The LORENZ PULSE 5 is one of the newest developements in the field of Pulse-Induction Metal Detectors. It is probably the most sensitive and stayable metal detecting device of it's kind presently available. The LORENZ PULSE 5 is the result of many years of research and developement. A lot of efforts have been put into making this new product and especially in the new metal classification facility offered with the LORENZ PULSE 5.

The Pulse - Induction principle is specially suitable for searching at depth. The performance of this electronic device is unaffected by salt water, most types of soil or temperature changes. The LORENZ PULSE 5 is therefore a reliable tool to locate metal objects at great depths even under the worst environmental conditions.

The LORENZ PULSE 5 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 four controls of which only one reset button will be necessary to operate during work. At the same time this detector model offers a number of features which are new for a Pulse-Induction Metal Detector. Quality electronics and very special designed electronic - circuitry produce benefits in terms of easy of use as well as sensitivity.

The LORENZ PULSE 5 gives a visual indication on the meter for every metal being located. This conductivity meter reading helps to classify metal objects. The target classification circuitry is only weakly affected by the size of a metal object and therefore identifies small coins as well as large pieces of metal. 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 the ground and therefore considerably higher than those possible with standard Pulse-Induction or Sinewave VLF - TR Detectors.

The LORENZ PULSE 4 & 5 Metal Detectors are recognised as representing the highest quality and newest developements in professional metal detecting equipment.

We as a manufacturing firm 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 advisible to read this operating manual first before turning the Lorenz Pulse 5 on. Special attention should be paid to the following notes.
Check out, if the plug-in type recharger supplied with the Lorenz Pulse 5 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 90 V-264 V (see lable).

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

To avoid short circuits, wrong polarity or electrical shock only spareparts and accessories offered by the manufacturer of the LORENZ PULSE 5 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 magnetic field produced by the searchcoil. Please understand that we as the manufacturer of the LORENZ PULSE 5 can't 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 PULSE 5 is based on the Pulse-Induction principle. Short and intensive magnetic pulses are emited by means of a searchcoil 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 emited by the said searchcoil 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 searchcoil which now acts as a receiving coil. A rather complicated electronic circuitry is necessary to detect those tiny voltage changes and has to seperate that particular signal from interferences 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 searchcoil.

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 conductivity meter reading for every metal being detected. This gives further information on the probable kind of metal being located as well as the audio sound emited, which makes it easy to predetermine the exact place and the size of the buried metal object.

2.1. Advantages

The Pulse-Induction 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 PULSE 5 without any adjustments.

A special adaption circuit has been added to the Detector to suit with different coils automatically. This ensures extreme depth capabilities with any coil connected. When enlarging the searchcoil 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 depth ranges of up to 8m (26ft). Those depth capabilities for both ferrous and non-ferrous metal objects can only be achieved with the Pulse-Induction principle. Other systems suffer from ground effects which reduce the depth range in the ground. The LORENZ PULSE 5 will be able to locate objects at same depths either in the ground or in "air tests". The high sensitivity of the LORENZ PULSE 5 to non-ferrous metal objects like gold, silver and copper together with the new target classification facility make this Detector an outstandig device for many different locating purposes.

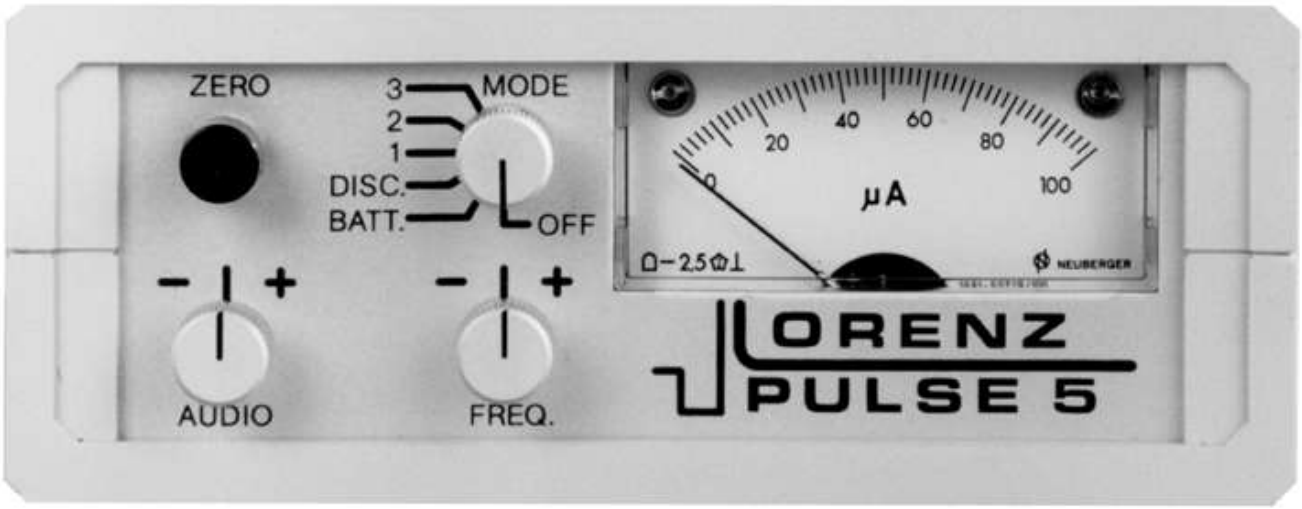
The LORENZ PULSE 5 was developed to provide a number of features including high sensitivity and stability together with easy operation. The amount of controls was therefore reduced and a calibration of the Detector to our factory settings was also made to guarantee best results in the field:

- highly sensitive to all kinds of metal
- stayable operation on mineralized ground or salt water
- reliable / simple operation
- exact pinpointing with large coils
- very easy and effective detection of large areas
- rugged mechanical construction
- a variety of searchcoils are avaiable for different detection purposes
- automatic adaption 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 for easy pinpointing
- battery check with meter and light
- calibrated static (non-motion) target classification with conductivity meter reading
- precisely adjustable Audio-threshold
- stable static response (acoustical and visual)
- waterproof searchcoils
- interchangeable built-in rechargeable NiMh-Battery pack
- Fast charge electronics with interchangeable AC-plug for worldwide operation
- frequency control for interference elimination
- automatic push-button retuning facility
- different Delay settings to eliminate small objects or for easy pinpointing
- possible detection depths of up to 8m (26 ft)
- 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 coil designs can be used
- Additional rechargeable NiMh-Battery packs can be connected

2.2. Applications

The LORENZ PULSE 5 was developed for professional search and locating applications. A variety of searchcoils 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 don't affect the detection range of the LORENZ PULSE 5. It is possible to eliminate 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 PULSE 5 is a great tool when searching for small objekts like single coins buried up to 20'' inches deep in the ground.

3. Controls on the front panel



Mode control
With this control the LORENZ PULSE 5 can be switched on and off. At the same time the battery can be checked and the target classification can be turned on. It is also possible to choose between three different sampling delay settings by means of the same control.

Position OFF
The detector is turned off in this position. When planning to store the LORENZ PULSE 5 please make sure that no connectors are connected to the rear panel of the detector to avoid a very slow discharge of the built-in batteries even when the detector has been turned off.

Position BATT.
In this position the detector is turned on and the condition of the built-in battery is displayed on the meter. The meter should indicate 100 when the battery is full. The LORENZ PULSE 5 can only be turned on via the mode switch when a searchcoil is connected to the coil-socket on the rear panel.
If the LORENZ PULSE 5 is powered by external power supplies like an additional rechargeable battery connected to the recharger/ext. power socket the meter will display the condition of the more powerful battery as both batteries, namely the built-in and the external battery are discharged in parallel in this case.

Position DISC
In this position the target classification of the LORENZ PULSE 5 is selected.
Any metal object detected will give a specific number (0-100) on the meter in this mode. It is derived from the conductivity of the same object. A certain intensity of the target signal is necessary for a conductivity meter reading. A blue discriminator light therefore indicates that a signal was strong enough to make a target classification possible. The light turnes on simultaneously with the meter indication. The meter indication will be stored as long as the searchcoil is over the target and immediately turns down to zero when the searchcoil passes the detected target.

Position 1
Position 1 offers no target classification but an intensity meter reading which works in parallel with the audio. The more the searchcoil approaches to the located metal object the higher the indication on the meter and the higher the frequency of the audio is.

Position 1 is an all metal mode which offers the highest sensitivity for every kind of metal and all object sizes. Position 1 and DISC are the same in sensitivity. In position 1 however no target classification is possible although the blue discriminator light will turn on with any detected object.

Position 2
The LORENZ PULSE 5 offers in this position less sensitivity than in position disc or position 1. Very small pieces of foil or very small coins will be indicated less sensitive and some very small objects can even be eliminated. At the same time mineralized grounds will be indicated less sensitive.
Iron, copper or silver objects will suffer from a small loss in sensitivity especially when they are bigger than a coin. This position is particularly useful when searching for bigger objects while ignoring difficult ground conditions or smaller pieces of metal. When the universal cable coil has got more than three windings the mode switch must be turned to position 2 or 3 to ensure best results.

Position 3
This position offers less sensitivity than position 2. Many coins and some very small iron pieces will be eliminated. Big objects will be indicated with a decreased sensitivity. The detector will work extremely stayable on every ground in this position. This is particularly useful while searching for large objects made of copper, bronze or silver at medium depth on badly mineralized ground or at very trashy areas. Very strong signals can be located more precisely in position 2 or 3 than in position 1 or disc.

! ***Note:*** *It is not possible to turn on the LORENZ PULSE 5 without having connected a search-coil to the electronics controlbox.*

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

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

ZERO-pushbutton
The zero-pushbutton is the most important control as the whole electronics, including the discriminator and the audio will be retuned when pressing this control for about 1-3 seconds. During that time no metal should be in the direct field of the searchcoil. While turning the detector on, the zero-pushbutton should be pressed down for at least three seconds first. During that time the needle of the meter should be at 0 and the previously tuned tick-rate should be audible, or silent when the audio control was turned to the left. With this control the present audio tick-rate can always be recalled during operation while pressing it for one second. When changing the searchcoil or when switching the mode-switch to different positions the zero-pushbutton has to be pushed down for about 2-3 seconds to retune the electronics.

FREQ. - frequency control
With this control the preset operation frequency of the LORENZ PULSE 5 can be altered. This is mainly necessary when searching near powerlines, which cause low frequency interferences. The performance of the detector won't be affected by changing the position of this control, but the amount of interferences can be greatly reduced by doing this.

Meter with discriminator and battery-lights
The meter has got three different functions which can be selected with the mode-switch.

1. Battery condition
The battery condition will be displayed on the meter when turning the mode-switch to the batt.-position. (100 = full, 70 = 1/2 full, 0-20 = battery discharged)

Note: *The battery condition can only be checked with a searchcoil connected.* !

2. Discriminator / conductivity meter reading
The conductivity of a detected metal object will be displayed on the meter with a specific number (0=coin or nugget, 10-20 can, 30-60 iron, 60-100 copper or silver), when the disc-position is selected with the mode switch.

3. Intensity / signal strength
The signal strength will be displayed on the meter when turning the mode switch to position 1, 2 or 3. The signal strength will be indicated by the way of a meter indication and an audio response from the speaker or headphones.

Red battery-indicator-light
This light indicates that the battery is discharged. During operation this light must be off. The LP 5 has to be turned off when this light comes on.

Blue discriminator-light
This light will always turn on when a conductivity meter reading will be stored as long as the searchcoil is in the near of the detected target.

Note: *The discriminator-ligth will turn on even in position 1, 2, 3 although no target classification is possible in those mode-positions.*

3.2. Connectors on the rear panel

Coil-jack
Searchcoils of different size and shape can be connected to this jack. The searchcoils available for the LORENZ PULSE 5 have got coded connectors to adapt the electronics to the coil automatically. With the same connector the power supply can be interrupted when disconnecting the coil plug from the coil-jack. The built-in rechargeable battery therefore can't be discharged in this case even if the LORENZ PULSE 5 is turned on. 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 roating it clockwise.

Note: *Any connectors should be disconnected from the rear-panel when planning to store the LORENZ PULSE 5.*

Headphone-jack
The supplied stereo headphones can be connected to this jack. Any stereo headphones with 1/4 inch (6,35 mm) plugs can be connected to the LORENZ PULSE 5 without any problems.
The built-in loudspeaker will be automatically turned off when headphones are connected.

Note: *Special Headphone-adaptor plugs have to be disconnected when using the Loudspeaker.*

Loudspeaker
The LORENZ PULSE 5 has got a built-in loudspeaker on the rear-panel which gives an audible signal when the searchcoil approaches to a metal object. The audio frequency will change with the distance between the searchcoil and target for better pinpointing. Especially with two persons operation and large diameter coils the signal from the loudspeaker is of greater help for both persons.

Charger / Ext. power Jack
To this connector the supplied charger can be connected in order to recharge the built-in Batteries. It is also possible to connect additional battery packs to increase the operation time of the detector to up to 24 hours. To connect the recharger or an additional Battery pack simply plug in the connector and fasten the metal sleeve of the plug clockwise (see chapter 7 for more detailed information.)

4. Operating procedures I

Connect the searchcoil-connector to the coil-jack and fasten the plastic sleeve of the connector by rotating it clockwise. Set mode-switch at position batt. The needle of the meter should rest near 100 and the red battery indicator should be off. If the meter displays a number lower than 50 or if the red light comes on, the detector should be turned off and immediately be recharged with the supplied recharger. The battery condition should be checked via the meter during operation in the batt.- mode (see chapter 7).

Now turn the mode-switch to the disc position. The built-in discriminator is now selected. Set the audio and freq. control to mid-position and retune the detector with the zero-control. The searchcoil therefore has to be hold constantly over the ground and the zero-control must be pushed for about three seconds, until the preselected audio ticking sound is audible.

! ***Important note:*** *With every retuning process one should pay attention that no metal is in the near of the searchcoil while pressing the zero-pushbutton. It is therefore necessary to hold the searchcoil far away from metal objects and the electronics control box itself.*
During operation no metal buckles or shoes 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 near the searchcoil. Therefore the electronics control box has to be carried far away from the searchcoil, this is especially important while searching with the large frame mounted coils. Never use any metal screws when building frames for the universal cablecoils.

The loudspeaker will give one "tick" every 1-2 seconds after having retuned the detector correctly with the zero-control. The "ticking-rate" can be individually tuned from silent to a low frequency threshold tone with the audio-control. This preset audio tone will be recalled every time the zero-push button is operated. As the LORENZ PULSE 5 offers it's highest sensitivity with correctly tuned electronics, one should check the threshold tone from time to time during operation. A threshold tone with a "ticking-rate" will give the operator the information that the detector works with it's highest sensitivity.
Especially for target classification purposes the electronics need to be tuned for best results (see chapter 5).
The detector is now ready to 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 it's highest frequency when the searchcoil is directly over the target. The center of the searchcoil is the part with the highest sensitivity. Even in the direct near of the target frequency changes make pinpointing possible. The detector works with it's highest sensitivity in position Disc and 1. when changing the searchcoil or when selecting a different position with the mode control, the electronics need always to be retuned via the zero-control. When lowering the searchcoil to the ground especially in position disc and 1 an audio sound may appear, which can be cancelled by pressing the zero-pushbutton again. The distance between the searchcoil and the ground has to be kept at a constant height when searching after having done this.

Large diameter coils like the frame mounted cablecoils should be hold at heights of 4"-24" inches (10-60 cm) over the ground to ignore magnetic mineralized ground. Those coils should be moved slowly without any jerky movements, parallel to the ground and at constant height.
When mineralized ground conditions or very strong signals are expected it may be advisible to select a higher delay setting with the mode control at position 2 or 3.
In position 3 and especially while using large Diameter frame coils the sensitivity to very small objects significantly decreases. This is in many cases desireable. The simplest way to ignore small metal objekts is to increase the distance between the searchcoil and the ground. Simply raise the loop and it will still be possible to locate those deeper bigger targets. In position disc the target-conductivity can be measured (see chapter 5).

Note: *The LORENZ PULSE 5 metaldetector has to be retuned with the zero control every time the mode control has been switched to a different position, a different coil has been connected or the detector has been turned on again. Therefore the zero-control has to be pushed for about three seconds. During operation only very few threshold corrections are necessary.* !

In position 2 and 3 the LORENZ PULSE 5 works with less sensitivity. Position 1 and disc offer the greatest sensitivity especially for very small non-ferrous metal objects like coins and nuggets for example. In position 1, 2, 3 no target-classification is possible, but an intensity meter indication which displays the signal strength in parallel to the audio sound.

5. Operating Procedures II (Target Classification)

This chapter is a kind of summary how to proceed with the LORENZ PULSE 5, when locating metal, while using target classification, intensity meter reading and the audio.
It is therefore possible to predertermine the exact position, the detection depth as well as the kind of metal located, without digging it out.
A specially developed electronic circuit makes conductivity meter readings possible which are directly displayed on a meterscale (0-100). Those conductivity readings are only known from TR-Machines but not from metal detectors based on the pulse induction principle.
Please proceed as described in chapter 4 and follow those 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 of about 8" inches (20 cm) over the ground. The search mode can now be selected with the mode-control. The following described metal classification facility can be selected in position disc. Before starting to search it is advisible to adjust the threshold of the audio.
For most detection purposes the audio and freq. control can be put to the marked mid-position. When having done this it is important to retune the electronics with the zero-control. Proceed as described in chapter 4 and hold the searchcoil or frame over the ground while pressing the zero-pushbutton for about 3 seconds.
When lowering the searchcoil to the ground an increasing ticking-rate of the audio can be audible in some cases.

This can either be generated by a metal object or mineralized ground. When expecting mineralized grounds the searchcoil can simply be raised again, 4-20" inches (10-50 cm) depending on the coil or the LORENZ PULSE 5 can simply be tuned to the ground conditions while holding the coil at a constant height and pressing the zero-control for a second. Pay special attention to metal objects in the near of the searchcoil which may cause false signals and therefore a false retuning process.

! ***Note:*** *It is always advisible to carry the detector with the supplied leather bag as far away from the searchcoil as possible. This is absolutely necessary to avoid false signals caused by metal parts of the electronics control-box.*

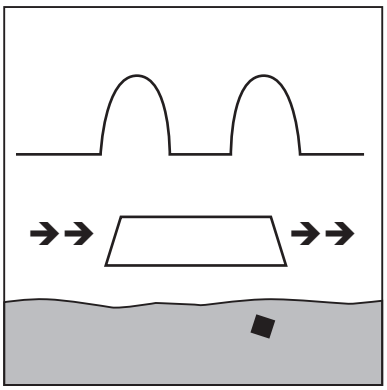
The searchcoil should be held at a constant height while searching. In many cases it is advisible to search in a systematically manner with a certain grid which can be marked on the ground for example.
The small 10" inch (26 cm) diameter searchcoil can be supplied with a telescopic pole which is held at constant height in parallel to the ground. It is moved from side to side with overlapping tracks to detect even the smallest coins which can sometimes only be detected in the center of the searchcoil as this is the most sensitive part.
Although the response speed of the LORENZ PULSE 5 is very fast, the search speed should not exceed 80" inches (2 m) per second.

When a metal object is located try to find the place with the strongest signal, that means highest indication on the meter in position 1, 2, 3 and highest audio frequency. Size, shape and depth informations can be derived from the audio sound. Small objects like single coins will be indicated with a short and intensive signal when a 10" inches (26 cm) coil is used.

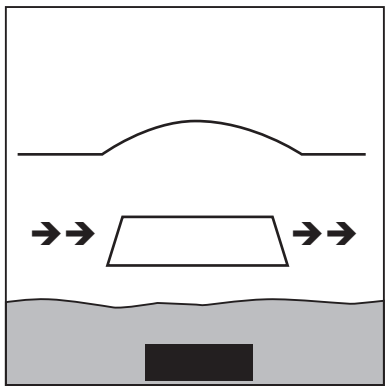
Coins and nails and very small pieces of metal will cause two indications when passing them with a frame mounted searchcoil (1 m x 1m) for example. This is mainly because those small objects are out of the range of the large coils and therefore will only be indicated at the edges of the frame mounted cablecoils and only when they are very closed to it. Large metal objects will give an extensive signal, 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 closed to the surface can be identified by the strong and fast increasing signal.

Large objects will cause a signal with a long duration especially when located with large frame mounted cable coils. A metalbox can give a signal up to 230" inches (6 m) of duration when using a 80" x 80" inches (2 m x 2 m) coil. It is therefore necessary to find the exact location of a buried object. 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 center of the searchcoil is always the most sensitive part.

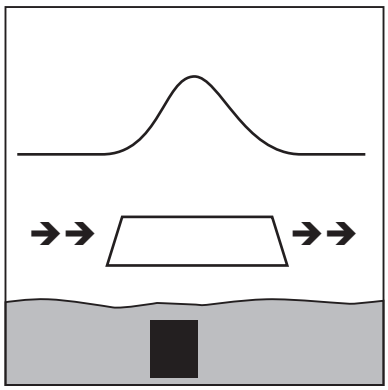
Signal intensity



small object at the surface



large objekt buried deep



medium size objekt

5.1. Target classification

In order to get further information from the buried metal object the target classification of the LORENZ PULSE 5 can be used. This target classification feature offered with the LORENZ PULSE 5 is based on the pulse-induction principle. It is static, therefore no motion is necessary for a meter reading. 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 conductivity on the meter. Weak signals which are out of the range of the target classification can't be identified. The conductivity meter reading is very precise. It will be stored as long as the coil is over the target and will disappear when passing the target with the coil.
When having located a target proceed as described in the following steps:

- Switch the mode-control to position disc.
- Hold the searchcoil at constant height over the ground beside the located target and retune the electronics to the ground with the zero-control. Be sure that there is no metal in the ground or over the searchcoil while doing this.
- Slowly move the searchcoil from the side at constant height towards the located target. Try to find the center of the target with the audio. As soon as a certain intensity of the audible signal is reached a conductivity meter reading will be performed automatically by the LORENZ PULSE 5 this will be indicated with the blue discriminator light and an indication on the meter.
- Compare the number (0-100) displayed on the meter with the following table. Therefore the searchcoil must be held over the target on the ground in order to store the conductivity value on the meter. For better accuracy the conductivity meter reading can be repeated. Therefore the coil has to be raised in the air until the blue light is off.
  Afterwards the coil can be lowered to the ground towards the target until another meter reading is performed by the LORENZ PULSE 5.

Note: *A conductivity meter reading can only be performed when the mode-control is in disc-position, when the blue discriminator light comes on and an indication can be read on the meter. The meter indication can also be locked near 0 when very small coins or gold nuggets are indicated. In pos. batt, 1, 2, 3 however no target classification via the meter is possible although the discriminator light will always come on in these position.*

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

Especially when expecting very strong signals and mineralized grounds it is often advisible to retune the detector in the "air". Afterwards the coil can be lowered to the target from the top. This will help to ignore magnetic soils, because the coil is at least 8" inches (20 cm) above the ground and therefore out of the range of the ground.
This will increase the perfomance and accuracy of the LORENZ PULSE 5 and makes it easier to locate and identify those targets.

When expecting very deep targets it will sometimes not be possible to perform a meter reading because the meter indication is always about 30-50 % less sensitive than the audio signal from the built-in speaker or headphones.

! ***Note:*** *Some smaller pieces of bronze may be indicate with a conductivity meter reading between 50-60 namely the same as some ferrous metal objects. The LORENZ PULSE 5 does not suffer from anomalous effects like VLF-TR-sinewave detectors do. Therefore very big ferrous metal objects will not cause a higher meter reading than 50-60 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 meter. The conductivity meter reading may also lay between the two different kinds of metal.*

The target classification of the LORENZ PULSE 5 will work with all available searchcoils. The universal-searchcoil-cable 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 LORENZ PULSE 5 responds to different metals.
In position disc the audio is necessary to find the center of the target. The searchcoil therefore has to be crossed directly over the target in order to find the point with the strongest signal. Highly mineralized grounds, electromagnetic interferences from powerlines or transmitters can course unaccurate conductivity meter readings (see chapter 8).
The LORENZ PULSE 5 is able to identify deeply buried big metal objects and small objects near the surface with different kinds of searchcoils.

Note: *When expecting heavily mineralized grounds it is necessary to tune the detector with the zero-button to the ground. Therefore the searchcoil must be hold at constant height and at least 2" inches over the ground during the time the zero-button is pressed down and when identifying objects with the meter reading.* !

6. Searchcoils/Accessories

Different searchcoils can be connected to the LORENZ PULSE 5 for special search and location purposes. In general small searchcoils offer great detection depths on small metal objects while large searchcoils offer the highest possible detection depths on big objects. The possible detection depths also depend on the kind of metal, the shape of the metal object and slightly on the type of ground below the searchcoil. The low sensitivity for small metal pieces in conjunction with the very high sensitivity for bigger and deeper targets make the LORENZ PULSE 5 especially useful when using it with large frame mounted searchcoils. The maximum detection depths achievable with a 40'' x 40'' inches (1m x 1m) frame mounted searchcoil are higher than 200'' inches (5m) and can even be increased to 315'' inches (8M) when enlarging the searchcoil to 80'' x 80'' inches (2m x 2m). Of course it will no longer be possible to detect single coins or nails with those large frame mounted searchcoils. In this chapter the different searchcoils available with the LORENZ PULSE 5 are described. (see chapter 11 for detection depths)

10" inches (26 cm) searchcoil with telescopic pole

This searchcoil was mainly developed for the location of very small metal objects which are closed to the surface of the ground like coin sized metal objects for example. The LORENZ PULSE 5 offers it's highest sensitivity in position **1** or **disc**. Especially when locating very thin foils, nuggets or other, non ferrous metal objects. The maximum detection depth is limited at 3 Meters on very large metal objects.

This searchcoil can be useful while pinpointing large metal objects which have been located with a frame mounted searchcoil before. Deeply buried metal objects can be out of the range of the small 10" inch (26 cm) searchcoil and therefore can only be detected with frame mounted searchcoils.

The 10" inch (26 cm) searchcoil is waterproof and therefore can be used in saltwater for example. Single coins can be detected at 30-50 cm even in different types of ground or conducting saltwater.

14" inches (35 cm) searchcoil with telescopic pole

This highly sensitive searchcoil has extreme depth capabilities on single coins and medium sized objects.
A telescopic pole with armrest (accessory) is necessary for the small searchcoils (10",14",18").

14" inches (35 cm) double d-searchcoil with telescopic pole

Separate transmitting and receiving windings offer more stayable operation on soils with high contents of ironoxides (minerals). Pinpointing small metal pieces is very easy with the double d-searchcoil, which can be used for most search applications.

18" inches (45 cm) Deep Scan Searchcoil with telescopic pole

This searchcoil can be operate by a single person with the S-rod-handle. It offers extreme depths ranges on both single coins or bigger objects buried up to 150" inches (3,8 m) deep in the ground. Depth ranges of more than 40" inches

(1 m) for a metal object of the size of a soft drink can (0,33 l) or up to 20" inches (50 cm) on a single coin with less than 1" inch (2,5 cm) 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 searchcoils unnecessary in some cases. Small items can be eliminated by increasing the distance between the coil and the ground or while selecting a different Delay Mode. This 45cm coil covers more ground than a 10" inches coil does and therefore makes very effective searching possible.
Those small objects can be easily identified by the way of the target classification. Coins with a diameter of less than 0,4" inch (10 mm) should rather be detected with the smaller 10" inches searchcoil.

Universal cable coil

This extremely lightweight and easy to transport universal cable coil offers a variety of different searchcoils for different search applications. The cable coil has to be fixed with tape on a frame which can be made of inexpensive PVC-tubes for example. The following searchcoil configurations are mainly useful for the location of metal objects with a surface of at least 6 cm^2 or fist sized metal objects for example. Small metal pieces like single coins or nails will be indicated with very 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 of the ground.

The following frame mounted searchcoils must be carried by two persons with adjustable carrying-straps. The searchcoil must be hold in parallel to the ground at a distance of 10-60 cm. The electronics control box should always be carried far away from the field of the searchcoil. It is also necessary not to wear any clothes with metal when operating the LORENZ PULSE 5 with large frame coils to avoid false signals.

0,7m x 0,7m universal cable coils 3 windings

The universal cable coil has to be arranged to a 3 winding searchcoil and has to be fixed on a 0,7m x 0,7m frame made of PVC-tubes for example. Never use any metal screws for the construction of a frame! This is the smallest frame mounted searchcoil 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 at 4,50m. This 0,7m x 0,7m coil receives less interferences from powerlines or transmitters than larger 1m x 1m or 2m x 2m coils do. (see chapter 8).

1m x 1m universal cable coil 2 windings

The universal cable coil has to be arranged to a 2 winding searchcoil and has to be fixed on a 1m x 1m PVC-frame for example.
Searching with the 1m x 1m frame coil is mainly advisible when looking for fist sized or bigger metal objects buried deep while ignoring small coins, nails and pieces of foil at the surface of the ground. The possible detection depths (see chapter 11) with this particular frame coil are very high compared with standard sinewave VLF-TR-detectors. This is one of the reasons why this particular searchcoil is used for most professional applications.

The detection depths are even higher than those achievable with magnetometers which are more expensive and can only detect ferrous metal objects.

The maximum detection depth is limited at 5,50m with this particular searchcoil.
Because of the size of the coil, small metal fragments will be ignored. Bigger nails can be identified with the target-ID. Most of the nails and other metal fragments can be easily eliminated by increasing the distance between the searchcoil and the ground. Even at distances of 50 cm there will only be neglectable 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 1m x 1m frame coil is achieved with it's intense and therefore deep going magnetic field transmitted. The detection depths listed in chapter 11 have been recorded with different delay settings namely mode-switch at position DISC, 1, 2, 3 and preset audio mid-position with zero retuned electronics. In many cases detection depths in wet, conducting ground are even higher than listed in chapter 11.

1m x 1m PVC-frame searchcoil

This is a very user friendly 1m x 1m frame coil with the same electrical properties as the universal cable coil with two windings as described before. The main advantage of this particular searchcoil is it's 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 universal cable coil 1 winding (turn)

This is the largest frame mounted searchcoil available with the LORENZ PULSE 5. The universal cable coil has to be laid to a single turn on a metal free PVC-frame and has to be fixed with tape for example.
This particular searchcoil 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 for example. This is mainly because it will become more difficult to pinpoint those smaller objects with the large coil. The maximum detection depth is limited at 8 m. This can be achieved when locating large objects like lost aircrafts or drums for example. The 2 m x 2 m frame coil can be carried by two persons without any carrying straps.

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. Although being more sensitive than the 1m x 1m coil, the 2m x 2m coil should only be used when expecting targets with a minimum surface of 20cm x 20 cm.

The large 2m x 2m coil acts as a large antenna for mediumwave transmitters. Therefore smaller frames like the 1m x 1m coil for example 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 interferences of transmitters, powerlines or the ground itself.

1m x 2m universal cable coin (compensated)

In order to construct a compensated coil the coil cable has to be laid to the figure of the shape of an eight (8) first. The coil cable has to be fixed on a 1m x 2m frame with a centre part which devides the frame into two 1m x 1m frames. The cable has to be laid and fixed twice on the center part as this is the midle of the eight (8). This type of frame mounted searchcoil is about 30% less sensitive than a 1m x 1m searchcoil. This is because of the opposite directions of the transmitted magnetic pulses. During the receiving phase the two coils of the eight do also work in opposite. Therefore magnetic interferences and most ground indications are substracted from each other and therefore eliminated.
Interferences from radio transmitters or powerlines will be absolutely cancelled. Highly mineralized grounds will be indicated less sensitive than with a 1m x 1m searchcoil. This compensated 1m x 2m frame mounted searchcoil 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 very small metal objects. Therefore fist sized or bigger objects should only be located. The minimum surface of a metal plate should be 10cm x 10cm to ensure best results when working with this coil.
Although being less sensitive, the compensated 1m x 2m coil offers very good detection depths on any kind of ground. The maximum detection depth is limited at 4 m.
Further informations concerning the detection depths with different coils and mode positions selected are recorded in chapter 11.

7. Battery / Recharger

The LORENZ PULSE 5 metal detector is supplied with a built-in NiMh-rechargeable battery which will power the electronics 8-12 hours depending on the coil connected and the environmental temperature conditions. The usage time will be 10 hours under average conditions.
A discharged battery should be recharged with the supplied charger. Therefore the plug of the recharger has to be connected to the charger/ext. power socket on the rear panel of the LORENZ PULSE 5 and the AC-plug of the charger into mains. The fast charge electronics will automatically change to a trickel charge mode when the battery is full. The built-in battery is therefore protected and can't be overcharged. The different charge modes are indicated via the red light on the recharger. A permanent red light indicates the standard state - rapid charge. A slowly flashing red light indicates charging finished - trickel charge. A fast flashing red light will only come on when the temperature of the battery is out of range or in any other fault condition.
The maximum recharge time is limited at 2,5 hours on an empty battery. NiMh-batteries suffer from a slow self discharge at higher temperatures. During one month time the capacity of a battery can decrease to 80% for example. The battery power can be simply doubled by connecting an additional rechargeable battery pack to the recharger/ext. power socket on the rear panel. The usage time can be extended to up to 24 hours. Both batteries, namely the built-in and the external one work in parallel, therefore even if one of the two batteries is empty it is still possible to operate the detector.

! ***Note:*** *Never forget to turn off the detector immediately after the red battery light on the meter comes on.*

Rapid-charger for LP 5 in general

The following safety information must be read before using the rapid-charger supplied with every LORENZ PULSE 5 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/3 Ah battery-packs
- (available from manufacturer of the LP 5 only)
- rechargeable batteries supplied with the LORENZ PULSE 5 contain chemical substances they are subject to special waste disposal.

operating temperature: 0°C - +40°C
storage temperature: - 40°C - +70°C
input data: UE = 100-240 V ± 10%, 50-60 Hz, 700 mA

When disconnecting the recharger from the mains it is important to disconnect the plug from the rear panel of the LORENZ PULSE 5 (recharger/ext. power) as well as avoiding a slow discharge of the batteries. The supplied recharger has got a wide range of input voltages in order to fit with any country mains. In conjunction with the interchangeable AC-plugs it is designed for worldwide operation.
Four different detachable AC-plugs are available at the manufacturer of the LORENZ PULSE 5: USA, UK, Europe, Australia.

Note: *Only spare parts and accessories available from the manufacturer of the LORENZ PULSE 5 should be used.* !

To guarantee a long lifetime of the encased NiMh 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 PULSE 5 when it is not in use or when planing to store it. Disconnect all plugs from the rear panel when transporting it as it can't be turned on inadvertently when the coil connector is left open.* !

The LORENZ PULSE 5 has to be turned off when the red battery light comes on!

The capacity of the built-in battery can always be checked when turning the mode-switch to the batt position. It will be displayed on the meter. If it is lower than 20 the battery is nearly empty and less than 1 hour usage time can be expected. When disregarding the red battery light the battery can be completely discharged. Resulting damages of the battery can not be covered by warranty.

The battery can only be checked via the meter or light when a coil is connected to the coil-socket of the LORENZ PULSE 5. The encased battery pack can be recharged at any time no matter if the battery pack is already full or empty. It is important to discharge the battery until the red light comes on every fifth time the LP5 has been in use before the detector is recharged again.

How to exchange the built-in battery-pack

NiMh batteries have got very good discharge characteristics in conjunction with high capacity and low weight. The lifetime of the encased 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 encased battery pack the electronics control box has to be opened first. This can be simply performed with an ordinary screwdriver by removing the four grey plastic parts of the top of the control housing and the screws below. Gently remove the top of the control box afterwards. Simply disconnect the battery connector from the printed circuit board, by pulling it gently. When exchanging the battery make sure that only the original 12V / 3 Ah battery pack available as spare part only from the manufacturing firm of the LORENZ PULSE 5 is connected to the electronics. Please make sure that the connector can only be pushed into the socket in one direction.

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. In the case of a short circuit the built-in fuse will protect the battery from heating up or coming on fire. It is always necessary to take special precautious of avoiding short circuits when handling with battery-packs.*

8. Interference

The LORENZ PULSE 5 was developed to ignore most magnetic interferences received by the searchcoil. In some cases however there are very strong interferences produced by powerlines, 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 PULSE 5 to suppress most low frequency inductions. Especially in the near of powerlines interferences can be noticed with false signals or rhythmic signals which cause indications on the meter, the disc-light or an audio response.

In urban areas, near transmitters or when other metal detectors are working close to the LORENZ PULSE 5, those kind of interferences could also be expected. In general interferences will increase with the size of the searchcoil. Interferences received with large coils are often accepted in respect of the high sensitivity still offered with those particular coils. In some cases interferences can be so intensive that it is simply impossible to work with the LORENZ PULSE5. Therefore it will sometimes be necessary to change the frequency with the freq.-control on the front-panel of the LORENZ PULSE 5 to suppress some interferences. The freq.-control can therefore be turned to the left or right, until the audio sound is clear and without any rhythmic pulses. The sensitivity or the target classification won't be affected when doing this.

If it is not possible to reduce or eliminate interferences by changing the frequency of the LORENZ PULSE 5 it is either possible to put the audio-control to a lower setting until the "noise" disappears or to change the size or kind of the searchcoil. When setting the audio-control to the left the sensitivity of the LORENZ PULSE 5 will be reduced, but the amount of false signals will also be greatly reduced. When connecting a smaller searchcoil the amount of interferences can also be reduced. The compensated 1m x 2m frame mounted searchcoil does not suffer from any kind of interferences, even the intensity of ground indications is greatly reduced at the expense of poor sensitivity for smaller metal objects. Therefore the compensated 1m x 2m coil should only be used while searching for metal objects which have a surface bigger than
10cm x 10 cm. The 1m x 2m coil will always guarantee a very stayable operation of the LORENZ PULSE 5 even under the worst environmental conditions like temperature changes, mineralized grounds or magnetic disturbances.
Interferences caused by transmitters and powerlines can't be reduced by changing the search mode with the mode-switch.

It is only possible to reduce the amount of ground indications and the sensitivity to small metal objects when turning the mode-control to position 2 or 3 (see chapter 3).

Note*: Low interferences with clear audio response and correctly tuned (zeroed) electronics is absolutely necessary to make exact target classifications possible. The LORENZ PULSE 5 therefore has to be tuned and the right coil has to be chosen first before starting to identify metal objects.*

The electronic unit of the LORENZ PULSE 5 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-control. The same should be done after very first five minutes of operation since many components inside the LORENZ PULSE 5 control box need to warm up to their working temperature.
Ground signals which are mainly derived from magnetic iron oxides will be indicated with an increasing audio response when lowering the searchcoil to the ground although no metal is below the searchcoil. This kind of ground indication can be simply eliminated by simultaneously holding the searchcoil 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 mineralized ground it is always advisible to hold the searchcoil at a distance of at least 10-30 cm from the ground depending on the size of searchcoil connected.

9. LORENZ PULSE 5 standard equipment

The LORENZ PULSE 5 detecting system is supplied with the following standard kit:

- Plastic carrying case with foam padding
- LORENZ PULSE 5 electronics control box
- Leatherbag with adjustable shoulder and belt strap for LORENZ PULSE 5
- Rapid charger with wide range AC-input (90-240 V)
- Detachable AC-plug for rapid charger (Euro, UK, USA, Australia available)
- Operating manual (English and German Version)
- Stereo headphones with 6,35 mm plug.

10. maintenance / service

The LP 5 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 not waterproof and should therefore not be exposed to rain or extreme temperature changes. All searchcoils available for the LP 5 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.

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 LP 5 when the red battery light comes on. Disregarding this can damage the built-in battery. Damages causes by deep discharged batteries are not covered by warranty!

Service

The LORENZ PULSE 5 is ruggedly designed. All necessary electronic components are placed on two printed circuit boards. The main circuit board is covered with a special plastic to protect it from temperature changes and humidity.

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

In case of any false functions or problems occurring with your LORENZ PULSE 5 detector do contact your dealer where you purchased your detector or directly contact us at:

(Adress see last page)

11. Detection depths I

Used Searchcoil / Metal object	10″in coil	18″in coil	27″in coil 3 turns	40″in coil 2 turns	80″in coil 1 turn	40″ x 80″in coil compensated 8
Goldnugget Diameter: 5mm	7,8″in	9″in	X	X	X	X
Goldcoin Diameter: 20 mm	15″in	18″in	17″in	X	X	X
Silvercoin Diameter: 13 mm	11″in	12″in	X	X	X	X
Silvercoin Diameter: 25 mm	17″in	21″in	22″in	X	X	X
German coin 1DM Diameter: 24 mm	16″in	20″in	18″in	X	X	X
Brass sheet 4″ x 4″inches	30″in	37″in	49″in	55″in	59″in	40″in
Brass sheet 8″ x 8″inches	35″in	47″in	65″in	71″in	90″in	51″in
Softdrink can 0,33 l	35″in	50″in	55″in	60″in	67″in	45″in
Iron box 12″x7″x6″inches	51″in	71″in	87″in	102″in	122″in	70″in
Fuel tank 20 l	59″in	94″in	106″in	122″in	145″in	78″in
Iron plate 20″ x 20″inches	63″in	86″in	98″in	114″in	142″in	79″in
max. range	118″in	150″in	177″in	217″in	315″in	157″in

Detection depths recorded in medium air; mode-switch at position **1** or **disc**

detection depths II

Used Searchcoil / Metal object	10″in coil	27″in coil 3 turns	40″in coil 2 turns	80″in coil 1 turn	40″x80″in coil compensated 8
Goldnugget Diameter: 5mm	X	X	X	X	X
Goldcoin Diameter: 20 mm	9″in	X	X	X	X
Silvercoin Diameter: 13 mm	6.7″in	X	X	X	X
Silvercoin Diameter: 25 mm	12″in	12″in	X	X	X
German coin 1 DM Diameter: 24 mm	8″in	X	X	X	X
Brass sheet 4″ x 4″inches	28″in	43″in	53″in	51″in	35″in
Brass sheet 8″ x 8″inches	35″in	57″in	67″in	79″in	47″in
Softdrink can 0,33 l	27″in	43″in	45″in	47″in	33″in
Iron box 12″x7″x6″inches	50″in	86″in	102″in	106″in	63″in
Fuel tank 20 l	53″in	98″in	106″in	122″in	75″in
Iron plate 20″ x 20″inches	57″in	94″in	114″in	118″in	75″in
max. range	98″in	157″in	188″in	275″in	141″in

Detection depths recorded in medium air; mode-switch at position **2**

detection depths III

Used Searchcoil / Metal object	10″in coil	27″in coil 3 turns	40″in coil 2 turns	80″in coil 1 turn	40″x80″in coil compensated 8
Goldnugget Diameter: 5mm	X	X	X	X	X
Goldcoin Diameter: 20 mm	X	X	X	X	X
Silvercoin Diameter: 13 mm	X	X	X	X	X
Silvercoin Diameter: 25 mm	7″in	X	X	X	X
German coin 1 DM Diameter: 24 mm	X	X	X	X	X
Brass sheet 4″ x 4″inches	24″in	40″in	47″in	43″in	31″in
Brass sheet 8″ x 8″inches	31″in	51″in	59″in	67″in	43″in
Softdrink can 0,33 l	14″in	24″in	20″in	X	24″in
Iron box 12″x7″x6″inches	41″in	75″in	90″in	98″in	59″in
Fuel tank 20 l	45″in	87″in	98″in	114″in	69″in
Iron plate 20″ x 20″inches	47″in	87″in	102″in	114″in	67″in
max. range	63″in	118″in	150″in	197″in	102″in

Detection depths recorded in medium air; mode-switch at position **3**

11. Specifications LORENZ PULSE 5

dimensions

electronic control box in leather case:
9″ x 67″ x 27,5″ (230 x 170 x 70 mm)

carrying case with standard kit and LP 5 inside:
15,7″ x 12 ″ x 6,5″ (400 x 300 x 165 mm)

1m x 1m pvc-frame coil (collapsed):
433″ x 59″ x 59″ (1100 x 150 x 150 mm)

10″ in (26 cm) searchcoil with extended S-rod:
length 53″ inches (1350 mm)

10″ in (26 cm) searchcoil with collapsed S-rod:
length 41″ inches (1050 mm)

weight

LP 5 electronic control box in leather case:
2300 g

carrying case with LP 5 and standard kit:
5200 g

universal coil cable:
380 g

1m x 1m pvc-frame coil:
2300 g

electrical data:

search-frequency with large / small searchcoils connected:
700 / 1300 Hz

audio target response freq. voltage controlled oscillator:
0 - 13000 Hz

power source:
built-in 12V / 3 Ah NiMh battery

usage time:
approx. 8-12 hours depending on temperature and coil connected

batt.charger:
rapid charger with interchangeable ac-plug
96 - 264 V for worldwide operation

recharge time:
max. 2,5 hours on empty battery

operating temperature:
-5° - +55°C

detection depths:
see chapter 11

Searchcoils (interchangeable)
electrostatic insulated (shielded); waterproof

- 10" inches (26 cm) searchcoil with S-rod shaft and armrest
- 14" inches (35 cm) searchcoil with S-rod shaft and armrest
- 14" inches (26 cm) double D-searchcoil (for the detection on mineralized soils)
- 18" inches (45 cm) searchcoil with S-rod shaft and armrest
- 1m x 1m pvc-frame searchcoil (Accessory)
- universal coil cable 8m perimeter (can be used as 0,7m x 0,7m; 1m x 1m; 2m x 2m; compensated 1m x 2m frame mounted searchcoil)

controls

mode-switch:
off; batt-test; discriminator; 1; 2; 3 - delay settings

zero-push button:
automatically retunes the electronics

audio-control:
changes the audio threshold (tick-rate) from silent to a low frequency audio sound.

freq.-control:
sets the operating frequency of the LORENZ PULSE 5

connectors

coil- socket:
different searchcoils can be connected to this connector

charger / ext. power:
the supplied charger or external battery packs can be connected to this jack.

headphone-jack:
the supplied stereo headphones can be connected to this jack.

optional accessories

different kinds of searchcoils, extension cables and additional battery packs are available on request.The encased rechargeable battery is also avaiable as sparepart for the LORENZ PULSE 5.

Design and specifications subject to change without notice!

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