STT GROUP СПЕЦИАЛЬНАЯ ТЕХНИКА И ТЕХНОЛОГИИ

SMD-300
Selective Pulse Metal-Detector

USER's MANUAL

* 2011 *

CONTENTS

PREFACE

This User's Manual describes SMD-300 Selective Pulse Metal-Detector design and principle of operation It should be read carefully to ensure correct use and maintenance of the instrument.

WARNINGS

SMD-300 Metal-Detector represents a functionally complete device – thus needs no maintenance from the User. Don't try to disassemble it. Ask qualified personnel for service and repair.

Remarks from experienced user:

Selective Metal Detector SMD-300 described below represents a smart reconnaissance instrument for revealing concealed eavesdropping devices and other covered installations in a difficult environment.

Certainly, one can use it for searching riches on a beach; however its main purpose is a scrupulous investigation of questioned items and surfaces after first superficial inspection with non-linear junction detector.

Unlike its competitor SMD-300 supplies operator with sufficient info about inspected object. By means of comprehensive software Detector displays the data in a handy form suitable for comparison and analysis. For instance, 'unidentified metal object' concealed under the plaster or inside a concrete block is represented as a certain virtual metallic plate with define size, width and occurrence depth.

At that, such an investigation is available when the object is masked by regular matter with metallic inserts like grid and reinforcement. Sometimes SMD-300 detector allows to get rid of frequent X-ray inspection.

Nevertheless, please, note: SMD-300 is a complicated 'second echelon' device for supplementary suspicious object investigation. Its successful use is possible only after careful study and adequate training.

Don't forget saying: 'Practice makes perfect…'

DESCRIPTION

SMD-300 Selective Pulse Metal-Detector (here and after SMD-300 Detector) is intended for searching metallic irregularities in a uniform substance that consists of regular metal insertions such as metal reinforced structures.

Fig. 1

SMD-300 can detect metallic items in homogeneous material with regular metallic parts (screws, bolts, holders, wall outlets and switches and etc.). The only condition is 20% alteration of electromagnetic parameters caused by the object to be revealed (its equivalent dimensions or occurrence depth). Even singular parameter alteration is sufficient for the right item detection.

SMD-300 Detector can reveals such irregularities as thin-walled metallic housing of electronic appliances concealed in fabric constructions with regular reinforcement (walls, sealing and a floor of a premise).

SMD-300 Detector allows operator to estimate dimensions and a form of a questioned item as well as its thickness and occurrence depth.

COMPLETE SET (see fig. 2)

1	Main Unit (transceiver module)	1 pc
2	Control unit	1 pc
3	Sensor unit with handle	1 pc
4	Headphones	1 pc
5	Imitator (test unit)	1 pc
6	Rechargeable battery	2 pcs
7	Charger	1 pc
8	AC Adapter	1 pc
9	Computer connection cable	1 pc
10	Car Adapter	1 pc
11	3.5" Floppy disk with SMD software	1 pc
12	Carrying case (not shown)	1 pc
13	User manual	1 pc

Fig. 2 Complete set

Fig. 3 SMD-300 Detector set in a carrying case

SMD-300 MAIN TECHNICAL PARAMETERS

Probe-signal-transmitting modes
(intensity of emitted magnetic field) – **Pmax** & **Pmin**.

Magnetic field strength at the Sensor unit geometric center:
– **50 A/m** in a Pmax- mode;
– **25 A/m** in a Pmin - mode.

Probe signal repetition rate – **1 kHz.**

Receiver sensitivity – not worse **10μV**
(500 kHz band under 10 dB s/n ratio)

Receiver dynamic range not less **100 dB** (AGC is "ON")

Signal analysis period (at a single spatial point) – **0.2 s**

Indication – **Audio** (headphones) & **Visual** (LCD)

DETECTION RANGE and the range of a searching object parameters evaluation: virtual shape, dimensions and depth of burial in a uniform medium (see Table 1)

Table 1.

Metallic item	Detection range, cm			
	Detection		Shape evaluation	
	Pmax	Pmin	Pmax	Pmin
Imitator (test unit)	16	14	9	8
45×25×15 mm metallic housing	20	18	15	13

Thin-wall metallic housing detection range - not less **6 cm** (9V battery equivalent)

NOTE - detection conditions: thin-wall metallic housing beyond an obstacle – Al-plate (3 cm wide, 1,5 mm thick) placed 3 cm far from the Detector's Sensor unit (see fig.4).

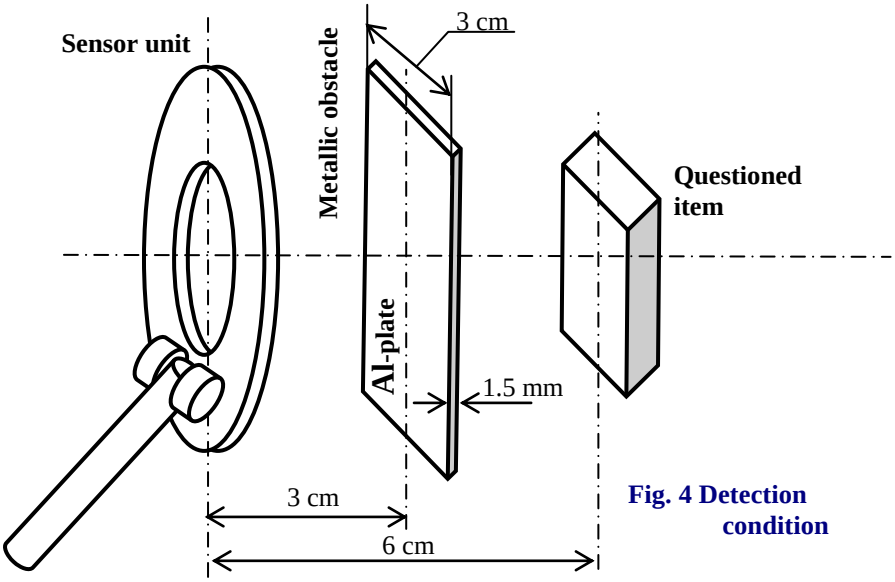


Fig. 4 Detection condition

OPERATION CONDITIONS:

- **Operating temperature** **+ 5°C …+ 40°C**
- **High and low temperature limits** **-20°C** and **+50°C**
- **Relative humidity**(under +25°C) – not more **80%**.

POWER SUPPLY **– GP 'VD-153'**
6 V rechargeable battery

Current consumption in Pmax mode – not more **0.7 A**
in Pmin mode **-** less then **0,4 A**

Continuous operation time in Pmax mode -not less **3 h**
from one fully charged battery in Pmin mode -not less **6 h**

DIMENSIONS:

– **Main unit** (transceiver) – **180×135×65 mm**;

– **Sensor unit** – **∅260 mm**;

– **Control unit with indication panel** – **260×100×30 mm**;

– **Standard carrying case** – **550×450×170 mm.**

WEIGHT in run-position - not more **3.0 кг.**

TOTAL WEIGHT -not more **6,5 kg**.
in standard carrying case

PRINCIPLE OF OPERATION

SMD-300 principle of operation is based on eddy current pulses analysis.

That current, known as Foucault currents, are originated in metallic items from the outside pulse magnetic field.

Pulse magnetic field is formed by two transmitting coils housed in a round Sensor body. Foucault currents are arisen in a part of the metallic body that is closer to the sensor and is under the influence of the coils.

Foucault currents magnetic field is captured by receiving coil of the sensor and processed by build-in μP.

Dedicated algorithm is used for this purpose.

The analysis results are displayed on a built-in LCD in a digital or graphic mode on operator's preference.

Corresponding audio signal can be heard in the headphones as well. The tone and loudness of it are adequate to the signal level received.

SDM-300 operation is available by means of Control unit with indication panel. All operational modes and the data obtained are displayed on a build-in LCD.

SMD-300 DESIGN

SMD-300 Detector represents a portable set that in operational status consists of (see fig. 5):

1- Main unit – transceiver module,

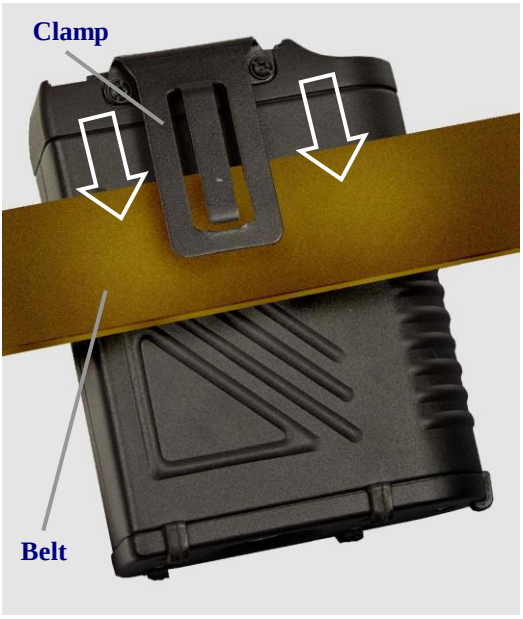
2- Sensor with a handle,

3- Control unit with indication panel and connecting cable,

4- Headphones.

Fig… Main unit, front panel

Fig. 6



In operation mode Sensor and Control unit with an indication panel are in an operator's hands while the Main unit is fixed on operator's belt by means of easy to use clamp(fig. 6-7).

Fig. 7 SMD-300 Detector Set

MAIN UNIT - FRONT PANEL

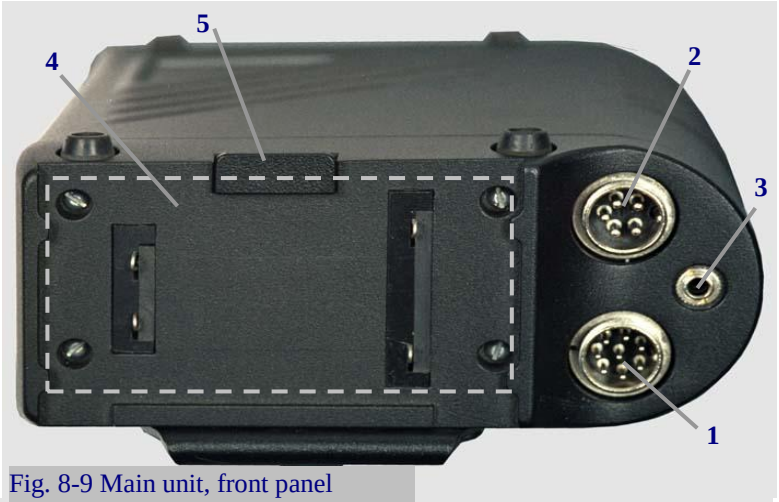
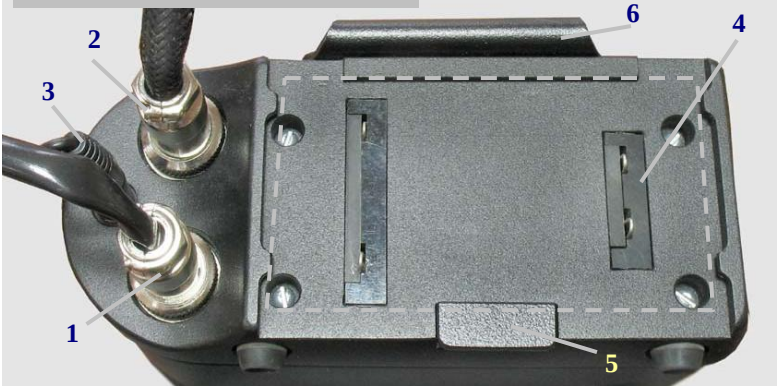


Fig. 8-9 Main unit, front panel



Main unit, front panel, turn-over image

Main unit, front plate connectors (fig. 8-9)

1 - 8-pin socket 'INPUT' for connecting Sensor unit;

2 - 5-pin socket 'DISPLAY' for coupling Control unit;

3 - '3.5 PHONE' socket for headphones connection;

4 - Terminal plate for rechargeable battery connection;

5 - Battery lock;

6 - Clamp.

MAIN UNIT – BOTTOM PLATE

Fig. 10 Main unit, bottom plate, PC connection socket

Socket for PC connection is on the bottom plate (see fig. 10).

CONTROL UNIT WITH INDICATION PANEL

Fig. 11

Control unit (1) with indication panel (2) has LCD window (3) and all essential controls (4) with non-fastened buttons (fig. 11). It has user's friendly design with handy shaft (5).

SMD-300 CONTROLS

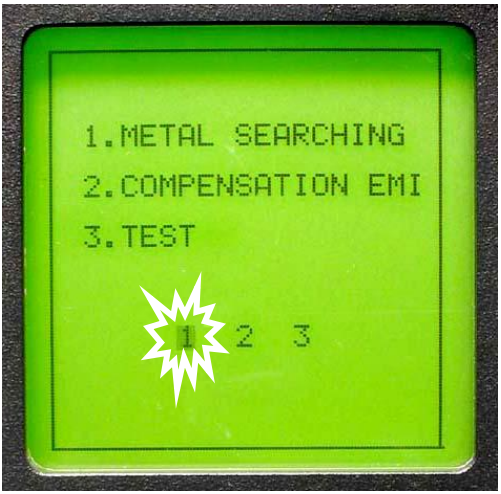
Fig.12

1- **'POWER' ON/OFF switch button;**
2- **'AXIS' button for parameters scale adjustment on a built-in graphic display;**
3- **'DATA' button for data transfer to PC coupled to the Detector;**
4- **◄ & ► cursor buttons;**
5- **'ENTER' button for selected mode activation;**
6- **Graphic display.**

MAIN MENU

OPERATIONAL MODES AND INDICATION

After switching on the device the inscription *'SELECTIVE METALL DETECTOR SMD-300'* appears on a screen (fig. 13)



3-5 sec later the Main menu will be displayed with '**1**' blinking symbol.

Fig. 13-14

SMD-300 MAIN MENU CONSISTS OF 3 PARTS

– 3 OPERATIONAL MODES (fig. 14)

#1. METAL SEARCHING.

It's a primary operational mode: metal item detection and its basic parameters evaluation.

#2. COMPENSATION EMI

corresponds to an automatic noise compensation mode.

*NOTE: Noise compensation should be carried out every time after switching on the device or switching over transmitter's output power (***Pmax ⇆ Pmin***.).*

In this case the following interferences can be compensated:

- Outside magnetic field in uniform (homogeneous) structures without secondary metallic insertions;
- Eddy current magnetic field caused by metallic reinforcement in uniform structures.

#3. TEST – automatic efficiency control mode.

Use ► or ◄ buttons to select an adequate operational mode and press 'ENTER' button to activate it.

TEST MODE

After activating mode '**3'** the word '**TESTING…'** appears of the screen. 2-3 s later - the label '**OK'** will be displayed … *(certainly, if the device is in a working condition).*

Fig.15

'**COMPENSATION EMI'** **operating mode**

After activating mode **'2'** the inscription '**COMPENSATION EMI'** appears of the screen (fig.16) together with progress bar control (1).

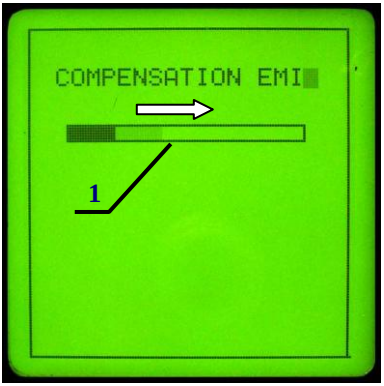


Fig.16

After 10 sec. and completion of automatic noise compensation mode Detector will return to the Main menu (fig. 14).

METAL SEARCHING mode

After activating mode '**1' – main operational mode** the words **METAL SEARCHING** appears on the screen.

The main screen area (fig.17) serves for displaying basic parameters of metallic item to be investigated.

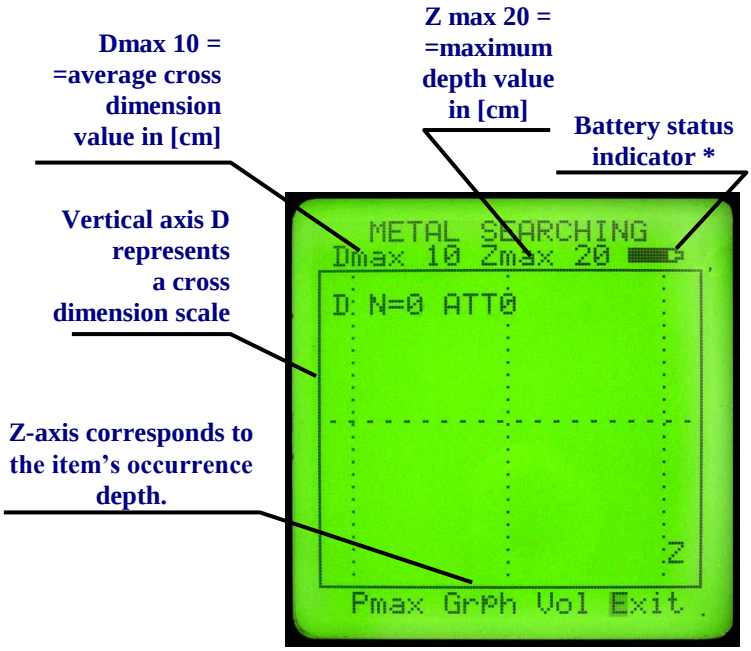


Fig.17

**- NOTE: If the battery icon is 'empty' – immediately replace it!*

Horizontal axis Z corresponds to the item's occurrence depth.

'Zmax 20' - in the upper part of the screen represents the maximum occurrence depth value in [cm] for the metallic item to be revealed and investigated (20 cm - for the sample displayed).

Vertical axis D represents an average cross dimension scale in [cm] for the metallic item detected.

Dmax 10 corresponds to maximum value in [cm] – the whole

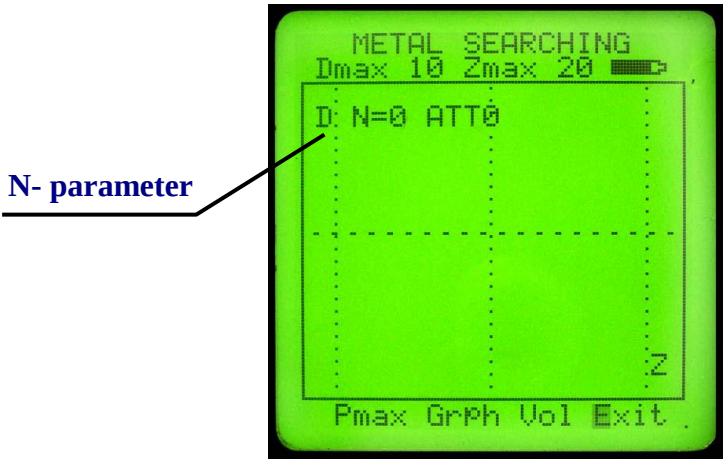


Fig.18

range of D-axis (10 cm - for the sample displayed)

NOTE: N & ATT symbols and their values are displayed automatically by Detector's μ-Processor.

N- parameter – from '0' to '3' is a conventional value that corresponds to relative complexity of detected item shape.

For instance:

- '0' – means that metallic item wasn't found at all;

- '1' – '2' – '3' - signifies that detected item can be represented 'by convention' as a single metallic plate or combination of two or three metallic plates (a kind of virtual equivalent).

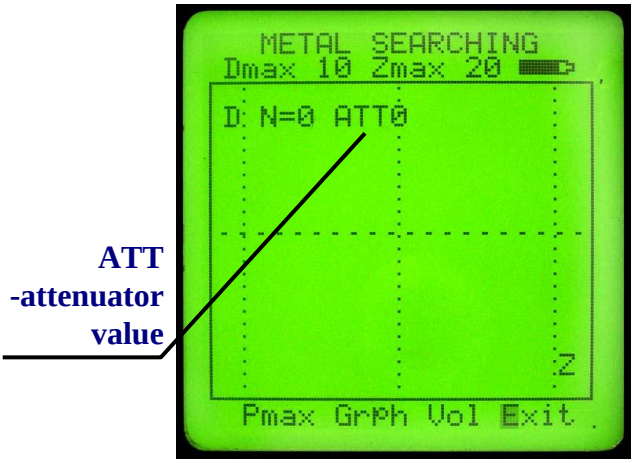


Fig.19

ATT- active attenuation value is displayed *'by convention'* from **'0'** to **'4'**

- '0' signifies that input signal exceeds receiver's noise level but not more then 60 dB.

- Every step **'1'** - corresponds to automatic 10 dB attenuation of receiver's input and so on - up to 40 Db.

DETECTED ITEMS GRAPHIC DISPLAY

Detected item is displayed *'by convention'* in a certain virtual graphic form depending on its size, thickness and occurrence depth: *three typical versions*- # I, # II, # III (see fig. 20-21-22)

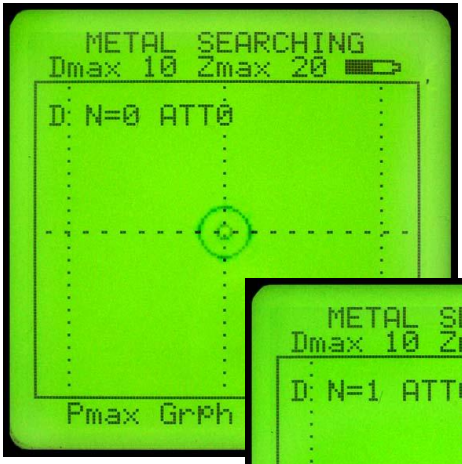


Fig. 20

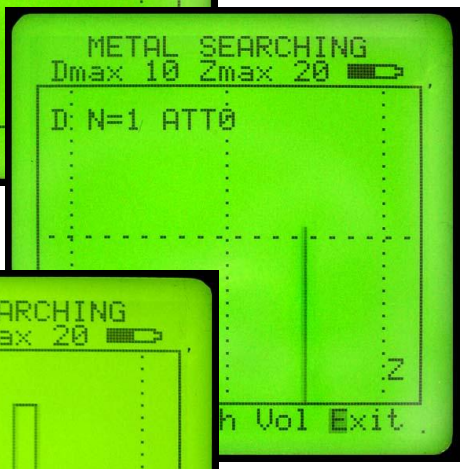


Fig. 21

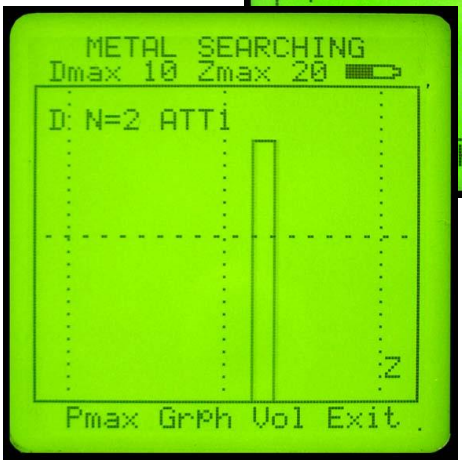


Fig. 22

I. BLINKING CONCENTRIC CIRCLES

Blinking concentric circles in a geometric centre of display window confirm the detection of metallic item (fig. 23).

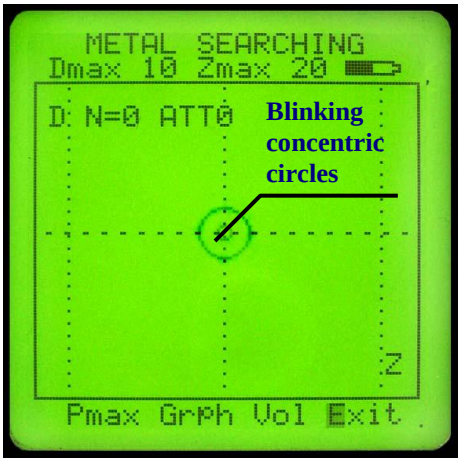


Fig. 23

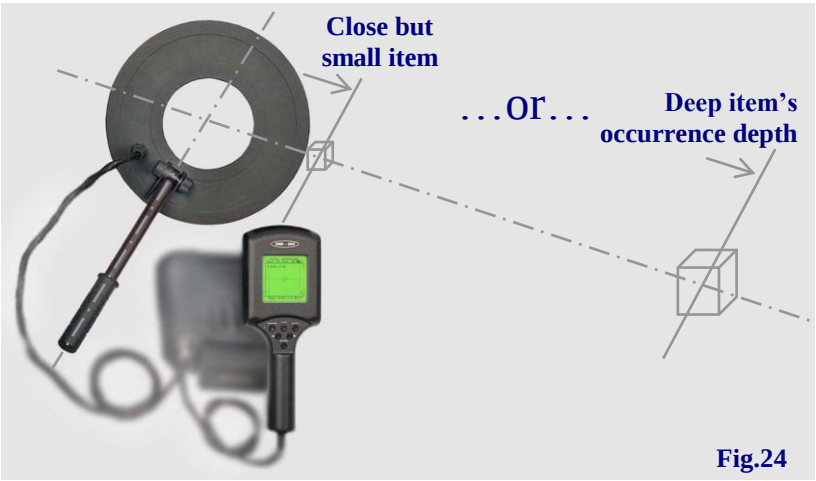


Fig.24

While its parameters are uncertain over the weak level of the signal received: small size of detected item or its great occurrence depth (fig. 24).

II. VERTICAL LINE on Z-axis

(see lines '1' – '2' – '3' on the fig. 25-26-27) – **corresponds to detected item – as equivalent to 'virtual single metallic plate' (N = 1).**

At that:

Position of that line on Z-axis (**Z co-ordinate**) corresponds to item's occurrence depth;

Line's height corresponds to an average plate's **Cross-cut size**;

Line's thickness corresponds to **equivalent Plate's thickness**, at the same time, one pixel complies with 0.1 mm of the plate thickness.

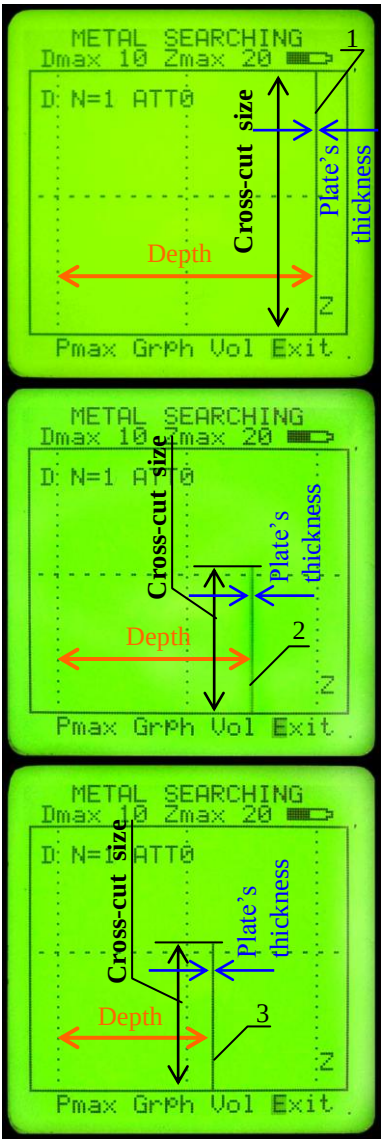
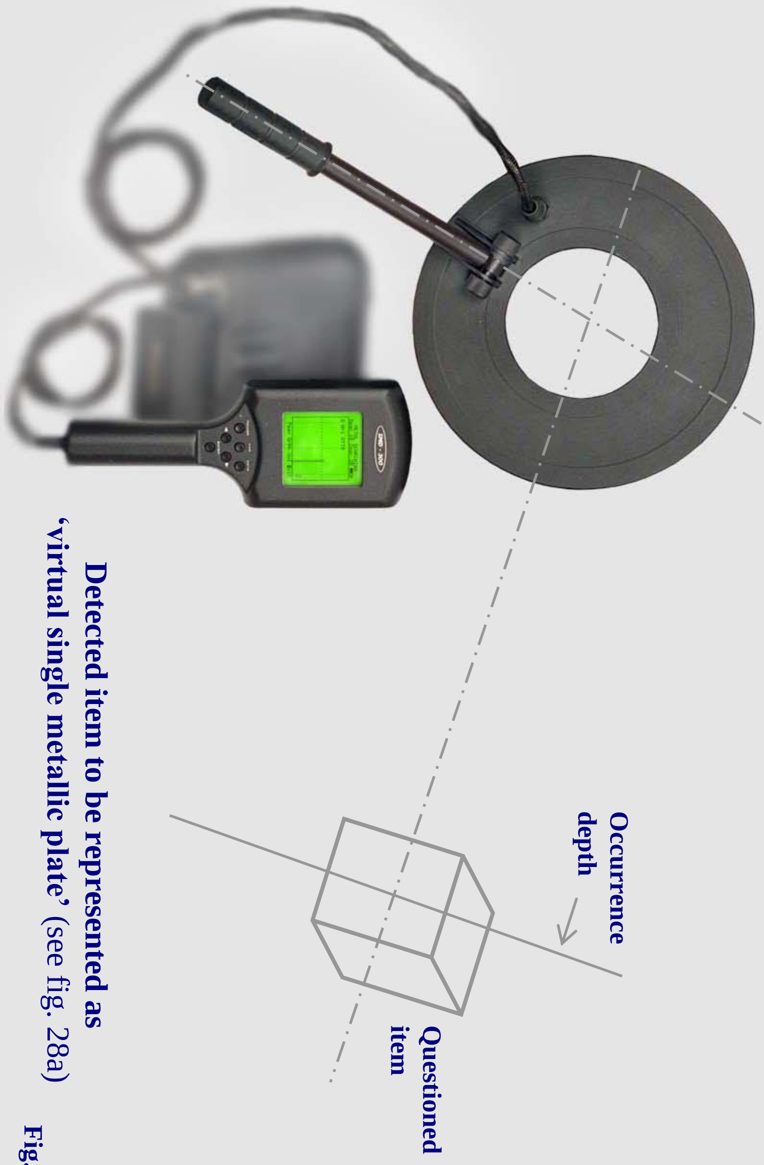


Fig. 25-26-27



Detected item to be represented as ‘virtual single metallic plate’ (see fig. 28a)

Fig. 28

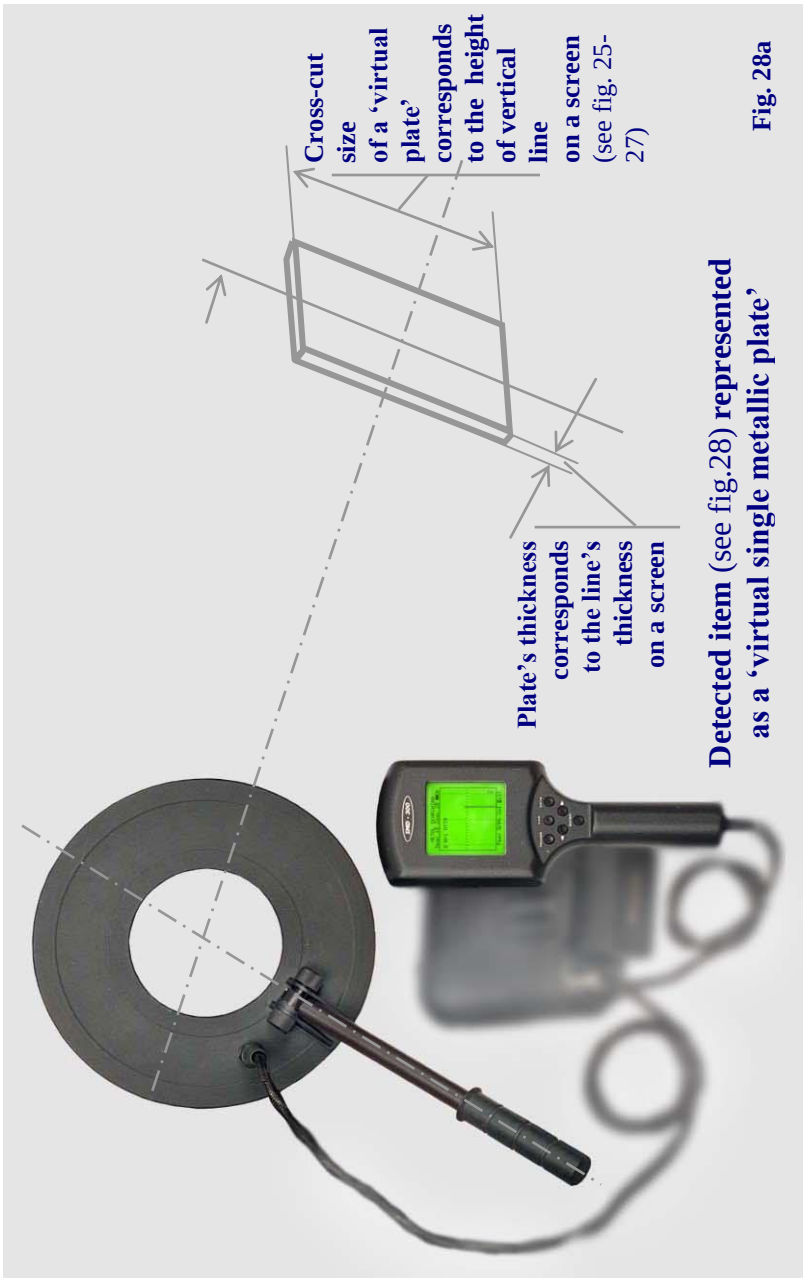

Cross-cut size of a 'virtual plate' corresponds to the height of vertical line on a screen (see fig. 25-27)
Plate's thickness corresponds to the line's thickness on a screen
Detected item (see fig.28) represented as a 'virtual single metallic plate'

Fig. 28a

III. VERTICAL RECTANGLE on Z-axis

(see fig. 29, 30 and 31)

– corresponds to the detected item of a shape more complicated then a simple metallic plate (N= 2 or 3).

At that:

Position of the left border of that rectangular corresponds to the item's occurrence **depth**.

Rectangle's **height** corresponds to an average cross-cut item's dimension (i.e. dimension of the surface close to detector's sensor).

Line's thickness corresponds to the thickness of the item's surface close to detector's sensor.

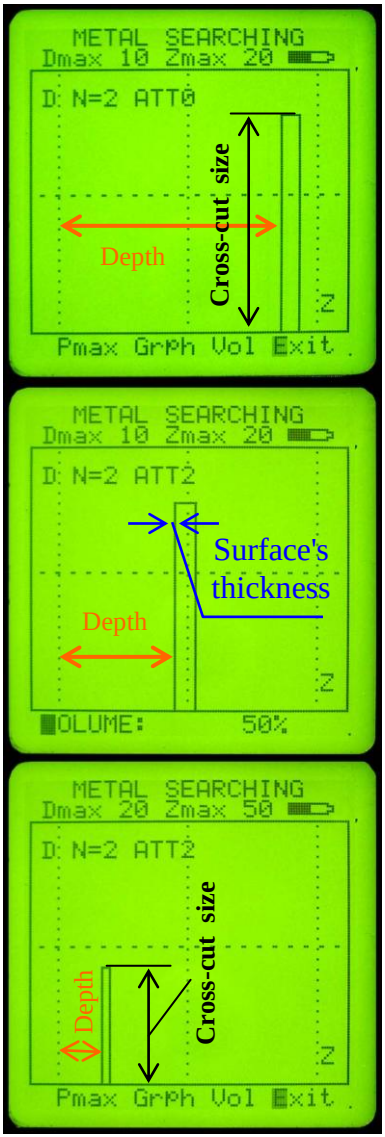


Fig. 29, 30, 31

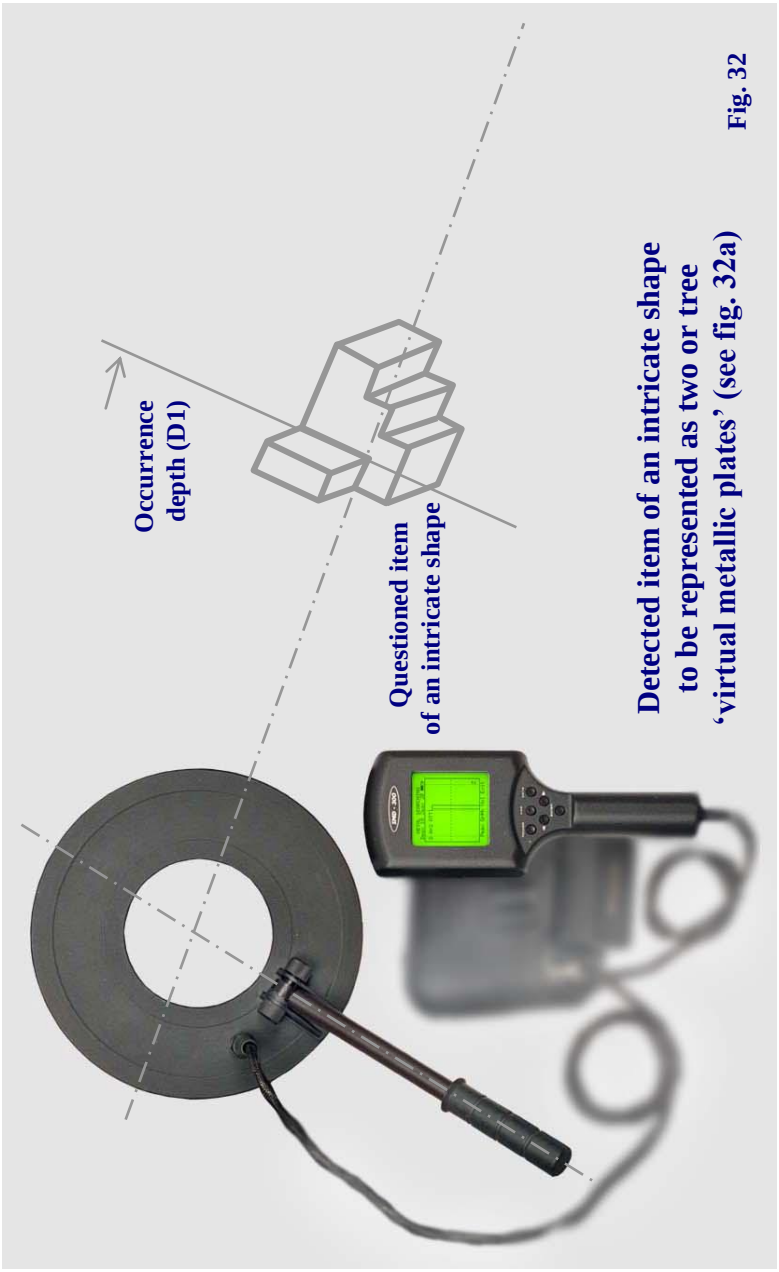

Occurrence depth (D1)
Questioned item of an intricate shape
Detected item of an intricate shape to be represented as two or tree 'virtual metallic plates' (see fig. 32a)

Fig. 32

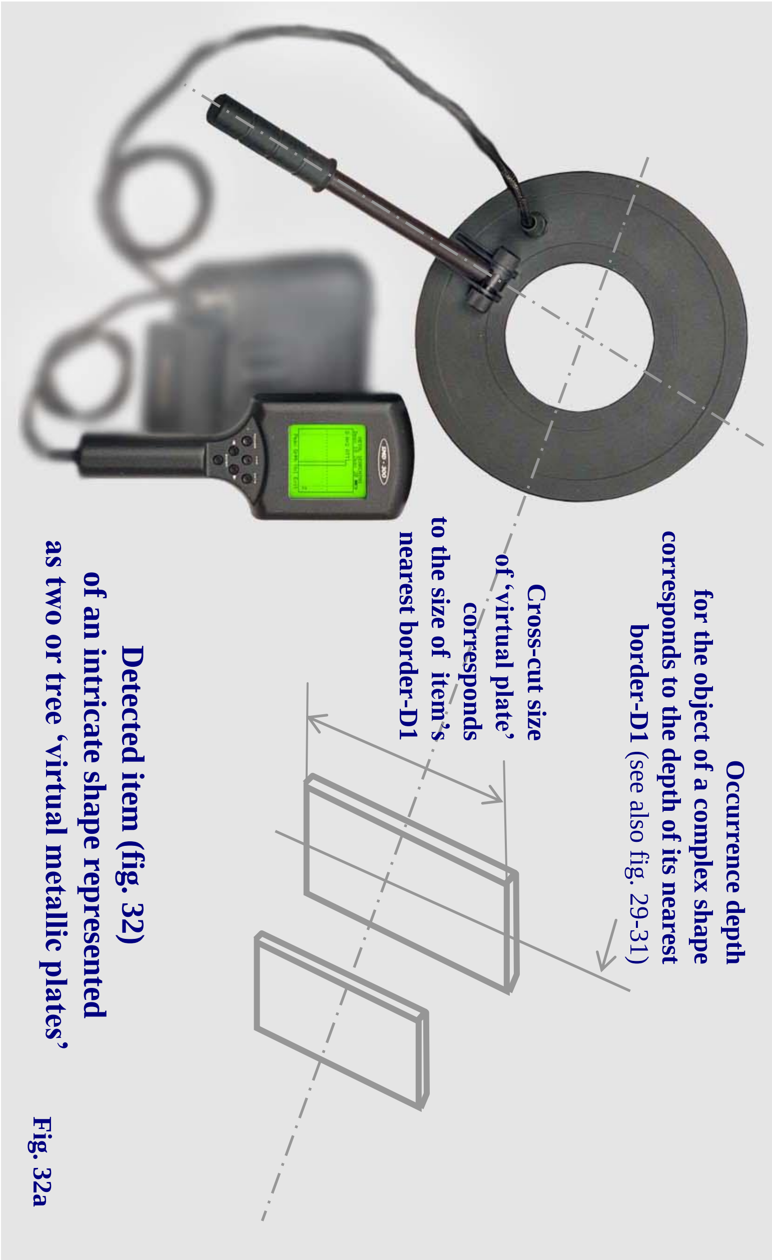

Occurrence depth
for the object of a complex shape
corresponds to the depth of its nearest
border-D1 (see also fig. 29-31)
Cross-cut size
of 'virtual plate'
corresponds
to the size of item's
nearest border-D1
Detected item (fig. 32)
of an intricate shape represented
as two or tree 'virtual metallic plates'

Fig. 32a

NOTE: There might be a situation when an occurrence depth of the item to be detected is lower, deeper then ***Zmax=20*** *pointed out on the Detector's screen (fig. 33).*

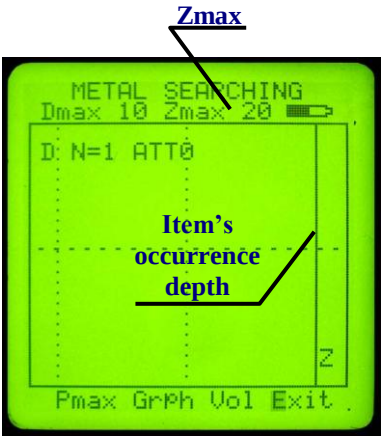


Fig. 33

In that case the item's virtual image is displayed in the far right part of a screen.

Operator can facilitate the matter and adjust the LCD-scale pushing **AXIS** button on Control unit panel (fig.12).

Three scale versions for 'occurrence depth' and 'average cross-cut item's dimension' is available. They can be displayed on the Detectors screen by serial pressure of **AXIS** button (see Table 2)

Table 2

LCD image scale version	**Dmax,** cm	**Zmax**, cm
1	10	20
2	20	50
3	50	100

Each version corresponds to a consequent **AXIS** button press.

OPERATIONAL MODE MENU

Bottom screen line of Detector's Control unit represents an **operational modes menu** and a **blinking cursor** (fig. 34).

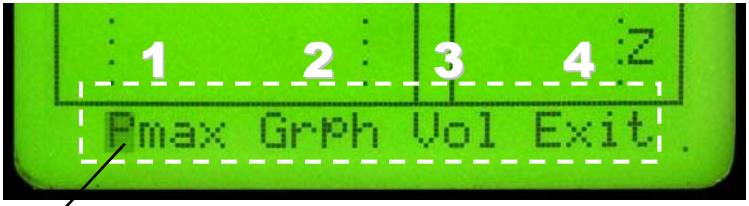


Fig. 34

Use blinking cursor to select operational mode you prefer: just press corresponding ► & ◄ button and then **ENTER** button (#1 and #2 on fig. 35).

Fig. 35

In that way:

1. Pmax / Pmin is intended for switching over the probe signal output power from **Pmax** to **Pmin** and backwards.

To do this - place cursor to the 1-st position and press **ENTER** button (fig. 35). The appropriate label: **Pmin** or **Pmax** appears on the screen in confirmation.

2. Graph / Text is used for switching over display mode from graphic to digital one. Place cursor to the 2-nd position and press **ENTER** button. The word **Graph** or **Text** appears on the screen in confirmation.

In a '**Graph'** mode (fig. 36) the detected item's parameters are displayed in a graphic form as a diagram (see also '**DETECTED ITEMS GRAPHIC DISPLAY',** pp. 22-28).

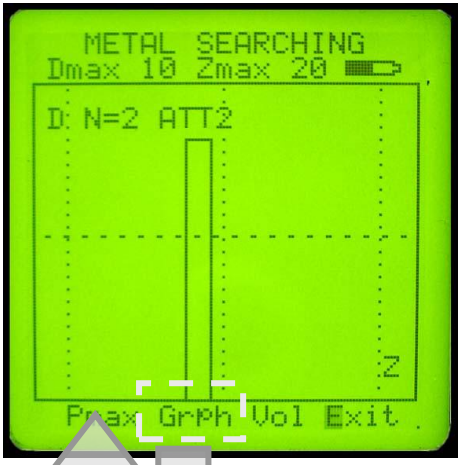


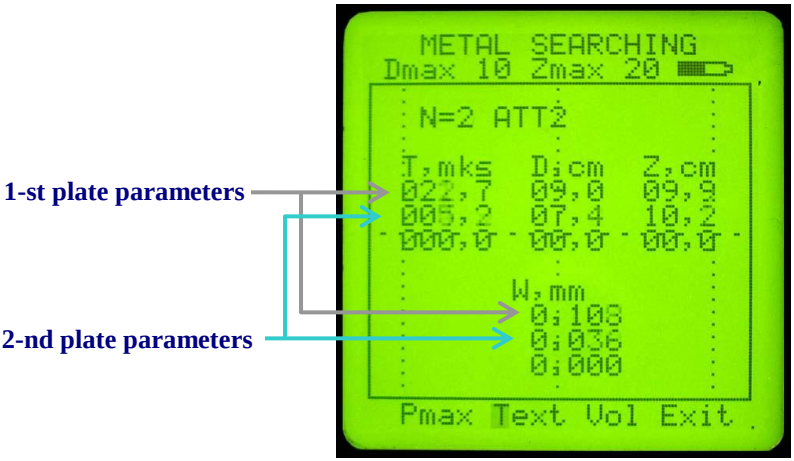
Fig. 36

Switching display to a **'Text'** mode converts the parameters of detected item into a digital form presented as a certain table (fig. 37).

Fig. 37

As long as the shape of detected item's housing is represented by 'virtual metallic plate' or 'plates' (N= from 1 to 3, where 'N' stands for a number of plates).

In that case the table consists of item's parameters conformed to each plate - see fig. 37 for your reference:



Fig, 37

The following item's parameters are displayed on a screen:

T, mks – time parameter [microsecond];

*NOTE: Time parameter value - '**T**', under the rest equal status, depends exclusively on the kind of a metal discovered during the investigation. At that, T-value for ferrous metal is higher while that for non-ferrous one is lower.*

D, cm – average cross-cut dimension;

Z, cm – occurrence depth;

W, mm – virtual plate thickness.

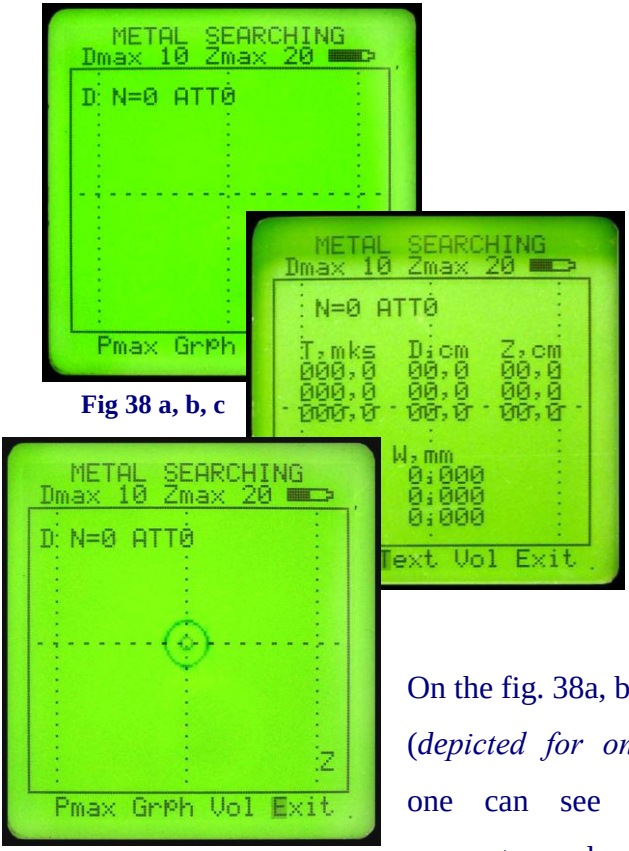


Fig 38 a, b, c

On the fig. 38a, b, c (*depicted for one's reference*) one can see the table of parameters when no item was discovered, i.e. N = 0,

or response signal was too weak (fig. 38).

3. 'Vol' - the 3-rd position of a screen's bottom line serves for adjusting the headphones volume control (fig. 34).

At that, '**VOLUME'** label is displayed on the screen (fig. 39) while the value itself is presented in %% for operator convenience. The default value is 50%.

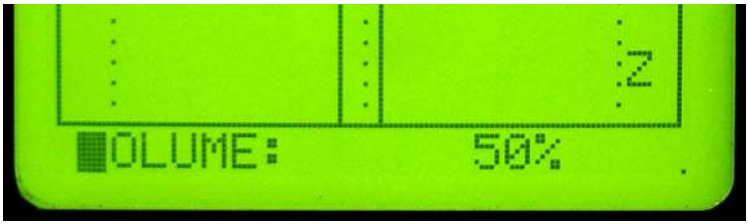


Fig. 39

NOTE: After switching on SMD-300 Detector the audio signal level in the headphones is automatically adjusted to 50% of a possible maximum level.

To adjust the volume in the headphones from 0 to 100 % in 10% step use ► & ◄ buttons (fig. 35).

To settle the selected value just press '**ENTER'** button.

AUDIO INDICATION

Metal item detection is indicated by tonal audio signal in the headphones. At that audio signal level is proportional to received response signal.

Moreover, right after an automatic attenuator's switching over the audio signal tone get higher.

So, the range of audio signal alteration corresponds to 100 dB alteration of input response signal.

4. 'Exit' - the 4-th position stands for coming back to the Main menu. Place cursor to '**Exit'** and press '**ENTER'** button.

TEAM-WORK WITH PC

Dedicated 'SMD'-software is intended for SMD-300 team-work with PC. Data obtained during the operation (signal level and other parameters) can be transferred to PC via serial RS-232 port.

Couple Main unit to serial port of PC by means of corresponding cable (#9 at the fig. 2 & 40).

Switch on the device and load 'SMD'- software for data collection.

Use 3.5" floppy disk supplied (#11 at the fig. 2 & 40).

Fig. 40

'SMD'- software allow the user to collect, accumulate, sort and process the data obtained while operating SMD-300.

Essential data can be printed for analysis and comparison afterwards.

Huge data files received during automatic data collection can be processed by means of the following dedicated software (optional):

"SMAS" software: ***metal item search in a reinforced structures***, -allows operator to reveal any alteration of average physical parameters for the structure under control.
For example, secondary metallic item that was built into a regular reinforced wall structure.

"SMIF" software: ***searching of metal item with a certain desired (prescribed) shape*** – allows to reveal any metallic item of a predefined form in a structure with single casual metallic insertions.
There might be metallic housings of concealed items ("bugs" and other eavesdropping devices, mines, shells cartridges and etc.).

Call you dealer for details!

GETTING STARTED

UNPACKING AND SETTING UP

NOTE: After transportation 'SMD-300' Detector at the environmental temperature that differs from the working conditions, the instrument should be kept unpacked at a working temperature for at least 2 hours.

Fig. 41

USEFUL HINTS: To obtain the maximum sensitivity of the instrument - it is highly recommended to switch off every TV-set, monitor and other possible source of strong magnetic fields at least 10 meters from the place to be inspected. Otherwise, significant decrease in detection ability (detection range and questioned item parameters evaluation) could take place.

- Take components of SMD-300 Detector out of the standard package (Fig. 42) and carry out their visual inspection.

Pay special attention to cables and connectors as well as to Sensor, Transceiver (Main unit), Control unit and power supply appliances.

Fig. 42, 42a

- Couple **Sensor unit** to **'INPUT'** socket on the front plate of the **Main unit** (see fig. 43, 43a),

Control unit - to '**DISPLAY'** socket,

Headphones - to **'PHONE'** socket.

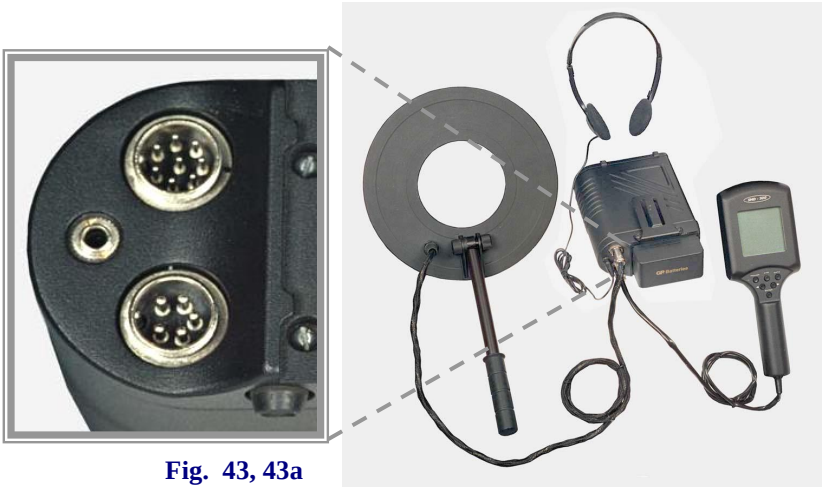


Fig. 43, 43a

SMD-300 POWER SUPPLY

- Take fully charged battery. (*see Battery Charger User's Manual for reference)*

Fig. 44

- Couple rechargeable battery to a corresponding connection plate of the SMD-300 body (see fig. 44a, b, c)

– Hold the Main unit (transceiver body) vertically with battery lock towards oneself (fig. 45a).

– Place the battery on top of the Main unit (battery terminal plate).

– Press down (#1 on the fig.45b) and slide it away from oneself (#2 on the fig. 45c).

Fig. 45a, b, c

NOTE (for reference): To remove the battery:

- Press battery lock downward (#1 on the fig. 46a).
- Slide the battery towards oneself (#2 on the fig. 46b)
- Take away the battery from the top plate of the Main unit.

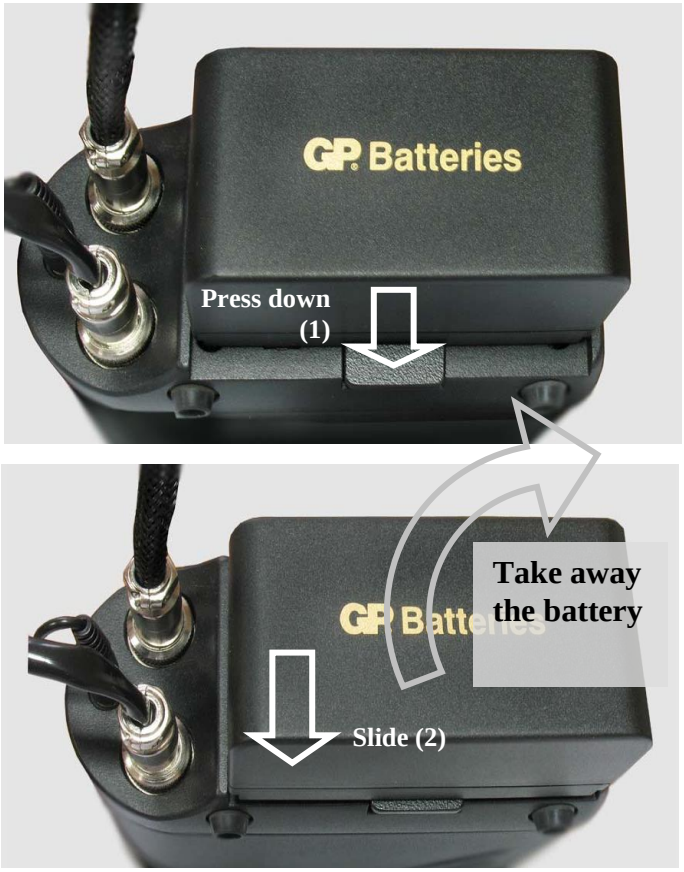


Fig. 46a, b

PERFORMANCE CHECK

- Place Main unit on operator's belt (see fig. 6 for reference).

- Put on headphones.

- Grasp Control unit with one hand, while sensor unit - with another (see fig. 7 for reference).

- Press **POWER** button (#1 on fig. 12) to switch on Detector.

- Use ► , ◄ and **ENTER** buttons to activate **METAL SEARCHING** mode.

- Referring battery status indicator estimate it condition (fig.).

If necessary – replace the battery.

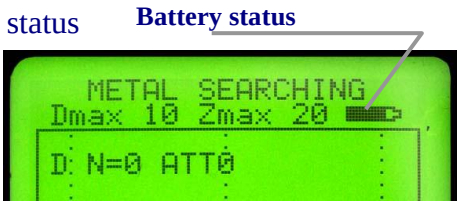


Fig. 47

- Use ►, ◄ and **ENTER** buttons to select **Pmax** mode (#1 on fig. 34).

- Place Sensor unit in open air at least 1 m from surrounding

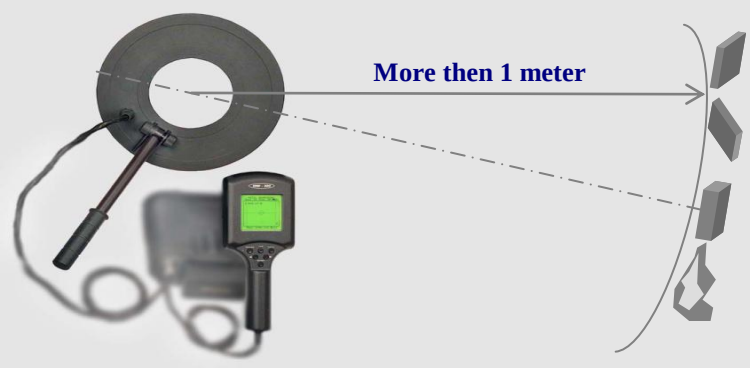


Fig. 48

metallic items (Fig. 48).

- Press ►,◄ and **ENTER** buttons to activate **COMPENSATION EMI** mode in the Main menu (fig. 14 and 16) and wait for its completion.
- Activate **METAL SEARCHING** mode and graphic mode (**Grph**) in operational modes menu (see display bottom line – fig. 34).
- Use ►, ◄ and **ENTER** buttons to engage headphones audio volume control '**Vol'** (see fig 39) .

- Bring any metallic item closer to the SMD-300 sensor so that flickering concentric circles appear in a graphic display center.

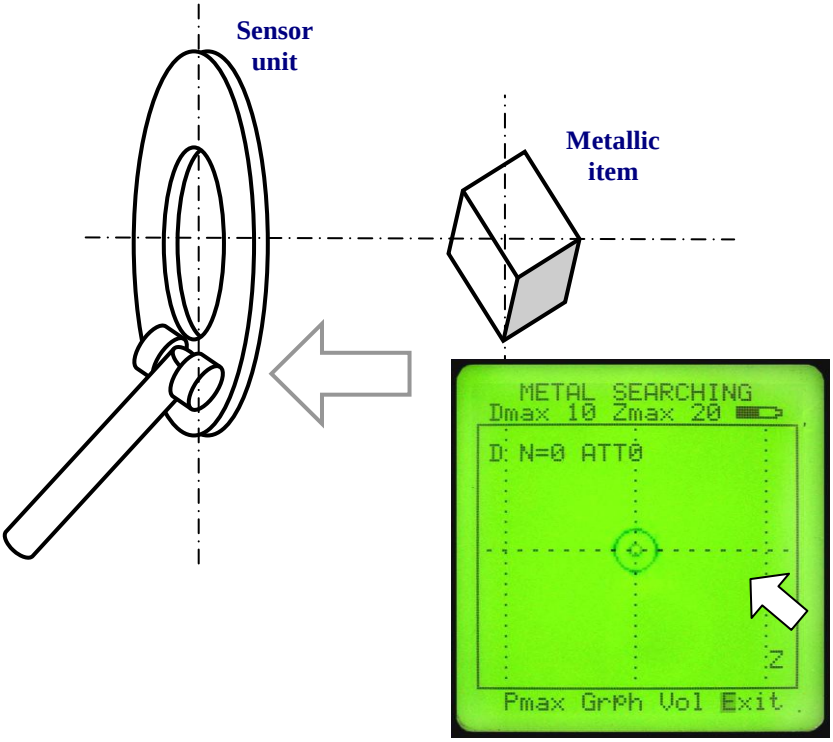


Fig. 49

- Use ►, ◄ to adjust minimum audio signal in the headphones.

That level would correspond to the minimum signal response from metallic item.

- SMD-300 detector is ready for operation.

OPERATING SMD-300 METAL DETECTOR

INVESTIGATION OF UNIFORM MATTER WITHOUT METALLIC INSERTS.

-Place the sensor on the surface to be inspected (fig.50).

-Return to the Main menu.

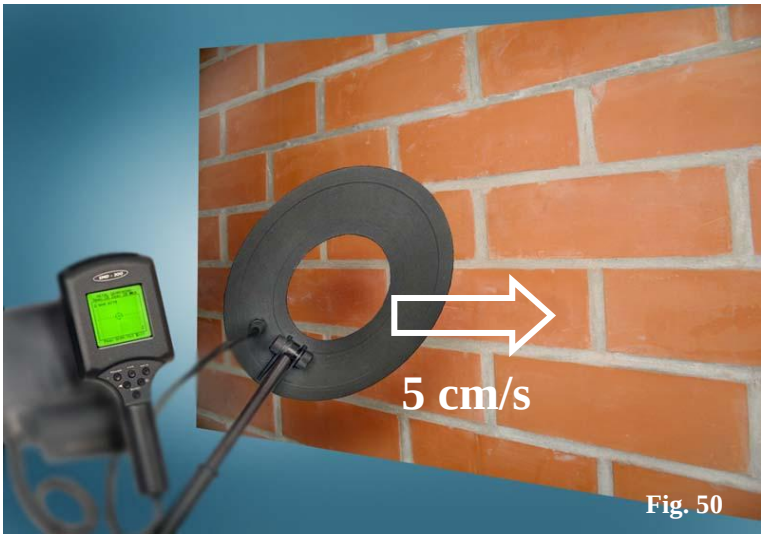


Fig. 50

- Turn on **COMPENSATION EMI** mode and wait for completion of the process keeping position of the sensor invariable.

- Switch over to **METAL SEARCHING** mode,

-Select indication mode **Grph** or**Text** that fit the situation.

-Scan the sensor along the surface not faster then 5 cm/s

-Referring tone & level of an audio signal in the headphones define and mark the spot where they are distinctly higher as compared to ones in adjacent areas.

-Place Sensor unit on a spot with a maximum signal response.

Referring graphic image on the screen in a 'Graph' mode or data displayed in digital form in 'Text' mode (fig. 51) determine parameters of detected metallic item or metallic irregularities in a structure under control:

- Conventional item's form - **'N'** –parameter,
- Cross-cut dimensions -**'D'**,
- Occurrence depth – **'Z'**,
- Thickness of the surface that is closer to Sensor unit-**'W'**.

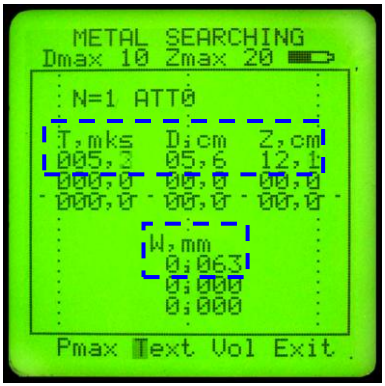


Fig. 51

NITE 1: Later on you can use these data for intensive study and comparison.

*NOTE 2: If a virtual image of detected item is close to the edge of a screen of even out of determined screen zone - press **'AXIS'** button to alter a screen image scale and thus get an adequate conventional image (see p.31).*

*NOTE 3: In case of **'ATT 4'** indication (maximum attenuation value) – switch over to **Pmin** mode (select **Pmax** in a screen bottom line – just press ►, ◄ and **ENTER** buttons).*

INVESTIGATION OF UNIFORM MATTER WITH REGULAR METALLIC INSERTS (PLASTER REINFORCED BY METAL GRID AND ETC.).

- Place Sensor unit on the surface to be investigated.
- Pass to the Main menu.

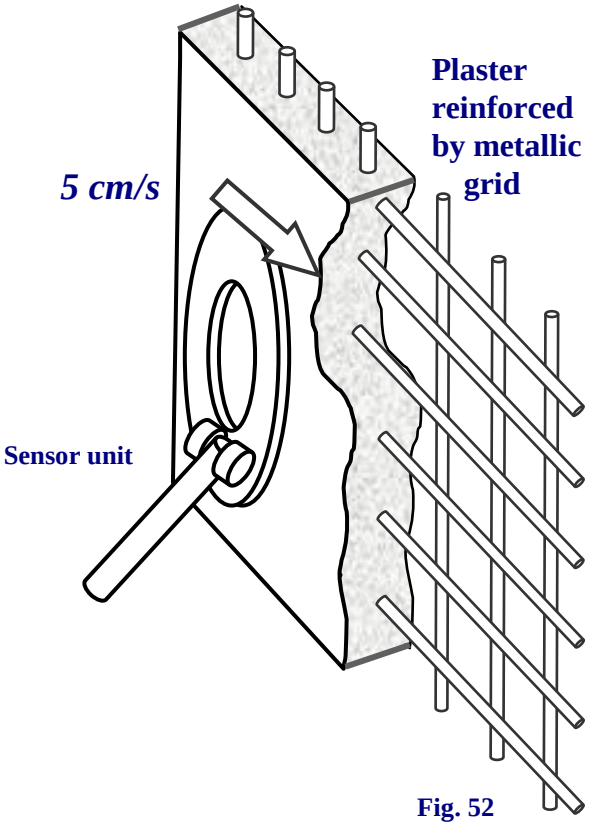


Fig. 52

- Keeping Sensor position invariable switch on **COMPENSATION EMI** mode and wait for its completion.
- Switch on **METAL SEARCHING** mode, select '**Grph'** or '**Text'** screen imaging referring operator's convenience.

Further, one should follow abovementioned sequence of operations for uniform matters:

- Scan the sensor along the surface not faster then 5 cm/s.
- Referring tone & level of an audio signal in the headphones define and mark the spot where they are distinctly higher as compared to ones in adjacent areas.
- Place Sensor unit on a spot with a maximum signal response.

Referring graphic image on the screen in a 'Graph' mode or data displayed in digital form in 'Text' mode (fig. 51) determine parameters of detected metallic item or metallic irregularities (see fig. 53) in a structure under control ('bugs', slot antennas…).

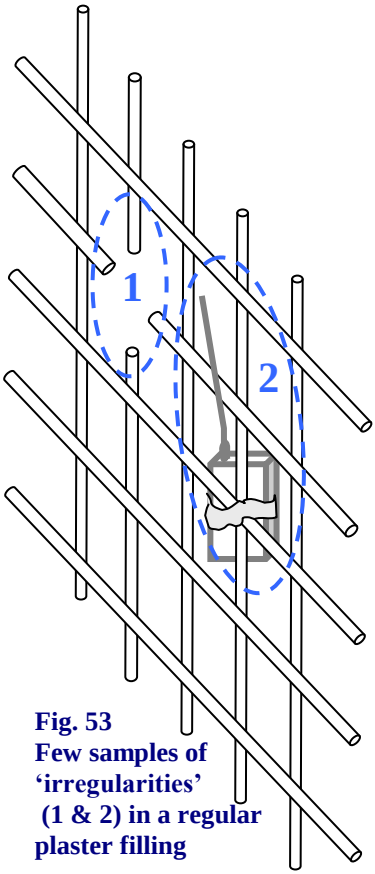


Fig. 53
Few samples of 'irregularities' (1 & 2) in a regular plaster filling

INVESTIGATION OF UNIFORM MATTER WITH TYPICAL DISCRETE METALLIC ITEMS OR IRREGULARITIES (BOLTS, SCREWS AND SIMILAR HARDWARE AS WELL AS WALL OUTLETS, SWITCHES, BRACKETS, CORBELS AND ETC).

Place Sensor unit on the surface to be investigated over the item mentioned above – 'wall outlet' for instance (fig.54). At that, centre of inspected item should coincide with geometric centre of Sensor unit.

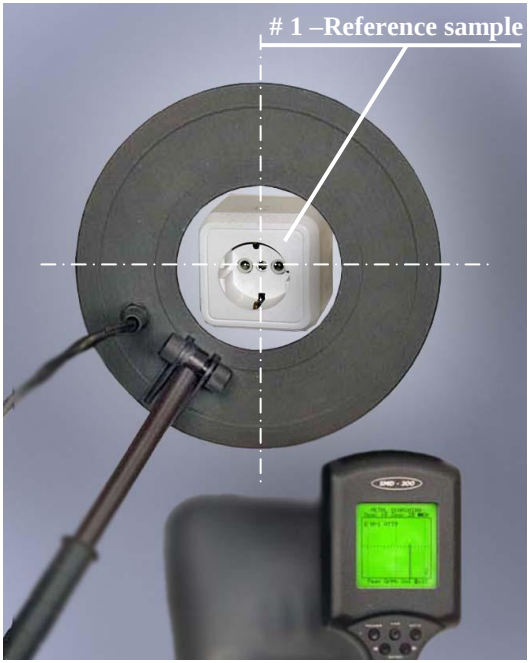


Fig. 54

*NOTE 1: This item is a **reference sample** for further searching. For sure it should be free from any optional inserts.*

*NOTE 2: In case of **'ATT 4'** indication (maximum attenuation value) – switch over to **Pmin** mode (select **Pmax** in a screen bottom line by means of ►, ◄ button and press **ENTER** button).*

- Pass into the Main menu *(select **EXIT** in a screen bottom line by means of ► ◄ button and press **ENTER** button).*

- Keeping Sensor position invariable, switch on **COMPENSATION EMI** mode and wait for its completion.

- Switch on **METAL SEARCHING** mode, select '**Grph'** or '**Text'** screen imaging referring operator's convenience.

- *Record conventional parameters for that item, selected as a reference one.*

- Place Sensor unit over the next item to be controlled - another wall outlet in this case (fig. 55).

At that, centre of the item should coincide with geometric centre of Sensor unit.

- Define and record its parameters using corresponding display mode (**'Text'** or **'Graph'**).

Fig. 55

- Compare the data obtained with the reference info.

If these parameters are practically the same or close to that – this might testify to the items identity.

Pass to the main menu:

- select **EXIT** in a screen bottom line by means of ► ◄ button and press **ENTER** button;

- Keeping Sensor position invariable, switch on **COMPENSATION EMI** mode and wait for its completion.).

Continue searching process.

Place Sensor unit over the next item to be controlled, similar to the reference one.

Watch over the geometric centre of Sensor - it should be above the centre of the item.

Note every alteration in measured parameters.

They might signify that the item under control has certain insertion or irregularity like concealed 'bug' (fig. 56).

Fig. 56

APPENDIX I SMD-300 BATTERY CHARGE

Fig. 57

Standard battery Charger (1) and AC power adapter (2) are used for SMD-300 battery charge.

CHARGER CONNECTORS & INDICATION

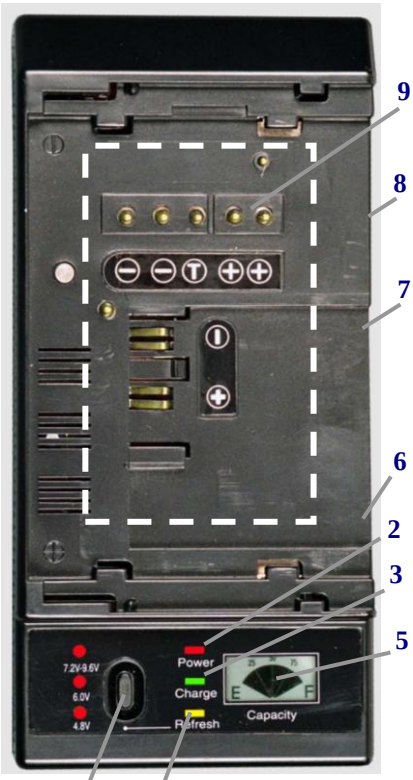


Fig. 58

1. 'Refresh' button for activation automatic-battery-refresh-charging mode.
2. Red 'Power' LED for charger's ready-for-service confirmation.
3. Green 'Charge' LED for charging mode confirmation.
4. Yellow 'Refresh' LED for refresh mode confirmation.
5. LCD for battery charging status indication:

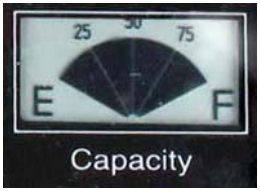


Fig. 59

E – battery is flat;

25-50-75 – battery is charged to 25%-50%-75%;

F- battery is fully charged.

6. DC 12V INPUT socket for AC - 120-230V/50-60Hz or car adapter - DC 12V (#10, fig. 2).
7. Output voltage switch.

Fig. 59

8. Output voltage socket
9. Charger's terminals

STANDARD CHARGER OPERATING ORDER

- Couple AC adapter to a corresponding socket on a side wall of battery charger (fig. 60).
- Connect AC adapter to wall outlet.

Fig. 60

NOTE: battery charging from a car battery is available via dedicated cable (see #10, fig. 2).

BATTERY CHARGING OPERATING ORDER

- Couple the battery to the charger (fig. 61).

Fig. 61

- Place the battery to be charged on the upper plate of the Charger (#1, fig. 61) with terminals (#9, fig 58);
- Press the battery body down (#2, fig. 61);
- Slide the battery to the left (#3, fig. 61).

Fig. 62

- Fast charging mode is starting automatically. Green LED will shine in confirmation (fig. 62).

Fig. 63

Fig. 64

Fig. 65

Built-in LCD displays the battery charging status: **E** =empty; **25%-50%-75%**;

- **F** =full (fig. 63-65).

NOTE 1: depending on battery status indication of charging level might be displayed after several seconds. of delay.

'**F**' (fig. 65) – confirms that charging is over and battery is fully charged.

After fast-charge mode completion executive charging circuit cuts off automatically and green LED will flash every 2 sec.

NOTE 2: One can leave fully charged battery coupled to the Charger after charging completion for a long time.

BATTERY REFRESH MODE.

New NiCad and NiMH battery or battery that was out of use for a long time needs special treatment: refreshing - i.e. several consecutive charge/discharge cycles.

That allows to 'refresh' the battery, in other words, to recover battery's full charging capacity. Refreshing process depends on general battery status and might take up to several hours.

Fig. 66

Couple the battery to the Charger and press 'Refresh' button to start the refreshing mode.

Green LED will die but Yellow LED will shine in confirmation (fig.66). Current battery-charging-status will be displayed by LCD

After 'discharge' mode completion the device switchs over to a 'charge' one automatically.

NOTE : It's highly recommended to use 'Refresh' mode every time you charge the battery – that will substantially extent battery's life.

Refer Charger User's Manuals (supplied) for complete info.

CAUTION:

- It is not advisable to store batteries in a discharged state.

- Store rechargeable batteries in fully charged state.

- Use only the charger from the kit supplied.

- Avoid battery terminals from short circuit.

- Don't store 'SMD-300' Main Unit coupled with the battery.

- Finishing operation disconnect it from the Main unit.

USEFUL HINTS:

If 'SMD-300'Detector is unused the batteries should be charged every 6 months in case of storage temperature less then +25°C, and every month if storage temperature range is from +25°C to +40°C

SHIPPING AND STORAGE

'SMD-300' Detector can be shipped in standard packing in a passenger cabin by any mode of transport.

Prevent packing from shock and vibration.

The 'SMD-300' can be stored, as supplied in its carrying case, in heated areas (warehouses) with ambient temperature +5°C … 40°C and relative humidity not more then 80% under.

CERTIFICATE OF ACCEPTANCE

Metal Detector 'SMD-300',- serial number _____ is in conformity with main technical parameters and accepted for use.

WARRANTY

Warranty period for 'SMD-300' is 18 months from the date of sale. The manufacturer guarantees normal functioning of the device under the conditions of following all requirements of this Manual by User.

In case of faulty within Warranty period the manufacture will repair the device free of charge.

Warranty period does not cover the battery.