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# Mole Impulse Digital DD Pro

## Operation manual



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## QUICK START

**THRESHOLD** - between “0” and “4” (in case there is no noise it shall be set on “0”; then the device is set on its most sensitive mode, i.e. the maximum depth detection). In the event of noise it shall be moved with one level up to “4” until the noise disappears. During search of large objects it must be set on “6” to “10” in order not to hear smaller objects which, to a certain extent, reduce the detection depth. The position of **THRESHOLD** shall be bigger than the position after **FIX**.

For instance: In case **FIX5** is set on „2”, the **THRESHOLD** potentiometer shall be set on “3”. This means that all signals higher than “3” will produce tones.

**LEVEL** – during work with large coils, **LEVEL** must be always set on „0”. During work with small coils and when a quick movement is needed, **LEVEL** shall be set on „0” to „10” until the tone is no longer heard in the speaker. In case the work with the smaller coil is slower, **LEVEL** shall be set on „0”.

**DISC** – from “0” to „10”, normally “5”. By using the **DISC** potentiometer, the operator can control the device and set it to detect a metal either as a ferrous or as a nonferrous one.

**FUNCTION** –this button/potentiometer changes the work mode as well as **MOV** and **FIX** modes by moving it leftwards or rightwards.

Mode change is made by two consecutive presses of the **FUNCTION** button. The arrow „>” shall be moved upwards to **Prof**. The turn of the **FUNCTION** button changes **Prof** from „1” to „4”. In case the mode needs to be changed, press the **FUNCTION** button downwards. Upon the first press the mode’s subsettings begin to appear consecutively, which in sequential order are: **POW**, **ADC**, **Stat**, **Disp** and **mDly**, and which values change upon turning the **FUNCTION** button leftwards or rightwards.

**Note:** There are 22 functions more available which are service settings and are to be changed only in special occasions. They cannot be entered into or changed by accident as it is to be made by pressing combination of buttons.

**Example:**

**Prof1:**

**POW: 1-2 (normally 2)**

**ADC: 1-3 (normally 2)**

**Stat: 2**

**Disp: 7**

**mDly -** in coils of 23x36 cm or 50 cm it is between 4 and 6  
in coils of 110x110 cm it is between 3 and 5  
in coils of 200x200 cm it is between 2 and 4

**smp1: 51**

**smp2: 49**

**0\_c1: 15**

**0\_c2: 11**

**cEFE: 0-10**

**rejF: 0**

**mode: 0-1 (for Europe and other countries with frequencies of 50 Hz) or  
2-3 (for the USA, Japan, China and other countries with frequencies of  
60Hz)**

**ofsB: 116**

**scIB: 100**

**ofsT: 33**

**scIT: 38**

**maxT: 40**

**chgi: 40**

**ofsl: 9**

**scII: 64**

**scIU: 105**

**maxU: 182**

**capB: 40**

**cf-l: 57**

**mneg: 6+**

**freq: 10-63 (61)**

**intM: 5-50 (on 5 – a short tone / on 50 – more continuous tone)**

### **DISC/ ALL METAL** button

Best to work is the **ALL METAL** mode which also provides discrimination. On the left from the centre section zeros shall be visible, i.e. ferrous metal detected, and on the right – bells, i.e. nonferrous metal detected.

When in **ALL METAL** mode, regardless of the discrimination, the device will produce one and the same tone for ferrous and nonferrous metals, but it will be visible on the display whether it is ferrous or nonferrous.

When a tone is produced while in **ALL METAL** mode, the operator must leave the detected object's area and switch to **DISC** mode by pressing the **DISC/ALL METAL** button, and after that he must press the **FAST ZERO** button and again walk over the signal's area. In case the metal detected is nonferrous, the produced tone will be loud and there are bells visible on the right from the centre's display. If the metal detected is ferrous, there are circles visible on the left from the centre and the tone produced will be low.

When the operator completes his work over the object detected, he must leave its area and go to plain land and again press the **FAST ZERO** button in order to continue searching.

By only pressing the **FUNCTION** button the operator will reach the main menu where only the main parameters can be changed, namely: **POWER (POW)**, **ADC**,

**STATISTIC (STAT)**, **DISPLAY**, **mDly**, without seeing the service ones.

### **How to enter the service settings menu?**

Press and hold down the **FAST ZERO** button with your right hand. Press and hold down the **FUNCTION** button with your left hand and turn leftwards 1-2 positions. Then release both **FAST ZERO** and **FUNCTION** buttons. Press again the **FUNCTION** button until the desired function is displayed in order to change the settings.

**If this short description is not enough to start detecting, please read the whole user's manual carefully.**

## Switching on

```
LOADING  
Please wait...
```

After pressing the **POWER** button the internal speaker produces a sound and the display shows:

```
START.  | bat: 78%  
        |      :651  
-----|      :160  
        |      :150
```

The automatic adaptation to the coil starts, resetting the device which normally continues 2...4 sec

```
Clear..| bat: 78%  
        |      :680  
-----|      :180  
        |      :155
```

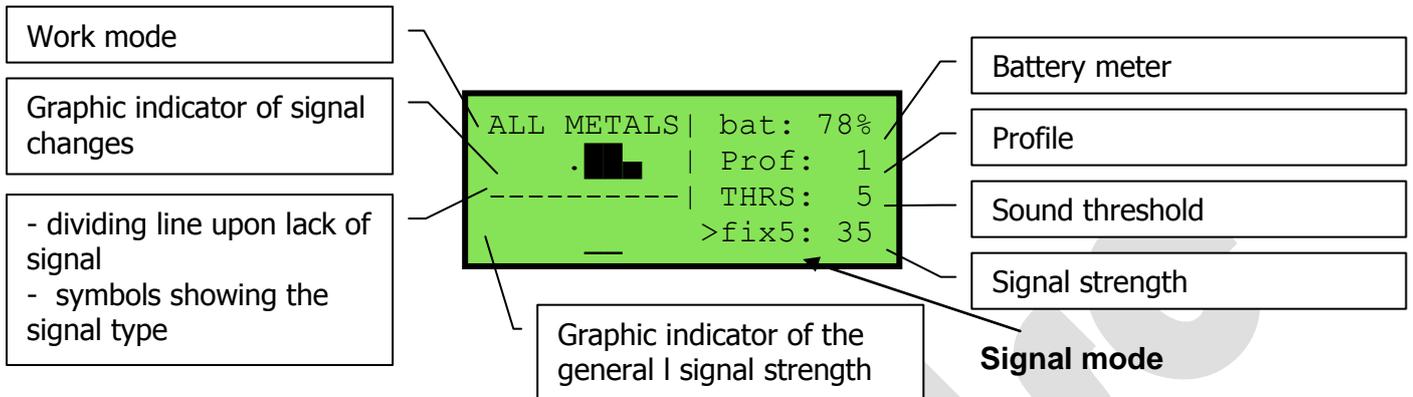
At the end of the coil initialization a second sound is produced and the display shows **Clear** – the device is reset.

```
ALL METALS| bat: 78%  
  .       | Prof:  1  
-----| TRSH:  5  
  .       |>fix5:  0
```

At the end, the device switches to the selected work mode - **ALL METALS** or **DISC (AUTO DISC)**.

## All Metals Mode

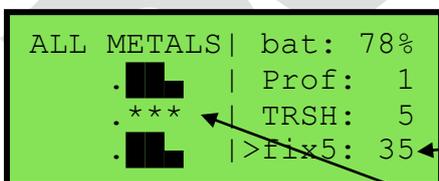
In **ALL METALS** mode the following parameters are displayed:



- **Battery meter** as a percentage of the maximum voltage ( **0..100%** shows empty / full battery );
- **Prof work mode 1/2/3/4** (for large searching coil - 1/2 or for small searching coil – 3/4);
- **Sound threshold TRSH** from **0** to **11**. Only sound with strength higher than the threshold will be accompanied by a sound.
- **Signal strength** from an object as a number from **0...500.... OVERFLOW (signal error)**.
- **Graphic indicator of signal changes**. It can have either positive or negative values moving right and respectively left from the dividing zero point in the middle.  
 In **fix** mode this indicator **is the same** as the indicator of the general sound strength of 4<sup>th</sup> row  
 In **mov** mode it shows only the increasing values above the average sound strength;
- **Graphic indicator of the general signal strength**. It is similar to the indicator of signal changes.

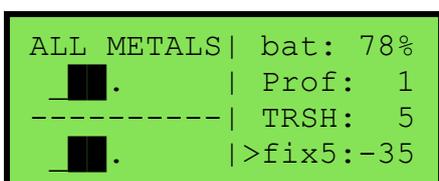
Normally, both indicators show positive values when an object is detected and upon its disappearance they are zero (or tend to vary around **fix5: -2 -1..0.. + 1 + 2**).

### Values of level indicators in fix mode



**When there is an object within the range of the coil**, the object causes a signal, which is displayed on the two level indicators as a **number**. If this signal **exceeds the chosen threshold TRSH**, a sound is produced. The frequency of this sound depends on the signal strength – higher frequency for higher signals.

**The signal type** is displayed on the **dividing line** as symbols – circles or stars (bells). The circles show slowly fading signal, and the stars – quickly fading signal



*Note: 1. If the device is reset with the **FAST ZERO** button while there is an object detected within the range of the coil, the level will become „0”. When the object disappears the signal will become negative (e.g. **-35** and a sound warning for negative level will appear*

```
ALL METALS| bat: 78%
.>>>>| Prof: 1
-oo.    | TRSH: 5
.>>>>|>fix5:135
```

If the **general signal** increases and becomes bigger than **120** units, the level indicators show higher level as >>>> (overflow), but **the value as a number** continues to monitor the growth, and **the sound frequency also continues to change**.

```
ALL METALS| bat: 78%
.>>>>| Prof: 1
-oo.    | TRSH: 5
OVERFLOW!
```

If the level of overflowing is reached, the sound changes to a very high signal tone and the following appears on the 4<sup>th</sup> row of the display: **OVERFLOW (signal error)**.

### Values of level indicators in mov mode

```
ALL METALS| bat: 78%
. _      | Prof: 1
-----| TRSH: 5
. _      |>mov3: 1
```

The **mov** mode is chosen after several turns of the **FUNCTION** knob, it can be **mov 0..5**. The difference between these submodes is in the time it takes to automatically reset the signals found. The device constantly adjusts to the average strength of the signal; however, the transitory changes are shown as a signal from an object

which disappears gradually. The signal disappears slower in **mov5**, i. e. in this case the movement is slowest and on the contrary, in **mov0** the movement must be quicker.

```
ALL METALS| bat: 78%
. ■      | Prof: 1
-----| TRSH: 5
. ■■■   |>mov3: 49
```

On the 4<sup>th</sup> row of the display **the level indicator** and the numerical index show the general signal and on the 2<sup>nd</sup> row the level indicator **mov** shows the transitory diversion from the average signal.

*Note: If the transitory signal fades below the level of the average signal and the difference became negative, the average signal is quickly leveled with the transitory one, i. e. the negative values in this mode are momentary so that the device can quickly pick up new signal intensifications.*

```
ALL METALS| bat: 78%
. ■ ← | Prof: 1
. **+ | TRSH: 5
. ■■■ |>mov3: 49
```

The sound signal appears when the **growth** above the **average signal** (not the general signal) is equal or bigger than the threshold **TRSH**. Again, the bigger increase causes higher frequency sound.

## Changing the working profile (capacity)

```
ALL METALS | bat: 78%
  . _      | >Prof:  1
-----   | TRSH:  6
  . _      | fix3:  5
```

The device can function in four different profiles for adjusting the searching coil (**Prof 1/2/3/4**). Switching on different profiles happens when the “**FUNCTION**” button is pressed twice, the arrow is moved upwards, first in front of **TRSH**, after that in front of **>Prof**. With turning the knob leftwards or rightwards **Prof 1,2,3** or **4** is chosen, after that the „**FUNCTION**” button is pressed downwards and the device is reset.

*Note: The presence of four working profiles allows the device to tune in, in advance, to circular searching coils or a large frame. The described parameters below, **POW**, **ADC**, **mDly**, vary for each profile.*

## Change of the main delay of sampling

```
ALL METALS | bat: 78%
  . _      | >mDly:  4
-----   | TRSH:  6
  . _      | fix3:  5
```

The parameter **mDly** (Main delay) determines on what level the procedure for automatic adjustment of the coil will end, after turning the device on. On this parameter depends where exactly will be situated the point of detection after the end of the impulse, upon acceptance of the reflected signals. This can greatly affect the sensitivity towards certain signals. For example, the early detection increases sensitivity towards quickly fading signals, on the opposite – the late detection suppresses the signals as the sensitivity towards slowly fading signals stays the same.

The practical application is the following – if ignorance of small objects is desired, as well as ground signal fading and only large and deeply buried objects, are searched (as in the case of working with a frame) – then **mDly** must be **3(4)**, which means delayed detection.

When working with circular coils **mDly** can be **(5)6**, this means earlier detection and provides maximum sensitivity.

## Example for working in ALL METALS mode

### **Mode fix (0..5) (ALL METALS)**

*This mode can be chosen either for working in motion or being static*

*When the coil is held above the object, the signal does not fade gradually as it happens in mode **mov**. The signal stays, which is very comfortable for the precise location of the object.*

```
CLEAR.. | bat: 78%
.       | Prof: 1
-----| TRSH: 1
.       | >fix5: 0
```

#### Example:

*Mode **fix5** is chosen. The coil is held in the air and the device must be reset using **FAST ZERO**.*

```
ALL METALS | bat: 78%
.■         | Prof: 1
-----| TRSH: 4
.■         | >fix5: 3
```

*After the coil is lowered to its working distance above the ground (6..10 cm for small coil and 30..40 cm for large coil), a ground signal appears **fix5=3..5**. Again push **FAST ZERO**.*

*Example: If the value of **fix5** is 3 the sound threshold is adjusted to **TRSH=4** with the **THRESHOLD** knob, the sound fades and appears only after the signal reaches levels beyond 4.*

```
ALL METALS | bat: 78%
.■         | Prof: 1
-000.     | TRSH: 4
.■         | >fix5: 20
```

*As the coil is moved around a certain area increase of the signal is discovered. **5..10..15..20..15..10..5** – a sound which monitors the amplitude is produced. Some slow movements, left and right, are made and the coil is stopped at the point where the signal is maximum (the frequency is the highest). After that, the coil is moved back and forth so that the device can determine the point of higher frequency and maximum sound. Thus, the place where the accepted signal is the strongest is found. The possible positioning of the object is in the ground, below the focus (the center) of the coil.*

*The difference between the submodes **FIX0,1,2,3,4,5** is in the maximum movement speed allowed.*

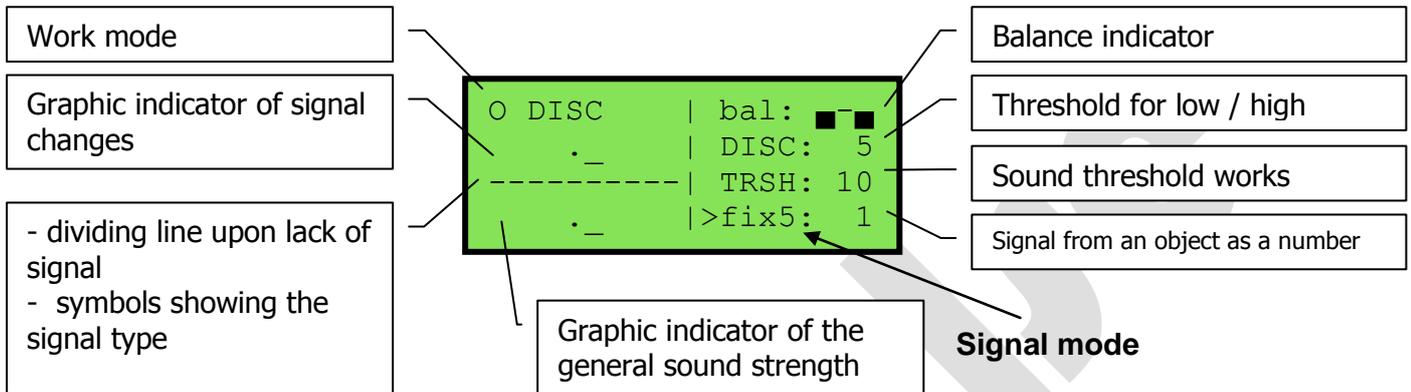
***fix0(1,2)** are quick modes where the consumed electricity from the battery is higher. The quickest one is **fix0**. It is suitable for very quick movements of the coil. However, it is very sensitive to disturbances as local radio stations, etc..*

*Submodes **fix3(4,5)** are slow modes, as **fix5** is the slowest one. In these modes the consumed electricity from the battery is lower which provides longer battery life and respectively more working time.*

*Normally, mode **fix5** is most suitable for work.*

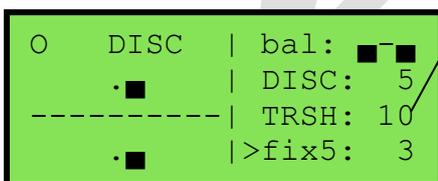
## DISC mode

Here as well, the **fix** mode is static, the signal does not fade, and **mov** mode is for working in motion, i. e. the signal disappears after continuous hold of the coil above the object.



Work parameters for this mode are:

- **TRSH** - sound threshold from **0 to 11**;  
Only sound with strength higher than the threshold will be represented and will be accompanied by a sound.
- **DISC** – Sound changing threshold from lower to higher tone. This threshold determines which object will produce high and which objects will produce low tones.
- **Balance indicator** – shows whether the device is balanced when there is no signal. In order to check this, the operator must lift the searching coil in the air, so that there is no signal in its range. Then the indicator must have the same levels on both sides of the dash symbol „-“, and if the levels are not the same, the device must be reset. Otherwise, the readings of **C1** and **C2**, would be invalid, especially for lower levels.



**Adjusting the sound threshold – TRSH parameter**  
 (minimum signal after which the discrimination begins and a sound is produced).

The minimal level for the sound is chosen with the **THRESHOLD knob**, and is normally 10.

*This level is higher than the level of the threshold in **ALL METALS** mode as the signal cannot be analyzed if the levels are too low. The higher the level, the steadier the discrimination is in the beginning, just beyond the threshold. This requirement for minimal levels of the signal in **DISC** mode is the reason why the greatest sensitivity can be achieved in **ALL METALS** mode.*

```

O   DISC | bal: ■■
.■   | DISC: 5
-----| TRSH: 10
.■   |>fix3: 3
    
```

**Adjusting the threshold determining the sound change: DISC parameter**

This is the value of the coefficient **C1**, which is followed by a high tone signal and preceded by a low tone signal.

The threshold for sound change is adjusted by the **DISC** knob, normally 5. When the device picks up a signal greater than the threshold from which the sound works **TRSH**, it is discriminated and the coefficients **C1** and **C2** show the type of the signal and according to **C1** and the chosen threshold **DISC**, a low or high tone is produced.

### Allowing and forbidding the low tone in DISC mode

For allowing or forbidding the low tone, press “**FUNCTION**” down continuously for 3..4 sec.

**A circle with bold outline means that high and low tones are allowed**

```

O   DISC | bal: ■■
.■   | C1=  -6
-00. | C2= -12
.■   |>fix3: 15
    
```

When both tones are allowed the device produces low or high tone when discovering all types of metals.  
 - high tone = nonferrous metals  
 - low tone = ferrous metals

**Circle with dashed outline means forbidden low tone**

```

○   DISC | bal: ■■
.■   | C1=  -8
○○○. | C2= -12
.■   |>fix3: 15
    
```

**When the low tone is forbidden**, upon discovering objects which provoked longer signal, a **sound is not produced**, but the signal’s strength and type are displayed.

## Example for working in DISC mode

### **MODE fix (0..5) - NORMAL DISC**

This mode can be used either in motion or being static.

If the signal picked up by the coil is greater than the sound threshold **TRSH**, according to the calculated coefficient **C1**, high or low tone is produced if both tones are allowed.

If the received signal is short **C1** has positive values.

If the signal is long, **C1** has low positive or negative values.

Depending on the adjusted environment of the discrimination scale (**DISC**), if **C1** is greater than **DISC**, a high tone is produced. And the opposite, if **C1** is smaller than **DISC**, a low tone is produced if it is not forbidden, and if it is, no sound is produced.

```

CLEAR. . | bal:  █  █
          | DISC:  5
----- | TRSH:  5
          | >fix5: 0
    
```

#### Example:

The device is reset before starting a search by lifting the coil in the air and pressing the **FAST ZERO** button.

```

O DISC   | bal:  █  █
          | DISC:  5
          | TRSH: 10
          | >fix5: 8
    
```

Lower the coil (to 6..10cm for small coil and 30...40cm for large coil) above the ground and press again **FAST ZERO**. If the ground signal is **fix5=4..8** the sound threshold **TRSH=10** must be adjusted by using the **THRESHOLD** knob. The environment of the discrimination **DISC=5** is adjusted using the **DISC** knob.

```

O DISC   | bal:  █  █
          | C1=    7
          | C2=    3
          | >fix5: 20
          | **+
    
```

Above certain areas the signal increases **fix5=15..25..30..15**, and **C1=7..8**, which is greater than the chosen **DISC=5** and that is why a high sound is produced, signaling that a metal provoking quickly fading signals is detected. On the row between the level indicators a graphic symbol is displayed «\*\*+», corresponding to **C1=7..8**.

```

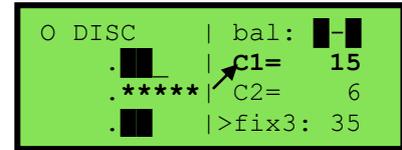
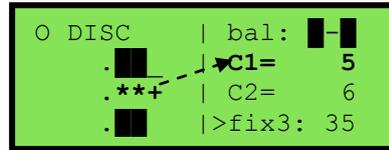
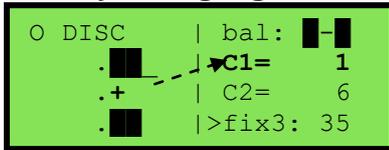
O DISC   | bal:  █  █
          | C1=   -3
          | C2=  -11
          | >fix5: 35
          | -O
    
```

Above another area a signal is picked up **fix5=15..30..40..30..15**, and **C1=-2..-4** and is lower than **DISC=5**, that is why a low tone is produced (if the low tone is forbidden there is no sound). This means that a metal provoking slowly fading signal is discovered. On the row between the level indicators a graphic signal is displayed «-O», corresponding to **C1=-3**.

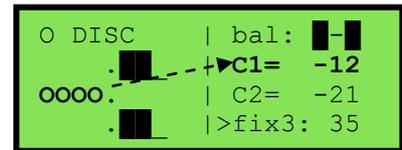
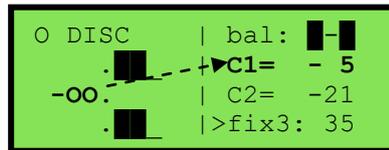
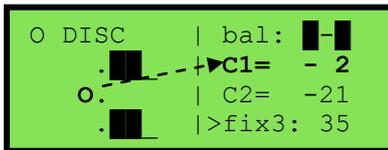
**O», corresponding to C1=-3.**

The symbol display of the discrimination result (the calculated coefficient for the signal **C1**) allows its quicker and easier understanding – it is in a way “visual discrimination”. The negative values of **C1** are shown on the left from the dividing point in the middle as circles, and the positive values are displayed as stars on the right side from this point.

### Quickly fading signal



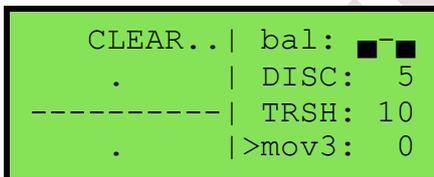
### Slowly fading signal



## mov 0..5 (AUTO DISC) MODE

In order to pick up signals in this mode, the coil must be in motion. After stopping, even if a signal is picked up, it gradually fades.

When the coil passes an area in which the signal is greater than the background and the **difference is greater than the chosen sound threshold (TRSH with the THRESHOLD knob)**, this difference is discriminated, coefficient **C1** is calculated and a low or high tone is produced depending on **C1** and the chosen environment for discrimination **DISC** with the **DISC** knob..



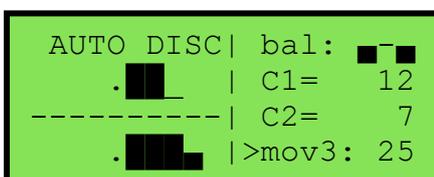
#### Example:

With turning the **FUNCTION** button anticlockwise submode **mov3** is selected. The coil is raised in the air and the device is reset.



Lower the coil above the ground (6..10cm for small coil and 30..40cm for large coil) and press again **FAST ZERO**. If the ground signal is **mov3=5..6**, which little by little fades to 0..1, the coil moves left and right and the signals received are **mov3=8..10** due to the movement and the small changes in the ground signal. The sound threshold **TRSH=10**

and the environment of the discrimination **DISC=5** are adjusted using the **THRESHOLD** and **DISC** knobs respectively .

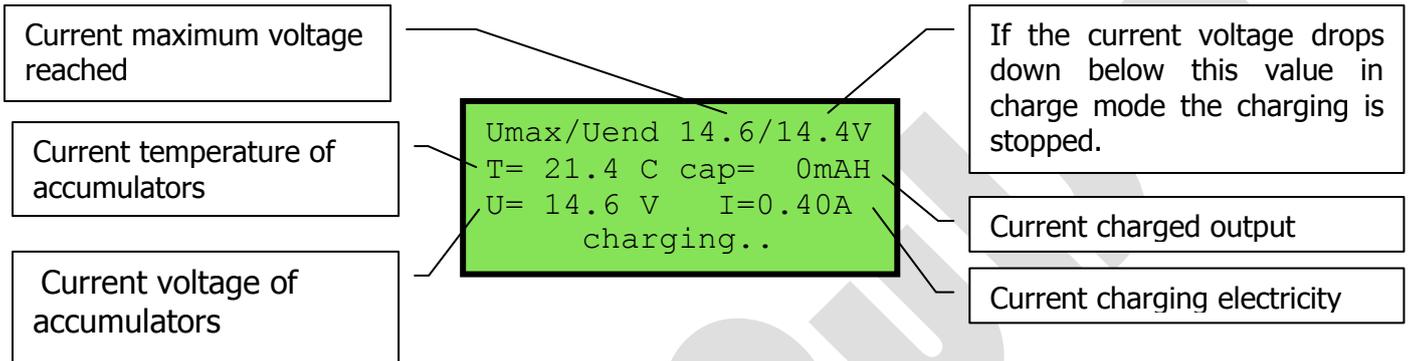


When moving the coil above certain areas the signal goes stronger and the device shows **mov3=15..25..15**. **C1=12**, which is greater than **DISC=5**, and that is why a high tone is produced. This means that there is a metal object in the ground causing quickly fading signal – nonferrous metal.

## CHARGING MODE

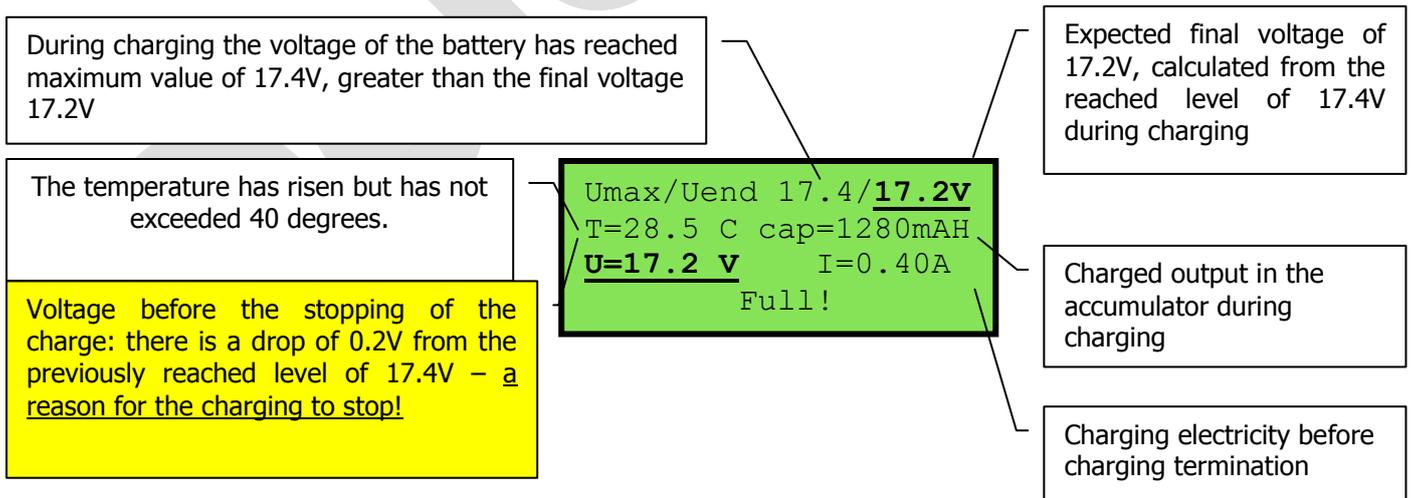
The charging of the built-in accumulative battery is carried out when **the POWER button is off** and outside voltage charge 12V to 24V is provided. Recommended 20V.

The following is displayed on the screen:

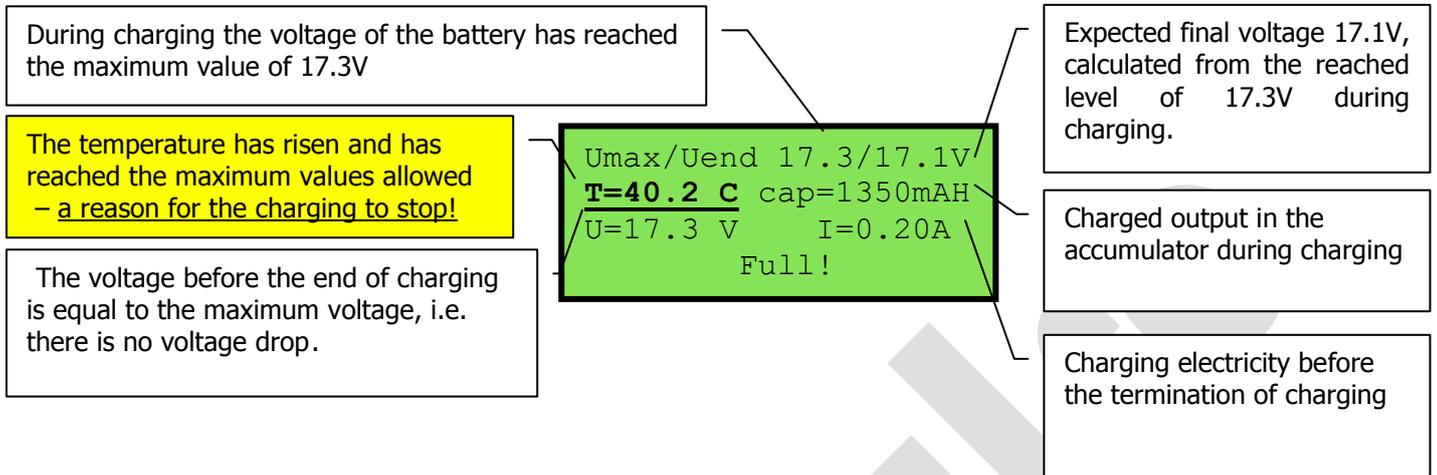


The charging of the batteries begins which continues to the reaching of the following measures:

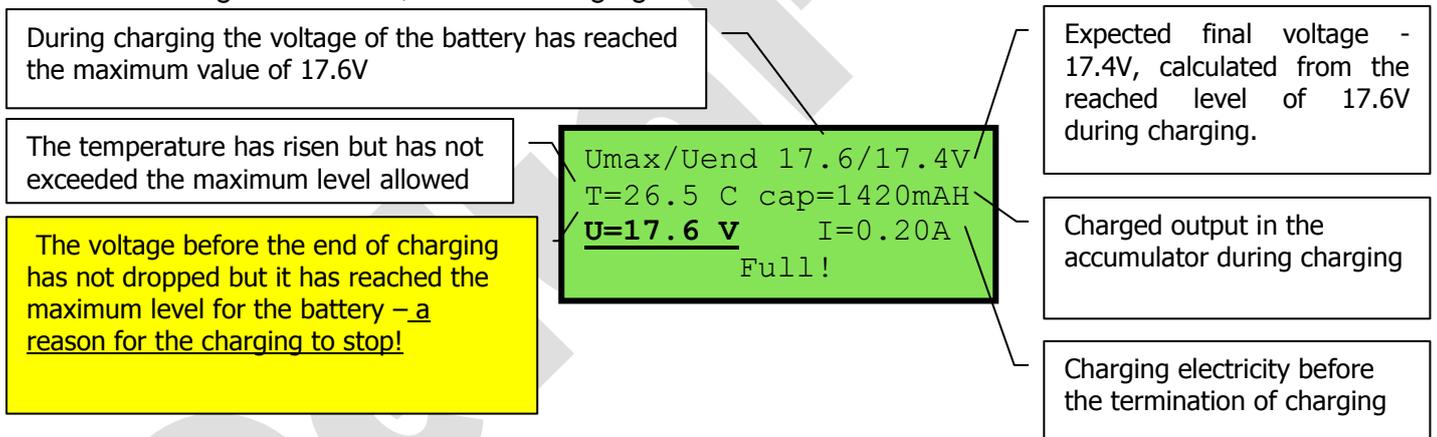
- Normally, when charging the battery the voltage of accumulator gradually increases. At the end of the charging, when full capacity is reached, the batteries start slowly to warm up which causes certain, even though minimal, drop of the voltage regardless of the ongoing charging. This is standard indication that the battery is full, so the charging stops;



- If, for some reason, the expected drop of voltage does not happen, the batteries will continue to warm up. After exceeding a certain temperature level the charging will stop.



- If, for some reason, the expected drop of voltage does not happen in the end of charging, the batteries do not warm up to the maximum temperature allowed but the maximum level set for the voltage is reached, and the charging ends.



Good luck!