

Future Series

Cavefinder

User's manual

10th January 2005

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1 Important Notes

Please read these operating instructions carefully and closely before using *Cavefinder* and its accessories! These instructions give information on how to use the device and point out potential sources of danger.

Cavefinder and its accessories serves for documentation and analysis of detect objects deposited and changes performed in the ground. The registered data of the ground structure will be transmitted to a PC for visual representation in a special software program using the components we offer. Any additional notes relating to this has to be observed. Please read attentively the manual according to the software you are using!

1.1 General Notes

Being an electronic device, *Cavefinder* has to be treated with the caution and care necessary when such devices are used. Any failure to observe the safety precautions given or any use for purposes other than the ones it is conceived for may result in a damage or destruction of the processing unit and connected components.

The device will get destroyed if it is opened improperly.

1.2 Possible Health Hazards

If used properly the device normally does not pose any health hazards. According to current scientific knowledge, the high-frequency signals are not harmful to the human body on account of their low power.

1.3 Surrounding Area

Having been transferred from a cold to a warmer place, the device should not be operated immediately afterwards. Any condensation, which may have formed, might cause the device to get destroyed. Avoid strong magnetic fields, which may occur in places such as near machines or loudspeakers, and avoid using a detector within a radius of 50 meters.

Metallic objects on the ground such as cans, doses, catches, nails, screw or others can influence negatively your measurement and have to be removed. Also you have to remove keys, telephones, chains and rings and all other magnetic and metallic objects from yourself.

1.4 Voltage

The power supply should not be outside the indicated range of values. Only use batteries and rechargeable batteries.

Never use the 230 Volt mains supply.

1.5 Data safety

There can be errors in the process of data collection if

- the range of the sender module is been exceeded,
- the power supply of the device is to low,
- the cables you are using are to long,
- other electronic devices sends out disturbances or
- atmospherics occurs (lightnings, ...).

2 Technical Specifications

The following technical indications are medial values. During operation small variations are quite possible.

2.1 Control Unit

Dimensions (H x W x D)	430mm x 150mm x 260mm
Weight	about 3kg
Voltage	12 VDC
Processor	Motorola, 4 MHz
Operating Temperature	0°C – 50°C
Storage Temperature	-20°C – 60°C
Air Humidity	5% – 75%
Waterproof	No
Maximal Penetration Depth	about 40 meters

Table 1: Technical Specifications (Control Unit)

2.2 Data Transmission

The following specifications of data transmission are only valid for the model *Cavefinder B*. The *Cavefinder A* does not have a data transmission.

Technology	Bluetooth
Frequency	2.4 – 2.4835 GHz
Maximal Data Transmission Rate	1 Mbps
Receiving Sensitivity	-85 dBm
Maximal Range	about 100 meters

Table 2: Technical Specifications (Data Transmission)

2.3 Computer, Minimum Requirements

The computer is not part of the scope of delivery. The indicated values should help you for a correct selection of a suitable computer for analysis of your measured results.

A computer is only necessary for the usage of *Cavfinder B*. The model *Cavfinder A* does not provide data transmission to pc.

CD-ROM Drive		minimum 4x
COM-Port (Data Transmission)		USB
Free Memory		minimum 20 MB
Working Memory (RAM)		minimum 128 MB
Graphic Card		minimum 64 MB, OpenGL-compatible
Operating System		Windows 98SE, Me, 2000, XP

Table 3: Technical Specifications (Computer, Minimum Requirements)

3 Scope of Delivery

In the following section you can find all standard equipment. The scope of delivery can be different in some circumstances because of some optional accessories which should not be included in the basic equipment.

- 1 Control Unit
- 4 Electrode (with about 20m cable)
- 1 User's Manual
- 1 Charger for Control Unit
- 1 Carrying Case
- 1 3D Software (standard)*
- 1 USB Bluetooth Dongle*
- 1 USB Extension Cable*
- 1 USB Setup CD*

* only Cavefinder B;

Table 4: Scope of Delivery

Beware that pictures in this manual could be different to delivered parts.



Figure 1: Scope of Delivery

4 Assembly

In this section is explained how to assemble the device and how to prepare a measurement.

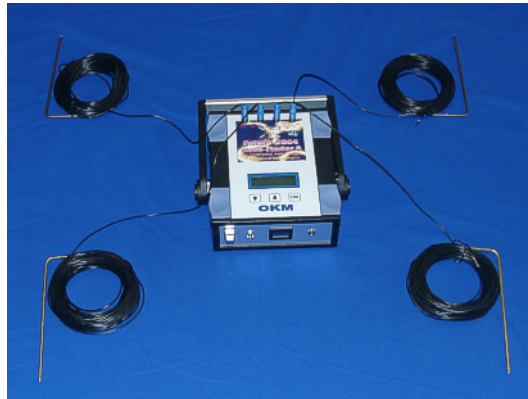


Figure 2: Connection of Electrodes

In figure 2 you can see how to connect the electrodes to the device in the right way. Do it without any unnecessary application of force! The detailed discription how to connect the electrodes you can find in section 7 on page 23.



Figure 3: Connection of USB Dongle

With the model *Cavefinder B* you have the possibility to transfer all measured values to a computer. In figure 3 you can see, how to connect the Bluetooth Dongle with the USB-Port of your computer. Further information about the correct utilisation and installation of the USB driver you can find in section 5 on page 12.

5 Installation of Radio Transmission

This section describes the installation of the USB Bluetooth Dongle. According to your operating system, please follow the instructions in the appropriate subsection. Consider that the represented figures not necessarily agree with the current version of your operating system or the version of your USB installation.

5.1 Windows 98

In Windows 98 there are no special preparations necessary to install the USB Dongle. Please go on to section 5.3.

5.2 Windows XP

Plug in the USB Dongle, which is delivered with the measuring instrument, in a free USB port of your PC. If a dialog like in figure 4 appears on your screen, than please read attentively section 5.2.1, if not please go on to section 5.2.2!



Figure 4: Recognition of a new hardware in Service Pack 1

5.2.1 Service Pack 1

Click *Cancel* in the dialog of figure 4 and finish this procedure. Please go on in section 5.3.

5.2.2 Service Pack 2

If a dialog like in figure 4 does not appear on your screen, than at least you should see a small symbol like figure 5 in the lower right side of your screen. Please wait until this automatic installation is finished completely and the following message, which is represented in figure 5 appears on your screen.

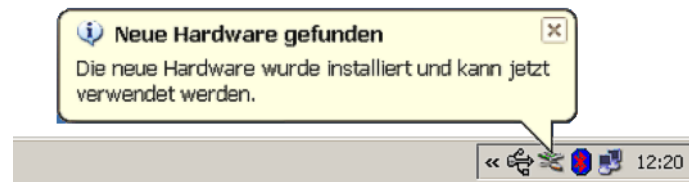


Figure 5: Recognition of a new hardware in Service Pack 2

Now install software and driver like it is explained in section 5.3 and further read attentively the following section!

After finished your complete installation of software and driver, you have to do some manual changes inside your system. Therefore click *Start* → *Control Panels* → *System*. Click inside the data sheet *Hardware* on *Equipment Manager*. A new window will open, where you can find a category named *Bluetooth Radio Instruments* and inside this file there is an entry *Generic Bluetooth Radio*. It is represented in figure 6.

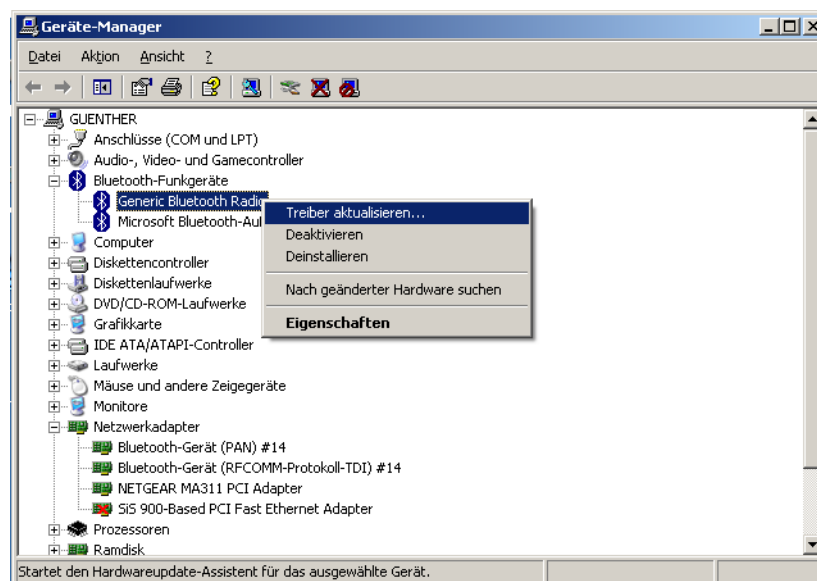


Figure 6: Equipment manager in Windows XP

Click on this entry with the right mouse button and select *Drivers update* from this menu. A dialog like represented in figure 7 appears, where you have to select the entry *No, not this time* and confirm your input by a click on *OK*.

Another dialog will open, where you please select the entry *Install software from a list ...* and also confirm by a click on *OK*.

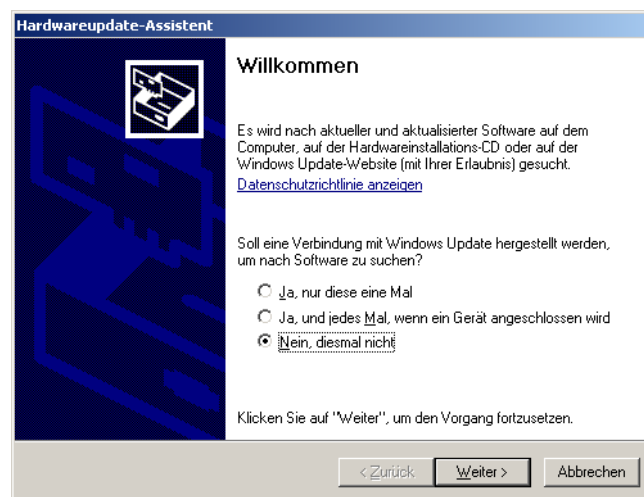


Figure 7: Hardware update assistant in Windows XP

In the next dialog select the entry *No search, select driver individually* and confirm by a click on *OK*. Now the dialog from figure 8 should appear on your screen.

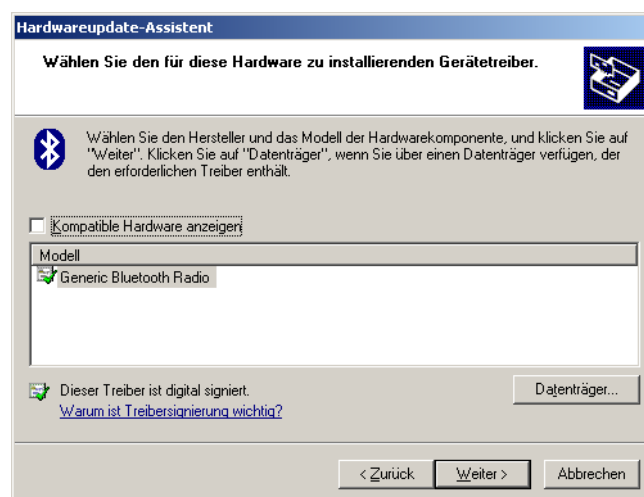


Figure 8: Select a driver in Windows XP

Click in this dialog on *Data carrier* and a new window will open, which is represented in figure 9.

Click on *Search* and select the directory **Software\BTW** inside your Bluetooth-CD. A list including all available files will appear on your screen where you have to select the file **BTWUSB.INF** and confirm by a click on *Open*.

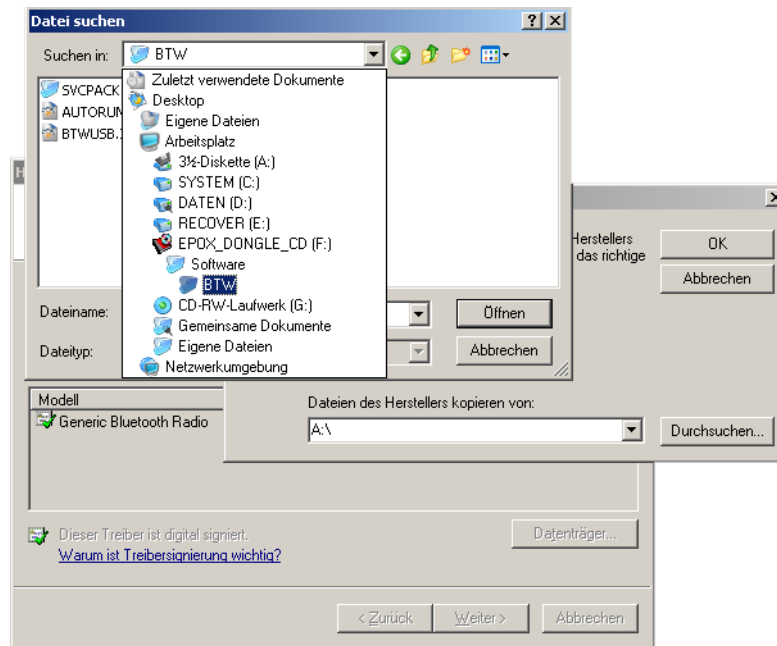


Figure 9: Device driver searching dialog in Windows XP

Then please click on *Next* and *Finish*, to finish the installation. Now go on in section 5.4, to configure the Bluetooth connection.

5.3 Software & Install driver

Now it is time to install the software and driver on your system. Therefore you have to insert your Bluetooth CD into the CD ROM drive of your computer. If the CD does not start automatically, please double click on *Desktop* and then double click on the symbol of your CD ROM drive. With a further double click on file *setup.exe* you start the installation.



Figure 10: Bluetooth installation

The first window of your installation will open. Click here on the entry *Dongle BTW 1.4.2.10* and follow the instructions on the screen.

If a dialog like in figure 11 appears (depending on the configuration of the system and the installed service pack), click on *Driver mark*, and a new window will open. This is also represented in the figure. Mark here the entry *Ignore* and then go on by a click on *OK* of both dialog windows.

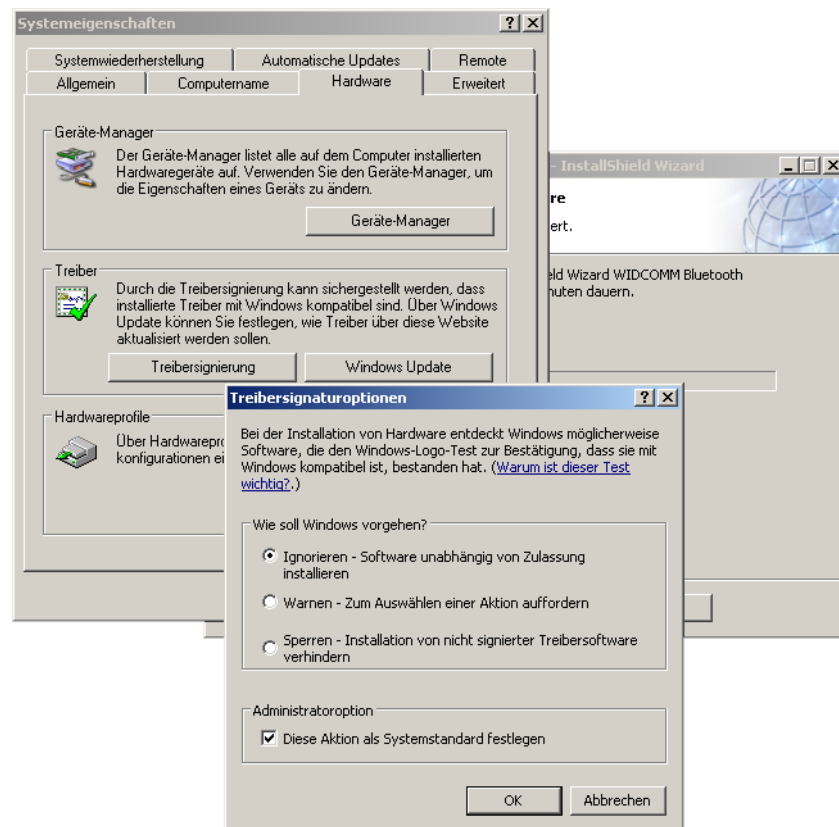


Figure 11: Bluetooth installation

Now please wait until the installation is finished and all data is transmitted to your computer. If necessary you can reload the computer now.

If you have Windows XP with Service Pack 2, then please finish to read the instructions in section 5.2.2, if not so please go on with the following section.

5.4 Software Configuration

If the installation is finished successfully you will find on your desktop the Bluetooth symbol. Double click on this symbol to start the configuration. Continue to click on *Next* until a dialog like in figure 12 appears on your screen.

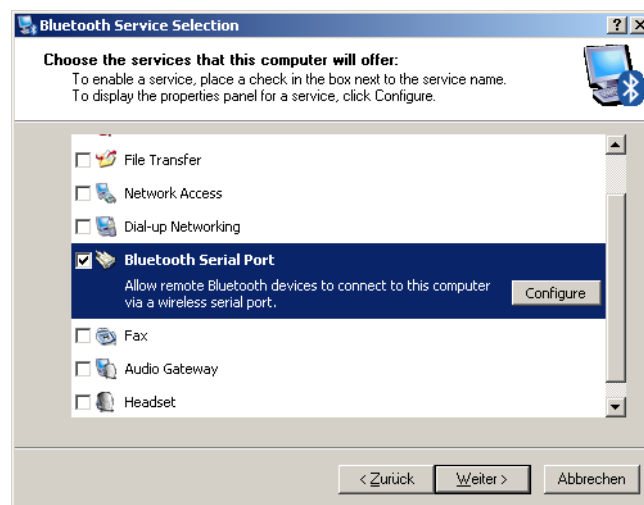


Figure 12: Bluetooth configuration assistant

Deactivate every option except *Bluetooth Serial Port*. This option is necessary for the data transmission from your measuring instrument to the software. Continue by a click on *Next*. Figure 13 shows the dialog window which is following.



Figure 13: Bluetooth configuration assistant

Click on *Skip* and then on *Finish*, to finish the configuration. Now your USB Dongle is configured.

To find out on which COM-Port your Bluetooth connection is been installed, click with the right mouse button on your Bluetooth symbol in the lower right side of your screen and select the menu option *Advanced Configuration*. A dialog will open like represented in figure 14.

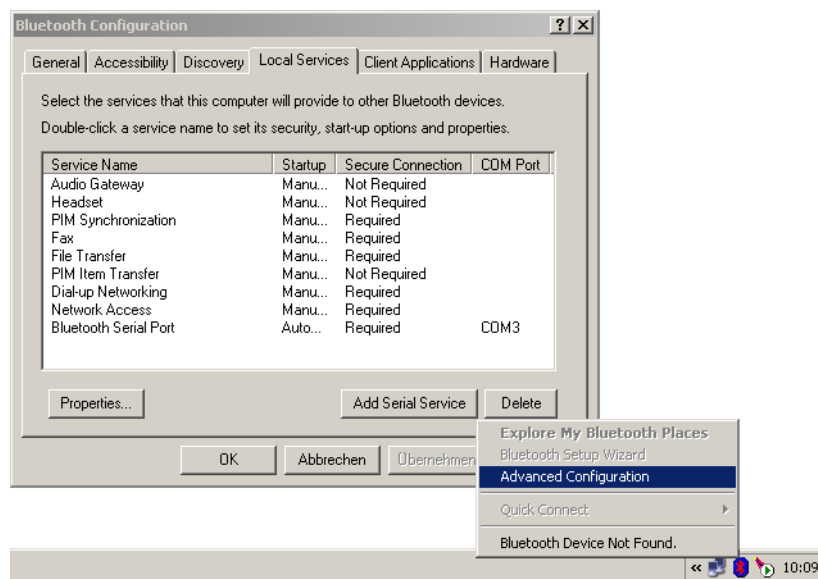


Figure 14: Determining the given COM-Port

You can find on the data sheet *Local Services* the indication *Bluetooth Serial Port*, which indicates on which COM-Port the connection is been installed. This COM-Port you have to indicate for every data transfer to your software.

5.5 Configure connection

After installation and configuration of your Bluetooth connection you should test if the data transmission from your measuring instrument to the computer is working correctly.

Be sure that the USB Dongle is attached to your computer. Take your measuring instrument and power on the device. Select a operating mode, which includes the direct data transmission to PC. Additional information on direct data transmission to PC you can find in section 7 on page 23.

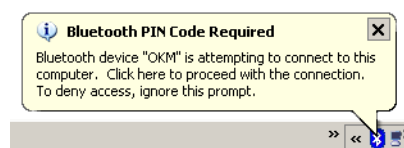


Figure 15:

As soon as you confirm your selected operating mode the device will try to get a radio connection to the computer. If this connection is successful a message like in figure 15 appears.

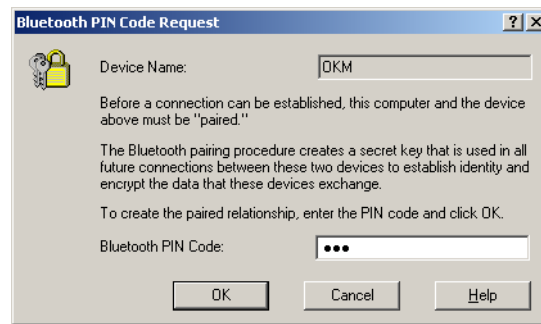


Figure 16:

Click with your mouse inside this message. The dialog from figure 16 will open. In this dialog you have to enter OKM. It is necessary to write in capital letters!

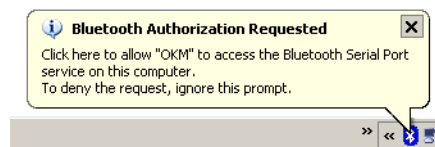


Figure 17:

In the first connection establishment a message like in figure 17 will appear on your screen. Click inside this message and mark in the following dialog this option *Always allow this device to access this service*.



Figure 18:

This marks saves the indications you made, so you don't have to enter all information again in the system. Now you have finished the configuration and installation of your Bluetooth radio transmission.

6 Control Elements

In this section you will learn more about the fundamental use of all control elements for this measuring instrument. All connections, inputs and outputs are explained in detail.

6.1 Front View

Figure 19 shows the front side of the device.

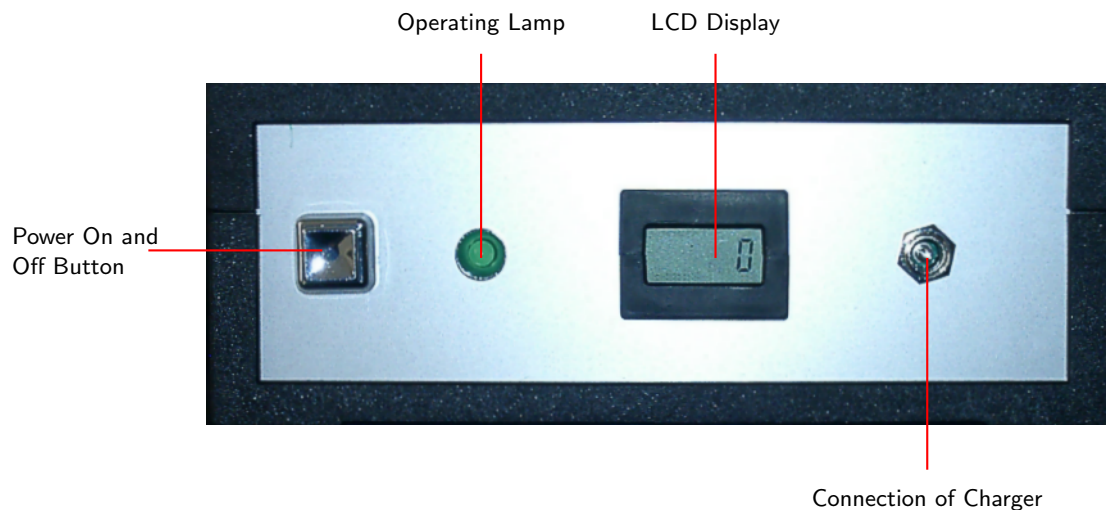


Figure 19: Front View

The **Power On and Off Button** is used to switch on and off the control unit. Before operating with your device you have to be sure that the device is charged.

The **Operating Lamp** shines, when the device is powered on and indicates the operating readiness of the control unit.

The **LCD Display** indicates how often the device was powered on. This display is only of interest for the repair and maintenance service.

The **Connection of Charger** is used to connect the delivered charger to the control unit if you want to load the internal battery of the device.

6.2 Back View

Figure 20 shows the back side of the control unit with all connections.

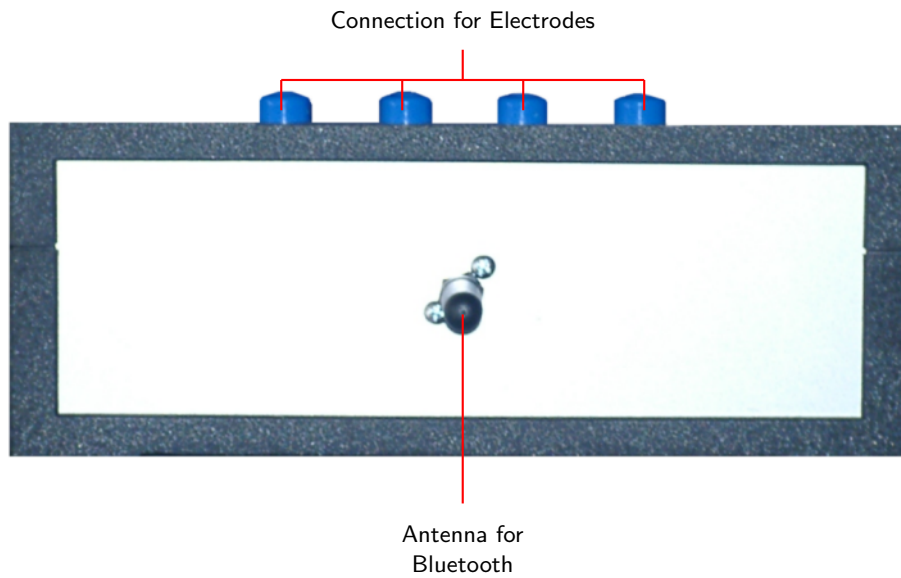


Figure 20: Back View

The Connection for Electrodes is used to connect the delivered electrodes for cavity detection.

The Antenna for Bluetooth is used for the data transmission to a connected pc and exists only for *Cavefinder B*.

6.3 Touchpad for Menu Navigation

The top of the device is including a touchpad like in figure 21. The represented buttons have no particular use in both models of the Cavfinder and are not necessary for operating the device.

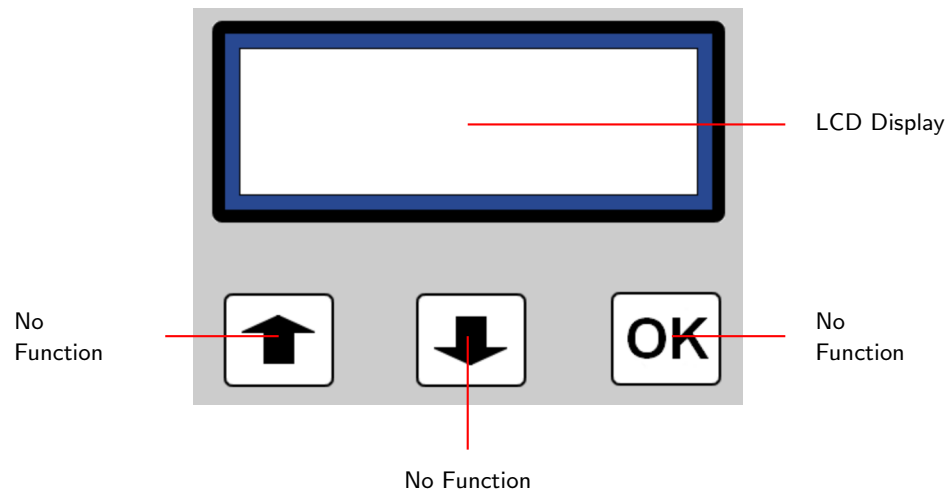


Figure 21: Touchpad for Menu Navigation

7 Detection of Cavities

The *Cavefinder* offers you a geo-electrical measuring method to detect all kind of cavities. The device is not able to determine the exact depth of a located cavity.

There are four connections for the electrodes on the control unit. You have to keep a certain manner to connect the electrodes in the right way. The correct connection is represented in figure 22.

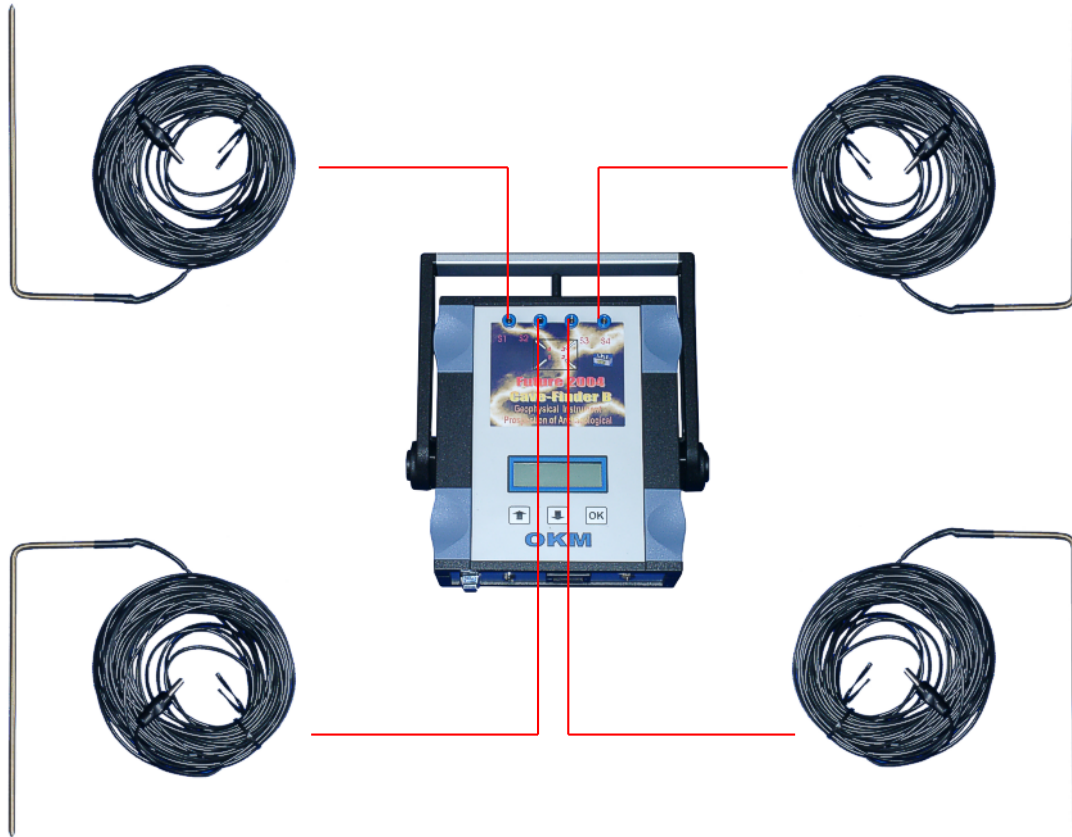


Figure 22: Connection of Electrodes

Try to define a square area with the four electrodes and connect the cables to the main unit. Therefore you have to plug in the electrode cable of the upper left electrode in the first connection of the device from left to right. The following electrode cable which is placed next to it counter clockwise has to be plugged into the next connection. Go on in the same direction until all electrodes are connected.

To perform a measurement plug in the electrodes like explained above and connect them in the correct way. Power on the device and wait until the result is represented on the display. If a cavity is been detected inside your defined area the message *Cave = Yes* appears on the display, if there is no cavity the message *Cave = No* will be shown.

If this is your first measurement it is advised to define a wide area to find out in generally if

there is a cavity or not. To detect the exact location of a cavity (if a cavity exists) split your measured field in four smaller parts and repeat the measurement in every subsection. This method you can repeat as often as you like until you found the exact location of the cavity.

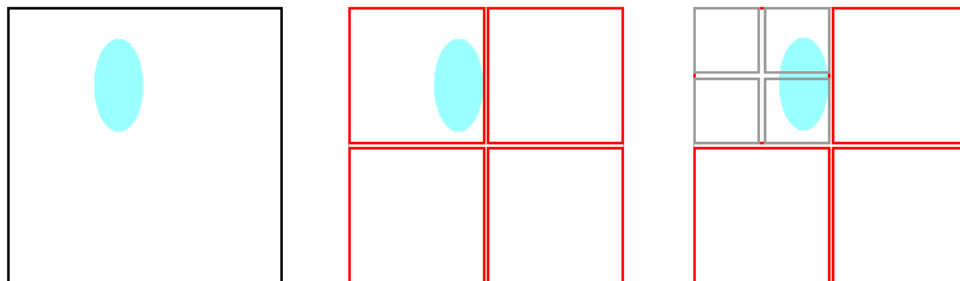


Figure 23: Rarefy a Measurement

In figure 23 the explained measuring method is represented once again. At first measure the wide area which is here represented in black color. On the display of the device the message *Cave = Yes* appears. Then divide this area in four smaller subsections and repeat your measurement inside these red represented fields again. Only in the upper left field the result *Cave = Yes* will be shown. All other fields will indicate the message *Cave = No* on the display. Now you can split this red marked subsection again to specify the position and size of the detected cavity.

With model Cavfinder B additionally you can transfer data to a connected computer. The measured data will only be transferred to a pc if the result is Cave = Yes. As a correct number of impulses you have to enter 4 when you prepare the software program. Further information about the software you can find in the appropriate user's manual for software!

8 Loading the Device

Before you start a measurement please control if the Cavfinder is charged completely. The following section describes how to load the Cavfinder in a correct way. To load the internal battery of the device use only the delivered charger.

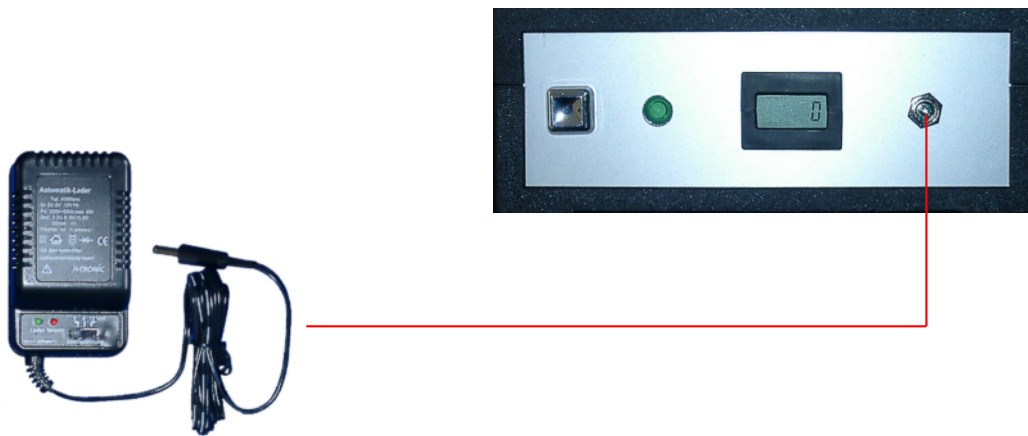


Figure 24: Connection of Charger

Figure 24 shows how to connect the delivered charger to the Cavfinder. Therefore you have to use the appropriate connection at the front side of the device. A control lamp on the charger lights up in green during the loading procedure and signal the current loading of the Cavfinder. Only if the lamp stops shining the loading procedure is finished. The loading time in case of complete discharge of the device is about 8 – 12 hours.

9 Danger of Explosion during Excavation

Unfortunately, the last two world wars also made the ground in many places of the world a potentially explosive scrap heap. A host of those lethal relics are still buried in the ground. Do not start digging and hacking for an object wildly when you receive a signal of a piece of metal from your device. Firstly, you might indeed cause irreparable damage to a truly rare find, and secondly, there is a chance that the object reacts in an insulted way and strikes back.

Note the colour of the ground close to the surface. A red or reddish color of the ground is an indicator of rust traces. As regards the finds themselves, you should definitely pay attention to their shape. Curved or round objects should be a sign of alarm, especially if buttons, rings or little pegs can be identified or felt. The same applies to recognizable ammunition or bullets and shells. Leave that stuff where it is, do not touch anything and, most importantly, do not take any of it home with you. The killing machines of war made use of diabolical inventions such as rocker fuses, acid fuses and ball fuses. Those components have been rusting away in the course of time, and the slightest movement may cause parts of them to break and be triggered. Even seemingly harmless objects such as cartridges or large ammunition are anything but that.

Explosives may have become crystalline over time, that is, sugar-like crystals have formed. Moving such an object may cause those crystals to produce friction, leading to an explosion. If you come across such relics, mark the place and do not fail to report the find to the police. Such objects always pose a danger to the life of hikers, walkers, farmers or children.

10 Maintenance and Services

In this section you will learn how to maintain your measuring instrument with all included accessories to keep it in good condition a long time and to get good measuring results.

The following list indicates what you absolutely should avoid:

- penetrating water
- strong dirt and dust deposits
- hard impacts
- strong magnetic fields
- high and long lasting heat effect

If you want to clean your device please use a dry rag of soft material. To avoid any damage you should transport the device and accessories always in the appropriate carrying cases.

Beware that all batteries and accumulators are always charged fully while operating with your system. You should only load the batteries when they are completely discharged no matter if you are working with the external power supply or with the internal accumulators. In this way a long durability of the used batteries is guaranteed.

To load the external and internal batteries you have to use only chargers which are part of our scope of delivery.

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