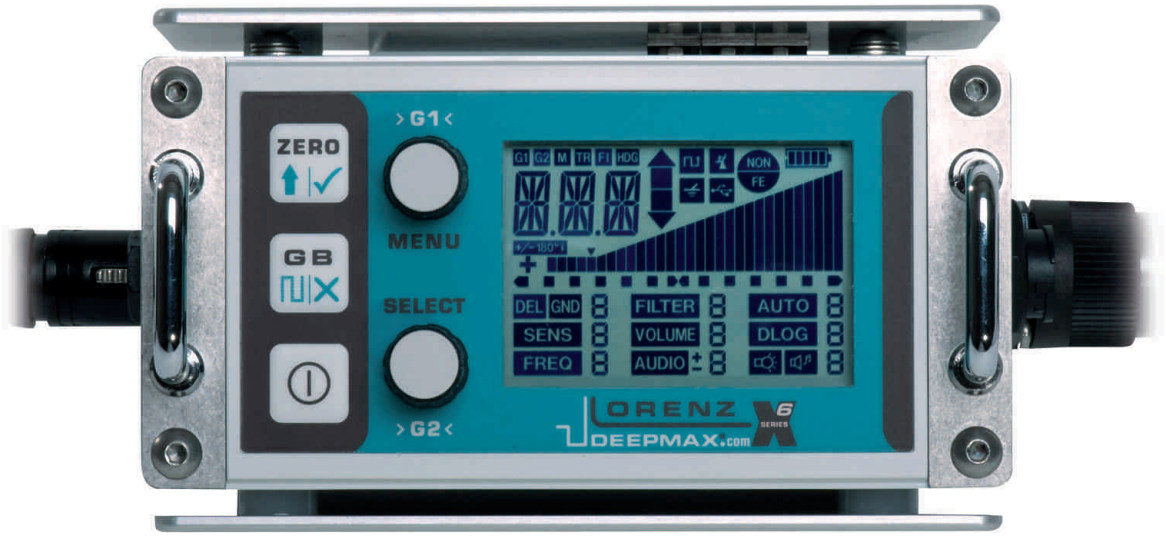
LORENZ

LORENZ DEEPMAX.com X SERIES

Operating manual X5/X6



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Declaration of conformity / EMC directive

The following metal detector
LORENZ DEEPMAX X5 / X6

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

The LORENZ DEEPMAX X5 / X6 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 EN55022:2006
Immunity EN61000-6-1:2007
FCC Part 15.107/15.109, RSS 210

Refer to certificate of testing No: F 100561 E1
If any changes are made to the above mentioned appliances without consulting Lorenz Detecting Systems GmbH&Co. KG this declaration becomes invalid.

Date: 31.03.2010 Signed: _____

Lorenz Detecting Systems GmbH&Co. KG
General Management

Lorenz Detecting Systems GmbH&Co. KG · Röpkestr. 12 · 30173 Hannover · Germany

The LORENZ DEEPMAX X5 and X6 seies detectors are some 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 X5/6 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 classifications and automatic ground balancing facilities offered with the LORENZ DEEPMAX X5 and X6 series.

The Pulse GBS (Pulse Ground Balancing System) is specialy 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 X5/X6 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 X5/X6 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. 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 X5/X6 gives a visual indication on the LC Display for every metal being located. This time delay reading producing a number between 000 and 099 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 X5/X6 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 X5/X6 on. Special attention should be paid to the following notes.

Check out, if the plug-in type charger supplied with the LORENZ DEEPMAX X5/X6 fits with the AC mains of your country. The AC plug of the recharger is inter-changeable 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 100-240 V AC (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 X5/X6 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 X5/X6 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 X5/X6 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.

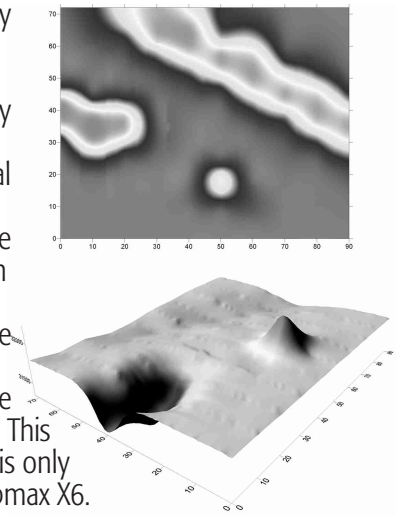
Eddy currents produced in a metal object by means of a pulsed primary field, will die away differently depending on the conductivity of the metal object. The classification circuit therefore gives a visual time delay reading for the eddy currents received over a certain period of time. In addition a 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 X5/X6 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 X5/X6 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 X5/X6 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 X5/X6 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 X5/X6 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 reading 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 Batterypack
- 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 (built-in the Deepmax X6 only) works with additional Hard- and Software to generate six 2 D image and six 3 D 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 GPS module and USB storage media. This Hard- and Software kit is only available with the Deepmax X6.

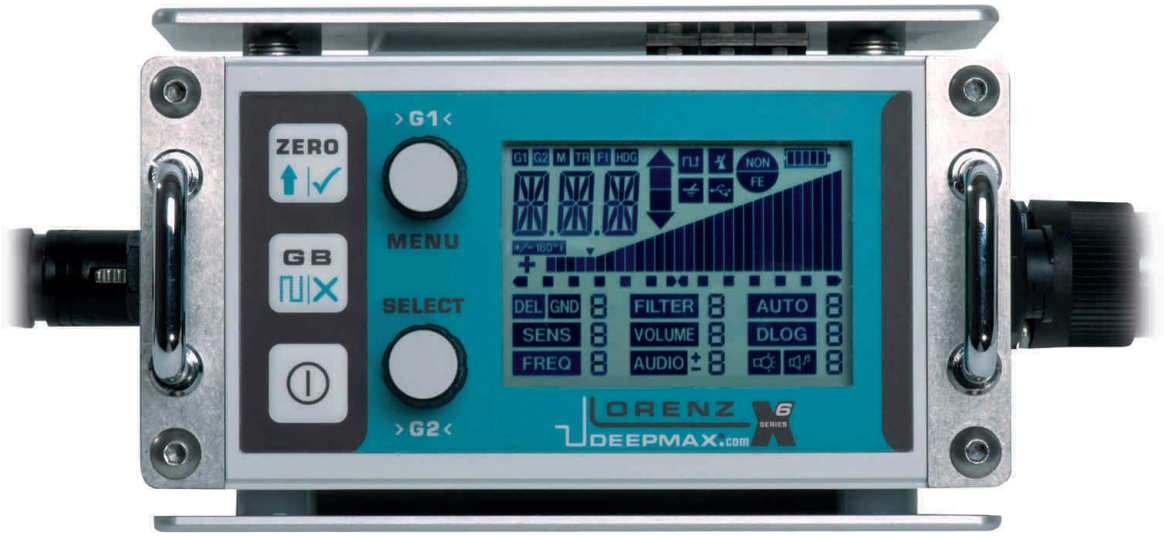


- New GPS based meter, Track, Field and compass Heading information displayed, makes it easy to work with the new data logger.
- New search system with new LC Display and all new functions.
- Signal strength bar graph, time delay reading, ferrous / non-ferrous icons, battery condition and all the mode settings are displayed simultaneously on a large LC Display.
- New improved searchcoils available.
- More stable ground balancing functions for 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. In addition different self tuning and Filter settings will help to make the unit even more stable.
- Completely New GROUND balancing systems with double D coils gives additional depth to small and large non- ferrous metal objects.
- Automatic false finding target identification.

2.2. Applications

The LORENZ DEEPMAX X5/X6 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 X5/X6. 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 X5/X6 is a great tool when searching for small objects deep in the ground.

3. Controls on the front panel / short instructions



The front panel controls of the two detectors X5 and X6 are the same, namely three push buttons with **ZERO**, **GB** Ground Balance, and **POWER** function and two incremental encoders with push button for **MENU** and **SELECT**. The X6 offers an additional data logger function which can also be set by means of **ZERO** and **GB** controls when the data logger function is turned on.

POWER button turns on and off the unit. A connected and fully charged battery pack and a search coil will be essential while doing this. The electronics runs through a tuning and self checking sequence with all the icons coming on first.

ZERO button retunes the electronics within half a second.
The **ZERO** button is the most important control as the whole electronics, including the discriminator and the audio will be retuned when pressing this control. When turning the detector on with the **POWER** button, the electronics will automatically retune itself.
This **ZERO** button has to be pressed frequently to retune the electronics to the set audio and visual indications. When doing this simply raise the coil to the air, far away from any metal objects and the detector itself and press this button shortly. An **ARROW** and **COIL** icon will come on the display. Rather keep the coil horizontally to minimize the effects of interference induction in the coil. There should be almost no signal indication on the intensity bar graph after having done this. The small arrow shows the starting point of the bar graph. Afterwards you can lower the coil to the ground again. Please be aware that the detector consists of quite a few metal parts and therefore can indicate itself. When the data logger function of the X6 is selected this button also acts as a start and stop button when taking field data with each track.

GB Ground Balance button will activate an automatic two step tuning process of the detector to the present ground conditions:

1. Before starting this process hold the coil horizontally in the air away from any metal.
2. Press the **GB** button and don't move the coil while looking on the display and watching an Arrow pointing up with a **COIL** icon coming on and several high beep sounds indicating that the first tuning process is active.
3. Afterwards the arrow is pointing downwards, indicating that the coil should be lowered to the soil without any movements at a place with no metal around.
4. Simply push the same **GB** button again to activate the second tuning process while holding the coil close to the ground and listen for low frequency beep sounds. The arrow will disappear when this tuning process is completed. Afterwards there should be no or only weak signals from the ground when moving the coil up and downwards when a **GROUND** 1,2,3… setting is selected.

During operation the ground setting of the detector can also be altered by the way of the **G1** and **G2** control manually.
In general an automatic tuning process with GB control should be taken first.

When the data logger is active (only X6- version) this **GB** button also acts as a field data storing or track deleting control.

MENU G1 / SELECT G2 Incremental encoders act as rotary switches to select different functions and settings of the detector:

1. To open a menu press the **MENU** control for one second until a function icon starts to flash on the display.
2. Rotate the same control to choose the operation mode you want to change. The active icon keeps flashing.
3. Rotate the **SELECT** control until the desired number is selected and alter the parameter, for example a low number stands for a low setting, high numbers will result in a higher setting.
4. Press any of the Incremental encoders or the **ZERO** button shortly to leave the menu and go on searching afterwards.

During operation, when the menu is not active, the same controls will adjust the settings of the Ground Balance circuit, namely **GND 1** and **GND 2** which will also be displayed with a number 000-999 and corresponding **G1 / G2** icon.

! ***Note:*** *It is necessary to Ground Balance the unit automatically with the **GB** button first before starting to alter ground balance parameters or using a target identification.*

Display

The Deepmax X5/X6 offers a huge number of functions which are shown on a large LC Display all the time even while searching. To select a function or alter parameters refer to the **MENU / SELECT** controls. The lower part of the Display shows the different functions and parameters as the upper part indicates more information on the probable kind of metal, signal intensity, ground balance settings, indications for the proper use of the automatic ground balance or the data logger function as well as battery condition.

Functions/ Parameters

DEL Delay settings 1-4 offer different sensitivity range on different metals without excluding ground effects. 1 gives the highest sensitivity range on small and thin non-ferrous metal objects as 4 offers a poor sensitivity range on these small bits and pieces but still a good range on larger metal objects. The Delay function is mainly in use while searching with large frame coils on soils with low iron oxide content. In most cases the coil has to be kept at a certain distance and at constant height over the ground to avoid false signals from the ground.

GND compensates 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 this function. Ground settings 1-3 and 4 (only with DD-coils) will activate different ground canceling settings to ignore the ground. The ground settings work differently with the different coils (small, frame, DD). Therefore please refer to the following table to select the right setting for your detection purpose.

GND		Soil conditions	Kind of metal	Sensitivy range
GND 1	DD Coil	Very High Fe2O3	All metall	High sensitivity
GND 2		Medium Fe2O3	All metall	Highest sensitivity
GND 3		Medium Fe2O3	Large non-ferrous	Medium sensitivity
GND 4		Medium Fe2O3	Small non-ferrous	High sensitivity

GND		Soil conditions	Kind of metal	Sensitivy range
GND 1	small Coil	High Fe2O3	All metall (Range 1)	High sensitivity
GND 2		High Fe2O3	All metall (Range 2)	High sensitivity
GND 3		High Fe2O3	All metall (Range 1/2)	Highest sensitivity

GND		Soil conditions	Kind of metal	Sensitivy range
GND 1	frame	High Fe2O3	All metall (Range 1)	High sensitivity
GND 2		High Fe2O3	All metall (Range 2)	Medium sensitivity
GND 3		High Fe2O3	All metall (Range 1/2)	Highest sensitivity

SENS Sensitivity range from 1 lowest sensitivity to 5 highest sensitivity setting

FREQ With this function the preset operation frequency of the LORENZ DEEPMAX X5/X6 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.
Frequency range from 1 lowest to 9 highest operating frequency. In general this setting does not affect the electronics and therefore can be left in any position. To reduce interferences please also refer to our double frame coil kits to make operation in urban areas possible.

FILTER range from 0 filter off to 5 highest filter setting to reduce intermittent or pulsed false signals from inducing power lines or radio transmitters. The response speed is reduced with higher filter settings, therefore higher settings are only usefull with large frame coils.

VOLUME 0 turns off the built-in Loudspeaker or external Headphones 9 highest setting is very loud.

AUDIO With this audio function the tick-rate of the audio can be selected. The initial tick-rate can be altered from silent to a low frequency ticking tone. When put to the 0 setting the built- in loudspeaker will give one tick every 1- 2 seconds, after the detector has been retuned with the **ZERO** button.
The threshold ranges from -9 silent, 0 slow ticking sound to +9 fast ticking sound. This setting can always be recalled by pressing **ZERO**. For most applications a setting between 0 and +2 is perfect.

AUTO self adjusting threshold cancels out the effects of drift which could occur during the first minutes of operation and when temperature changes are present such as sunlight warming up the coil and therefore alters the electrical properties. In most cases the detector will work in position 0 as a non motion metal detector perfectly. However in some cases especially when selecting **GND 2** with a DD coil a low **AUTO** setting will make the unit work more stable. Therefore the **ZERO** button has no longer to be pressed so frequently. The range starts with 1 very slow self adjusting to 5 very fast automatic self adjusting Motion detector. 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. Rather turn off 0 the **AUTO** function while using a frame coil in order not to lose too much sensitivity.

DLOG (this function is only available with DEEPMAX X6) 0= turned off, 1= turns on the built-in data logger function and starts a different display setting with preset functions. Therefore only **FREQ**, **VOLUME**, **DLOG** and **LIGHT** can be adjusted. In addition **M** Meter length of a track in meters, **TR** Track number, **FI** Field number, **HDG** Heading for each track will be available for selection with the **MENU/ SELECT** controls as shown before.

1. To start collecting field data first connect the GPS module with USB stick and the Detector itself. The USB module has to be mounted on the shoulder of the operator with the transparent part pointing up. Connect a search coil (frame coil) and battery pack, turn on the unit and make sure that the data logger **DLOG** is turned off **DLOG** 0.
2. Hold the frame coil in the air, far away from any metal. Push the **GB** Ground button once and wait until the high beep sounds are completed. Lower the frame coil to the ground at a distance of approximately 10cm over the ground and press the same **GB** button a second time and wait until the lower beep sounds indicate that the tuning process is in progress and completed.
3. Press the **MENU** control for approximately 1 second to start the menu. Select **DLOG** 1, **M** for meter indications, **FREQ** (any position that looks silent on the bar graph) **VOLUME** (adjust to desired setting) and leave the menu by pressing **MENU/ SELECT** or **ZERO**.
4. Check the icons for the field, antenna and USB coming on. Flashing antenna means no valid GPS data available. Flashing USB means problem occurred with storing data.
5. Start collecting field data in the left corner of the new field by pressing the **ZERO** button and immediately start walking a straight line at constant speed. The large arrow starts to move to indicate that data acquisition is working. A pulsed beep sound indicates the same. As the **M** Meter indication is selected the multi function display shows the lenght of the track in meters already being covered. In that case walk a few meters on each track until a useful indication can be read on the display.
6. Stop the first Track by pressing the **ZERO** button again. A low and high beep sound states that the first track is completed.
7. Move to the next track for example 1m to the side and 180 degrees pointing backwards. Start and stop with the next track the same way as the previous track, pressing the **ZERO** button. A **+/-180** degrees indication comes on to make sure that you move backwards. The multi function display counts the meters you walk back until you reach the starting X line with 0 meters again.
8. A compass indication in the middle of the display points to the direction you have to walk. For example two square icons pointing to the right show that you are presently not walking in a straight and parallel line and that you have to move slightly to the right while walking until the square icons disappear. In addition the present Heading can be indicated on the multi function display when **HDG** is selected. Therefore simply make sure that the same Number appears when you walk on each track. A few meters have to be covered until an indication is possible.
9. At the end of the field push the **GB/ field** button once and a longer lower beep sound states that the first field is completed and stored on the USB stick. The next field will automatically come on with a higher number when you start collecting data again.
10. Disconnect the USB Stick from the GPS module and read the data with your computer with installed Scripter and Surfer software.
In order to change from **M** Meter to **TR** Track, **FI** Field, **HDG** Heading indication simply alter the **SELECT** rotary control. This can be performed even during the operation of the Deepmax X6. When starting with the first track there will be no **HDG** Heading available as this track is for reference purposes only.

LIGHT adjusts the backlight from 0 off to 9 bright

TONE function changes from Analog A signal to Logarithmic L signal range providing a different dynamic range of the audio and intensity bar graph in the middle of the display. In the Analog mode the audio frequency raises quickly to its highest tone. In the Logarithmic mode the tone will raise quickly in the beginning and than gradually to the highest tone even if the metal object is close to the coil for better pinpointing.

Target Identification

The Deepmax X5/ X6 series detectors offer two different target identifications namely a **FE** Ferrous/ **NON-FE** Non-Ferrous indication which is only working when a DD coil is connected and a time delay reading of the eddy currents produced in conducting materials like metals which works with any coil connected. Both indications give a hint on the probable kind of metal being detected. Please find a table of different metals and there corresponding numbers being taken. The **FE/ NON-FE** indication is based on a motion circuit, therefore

the coil has to be moved over the metal object to achieve an indication. The Number for the time delay measurement is static and will come on when certain intensity is reached and stays on as long as the coil is over the target.

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
80-99	big bronze, copper, silver, gold-objects

000-099 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:
(000-020 coin or piece of foil, 030-060 iron, 060-099 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 (000 to 099). 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.

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 **FE** indication at the top of the display and Non-ferrous metal objects like gold silver or copper will result in a **NON- FE** 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 GB automatic ground balance.

INTENSITY / signal intensity 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.

ARROW; AERIAL, USB icons
These icons will work together with the built- in datalogger function which will run on a hard- and software which comes with the X6 version. For further information please refer to the instructions for use the LORENZ DEEPMAX X6, six channel datalogger, Sufer and Scripter Software..

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

BATTERY alarm LOW BAT
Low battery condition will be indicated by a pulsed beep sound every few seconds the LORENZ DEEPMAX X5/X6 has to be turned off when this sound appears to avoid damage from the batteries. The pulse circuit is automatically turned off at low battery for safety reasons.

BATTERY jack
This jack is located on the bottom of the control housing. The plug of the supplied battery pack has to be connected with this jack. The operation time of the LORENZ DEEPMAX X5/X6 on a fully charged battery pack at normal temperature range is approximately 5 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 X5/X6 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 X5/X6.*

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 X5/X6 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 X5/X6 has got a built-in loud-speaker on the front 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 greate help for both persons.

USB Jack Version X5
In order to update the firmware of the Deepmax X5 the supplied USB- Stick can be used to flash the built- in controllers by the way of using the newest software version. It will take a few minutes to transfer the data. For furthe details please refer to instructious on our website **www.metaldetectors.de**

GPS Module Jack Version X6
The LORENZ DEEPMAX X6 has a built-in data logger function in order to record different signal data during operation. For operation a supplied hard- and software kit will be necessary. To this jack the combined GPS module with USB stick can be connected for further data acquisition. In conjunction with available specially developed software it is possible to convert stored data to visual 2 D image or 3 D surface maps on a computer for example.

4. Operating procedures I

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 right 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 on the left side of the detector by pushing it gently. Hold the connected searchcoil horizontaly and far away from metal objects about one meter above the ground. Set the **POWER** button to turn the LORENZ DEEPMAX X5/X6 on. Press again for "**OFF**". At switch **ON** the detector runs through a display check sequence since all the icons com on and indicate the retuning process is performed by the electronics at the same time. If the **LOW BAT** 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 on the top of the Display continuously during operation.

! ***Note:*** *On the main electronics unit three large aluminium plates are located, of which two get warm during operation. Please make sure that the heat can disappear and that the aluminium plates are 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 and rotating the **ZERO**, **GB**, **MENU**, **SELECT** push buttons and encoders, different settings will be selected and will be displayed on the bottom of the LC Display at the same time. To enter the menu and to change a parameter go on as follows. Press the **MENU** encoder for one second until one icon starts to flash, than rotate the **MENU** encoder, avoiding to push it again to find the desired function to be changed. Use the second encoder **SELECT** and rotate until the new parameter is set. To leave the **MENU** press either the **MENU**, **SELECT** or **ZERO** button shortly afterwards.

For the first time adjust the detector as follows:
Connect a 35cm DD coil and select **GND 2**, **SENS 3**, **FREQ 9**, **FILTER 2**,**VOLUME 7**, **AUDIO+1**, **AUTO 0**, **DLOG 0**, **LIGHT 9**, **TONE L**. Leave the menu and hold the coil in the air. Before metal detecting ground balance the detector first. Press the **GB** button while holding the coil in the air and wait until the arrow changes from up to down on the display and the high beep sounds are heard. Lower the coil to the ground at a place with no metal and repeat pushing the **GB** button. The second step of the automatic ground balance is activated and indicated by the way of the arrow and lower beep sounds. When the arrow disappears the tuning process is completed and you can move the coil upwards and downwards without hearing any changes in the audio ticking tone.The detector is ready for operation afterwards. If low mineral contents of the ground are expected it is sufficient to work in the **DEL 1** mode instead of a **GND** groundexcluding mode. Therefore hold the searchcoil a few centimeters over the ground while simultaneously pressing the **ZERO** button shortly. Than try to keep the distance between the coil and the ground very constant when searching. The **DELAY** Modes are often in use with frame coils on weakly mineralized soils and a distance of approximately 50 cm between the coil and the ground are kept constant.
The selected audio ticking sound is audible every second. 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 but also with the smaller DD-coils in the **GND 2** mode. 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** settings. This pre-set audio tone will be recalled every time the **ZERO** button is operated.
As the LORENZ DEEPMAX X5/X6 offers 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 **DEL** 1 for small coils and **DEL** 2 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 **AUTO** 1 for slow and 5 for very fast automatic tuning in order to retune the electronics to changing ground conditions automaticaly 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 certain time.

In the **DEL** modes 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 and very strong wanted signals are expected at the same time it may be advisable to select a higher delay setting like **DEL** 3 for example.
In **DEL** 3 mode 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 X5/X6 metal detector has to be retuned with the **ZERO** control every time a different coil has been connected. During operation only a few threshold corrections are necessary.* **!**

Position **DEL** 1, **GND** 1 and **GND** 2 with DD coil offer 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 X5/X6, 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 probable 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 000 to 099. 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 to a **DEL** or **GND** setting.
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.
When lowering the search coil to the ground an increasing ticking-rate of the audio can be audible in some cases, especially when **DEL** 1, 2, 3, 4 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 X5/X6 can simply be tuned to the ground conditions while holding the coil at a constant height and pressing the **ZERO** button shortly. Pay special attention to metal objects in the near of the search coil which may cause false signals and therefore a false retuning process.

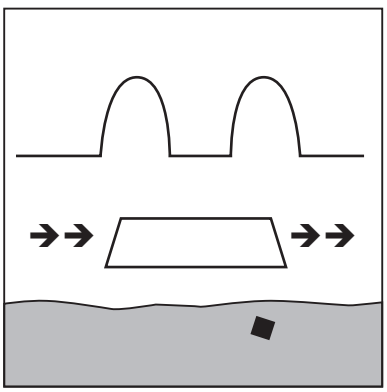
! *Note: It is always advisable to carry the detector and the separate battery pack as far away from the search coil as possible. This is absolutely necessary to avoid false signals caused by metal parts of the electronics control-box.*

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 X5/X6 is very fast, the search speed should not exceed 2 meters per second.

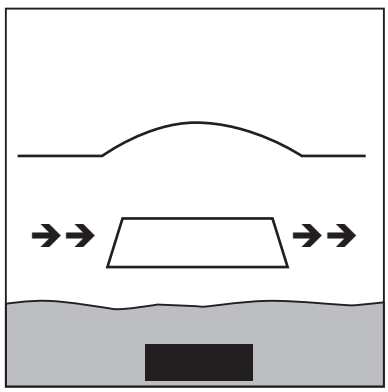
When a metal object is located try to find the place with the strongest signal which means highest indication on the **INTENSITY bargraph** and highest audio frequency. Size, shape and depth information can be derived from the audio sound in some cases with some experience. Small objects like single 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 reading. Objects which are close 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.

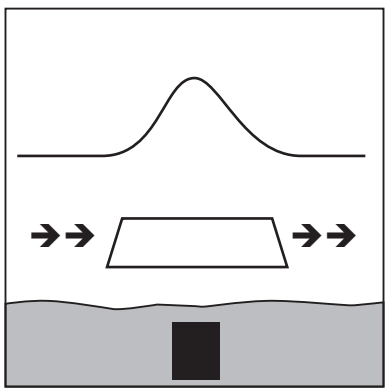
Signal intensity



small object at the surface



large object buried deep



medium size object

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 **FE** ferrous / **NON-FE** non-ferrous indication will appear on the LC Display. Therefore the Deepmax X5/6 has to be ground balanced with the **GB** control first 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. Automatic/Manual GB Ground excluding GND 1/2/3

These different filters can be selected with **MENU** and **SELECT** 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 functions.
For automatic tuning purposes please go on as follows. Select the **GND** settings 1, 2 or 3. Hold the searchcoil horizontaly about 1m over the ground where there is no metal. Press the **GB** button and wait until the first tuning process is finished in the air. Lower the coil to the ground and press the **GB** button again while keeping the coil close to the ground. When pressing the **GB** button the arrow on the display points up and down as long as the tuning process is working. High and low beep sounds will indicate the same.During that time no movements of the coil should be done. Afterwards the detector is ready for use and there should be no indications of the ground when changing the distance between the coil and the soil.

During operation it might be necessary to retune the ground settings from time to time. Therefore use the automatic tuning process as described before or try the manual tuning as follows. Therefore lower the coil to the ground or hold directly on a magnetic stone. An audible sound will appear most likely. When having selected the **GND** 1 function the signal can be completely canceled by adjusting the corresponding **G1** 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. The position of the rotary control is displayed on the meter with a Number and **G1** or **G2**. The Ground settings can only be altered when the Menu is off. Therefore avoid pressing those controls when changing the position.It is essential that the detector run through a complete automatic tuning process first, before tuning manually.
The LORENZ DEEPMAX X5/X6 should now be silent even if the coil is raised in the air or 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 **GND 2** and could be performed with the G2 control after having turned on the **GND 2** function. Both filters could be selected at the same time to achieve highest sensitivity for most types of metal objects when **GND 3** is selected and a small or large search coil is connected. The Detector will distinguish automatically between the two signals and will use the stronger signal of the two. In most cases however the **GND 1** function will be sufficient. In the case of a connected DD coil GND 2 and GND 3 work differently. 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 G1 and G2 when **GND 3** 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 **GND 1** position will be the best choice. When Double D coils are in use the **GND** 2 function works differently compared to the previous explained single coils. The detection depth to many non- ferrous metal objects will significantly increase when **GND** 2 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 **GND** – function the LORENZ DEEPMAX X5/X6 works with either reduced or higher sensitivity compared to **DEL** Delay functions. Some iron objects and very few non-ferrous metals with a similar signal response as iron will be indicated less sensitive with small or large coils. It is even possible to eliminate large or small iron objects when selecting a special **GND** setting. Signals will still occur when the distance between the coil and the target is too small because of signal overload. However most metal objects will be detected with almost the same or even higher sensitivity as without ground balancing circuit. An increase in interferences with turned on **GND** 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 **FREQ** 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 X5/X6 are based on different working principles. The time delay reading is static therefore no motion of the coil is required to make a reading 000 to 099 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 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. 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.
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
80-99	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 X5/X6 automatically. This will be indicated with a number between 000 and 099 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 X5/X6.

Note: *The TIME DELAY indication can also be locked near 000 when very small coins, foils 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 X5/X6 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 X5/X6 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 coils (8m or 12m) 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.
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 FE/ NON FE, FERROUS / NON-FERROUS target identification is of great help when classifying smaller objects in weakly or medium mineralised soils.

6. Searchcoils/Accessories

Different search coils can be connected to the LORENZ DEEPMAX X5/X6 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 X5/X6 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 X5/X6 are described. (see chapter 10 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.

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 X5/X6 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.* !

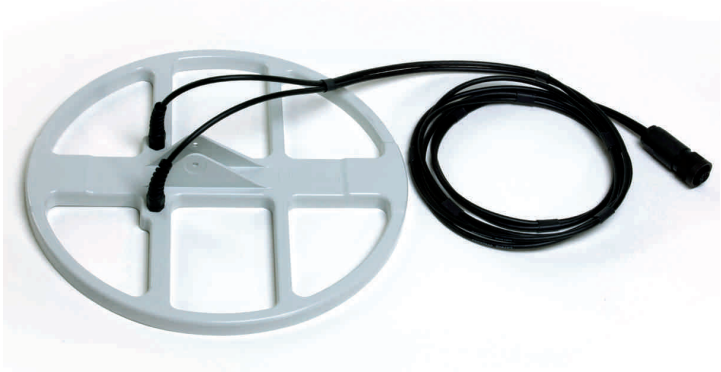
35 cm - search coil

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

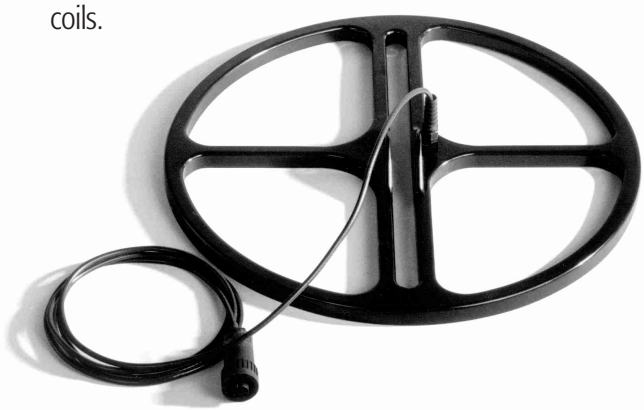
Separate transmitting and receiving windings offer more stable operation on soils with changing contents of iron oxides (minerals) in some cases. Pinpointing small metal pieces is easy with this coil, which can be used for most search applications. The FERROUS / NON-FERROUS target identification does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

! ***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 50cm 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. This 45 cm coil covers more ground than a 26cm 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 perimeter

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 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 hand 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 X5/X6 to avoid false signals.

0,67 m x 0,67 m universal cable coil 8 m perimeter (3 windings)

The 8m 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.

1m x 1m universal cable coil 8m perimeter (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 hand 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 10). This is one of the reasons why this particular search coil is used for most professional applications.

The detection depths are in some urban 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 X5/X6 is specialy 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 intense and therefore deep going magnetic field transmitted. The detection depths listed in chapter 10 have been recorded with different **DEL** Delay and **GND** Ground settings. In some cases detection depths in wet, conducting ground are slightly higher or lower than listed.
For even higher Detection depths use the 12m cablecoil which can be arranged similary to the 8m cablecoil to 1m x 1m, 1,5m x 1,5m and 3m x 3m.

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 8m 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

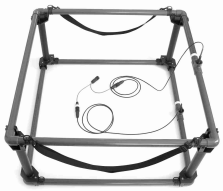
The 8m universal cable coil has to be laid to a single turn on a metal free frame and has to be fixed with tape for example.
This particular search coil covers four times as much ground as a 1m x 1m frame coil does. It should only be used when searching for metal objects with a surface of at least 20 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 cable coil 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 frame coil (8m cable coil)

In order to construct this compensated coil the 8m 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 X5/X6 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 **DEL** Delay settings are recorded in chapter 10.
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.

1m x 1m double frame coil kit



This specially designed double frame coil kit basicaly consists of two 1m x 1m frame coils mounted on each other at a distance of approximately 55 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 substracted 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 0,6m length; one Y 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 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 a signal decay when a metal piece is approaching from the top towards the coil. This could only be performed when* ***AUTO / GND*** *functions are turned off, and* ***DEL*** *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 ***GND*** *Ground mode it is very usefull to work with this particular searchcoil due to very stayble operation.*

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

Similar to the 8m universal cable coil this large cable coil can be arranged to three different frame coils by simply mounting 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 X5/X6 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 X5/X6. 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 eliptical or different shapes but this is only achieved at the expense of sensitivity. Anyway it is advisible 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. 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 **GND 1, 2, 3** should be changed to **DEL 1-4** in some cases using these large coils because of the same reason. Some customers 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 differential double frame coil described before. A Y- adapter cable would be necessary doing this.

7. Battery / Recharger

The LORENZ DEEPMAX X5/X6 is supplied with an external rechargeable battery which will power the electronics 5 to 1 0 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 orange / green light on the charger. A permanent rorange 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 minuts 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 detector will automatically turn off the transmitter when the battery is lower than 8Volts for safety reasons. The Detector still has to be turned off afterwards.*

The following safety information must be read before using the charger supplied with every LORENZ DEEPMAX X5/X6 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 X5/X6
- rechargeable batteries supplied with the LORENZ DEEPMAX X5/X6 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 world- wide operation. Four different detachable AC-plugs are available at the manufacturer of the LORENZ DEEPMAX X5/X6 namely: USA, UK, Europe, Australia.

Note: *Only spare parts and accessories available from the manufacturer of the LORENZ DEEPMAX X5/X6 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 X5/X6 when it is not in use or when planing to store it. Disconnect all plugs from the control box when transporting or storing it.* !

The capacity of the built-in battery can always be checked when turning the LORENZ DEEPMAX on with the **Battery icon** on the top of the LC Disply. 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 X5/X6 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 X5/X6 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 X5/X6 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 X5/X6 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 intense that it is simply impossible to work with the LORENZ DEEPMAX X5/X6. Therefore it will sometimes be necessary to change the frequency with the **FREQ** Frequency of the LORENZ DEEPMAX X5/X6 to suppress some interference. The **FREQ** Frequency function can therefore be turned to a lower or higher setting, until the audio sound is clear and without any rhythmic pulses. The sensitivity or the target classification won't be affected when doing this.
For further reduction of any pulsed interferences put **FILTER** to a higher setting but this will also result in a slower response speed which makes only sense with frame coils but not with smaller coils.

If it is not possible to reduce or eliminate interference by changing the frequency and filter of the LORENZ DEEPMAX X5/X6 it is either possible to put the **AUDIO** and **SENS** Sensitivity to a lower setting until the "noise" disappears or to change the size or kind of the search coil. When setting the **AUDIO** setting to - the sensitivity of the LORENZ DEEPMAX X5/X6 will be slightly 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 double frame coil 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 X5/X6 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. Especially when working in the **GND** mode this coil is the best choice, as the electronics need a signal free of interference to be able to cancel out the ground and to distinguish between metals.

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 X5/X6 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 X5/X6 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 X5/X6 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 **GND** function turned on. For further description refer to chapter 5.1.

LORENZ DEEPMAX X5/X6 standard equipment

- Plastic carrying case with foam padding
- LORENZ DEEPMAX X5/X6 electronics control box Version X6 has a built-in data logger function
- 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 X5/6 is also available as a kit with the following items included:

- 1m x1m frame coil
- 35cm double D coil
- telescopic S- pole with armrest for 35cm DD coil
- USB- stick for data transfer
- Lorenz Deepmax X6 also comes with a built- in data logger and aditional GPS module with USB storage media

9. maintenance/service

The LORENZ DEEPMAX X5/X6 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 X5/X6 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 X5/X6 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 X5/X6 is ruggedly designed. All necessary electronic components are placed on three 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 within European Community and one year outside the EC, with the exception of batteries and accessories. The guarantee is not valid when disregarding following

- Non-observation of our guidelins 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 X5/X6 detectors do contact your dealer where you have purchased your detector or directly contact us at:

Lorenz Detecting Systems GmbH & Co. KG
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

10. Detection depths I

Used Searchcoil / Metal object	26cm-coil	35cm DD-coil	35cm-DD-coil **GND2***	45cm-coil	1m double frame square	1,5m double frame square
Gold nugget d = 5 mm	22 cm	23 cm	28 cm	(23 cm) X	X	X
Silver coin d = 1,3 cm	30 cm	30 cm	34 cm	(30 cm) X	X	X
Gold coin d = 2 cm	40 cm	40 cm	45 cm	50 cm	(50 cm) X	X
Silver coin d = 2,5 cm	45 cm	46 cm	50 cm	54 cm	(50 cm) X	X
Brass plate 10cm x 10cm	80 cm	90 cm	100 cm	105 cm	145 cm	170 cm
Softdrink can 0,33 l	100 cm	110 cm	120 cm	125 cm	165 cm	200 cm
Brass plate 20cm x 20 cm	105 cm	118 cm	130 cm	125 cm	185 cm	240 cm
iron box 30x18x15 cm	150 cm	160 cm	170 cm	190 cm	280 cm	340 cm
Fuel tank 20 l	160 cm	175 cm	185 cm	205 cm	300 cm	380 cm

Detection depths recorded in medium air; Function: **DELAY 1 / *GND 2**

X = outside the range of the coil.

10.1 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**

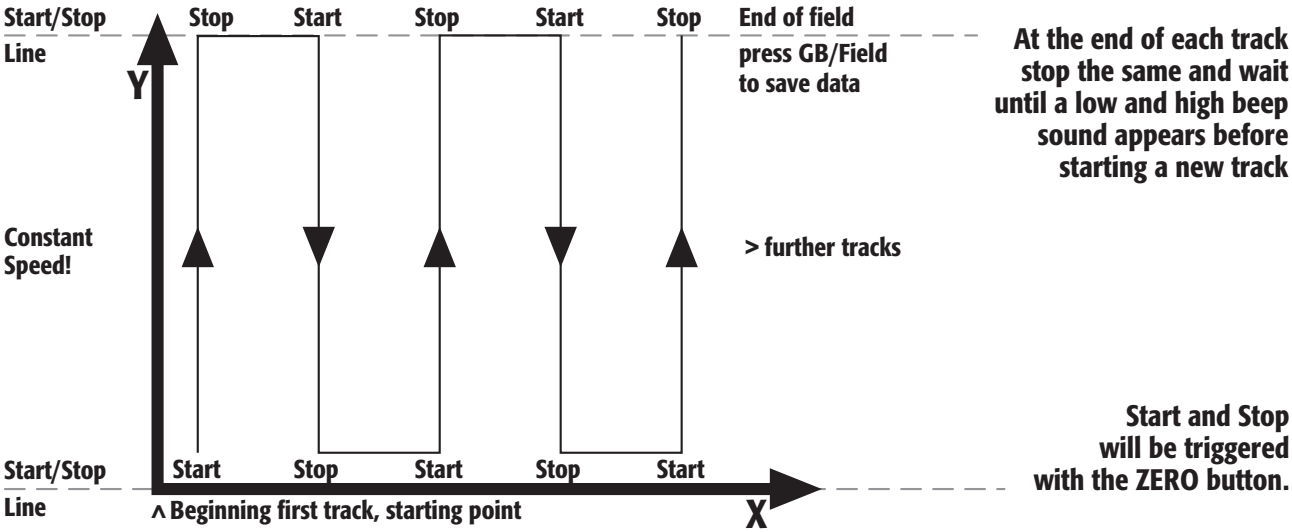
X = outside the range of the coil.

11. Instructions for use: Data logger, Surfer and Scripter Software

To generate colour, image, surface or contour maps with the Lorenz Deepmax X6, additional Hard- and Software is necessary. A very sophisticated data logger function of the Deepmax X6 metal detector together with an USB 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 Software easily and accurately transforms the data stored on the USB-Stick into colour, contour, surface, image or vector maps on a computer in minutes.
An additional Scripter 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 four controls of the Deepmax X6 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 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. In addition GPS data is also recorded from a supplied GPS module to support the user with a compass function or to find the different fields after recording again.
For the professional users additional Hard- and Software will be available for storing positioning data from GPS and several Deepmax X6 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 X6 datalogger and Surfer Software



Operating procedures:
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 20 m x 20 m. Different field sizes measuring 10 m x 20 m 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.
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.
1. To start collecting field data first connect the GPS module with USB stick and the Detector itself. The USB module has to be mounted on the shoulder of the operator with the transparent part pointing up. Connect a search coil (frame coil) and battery pack, turn on the unit and make sure that the data logger **DLOG** is turned off **DLOG** 0.
2. Hold the frame coil in the air, far away from any metal. Push the **GB** Ground button once and wait until the beep sound is completed. Lower the frame coil to the ground at a distance of approximately 10cm over the ground and press the same **GB** button a second time and wait until the lower beep sounds indicate the tuning process is completed.
3. Press the **MENU** control for approximately 1 second to start the menu. Select **DLOG** 1, **M** for meter indications, **FREQ** (any position that looks silent on the bar graph) **VOLUME** (adjust to desired setting) and leave the menu by pressing **MENU/ SELECT** or **ZERO**.
4. Check the icons for the field, antenna and USB coming on. Flashing antenna means no valid GPS data available. Flashing USB means problem occurred with storing data. It might take some time until the GPS icon stops to flash because of recording data.
5. Start collecting field data in the left corner of the new field by pressing the **ZERO** button and immediately start walking a straight line at constant speed. The large arrow starts to move to indicate that data acquisition is working. A pulsed beep sound indicates the same. 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. Keep constant height between the coil and the ground. As the **M** Meter indication is selected the multi function display shows the meters already being covered. A few meters have to be covered until a proper indication is possible.
6. When passing the end of the first track Stop by pressing the **ZERO** button again. A low and high beep sound states that the first track is completed.
7. Move to the next track for example 1m to the side and 180 degrees pointing backwards. Start and stop with the next track the same way as the previous track, pressing the **ZERO** button. A **+/-180 degrees** indication comes on to make sure that you move backwards. The multi function display counts the meters you walk back until you reach the starting X line with 0 meter again. In the case of an error do not press the **ZERO** button to store but the **GB** X button to delete the last track. 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.
8. A compass indication in the middle of the display points to the direction you have to walk. For example two square icons pointing to the right show that you are presently not walking in a straight and parallel line and that you have to move slightly to the right while walking until the square icons disappear. In addition the present Heading can be indicated on the multi function display when **HDG** is selected. Therefore simply make sure that the same Number appears when you walk on each track. In that case again cover a few meters on each track until proper indications can be read on the display.

9. At the end of the field push the **GB** field button once and a longer lower beep sound states that the first field is completed and stored on the USB stick. The next field will automatically come on with a higher number when you start collecting data again. Up to 99 fields can be generated with the Lorenz Deepmax X6. The current field will be displayed by the way of the FI Field 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!
10. Disconnect the USB Stick from the GPS module and read the data with your computer with installed Scripter and Surfer software. A Computer working with Windows would be essential to install the supplied Surfer single license and the additional Scripter data. See newest Instructions for installing Lorenz Scripter / Surfer Software on our website for download **www.metaldetectors.de**

In order to change from **M** Meter to **TR** Track, **FI** Field, **HDG** Heading indication simply alter the **SELECT** rotary control. This can be performed even during the operation of the Deepmax X6. When starting with the first track there will be no HDG Heading available as this track is for reference purposes only.

Design and specifications subject to change without notice!

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 X6 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 high and a low 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 negative 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 positive 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 X6. 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 X6 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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12 Specifications

dimensions:

electronics control box:
18 cm x 9.5 cm x 10 cm

carrying case for LORENZ DEEPMAX X3:
40 cm x 30cm x 22cm

1m x 1m frame coil (collapsed):
110 cm x 15 cm x 15 cm

35 cm search coil with extended S-rod: length: 150 cm

35cm search coil with collapsed S-rod: length: 120 cm

electrical Data:

Search-frequency with small/large search coils connected:
approx. 2000 / 1000 pulses per second

Audio target response freq. voltage controlled oscillator:
0 - 6000 Hz

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

Usage time:
approx. 5 to10 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° - + 50°C

Detection depths: see chapter 10

Data logger (only X6):

six channel data acquisition, supported by GPS:
storage media USB-stick (2.0)

number of fields: 99

sampling rate: 16 per second

Resolution: 24 bit

GPS module with USB storage media:
- High Sensitivity: -160 dBm
- DGPS, WAAS, EGNOS and MSAS Support
- very short TTFF Time To First Fix
- position accuracy 2,5 m CEP, 5,0 m SEP/SBAS, 2,0 m CEP, 3,0 m SEP

Desigh and specifications subject to change without notice!

weight:

LORENZ DEEPMAX X5/X6 electronics control box:
approx. 1100 g

Shoulder and belt strap with battery pack:
approx. 3330 g

Carrying case with LORENZ DEEPMAX X5/X6 inside: approx. 7000 g

Telescopic S pole: approx.470 g

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

26cm single coil:
approx. 400 g*

26cm double D coil necessary for FERROUS / NON-FERROUS indications:
Weight approx.440 g*

35cm single coil:
Weight approx.550 g*

35cm double D coil necessary for FERROUS / NON-FERROUS indications:
Weight approx.600g*

45cm single coil:
Weight approx. 600 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. 830 g

1mx1m double frame coil kit for interference elimination:
Weight approx. 7000 g

Y-Adaptor cable for interference eliminating search coil systems:
Weight approx. 150 g

*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.


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