Future Series

# eXp 3000

User's manual

12th November 2004

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# 1 Important Notes

Please read these operating instructions carefully and closely before using *eXp 3000* and its accessories! These instructions give information on how to use the device and point out potential sources of danger.

*eXp 3000* 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, *eXp 3000* 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 rechargable 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 | 9.6 14.4 VDC |
| | 22W maximum |
| Schutzart | IP40 |
| Operating Time (Full Charged Battery, Delivered Power Supply, 25°C) | about 3 hours |
| Operating Temperature | 0°C 40°C |
| Display | 300mcd Background lighting |
| | 6.4" Diagonale |
| | 640 x 480 Pixel TFT Color |
| Computer | 300 MHz Processor |
| | INTEL i586- compatible |
| Working Memory | 64 MB RAM |
| Data Memory | 64 MB |
| Feedback | accustic, visual |
| Controller | Motorola 4 MHz |

Table 1: Technical Specifications (Control Unit)

## 2.2 Data Transmission

| | |
|---|---|
| Technology | USB |
| Maximal Data Transmission Rate | 19200 Baud |

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.

| | |
|---|---|
| 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 |
| 1 | Linkage for Antenna |
| 1 | External Power Supply |
| 1 | Charger for External Power Supply |
| 1 | Cable for External Power Supply |
| 1 | Horizontal Probe (25cm) |
| 1 | Headphones |
| 1 | Joystick |
| 1 | User‘s Manual |
| 1 | Carrying Case |
| | |
| 1 | 3D Software (Visualizer 3D) [optional] |
| 1 | USB-Connection Cable [optional] |
| 1 | Horizontal Probe (50cm) [optional] |
| 1 | Horizontal Probe (75cm) [optional] |
| 1 | Horizontal Probe (100cm) [optional] |
| 1 | Verticale Probe (Antenna for Tunnel Detection, 50cm) [optional] |
| 1 | Verticale Probe (Super Sensor, 100cm) [optional] |

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.

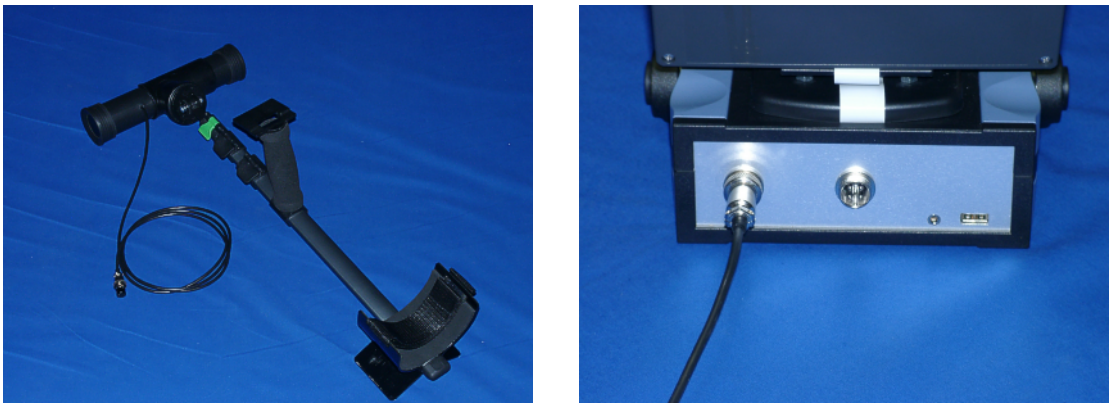


Figure 2: Assembly and Connection of the Probe

Figure 2 shows how to assemble the standard horizontal probe (25cm) to the linkage. Therefore just put the probe into the appropriate attachment of the linkage. Then connect the probe cable to the control unit. Do it without any unnecessary application of force! The verticale probes can be used without linkage. You can simply hold it in your hand perpendicularly to the soil.

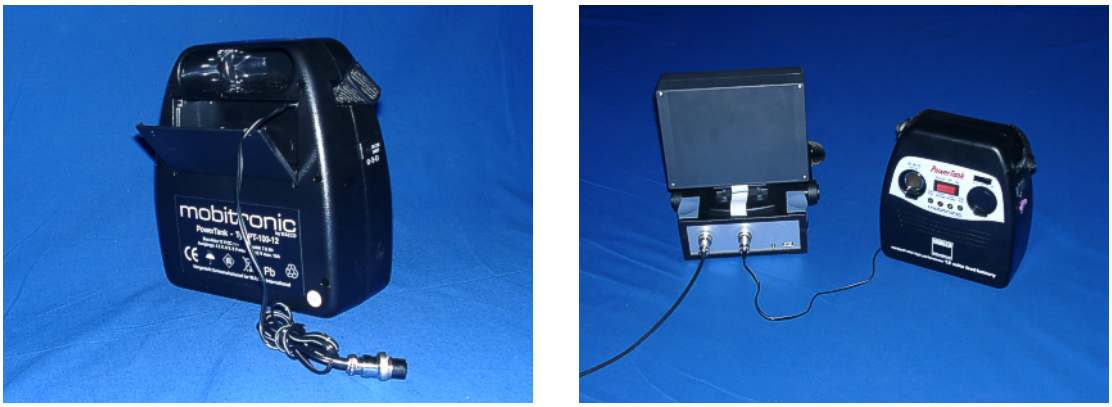



Figure 3: Connection of the External Power Supply

Figure 4 shows how to connect the external power supply to the control unit. The cable is placed inside a storage case on the back side of the battery and is wired to this power supply. While connecting the external power supply take care to connect at first the cable with the control unit. The external power supply has to be powered on afterwards.

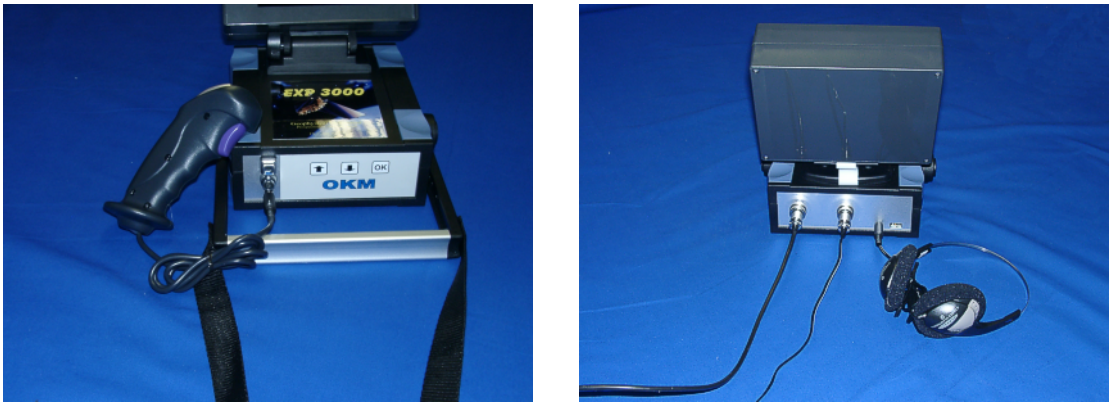



Figure 4: Connection of Joystick and Headphones

Figure 4 indicates which connection has to be used for joystick and headphones. Please take care not to exchange both elements, otherwise the device can get damaged.

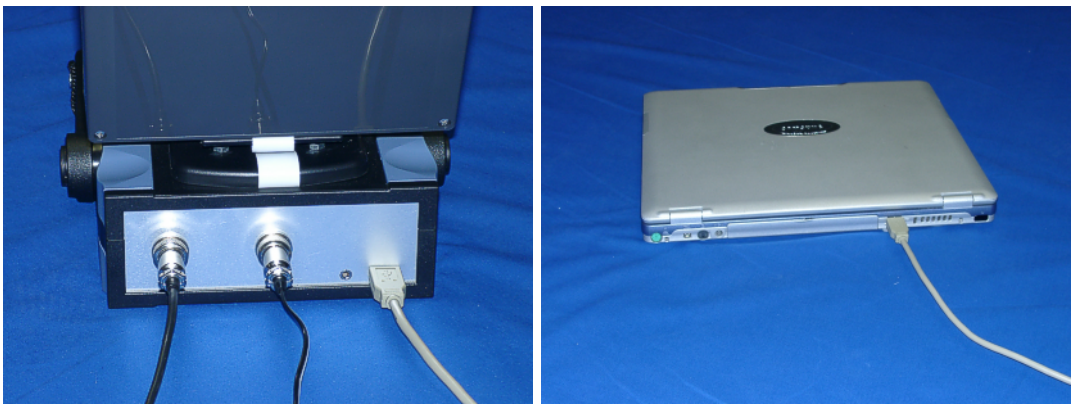


Figure 5: Connection of the USB Cable

Figure 5 shows how to plug in the USB connection cable to the computer. Further information about the use and installation of the USB driver you can find in section 5 on page 14.

# 5 Installation of Device Driver

Before you can transfer data from the device to your computer you have to install the USB driver. Therefore you have to connect the active computer and the control unit via the USB connection cable. When you switch on the power supply a message like in figure 6 will appear on your computer screen.


Figure 6: Installation of Device Driver: Step 1

If you prosecute Windows XP with Service Pack 2, you will be asked in dialog from figure 7 if Windows Update has to search for drivers up to date. Mark entry *No, not this time* and click on *Next*.

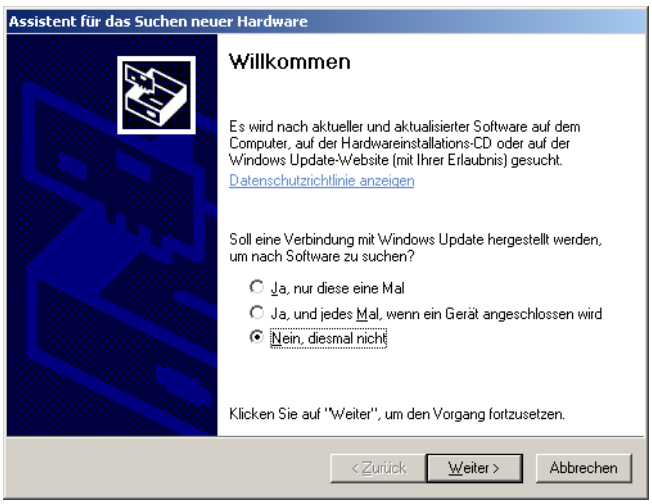



Figure 7: Installation of Device Driver: Step 2

In other versions of the operating system Windows this dialog window should not appear.

In the following dialog window like figure 8 select the entry *Install software from a list ...* and click on button *Next*.

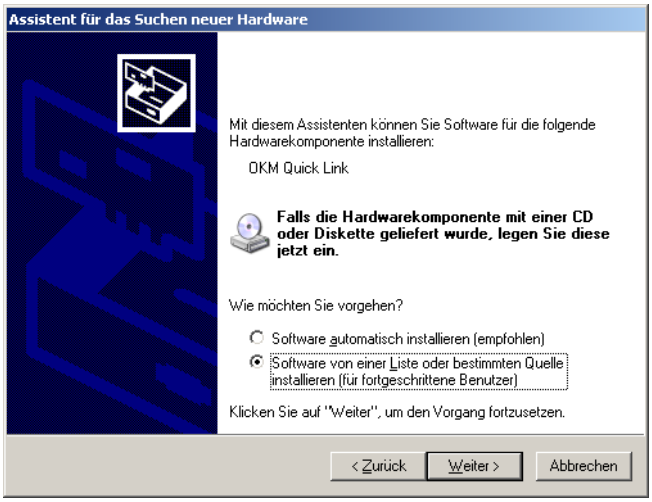



Figure 8: Installation of Device Driver: Step 3

In the next dialog window from figure 9 mark the entry *No search, select driver individually* and click on *Next*.

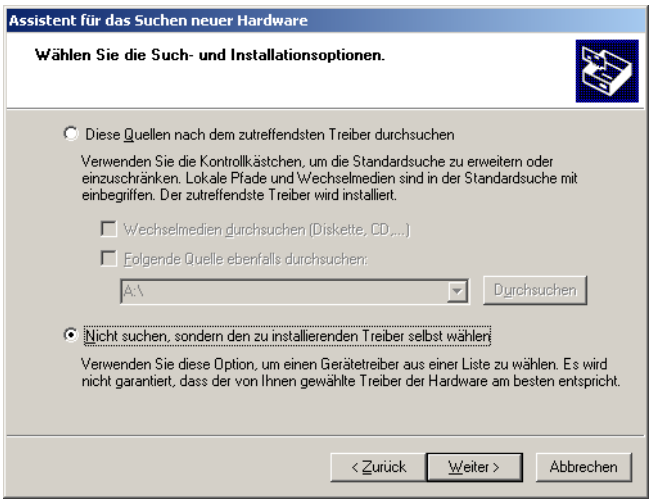



Figure 9: Installation of Device Driver: Step 4

Another window will open, represented in figure 10, where you have to select the driver file. Therefore click on Data carrier.... Immediately another window appears where you click on the button *Search...*. Then select the file `OKM_LE.INF`, which you can find in the directory `\drivers\usb_cable` of your software CD. Afterwards you have to click on *Open*, *OK* and *Next*, to start the installation of the files.

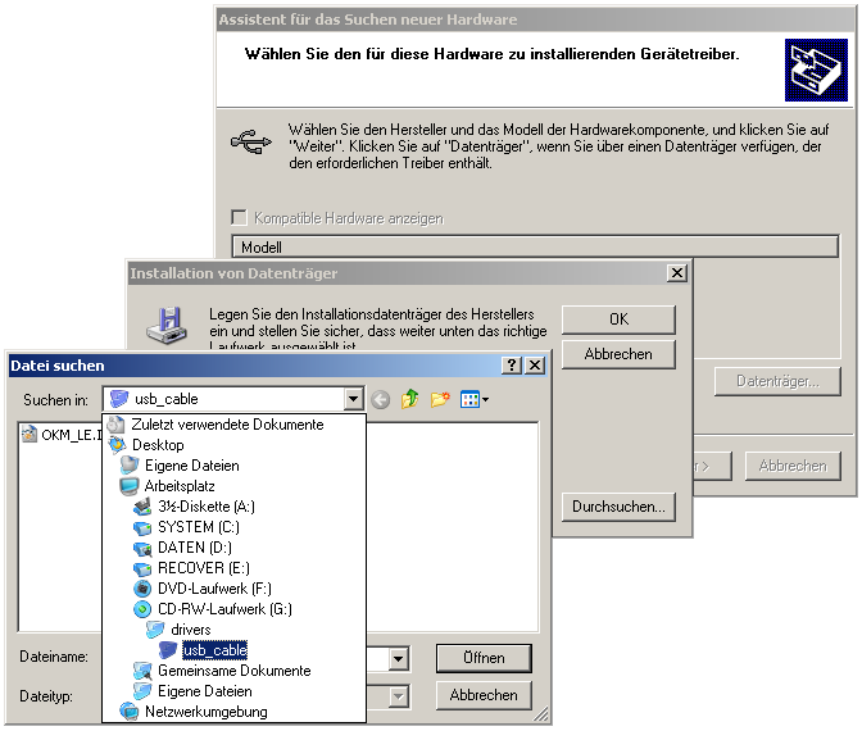



Figure 10: Installation of Device Driver: Step 5

After successful installation of the driver a message like in figure 11 will appear on your computer screen. Now the drivers of your device are installed and you can transfer data to your PC.

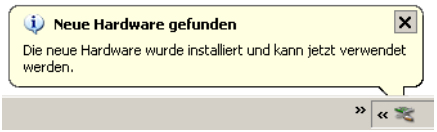



Figure 11: Installation of Device Driver: Step 6

# 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 12 shows the front side of the control unit.

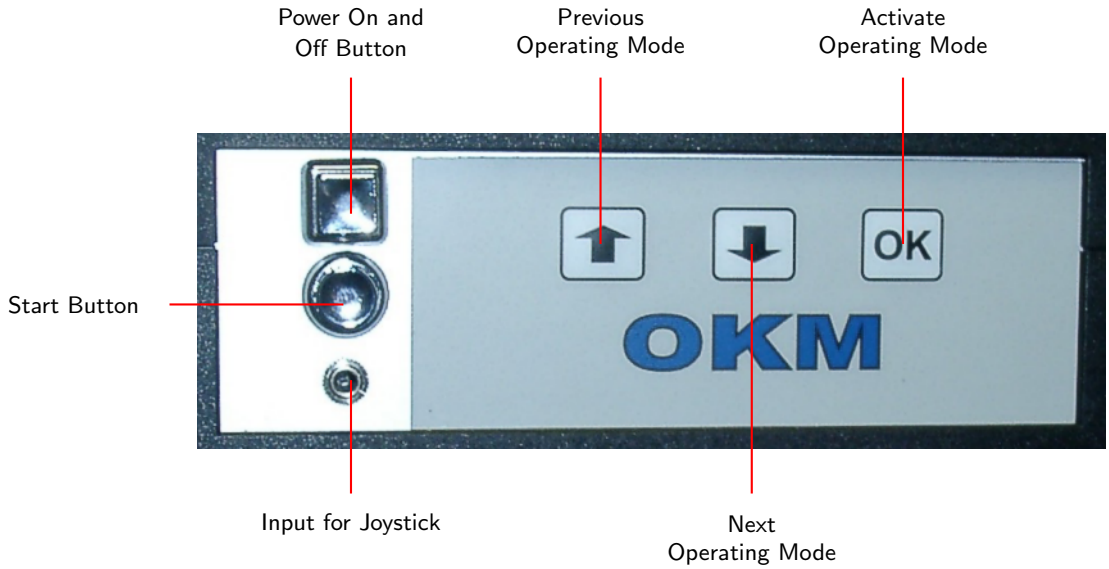



Figure 12: Front View

The Power On and Off Button is used to switch on and off the control unit. Before operating with your device you have to connect your external power supply and power it on.

The Start Button is used to start a measurement and to to release every impulse manually in the appropriate operating mode.

The Input for Joystick is used to connect the delivered joystick to the device. He fullfils the same functions like the Start Button, but is more comfortable and can facilitate the measurement procedure.

With the keys ⬆ and ⬇ you can select every single operating mode. To confirm your selection press OK.

## 6.2 Back View

Figure 13 shows the back side of the control unit with all their connections.

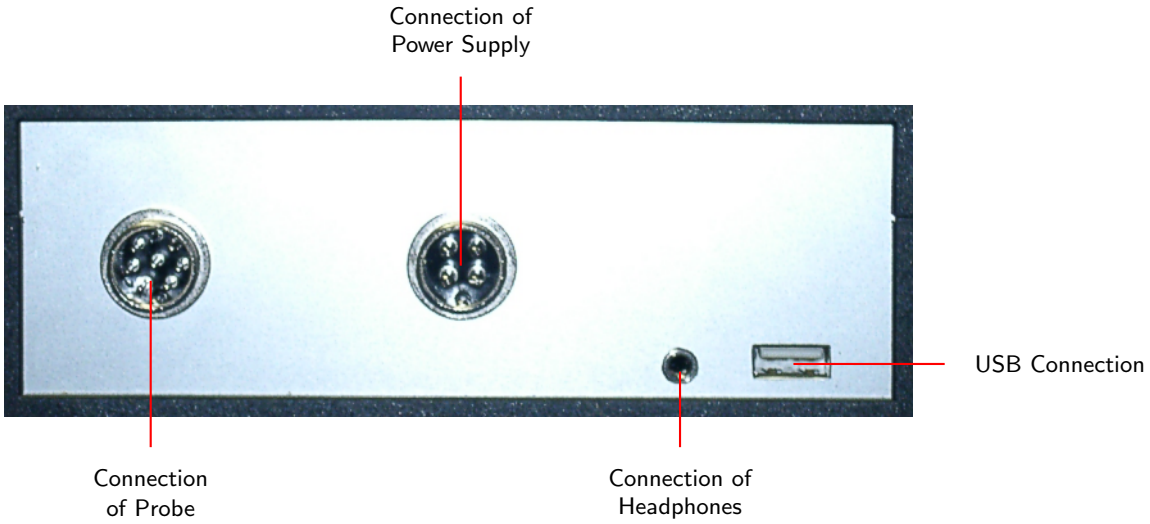



Figure 13: Back View

The Connection of Power Supply is used to connect the device with the delivered battery. Here the external power supply (Power Tank) has to be connected.

In the Connection of Probe the cable of the probe has to be plugged in.

In the Connection of Headphones the delivered headphones has to be connected to the device.

Via the USB Connection the device will be connected to a computer with a USB data cable.

# 7 Operating Modes

In this section you will learn more about the different operating modes of the device. Every function is been explained in particulary in its proper subsection. The right selection of an operating mode depends primarily of your planned measurement. So for example there are some special functions which have to be used for a first measurement in a unknown area to get a general overview, against which others are more suitable for a detailed search and analysis with a special processing software program.

The device prossesses the following operating modes:

- **Magnetometer**
  Research of the subsurface with the integrated magnetometer.
- **Ground Scan**
  Measurement with graphical evaluation, whereby measured data are stored in the internal memory of the device.
- **Discrimination**
  Examination of detected objects to their characteristics of iron content.
- **Detector**
  Activate optional DDV system to discriminate metals.
- **Empty Memory**
  Delete all data stored in the internal memory.
- **Exit**
  Power off the device and shut down the integrated PC module.

Via a touchpad on the top of your device you can select and confirm your appropriate operating mode.

## 7.1 Magnetometer

You select the operating mode *Magnetometer* in the main menu to determine the subsoil taking the earth magnetic field into account. Also you can recognize through the graphical representation of a oscilloscope like picture on the monitor if you are placed above an metallic object.

When you confirm the option *Magnetometer*, the integrated magnetometer will be adjusted to the current basic ground value of the place where it is situated in this moment. During the initialization process the message *Ground Balance, Please Wait* appears on your screen. Only if this message disappears you can start your research.

If you power on the device above neutral ground all metals will be shown with a deflection to the top in your monitor. If the device is situated above a metal while activating the magnetometer, all equivalent metal parts will not be recognized.

By a new press on the button Activate Operating Mode, you can initiate a manual soil reconciliation. Therefore you have to start on a place with neutral ground. With buttons Previous Operating Mode or Next Operating Mode you are leaving the magnetometer mode and turn back to the main menu.

## 7.2 Ground Scan

To get a complete picture of the subsurface you have to use the operating mode *Ground Scan*. After the confirmation of this option a further menu will appear, where you can select a scan mode. You will have the following possibilities:

- *Automatic*
  The record of the measured results is automatically in regular intervals. Therefore you have to scan continiously your measured field.
- *Manual*
  The record of the measured values is manually. You decide on your own when a measurement should be started. Therefore you use either the Start Button or the delivered Joystick.
- *Cancel*
  With this option you will get back into the main menu.

With the selection of the scan mode another submenu will open, where you have to determine the number of impulses (measured values) per measured line. When you confirmed your selection of the number of impulses you will be asked if you want to start a measurement. Select *Yes* and confirm by pressing the button Confirm Operating Mode. Now the scanning of the first measured line will start. When the current measured line is finished the program will stop and wait until you are ready to begin the next line.

If your destination area is scanned completely or you want to escape the measurement just select *No* in the appropriate dialog. Another window will open where you will be asked if you want to save the current record. If you decide to save the measurement you have the possibility to transfer this graphical representation later to a computer using the optional software program.

You can store until 10 different measurements by using the operating mode *Ground Scan* without overwrite previous records. Every new record will be stored separately in the internal memory of the device. On the lower left side of the screen in the main menu you can see how many records are already stored inside the device.

## 7.3 Discrimination

This operating mode is used to identify metals and cavities. There is no given manner fixed or a scan direction. You can walk as you want to determine the soil. This operating mode is most effective if you already detected possible objects and now want to know more details about them.

During the measurement you will get a live picture on the screen of your device. The different curves give conclusion to the characteristics of possible objects.

Figure 14 shows which principle curve shape is created if you pass above an iron object. Typically is the high deflection to the top followed by the same deflection down.

Figure 15 shows which principle curve shape is created if you pass above a precious metal. Typically is the small additional deflection with the difference that there is no deflection down.

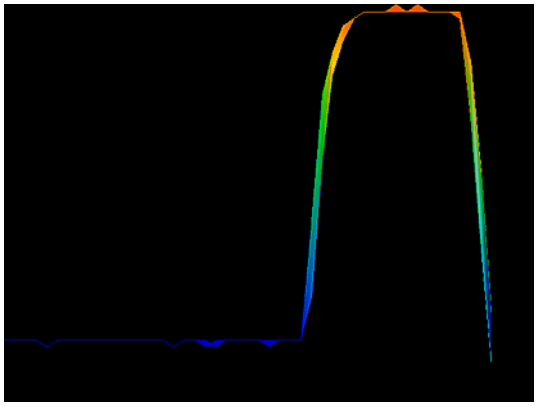


Figure 14: Curve Shape of Iron

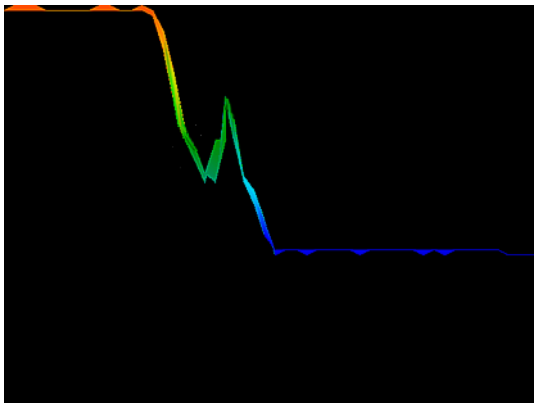


Figure 15: Curve Shape of Precious Metals

Figure 16 shows the principle curve shape when passing over a cavity. Typically is the high deflection down. But there is no equivalent deflection in the opposite direction.

## 7.4 Detector

To use this operating mode you have to connect the optional DDV system to the control unit. The detector is most suitable to localize small metal objects (like coins) which are placed near to the surface.

With the detector you have the possibility to check possible founds on their type of material. So for example you can find out if an object is composed of gold, silver or iron.

Detailed information about the utilisation of the detector and the related discrimination you can find in section 8.1 on page 23 and in section 9 on page 24 of this manual!

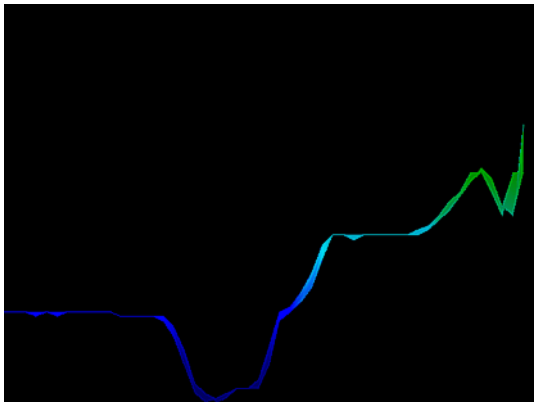


Figure 16: Curve Shape of Cavities

## 7.5 Empty Memory

The operating mode *Empty Memory* is used to delete all data which are stored in the internal memory of the device. If you confirm this option you will be asked again if you really want to delete all data. If you confirm now by pressing *Yes* all data will be deleted and cannot be rebuilt or transferred to a computer.

## 7.6 Exit

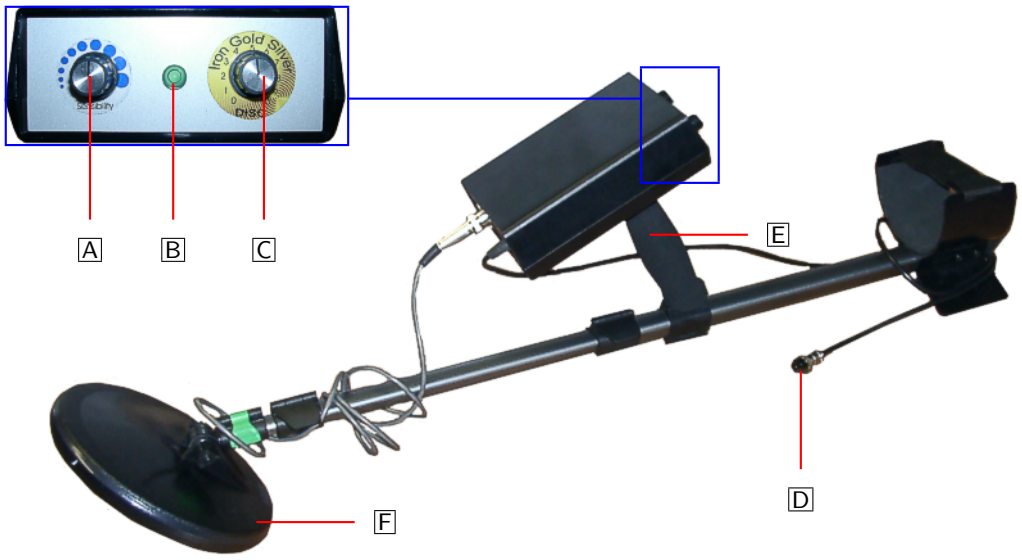
Select option *Exit* to finish operating with the device. As soon as you confirm this option the integrated PC module will shut down and the device will power off.

# 8 Optional Equipment

Here you can find additional information about all equipments which are available as optional accessories to the basic package.

## 8.1 Disc Detector Visualization System (DDV)

With the *DDV* a powerful metal detector is on your disposal, which not only supports your underground research with a visual representation but also offers you various filter possibilities.




A Sensibility Regulator
B Operating Lamp
C Discriminator
D Connector
E Retaining Handle
F Coil

Figure 17: Control Elements of the Detector

To use the detector just plug in the connector D into the Connection for Probe of the control unit. Then select the operating mode *Detector* in the main menu.

**Attention:** As soon as you confirm this option the soil reconciliation will start. Detailed information you can find in section 9 on page 24!

Now you have to pivot the detector coil continiously right above the ground, trying to keep the same distance to the soil. Adopt the rhythm of the graphical representation on the screen. As soon as you pass above a metallic object a yellow colored trace will appear in your graphic and you can hear an acoustical sound through the headphones.

# 9 Discrimination

In this section the regulation of the discrimination and the soil reconciliation is explained.

## 9.1 Adjust the Discriminator

The discriminator serves to filter certain materials. So it is possible to „*exclude*"for example worthless iron and steel objects. Or people who are hunting for treasures and gold are able to exclude other materials with the help of this discriminator.


Figure 18: Adjustment of discrimination

In figure 18 the regulator to adjust the discrimination is represented. This regulator can filter certain materials. Table 5 explains the adjustment in the case of normal ground conditions[1].

| Adjustment | Indicated materials |
|---|---|
| **0** | All metalic objects |
| **3** | Iron, gold, bronze, silver, aluminium |
| **5** | Gold, bronze, silver, aluminium |
| **7** | Silver, aluminium |
| **10** | Aluminium |

Table 5: Standard adjustment of the discrimination

Beware: When you adjust the regulator for discrimination on gold, the detector reacts besides gold also on bronze, silver and aluminium. To find out if there is really gold in the ground you have to follow the following instructions:

1. Switch the regulator on gold and start your soil examinations until you reach a place where the detector reacts positive.
2. Now switch the discriminator on silver and examine this place again. Following there will be two possibilities:
   - the detector reacts positive → the material under the ground is *not* gold, but could be silver or aluminium.

[1]The indications from table5 concern the use in normal type of soil. In extreme conditions (mineralisation, salt deposits, ...) they can variate from this normal value.

- the detector does not react → there is probably golden material in the ground but also bronze is possible.

Please consider that you always should do the soil reconciliation, which is explained in this following section.

## 9.2 Soil Reconciliation

A correct soil reconcilation is absolutely necessary that the adjusted discrimination can work properly. If the soil reconciliation is not done correctly the operation of the device and the integrated discriminator cannot work properly.

In the following section you can find a list of all necessary working procedures to do a correct soil reconciliation:

1. Power on the device and wait until the acoustic signal disappears.
2. Adjust the discriminator on the material you like, see previous section.
3. Put the device with coil probe about 5cm above the ground.
4. Select the operating mode you like and confirm.

If you hear an acoustic signal from the metal detector after these indications, then the soil reconcilation is not finished correctly. Repeat these steps until there is no acoustic signal from the metal detector.

The following causes can prevent a correct soil reconciliation:

- You are staying above a metalic object.
- You confirm the operating mode with integrated discriminator without holding the probe directly above the ground.
- You are holding the probe during your confirmation of the operating mode with integrated discriminator to high and then minimize the distance to the ground.
- You are turning the regulator for discrimination during soil reconciliation.

*Only if you are doing a correct soil reconciliation the functionality of discrimination can be guaranteed.*

# 10 Analysis and Evaluation of Measurements

Before measurement you have to know what kind of objects or cavities you are looking for and if the area you choose is suitable for this. Measurement without a plan will not give you the results you would like. For this reason please consider the following indications:

- What are you looking for (graves, tunnels, buried objects, ...)? This question has its effects on your concrete manner to measure an area. If you are looking for big objects you can enlarge your distance between the measure points (impulses), for small objects use small distances (see section 11.2 on page 29).
- Inform yourself about the area you select for measurement. Is it usefull to search at this place? Are there historical indications, which confirm your speculations? What type of soil is on this area? Are there good conditions for data recording?
- Your first measurement in a unknown area has to be large enough to get representative values (f. ex. 20 impulses, 20 search lines).
- What is the form of the object you search? If you are looking for an angular metal box, the identified object in your graphic should have a form according to this.
- To get exact values concerning the depth measurement, the object has to be in the centre of the graphic, which means it has to be framed by normal reference values (normal ground). If the object is on the side of the graphic and not totally visible a correct depth measurement is not possible.
- There should not be more than one object in a graphic. This will influence the exactness of depth measurement.
- You should do at least two control scans to get sure about your results. So you also can recognize and isolate mineralized ground (see section 10.1 on page 26).

## 10.1 Metal or Mineralisation

At the beginning it is not always easy to make a difference between real objects and mineralized ground. In principle metals are represented in red color, but mineralized accumulations can also include red signals.

Here some advice how you can differentiate between a real object and a mineralisation:

- **Form**
  If the object represented in your graphic has a special form (f. ex. rectangle, circle, ...), you can conclude of a possible real found.
- **Color**
  If there are many yellow and orange color values around the object, it will be probably a mineralisation.
- **Depth**
  With a small depth of about 0,10m or 0,40m there is a high possibility that there is only a mineralisation of the ground.

- **Color Filter**
  If position and form of the object are changing with the use of the color filter it is probably a mineralisation.

- **Control Scan**
  If position, depth and form of the object stay nearly the same, also in further control scans you can conclude of a real object. Also if some graphics look similiar you always have to compare all indications.

Figure 19 shows a real object (left side) and a mineralized accumulation (right).

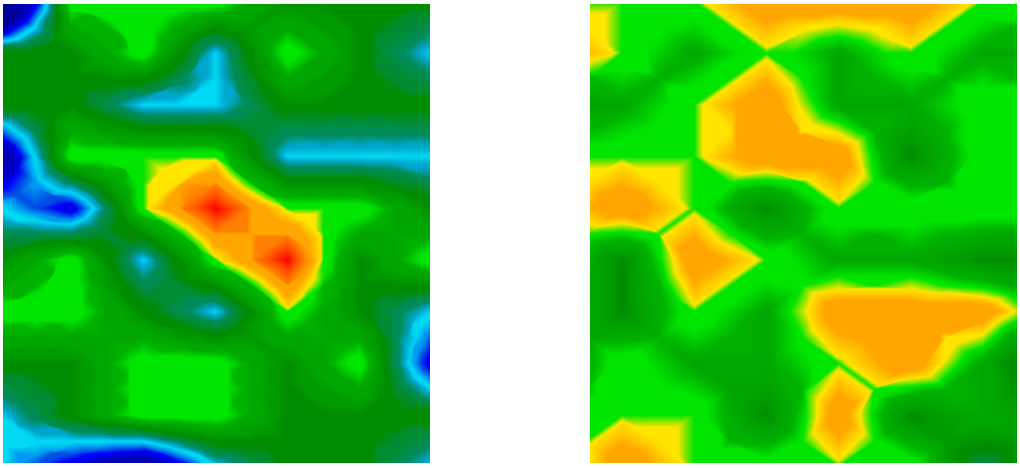


Figure 19: Comparison of object and mineral

# 11 Data Record

In this section you will learn the basics for a correct measurement.

## 11.1 Proceeding for a Measurement

The main rule for scanning an area is:

**The more exactly you scan an area**
**the better will be your graphical evaluation.**

You have to scan in a given manner that the software can calculate the measured values in the right way. The given manner depends on the device you are using. Figure 20 shows two different ways of scanning in a scheme. The measurement starts at your starting point ① and ends at point ②.
If you have finished one scan line, the next line has to be on the *left* side. The measuring instrument should not be turned. Direction north is adviced.

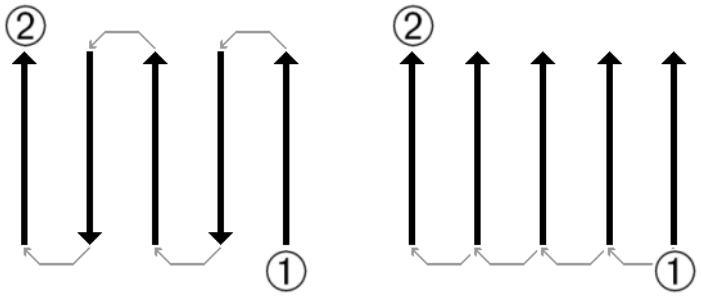



Figure 20: Given manner

The more you repeat your scanning above a possible object (control scans), the better you can decide afterwards if it is a real object or not. Temperature, other radio transmission, sun energy, mineralisation of the ground, loam, salt, water, etc. can influence negatively the measure results.

Before you start to dig, take your time to do some control scans. Repeat exactly the same scan about 3 - 5 times, to be sure about your results. Only if all these graphics have almost the same values you can be sure about your results.

Figure 21 is a graphical representation of a measured area. The blue rectangle marks a possible object in the ground.

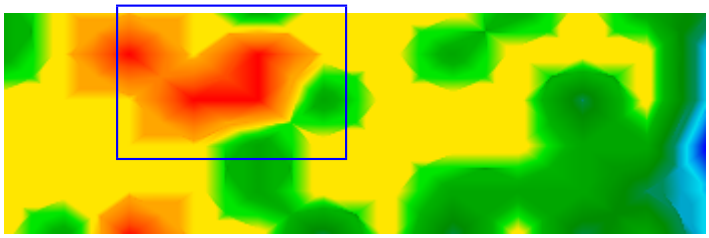


Figure 21: First measurement of an area

To be absolutely sure that there is an object in the ground you have to do a control scan. Measure exactly the same area, same starting point and the same number of impulses and lines. Take also the same distance between the measure points. Figure 22 and 23 shows two possible measurements.

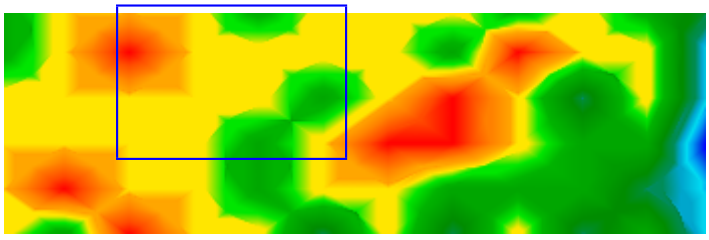


Figure 22: Control scan, Variant A

It is easy to recognize that the control scan in figure 22 is totally different from the first measurement in figure 21. This means only a mineralisation of the ground, not a concrete metalic object.

Even if the control scan in figure 23 is not exactly the same to the first one, you can see that the blue marked parts show nearly the same values. This is a reference for the existence of an object.

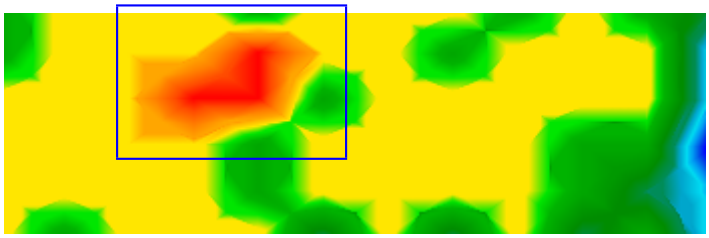


Figure 23: Control scan, Variant B

Before you can determine the depth of the detected object you have to scan a further image. It only should cover the blue marked area. All other metals and mineralized ground should be ignored because it would disturb the measurement. After this you can determine the correct depth.

## 11.2 Regulation of the Number of Impulses

There is no special rule for the number of impulses. But there are different aspects which has to be considered. These are for example

- the length of your measured area and
- the size of the objects you are searching.

The optimal distance between two impulses is about 20cm until 30cm. The smaller the distance between two impulses is the more exactly will be the graphical representation. If you are looking for small objects you have to select a small distance, for big objects you can increase the distance between each impulse.

Figure 24 shows the effects of the distance and the number of impulses per scan line for some objects.

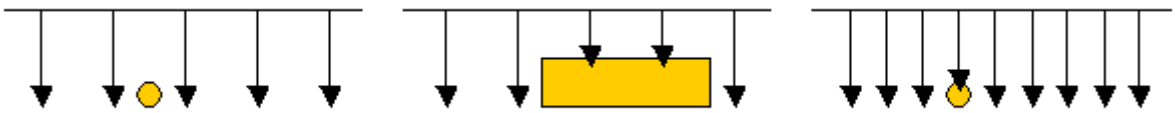


Figure 24: Effect of number of impulses and their distance

Figure 25 shows the difference between very few impulses (left side) and much more impulses on the same scan line length (right side). The second record (right side) shows much more

details and also smaller objects can be seen.

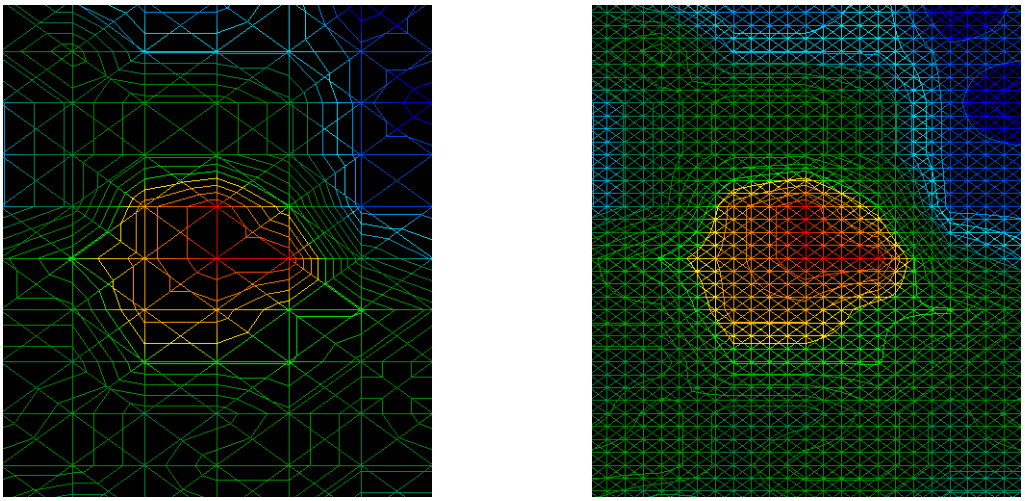


Figure 25: Comparison of small and high number of impulses

Do not hesitate to record more measurements with different numbers of impulses. For example you can scan a large area before doing a second detailed precision measurement. Especially for the search of bigger objects you can proceed like this. With this manner you can measure relatively fast a large area and afterwards you can record the interesting subsection.

Further information about the graphical analysis you can find in the appropriate software manual.

# 12 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.

# 13 Error Messages

In this section you can find possible error messages which can appear during the work with the device.

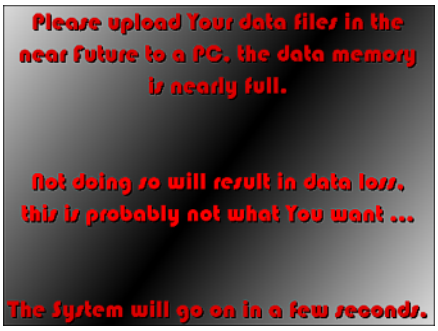



Figure 26: Only a small amount of memory available

Because every scan in the operating mode *Ground Scan* will be stored in the internal memory of course the memory place will decrease over time. As soon as the free memory cell is less than 20% the following message like in figure 26 will appear.

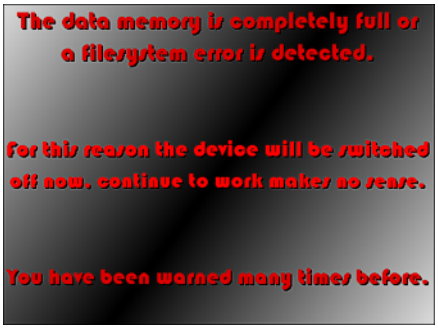



Figure 27: No free memory available

If there is no more free memory available you will see a message like in figure 27. You can create more memory space if you transfer all stored data with optional software to your computer or if you select option *Empty Memory* to delete all stored data without having transferred them to your computer.

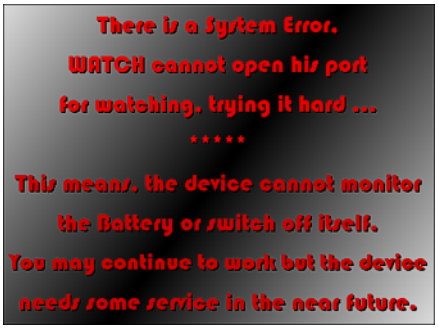



Figure 28: Internal Hardware Error

If message 28 appears the device cannot control the operating voltage. This also means it cannot warn you in case of a low status of the battery. Also the automatic shutdown of the device may be affected. It is adviced to let the device check from the manufacturer to avoid further damages. Ask your dealer for further help.


Figure 29: The external power supply has to be charged

Message 29 appears if the battery is low because of a long operating time with the device and not enough voltage is available. You should power off the device and charge the external power supply as soon as possible. If you continue operating with the device it could be possible that data can get lost.

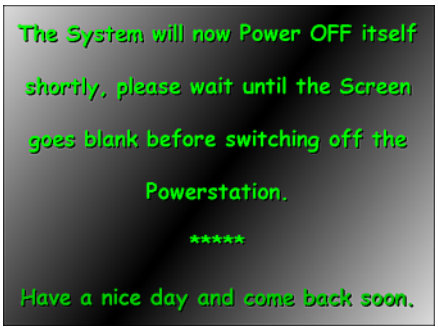



Figure 30: Shutting down the system

Because there is a PC module integrated in the device you have to shutdown it like a normal

computer. Therefore you have to use option *Exit* from the main menu. The following message like in figure 30 remind you to wait until the device powered off by itself.


Figure 31: Shutting down the system is not possible

If the device itself is not able to power off, a message like in figure 31 is shown. In this case you simply power off your external power supply.

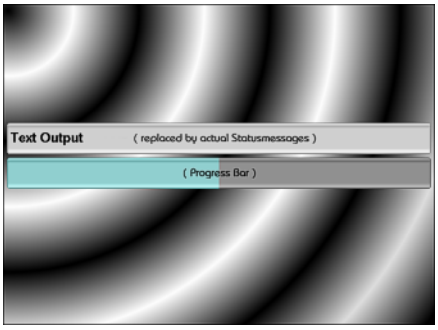



Figure 32: Progress of Data Transmission

If you transfer data from the device to your computer you can see how many of the files are already transferred. Figure 32 shows the progress of data transmission.

# 14 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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