Ground Penetrating Analyzer

GPA 1000

User-handbook KTS - 3D

KTS-Electronic
Germany

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1 General hints

1.1 Prefaces

We would like to congratulate you for the acquisition of one of the most modern geophysicalic ground-control-utensil GPA. The assembly is very simple since the programs are already pre-installed and it is very easy to understand the instruction manual with the help of many pictures. So, you may start quickly with the practical measurements.
This instruction has been developed by company KTS-Electronic for GPA. Any alterations or duplications are allowed only with written permission of KTS-Electronic.
The company KTS-Electronic keeps the right to change the instruction with new knowledge anytime or completely. The new instructions are always prepared gratuitously on our website for customers to download.

1.2 Important hints

Please be aware of the following:

1. Do not store appliance in strong wetness and high moistures.

2. Avoid current-carrying over lines

3. Do not use mobile phones during the operation

4. Do not process any measurement during thunderstorms

5. Flawless operation is not guaranteed with empty accumulator

6. Please use for the operation or loading only the components enclosed or released by KTS.

1.3 Delivery capacities

- Ultramoblie PC, incl. bag and lithium-ion accumulator
- GPA 1000 electronics-unit with shoulder strap
- 45 cm (17.72") universal probe
- 60 cm (23.62") super probe
- 3 part telescopic pole with grab handle
- Accessory metal discrimination (Goldscan)
- 45 cm (17.72") seach-coil for metal discrimination
- USB-cable, fast battery recharger
- USB-Stick with pre-installed software and digital handbook
- Solid bag

2 Hardware-operations

2.1 Assemblies

In contrast to other appliances, the assembly is very simple.
The assembly of the universal and super probe:
Unscrew the rod 3 (page thread) into the holder of the probe (4). Now insert the remaining parts in the correct order. You can get the universal or super probe into the holder (4).
Only 2 connection-cables must be connected: USB - and sensor-cables. Already, your appliance is operational.

Fig.: 4-part- reducible universal probe

First connect the GPA electronic-unit with the PC by the included USB-cable, then connect the sensor-cable on the rear with the electronic.

2.2 Front-side

Turn-switch:
The turn-button has 4 positions:

- OFF The device is switched off
- BAT The display shows the current battery voltage (over 12 should lie)
- SENSOR You can read on the display the value of the sensors
- ECO Power save mode, backlight off

Toggle-switch: SENSOR/ CALIBRATION

- SENSOR Shows the battery voltage (BAT) or the current value sensor (SENSOR or ECO).
- CALIBRATION Shows every time the value of calibration.

PC-connection (green LEDs) = if both on, the connection is active to the PC

Fig.: front-side of electronic-unit (GPA 1000)

2.3 Start the electronic

Switch on the electronic-part with the turn-button on the forefront at BAT to control the current battery charge. This value must always lie over 12. (Otherwise, please charge the battery). Then turn to the position SENSOR or ECO, to see the sensor or calibration data on the screen. The sensor data should always be between 1-4 and the calibration approximately 2.5 (for a short time the calibration values show other value, before the calibration automatically set).

Data-delivery through USB: USB delivers more quickly in contrast to other appliances, which take the measuring data by the parallel interface, and more certainly the data of the GPA at the PC.

Fig.: Complete electronics unit with PC

3 Program-start

3.1 Program-start

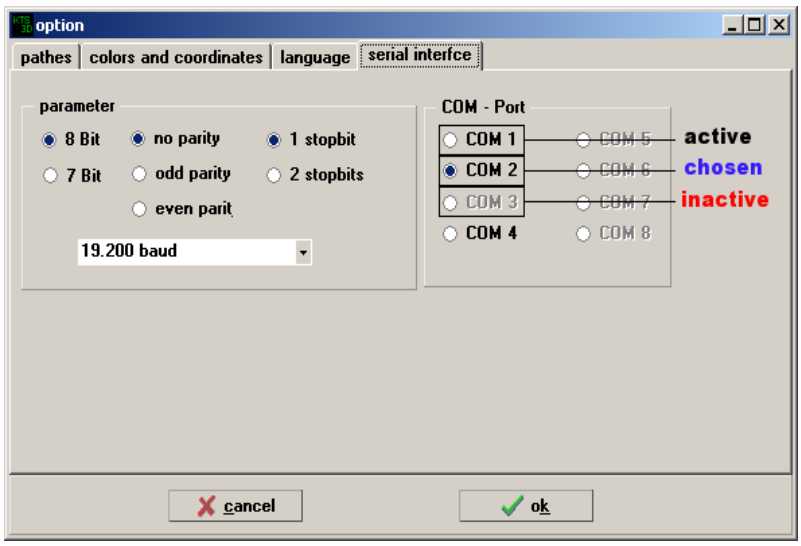
After booting the PC, start the KTS software, by double-click on the KTS-3D icon.

3.2 Com-Port attitudes

If the error mark “com errors” appears when operating the new-button , the Com-Port must be selected again. You may do this in the options or with a click on the interface-button.

Only the active Com-Ports may be selected, that means that the GPA in any case must be at least interconnected with the PC for at least 1 minute and both green LEDs at the GPA must light up. (COM 2 is put in as standard)

In exceptions, it may occur that the USB-interface does not activate itself. Then separate the USB-connection and turn off the electronic-unit. Wait 2 minutes and connect the PC with the electronic-unit then again. Now, the COM-Port should be active.



4 Driver-reinstalling (with reinstalling of Windows)

If you want to connect another laptop to the main-unit, or have to install Windows, then copy the file KTS3D and virtual USB-driver of the included USB-Stick on your computer at first. A new hardware of Windows is recognized when the first-time connecting of the main-unit, by means of USB-cable. Now, Windows starts the hardware-assistant. You now click on searches. Choose the file of the Virtual USB-driver and click on O.K.. Now, the computer installs the first driver. Repeat the same with the second new hardware that is found. Now all drivers are installed and you may begin with the measurements.

5 The search-process

With the control of the ground, one can start with different search-modi.

5.1 Search with the universal probe

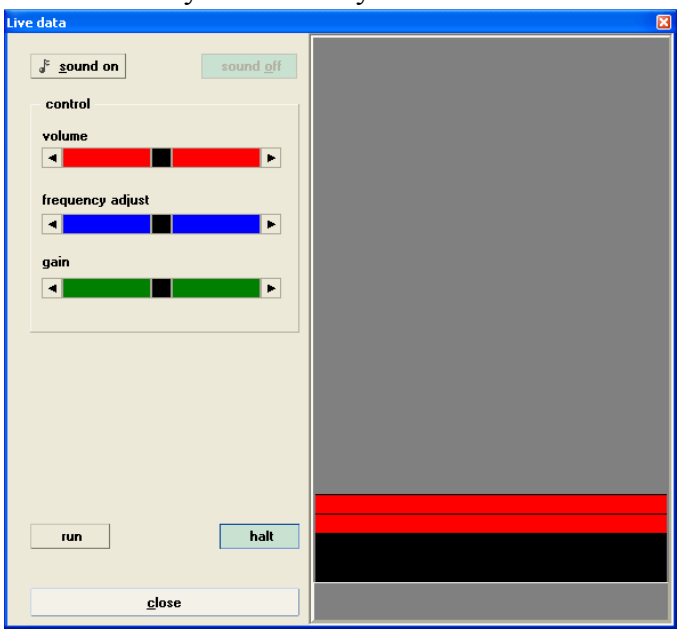
a. Turning to the probe so the arrow (on the side parts of the probe) while running in the direction of the ground (so you can reach the highest search performance).
b.Turn on the electronics, check the battery and make the switch to the sensor-position.
c. Check the calibration before the search (ca. 2,5)
d. Now we switch back to sensor and check whether the indicated value between 1 to 4 stands. Should this not be the case, they should be changed your search to something of value between 1 to 4 lies.
e. Now you can connect the computer with the electronic (connect to the computer using the livering USB cable with electronic).
The further description of the search will be from 5.3.

5.2 Search with the super probe

The Super probe is similar to the universal probe, but has approximately 30% more depth performance.
The search with the super probe is a little difficult, because the magnetic direction of the probe needs to be adjusted.
For the super probe should absolutely predict the direction so choose the values of the probe to 1 - 4 are displayed.

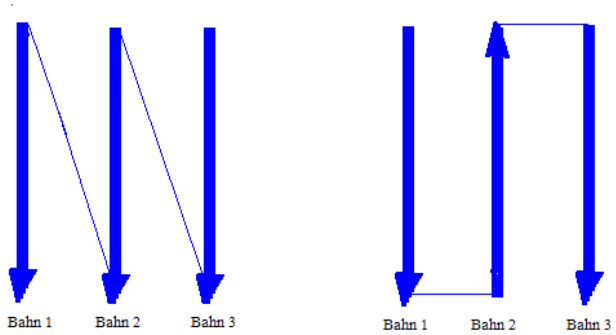
5.3 Live mode

It is meaningful first to scan big areas in the live mode roughly in order to mark the important areas and, to control more exactly in the 3D-System then.



5.4 3D-search-mode

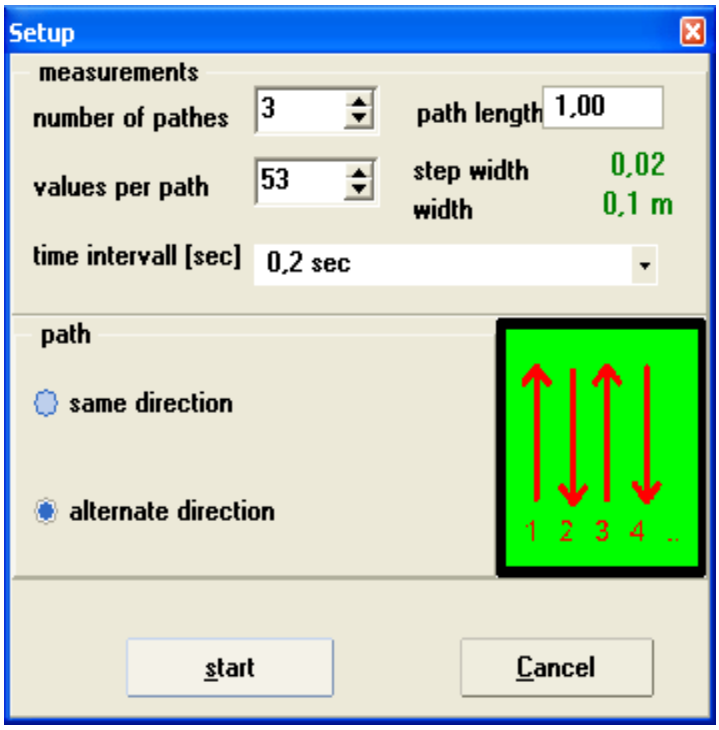
For the exact control of the ground, the area should be divided in different tracks. These tracks can be run into the same direction or into the counter-direction.



The track-length can be selected variably, with the search for big objects or airspaces, longer track-lengths can be selected. With the search for small objects, shorter track-lengths are recommended.

5.4.1 Defaults

With the " new " button on the screen begins the search, and the computer requires the sensor-number, track-length, track-number, track, (see 4.3) and measurement-speed, etc.

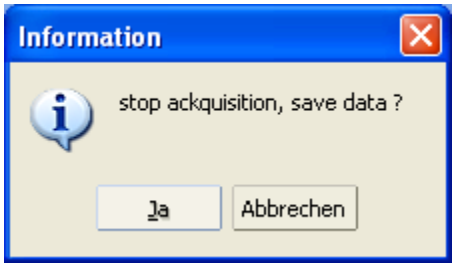


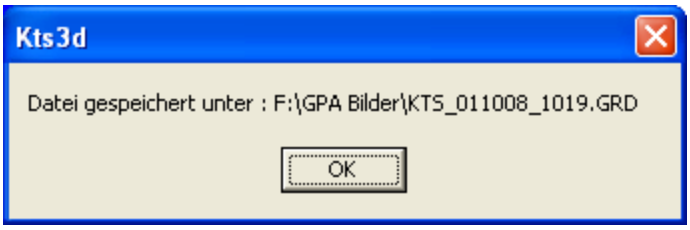
5.4.2 Start-button

With pressing start on the button the search begins. The first results are shown on the screen 2-dimensionally, until the track finishes, then the measurement is finished automatically. The start-button must be operated at the next track again.

5.4.3 End the measurement

About end of the last track, the computer asks, whether you would like to store the measurements, with the O.K. button, the measurement is stored internally automatically on a place intended for it.





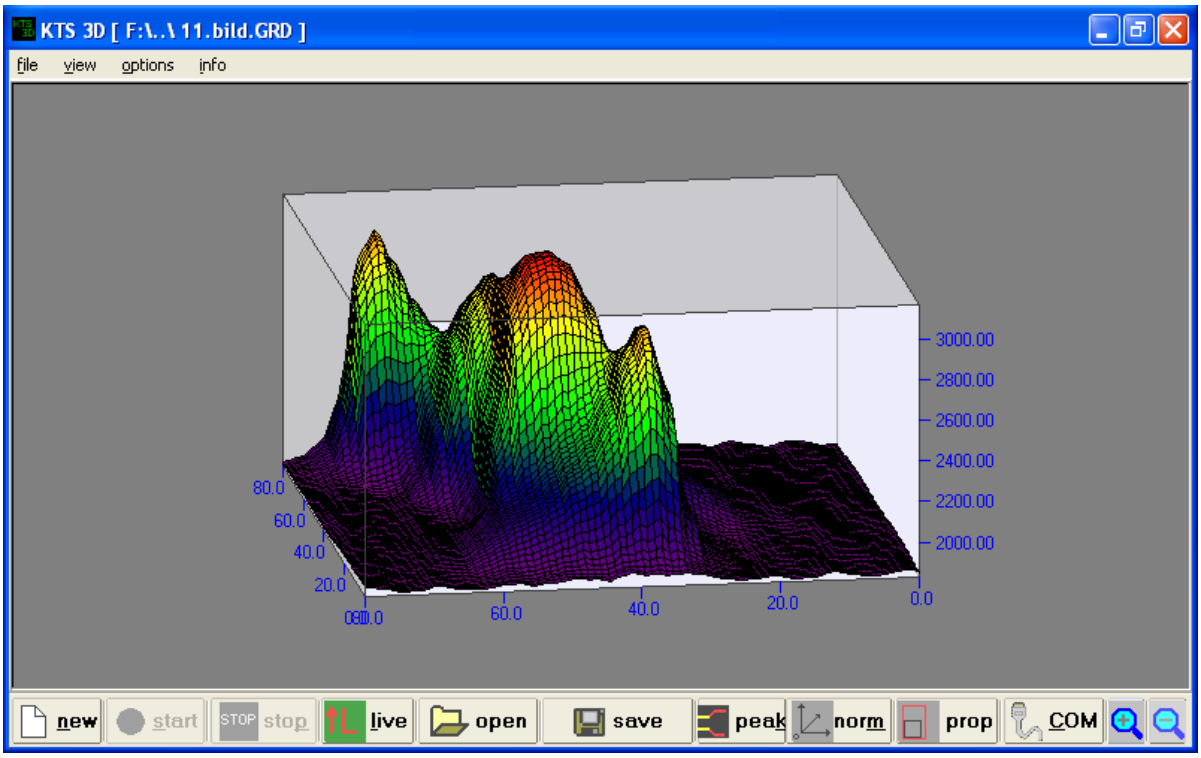
5.4.4 Tranfer of measurement-data

If you would like to look at the measuring data on another monitor transfer the measuring data on the included USB-Stick.

The entire software is on the USB-Stick pre-installed so that you can transfer the measuring date on each other computer and can process further.

5.4.5 3-D figures

The measurement-data can measuring-direction X as 3-D figures in 3 extras, Y and vectorial is shown.

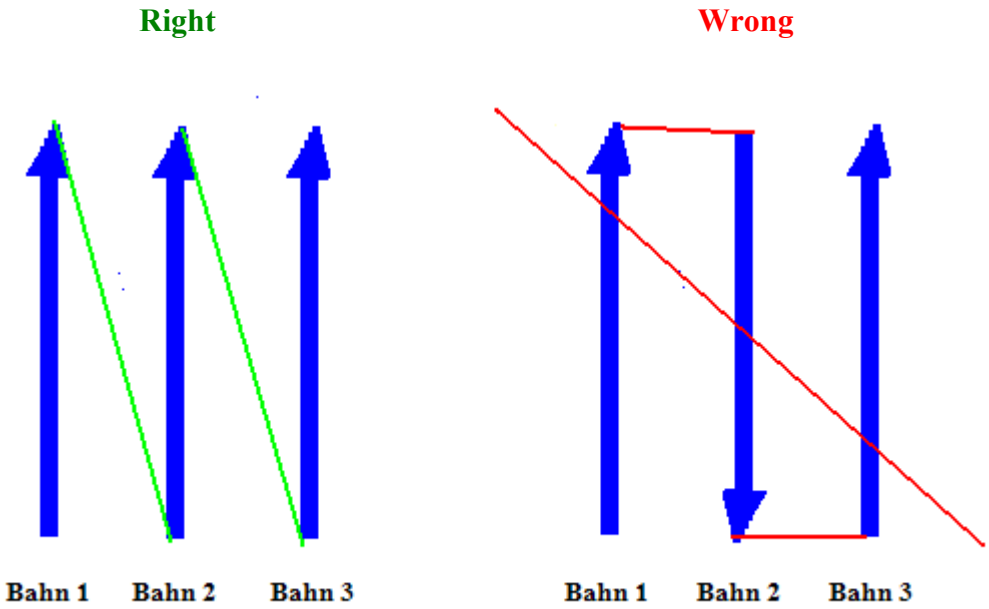


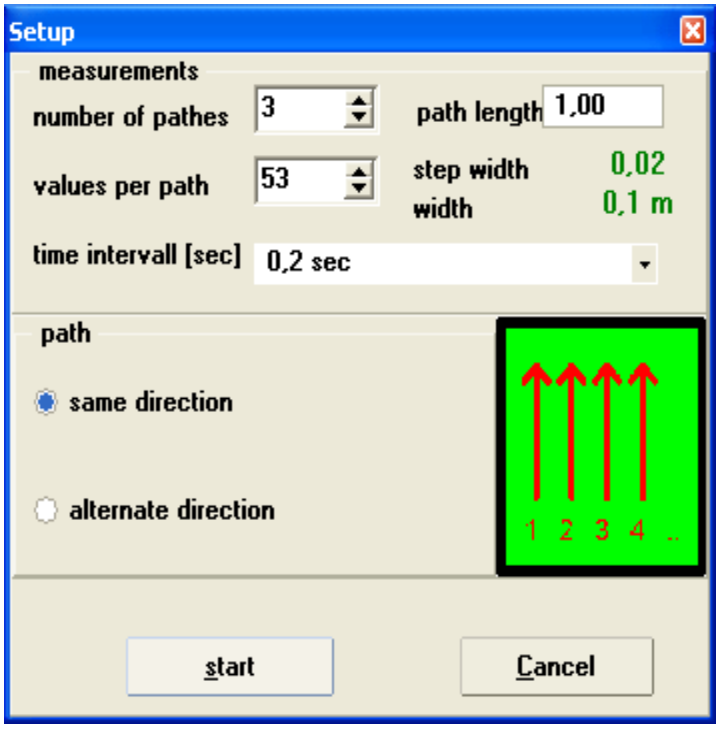
One can show the width, length and strength of each ground-structure on the side.

5.5 Search-process (measurements)

The GPA is a gauge, that changes ground-anomalies through metal-objects, ground-structures or airspace measure and can distinguish from the normal ground-magnetism. The right results depend strongly on ground-type and measuring method. Areas to be measured should not have electric fields (like high voltage-cables or groundwires), strong mineralising or wet grounds possess because these influence the measuring results.
The dryer the ground is, the more exact are the results.
For the measurements, you should divide the area to be measured into different tracks.
You may seek with 2 different methods.

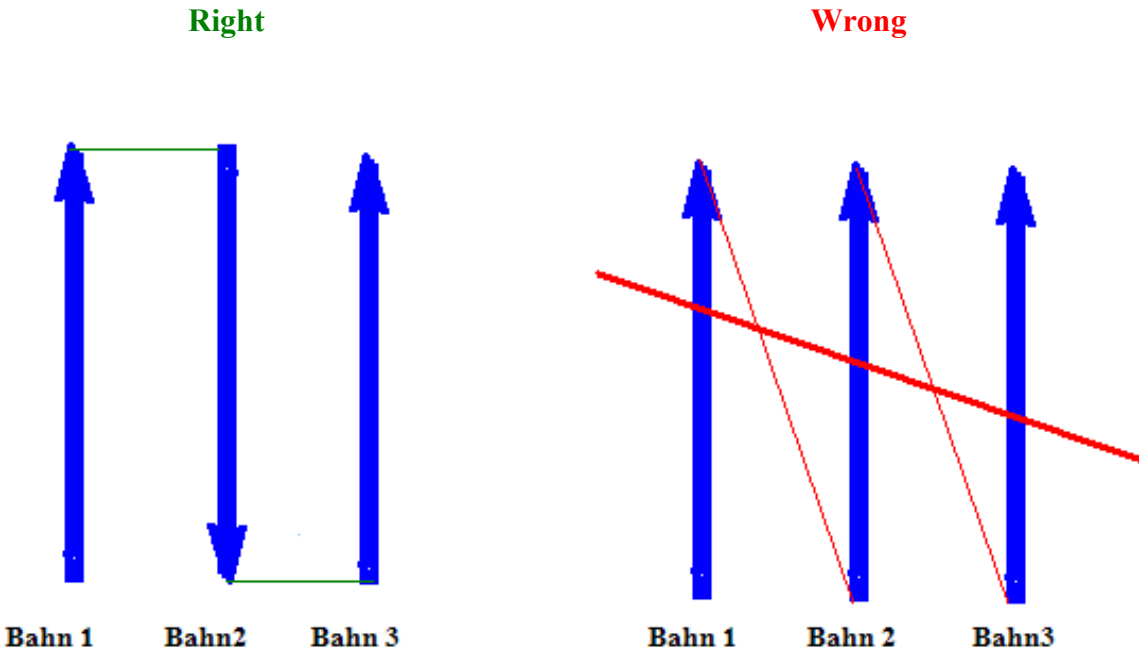
5.5.1 Searches with rectification

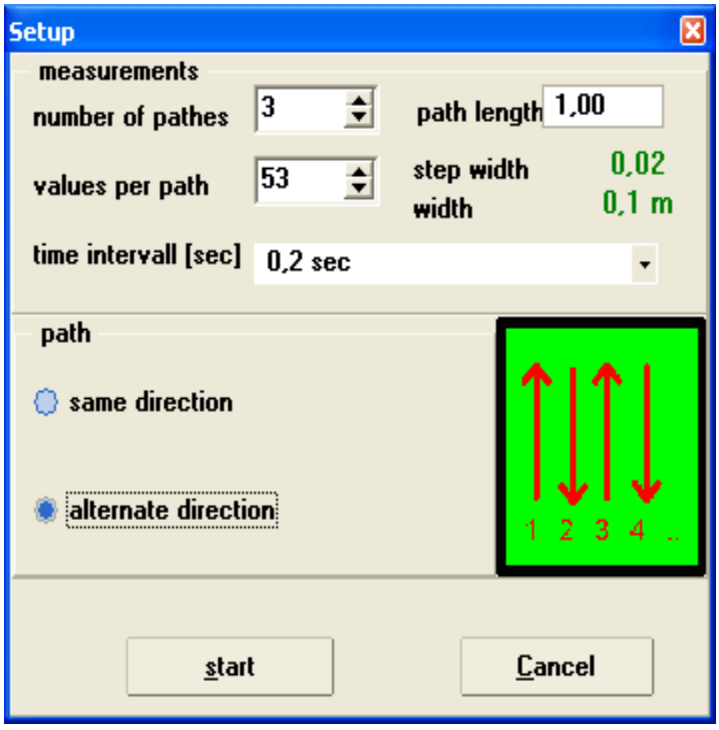




If you have chosen the search in rectification, you should come back after completion of each track to the start-height and should press the start-button (for the measurements of the second track).

5.5.2 Searches in counter-direction





If you have chosen the search in counter-direction, you should turn around after completion of each track, go 1m to the right approximately and directly the next track with the pressure on it start-button starts.

For the precise measurement you should hold the search-speed so that on opposed walk you grasp the objects on the same place. Also for precise measurements the track lengths should not be too long (between 5 to 10 meters).

6 System-prerequisites and license-agreements

6.1 System-prerequisites

The program is a 32-bit-application, that under Windows 98, Windows 2000, Windows NT or Windows XP is driven. As minimum-prerequisites for the meaningful business, the PC should show following production:

- Processor with bar-frequency from 1000 MHzes or more
- Hard disk with approximately 10.. 20 MByte free storage area
- Graphic-card with a minimum-dissolution of 800 x 600 points
- USB interface to the connection of the external measuring-hardware

6.2 License-agreements

The program KTS 3D as well as the entire accompanied electronic or printed documentation is subject to the copyright of the company KTS-Electronic. If parts of the present license-regulations should show alterations or expansions opposite the license-regulations present for older program-versions, so with beginning of the day of entry it have to be used for earlier versions.

The present license-regulations come at the 01.05.2007 into force.

Through the utilization of the software, the user states with the present license-regulations in agreement. The usufruct goes out automatically with a violation against the license-regulations.

6.3 Utilization-regulations

After full payment of the invoice amount the user is allowed to not exclusiv right of use, of the program listed in the bill.. This right is restricted to the owner of original-software. Consequently, the software can be used only on one single computer-system at the same time. All present and future copyright and/or of industrial protection-right at the left programs and at all programs derivative from it, program modules or in this context produced records remains at the company KTS-Electronic.

6.4 Liability-exclusions

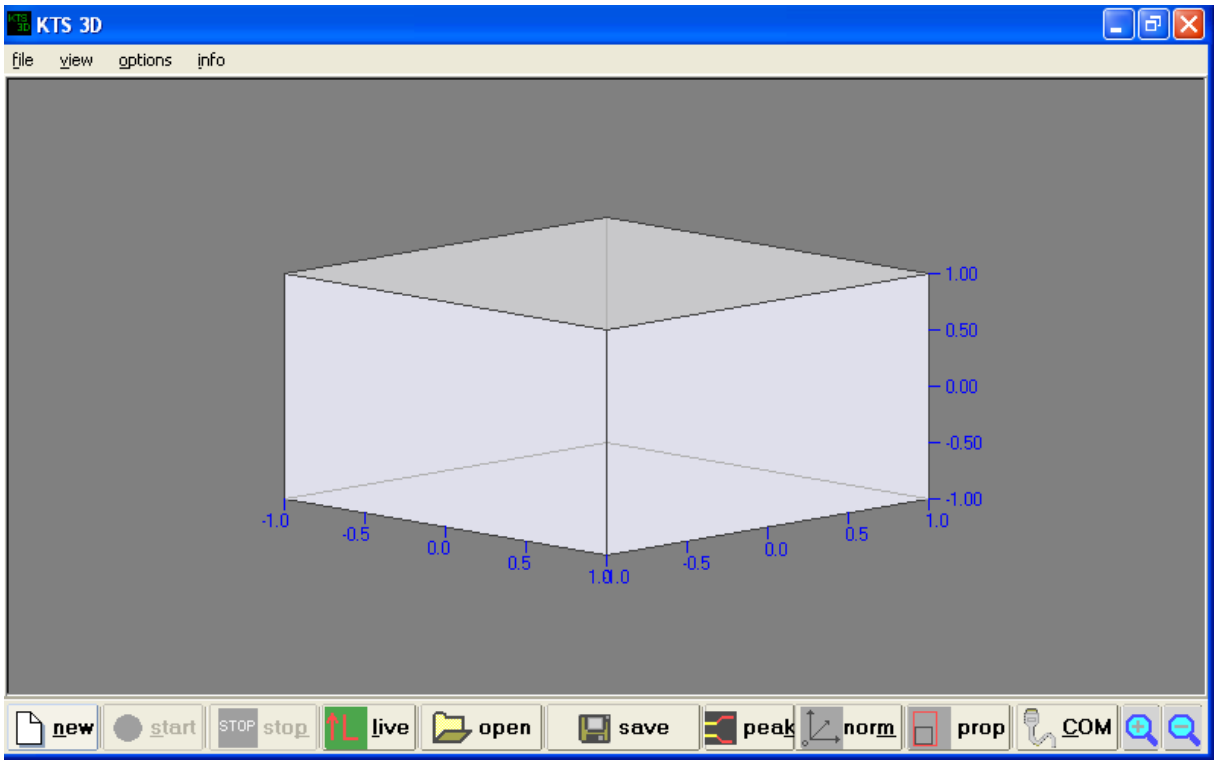
The present program was tested carefully, nevertheless mistakes are not to be excluded. No guarantee is adopted for the usability of the program to a certain purpose. Especially, no liability is adopted for consequence-damages and profit - and fortune-losses, that could originate through the application of the program as well as the affiliated documentation, Price-alterations as well as alterations of each type at the software and the documentation must remain reservations and must need no separate communication.

7 Program-operations

The program serves the visualisation of measurement data in colored, three-dimensional representation, in the particular of the ad of magnet-field-data.

7.1 Main-window

After the program-start, the empty main-window appears with the Menu-bar, the Tool-bar, and the ad-area (midle),



With the program-start, the ad-area is first empty.

7.1.1 Toolbar

In the Toolbar, some buttons are summarized for the fast operation with the mouse. This is from the left to the right:

- New — shows a data-reception with external hardware
- Start — starts a data-reception with a track
- Stop — stops the data-reception
- Live — start a data-reception in the live mode
- Open — reads a stored file
- Save — save the current file
- Peak — switch between absolute and relative ad
- Norm — re-puts down the main-ad into the basic attitude
- Prop — switch between proportional and quadratic representation
- Com — open the COM-Port-menue
- Zoom — the two buttons [+] and [-] steers the enlargement

7.1.2 Adjustment range

Following possibilities are located in the adjustment range from above downward:

- Fence-lines switches the grid-lines in the ad-area an as well as from
- Scales switches the scale labelling in the ad-area an as well as from
- Graphic-cursor switches the graphic cursor in the ad-area an as well as from
- Distances switches between space - and index-ad of the scales

7.2 Menu-bar

7.2.1 Data-Menu

In the Data-menu, entries appear to the opens and stores from measurement-data. It is marked through the ending GRD.

The entry [again] starts a data-recording with connected external measurement-Hardware. A selection-window appears for the attitude of the measurement-conditions.

The entry [end] finishes the program.

7.2.2 Display-Menu

Individual elements of the main-window can be switched visibly as well as invisibly in the display-menu.

The entry [Toolbar] switches the Toolbar visibly as well as invisibly

The entry [status-bar] switches that status-bar visibly as well as invisibly

The entry [numerically] switches from the graphic representation on a numerical ad of the measurements.

7.2.3 Options -Menu

The options-menu entry opens a new window for the attitude of program-options. The description of the different possibilities takes place there.

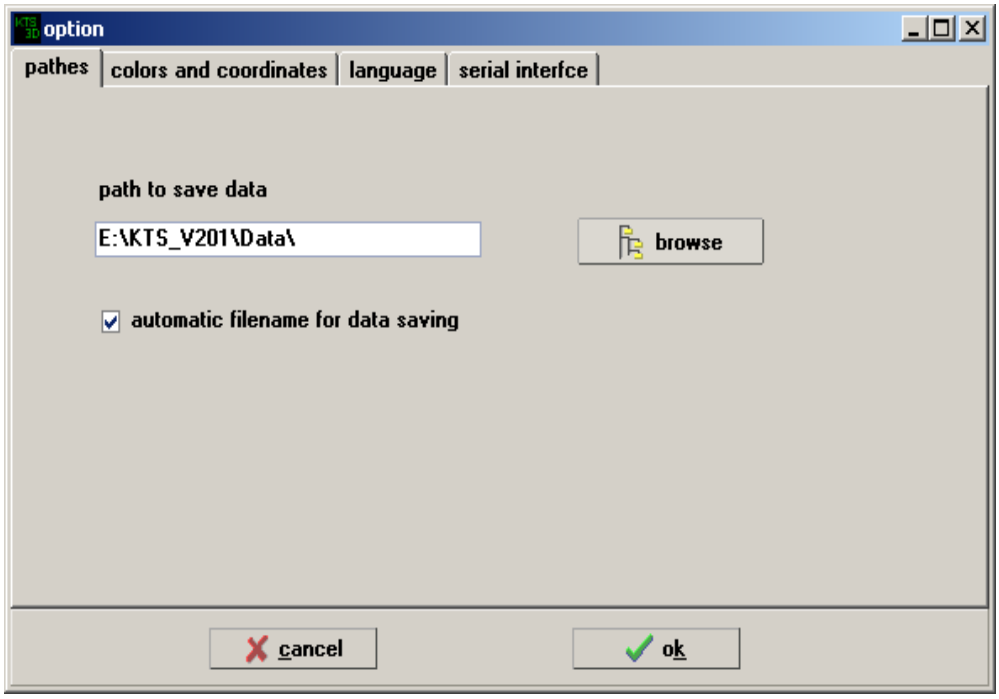
7.2.4 Info-Menu

Only one single point appears in the Info-Menu. It delivers information of the present version.

7.3 Options-window

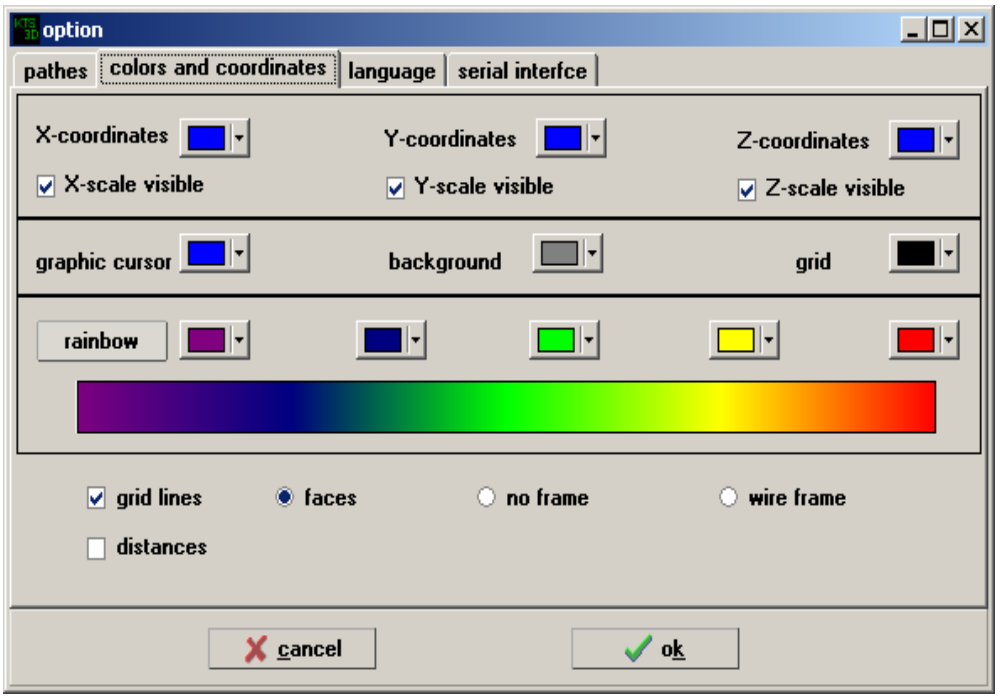
That options-window is divided into four areas.

7.3.1 Paths



With the path-attitude, the table is fixed for the data-storage. A selection-dialogue appears after activity the [search]-button.

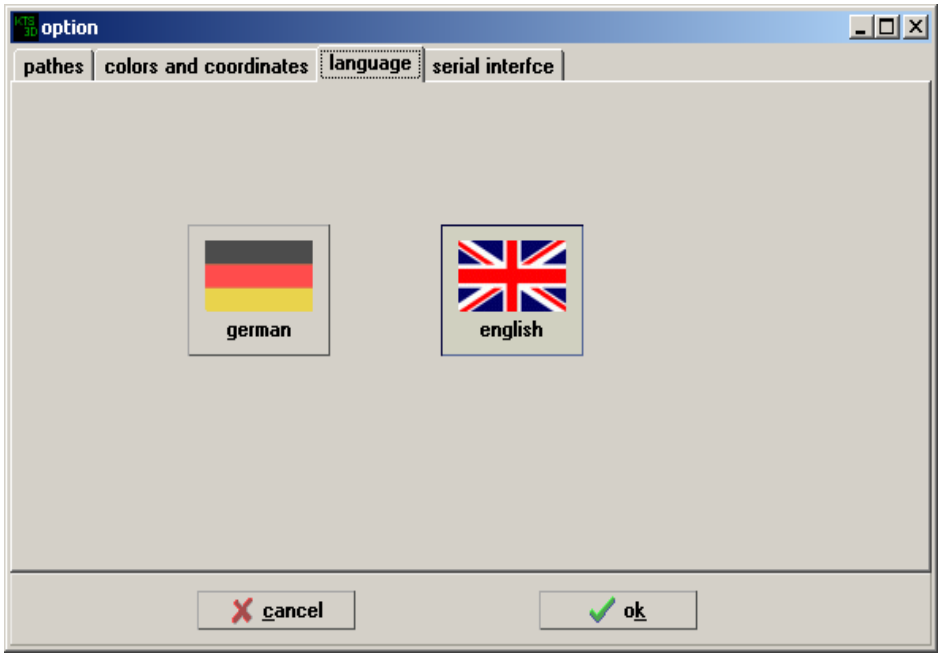
7.3.2 Colors and coordinates



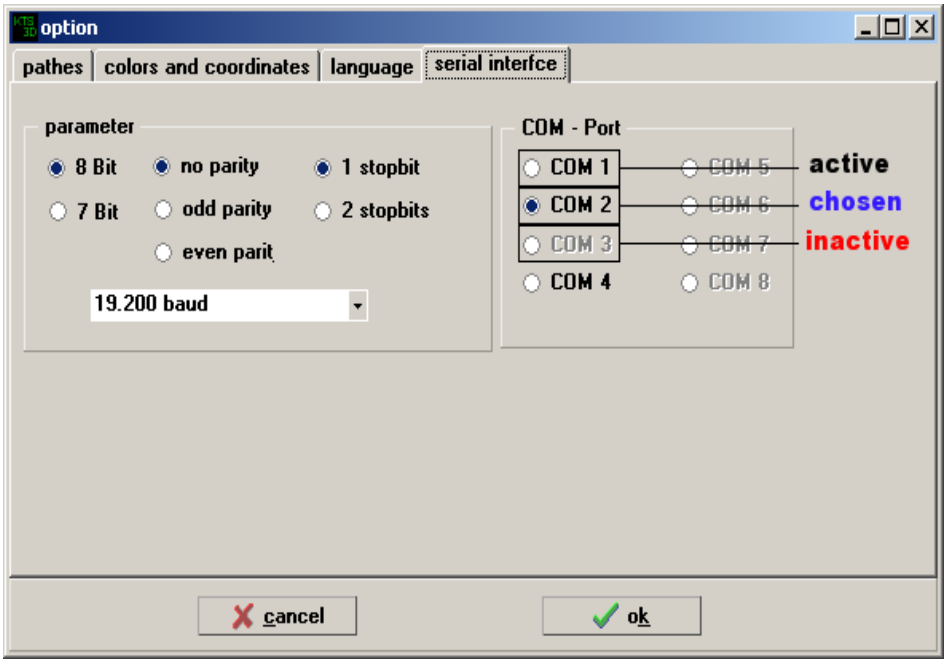
Here you can choose colors for the coordinate-ad, graphic-cursor and the background. A color-selection-dialogue appears after activity of the corresponding buttons.

7.3.3 Speeches

The program can be switched completely for the service to several languages.



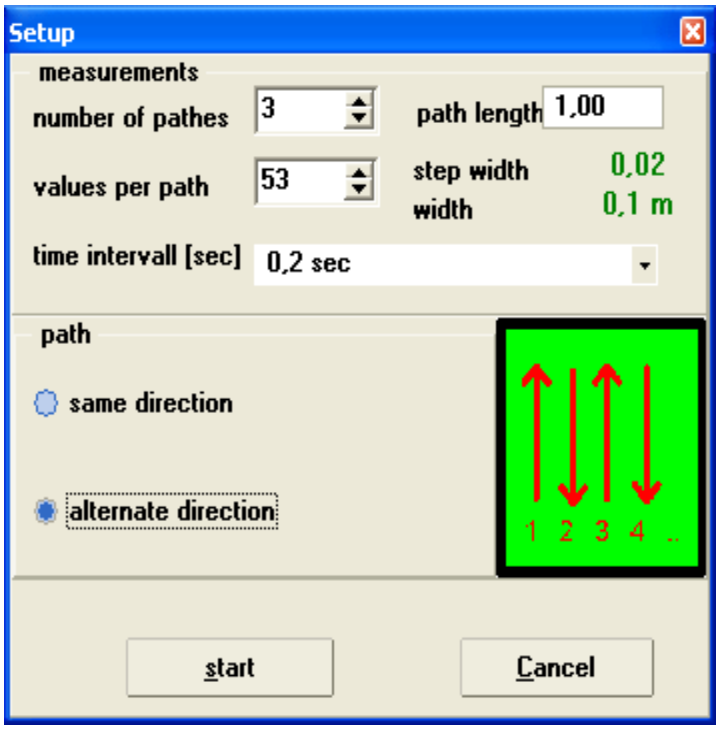
7.3.4 Interfaces



The parameters of the interface must be fixed for the connection of external hardware. The corresponding statements must be taken the description of the external hardware. The selection of the COM -Ports follows the chosen connection at the PC.

7.4 Data-recordings

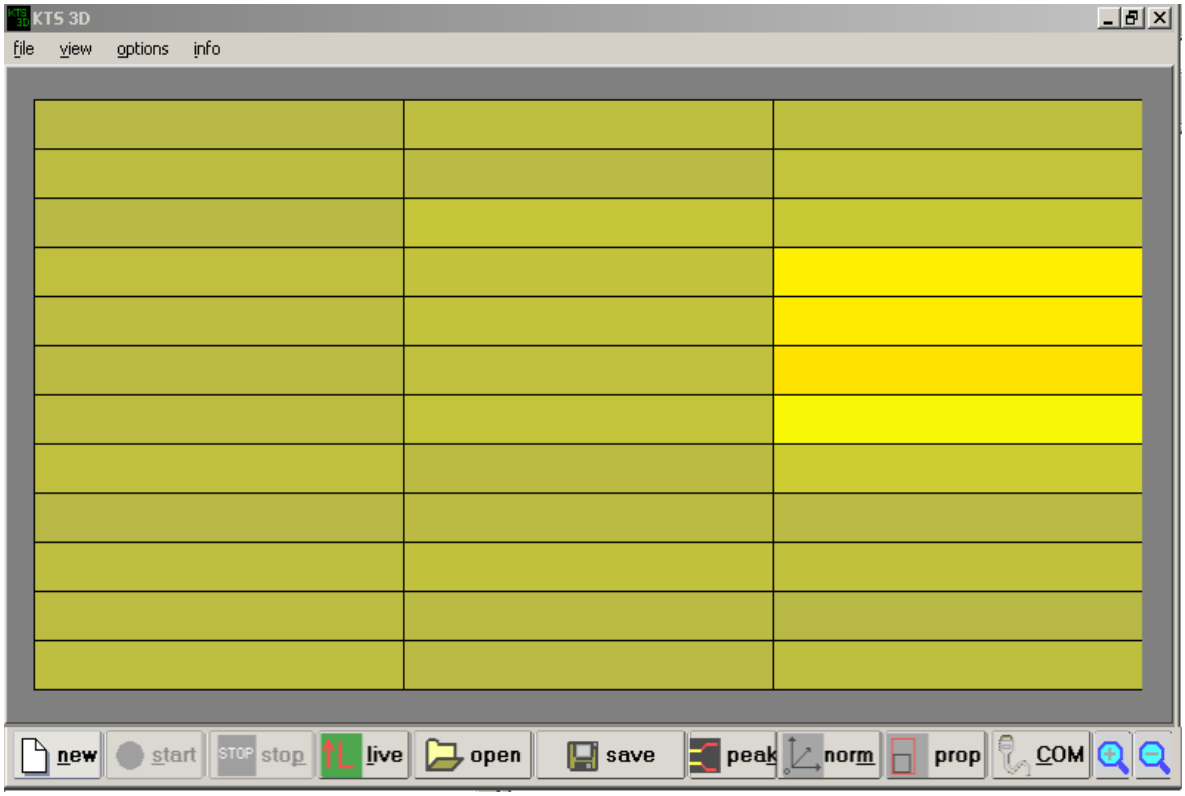
7.4.1 Employments before the data-recording



Different attitudes must be planned before the data-reception with external hardware. The track-length determines the distance between the measurement-points with the number of the measurement-points. Together with the number of the tracks, the number of the measurements results from it. The number of the values per track is restricted on at most 100. The measurement begins after the activity the [Start]-button. The demolition is anytime possible with [Cancel]-button. Still, one can switch between an consensual or contrasensual movement.

The measurement can be caused either manual or in the time of-controlled. A corresponding hint takes place.

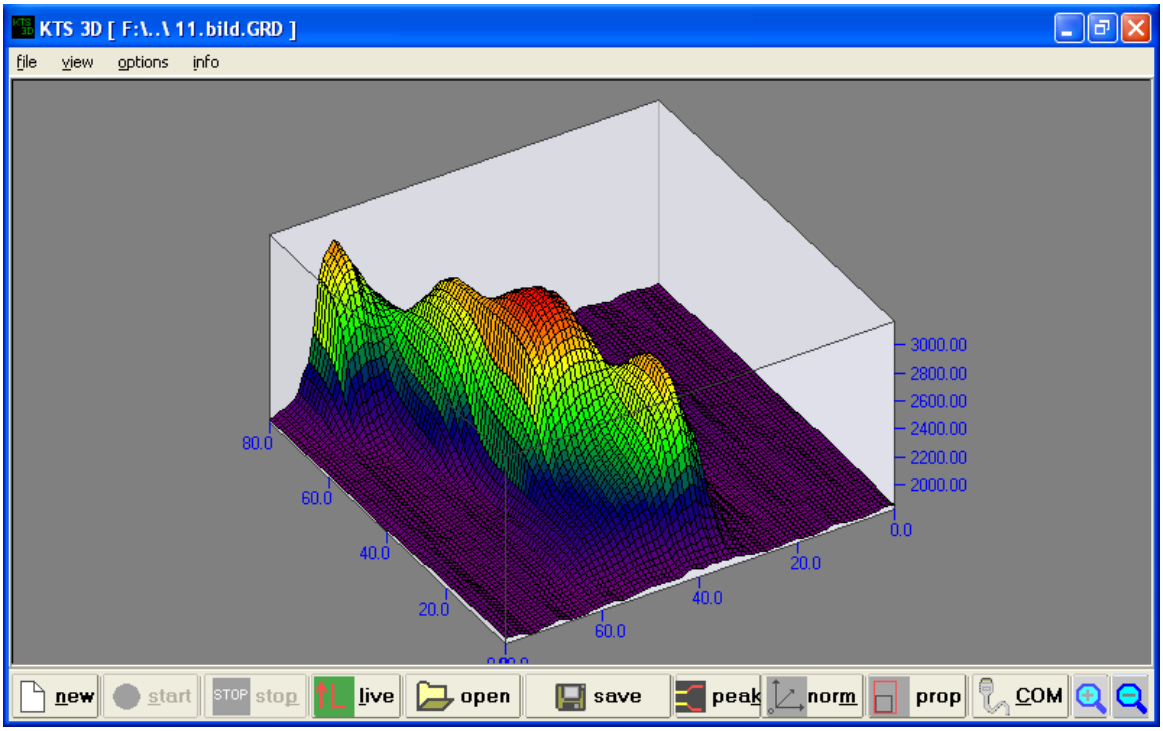
7.4.2 Display during the data-reception



During the actual data-reception, the ad takes place coded two-dimensional and color-like. The colors are dependent with it on the chosen attitude of course. The end of a track is shown and a new track is only measured after a confirmation. In the end of the last track, it switches automatically on the three-dimensional representation.

7.4.3 Display after completion of the data-reception

The picture shown above appears from the further shown two-dimensional representation in the front.



7.5 Display-possibilities

7.5.1 Figures proportional or quadratic

With the button, the representation can be switched between proportional and quadratic. In the quadratic representation, the ad takes place with quadratic elements. The relationship from track-length to field-width is not taken into account. Here, partial details are to be recognized better. With the proportional representation, the ad takes place under consideration of the real track-length and field-width like it was adjusted in [data-reception].

Hint: The actual measured length / width is only about the setting [Data Recording] given. An inaccurate assignment cannot be recognized by the program.

7.5.2 Figures raw data or smoothed data

Here you can switch between the display of raw data or smoothed data grounds. The raw data show the measured values. This representation is rough and is for orientation. In the smoothed data, the raw data is charged into a presentation with smoother transitions.

7.5.3 Figures data absolutely or relatively

Here you can switch between the absolute representation or a relative representation. With the absolute representation, the Z-axis is extended to the full available measuring range. With the relative representation, the value-area is oriented by the smallest as well as biggest measurement. Thus a maximum detail-resolution is reached also for color representation.

8 Guarantees

8.1 In the guarantee-time

We guarantee you free repair 24 months on works-mistakes, founded mistakes and lacks. The guarantee-time amounts to 24 months from purchase-date. In this time, we remedy damages or lacks at the product gratuitously according to standard of the following terms of guarantee.

We remedy gratuitously according to standard of the following conditions (presented below) lacks at the appliance, that demonstrably on a material - and / or manufacture-mistakes, if they are reported to us instantaneously after observation and within 24 months after delivery at the first-final-buyer. Deviations of the debit-nature, that are insignificant for the value - and application-efficiency of the product, through damages from chemical or electro-chemical effects, from water as well as broadly from abnormal services.

The guarantee-performance takes place in the manner that defective parts will be repaired after our election or replaced with perfect parts gratuitously. KTS reserve the exchange against an equivalent substitute-appliance , if the sent product cannot be repair within an appropriate time - and budget. As well, the product can be exchanged with another equivalent model. Repairs on the spot cannot be demanded. Replaced as well as traded parts change to our property.

The guarantee-claim expires if repairs or interventions of persons, that are not empowered by us to this, or if they equipped our product with complementary - or accessories, that were not released by us for the application.

Guarantee-performances neither cause an extension of the guarantee-period, nor a new guarantee-period begins.

Continuing and other claims, especially such on substitute outside the product of originated damages is - generally a liability is not necessarily legally ordered - excluded. We therefore are not liable for accidental, indirect or other consequence-damages of all type, that leads to use constrictions, data-losses, profit-losses or business-cancellation.

8.2 Outside the guarantee

KTS can consent a service also outside the guarantee, then all repair - and transport costs can be invoiced.

9 Contact

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