



Operating manual



Lorenz Detecting Systems GmbH
Metal Detectors for professional, industrial and
security applications

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**Declaration of conformity /
EMC directive**

The following metal detector
LORENZ DEEPMAX X3

Correspond to the following EC requirements:
EC-EMC-directive version 89/336/EEC

The LORENZ DEEPMAX X3 series are found to meet
the specification requirements detailed, when tested
to the customers/ specification requirements.

Compatible norms are in particular

Test Specifications & Categories

Emissions EN61000-6-3:2001

Immunity EN61000-6-1:2001

Refer to certificate of testing No: E41105 Phönix Testlab

If any changes are made to the above mentioned appliances without
consulting Lorenz Detecting Systems GmbH this declaration becomes invalid.

Date: 24.11.2004 Signed:



Lorenz Detecting Systems GmbH
General Management

The LORENZ DEEPMAX X3 is one of the newest developments in the field of Pulse GBS metal detectors. It is probably one of the most sensitive and stable metal detecting devices of its kind presently available. The LORENZ DEEPMAX X3 is the result of many years of research and development. A lot of efforts have been put into making this new product and especially in the new improved metal classification and ground balancing facilities offered with the LORENZ DEEPMAX X3 series.

The Pulse GBS (Pulse Ground Balancing System) is specially suitable for searching at depth. The performance of this electronic device is almost unaffected by salt water, most types of mineralised grounds or temperature changes. Specially designed electronics cancel out signals from the ground. The LORENZ DEEPMAX X3 is therefore a reliable tool to locate metal objects at great depths even under the worst environmental conditions. A new improved circuit design suppresses interference from power lines and a power pulse technique produces very accurate signals to obtain very high detection depths.

The LORENZ DEEPMAX X3 is a high quality specialist Detector and it is designed to be used with both, small or large coils. Large coils offer extreme depth capabilities for big metal objects because of the strong and deep going magnetic field produced. Small coils are preferably used while searching for small objects like single coins or gold nuggets.

This model offers a great range on non-ferrous metal objects in general. A very simple operation is guaranteed

by a specially developed, LC Display and a minimum amount of controls of which only one reset button will be necessary to operate during work. At the same time this detector model offers a number of features which are new for a pulse metal detector. Quality electronics and very special designed electronic - circuitry produce benefits in terms of easy of use as well as sensitivity.

The LORENZ DEEPMAX X3 gives a visual indication on the LC Display for every metal being located. This time delay reading producing a number between 00 to 99 helps to classify metal objects. The target classification circuitry is only in some cases affected by the size of a metal object and therefore identifies small coins as well as large pieces of metal. The LORENZ DEEPMAX X3 also offers a sophisticated and refined ferrous / non-ferrous target analysis which works more stable on difficult soils in conjunction with the 26cm or 35cm double D search coil. The Detector also emits an audible sound by way of either a speaker or headphones. Detection depths achieved (in air tests) are almost the same in many types of soils and therefore considerably higher than those possible with standard pulse induction or sinewave VLF - TR Detectors.

The DEEPMAX metal detectors are often recognised as representing some of the highest quality and newest developments in professional metal detecting equipment.

We as a manufacturing company always try to keep the highest standard on our products, therefore alternations of the design, specifications as well as the availability subject to change without notice.

1. Safety information

For reasons of safety it is advisable to read this operating manual first before turning the Lorenz DEEPMAX X3 on. Special attention should be paid to the following notes.

Check out, if the plug-in type charger supplied with the LORENZ DEEPMAX X3 fits with the AC mains of your country. The AC plug of the recharger is interchangeable and therefore can be used at any countries mains. See chapter 7 for more detailed information. The supplied recharger will work at AC voltages of 90 V-264 V (see label).

Damaged connecting cables or search coils should no longer be used, because of possible electrical shock.

To avoid short circuits, wrong polarity or electrical shock only spare parts and accessories offered by the

manufacturer of the LORENZ DEEPMAX X3 should be used.

When digging for metal objects war material could also be found. Precautions should be taken in advance especially when big objects have been located.

Special kinds of mines could be triggered by the strong DC magnetic field produced by the search coil. Special versions for military use are also available on request. Persons with implanted pacemaker or other sensitive device should not approach to the field of the search coil. Please understand that we as the manufacturer of the LORENZ DEEPMAX X3 can not be made liable for any kind of damage caused by or in conjunction with our products.

Design and specifications subject to change without notice!

2. Function

The LORENZ DEEPMAX X3 is based on the non-motion; Pulse GBS (Pulse Ground Balancing System). Short and intensive magnetic pulses are emitted by means of a search coil first. Those magnetic pulses produce eddy currents in conducting materials like metal objects for example. Said eddy currents will be kept in a metal object and will die away after the magnetic pulse emitted by the search coil has turned off. This is the reason why it is possible to detect those eddy currents during the time delayed receiving phase by means of the same search coil which now acts as a receiving coil. A rather complicated electronic circuitry is necessary to detect those tiny voltage changes and has to separate that particular signal from interference also received. The signal has to be amplified to drive a voltage controlled oscillator (VCO), which emits

an audible signal either by headphones or built-in loudspeaker when a metal is in the near of the field of the search coil.

Eddy currents produced in a metal object by means of a pulsed primary field, will die away differently depending on the conductivity of the metal object. The classification circuit therefore gives a visual time delay reading for the eddy currents received over a certain period of time. In addition a ferrous / non-ferrous indication for every metal being detected is working when a double D coil is in use. This gives further information on the probable kind of metal being located as well as the audio sound emitted, which makes it easy to predetermine the exact place and the size of the buried metal object.



2.1. Advantages

The Pulse GBS principle has got the advantage of using large diameter coils and high transmitting power. This is especially necessary when searching at depth. Frame mounted cable coils of different size and shape can be connected to the LORENZ DEEPMAX X3 without any adjustments.

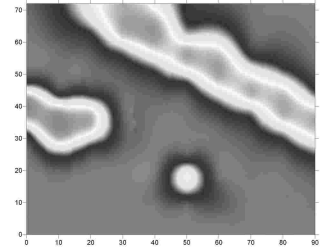
A special adaptation circuit has been added to the Detector to suit with different coil systems automatically. This ensures extreme depth capabilities with any coil connected. When enlarging the search coil diameter the sensitivity to bigger objects will also rise. At the same time smaller objects will be located less sensitive. This is particularly desirable when locating large objects while ignoring small bits. Large coils offer very high detection ranges. Even in difficult soils where magnetic iron oxides are present the LORENZ DEEPMAX X3 will offer extreme

depth capabilities for both ferrous and non-ferrous metal objects when the Ground Balancing System is in use. Other systems often suffer from ground effects which reduce the depth range in the ground. The LORENZ DEEPMAX X3 will be able to locate objects at almost the same depths either in most types of ground or "in air tests". The high sensitivity of the LORENZ DEEPMAX X3 to non-ferrous metal objects like gold, silver and copper together with the new target analysis make this detector an outstanding device for many different locating purposes.

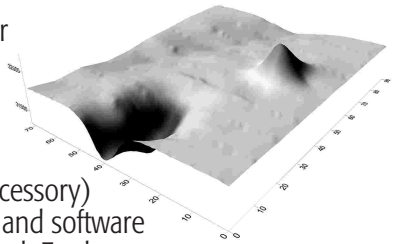
The LORENZ DEEPMAX X3 was developed to provide a number of features including high sensitivity and stability together with easy operation. The amount of controls was therefore reduced and a calibration of the Detector to our factory settings was also made to guarantee best results in the field:

- highly sensitive to all kinds of metal
- stable operation on mineralised ground or salt water with Pulse Ground Balancing System
- reliable / simple operation
- exact pinpointing with large coils
- very easy and effective detection of large areas
- rugged, refined mechanical construction
- a variety of search coils are available for different detection purposes
- automatic adaptation of different coil sizes to the electronics
- small unwanted metal objects can either be identified or eliminated
- fast audio response speed with voltage controlled oscillator (VCO)
- logarithmic audio response and intensity bar graph rading for easy pinpointing
- battery check with audio alarm tone
- calibrated static (non-motion) target classification with visual time delay reading
- improved ferrous / non-ferrous identification which is less affected by the ground
- precisely adjustable audio-threshold
- stable static response (acoustical and visual)
- waterproof search coils
- interchangeable rechargeable Battery pack
- charge electronics with interchangeable AC-plug for world-wide operation
- frequency control for interference elimination
- automatic push button retuning facility
- different Delay and Sensitivity settings to eliminate small objects or for easy pinpointing
- extreme detection depths for very large metal objects
- optimal performance for the detection of small objects like coins or other non-ferrous objects as well as for bigger objects buried deep.
- single or dual induction balanced or differential coil designs can be used.
- Multi sensor detection (MST) with several searchcoils working at the same time without interfering each other. Please ask for details.
- Easy to use data logger function works with

additional Hard- and Software to generate six 2D image and six 3D surface maps from the scans being taken. Each map is different depending on the electronic analysis method and therefore can be the key to the probable kind of metal buried in the ground. There is clearly a difference in the signature different metal objects and ground conditions will give.



The same are displayed on a two or three dimensional surface or image map according to the available Hard- and Software kit (accessory)



- External Datalogger and software can also be connected. Further informations are available on request.
- New computer aided search system with LC Display and new functions.
- Signal strength bar graph, time delay reading (derived from the eddy currents of the object's size, conductivity and permeability), ferrous / non-ferrous icons, battery condition and the mode settings are displayed simultaneously.
- All functions are visible on a large LC Display, no menus to scroll to get to the function to be altered.
- New improved searchcoils available.
- More stable ground balancing functions means less interference in urban areas.
- Improved AUTO function which gives with most targets only one indication instead of two when ground balancing system is selected.
- New GROUND balancing systems with double D coils gives additional depth to non-ferrous metal objects.
- Automatic false finding computer aided target identification.

2.2. Applications

The LORENZ DEEPMAX X3 was developed for professional search and locating applications. A variety of search coils can be connected to this metal detector. Large areas can be detected effectively especially with frame coils. Saltwater, most types of ground or temperature changes will only slightly affect the detection range of the

LORENZ DEEPMAX X3. It is possible to eliminate some unwanted objects like nails and foils or to identify them as being small unwanted objects while searching for bigger and deeper objects. In conjunction with small coils the LORENZ DEEPMAX X3 is a great tool when searching for small objects deep in the ground.

3. Controls on the front panel



ZERO-pushbutton

The ZERO push button is the most important control as the whole electronics, including the discriminator and the audio will be retuned when pressing this control for about 1-3 seconds. During that time no metal should be in the direct field of the search coil. To retune simply hold the search coil in air horizontally and away from any metal objects while simultaneously pressing the ZERO button for about three seconds. There should be almost no signal indication on the meter after having done this. While turning the detector on with the POWER button, the electronics will automatically retune itself for five seconds. The previously tuned tick-rate (AUDIO-control) should be audible, or silent when the AUDIO-control was turned to the left. With this button the present audio tick-rate can always be recalled during operation while pressing it for one second. When changing the search coil the ZERO push button has to be pushed down for about 3 to 5 seconds to retune the electronics. The same button will start and stop each track of the field recorded with the available datalogger equipment.

SENS button

With the SENS- function control three different sensitivity settings LOW; MED; HIGH (Low, Medium and High) can be selected by the operator. The current setting is indicated near the bottom on the left hand side of the display. Different sensitivity settings can be selected by the way of operating the SENS button several times. This button will delete the last track when having the datalogger equipment connected to the same control box.

DELAY button

Three different DELAY settings can be selected by the way of this control. The selected setting is always

displayed at the bottom on the right hand side of the Display.

Position 1, 2 and 3 offers an intensity intensity bar graph reading which works in parallel with the audio. The more the search coil approaches to the located metal object the higher the indication on the meter and the higher the frequency of the audio is. Position 1 is an all metal mode which offers the highest sensitivity for every kind of metal and all object sizes. It should be in use when locating with small searchcoils and weakly mineralised soils like sand for example.

Position 2 is selected while pressing the DELAY button again. This Position is mainly in use when locating with frame coils on weakly mineralised soils. This position offers a very high sensitivity as well. Only the sensitivity to thin foils and coins will be reduced in this position.

Position 3

The LORENZ DEEPMAX X3 offers in this position less sensitivity than in position 1 or 2. In most cases very small pieces of foil or very small coins will no longer be detected. At the same time the LORENZ DEEPMAX X3 will work slightly more stable.

Iron, copper or silver objects will suffer from a small loss in sensitivity. Thin gold or silver plates will be detected less sensitive or can be even ignored. This position is particularly useful when searching for bigger objects with a limited detection range while ignoring some smaller pieces of metal. When the universal cable coil 8m or 12m has got more than three windings the DELAY position has to be changed to position 2 or 3 to ensure best results.

GROUND button

Ground Balancing System GBS

The GROUND push button works in conjunction with the GROUND 1 and GROUND 2 controls in order to compensate or balance heavily mineralised soils containing plenty of magnetic iron oxides.

Single (hot) stones or certain iron objects can also be completely eliminated/ canceled by the way of these controls. To tune these controls correctly please continue as follows:

Do only select the GROUND1 or GROUND2 function if strong signals with a long duration produced by the ground or many false signals from single stones appear. The selected Function will be displayed in the right hand side on the bottom of the LC Display. When pressing the same button again the next Position namely GROUND 2 or three is selected.

Turn on the GROUND1 function. Please also make sure that the AUTO function is turned off! Before starting to tune the ground balancing facility make sure that the LORENZ DEEPMAX X3 is tuned with the ZERO push button in the air first.

The connected Searchcoil therefore has to be hold horizontally 1 to 2m above the ground while simultaneously pressing the ZERO push button for approximately 4 seconds. The coil can be lowered to the ground or can directly be put on a magnetic stone afterwards. An audible signal will be produced by the way of the loudspeaker or headphones. Leave the coil at the same place and try to alter the position of the corresponding GROUND1 control in order to minimize the signal. The ten turn control therefore has to be turned to either the left or right direction. When having found the point with the lowest indication, leave the control at this position. (While further moving the control a signal would appear again). When raising the coil in the air or lowering it to the ground or the single stone, the LORENZ DEEPMAX X3 should be silent. If in any case a signal is produced this could be derived from a metal object in the ground which interfered with the tuning process. The whole tuning procedure therefore has to be repeated at a place with no metal. In extremely mineralised environment like basalt rocks for example a small distance 5-10cm between the ground and the coil should be maintained mainly during the tuning process (when lowering the coil to the ground). The tuning process of the GROUND1 and GROUND2 circuit is the same. Simply select GROUND2 with the GROUND button and repeat the same procedure. When GROUND3 is selected both GROUND channels are selected simultaneously and the channel producing the stronger signal will be indicated by the way of audio or on the display. The GROUND2 channel makes sense

when locating a few metal objects with a similar signal response as magnetic soils like some bronze or iron objects for example. Otherwise some of these items could be almost completely masked or give a much weaker indication. In many cases however the GROUND1 channel will be sufficient.

After having connected different searchcoils or altering the FREQUENCY control it might be necessary to retune the GROUND- controls again. If changing ground conditions are expected the 35cm double D- coil should be in use. Any time a different GROUND or DELAY position is changed by the operator the electronics will retune itself automatically while a flashing GROUND or DELAY icon will indicate this tuning time. During that time (approximately 5 seconds) the searchcoil should be hold away from metal objects and at least 100cm over the ground.

AUTO / FIELD button

When pressing this button the AUTO sign in the middle of the LC Display comes on. The Detector works very stable and is capable to suppress signals caused from weakly mineralised soils or temperature changes. A slow moving speed of the searchcoil over the ground or target has to be provided to find metals. While resting over the object the audio and meter indication disappears.

This so called Motion – function should only be selected when working with smaller coils (up to 45cm diameter) as deeply buried targets at certain depth might also be canceled by the AUTO / Motion- function. That is the main reason why it is not advisable to turn on the AUTO function while working with large frame coils.

When suffering from weak ground signals or a drifting audio in the GROUND2 Mode and double D coil for example, the AUTO-function should be selected. If the signals from the ground in different DELAY modes still can not be canceled the ground balancing system should be selected with the GROUND button. When the additional six channel datalogger equipment is connected to the LORENZ DEEPMAX X3, the same push button will store the collected data from the different tracks to complete a field. The next field number will be displayed afterwards.

POWER button

After having connected a fully charged battery to the POWER- jack, the LORENZ DEEPMAX X3 can be turned on with this push button.

The electronics will automatically tune and reset itself for five seconds and the detector runs through a display check sequence with an attention icon flashing at the same time. During the retuning process the searchcoil should be held at least 1m over the ground and far away from metal objects. Each time the battery is disconnected, the LORENZ DEEPMAX X3 has to be turned on with the POWER button again.

The selected settings will be stored even if the Detector is turned off and on again. When planning to store the LORENZ DEEPMAX X3 please make sure that no connectors are connected to the control box or battery.

AUDIO threshold control

With this audio control the tick-rate of the audio can be selected. The ZERO button can be hold simultaneously while turning the audio control. The initial tick-rate can be altered from silent to a low frequency ticking tone. For most applications this control can be left in mid-position. In this position the built- in loudspeaker will give one tick every 1- 2 seconds, after the detector has been retuned with the ZERO button.

! ***Note:** The AUDIO threshold control also acts as a sensitivity control. When it is set to the left the detector will respond up to 60 % less sensitive than at the mid- position. The detectors sensitivity may also be slightly increased when using a higher threshold-setting than the mid- position.*

FREQ. - frequency control

With this control the preset operation frequency of the LORENZ DEEPMAX X3 can be altered. This is mainly necessary when searching near power lines, which cause low frequency interference. The performance of the detector won't be affected by changing the position of this control, but the amount of interference can be greatly reduced by doing this.

LC Display

The LC Display has got different icons and indications which are displayed at the same time.

BATTERY icon

The battery condition will be displayed on the bar graph with 5 bars located in the middle of the display. Note: The battery condition should be checked with a search coil connected and after a few minuts of operation.

00-99 TIME DELAY reading

A time delay reading which is mainly derived from the conductivity, permeability and the object's size is displayed with a specific number on the LC Display. Possible examples:

(0-20 coin or piece of foil, 30-60 iron, 60-99 large copper or silver object)

The indication is displayed as long as the coil is over the target.

Any metal object detected will give a specific number (00 to 99) if the signal is strong enough to make a reading possible. Therefore a certain intensity of the target signal is necessary for a time delay reading.

The number simply appears when a reading was possible. The indication will be stored as long as the search coil is over the target and turns off when the

search coil passes the target. With connected six channel data logger equipment available from the manufacturer this number will display the current field number when storing field data.

FERROUS / NON-FERROUS icons

This function does only work with the 26cm or 35cm double D coil. Ferrous metal objects like iron for example produce a FERROUS indication at the top of the display and Non-ferrous metal objects like gold silver or copper will result in a NON- FERROUS icon indication when the searchcoil is moved over the target. The two icons will turn off if no metal is present or no double D coil is connected. This identification facility is tuned to the ground with the GROUND2 control as well.

INTENSITY / signal strength bar graph icons

The signal strength will be indicated by the way of a large bar graph in the middle of the LC Display and an audio response from the speaker or headphones.

ATTENTION; ARROW; AERIAL icons

These icons will work together with the built- in datalogger function which will run on an optional hard- and software which is available from the manufacturer of the LORENZ DEEPMAX X3. For further information please refer to the instructions for use the LORENZ DEEPMAX X3, six channel datalogger, Sufer 8 and Scripiter Software..

BATTERY alarm

Low battery condition will be indicated by a pulsed beep sound every few seconds the LORENZ DEEPMAX X3 has to be turned off when this sound appears to avoid damage from the batteries.

BATTERY jack

This jack is located close to the COIL jack. The plug of the supplied battery pack has to be connected with this jack. The operation time of the LORENZ DEEPMAX X3 on a fully charged battery pack at normal temperature range is approximately 6 to 10 hours depending on the coil connected.

COIL jack

Search coils of different size and shape can be connected to this jack. The search coils available for the LORENZ DEEPMAX X3 have got coded connectors to adapt the electronics to the coil automatically. To connect a coil plug to the electronics make sure that the plug is fully pushed in the jack and that the sleeve is fastened by rotating it clockwise.

! ***Note:** Any connectors should be disconnected when planning to store the LORENZ DEEPMAX X3.*

HEADPHONE- jack

The supplied stereo headphones can be connected to this jack. Any stereo headphones with 1/4 inch (6,35 mm) stereo plugs can be connected to the LORENZ DEEPMAX X3 without any problems.

The built- in loudspeaker will be automatically turned off when headphones are connected.

! ***Note:** Special headphone- adapter plugs have to be disconnected when using the loudspeaker.*

Loudspeaker

The LORENZ DEEPMAX X3 has got a built-in loudspeaker on the rear which gives an audible signal when the search coil approaches to a metal object. The audio frequency will change with the

distance between the search coil and target for better pinpointing. Especially with two persons operation and large diameter coils the signal from the loudspeaker is of great help for both persons.

DATALOGGER jack

The LORENZ DEEPMAX X3 can be operated with a datalogger function in order to record different signal data during operation. For operation an optional hard- and software kit will always be necessary (accessory). This jack therefore offers different signals for further data recording equipment. In conjunction with available specially developed software it is possible to convert stored data to visual 2D image or 3D surface maps on a computer for example. Please contact us for further details.

4. Operating procedures

Do connect the two shoulder straps to the main belt at both sides in the front and one large strap above the battery pack on the back. Adjust all the belts to comfortable length and fasten the main electronics unit in front of the operator.

Connect the search coil-connector to the COIL jack on the left hand side of the electronics unit, and fasten the plastic sleeve of the connector by rotating it clockwise. Do connect the battery connector to the BATTERY jack which is located close to the COIL jack on the left side of the detector by pushing it gently. Hold the connected searchcoil horizontally and far away from metal objects about one meter over the ground. Set the POWER button to turn the LORENZ DEEPMAX X3 on. Press again for "OFF". At switch ON the detector runs through a display check sequence since all the icons come on and the flashing ATTENTION icon indicates the retuning process is performed by the electronics at the same time. If the BATTERY icon displays less than one bar afterwards or if the BATTERY alarm gives a beep sound every few seconds, the detector should be turned off again and the battery should immediately be recharged with the supplied charger. The battery condition is displayed with five bars in the middle of the Display continuously during operation.

! ***Note:** On the main electronics unit two large aluminium plates are located, which get warm during operation. Please make sure that the heat can disappear and that the aluminium plate is not covered with a jacket or other materials to avoid overheating the unit or burn your skin. The unit therefore has to be looked after during operation and should not be used in sealed containers.*

Afterwards the Detector will automatically turn to the positions which were selected the last time the detector was in use. While pushing the SENS, DELAY, GROUND or AUTO push buttons several times, different settings will be selected and will be displayed on the bottom of the LC Display at the same time.

Select mid position for both the AUDIO- and FREQUENCY control and push the ZERO button for three seconds. If low mineral contents of the ground are expected it is sufficient to hold the searchcoil a few centimeters over the ground while simultaneously pressing the ZERO button for about three seconds. Then simply release the button and try to keep the distance between the coil and the ground very constant when searching.

The pre selected audio ticking sound is audible every 1-3 seconds. Alter the AUDIO control for different ticking sound if necessary.

Important note: With every retuning process one should pay attention that no metal is in the near of the search coil while pressing the ZERO button. It is therefore necessary to hold the search coil far away from metal objects and the electronics control box itself.

During operation no metal buckles or shoes containing metal parts should be worn. The same with keys, coins, rings and watches. Every metal carried by the operator can cause false signals, especially when they are located near the field of the search coil. Therefore the electronics control box has to be carried far away from the search coil, this is especially important while searching with the large frame mounted coils. Never use any regular metal screws except thin V2A or V4A

steel screws with less than 6mm diameter and 50mm in length when building frames for the cable coils.

The loudspeaker will give one "tick" every 1-3 seconds after having retuned the detector correctly with the ZERO button. The "ticking-rate" can be individually tuned from silent to a low frequency threshold tone with the AUDIO control. This pre-set audio tone will be recalled every time the ZERO button is operated. As the LORENZ DEEPMAX X3 offers its highest sensitivity with correctly tuned electronics, one should check the threshold tone from time to time during operation. Although a constant ticking sound is not always achievable, a threshold tone with a "ticking-rate" will give the operator the information that the detector works with its highest sensitivity.

Especially for target classification and ground balancing purposes the electronics need to be tuned for best results (see chapter 5).

The detector is now ready for use and will indicate a metal object immediately with an audio sound emitted by the way of loudspeaker or headphones. The audio frequency will rapidly rise and attains its highest frequency when the search coil is directly over the target. The centre of the search coil is the part with the highest sensitivity. Even in the direct near of the target frequency changes make pinpointing possible.

The detector works with highest sensitivity in position DELAY1 for small coils and DELAY2 for large frames. When changing the search coil the electronics need always to be retuned via the ZERO button. When lowering the search coil to the ground an audio sound may appear, this can be canceled out by pressing the ZERO button again. The distance between the search coil and the ground has to be kept at a constant height when searching afterwards. When working with small searchcoils of up to 45cm diameter it is also possible to select the AUTO function with the AUTO button in order to retune the electronics to changing ground conditions automatically during operation. The search coil therefore has to be moved at constant speed to achieve a signal

from metal objects. When resting the coil over the target the AUTO function will cancel out the signal after a short time. In the following chapter operation procedures for highly mineralised soils with ground canceling controls GROUND1 and GROUND2 are explained.

Large diameter coils like the frame mounted cable coils should be hold at heights of (10 to 60 cm) over the ground to ignore magnetic mineralised ground or small unwanted metal objects. Those coils should be moved slowly without any jerky movements, parallel to the ground and at constant height.

When many small unwanted bits and pieces or very strong signals are expected it may be advisable to select a higher delay setting selected with the DELAY button like DELAY3 for example.

In position 3 and specially while using large diameter frame coils the sensitivity to very small objects significantly decreases. This is in many cases desirable, although the general sensitivity will be less. The simplest way to ignore small metal objects is to increase the distance between the search coil and the ground. Simply raise the loop and it will still be possible to locate those deeper bigger targets. Be always sure that there is a sufficient distance between the detector or battery and the frame coil when raising the loop.

Note: *The LORENZ DEEPMAX X3 metal detector has to be retuned with the ZERO control every time a different coil has been connected. During operation only very few threshold corrections are necessary.* !

In position DELAY2 and specially in position DELAY3 the LORENZ DEEPMAX X3 works with less sensitivity for thin foils and small coins. Position DELAY1 offers the greatest sensitivity especially for very small non-ferrous metal objects like coins and nuggets. To record the conductivity (derived from the time delay of the eddy currents produced by the targets) or to distinguish between a ferrous and non-ferrous metal targets please refer to the next chapter.

5. Operating procedures II

This chapter is a kind of summary how to proceed with the LORENZ DEEPMAX X3, when locating metal, while using the two target classifications, intensity reading and the audio signal.

It is therefore in some cases possible to predetermine the exact position, the detection depth as well as the kind of metal located.

A specially developed electronic circuit makes time delay readings possible which are directly displayed on a scale of 0 to 99. Those so called conductivity readings are only known from VLF TR-Machines but not from metal detectors based on the Pulse-GBS principle. In general these readings are based on object's size, conductivity and permeability of the

target and therefore named time delay readings for simplicity.

Please proceed as described in chapter 4 and follow these additional instructions listed below.

Two person operation is necessary when using frame mounted coils. The coil has to be hold with two adjustable carrying straps at a constant height over the ground. The search mode can now be selected with the DELAY or GROUND button. Before starting to search it is advisable to adjust the threshold of the audio.

For most detection purposes the AUDIO and FREQUENCY control can be put to the marked mid-position.

When having done this it is important to retune the electronics with the ZERO-control. Proceed as described in chapter 4 and hold the search coil or frame over the ground while pressing the ZERO button for about 3 to 5 seconds.

When lowering the search coil to the ground an increasing ticking-rate of the audio can be audible in some cases, especially when DELAY1 or DELAY2 is selected.

This can either be generated by a metal object or mineralised ground. When expecting mineralised grounds with high iron oxide content the search coil can simply be raised again, (10 to 50 cm) depending on the coil and the LORENZ DEEPMAX X3 can simply be tuned to the ground conditions while holding the coil at a constant height and pressing the ZERO button for a second. Pay special attention to metal objects in the near of the search coil which may cause false signals and therefore a false retuning process.

! *Note: It is always advisable to carry the detector and the separate battery pack as far away from the search coil as possible. This is absolutely necessary*

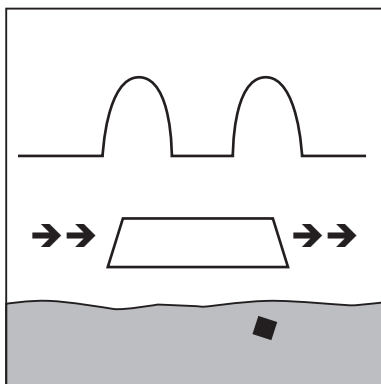
to avoid false signals caused by metal parts of the electronics control-box.

The search coil should be held at a constant height while searching. In many cases it is advisable to search in a systematically manner with a certain grid which can be marked on the ground for example. The small (26cm ; 35cm ; 45cm) diameter search coils can be supplied with a telescopic S- pole which is held at constant height and in parallel to the ground. The coils have to be moved from side to side with overlapping tracks to detect even the smallest metal pieces which can sometimes only be detected in the centre of the search coil as this is the most sensitive part. Although the response speed of the LORENZ DEEPMAX X3 is very fast, the search speed should not exceed 2 meters per second.

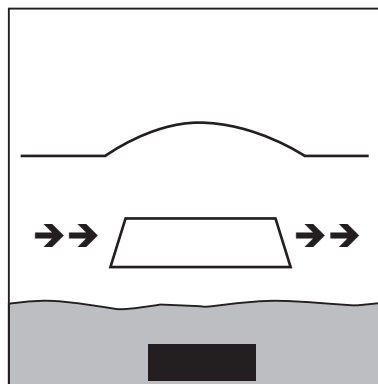
When a metal object is located try to find the place with the strongest signal which means highest indication on the INTENSITY bargraph and highest audio frequency. Size, shape and depth information can be derived from the audio sound in some cases with some experience. Small objects like single coins will be indicated with a short and intensive signal when a small coil is used.

Coins and nails and very small pieces of metal will cause two indications when passing them with a frame mounted search coil (1 m x 1m) for example. This is mainly because those small objects are out of the range of the large coils and therefore will only be indicated at the edges of the frame coils and only when they are very close to it. Large metal objects will give an extensive signal with a longer duration, and therefore can easily be identified. Deeply buried metal objects will generate a weak and slowly increasing audio sound and intensity meter

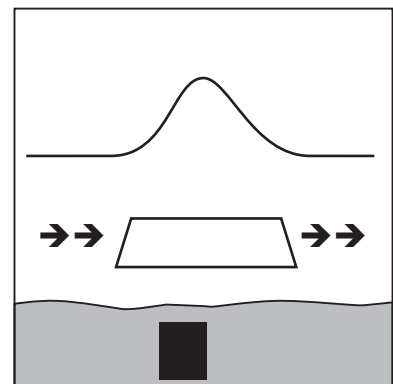
Signal intensity



small object at the surface



large object buried deep



medium size object

reading. Objects which are closed to the surface generate a strong and rapidly increasing signal.

Large objects will cause a signal with a long duration especially when located with large frame mounted cable coils. For example a metal box 20cmx20cm can give a signal of up to 6 m in length when passing with a (2 m x 2 m) coil for example. It is therefore necessary to find the center of a buried object by the way of the audio and INTENSITY bargraph. This is achieved by moving the coil from different directions slowly towards the strongest indication. In many cases

it is of great help to use an additional smaller coil when pinpointing a target. The centre of the search coil is always the most sensitive part.

When having found the place with the strongest indication the time delay indication will come on with a number when the signal is strong enough. When double D coils are in use an additional ferrous / non-ferrous indication will appear on the LC Display. Therefore the GROUND 2 control has to be tuned properly as shown in the next chapter to avoid false indications produced by the ground. Larger ferrous metal pieces will also be indicated as being non-ferrous.

5.1. Ground excluding GROUND 1/2/3

These two ground excluding filters can be selected with GROUND button and work in conjunction with the corresponding GROUND1 and GROUND2 controls in order to cancel out signals from magnetic soils or single stones with high iron oxide contents. Even some iron objects can be discriminated/ eliminated by the way of the same controls.

For tuning purposes please go on as follows. Select the GROUND settings 1, 2 or 3 if false signals from magnetic stones or soils occur. Hold the searchcoil about 1m over the ground. Press the GROUND button repeatedly if necessary until the desired position is displayed on the right hand side of the screen and wait until the tuning process is finished. When pressing the GROUND button the function starts to flash in the display as long as the tuning process is working. A short beep sound will indicate that the detector is ready for use. If the detector has been tuned before you are ready to go searching if not go on as follows.

Before the compensation to the ground is performed the electronics need to be tuned. Therefore be sure that the AUTO- function is turned off. Firstly the connected search coil has to be hold horizontally at least 1m over the ground in the air where there is no metal, while simultaneously pressing the ZERO button for about three seconds. Secondly the Searchcoil can be lowered to the ground or hold directly on a magnetic stone. An audible sound will appear most likely. When having selected the GROUND1 function the signal can be completely canceled by adjusting the corresponding GROUND1 control to either the left or right direction. When approaching to the minimum indication the audio will disappear. When moving the control further, a signal will be audible again. Try to find the place

with the lowest indication and leave the control in this position.

Afterwards the coil can be raised in the air. The LORENZ DEEPMAX X3 should now be silent even if the coil is lowered to the ground again. If still indications occur it may be possible that the Detector has been tuned to a piece of metal in the ground. In this case simply repeat the same procedure at a metal free place. The tuning process is the same with the second ground canceling circuit GROUND2 and could be performed with the GROUND2 control after having turned on the GROUND2 function. The GROUND2 function was mainly developed to receive signals even from some iron and bronze objects producing almost the same signals as some types of ground. Both filters could be selected at the same time to achieve highest sensitivity for most types of metal objects when GROUND3 is selected. The Detector will distinguish automatically between the two signals and will use the stronger signal of the two. In most cases however the GROUND1 function will be sufficient. It is not necessary to run through the whole tuning process every time the ground properties changes. It is also possible to alter the settings of the two controls GROUND1 and GROUND2 when GROUND3 icon is on the Display and the coil is lowered to the ground. When changing the coil the ground compensation has to be retuned again. If changing ground conditions are expected the 35cm double D-coil and GROUND1 position will be the best choice. When Double D coils are in use the GROUND2 function works different to the previous explained single coils. The detection depth to many non-ferrous metal objects will be significantly increased when GROUND2 or 3 is in use with that coil. In some cases however temperature changes

might cause a drift of the audio and the detector therefore has to be retuned with the ZERO button from time to time or the AUTO function has to be selected to cope with this matter. When having selected the AUTO function some iron targets will respond with a slowly decaying double or triple signal every time the coil passes a metal object.

With turned on GROUND – function the LORENZ DEEPMAX X3 works with reduced sensitivity. Some iron objects and very few non-ferrous metals with a similar signal response as iron will be indicated less

sensitive. It is even possible to eliminate large or small iron objects when selecting a special GROUND setting. Signals will still occur when the distance between the coil and the target is too small because of signal overload. Most metal objects will be detected with almost the same sensitivity as without ground balancing circuit. An increase in interferences with turned on GROUND function due to powerlines and radio transmitters will be realized. The amount of interferences could only be reduced by the way of changing searchcoils or setting the FREQUENCY control to a different position.

5.2. Target classification

In order to get further informations from the buried metal object the target classification can be used. The two target classification features offered with the LORENZ DEEPMAX X3 are based on different working principles. The time delay reading is static therefore no motion of the coil is necessary to make a reading 00 to 99 possible. This is especially of great advantage when identifying deeply buried metal objects with the highest sensitivity possible. The calibrated target classification will directly display the time delay with all coils connected. The FERROUS / NON-FERROUS indication is a motion type which will appear with the 26cm or 35cm double D coil connected only when the coil is moved over the target. Weak signals which are out of the range of the target classification can not be identified.

The conductivity reading is very precise. It will be stored as long as the coil is over the target and will disappear when passing the target with the coil. When having located a target proceed as described in the following steps:

Conductivity meter-reading	Possible Metal object
0-10	coin, ring, ringpull, aluminium-foil, gold-coin
10-20	bronze-coins, silver-coins, nickel
20-30	softdrink-can, small pieces of iron
30-50	ferrous metal objects, nails
50-60	iron-box, weapons made of iron
60-80	medium sized bronze, copper, silver-objects
80-100	big bronze, copper, silver, gold-objects

- Slowly move the search coil from the side at constant height towards the located target. Try to find the centre of the target with the audio signal. As soon as a certain intensity of the audible signal is reached a time delay reading will be performed by the LORENZ DEEPMAX X3 automatically. This will be indicated with a number between 00 and 99 on the screen.
- Compare the displayed number with the following table. Therefore the search coil must be held over the target on the ground in order to store the conductivity value. For better accuracy the conductivity reading can be repeated. Therefore the coil has to be raised in the air or moved to the side until the first reading disappears. Afterwards the coil can be lowered to the ground towards the target until another meter reading is performed by the LORENZ DEEPMAX X3.

Note: The TIME DELAY indication can also be locked near 00 when very small coins or gold nuggets are indicated. This target classification will work in any position and with any searchcoil connected. **!**

Note: Especially when expecting very strong signals and mineralised soils at the same time it is often advisable to hold the coil at a higher distance over the ground. This will help to ignore magnetic soils, because the coil is out of the range of the ground. This will increase the performance and accuracy of the classification circuit and makes it easier to locate and identify these targets. In most cases however a special circuit will suppress the false readings derived from magnetic soils effectively, even if the coil is close to the ground. **!**

When expecting very deep targets it will sometimes not be possible to perform a reading because the indication is always about 30 to 50% less sensitive than the audio signal or intensity bargraph.

Some smaller pieces of bronze may be indicated with a time delay reading between 50 and 60 namely the same as some ferrous metal objects. At the same time the LORENZ DEEPMAX X3 does not suffer from anomalous effects like VLF-TR- sinewave detectors do. Therefore very big ferrous metal objects will not cause a higher reading than 60 in most cases. If ferrous and non-ferrous metal objects are simultaneously located by the search coil the target classification circuitry will display the conductivity of the larger metal object on the screen. The reading may also lie between the two different kinds of metal.

The TIME DELAY target classification of the LORENZ DEEPMAX X3 will work with all available coils. It is capable to identify deeply buried big metal objects and small objects near the surface. The universal cable coil should not have more than three windings (turns) for identification purposes. It is often helpful to start with "in-air" tests in order to see how the detector responds to different metals.

It is necessary to find the centre of the target. The search coil therefore has to be crossed directly over the target in order to find the point with the strongest signal. Highly mineralised soils, electromagnetic interference from power lines or transmitters can cause inaccurate conductivity meter readings especially in urban areas. (see chapter 8).

Some nails or longer ferrous objects produce different signals when passing them with the coil.

Note: *When expecting heavily mineralised soils it is necessary to tune the detector to the ground first as described before.* !

The FERROUS / NON-FERROUS target identification is of great help when classifying smaller objects in weakly or medium mineralised soils at detection depths between 10 and 70cm.

6. Searchcoils/Accessories

Different search coils can be connected to the LORENZ DEEPMAX X3 for special search and location purposes. In general small search coils offer great detection depths on small metal objects while large search coils offer the highest possible detection depths on big objects. The possible detection depths also depend on the setting of the detector, the kind of metal the shape of the metal object and slightly on the type of ground below the search coil. The low sensitivity for small metal pieces in conjunction with the very high sensitivity for bigger and deeper targets make the LORENZ DEEPMAX X3 especially useful when using it with large frame mounted search coils. The maximum detection depths achievable with a 1m x 1m frame mounted search coil are very high and can be increased when enlarging the search coil to 1,5m x 1,5m, 2m x 2m or 3m x 3m. Of course it will no longer be possible to detect single coins or nails with those large frame mounted search coils. In this chapter different search coils available with the LORENZ DEEPMAX X3 are described. (see chapter 11 for detection depths)

26 cm search coil

This search coil was mainly developed for the location of very small metal objects which are close to the surface like coin sized metal objects for example. The maximum detection depth is limited by the size of the object and the coil.

This search coil can be useful while pinpointing large metal objects which have been located with a frame mounted search coil before. Deeply buried metal objects can be out of the range of the small 26 cm search coil and therefore can only be detected with frame mounted search coils.

The 26 cm search coil is waterproof and therefore can be used in saltwater for example. Single coins can be detected at 20 to 40 cm even in different kinds of ground or conducting saltwater.



26cm double D search coil

A special double D version of this coil with separate transmitting and receiving coils is also available. This coil makes FERROUS / NON-FERROUS indications on the display of the LORENZ DEEPMAX X3 possible.

Note: *The electrical properties of the double D search coils may change when mechanical tension is produced in the coil when being used not properly. Searchcoils therefore are not covered by warranty for that reason.* !





35 cm - search coil

This highly sensitive search coil has got very good depth capabilities on single coins and medium sized objects. A telescopic pole with armrest (accessory) is necessary for any of the small search coils (26 / 35 / 45 cm).



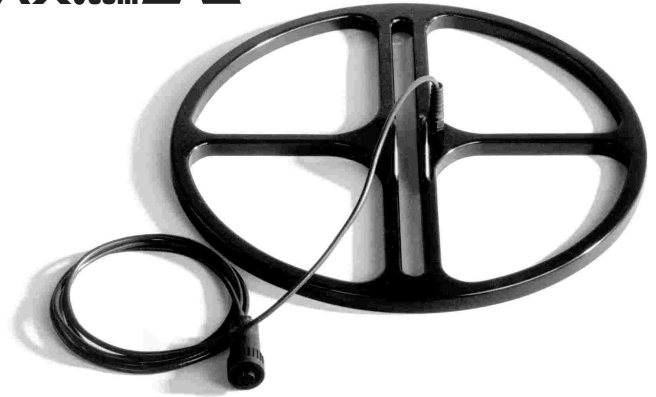
35cm double D search coil

Separate transmitting and receiving windings offer more stable operation on soils with changing contents of iron oxides (minerals) in some cases. Pinpointing small metal pieces is easy with this coil, which can be used for most search applications. The FERROUS / NON-FERROUS target identification does only work with the 26cm and 35cm double D searchcoil.

! ***Note:** The electrical properties of the double D search coils may change when mechanical tension is produced in the coil when being used not properly. Searchcoils therefore are not covered by warranty for that reason.*

45 cm - search coil

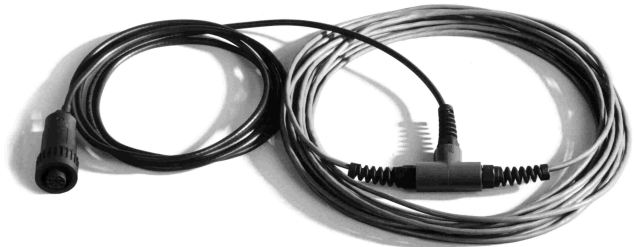
This search coil can be operated by a single person with the S-rod-handle. It offers extreme depth ranges on either single coins or bigger objects buried deep in the ground. Depth ranges of more than 1 m for a metal object of the size of a soft drink can (0,33 l) or up to 50 cm on a single gold coin with 25mm diameter make this coil interesting for a lot of different search and locating purposes.



Those extreme depth ranges on medium sized and bigger metal objects make frame mounted search coils unnecessary in some cases. Small items can be eliminated by increasing the distance between the coil and the ground or while selecting DELAY2 for example. This 45 cm coil covers more ground than a 26 cm coil does and therefore makes very effective searching possible.

Those small objects can easily be identified by the way of the target classification. Coins with a diameter of less than 15mm should rather be detected with smaller search coils.

Universal cable coil 8 m



This extremely lightweight and easy to transport universal cable coil offers a variety of different search coils for different search applications. The cable coil has to be fixed with tape on a frame which can be made of inexpensive PVC-tubes for example. The following search coil configurations are mainly useful for the location of metal objects with a surface of at least 6 cm x 6cm or fist sized metal objects for example. Small metal pieces like single coins or nails will be indicated with poor sensitivity or will even be eliminated in some cases because they are out of the range of those frame coils. It is very easy to cover a large area with frame coils in a short time. This is especially useful when looking for bigger deeply buried metal objects while ignoring those smaller metal pieces at the surface.

The following frame mounted search coils have to be carried by two persons with adjustable carrying straps. The search coil should be hold in parallel to the ground at a constant distance of 10 to 60 cm. The electronics control box should always be carried far away from the field of the search coil. It is also necessary not to wear any clothes with metal when operating the LORENZ DEEPMAX X3 to avoid false signals.

0,67 m x 0,67 m universal cable coil (3 windings)

The universal cable coil has to be arranged to a 3 winding search coil and has to be fixed on a 0,67m x 0,67m frame made of PVC-tubes for example. Never use any regular metal screws for the construction of a frame! Only V2A or V4A screws with less than 6mm diameter and less than 50mm in length may be used to fix the frame. This is the smallest frame mounted search coil which offers extreme detection depths for smaller and medium sized objects. Metal fragments and some coins will still be indicated. The maximum detection depth is limited below the bigger frames but higher than with a 45cm diameter coil. This 0,67m x 0,67m coil receives less interference from power lines or transmitters than larger 1m x 1m or 2m x 2m coils do. (see chapter 8).

1m x 1m universal cable coil (2 windings)

The universal cable coil has to be arranged to a 2 winding search coil and has to be fixed on a 1m x 1m PVC- tube frame for example.

Searching with the 1m x 1m frame coil is mainly advisable when looking for fist sized or bigger metal objects buried deep while ignoring small coins, nails and pieces of foil at the surface of the ground. The possible detection depths with this particular frame coil are very high compared with standard sinewave VLF-TR-detectors (see chapter 11). This is one of the reasons why this particular search coil is used for most professional applications.

The detection depths are in some urban or areas where a lot of small iron pieces are present even higher than those achievable with much more expensive magnetometers which can detect ferrous metal objects only. The LORENZ DEEPMAX X3 is specially sensitive to many non-ferrous metal objects no matter which coil is connected.

Large areas can be covered in a short time. Best results are achieved with metal objects having a surface of at least 10cm x 10cm. Because of the size of the coil most of the small metal fragments will be ignored. However bigger nails can be identified with the time delay target-ID. Most of the nails and other metal fragments can be easily eliminated by increasing the distance between the search coil and the ground. Even at distances of up to 50 cm there will only be negligible detection depth losses when locating large metal objects. This frame

coil has to be carried by two persons with the supplied carrying straps.

The high depth range of the 1mx1m frame coil is achieved with its intense and therefore deep going magnetic field transmitted. The detection depths listed in chapter 11 have been recorded with different DELAY settings. In some cases detection depths in wet, conducting ground are slightly higher or lower than listed in chapter 11.

For even higher Detection depths use the 12m cablecoil which can be arranged similarly to the 8m cablecoil to 1m x 1m, 1,5m x 1,5m and 3m x 3m for example.

1m x 1m frame coil



1m x 1m frame coil with cable inside tubes
This is a very user friendly 1m x 1m coil with the same electrical properties as the universal cable coil with two windings as described before. The main advantage of this particular search coil is its simple assembly, which can be performed in a few steps. The disassembled coil is easy to transport and will always be ready for use.

The coil cable is protected inside the tubes and therefore can be used even under the worst environmental conditions. Two adjustable carrying straps are supplied with every frame coil.

2m x 2m frame coil

The universal cable coil has to be laid to a single turn on a metal free frame and has to be fixed with tape for example.

This particular search coil covers four times as much ground as a 1m x 1m frame coil does. It should only be used when searching for metal objects with a surface of at least 20 cm x 20 cm pointing towards the coil. Smaller targets will be located less effectively than with a 1m x 1m frame. This is mainly because it will become more difficult to pinpoint those smaller objects with the large coil. The maximum detection depth is very high and can only be increased with the 12m cablecoil arranged to a 1,5m x 1,5m or 3m x 3m frame. Very high detection depths can be

achieved when locating large objects like several drums or ammunition deposits or bombs buried deeply in the ground. The 2 m x 2 m frame coil can be carried by two persons without any carrying straps (at a distance of about 80cm towards the ground). This is particularly useful when trying to ignore medium sized metal objects which are smaller than a horseshoe for example. Coins and nails will no longer be detected when doing this.

The 2m x 2m coil acts as a large aerial for medium wave transmitters. Therefore smaller frames like the 1m x 1m coil will be of better choice when working in urban areas. The next coil described will be less sensitive in general but won't suffer from electromagnetic interference of transmitters, power lines or the ground itself.

1m x 2m compensated framecoil

In order to construct this compensated coil the coil cable has to be laid to the figure of the shape of an eight (8) first. The coil cable has to be fixed on a 1m x 2m frame with a centre part which divides the frame into two 1m x 1m frames. The cable has to be laid and fixed twice on the centre part as this is the middle of the eight (8). This type of frame mounted search coil is about 30% less sensitive than a 1m x 1m search coil. This is because of the opposite directions of the transmitted magnetic field. During the receiving phase the two coils of the eight do also work in opposite. Therefore interference and some ground indications are subtracted from each other and therefore eliminated.

Interference from radio transmitters or power lines will be almost completely cancelled. Highly mineralised grounds will be indicated less sensitive than with a 1m x 1m search coil. This compensated 1m x 2m frame mounted search coil is of great advantage when locating metal objects in urban areas where interferences are often expected. This type of coil has a very poor sensitivity for small metal objects. The minimum surface of a metal plate should be 10cm x 10cm to ensure good results when working with this coil.

Although being less sensitive, the compensated 1m x 2m coil offers good detection depths on most types of ground. The LORENZ DEEPMAX X3 will work very stable with this particular coil. The maximum detection depth is limited and below a 1m x 1m frame coil. Further informations concerning the detection depths with different coils and DELAY settings are recorded in chapter 11.

The following described 1m x 1m double frame coil will give much higher detection depths namely almost the same sensitivity range as a single 1m x 1m frame but is also capable to cancel out said interferences.

Special cablecoil 12 meters perimeter 1 m x 1 m (three windings) 1,5 m x 1,5 m (two windings) or 3 m x 3 m (one winding)

Similar to the 8m universal cable coil this large cable coil can be arranged to three different frame coils by simply fastening one two or three windings on a metal free frame with tape for example. With the largest 3m x 3m frame coil the highest possible detection depths of the LORENZ DEEPMAX X3 can be achieved. This is mainly possible because of specially developed electronics to eliminate low frequency interference and a power pulse circuit built- in the LORENZ DEEPMAX X3. The high sensitivity for large and deeply burried metal objects and the simple elimination of smaller metal fragments make these three coils interesting. The shape of these large coils should be the same as with the other coils namely round or square. It is also possible to build elliptical or different shapes but this is only achieved at the expense of sensitivity.

In urban areas the amount of interferences produced from power lines will be higher than with smaller coils and therefore again the sensitivity might be reduced. The ground balancing system GROUND1, 2, 3 should be turned off in some cases using these large coils because of the same reason. Some companies use these large frame coils with two similar coils mounted on each other at a distance of about 60 to 70 cm the same way as the double frame coil described before. Anyway it is advisable to keep a distance of at least 20 to 80 cm constantly between the coil and the ground to reduce the amount of ground effects to a minimum when using these very large coils.

1m x 1m double frame coil kit

This specially designed double frame coil kit basically consists of two 1m x 1m frame coils mounted on each other at a distance of approximately 50 cm. Because of its ability to cancel out interferences from power lines or radio transmitters it can be used in urban areas where single loop coils will suffer from false signals.

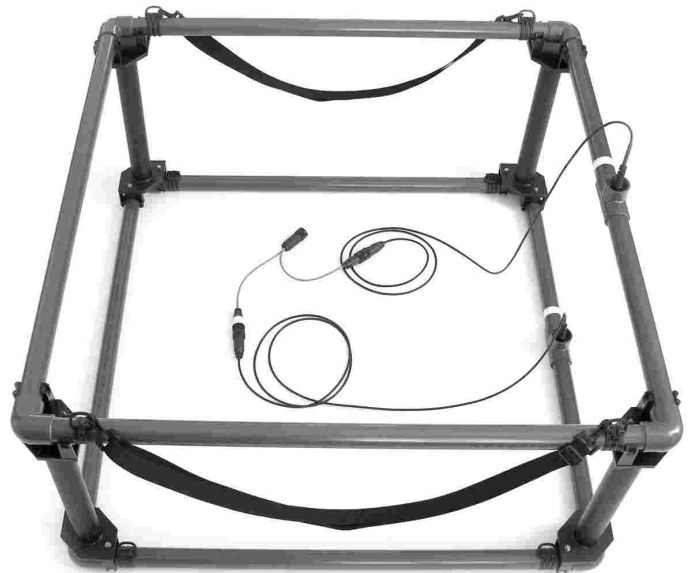
The two coils receive the same amount of interference but work in opposite directions. Therefore almost any interference is subtracted from each other while signals from the ground or metal object will pass to the electronics. It is important that the components of the double frame kit are put together in the right order as described below. The available kit consists of the following components: two 1m x 1m frame

coils; four black mounting devices 0,5m length; one adapter cable with three connectors; two carrying straps.

The two 1m x 1m frames have to be mounted on each other via the four mounting devices. They will automatically lock when pressing them together. Please make sure that both frames go in the same direction, so that the two yellow marks on the frames are pointing to each other the same way! Afterwards the marked adapter plug has to be connected to the lower frame which points to the ground. The second frame has to be connected to the other adapter plug. The third connector has to be connected to the electronics control box.

! **Note:** *It is usefull to make an operating test where the lower searchcoil pointing to the ground gives a signal when approaching to a metal piece located on the ground and the upper coil will cause in signal decay when a metal piece is approaching from the top towards the coil. This could only be performed when AUTO / GROUND functions are turned off, and DELAY is selected.*

The sensitivity of this double frame coil is almost the same as with the 1m x 1m single loop frame coil. This coil does only suffer from a very weak sensitivity reduction of less than 10 % for very deep and large metal objects. Especially when working in the GROUND mode it is very usefull to work with this particular searchcoil due to very stayble operation.



7. Battery / Recharger

The LORENZ DEEPMAX X3 is supplied with an external rechargeable battery which will power the electronics 6 to 10 hours depending on the coil connected and the environmental temperature conditions. The usage time will be 8 hours under average conditions.

A discharged battery should be recharged with the supplied charger. Therefore the plug of the charger has to be connected to the plug of the external battery pack and the AC- plug of the charger to the mains. The charge electronics will automatically change to a trickle charge mode when the battery is full. The battery is therefore protected and can't be overcharged. The different charge modes are indicated via the red / green light on the charger. A permanent red light indicates the standard state-charging. A green light indicates charging finished-trickle charge.

The maximum recharge time is limited at 10 hours on an empty battery. The rechargeable battery pack can be recharged at any time even if it is only used for a few minutes and the capacity is still very high.

! **Note:** Never forget to turn off the detector immediately after the audio beep alarm sound comes on to protect the battery pack.

The following safety information must be read before using the charger supplied with every LORENZ DEEPMAX X3 detector:

- please read the user instructions before using the charger
- for indoor use only (protect against moisture)
- never try to charge ordinary non-rechargeable batteries!
- do only use to recharge 12V/ 7,2Ah Panasonic lead battery-packs available from the manufacturer of the LORENZ DEEPMAX X3
- rechargeable batteries supplied with the LORENZ DEEPMAX X3 contain chemical substances they are subject to special waste disposal.

Charger specifications

operating temperature: 0°C bis +40°C
 storage temperature: -40°C bis +70°C
 input data: UE = 100-240 V / 50-60 Hz / 250mA/18VA

When disconnecting the charger from the mains it is important to disconnect the plug from the battery pack as well to avoid a slow discharge of the batteries. The supplied charger has got a wide range of input voltages in order to fit with any country mains. In conjunction with the interchangeable AC- plugs it is designed for worldwide operation. Four different detachable AC- plugs are available at the manufacturer of the LORENZ DEEPMAX X3 namely: USA, UK, Europe, Australia.

! **Note:** Only spare parts and accessories available from the manufacturer of the LORENZ DEEPMAX X3 should be used.

To guarantee a long lifetime of the battery pack it should never be completely discharged, as this can result in a loss of capacity or complete damage of the battery.

! **Note:** Do never forget to turn off the LORENZ DEEPMAX X3 when it is not in use or when planning to store it. Disconnect all plugs from the control box when transporting it.

The capacity of the built-in battery can always be checked when turning the LORENZ DEEPMAX on with the Battery icon in the middle of the LC Display. If it is lower than 2 bars the battery is nearly empty and less than 1 hour usage time can be expected. When disregarding the beep alarm tone the battery can be completely discharged. Resulting damages of the battery can not be covered by warranty.

The battery pack can be recharged at any time no matter if the battery pack is already full or empty. The life time of the supplied battery pack is limited to five years. After this period of time the capacity of the battery will constantly decrease, which makes an exchange necessary.

In order to exchange the battery simply disconnect the battery connector from the electronics control box and open the battery compartment on the rear of the belt. When exchanging the battery make sure that only the original 12V / 7,2 Ah battery available from the manufacturing firm of the LORENZ DEEPMAX X3 is connected to the electronics.

! **Note:** Please make sure that the connector of the battery pack is always kept clean and that no conducting material is in the near of the connector when storing it. It is always necessary to take special precautions of avoiding short circuits when handling with battery- packs!



8. Interference

The LORENZ DEEPMAX X3 was developed to ignore most magnetic interference received by the search coil. In some cases however there is very strong interference produced by power lines, railroad tracks or transmitters which are very difficult to suppress with electronic circuits as they are many times more intense than a signal received from a metal object for example. Several filter circuits have been added to the LORENZ DEEPMAX X3 to suppress most low frequency induction. Especially in the near of power lines interference can be noticed with false signals or rhythmic signals which cause indications on the screen or an audio response.

In urban areas, near transmitters or when other metal detectors are working close to the LORENZ DEEPMAX X3 interferences could also be expected. In general interference will increase with the size of the search coil. Interference received with large coils is often accepted in respect of the high sensitivity still offered with those particular coils. In some cases interference can be so intensive that it is simply impossible to work with the LORENZ DEEPMAX X3. Therefore it will sometimes be necessary to change the frequency with the FREQUENCY control on the front- panel of the LORENZ DEEPMAX X3 to suppress some interference. The FREQUENCY control can therefore be turned to the left or right, until the audio sound is clear and without any rhythmic pulses. The sensitivity or the target classification won't be affected when doing this.

If it is not possible to reduce or eliminate interference by changing the frequency of the LORENZ DEEPMAX X3 it is either possible to put the AUDIO control to a lower setting until the "noise" disappears or to change the size or kind of the search coil. When setting the AUDIO control to the left the sensitivity of the LORENZ DEEPMAX X3 will be reduced, but the amount of false signals will also be greatly reduced. When connecting a smaller search coil the amount of interference can also be reduced. The compensated 1m x 2m frame mounted search coil or the different double frame coils do not suffer from interferences, false indications are simply reduced when using these coils. This will always guarantee a very stable operation of the LORENZ DEEPMAX X3 even under the worst environmental conditions like temperature changes, mineralised grounds or magnetic disturbances. For the detection of smaller objects the available 1m x1m double frame coil should be rather used than the compensated 2m x 1m (eight (8) shaped) coil. This

specially designed frame coil is capable to eliminate interference while offering detection depths similar to a single loop 1m x 1m frame coil because of its construction. Especially when working in the GROUND mode this coil is the best choice, as the electronics need an interference free signal to be able to cancel out the ground and to distinguish between metals.

Interference caused by transmitters and power lines can't be reduced by changing the search mode with the DELAY button. It is only possible to reduce the sensitivity to small metal objects when changing to DELAY3 setting (see chapter 3).

Note: *Low interference with clear audio response and correctly tuned (zeroed) electronics is absolutely necessary to make exact target classifications and ground excluding functions possible. The LORENZ DEEPMAX X3 has to be tuned and the right coil has to be chosen first before starting to identify metal objects.* !

The electronics unit of the LORENZ DEEPMAX X3 does not suffer from any drift in general. That means only in case of extreme temperature changes the electronics have to be retuned with the ZERO button. The same should be done after the very first five minutes of operation since many components inside the LORENZ DEEPMAX X3 control box need to warm up to their working temperature. When working with small handheld search coils the AUTO function can also be used to make the detector respond more stayable.

Ground signals which are mainly derived from magnetic iron oxides will be indicated with an increasing audio response when lowering the search coil to the ground although no metal is below the search coil. This kind of ground indication can be simply eliminated by simultaneously holding the search coil at constant height over the ground and pressing the ZERO push button for a second. (see chapter 4, 5 for further details)

As long as the coil is hold at the same height during searching there will be no loss in sensitivity after having retuned the detector to the ground. When expecting highly mineralised ground it is always advisable to turn on the built- in ground balancing System (GBS) with the GROUND push button. For further description refer to chapter 5.1.

LORENZ DEEPMAX standard equipment

- Plastic carrying case with foam padding
- -LORENZ DEEPMAX X3 electronics control box
- -adjustable shoulder and belt strap with built-in 12V battery pack
- Charger with wide range AC-input (100-240V)
- One detachable AC-plug for rapid charger (Euro, UK, USA, Australia available)
- Operating manual (English or German version available)
- Stereo headphones with 6,35 mm plug

The LORENZ DEEPMAX X3 is also available as a kit with the following items included:

- 1m x1m frame coil
- 26cm or 35cm double D coil
- telescopic S- pole with armrest for 26cm or 35cm coil



9. maintenance/service

The LORENZ DEEPMAX X3 is practically service free. The electronics control box and the other components should always be kept clean and dry. This is particularly important for the plugs and sockets, which should never be stored when being wet. The electronics control box is splash proof but not completely water proof and should therefore not be exposed to rain or extreme temperature changes. All search coils available for the LORENZ DEEPMAX X3 are waterproof. When extension cables are in use please make sure that the connectors are securely fastened so that no

water runs into the plugs as they are only water protected when connected.

All of the components can be cleaned from dust with a soft cloth if necessary. In case of false signals or any kind of unstable operation please check the capacity of the battery first. Do switch off the LORENZ DEEPMAX X3 when the beep alarm sound comes on. Disregarding this can damage the built- in battery. Damages caused by deep discharging batteries are not covered by warranty!

9.1. Service

The LORENZ DEEPMAX X3 is ruggedly designed. All necessary electronic components are placed on four printed circuit boards. The main circuit board is covered with a special plastic to protect it from rapid temperature changes and humidity.

Different components like the front panel, circuit boards, battery, connectors can easily be exchanged if necessary.

Guarantee

This Detector is guaranteed against defects in materials and workmanship for two years with the exception of batteries and accessories. The guarantee is not valid when disregarding following

- Non-observation of our guidelines in the operating instructions
- Use outside the described applications
- Alteration to or opening of the device

- Mechanical damage caused by media, liquids, natural wear and tear
- Electric installation
- Overloading of the detecting equipment

In the case of any false functions or problems occurring with your LORENZ DEEPMAX X3 detectors do contact your dealer where you have purchased your detector or directly contact us at:

Lorenz Detecting Systems GmbH
Röpkestrasse 12 • 30173 Hannover
Germany
Telephone: +49 (0)5 11 55 106 70
Fax: +49 (0)5 11 55 106 71
eMail: Lorenz@metaldetectors.de
Internet: www.metaldetectors.de
www.deepmax.com

11. Detection depths I

Used Searchcoil Metal object	26cm- coil	35cm DD-coil	45cm- coil	1m double frame square	1,5m double frame square
Gold nugget d = 5 mm	22 cm	23 cm	(23 cm) X	X	X
Silver coin d = 1,3 cm	30 cm	30 cm	(30 cm) X	X	X
Gold coin d = 2 cm	40 cm	40 cm	50 cm	(50 cm) X	X
Silver coin d = 2,5 cm	45 cm	46 cm	54 cm	(50 cm) X	X
Brass plate 10cm x 10cm	80 cm	90 cm	105 cm	145 cm	170 cm
Softdrink can 0,33 l	100 cm	110 cm	125 cm	165 cm	200 cm
Brass plate 20cm x 20 cm	105 cm	118 cm	125 cm	185 cm	240 cm
iron box 30x18x15 cm	150 cm	160 cm	190 cm	280 cm	340 cm
Fuel tank 20 l	160 cm	175 cm	205 cm	300 cm	380 cm

Detection depths recorded in medium air; Function: **DELAY 1**

X = outside the range of the coil.



11.1 Detection depths II

Used Searchcoil Metal object	26cm- coil	35cm DD-coil	45cm- coil	1m double frame square	1,5m double frame square
Gold nugget d = 5 mm	15 cm	15 cm	X	X	X
Silver coin d = 1,3 cm	22 cm	22 cm	(20 cm) X	X	X
Gold coin d = 2 cm	29 cm	33 cm	31 cm	X	X
Silver coin d = 2,5 cm	35 cm	40 cm	42 cm	X	X
Brass plate 10cm x 10cm	75 cm	85 cm	95 cm	135 cm	160 cm
Softdrink can 0,33 l	80 cm	90 cm	100 cm	130 cm	160 cm
Brass plate 20cm x 20 cm	100 cm	110 cm	125 cm	180 cm	230 cm
iron box 30x18x15 cm	130 cm	145 cm	165 cm	240 cm	320 cm
Fuel tank 20 l	150 cm	165 cm	190 cm	280 cm	370 cm

Detection depths recorded in medium air; Function: **DELAY 2**

X = outside the range of the coil.



11.2 Specifications

dimensions:

electronic control box:

26,5 cm x 9 cm x 10 cm

carrying case for LORENZ DEEPMAX X3:

40 cm x 30 cm x 22 cm

1m x 1m frame coil (collapsed):

110 cm x 15 cm x 15 cm

35cm search coil with extended S-rod: length: 145 cm

35cm search coil with collapsed S-rod: length: 115 cm

electrical Data:

Search-frequency with large/small search coils connected: 2100 / 1400 pulses per second

Audio target response freq. voltage controlled oscillator: 0 - 3800 Hz

Power source: external 12V / 7,2Ah lead battery

Usage time: approx. 6 to 10 hours depending on temperature and coil connected

Battery charger:

rapid charger with interchangeable AC-plug 100-240 V for world-wide operation

Recharge time:

max. 10 hours on empty battery

Operating temperature:

- 5° - + 55°C

Detection depths: see chapter 10

*all measurements taken without connecting cable and connector! The coils ranging from 26cm to 45cm diameter need an S-shaped shaft for operation. All search coils are interchangeable, electrostatic insulated (shielded) and waterproof.

weight:

LORENZ DEEPMAX X3 electronics control box:

approx. 1600 g

Shoulder and belt strap with battery pack:

approx. 3330 g

Carrying case with

LORENZ DEEPMAX X3 inside: approx. 7300 g

26cm single coil:

approx. 400 g*

Search coils (interchangeable) electrostatic insulated (shielded); waterproof

26cm double D coil necessary for FERROUS / NON-FERROUS indications: Weight approx. 470 g*

35cm single coil: Weight approx. 520 g*

35cm double D coil necessary for FERROUS / NON-FERROUS indications: Weight approx. 660 g*

45cm single coil: Weight approx. 620 g*

1m x 1m frame coil with cable inside tubes:

Weight approx. 2500 g

Universal cable coil 8m perimeter (can be used for 0,7mx0,7m; 1mx1m; 2mx2m and compensated 1m x 2m frame mounted search coil)

Weight approx. 380 g

Universal cable coil 12m perimeter (can be used for 1mx1m; 1,5mx1,5m; 3mx3m frame mounted search coil) Weight approx. 880 g

1mx1m double frame coil kit for interference elimination.

Adaptor cable for interference eliminating search coil systems.

12. Instructions for use: Data logger, Surfer 8 and Scriptor Software

To generate colour, image, surface or contour maps with the Lorenz Deepmax X3, additional Hard- and Software is necessary. A very sophisticated data logger function of the Deepmax X3 metal detector together with an SD- Memory-Card 6 channel data logger will take simultaneously six channels of data when you go over the ground and stores the information into memory when this function is selected.

After recording or collecting field data the Surfer 8 Software easily and accurately transforms the data stored on the SD-Memory card into colour, contour, surface, image or vector maps on a computer in minutes.

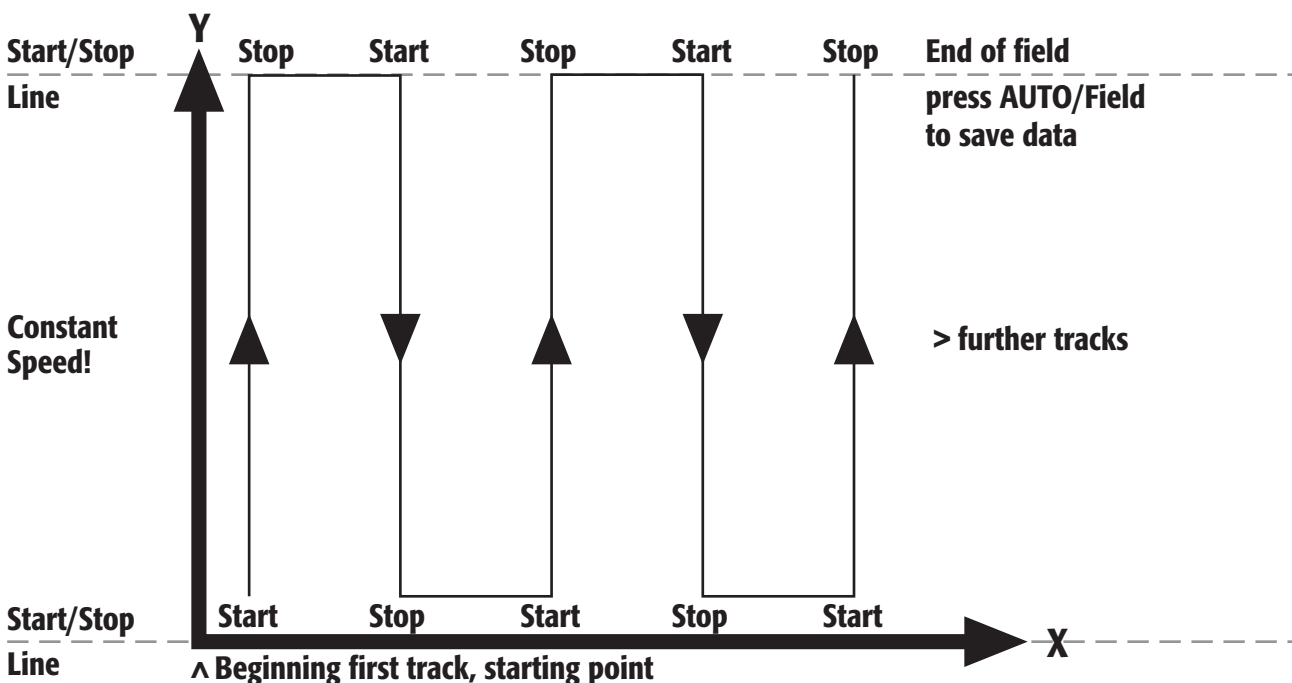
An additional Scriptor Software will therefore automatically generate twelve maps with each field. Six are two-dimensional and six three-dimensional. The operator can therefore

choose between different gridding and mapping methods. The new Datalogger Hard- and Software developed by Lorenz Detecting Systems is first of all easy- to use, very accurately working and affordable. Only three controls of the Deepmax X3 will make data acquisition a pleasure for both beginners and professionals like engineers, geologists, archaeologists, scientists and many more. The users will investigate mainly for waste disposal, meteorites, unexploded ordnance, or lost aircrafts. No non- sense or upgrade functions will confuse the operator. Six different maps will be generated simultaneously when covering the ground with multiple tracks. Each scan/ map is different depending on the electronic analysis method and therefore will not only give different sensitivity ranges but can be the key to the probable kind of metal buried in the ground. There is clearly a difference in the signature metal objects and ground conditions will give for example. Areas of disturbances in the scans will directly lead to the different metals or ground signals and therefore can be classified in some ways. The operator therefore can use the different scans to his advantage in order to choose between the targets of most interest only by comparing the different scans/ maps. Three delay channels will

produce maps with different sensitivity to small and large metal objects. Two ground channels will enable the operator to generate maps with no ground response but Z dimensions and directions for different decay curves of the eddy currents produced in a metal object. In addition the target classification channel will display the delay of the eddy currents of each signal with a certain intensity to give further information on the probable kind of metal in the ground. No matter how strong the ground is mineralised or how many different metals are located in close proximity, this new device will ensure very good results even with difficult surrounding conditions. Faults produced by the operator or the environmental conditions like overload signals from nearby metal objects for example will be immediately seen when comparing the six channels. For the professional users additional Hard- and Software will be available for storing positioning data from GPS or several Deepmax X3 detectors. Although the detector can be used with smaller search heads the data logger function is mainly developed for larger metal objects being at least 6cm x 6cm in size. Therefore frames of 1m x 1m or even bigger should be in use to achieve best results.

Recording field data with the Lorenz Deepmax X3 datalogger and Surfer Software

At the end of each track stop the same and wait approximately three seconds until a low beep sound appears before starting a new track



First ZERO the electronics, make sure that search coil is in the air and far away from any metal, than start the datalogger function with the same ZERO button. Start and Stop will be triggered with the ZERO button.

Operating procedures:

- 1.** To record field data, find a starting point where X and Y lines will meet. Put a mark on the ground to find this place again. Put additional marks in the corners of a rectangle where you plan to have a field for searching. For best results cover an area of less than 20m x 20m. Different field sizes measuring 10m x 20m for example are possible as well. Try to make marks for each line that means every 1m in X direction when planning to work with a 1m frame coil.
- 2.** Make sure that you start in the left corner of the new field with the first track! See and compare to the pictures! Afterwards you will slowly cover the ground from the left to the right, step by step with each track you are going.
- 3.** To start with the data logger, connect a search coil and a battery to the Lorenz Deepmax X3 first. Then connect the field recording instrument (data logger) with the same unit, please make sure that a SD- card is inserted! **To open the box press one finger on the hinge from the side and open with the other hand while pulling the flap simultaneously.** Fasten the small aluminium control box to the main belt with the supplied belt.
- 4.** Turn on the Lorenz Deepmax X3 with the POWER button.
- 5.** Any false operation will immediately be indicated with a special double false sound. A beep alarm will also occur when no card is inserted to the SD card recording unit. Simply turn off the unit, insert a card and turn on again.
- 6.** Raise the coil to the air away from any metal and away from the detector itself.
- 7.** Press the ZERO button shortly while still holding the coil away from any metal! A short beep sound and the attention sign in the display states the beginning of a self tuning process. After 5 seconds a lower and longer beep sound and a disappearing attention sign in the screen will display that the tuning process is performed properly and that the Data logger function is ready for use.
- 8.** Now lower the coil to the ground.
- 9.** To start the first track, go to the starting point where X and Y meet.
- 10.** Press the same ZERO button with the arrow sign and immediately start walking in straight line along the Y axis at constant speed! Try to avoid jerky movements. Keep constant height between the coil and the ground. It is most important to keep the speed constant each track. It is possible to have a different speed in each line but it should be kept constant in each line. A typical walking speed not exceeding

2m/second is perfect. Try to listen to the high beep sound every second when walking at constant speed. An arrow will built up in the display to show that the data is being recorded and that the operator should be in motion.

11. When passing the end of the track press the ZERO button again. The last track will now be stored and a second, time delayed low beep tone will indicate that the data is stored properly. The delay between the high and low beep indication depends on the length of the track to be saved.

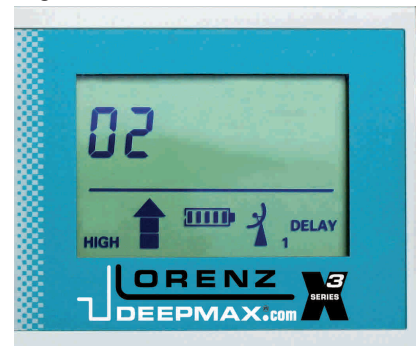
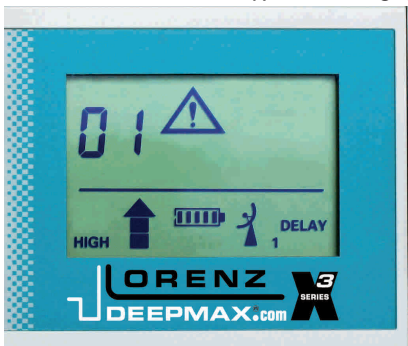
12. To start the second track simply go 1m in X direction and start the logger while pressing the ZERO button again shortly. Go in straight line in opposite direction towards the X axis. Again be careful not to change your walking speed and try to cover a new track in parallel to the track before. Covering the same track again will degrade the accuracy of the pictures derived by the software. In that case simply press the SENS button with the X sign shortly to clear the last track recorded *before you store the track with the ZERO button*. The arrow sign in the display will automatically disappear in that case. Go back to the starting point of the last track and walk the same track again pressing the ZERO button for starting as described before.

13. The next track will start at the X axis again. Small marks every meter on the X axis are of great help finding the right track.

14. When the last track is completed with start and finish, simply press the AUTO- field icon signed push button. Having done this a low beep sound will state that the complete field data is stored on the SD- Memory card. The display will automatically change to a higher number indicating that the detector is ready to generate the next field. Up to 99 fields can be generated with the Lorenz Deepmax X3. The current field will be displayed by the way of the number on the display. At least two tracks will be necessary to generate a field map a single track will cause an error with the software!

15. The Deepmax X3 can now be turned off and the SD card can be disconnected from the electronics opening the small black control housing and pushing the card to come off the recording unit.

16. To obtain very accurate signals with the two GROUND channels the Lorenz Deepmax X3 should be tuned by the way of the two GROUND 1 and 2 controls before connecting the SD card recording unit. Turn off the whole unit in



between and tune the Lorenz Deepmax X3 according to the main instruction manual.

17. During operation of the data logger try to avoid pressing the GROUND or DELAY buttons.

18. To turn off the audio from the Lorenz Deepmax X3 detector simply connect a headphone plug to the headphone jacket to turn off the built- in loudspeaker.

19. To display the recorded data on the computer please proceed as described in the following screen shots (next pages) and refer to the Surfer 8 Software handbook. A Computer working with Windows XP would be essential to install the supplied Surfer 8 single license and the additional Scripser data CD. See Instructions for installing Lorenz / Surfer8 Software for further information first!

20. Insert the SD Memory card into the SD slot of your computer. In the case that you do not have a SD- Slot on your computer please use an USB- card reader.

21. Start the computer and insert the SD card from the Data logger with field data. Double click on the Scripser logo on the front panel named: LorenzScript.bas a window called lorenzscript (code) – Scripser will come on.

22. Select Script in the menu bar and then select Run with left mouse clicks only. A second window Get File Path asking for field data will also come on.

23. Select and open the field you want to display, either with a double click or selecting and pressing open afterwards.

24. The next window Field Dimension with Track Lengths (m) and Track Width (m) will appear. The pre-selected track length is 10 meters and the track width is 1 meter, namely

for a 1m x 1meter frame. Change the pre-selected field and track sizes according to the real size of the field and press the OK button.

25. A Surfer – Plot 1 and a Surfer - Plot 2 window will come on after approximately one minute time when the computer has completed all the twelve different grids, the image and surface maps will be displayed automatically on the screen on two pages. Six two-dimensional image maps are displayed on one page (Plot 1). Six three-dimensional surface maps are displayed on the next page (Plot 2). A colour scale on the top will give further reference on the order of the colours in use, starting with purple for week or low indications and ending with red for the highest indications. The size of the field is also indicated on the X and Y axis in meters referring to the track length and width.

26. Please refer to the Surfer 8 handbook, to adjust further settings of the same software. Some of the adjustments can be easily performed by pressing the buttons of the computer screen. To adjust the settings of a single picture simply select the same with the arrow button on the top of the screen first. When selecting a single picture and performing a right mouse click choose Properties to change colours for example. Most of the buttons are self explaining like + for enlarging or – to scale down.

The different tracks will appear on the Plots 1 and 2. To understand the metres indication and the corresponding track numbers please go on as follows:

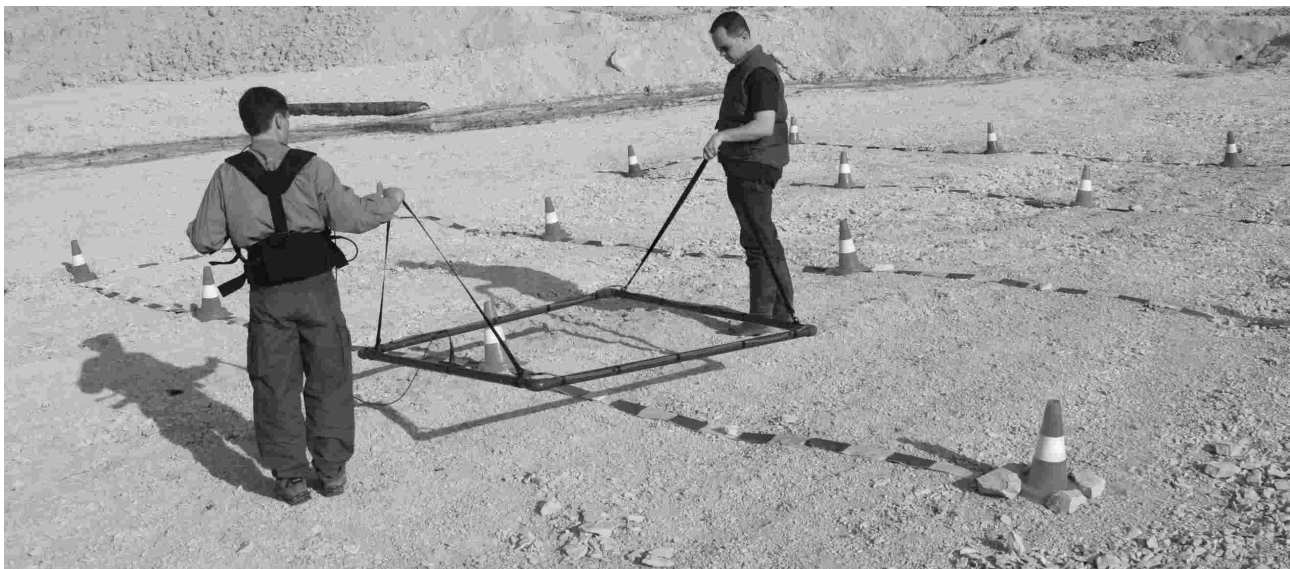
X = 0 metre = first track, X = 1 metre = second track, X = 2 metres = third track. . .

Analyzing Field Data

To analyze the different pictures generated with the software refer to the following instructions. Compared to many other systems the Lorenz Deepmax X3 and Data logger will not only generate one or several graphic representations with different sensitivity ranges for the same metal objects but also gives additional information on the probable kind of metal being located. The advantages of the six channel data

logger are as follows:

False or overload data will be easily recognized on one or two of the maps. At the same time you will find useful data on at least one or two channels. When looking at the different pictures select only these with no ground signals or with the stronger indications to avoid investigating on the small junk objects like foils, nails, magnetic soils or littered ground near the surface.



- Some signals appear on one scan and disappear on others to give the operator more advanced information on the kind of metal (decay of the eddy currents) or the surrounding ground conditions.
- It is possible to separate two or more different metal objects which give only one large indication in the Delay channels but two on the target classification or Ground channels.
- Some ferrous metal objects lying horizontally in the ground will cause a special triple signal with two low and a high indication when looking at the Ground channels.
- Signals with a fast decay of the eddy current like foils, thin plates small nails (Target classification Number 35 or lower) will generate a positive peak in the vertical Z direction in Ground 1 and 2 channels, At the same time Metal objects with a long decay of the eddy currents like

massive copper Bronze Aluminium or silver (Target classification 40 or higher) will cause a negative peak in Z direction. Ferrous metal objects will only give weaker signals and therefore a poor indication in Z direction (in the three dimensional Surface maps only)

- When looking at the Ground channels most of the ground and some of the smaller ferrous items will no longer be displayed comparing them to the Delay channels.
- On the target classification pictures stronger signals which generate a time delay reading will produce mainly a single colour dot corresponding to the delay reading on the display of the Lorenz Deepmax X3. Neutral ground will cause a purple indication. Different nearby metal objects lying in close proximity will give different colours in most cases for better selection. See table of target classification indications:

Colour on Target classification channel	Reading on the Lorenz Deepmax X3 without data logger (00-99)	Corresponding possible metal object
Purple	No Reading/ neutral	No metal or signal to weak
Blue	00 - 10	Thin foil non-ferrous
Green	15 - 40	Small ferrous nail
Yellow	45 - 60	Ferrous metal object
Orange	65 - 75	non-ferrous metal object
Red	80 - 99	Large non-ferrous metal object

Instructions for installing the Surfer 8 Software and the Lorenz Scripiter

A Computer working with Windows XP and a SD- card slot would be essential when doing the following steps. First install the Surfer 8 Software CD corresponding to the instructions on the screen. C:/program file/Golden Software/Surfer8. Do not change any default path names! When following all instructions it may be possible that a license number will be necessary. This mainly occurs when starting to work with the same program afterwards. Please use this serial number of the single license included with the data logger and Software kit you have purchased. Please send the owner registration card which is on the first page of the book to Golden Software, Inc. in order to register for a single license/ person and to receive new update software in the future.

When having done this go on to install the second Lorenz Scripiter CD. Therefore insert the Lorenz Scripiter CD to your computer and follow the instructions on the following screen shots. One file called LorenzScript.bas will appear. This one should be selected and moved (copied) to the desk top of your computer while holding the left push button of your mouse and moving it to the desk top at the same time. A new green Scripiter Logo will appear on the desk top afterwards. (See screen shots)

After following all the instructions described on the

screen shots the complete Software is installed and ready for use.

The operator therefore only has to insert a SD Memory card and a double click on the Scripiter Logo on the desktop in order to start the Software. Please proceed as described above and follow the screen shots on the next pages.

To print the generated Plots 1 or 2 simply select one of the two Plots and push the Print- Button of the Surfer Toolbar.

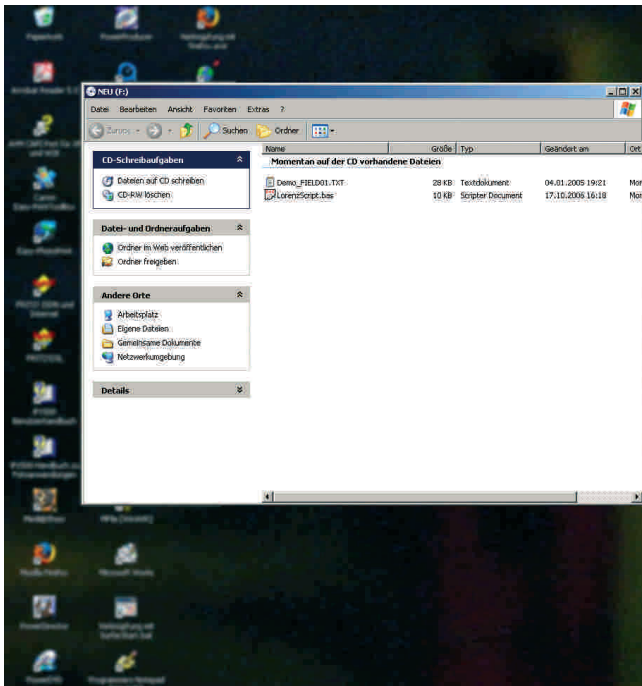
Sometimes it is necessary to delete some field data to start with new fields afterwards. This can be performed many times. In some cases however it is better to format the SD Memory card, especially when it is not working properly with the data logger any more. Make sure that you format the same card with FAT only. FAT32 will cause problems when storing data afterwards. To format the card open Explorer with a right mouse click on the Start button, select Explorer and find the drive letter of your SD card is connected to. Select the same with a right mouse click and be sure that it is the right one and format afterwards with FAT. Afterwards the card is completely deleted and ready to be used again.

Design and specifications subject to change without notice!

12.1 Important Note!

The following steps are only necessary during the installation procedure.

A computer with Windows XP, a CD-ROM drive and a SD-Memorycard slot would be essential when doing the following steps:



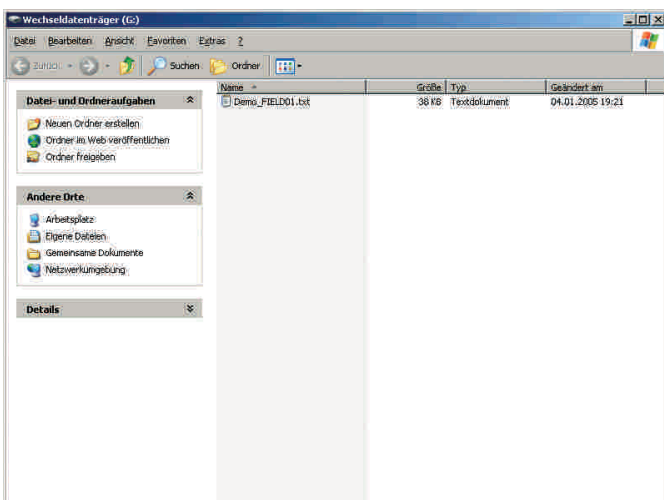
1.) Install the Surfer8 software:

Place the Surfer8 CD in the CD-ROM drive and close it. The installation program will start. Follow the instructions and don't change the default installation path C:\program file\Golden Software\Surfer8. Remove the Surfer8 CD, place the Lorenz Scriptor Installation CD in the CD-ROM drive and close the drive.

2.) An Explorer window will appear:

Then click with the left mouse button at the File "LorenzScript.bas" on the window, drag it somewhere on the desktop out of the Explorer – window and release the mouse button. Close the Explorer window. Now the file "LorenzScript.bas" appears on the desktop.

3.) Place the Memory Card with the demo – field in the card reader. An Explorer-window will appear:

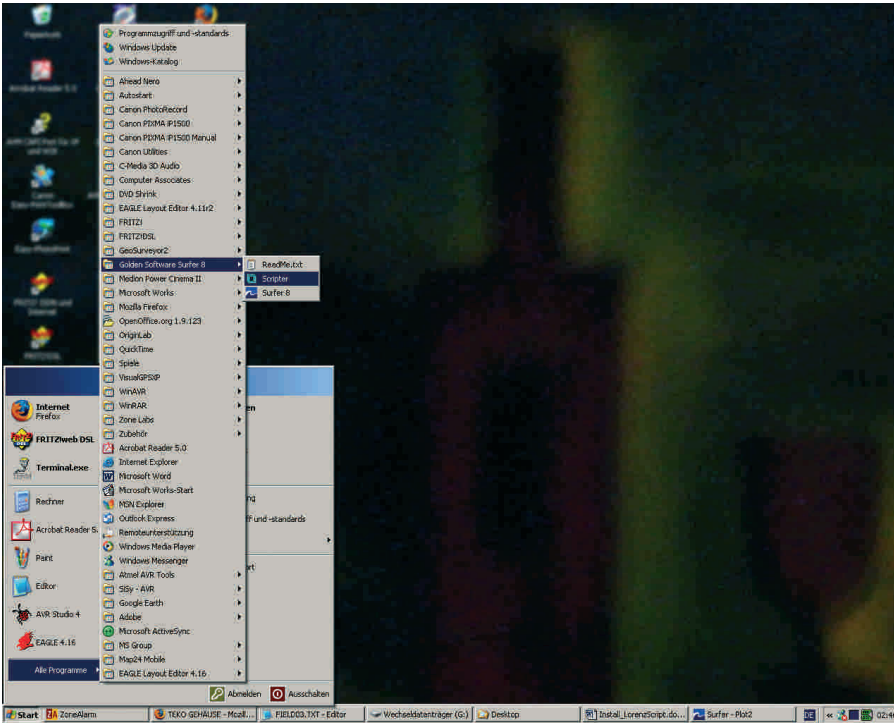


Notice the drive letter of your memory card reader, in this case it is "G:". The letter depends on the hardware configuration of your computer and can be another letter.

Now close the Explorer window but leave the SD-memory card in the slot.

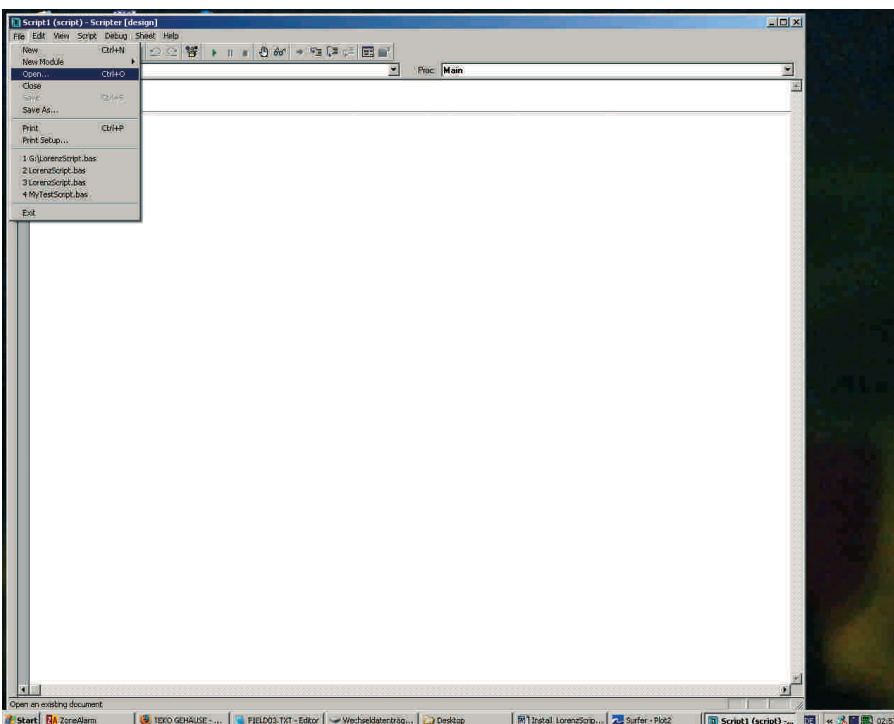
4.) Left click on the "Start" button and click "Programs" -> "Golden Software Surfer8" -> "Surfer 8". Surfer 8 will start and a window will appear where you have to type in the serial number of your Surfer 8 license. Then you can select the way to register your license at Golden Software. Then exit Surfer 8.

5.) Left click on the "Start" button and click "Programs" -> "Golden Software Surfer8" -> "Scripter".

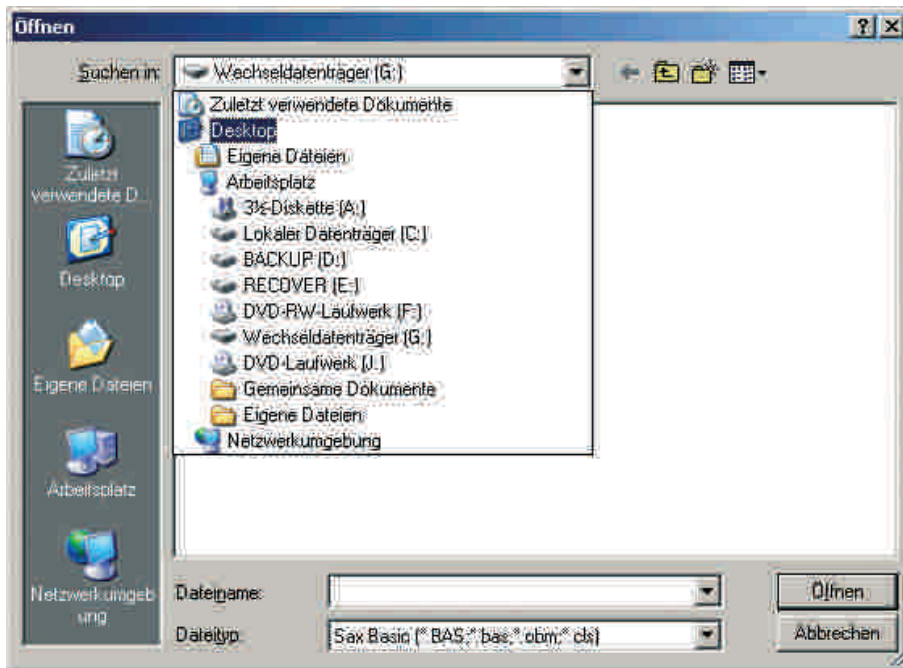


Scripter will start.

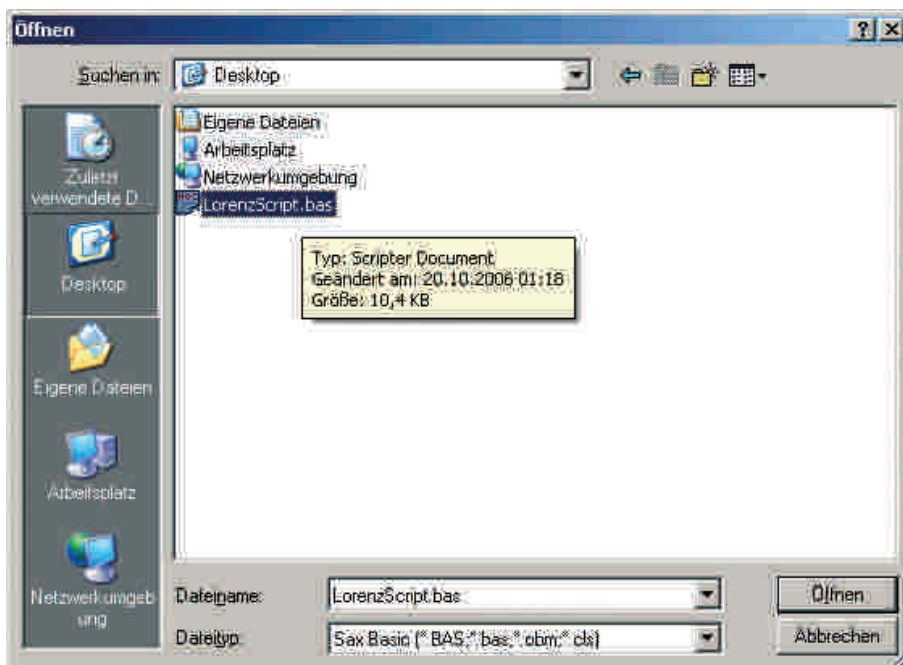
6.) Click on "File" at the Scripter menu bar and then on "Open":



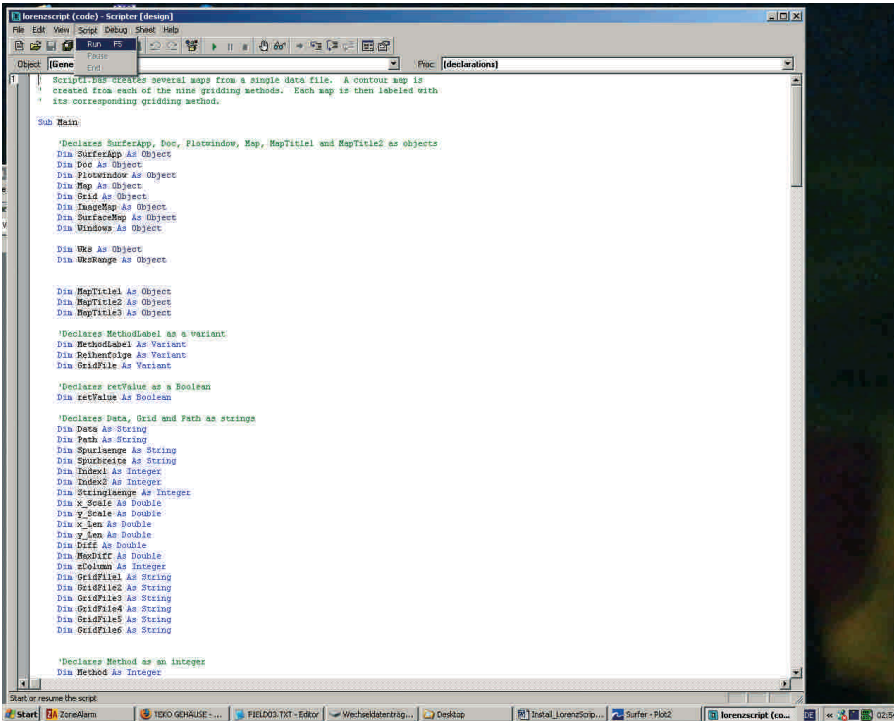
Click on "Desktop":



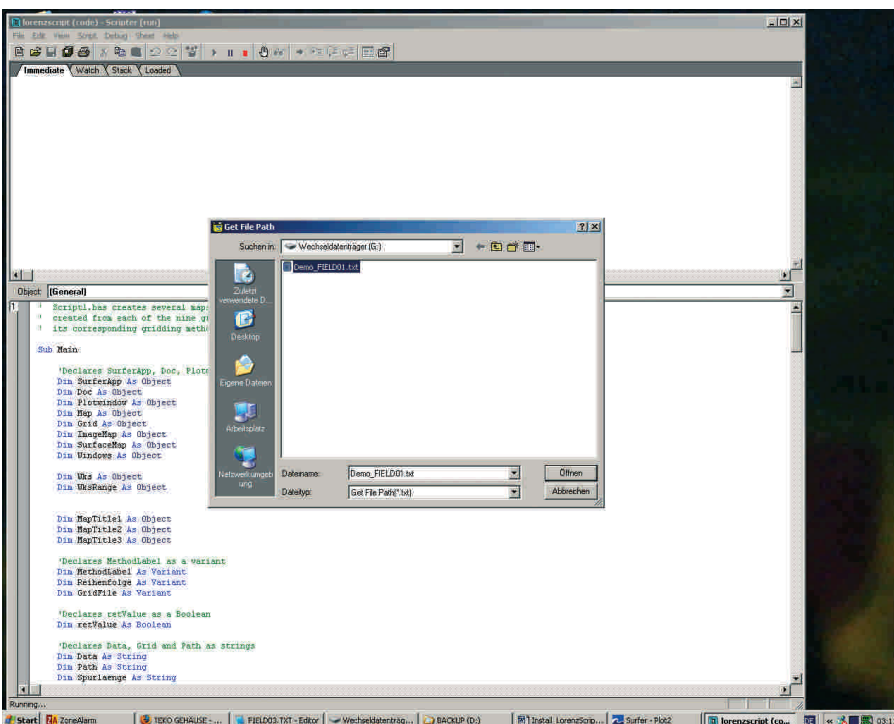
and then doubleclick on "LorenzScript.bas".



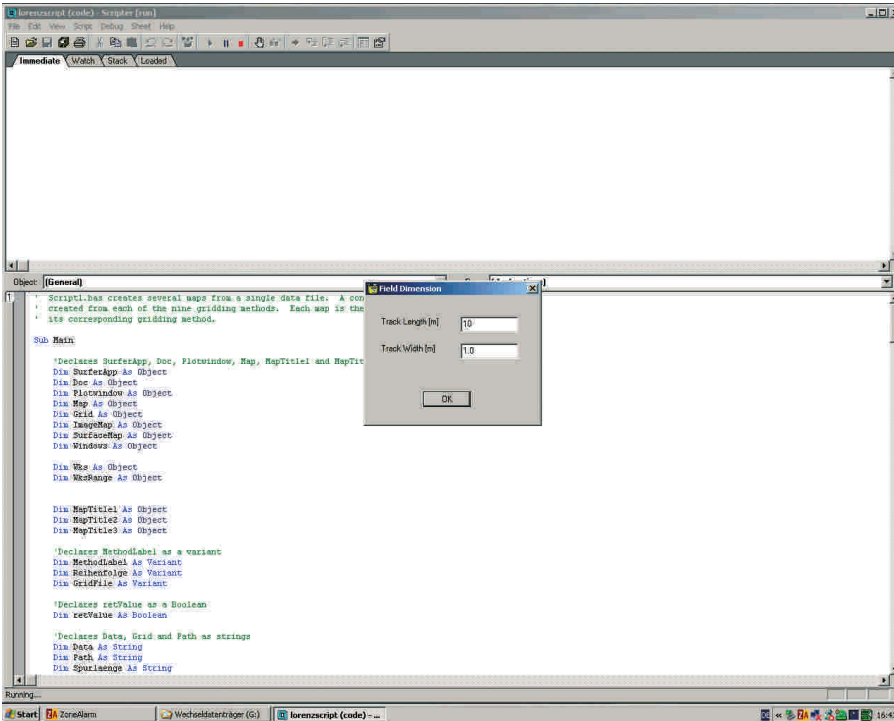
7.) Now click on “Script” at the menu bar and then “Run”:



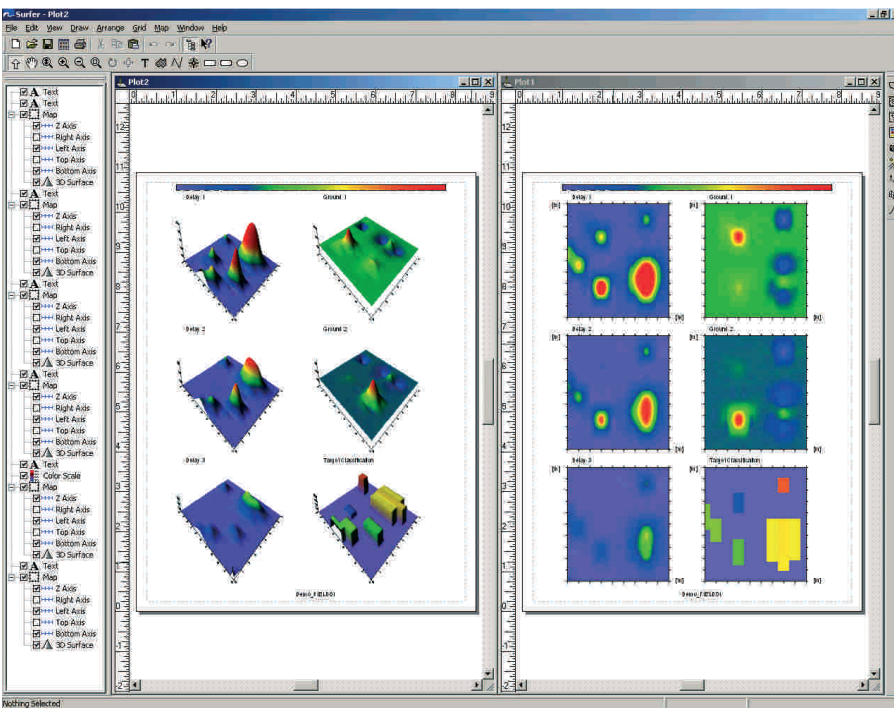
8.) Now, the script will start and opens a window, where you can navigate to the location (see step 3.) of the Memory Card Reader in your PC . Select the file “DemoFIELD01.txt” which you want to see and click “Open”.



9.) In a final step leave the default values "Track length" and "Track width" unchanged, simply press "Ok":



Now the PC will work a little while, then the following result will appear:

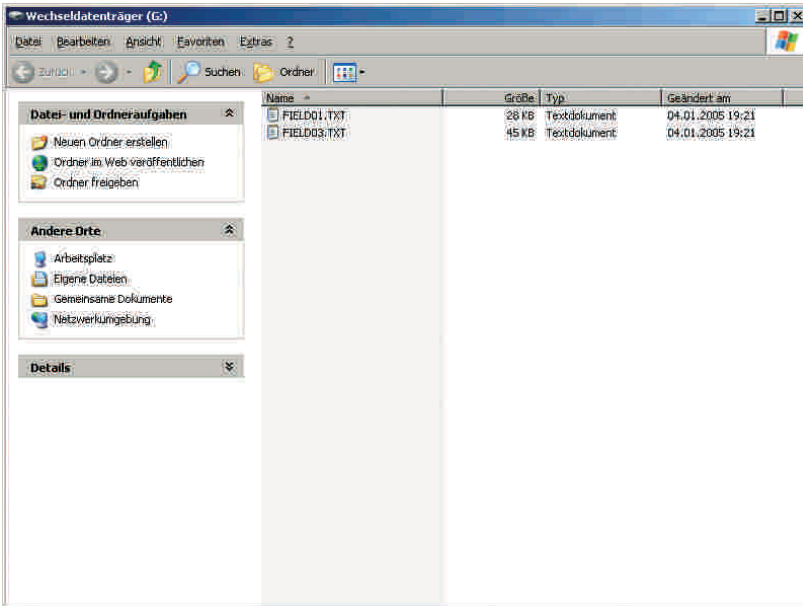


The installation procedure is complet !

Now, close Surfer and Scriptor. As a final step restart your computer. After this procedure, the software is ready for use.

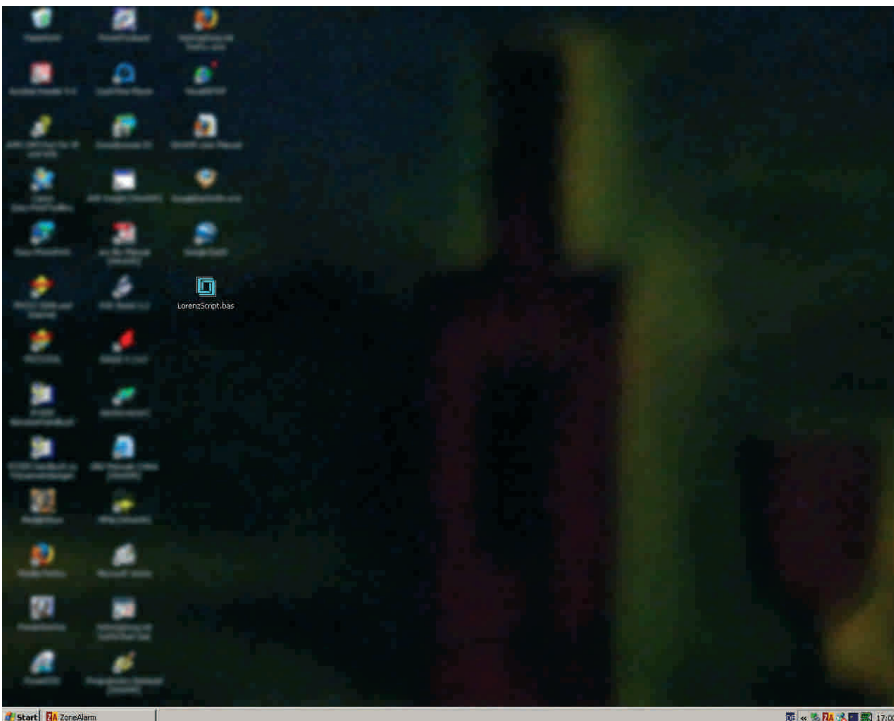
Instructions to use installed LorenzScript

- 1.) Place the SD – Memory card in the card reader.
A window similar to this will appear:



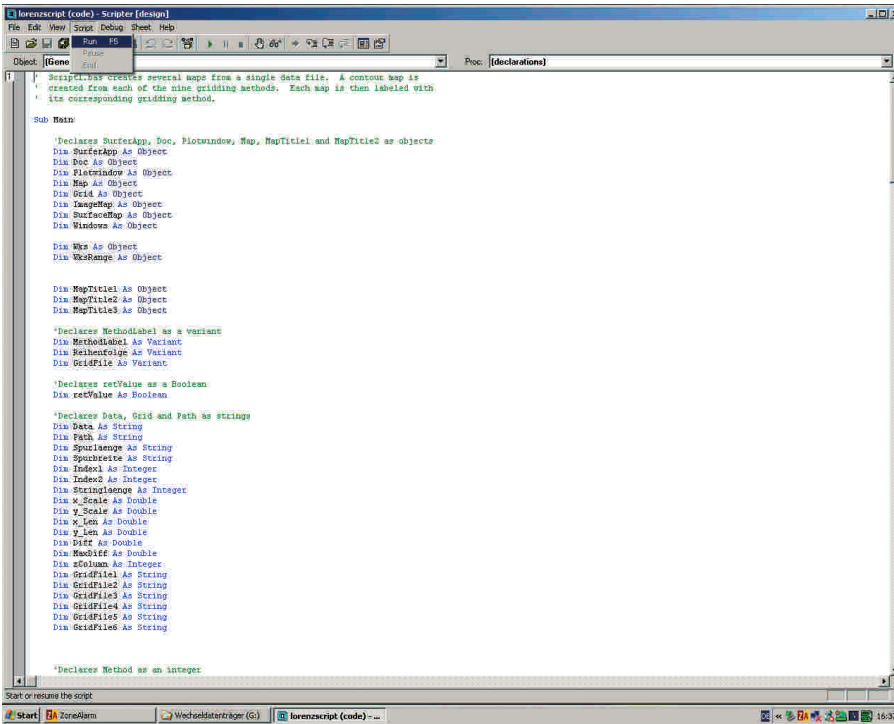
Notice that the drive letter of your Card Reader is in this case "G".
Close this Explorer window.

- 2.) Double click "LorenzScript.bas" on the desktop.

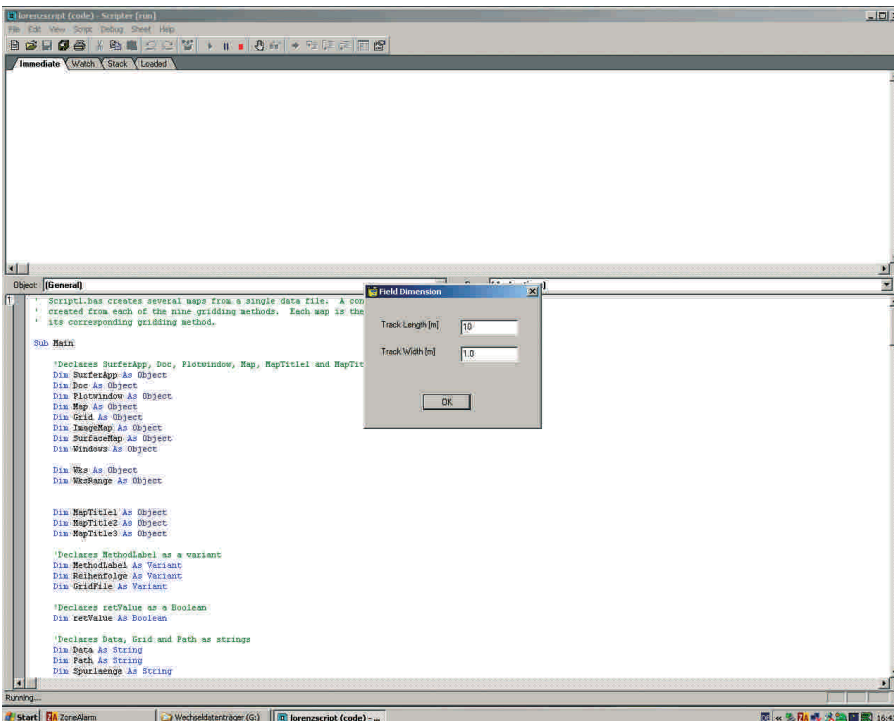


3.) Now the Scriptor-window with the loaded script file “LorenzScript.bas” will appear. The program “Scripter” can execute the scriptfile and proceed the stored data on the Memory card.

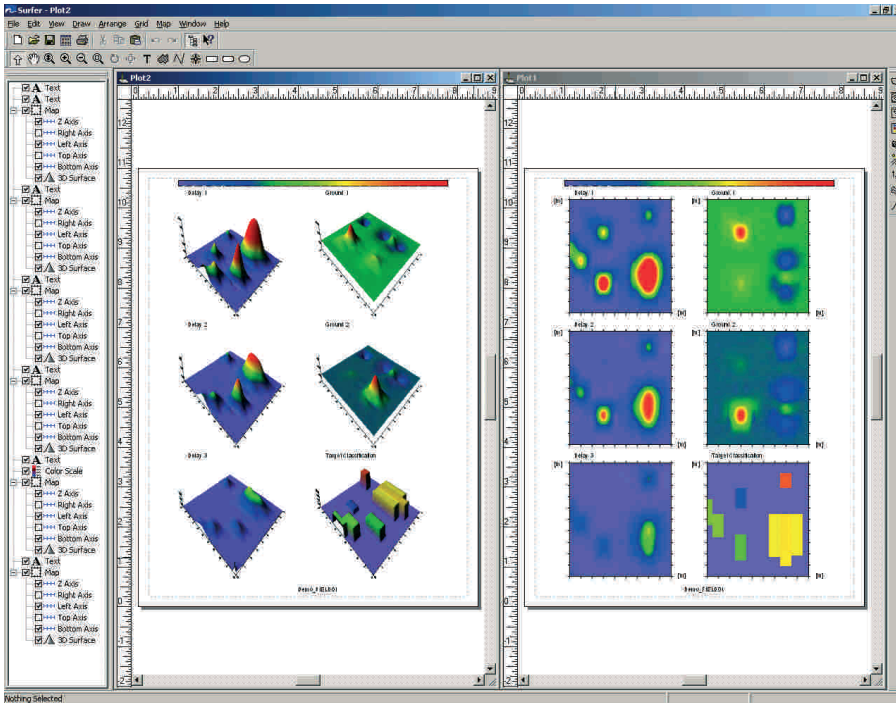
To start the script file, click with the left mouse button at “Script” on the menu bar and then click with the left mouse button at “Run”.



4.) In a final step you have to write the track length and track width of the chosen field in the appropriate place. Click on the “OK” button afterwards.



5.) Now the PC will work a little while until this result will appear:



The produced graphics are different from this demo field, they depend on the data of your own field, please refer to the examples in the instruction manual mentioned before.

Specifications Deepmax X3 with six channel Datalogger:

- Six channel data acquisition: three Delay channels, two Ground channels, one Target Classification channel
- Storage media: SD- Memory cards
- Number of fields (one card only): 99
- Sampling rate 16 samples per second
- Resolution: 16 bit

Design and specifications subject to change without notice!

12.2 optional accessories

Lorenz Detecting Systems GmbH can provide specially designed search coil solutions to meet our customer's detection needs. Please contact us for detailed discussion concerning design-in, specifications and availability. Different kinds of search coils, extension cables, multi channel data recording units, dataloggers with specially designed software solutions, additional battery packs are available on request.

Design and specifications subject to change without notice!

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