

```
 ■     S K M An     TURBO    -003
 A
 T
 🔦
 🔊

 3
```
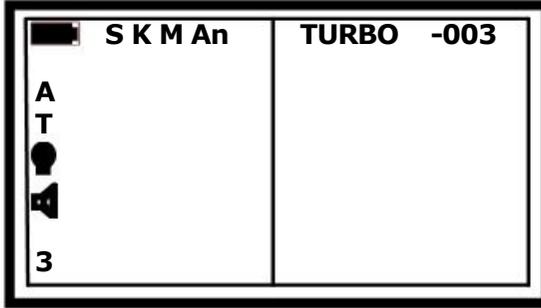
Fig. 9

Otherwise, after a warning melody, there will be a warning as shown in a Fig. **10**:

```
         THE COIL IS NOT
         COMPENSATED.
         REPEAT COMPENSATION
```

Fig. 10

In this case switch off the device and repeat coil compensation in a different place (Having previously determined the absence of any metal objects). If compensation still does not occur, after insuring there is no presence of large metal objects, check to make sure the coil connector is seated correctly and the proper coil is installed. If this has been verified and compensation is still not established the device will need to be returned to the service center.

Device power off is carried out by pressing the power switch to the down or off position.

Once the switch has been turned off the device may take up to 10 seconds to completely shut down as settings are stored into the internal memory.

THE START MENU

At device power on it is possible to enter certain key startup parameters without waiting for the system to perform coil compensation. As displayed in fig 8 these are

Factory Reset, Enter Coil Setup, and Start Menu.

To access the startup menu press and hold [**Fn**] (a Fig. 11) while turning on the device.

```
┌─────────────────────────────────────┐
│            Start Menu               │
│  ─────────────────────────────────  │
│                                     │
│     Factory Reset                   │
│     Select Coil                     │
│     Coil Setup                      │
│     Add Coil                        │
│     Battery: Alkaline               │
│                                     │
│                                     │
└─────────────────────────────────────┘
```
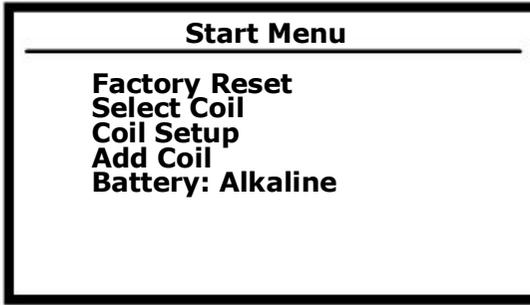
Fig. 11

In the inclusion menu following functions are accessible:

- **Factory Reset.** By pressing the button [**+**] the factory values will be reset Note that parameters of the adjusted coils thus remain (a Fig. 12).

```
┌─────────────────────────────────────┐
│                                     │
│     ATTENTION!!                     │
│     Resetting the factory           │
│     Settings                        │
│                                     │
│                                     │
│                                     │
│                        Fig. 12      │
└─────────────────────────────────────┘
```
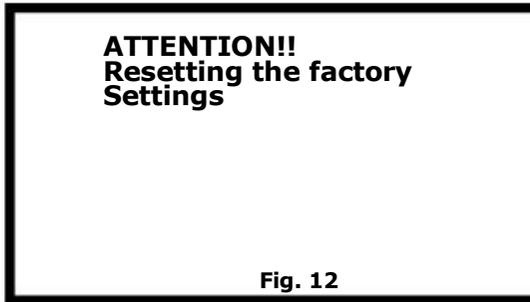
Fig. 12

- **To choose Select Coil.** By button pressing [**+**] the select profile of coil menu appears (a Fig. 13).

```
┌─────────────────────────────────────┐
│     Select profile                  │
│     Of coil                         │
│                                     │
│           D9x12-14                  │
│                                     │
│    [↑], [↓] -  select               │
│    [+]       -  enter               │
│                                     │
└─────────────────────────────────────┘
```

Fig. 13

↓

To choose the coil profile desired press the buttons ⬆or
To select the profile activation press button [**+**].

- **To Adjust the coil.** By pressing the button [**+**] the program enters the

  automatic adjustment of the coil for the current coil profile selected.

- **To Add the new coil.** By pressing the button[**+**] enters the program of automatic adjustment of the selected coil profile (a Fig. 14).

```
┌─────────────────────────────────────┐
│                                      │
│        Select Profile                │
│        Of coil                       │
│                                      │
│        D9x12–14                       │
│                                      │
│     [⬆], [⬇]    - select             │
│     [+]         -  enter             │
│                                      │
└─────────────────────────────────────┘
```
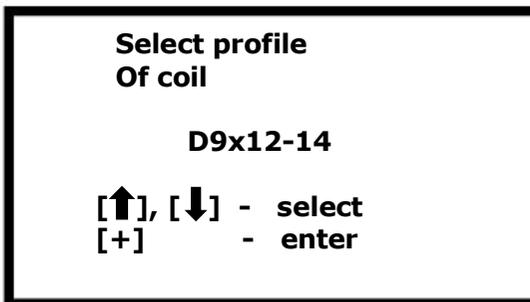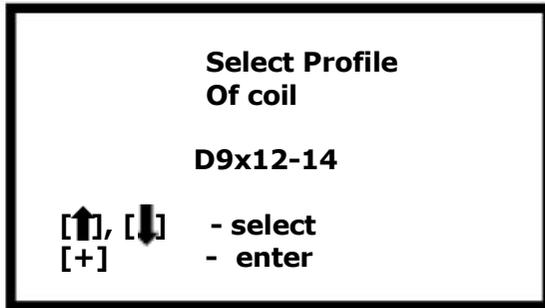
Fig. 14

The choice of a profile of the gauge is carried out by buttons ⬆or ⬇, to start automatic adjustment of the coil press the button [**+**].

- **Battery.** Selects the type of batteries installed (p. 29).

GROUND BALANCING

Proper ground balancing is necessary in order to reduce the effects of ground minerals on the detector. Without proper ground balance the detector cannot operate to its full potential and can be subject to false signal from ground minerals.

To carry out a proper ground balance perform the following procedures:

1. Locate an area of ground that is free from any metal targets within a 4 foot diameter. Use standard search mode with no discrimination to help locate clean ground;
2. Lift the coil to around waist level and
3. Press the button [GB]. The device will enter the automatic ground balance mode (Fig. 15):

1
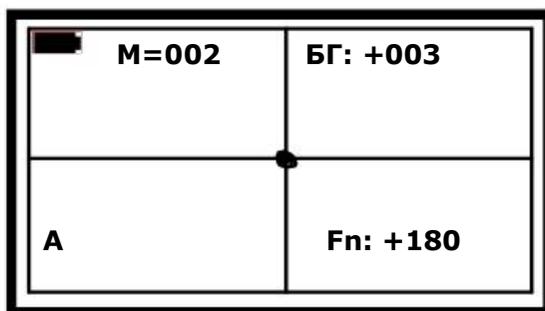
Fig. 15

In the right top part of the indicator the phase of balance of a ground is represented in Degrees.

On top left – The level of ground mineralization in standard units.

On bottom left - Ground balancing mode (**A** - Automatic, **P** -Manual).

4. Slowly and smoothly lower the coil to the ground avoiding touching grass, stones, etc. Lower the coil at a speed of 1 to 2 seconds from the raised to lowered position.

Upon lowering the coil to the ground, on the display, will appear a line in the screen left-hand side (a Fig. 16). Lower the coil until the line reaches the display left edge.
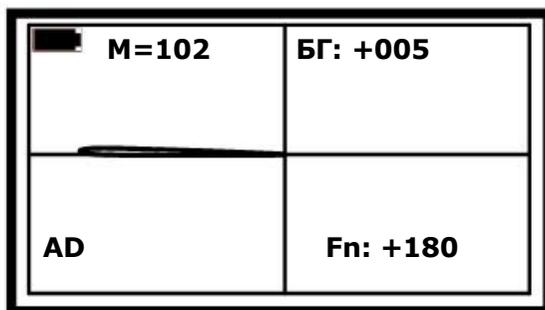
Fig. 16

5. At successful balancing, the device will play a melody
6. Press the button [**GB**] for transition to standard search mode;
7. If ground balance was not successful raise the coil waste high and wait 2-3 seconds (ground line will retract to a small circle in center of screen). Repeat steps 4-6.

To enter the manual ground balance mode press either the + or - buttons. This will allow you to adjust the ground balance point achieved in the automatic ground balance procedure. The automatic GB procedure will be turned off and parameter **SPEED AGB** will now be set to **OFF.** To return to previously set Speed AGB values either perform automatic ground balance procedure again or simply access Speed AGB

in Search menu and set to preferred value (p. 28).

If, after carrying out the ground balance procedure, the value of БГ differs greatly from zero this may can cause an incorrect installation of the phase parameter of the coil. To reset this value to zero simply press the ⬇ button.

ADJUSTING THE KEY PARAMETERS

Access to the key parameters is carried out from the main search mode by simply pressing the ⬇ button. Once pressed, in the bottom left corner of the display, will appear the parameter and its related value as seen in fig 17 (gain:15)
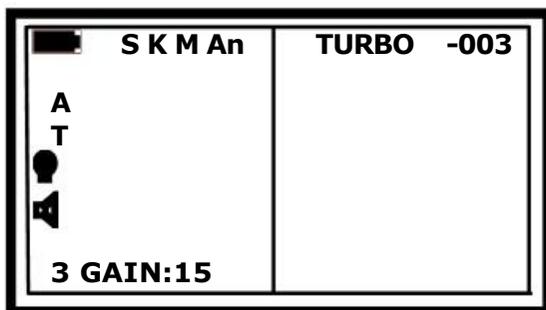
```
 ▰▰        S K M An      TURBO   -003

   A
   T
   ●
   🔊

   3 GAIN:15
```

Fig. 17

With each subsequent pressing of the button ⬇ there is a transition from one parameter to another. Changing the value of a parameter is carried out by using Keys [-] and [+].To decrease the value of the parameter setting press [-] and to increase its value press [+] . If, after approx. 15 seconds, there are no further changes made the key parameter settings will disappear and return to the normal search screen. The last adjusted parameter is stored in memory and by pressing the + or – button will recall this last adjusted and its value will change according to whether you pressed the + or-button. Note that this quick access is only available if the detector does not have the discriminator training mode enabled. If the discriminator training mode (teach mode) has been enabled than the + and – buttons perform different functions when pressed in standard search mode (no key parameters displayed). In order to access the key parameters one will have to press the ⬇ button to first access the key parameters then make the appropriate + or - corrections

Adjustment key parameters concern:
CC – Current to the coil,
AT – Audio Threshold,
IT – Identification Threshold,
GN – Gain (Sensitivity),
RS – Recovery Speed

Further details on each of these parameters are now considered. The range of each parameters settings are within the square brackets []

- **COIL CURRENT (CC) [1- 2]** Sets the level of current supplied to the coil. At A setting of 2 (TURBO) maximum current is applied to the coil. Maximum depth ability is achieved however operating time is decreased due to increased battery usage. At the minimum setting of 1 maximum battery time is achieved at the cost of reduced depth.
  The remark. If operating near sources of electrical interference or other detectors it is advised to set CC to 2 (turbo) and reduce sensitivity in order to reduce these affects. On the other hand it may be necessary to reduce CC to 1 in order to minimize the interference on other devices close by.

- **RECOVERY SPEED (RS) [1- 9]** defines speed of the automatic tuning under ground conditions in the dynamic mode (This setting has no affect in the pinpoint or static mode). Reducing the speed of auto will increase the depth of search. However in areas of considerable ground mineralization, target ID reliability can worsen. There can be false responses from the ground, and also separation of the closely spaced targets worsens. Lower settings of the recovery speed are recommended for areas with deep targets, areas with low mineralization and areas with little metal trash. It is also important to use a slower steady sweep speed avoiding erratic movements, jerking etc. as well as keeping the coil parallel to the ground. Increase in recovery speed settings is recommended for areas with many closely spaced targets where target separation is most important. It is not recommended to set the RS below 5.

- **AUDIO THRESHOLD (AT) [0- 20]** defines the minimum signal level required to generate an audio response on a detected object. Reducing the Audio Threshold setting increases the sensitivity to small and deep targets but also increases the risk of false audio responses. The device will react to the smallest particles of metal as well as possible ground mineral concentrations. To achieve maximum depth of search set the Audio Threshold as low as possible without creating excessive false responses from the ground. Increasing the Audio Threshold will improve the comfort of search by reducing false ground responses but at the expense of reducing depth sensitivity. Unless there is a special reason to do so, do not set the level too high as a loss in response sensitivity to large nonferrous items can occur.

- **GAIN (GN)[0- 20]**   Defines overall sensitivity of the metal detector. The higher the Gain the deeper the ability of the detector as well as increased response from smaller targets. To achieve maximum depth and target response set the gain as high as possible while still maintaining a stable detector. In areas of excessive ground minerals or areas with a lot of metal trash it will be necessary to reduce gain levels to a lower level. It is not recommended to set the gain to the maximum level especially in areas with mineralization as performance will decrease at these excessive settings. In most cases a maximum setting of 16 is recommended to avoid false responses.

- **IDENTIFICATION THRESHOLD (IT) [0- 20]** Defines the minimum signal level required to generate a target ID audio response as well as to display a VDI value. If a target is detected but does not meet the minimum signal level an audio response from the threshold will be heard but no VDI number will be displayed. Lower values will increase the depth response for target ID but reliability as well

as stability of the VDI will worsen. At increased settings depth of target ID will be reduced but VDI reliability and stability will increase. At a setting of 0 the device will identify a target immediately but on deep or weak targets the probability of error greatly increases.

ADDITIONAL PARAMETERS

Access to additional parameters is carried out by means of the branched menu. All parameters are grouped in a separate submenu. Access is possible both from the main menu and by means of fast access by long pressing of the corresponding buttons in normal search mode.

The input in the main menu is carried out by long pressing (more than one second) the button [**PR/MENU**] (Fig. 18).

```
┌─────────────────────────────────┐
│ _____     │
│  MAIN MENU                      │
│                                 │
│     Audio                       │
│     Display                     │
│     Search                      │
│     Discriminate                │
│     Other                       │
│     Coils                       │
│                                 │
└─────────────────────────────────┘
```
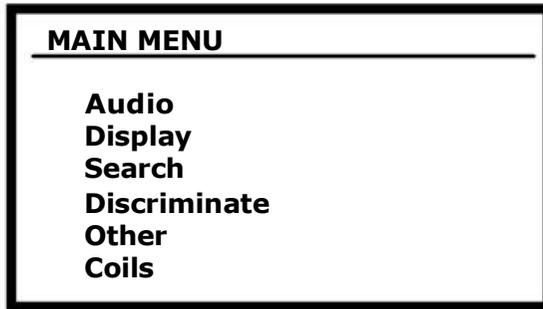
Fig. 18

Parameters are broken into the following groups:

- **Audio**
- **Display**
- **Search**
- **Discriminate**
- **Other**
- **Coils**

To select a sub menu option scroll to the selection using the ⬆ or ⬇ then to enter the menu press+.

THE AUDIO MENU

```
┌─────────────────────────────────────┐
│  Audio        🔊        Pag1         │
│  ─────────────────────────────────   │
│  ➤ Volume:              10           │
│    Equalizer:                        │
│    Volume S.S.:         8            │
│    Keys sound:          On           │
│    Border Fe:           -15          │
│    Num. of tones:       91F          │
└─────────────────────────────────────┘
```

Fig. 19

```
┌─────────────────────────────────────┐
│  Audio                  Pag2         │
│  ─────────────────────────────────   │
│  ➤ Sound freq:          5            │
│    Length fe:           Short        │
│    Overload vol:        8            │
│    Sm signal vol:       4            │
│    Thresh volume:       0            │
│                                      │
└─────────────────────────────────────┘
```

Fig. 20

Under the Audio Menu section are available the following parameters for adjustment:

❑   **VOLUME[0-10]** Sets the overall audio level of the detector.

❑   **EQUALIZER** Allows the user to set unique volume levels to 12 different VDI groups. The audio level is adjustable from 0-17 for each group. When the level is set to 0 there is no audio response while a setting of 17 is maximum audio response. To enter the Equalizer adjustment mode press the button [**+**]. On the screen will appear the Equalizer menu for adjustment (a Fig. 21):
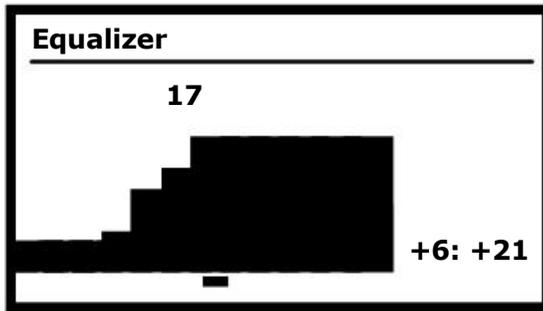
Fig. 21

The cursor under a column specifies which sector is currently selected. On the bottom right is displayed the VDI range for the currently selected group. The column height corresponds to the volume level of the currently selected VDI sector. A numerical value of the volume level is also displayed above the selected VDI group. The choice of sector of adjustment is carried out by keys [**-**] and [**+**], while adjusting the audio level is performed by using the ⬆ and ⬇ keys.

 VOLUME of SERVICE SIGNALS [0... 10] Sets the volume level of service signals such as the pressing of keys, successful ground balance, the melody played upon successful coil compensation etc.

 KEYS SOUND [ON/OFF] Enables or disables sounds made while pressing any keys (buttons).

 Border Fe - [-85 to +85] Defines the VDI border for setting the iron tone. The user may find this advantageous as the effects of ground minerals can affect the signal from small non ferrous objects causing them to respond with a negative VDI number. Thus the user may choose to set the Fe border to a specific negative value to include these small low conductive targets. Also one may wish to include some small desirable ferrous objects by adjusting the FE border to exclude these from the Fe tone. While conversely one may wish to set this value to a slightly positive value [+10] to include small annoying pieces of foil commonly found in modern sites littered with trash. Setting is done on a personal preference of the user.

 The NUMBER of TONES[1F, 2F, 3F, 10F, 91F] Allows the user to set the number of available tones .
  ▪ **VALUE 1F-** will generate a single tone on ALL targets including ferrous targets. NOTE: a setting of 1F effectively negates the Border FE setting as there is no separate FE tone
  ▪ **VALUE 2F-** A low tone will be generated for ferrous targets while a high tone will be generated for all non ferrous targets. The border for these tones can be set under BORDER FE option previously mentioned.
  ▪ **VALUE 3F**, A low tone will be generated for small ferrous objects whose border has been determined by setting BORDER FE. A medium tone will be generated for targets just above the Border FE setting but below VDI +15. A High tone will be generated for targets within VDI +15 to +90 range.

▪ **VALUE 10F**, indication of small ferromagnetic objects is identical to the previous mode. However the sector of nonferrous metals is broken into 9 separate sectors with a division of 10 units (VDI). The higher the VDI the higher the tone generated. The variability of the frequency of the tones is set under the parameter **Frequency of Sound.**

▪ **VALUE 91F**, indication will be similar to the mode **10F**, accept that instead of the tones being divided into 9 sectors they will be set to 90 sectors . Meaning each positive VDI number will have a corresponding tone. The variability of the frequency of these tones is set under parameter **Frequency of Sound**.

Deciding which number of tones parameter to use depends on the users goals. On a site where the collection of all metal targets is desired then a setting of **1F** would be fine. However if one has good hearing and wants to be able to ID targets by audio response mainly then a setting of **91F** would give the user the greatest amount of target information via audio only.

 SOUND FREQUENCY[1-10] Defines the range or variability of frequency for tone selections of 10F and 91F. In any other number of tones selection this parameter has no affect. With a value of 1 all non ferrous targets would give a high tone with no variability. While a setting of 10 would give the greatest variability of frequencies amongst the tones.

 LENGTH FE [SHORT/NORMS] Defines the length of the FE tone. **NORM** – under this setting the duration is the same as for non ferrous targets whereby the duration is based upon size, shape and strength. **SHORT** – Under this setting all ferrous targets give a very short audio response regardless of size, shape etc.

 OVERLOAD VOLUME [0-10] Sets the volume level of the target overload warning. Large objects at shallow depths can overload the device and will cause strong distortions and erroneous information. When the parameter is set above 0 there will be an audible melody whose volume is relative to the parameters setting. Also there will be a corresponding warning message displayed on the LCD display.

 THRESHOLD VOLUME[0-5] Sets the volume level for the background threshold.

 SMALL SIGNAL VOLUME [off/1... 6] Adjusts the volume of deep or weak targets. When set to off the response of weak targets is minimal. As this level is increased the volume of weak targets is amplified. At a setting of 6 all targets will have the same audio level response regardless of whether they are weak or strong.

NOTE: Any of the parameters mentioned under the Audio menu have separate profiles for the external speaker and headphones. Such that any volume level adjustment performed while wearing headphones will be saved to the headphone profile while any adjustments made while using the external speaker will be automatically saved under that profile.

DISPLAY MENU

```
┌─────────────────────────────────────┐
│  DISPLAY                             │
│  ─────────────────────────────────  │
│  ➤ Backlight lev:        5           │
│    Backlight:            On          │
│    Visual disc:          Off         │
│    Accumulation:         Off         │
│    Screen scale:         3           │
│                                      │
└─────────────────────────────────────┘
```

Fig. 22

Under the Menu DISPLAY the following parameters are available:

- **BACKLIGHT LEVEL [1- 5]** Allows the user to set the level of backlight illumination. Backlight is always set to off upon startup. The user can turn backlight on by accessing the menu or by setting the Fn hot key to turn on and off backlight. Turning the backlight on decreases the operating time. The higher the backlight level the greater the power consumption. Therefore whenever possible set the backlight setting to off or as low as possible

- **BACKLIGHT [Off/On/Auto]** Turns backlight on or off. In the Auto setting the backlight will turn on if a target is detected or a button is depressed. It will turn off after a short period of time if no target is detected. This will help save battery life during use of the backlight.

- **VISUAL DISCRIMINATION [On/Off]** Turns visual discrimination on/off. This is conditional on whether discrimination is set to on **D** (not all metal **A**). When discrimination is set to on(**D**) and visual discrimination is set to on(**D** will now change to a **V)** any target that has been rejected in the discrimination card will not generate a tone nor will it display a VDI or hodograph.
  With discrimination on and visual discrimination set to off any target rejected by the discrimination card will not generate a tone however a VDI and Hodograph display will be seen.

  ACCUMULATION [Off/1- 9] Determines the quantity of signals that will be stored on the screen before being deleted. The use of accumulation can help in identifying targets that are spaced close to each other. The given parameter matters only at included mode **VDI**.

- **SCREEN SCALE [1... 4]** Allows the user to change the size ratio of the hodographs displayed on the screen when in mode VDI(not Analog mode). The size of the hodograph is dependent upon signal strength. Objects that are small and/or deep will have a very small hodograph and may be difficult to see. Conversely if an object is large and shallow the hodograph may not fit completely within the screen. To increase the size of the hodographs from weaker targets use a lower value. To decrease the sizes of the hodograph then raise the value.

In the majority of the situations a normal perception of signals can be attained by setting this value to 2.

When the metal detector is in mode VDI the scale of screen is established automatically such that hodographs always fit within the screen. At the lowest value of 1 small signals are amplified to maximum and large targets are slightly compressed. At the maximum setting weak signals are reduced.

SEARCH MENU

```
┌─────────────────────────────────┐
│  Search              Pag1        │
│ ─────────────────────────────    │
│                                  │
│ ➜ SFT-filter:        On          │
│   Big-Filter:        3           │
│   Small -Filter:     2           │
│   Speed AGB:         1           │
│   Analog Mode:       Off         │
│   Ground Comp:       3           │
│                                  │
└─────────────────────────────────┘
```

Fig. 23

```
┌─────────────────────────────────┐
│  Search              Pag2        │
│ ─────────────────────────────    │
│                                  │
│ ➜ Ident Thresh:      5           │
│   Coil Current:      2           │
│   Gain:              7           │
│   Audio Thresh:      8           │
│   Recovery Speed:    12          │
│                                  │
└─────────────────────────────────┘
```

Fig. 24

In the menu SEARCH the following parameters are available:

 SFT-FILTER [On/Off] Enables or disables the SFT filter. Enabling the SFT filter reduces the influence of ground mineralization on the detected targets signal thus improving target ID in mineralized soils. This filter only works in VDI mode. When VDI mode is off this filter has no affect.

- **BIG FILTER [Off/1-9]** (filtering of large objects) The purpose of this filter is to eliminate an audio response from larger objects based upon their size. When set to OFF this filter is disabled.
  When this filter is turned on the software estimates the size of the target.If the size is LARGER than the selected value the audio response is eliminated. Response to target size is also based on sweep speed. At slower sweep speeds the duration of the interaction between the object and coil is increased and as such smaller targets than desired may be eliminated verses say a faster sweep speed. So a constant sweep speed is important to maintain a consistent size filtering.

- **SMALL FILTER [Off/1-9]**(The filter of small objects) Works similarly to the Large Filter accept in reverse. When this filter is enabled the software estimates the size of the target if it is LESS than the selected value the audio response will be eliminated. Again this filter is dependent upon a constant sweep speed for consistent results. If you slow your sweep speeds larger targets may be rejected.

- **SPEED of AGB GROUND [Off/1- 9]** Defines the speed the detector automatically tracks changes in ground mineralization. When set to **OFF** automatic ground tracking is disabled. Increasing this setting increases automatic fine tuning of the ground tracking. When enabled the letter **T** will appear on the left side of the display. When disabled the area on the display will be blank. While in Autotrack if the device has carried small fine tuning adjustments the letter **R** appears.

- **ANALOG MODE** Defines the operating mode the detector is operating in.
    - When set to **Off**, considered VDI Mode On, the device continuously analyzes the information received from the coil and stores this information in memory. It then analyzes this information and generates an audio response, the hodograph display as well as a VDI indication based upon this analysis.
    - When set to **On**, considered VDI mode OFF, the detector simulates an analog device. The sound indication occurs continuously in the real time. The hodograph and VDI occurs in a manner similar to mode **OFF**.

- **GROUND COMPENSATION [Off/1- 5]** reduces false signals which appear due to non uniformity of ground minerals as well as "hot stones". There is a clipping of sectors around VDI +90,-90 numbers. Increasing this parameter improves the quality of detuning from the influence of mineralization. However, this reaction worsens the response from large non ferrous objects with a VDI close to **+90**.

- **IDENTIFICATION THRESHOLD (IT) [0-20]** See section **Adjusting Key Parameters** Page 16

- **COIL CURRENT (CC) [1-2]** See section **Adjusting Key Parameters** Page 16.

- **GAIN (GN) [1-20]** See section **Adjusting Key Parameters** Page 16.

- **AUDIO THRESHOLD (AT) [1-20]** See section **Adjusting Key Parameters** Page 16.

- **RECOVERY SPEED (RS) [1-9]** See section **Adjusting Key Parameters** Page 16.

THE DISCRIMINATION MENU

```
┌─────────────────────────────────────┐
│  Discriminate                       │
│ ─────────────────────────────────   │
│ ➡ Map                               │
│   Sp signal:          On            │
│   Teach disc:         Off           │
│   Left border:        +60           │
│   Right border:       +85           │
│   Sector width:       16            │
└─────────────────────────────────────┘
```

Fig. 25

In the menu **DISCRIMINATE** the following parameters are available:

    ◻   **MAP** serves for adjusting the discrimination characteristics of the detector. Because various objects correspond to different VDI numbers it is possible to adjust the detector to respond to certain objects while ignoring others. Adjusting the discriminator MAP allows you to do this. To adjust these parameters please see section **Discrimination mode of search** on p. 32.

    ◻   **SP SIGNAL [on/off]** Turns on/off the special audio sound for certain targets. When turned on the special signal (bell tone) will be heard when a targets VDI falls between the border sectors set below (left border/ right border).

    ◻   **TEACH DISCRIMINATE [on/off]** Turns on/off the fast teach discriminate mode (learn accept/reject). When this mode is set to on, while in the normal search mode, the buttons [**-**] and [**+**] are now used to teach the discriminator to either accept or reject specific targets. For further explanation please see page 34. If the parameter is switched off the pressing the + and – buttons adjust key parameters (p. 17).

    ◻   **LEFT BORDER** Defines the left border for the special signal previously described. When a target falls above the left border VDI and below the right border VDI the bell tone will be heard.

    ◻   **RIGHT BORDER** Defines the right border for the special signal. When a target falls below the right border VDI and above the left border VDI a bell tone will be heard e.

    ◻   **SECTOR WIDTH [6- 90]** Defines the sector width for the Teach Discriminate function of the discriminator and automatic installation of sector special signal.

THE OTHER MENU

```
┌─────────────────────────────────┐
│ Other                    Pag1   │
│ ───────────────────────────     │
│ ➤ Freq offset:           000    │
│   Pin-P Automatic:        30    │
│   Pin-P Gain:             16    │
│   Fn function:            An    │
│   PWR function:          Off    │
│   Battery:              NiMH    │
└─────────────────────────────────┘
```

Fig. 26

```
┌─────────────────────────────────┐
│ Other                    Pag2   │
│ ───────────────────────────     │
│ ➤ Passage menu:          Off    │
│   Cons b-light:          Off    │
│   Num Programs:            4    │
│   Transmitter            Off    │
│   Language               Eng    │
│   Factory Reset                 │
└─────────────────────────────────┘
```

Fig. 27

In menu **OTHER** the following parameters are available:

- **FREQUENCY OFFSET[0… +250]** Carries out small shifts in the operating frequency of the metal detector. In cases where two or more detectors, operating in close proximity and frequencies, there is an increased risk of interference from each other. This can also be the case if you are within close proximity to various sources of EMI. To reduce this interference make small adjustments until satisfactory results are achieved. Whenever changes to the **frequency offset** have been made it is necessary to perform a ground balance procedure.
  NOTE: The best operating characteristics of the detector are at a 0 frequency offset.
 Whenever a coil is changed the frequency offset will automatically be reset to 0.

  ATTENTION! Always perform a ground balance procedure after making ANY changes to the frequency offset

PINPOINT AUTOMATIC[Off/10- 50] Allows the user to set the time period for automatic turning off of the pinpoint mode. Times are set in approximately 10 second intervals.

Automatic pinpoint can be disabled by setting parameter to **off**

 PINPOINT GAIN [0- 20] Sets the gain or sensitivity level of the static pinpoint mode. A lower value will make stability in the static pinpoint mode better but at a reduction in depth. Increasing this value will have the opposite effect.

 Fn function Allows to set the function of the Fn button when short pressed. The user has the choice of assigning the following parameters to the Fn button short press.

> ❖ **CC** - switching the coil current (1-2)
> ❖ **An** – Turn on/off the analogue mode
> ❖ **BL** – Turn on/off backlight
> ❖ **Eco** – Enables the economy mode

 PWR function Allows the user to set function of the power switch when it is quick cycled off/on (cycle time of less than 2 seconds). The following options are available.

> ❖**BL**– Cycling of the backlight
> ❖**Eco** – enables the economy mode
> ❖**Off-** No function assigned. Button will only cycle on/of power to the device.

 BATTERY. Establishes the battery type installed in the detector. Options are NIMH or ALKALINE. Proper battery type is needed for correct display of battery level in the lcd display.

 PASSAGE MENU [On/Off]. When set to [off] scrolling is restricted to the current menu. When the user scrolls to the end of the current menu the cursor will reset to the opposite end of the current menu.

When set to [on] scrolling from one menu to the next is enabled. When the cursor reaches the end of one menu it will scroll to the next available menu in the menu list.

 CONSTANT BACKLIGHT [on/off]. When set to [off] the current setting of the backlight (**backlight** parameter in the **search** menu) are not stored when power is cycled off. Upon power on the backlight parameter, in the search menu, will be set to off. To retain current **backlight** settings set this parameter to [on]

 NUMBER OF PROGRAMS [1-4]. Sets the number of available user programs when pressing the button [**PR/MENU**].

 TRANSMITTER-As of the writing of this manual this parameter is not used. It has been installed for future use

 LANGUAGE Allows the user to set the language of the menus and detector operations. User may choose Russian or English.

 FACTORY RESET – Resets the memory to factory settings with the exception of installed coils. Any coils that have been installed and compensated will be retained.

THE COIL MENU

```
COILS
━━━━━━━━━━━━━━━━━━━━━━━━

➡ Coil:        D6x10-14
   Editor



```
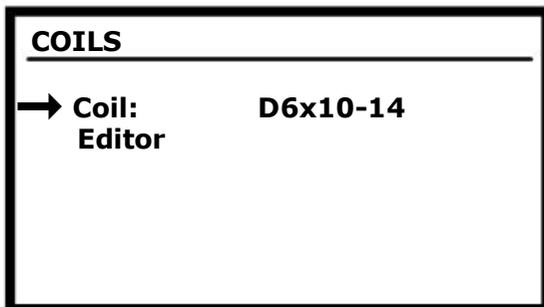
Fig. 28

In the menu COILS the following parameters are available:

☐ **COILS-**Defines the coil currently installed on the device. The type of coil needs to exactly match the currently installed coil (size and frequency). More detailed description of this procedure is outlined in the section on **replacing search coils**.

☐ **EDITOR** – Accesses the coil editor parameters. To access the editor press + button. The following options will appear (a Fig. 29) :

❖ Currently selected coil (ie D6x10-7)
❖ On/off of including the currently selected in added coils(previously compensated)
❖ Auto –initiates Auto inclusion of the currently selected coil.
❖ Manual adjustment of the working frequency of the detector (Should correspond to the working frequency of the installed coil)
❖ Manual adjustment of a basic signal of synchronous detector
❖ Manual adjustment of an initial phase of ground balance

```
☐ D6x10-7                 1

   On
   Auto
   Fr  = 06725
   Ort = 095
   Ph = 018

```
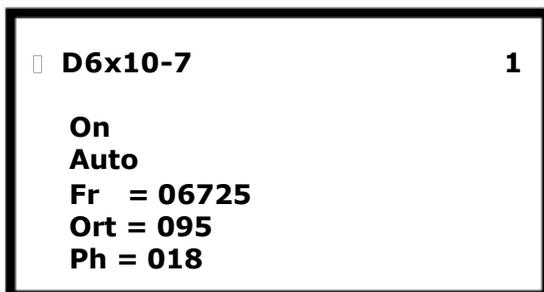
Fig. 29

More in detail about adjustment of gauges it is described in section the Built in program of adjustment of gauges on p. 38.

DYNAMIC AND STATIC OPERATING MODES

Dynamic mode is the main mode of operation of the detector. It is characterized in that the processor constantly adjusts to relatively slow changes in ground conditions. Therefore, in this mode, the instrument responds to the desired objects only when moving the coil. If the coil is stationary over an object after a while the sound will disappear. This is the primary mode your detector is in every time you turn it on. The speed of auto fine tuning of the ground is based upon the AGB parameter, the level of soil mineralization, the heterogeneity of the soil mineralization and the sweep speed of the coil. (see Parameter "**AUTOFINE TUNING**" on p. 18).

Pressing the button [⬆], enters the pinpoint mode in which auto fine tuning is disconnected. The lcd display will now display the pinpoint mode screen (a Fig. 30).
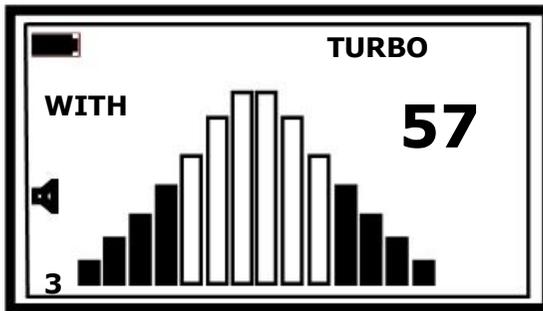
Fig. 30

Prior to initiating the pinpoint mode it is necessary to locate the approximate position of the target. Then move the coil off to one side and press the [⬆]. Pressing the button should occur in a location where there or no metal objects under or near the edge opf the coil. Once the pinpoint mode is enabled it is important to keep the coil at a constant search height and parallel to the the ground and to avoid lfiting or lowering of the coil while pinpointing.

To disable the pinpoint mode press the [⬆] button. If the parameter **Pinpoint Automatic** has been enabled then the pinpoint mode will be disabled and returned to the normal search mode after the selected amount of time.

To adjust for optimum operation of the pinpoint mode see section **Pinpoint Gain** (page 30).

DISCRIMINATION MODE OF SEARCH

Discrimination- The ability of the detector to react to certain types of objects while ignoring others. In certain cases this is useful to improve the comfort of the search. Turning on or off discriminate is performed by pressing the button [**AM/DISC**]. When discrimination mode is enabled [**D**], briefly pressing the [**AM/DISC**] button the discrimination **MAP** will appear. This view will give the user a quick view of what discrimination levels have been set. The discrimination card is broken into 18 sectors with 10 VDI numbers per sector. The exception is VDI numbers +80 to +90 which obviously has 11 numbers in this sector. Each sector will appear as either a completely filled box, partially filled box or completely empty box. A completely filled box indicates this VDI sector has been completely included and will not be discriminated out. A partially filled box indicates some VDI numbers have been excluded and those specific VDI numbers will be discriminated. While a completely empty box indicates all VDI numbers in this sector have been discriminated out.

The specific type of discrimination response is set by setting the mode **Visual Discrimination** (p. **23**). On the left side of the screen is the current mode of discrimination. If the mode visual discrimination is enabled the letter **V** will be displayed When a target is detected and it is not included in the discrimination map the target will not generate an audio response nor will a hodograph or VDI value be displayed.

If Visual discrimination is off (discriminate mode is enable) the letter **D** will be present. In this case a target that is not included in the map will not make an audio response however there will be a hodograph and VDI of the rejected target.

When discrimination is turned off (**All metal** mode) the Letter **A** will appear and all targets will generate an audio, hodograph and VDI response.
.

DISCRIMINATION MAP

The discrimination characteristics are set in the menu **Discriminate**. To enter this menu choose Discriminate from the menu or long press button [**AM/DISC**] From the discriminate menu select the Map parameter by selecting with the cursor and then pressing +. The menu will enter options for adjusting the map (a Fig. **31**).
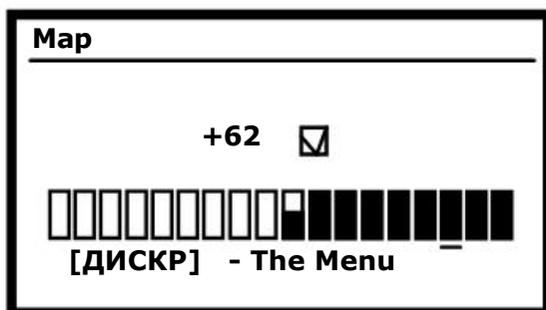

Fig. 31

In this mode the display will show the VDI graph and above it the individually selected VDI number. Next to the VDI number will be a box that will indicate whether this specific number will be accepted or rejected (discriminated). An empty box indicates this VDI number has not been included (rejected) and will be discriminated. A check appears in the box if this VDI number has been included (accepted) and will not be discriminated.

Use the + and − buttons to select the VDI numbers and the up or down arrows to check or uncheck the selected VDI numbers.

To select an entire block of VDI numbers to accept or reject at once perform the following. Select the first VDI number to be accepted/rejected. Press the Fn button (HOLD will appear on screen). Now press either one of the up or down keys to choose the status of the selected VDI group (either accepted or rejected). Now, using the + or − key, scroll to the last VDI number in your selected group. When complete press the Fn button to end the HOLD function.(Fig. 32).
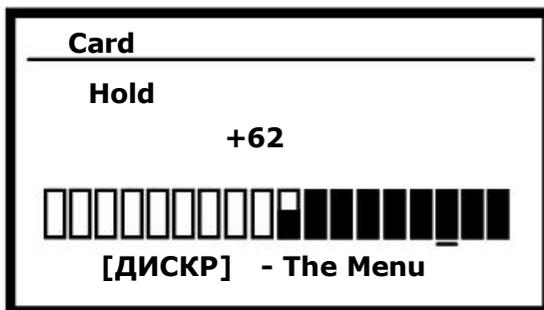

Card

Hold

+62

[ДИСКР] - The Menu

Fig. 32

For example, if you wish to reject VDI numbers -90 to -21 while accepting +20 to +90 perform the following:

1. Enter the discrimination Map.
2. Set the currently selected VDI number to -90 by using the + or - buttons.
3. Use the up or down arrow to make sure the box is NOT checked.
4. Press the button [**Fn**] to enable HOLD
5. Press the button [**+**] and scroll to VDI number -20. (All VDI between -90 and -20 are now rejected)
6. Press either the up or down arrow to change the status of the check mark.
7. Press the button [**+**] and scroll to number **VDI+90**.
   Now all VDI from -20 to +90 have been accepted while -90 to -21 have been rejected. You can scroll down through the numbers quickly by holding + or − to verify.

CAUTION. Remember when programming the maps do not make discrimination rejected sectors too narrow (less than 10 VDI) because, due to the influence of soil, salinity and other external factors, VDI indexes of objects can deviate in either direction relative to the received air test value thus increasing the probability of missing the object you want.

Note that within the internal memory there are stored preprogrammed discrimination maps to assist in quickly setting up the map. Choices are – **Clear all, Set all, Coins, Only Ferrous, Only non ferrous**. To choose one of these preset maps you must first be in the map menu then press the button [**AM/DISC**]. On the screen will appear The program name. To choose the appropriate map use the up/down keys.

To load the selected map press [**+**]. To exit press [**PR/MENU**] or [**-**].

The installed programs of discrimination serve for acceleration of process of adjustment of the discriminator.

Attention! Quantity and names of the pre-established programs of discrimination IN YOUR DETECTOR can differ from described in the present instruction.

MODE OF TRAINING OF THE DISCRIMINATOR

For fast programming of the discriminator, to a specific object type, there is the Teach discriminate mode. This mode will allow the detector to store the scanned object into memory and allow the user to reject or accept this type of object (VDI).

For discriminator programming in teach mode make the following. Insure Teach discriminate has been turned to On then

1. Set mode to **ALL METALS**.
2. Scan the object and insure an accurate hodograph.
3. To reject the object press the button [**-**], to accept the object press the button [**+**].
4. If the received signal level is sufficient the detector will prompt the user either to accept the VDI by pressing ⬇. To reject or cancel the inclusions press the **PR/Menu** button.
5. If the signal level is sufficient the detector will return to the search mode.
6. To verify that the accepted/rejected target was properly scanned into memory press [**AM/DISC**] to enter into discriminate (**D**) and scan target to verify action.

When programming a target in teach mode the sector width, for accepting or rejection, is set under parameter setting **Sector Width** (page 28). If the sector width is set to say 10 and the scanned target VDI is +20 then the sector width will range from +15 to +25.

Also, when using the teach mode insure the repeatability of the targets VDI and try to insure a repeatable VDI range of less than 5 VDI units.

SECTOR OF THE SPECIAL SIGNAL

In the device it is possible to set a sector for the special signal or bell tone. This will allow the operator to assign this special bell tone to certain objects whose VDI borders have been set under the parameters **left border/right border**. Do not set the width between the borders to narrow due to the effect of ground mineralization. Mineralization can affect the VDI of the desired target and if set too narrow the target may fall outside of this sector. It is suggested to not set the sector width to less than 10 VDI units.

To quickly set the special signal to a certain class of objects you may use the fast teach mode. Insure that teach mode is set to on. Insure device is in discriminate mode (D). Scan the desired target insuring an accurate and repeatable VDI.

To include the scanned target in the special signal press the ⬆ button. To cancel the operation press [**PR/MENU**] .

Any object whose VDI falls within this sector will generate the bell tone.

OVERLOAD MODE

AT times you will encounter large shallow objects that can overload the detectors electronics. Under this overload condition the detector cannot properly identify the object. When this happens a warning message will be displayed and an audible warning will be heard. The volume of which is set under parameter OVERLOAD VOLUME (page 23).
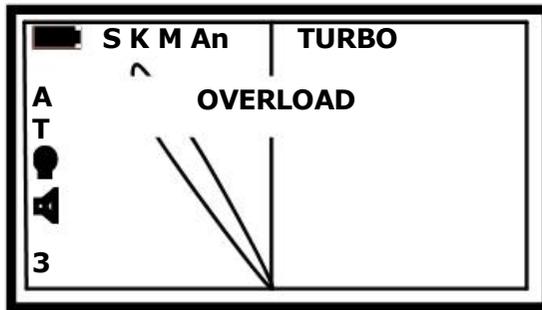

Fig. 33

If the overload warning occurs too often it is recommended to reduce the sensitivity of the device by means of parameters **gain** and/or **coil current** (p. 17, 18) or to lift the gauge above over a ground. If the overload arises on single instances simply raise the coil and re scan the object.

There can be situations where an overload occurs yet no target can be located. This is usually due to an elevated level of mineralization in the ground. In this case it is necessary to reduce sensitivity.

USER PROGRAMS

The detector has been programmed with 4 user programs. These programs are fully able to be edited by the user to suit their own preferences. Switching between programs is carried out by short term pressing of the [**PR/MENU**] button. In the bottom left hand corner of the display is the number of the currently selected program.

Any change of a parameter is automatically stored in memory for the current program. Remember the detector can be restored to the default factory settings at any time. To perform the factory resets turn the detector off. Press and hold the [**PR/MENU**] button while turning the detector on. Once the detector has turned on a message will be displayed indicating factory settings have been restored. The Menu button can now be

released and the unit will enter the standard search mode. The current program will be program **№1**. And the ground balance reference point will be(**0**).

ATTENTION! The parameters for the coils are not reset and will be retained during a factory reset

The factory program №1-This program has the sensitivity set low which gives it stable response to the ground and economic battery life (low coil current). It is intended when searching for large or shallow objects. The discriminator is set to reject most undesirable targets. The included filters suppress most of the unwanted signals.

The factory program №2- This program has sensitivity set a bit higher than Prog. 1. Again this program is most useful in detecting medium to large targets and those targets at shallow to medium depths as well as detecting in areas littered with trash.

The factory program №3- This program has higher sensitivity levels and is intended for searching smaller objects that are deeper. In most cases it provides very good depth while retaining a good quality of search. The coil current is set to TURBO therefore power consumption is higher than in the first two programs.

The factory program №4- This program has high levels of sensitivity and is intended to search for deeply buried targets in areas with minimal levels of trash. In this program it is important to slow the sweep speed and maintain a constant distance from the ground without deviations. Also in this program the coil current is set to TURBO.

In program **№1** the discriminator is for maximum rejection of unwanted targets.
Targets typically rejected include small ferrous objects, small pieces of foil and aluminum wire. Typical targets that are accepted would be objects made from copper, silver larger pieces of aluminum as well as other similar objects. This program may reject targets that are desirable to you such as small gold or jewelry as well as some small hammered coins.
In program **2-4** The discriminator is set to reject small ferrous targets.
Remember that these programs are intended as a starting point to allow the user to become acquainted with the device. For maximum efficiency of the detector the user will need to adapt the programs to their search conditions.

Remember when adjusting any of the programs to try and have an understanding of what the parameter is and how it will affect the detector in the field. Just because an increased setting will result in improved air tests does not mean this will necessarily happen under actual detecting conditions.

 RECOMMENDATION! At first power up factory programs will be installed.

REPLACING THE SEARCH COIL

If your detector is supplied with two or more search coils, configured to work with your device, in order to replace them perform the following.

1. Turn off the detector.

2. Disconnect the coil from the connector on the rear of the control box.
3. Remove the coil from the lower rod.
4. Install new coil on the lower rod.
5. Connect coil connector to the socket on the rear of the control box.

6. Turn on the detector while holding the [**Fn**] button
7. Press the **up/down** keys to choose select coil.
8. Press [**+**] to select
9. Buttons **up/down** keys to choose the installed coil.
10. Press [**+**] to select
11. The detector will automatically restart and make adjustments to the currently installed coil.
12. Perform ground balance procedure.

Note that when the device reboots it will automatically perform an air balance. Therefore it is necessary to hold the coil at waist level and away from any metal objects while selecting the coil from the menu. This I similar to the procedures described on page 12.

The detector should only be used with coils that have been preprogrammed into the devices memory. To make demanded options it is possible as independently by means of the built in program of adjustment of the gauge, and having addressed in **firm AKA** service-center.

When bundled with the device, the coils used with different frequencies and there are no sensors with the same frequency, switching of profiles is carried out automatically, without operator assistance. This is only possible if all sensors are pre-configured to work specifically with your device.

BATTERIES

The detector is powered by 4 AA batteries. It is recommended to use alkaline type batteries or batteries whose rating is not less than 2500 Mah.

The current charge level of the batteries is displayed in the top left corner of the display. A completely filled in icon ▬▬ indicates a full charge while a completely empty icon ▭ indicates a discharged set of batteries.

When the batteries are almost fully discharged, and there are only a few minutes of operating time left, a warning message will appear (fig 34) and a warning melody will be heard. If the device had been operating in TURBO mode (CC=2) the detector will automatically switch of TURBO (CC=1) to extend operating time. When the batteries are fully discharged the detector will enter Sleep Mode and further operations are not possible.

LOW BATTERIES!

**Charge or
Replace the battery!**

Fig. 34
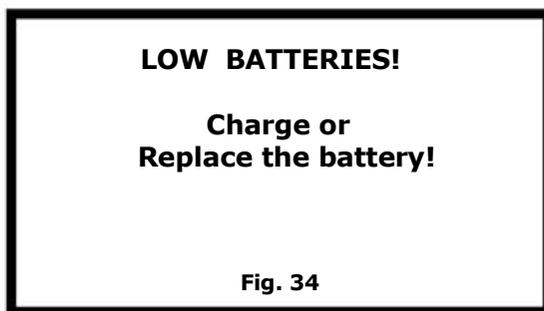
In this case it is necessary to turn off the device and replace the batteries. To insure the proper charge level of the batteries is displayed insure that the correct battery type has been selected (**Alkaline** or **NiMh**).

USE OF HEADPHONES

Your metal detector is supplied with a 3.5mm (1/8") headphone jack. The jack is located on the rear of the control panel. It is preferred to use stereo type headphones with independent volume controls. The audio profile of the headphones is stored separate of the speaker profiles.

PROGRAM ADJUSTMENT OF COILS

Your Berkut 5 is preconfigured to work with the coils manufactured by AKA LLC. There are a couple ways to configure the coils to work with your device by using built in programs designed for this operation:

- Adjusting coil to the current profile
- Addition of the new coil

These actions can be performed either through the main menu (**Coils - Editor**) or with use of the inclusion menu.

```
  D6x10-14                    2

    On
➡   Auto
    Fr    = 13890
    Ort   = 047
    Ph    = 244
```
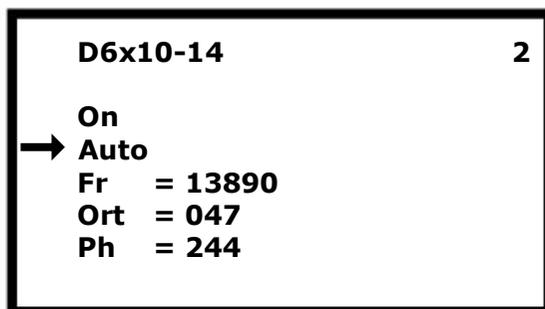
Fig. 35

For proper operation of your detector, and to avoid unnecessary service, insure that the profile selected matches exactly the coil installed.

ADJUSTING THE NEW COIL TO THE CURRENT PROFILE

If, while in use, it was necessary to make repeated adjustments to the coil, or you do not wish to use different profiles for different coils, and prefer to make adjustment at each switching of gauges (similar to some of our other models), take advantage of a mode of adjustment of the new coil under the current profile. This mode can be activated in several ways:

- By means of the basic menu of the device (**Coils** - **Editor** - **Auto**)
- By means of the inclusion menu (Power on while depressing [**Fn**] - **To adjust the coil**)
- By means of fast accessing the main menu (Powering on while holding button [**+**])

For adjusting the new coil for the current profile:

- Turn off the detector
- Connect the coil to the device
- Activate one of the modes described above
- After the automatic adjustment of the frequency and ORT, the device switches to Ground Balance
- Perform the Ground Balance procedure on pure ground, ferrite or a piece of red brick.
- If the GB value differs from zero significantly then press the button [▼] to zero.
- To exit from the adjustment mode press the button [**GB**]
- Switch the device off and then back on.
- Recheck the operation of the detector on several typically found objects.

ADDITION OF A NEW COIL TO A NEW PROFILE

If you have purchased a new coil whose size or operating frequency is different from a previously established coil then it is necessary to use the mode addition of the new coil. It can be performed in two ways:

- By means of the basic menu of the detector (**Coils** - Editor)
- By means of the inclusion menu   (Power on while depressing the button [**Fn**]- **To add the gauge**)

For addition of the new gauge to a new profile, it is necessary to perform the following:

- Turn off the detector
- Connect the coil to the device
- Activate a mode one of specified above ways
- Choose the profile name, corresponding to the parameters of the new coils (size and frequency)
- Activate an adjustment mode
    - ❖ If you are using the main menu method then move the cursor to AUTO and press [**+**]

❖ If you are using the inclusion menu then after choosing the corresponding profile press [**+**]

- After automatic adjustment of the frequency and **ORT**, the device will switch to the Ground Balance mode.
- Perform the Ground Balance procedure on pure ground, ferrite or a piece of red brick.
- If the GB value differs from zero significantly then press the button [⬇] to zero.
- To exit from the adjustment mode press the button [**GB**]
- Switch the device off and then back on.
- Recheck the operation of the detector on several typically found objects.

STORINGYOUR METAL DETECTOR

Your metal detector is a complex electronic device that is constantly exposed to a harsh environment in the field. To insure a long service life it is important to monitor its performance and condition and to store it properly.

Store your detector in a warm dry place. If the device is to be stored for long periods of time, longer than 2 weeks, it is required to remove the batteries. Over a long period of storage batteries can leak and damage your device.

After each use it is recommended to clean the detector including the coil, rods and control box from dirt. Immediately after use it is recommended to remove the batteries. If the detector has been used in particularly damp environments, rain or extremely humid weather, then remove the batteries from the device. Leave the battery cover off of the detector and allow the internal area of the detector to dry out preferably in a warm and dry room to prevent moisture from condensing on the electronics. Moisture can evaporate through the slots in the control box so it is best to store in an upright position.

Do not attempt to help the detector dry out by using ANY external heat device such as a hair dryer, torch or any open flame as damage will occur to the control box or coil.

Should water ever enter the control box immediately remove the batteries leaving the cover off and contact the service department.

SOME COUNCILS ABOUT OPERATION МЕТАЛЛОДЕТЕКТОРА

This section intentionally left blank due to problems properly translating the original authors' intents and explanations.

SCANNING TECHNIQUES

It is important to have good sweep or scanning techniques. Try to keep the coil 3-4 cm off of the ground moving the coil smoothly and evenly above the surface of the ground. Try not to make any sharp or jerking movements of the coil.

The most important factor is the correct choice sweep speed. In most cases you should do one complete movement of the coil (from right to left or from left to right) in 1-2 seconds. In strongly littered areas reducing the sweep speed of the coils is required in order to achieve the best division between targets. Each following pass of the gauge should overlap the previous, ideally half of diameter of the coil.

ABOUT GROUND BALANCING

Remember that ground balancing, while basic in its operation, is critical to proper performance and to achieve the best depth and target ID.

It is important to check the correct ground balance level whenever search conditions have changed. This would include the type of ground as well as temperature..

It is also important to ground balance on pure soil free of any metals. If this is not possible you may excavate approximately 1.5 to 2 Kilo (3-4 lbs) of soil. Insure the soil is clean of any metals and place in a plastic bag or plastic container.

Having laid the detector on the ground with the coil in the air go ahead and activate the ground balance mode. Now present the sample of clean soil to the coil until the ground balance melody has been heard.

If the melody fails to play try raising the CC or GN levels and repeat.

Once the ground balance procedure has been performed pay close attention to the GB numbers and insure they do not differ greatly from 0. Should the exceed -15 to +10 then it is likely that metal was present and the detector will be appear disabled.

In the course of searching the device makes automatic GB fine tuning (if AGB is enabled). It is necessary to notice that in certain cases (For example, on strongly littered ground) the device may erroneously track to the trash targets. In these situations it is advised to disable the automatic ground tracking.

COUNCILS ABOUT IDENTIFICATION OF TYPES OF OBJECTS

In the course of detecting you will notice those objects that are located close to the coil can complicate the ability of the detector to ID these properly either with audio or visual indications. This effect is the so called near zone. Just a person cannot see a small object brought too close to the eyes the detector also cannot "see' these near zone objects clearly. In these cases it is recommended to lift the coil and re scan the object. This will also allow the hodograph to fit within the the screen and not travel outside of the display area. The goal is to try and keep the hodograph of the detected object within the confines of the screen and also to reduce the effects of ground minerals on the hodograph when held to near the ground.

While using your detector you may notice that large ferrous objects, due to their size and shape, can appear as a possible coin. How can we properly identify these erroneous targets?

First of all the audio from these large ferrous targets will also sound "large" and lifting the coil even 40cm off of the ground the audio will not significantly diminish. Obviously then this is not a coin.

Secondly, as it was already noted, large ferrous targets often times will have large distinct loop shape to the hodograph. However if the target is large and the coil is too close then the signal will leave the screen (see below) and may appear as a coin. This will often times confuse users new to the detector. See the comments in fig. 36.
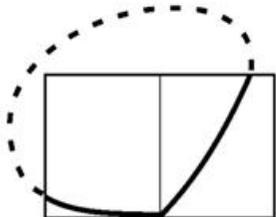
Here part of the ferrous signal "loop" has left the screen and may now appear as a coin signal due to the clipping of the displayed signal.
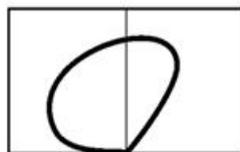
The same target signal but this time with the coil raised enough to allow the entire signal to be displayed properly without any clipping. Clearly the object is iron.

Fig. 36

Observing the above drawing we can clearly see the advantage to raising the coil on certain large or shallow objects in order to keep the signal within the screen.

40

There are times, when searching in discrimination, that a target may be present in one direction but not the other. In this case it is suggested to use the "**all metals**" mode. This will often time help in locating these targets that may appear in direction and disappear in another.

ABOUT THE PINPOINT MODE

As was already mentioned, the pinpoint mode serves to define the exact location of the detected target. We will look at some suggestions for the proper use of the pinpoint mode.

Having located a target in the standard search mode and deciding that it is worth retrieving we now need to locate its precise location.

Move the search coil off to one side of the located target along the line A (Fig. **37**). Then activate the pinpoint mode.

As accurately as possible, while maintaining the distance between the ground and the coil, scan the object left to right. Determine on line A the location (coordinate) where the tone of the sound was the highest. Then take the coil from the sensing area perpendicular to the primary direction (A) scanning (e.g. forward) along the line (line B).

Scan the object along the line as accurately as possible keeping a minimum distance between the ground and the sensor. The recorded coordinate of the maximum sound volume on line B, will determine the exact location of the object and will coincide with the centre of a round window.
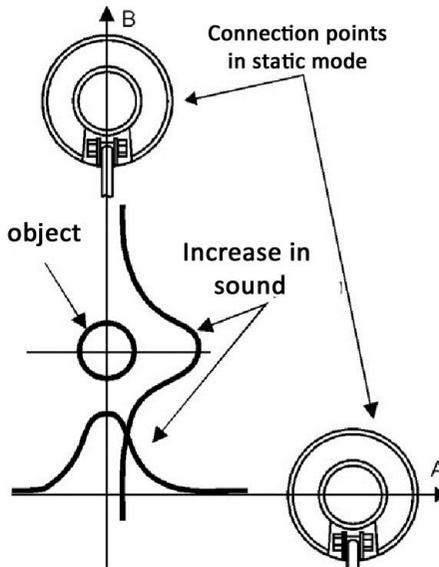

Fig. 37

ABOUT EQUALIZER USE

The "**EQUALIZER**" function can be thought of as another form of a discriminator. You can use the equalizer to accept or reject from some groups of objects.

Due to the nature of the signal processing in some metal detectors Objects may be louder (e.g., foil, aluminum caps, etc.) and some quieter (for example, large objects made of copper) . With EQ you can adjust the volume of different objects as you see fit.

Also , if you work in the " ALL METAL " , you can make the volume , for example, of ferrous objects quieter than those of other signals. In this case you will continuously monitor the situation under the search coil without straining ears.

EXAMPLES OF SOME VDI

A table of **VDI** values for some objects measured in the air.

OBJECT	Number VDI
Small ferromagnetic objects	-90... 0
Grenade Ф1	-30...-35
Foil	0... +20
Small coin (чешуйка) silver	+15... +35
The Golden Ring	+25
Coin (10 copeck 2004 г.)	+30
Coin (5 copeck 1961 г.)	+35
Coin (10 rbl. of 1899) gold	+38
Coin (1 copeck of 1869) copper	+61
Coin (Fifty-kopeck piece of 1924) silver	+77
Coin (Denga of 1749) copper	+78
Coin (1 rouble of 1878) silver	+80
Coin (2 copeck of 1840) copper	+81
Coin (5 copeck of 1786) copper	+85

The specified values of VDI's of the objects are rough and can differ from real depending on type of a ground, depth type of object and size/frequency of the coil etc.

GUARANTEE CERTIFICATES

The Manufacturer guarantees working capacity металлодетектора under condition of observance by the consumer of service conditions.

Warranty period of operation **24** months from the date of sale.

During a warranty period the found out industrial defect It is free of charge eliminated by the manufacturer, under condition of absence of mechanical damages of the electronic block and the device gauge.

For realisation of guarantee repair it is necessary to show the present maintenance instruction with the specified date of sale. In the absence of a mark about sale, the guarantee is estimated from a date of issue.

The address for a presentation of claims:

ACCEPTANCE CERTIFICATE

Металлодетектор **БЕРКУТ-5**,   № _____

Date of issue _____ 20 _____

Enterprise stamp
The manufacturer

It is serviceable _____ the Signature of the inspector.

Sale date _____ 20 _____