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# GPA 500 XS

Model 2020

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## Ground Penetrating Analyzer

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KTS-Electronic GmbH & Co. KG  
Germany

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# 1 General guidelines

## 1.1 Preface

Congratulations on your purchase of one of the most advanced high performance detectors: The GPA 500 XS.

The GPA 500 XS is the new development of KTS-Electronic GmbH & Co. KG. The device contains the GPA 500 XS unit and the GOLD ID-XL unit.

Besides the KTS 3D software, the new "GPA Visualizer" software is pre-installed on the tablet computer; this enables an easy operation without the need for previous knowledge.

Already pre-installed programs and an instruction manual which is furnished with numerous illustrations and easy to understand will facilitate the assembly, so that nothing will stand in the way for a practical application.

This instruction has been developed by KTS-Electronic GmbH & Co. KG. Any alterations or duplications are only allowed with written permission of KTS-Electronic GmbH & Co. KG. KTS-Electronic GmbH & Co. KG reserves the right to modify the instruction with new knowledge at anytime. The new instructions can always be downloaded gratuitously from our website.

## 1.2 Important details

Please note:

- Stay away from conducting overhead lines
- Do not use cell phone during operation
- Do not process measurements during thunderstorms
- Keep dry
- Accurate operation is only guaranteed with a fully charged battery
- For operation or charging only use the components enclosed or authorized by KTS GmbH & Co. KG.

## 1.3 Scope of delivery

### Hardware:

- GPA 500 XS electronic unit with integrated GOLD ID-XL metal discrimination and Bluetooth
- GPA 500 XS probe 50 cm (20") incl. bag
- GOLD ID-XL 30x30cm search coil with carbon telescope rod
- Eight-fold demountable GOLD ID-XL search frame 1x1 meter incl. bag
- Separate Battery pack
- Tablet computer with KTS-Software, Li-ion battery and bag
- Powerful 220 Volt quick charger with 110 Volt adapter
- 150 W transformer to charge in car
- Solid hard top case

### Software:

- Newly developed KTS-3D Software and KTS GPA Visualizer software (both pre-installed on tablet computer)
- USB stick with software for processing data on other computers

### Service:

- English, German, French or Spanish user's manual.
- 2 years manufacturer's warranty for the entire scope of delivery (incl. hardware and software).



## 2 Hardware operation

### 2.1 Assembly of GPA probes:

GPA search method requires a probe.

#### 2.1.1 GPA 500 XS probe

- Connect the telescope rod to the probe as shown and fasten the screw with the included Allen key.
- Join the electronic unit to the other side of the telescope rod as shown
- Plug the probe in to the “GPA”-socket of the electronic unit.



Fig.: 1 - GPA 500 XS Universal probe with carbon telescope rod and electronic unit



Fig.: 2 - Assembly probe



Fig.: 3 - Assembly electronic unit



**Fig.: 4 - Universal probe with tablet computer**

GOLD ID-XL search method requires a search coil.

- The search coil is already connected to the telescope rod.
- Screw the telescope rod to armrest.
- Connect the electronic unit to the armrest (display facing up) and fasten it with the adjusting screw.
- Plug the search coil in to the “Pulse”-socket of the electronic unit.





### 2.2.2 Search frame 1x1m

- Plug the pipes together. Mind the colored markings, which should all face in the same direction.
- While plugging together the last two pieces there will be a 10-15cm slack of cable which runs through the pipe. Fold the cable and place it into the pipe like shown in the figures.
- Plug the search frame in to the “Pulse”-socket of the electronic unit.



Fig.: 6 - Folded cable



Fig.: 7 - Placed cable



Fig.: 8 - Search frame (unplugged)



### 3 Electronic unit

The newly developed compact housing of the GPA 500 XS now contains the electronic unit of the GPA as well as the GOLD ID-XL and impresses with its simple handling.

The GPA 500 XS is a measuring device, which can measure alterations of ground anomalies caused by metal objects, soil structure or excavations and can discriminate from normal ground magnetism. Correct results strongly depend on ground type and measuring method. Areas to be measured should not have electric fields (like high voltage cables or earth wires) or strong mineralised or wet grounds because they influence the measurement. The dryer the soil, the more precise the results.



Fig.: 9 - Elektronik unit

#### 3.1 Setup electronic unit

- After switching the unit on via On-/Off-button the language selecting screen will appear.
- After selecting your language the option to select a search method will appear.



Fig.: 10 - Language selection

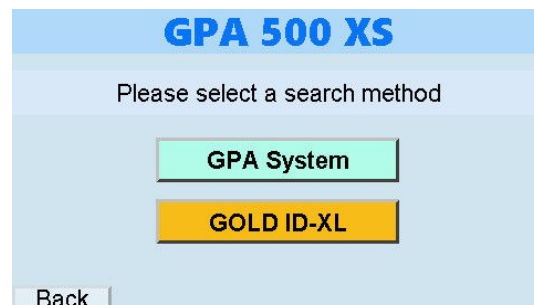


Fig.: 11 - Search method selection

### 3.2 GOLD ID-XL display

- The Goldscan display has three different indications for the detectable metals which will be displayed with different colors and ID-number on the screen.
- Frequency and volume of the signal sound are variable.
- The “Reset”-button is for an automatic zero balance.
- The “back”-button leads you back to the search method selecting screen.
- The battery status will be shown in the lower left corner of the display.
- If you tick the “auto”-box a reset will be performed automatically after each detection.



Fig.: 12 - GOLD ID-XL display

### 3.3 GPA display

- The sensor value will be shown as a bar graph. The corresponding digits will appear on the right hand side of the screen.
- The calibration value will be shown on the left hand side of the screen.
- The “back”-button leads you back to the search method selecting screen.
- The battery status will be shown in the lower left corner of the display.

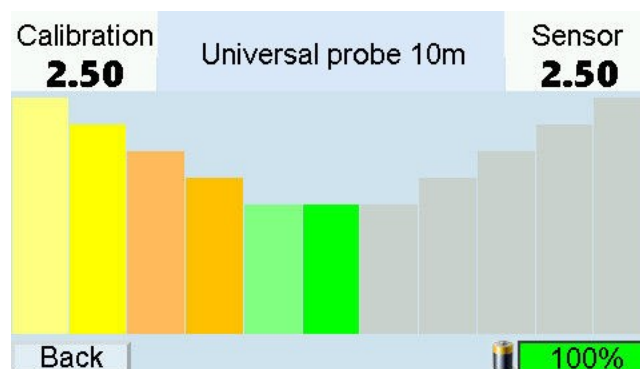


Fig.: 13 - GPA display

## 4 Search methods

### 4.1 GPA search methods

There **must** be a probe connected to the electronic unit to use the GPA search method.

#### 4.1.1 Search with the universal probe

- Switching the electronic unit on via On-/Off-button.
- Select your language.
- Select “GPA System” as search method.
- The electronic unit should face up while using the probe
- Optionally the tablet computer can be connected to the electronic unit via Bluetooth. (See 5.2)
- Place the universal probe so that one of the square ends shows in the direction you want to search and check both, calibration value and sensor value..
- Turn the probe 180° so that the opposite square now face forward and check the two values again.  
Choose the side with values closer to 2,5 as forward direction (as shown in the following figures).
- The distance between the probe and ground should not vary a lot.
- Avoid hectic movements and try to walk in straight lines.



Fig.: 14 - Universal probe



Fig.: 15 - Complete universal probe

### 4.2 GOLD ID-XL search methods

There **must** be a coil connected to the electronic unit to use the GOLD ID-XL search method.

KTS-Electronic GmbH & Co. KG – GPA 500 XS

#### 4.2.1 Search with 30x30cm search coil

- Switching the electronic unit on via On-/Off-button.
- Select your language.
- Select "GOLD ID-XL" as search method.
- Hold the search coil to the ground and press the Reset-button for a brief moment. You herewith attain a zero balance, which is necessary for a trouble-free search.
- During zero balance make sure that there are no metallic objects near the search coil. This could cause a wrong adjustment of the metal detector and produce unwanted indicator effects.
- Repeat the zero balance process after soil-changes like a dig up or after you changed location.
- In the beginning please set the frequency to the lowest level. The volume should be set hearable with the help of the Audio control. Generally we recommend to start with the lowest frequency adjustment to acquaint yourself with the handling of the device. With advancing experience it is expedient, to increase the frequency gradually, what will have a positive effect on the search performance.
- It is recommendable to keep the search coil parallel to the ground while searching.
- It takes some experience to interpret the sounds correctly. The sound becomes more intense the bigger the object or the closer to the surface the object is.



Fig.: 16 - Complete 30x30cm search coil



#### 4.2.2 Search with 1x1m search frame

- Switching on the electronic unit via On-/Off-button.
- Select your language.
- Select "GOLD ID-XL" as search method.
- Perform a zero balance like in 4.2.1
- Frame can be carried by either one or two persons.
- The search frame is primarily used for the deep sounding after medium sized and large metal objects. The frame is indispensable for the search in larger areas.
- It is recommendable to keep the search coil parallel and close to the ground while searching.
- Small scrap iron parts will automatically be filtered.
- Set frequency like in 4.2.1.



Fig.: 17 - Complete search frame

### 4.3 Battery and charger

The electronic unit is powered by two external 2900mAh Li-Ion batteries, which gets fully charged each within 90 minutes. (Please note: Do not exceed the charging time of 90 minutes). The operating time of the unit depends on the type and size of the search coil and type of headphones. It varies between 4 to 6 hours. The charging process is indicated by a red glowing LED on the power adapter. The LED changes to green when the battery is fully charged. Disconnect the adapter after charging is finished.



Fig.: 18 - Power adapter for electronic unit

An included inverter allows for charging in the car.



Fig.: 19 - Power Inverter



Fig.: 20 - Batterypack incl. wire and clip

- The external battery pack is connected to the electronic unit via included cable. The battery pack can be attached to your belt loop or somewhere similar.

## 5 Android software

There is a tablet computer included in the GPA 500 XS-set for two-dimensional and three-dimensional evaluation of your measurements which connects wirelessly via Bluetooth with the electronic unit.



Fig.: 21 - Tablet computer incl. mount

### 5.1 Commissioning of tablet computer

- Turn on the tablet computer by pressing and holding the left button on the upper edge.
- Unlock the display by swiping across the screen.
- Both preinstalled programs are located right on the desktop. Simply start them by tapping.
- The menu of each program is on the right hand side of the screen.
- Each program-window has an “info”-button on the lower right hand corner of the screen which provides you with some information about the current window.
- You can leave the program by tapping on the “QUIT”-button which is located next to the “info”-button.
- There is a “share”-button in the upper right hand corner of the screen. Tap it to take a screenshot which can be shared on several platforms.
- The tablet computer can be connected to the telescope rod of the universal probe. To this end there is a mount on the telescope rod, to which the tablet computer connects and is secured with a half turn. (see following figure)





Fig.: 22 - Assembly tablet with telescope rod and mount

## 5.2 Bluetooth-Connection

To evaluate the measurements of the GPA universal probe on the tablet you need to connect the electronic unit to the tablet via Bluetooth.

- To pair the electronic unit with the tablet computer you need to switch on the unit and select the universal probe of the “GPA”- search method.
- Turn on the tablet and run the program of your choice.
- Select “CONNECT” from the menu on the right hand side of the screen.
- Select the shown device.

Note: If there is no device shown tap on the button “SCAN FOR BLUETOOTH DEVICES” (several times if necessary) and select it.

- A confirmation pop up with :”CONNECTED” will appear on the tablet computer.
- A blue dot will appear on the screen of the electronic unit.

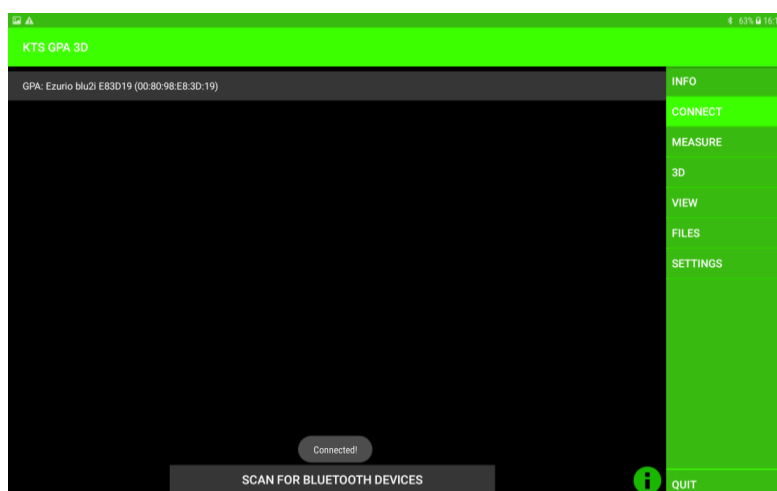


Fig.: 23 - Successful Bluetooth connection

## 5.3 KTS GPA 3D - Software

### 5.3.1 Search with KTS GPA 3D

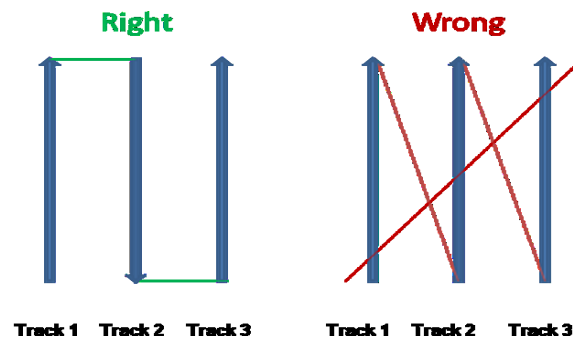


Fig.: 24 - Walking direction for 3D evaluation

- Before starting the measurement the area should be divided in equal lanes
- Select “MEASURE” in the menu on the right hand side of the screen.
- Tap on the “START”-button which will appear on the lower part of the screen and immediately start walking with the universal probe like shown in the figure above.
- During the measuring process the values will appear in different colors on the screen.
- After each lane the measurement will stop automatically. Tap on “START” to continue. (The number of lanes is selectable. See 5.3.3).
- The frequency of the measurements is adjustable. The options “SLOW”, “NORMAL” and “FAST” appear on the lower hand of the screen. (Selecting “SLOW” results in a bigger area but lower resolution and vice versa).
- For higher accuracy you should walk in a steady pace.
- Lane lengths of 5 to 10m are advantageous.
- You can pause a measurement anytime with the “STOP”-button. (Continue with the “START”- button.).
- After the measurement is completed the image gets rendered.
- The measurement can be saved with the “SAVE”-button. Time and date will be added automatically after you named the image.
- The measurement can be deleted with the “RESET”- button.

Hint: The Bluetooth pairing has failed if there is no “START”- button on the lower part of the screen . (see 5.2)



Fig.: 25 - Active measurement with KTS GPA 3D

### 5.3.2 Evaluation with KTS GPA 3D

- You can switch to the three dimensional view any time by tapping “3D” in the menu (even while still measuring).
- Here you see the current measurement in 3D.
- Tap “LOAD” for loading a previously saved measurement.
- The 3D- image can be moved with one finger and rotated/zoomed with two finger (see following figures).

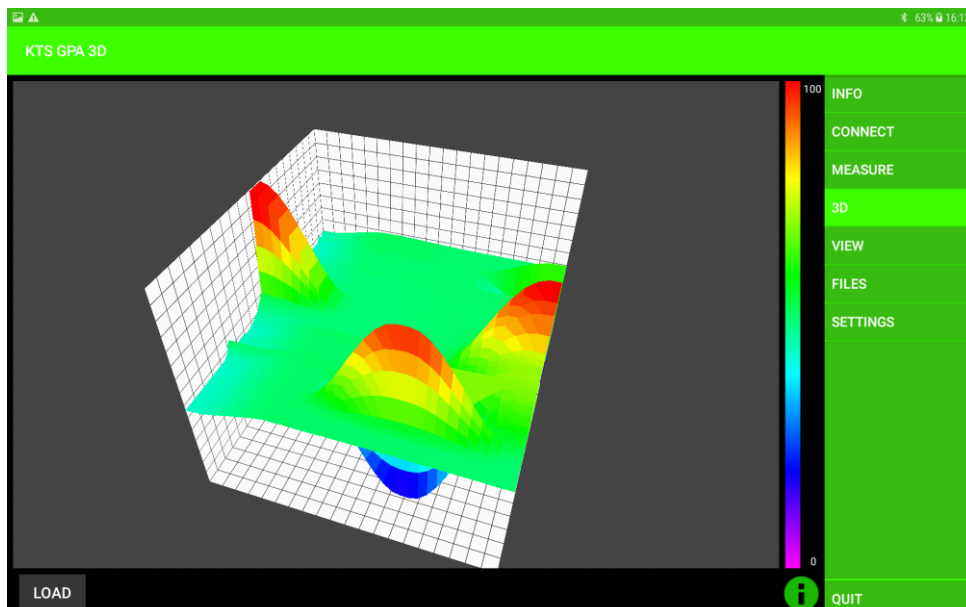
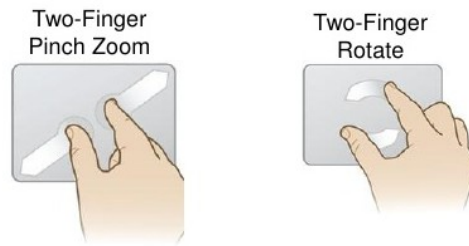
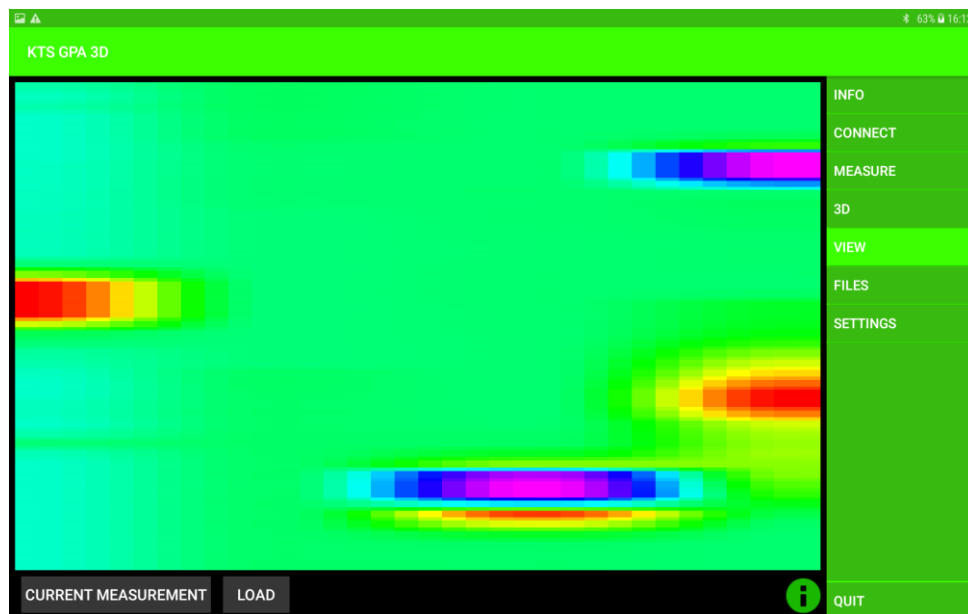


Fig.: 26 - 3D evaluation of measurements



**Fig.: 27 - Two-finger touchscreen gesture**

- Tap “VIEW” to see measurements in 2D.
- Tapping “CURRENT MEASUREMENT” on the lower part of the screen will show the current measurement in 2D.
- Tapping “LOAD” gives you the option to see a previously saved measurement in 2D.



**Fig.: 28 - 2D evaluation of measurements**

- You can manage your saved measurements by tapping on “FILES”
- Tap on a file to display the options : “open file”, “rename file”, “delete file” and “show file in 3D”.
- To delete all files tap the button “DELETE ALL FILES” on the lower left part of the screen.

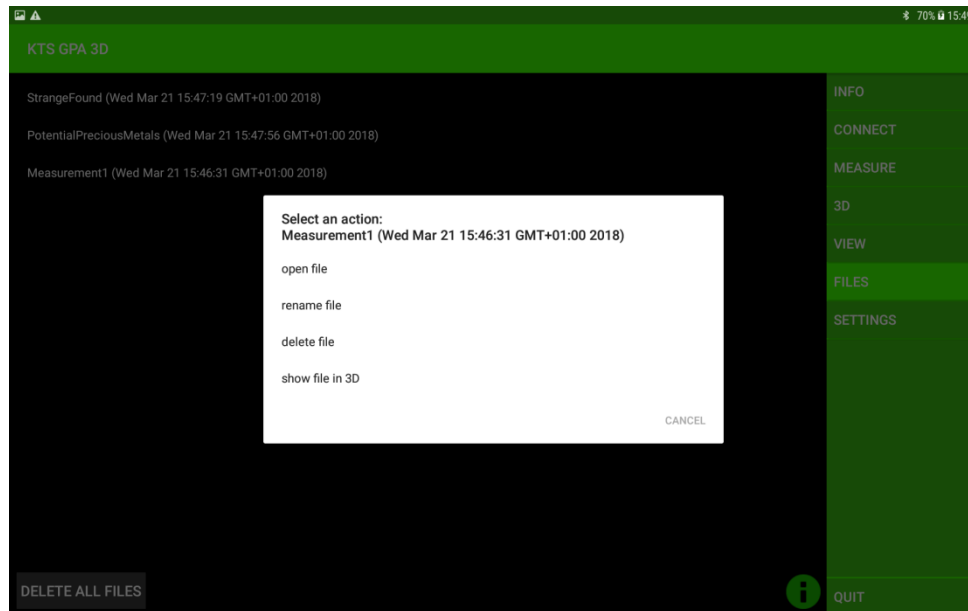


Fig.: 29 - File management

### 5.3.3 Settings for KTS GPA 3D

- The following settings can be adjusted by tapping on “SETTINGS”:
  - “Number of lanes”: Changes the number of lanes.
  - “Number of measurements”: Number of measurements in one lane.
  - “Language”: Selection between German, English and French. (Note: App will restart after selecting a language).
  - “Reset Settings”: Resets the device to factory settings.
  - “Developer Settings”: Please do not change the developer settings except for “Measure-delay”. Here you can change the time between two measurements. Please note that this option will effect the speed options “SLOW”, “NORMAL” and “FAST” under “MEASURE”.



Fig.: 30 – Settings

## 5.4 KTS GPA Visualizer -software

### 5.4.1 Search with KTS GPA Visualizer

- The search with the GPA Visualizer allows for searching on one straight line.
- Tap “START” and immediately start walking with the universal probe.
- During the measuring process the values will appear in different colors on the screen.
- If you want to take a turn: stop walking, tap on the “STOP”- button and wait for the “START” button to change its color from red to grey (or until one lane hits the end of the display). Tap the “START”-button as soon as you are ready to continue.
- The frequency of the measurements is adjustable. The options “SLOW”, “NORMAL” and “FAST” appear on the lower hand of the screen. (Selecting “SLOW” results in a bigger area but lower resolution and vice versa).
- For higher accuracy you should walk in a steady pace.

Hint: The Bluetooth pairing has failed if there is no “START”- button visible on the lower part of the screen (see 5.2).

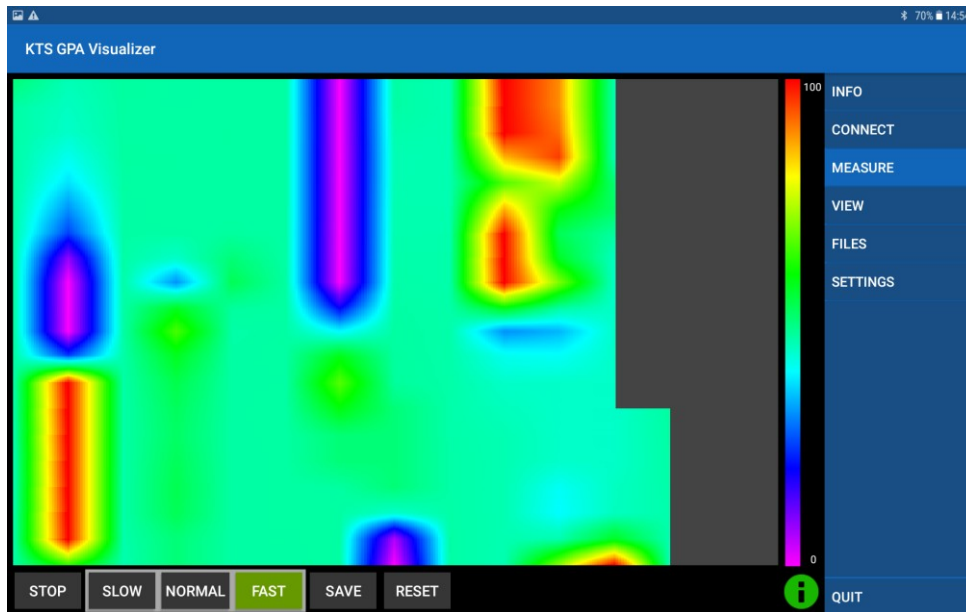


Fig.: 31 - Active measurement with KTS GPA Visualizer

#### 5.4.2 Evaluation with KTS GPA Visualizer

- Tap “VIEW” to see measurements in 2D.
- Tapping “CURRENT MEASUREMENT” on the lower part of the screen will show the current measurement in 2D.
- Tapping “LOAD” gives you the option to see a previously saved measurement in 2D.

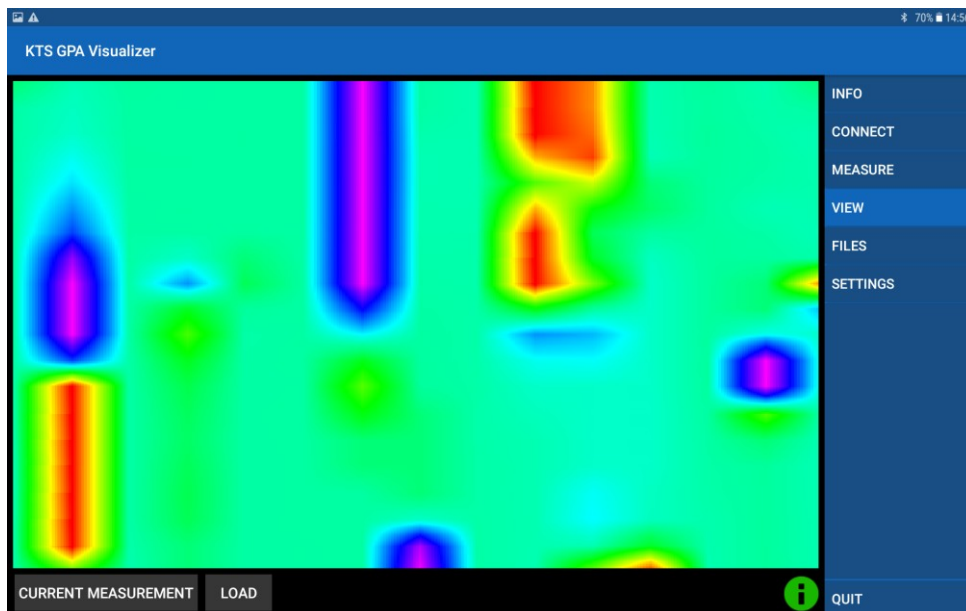


Fig.: 32 - Evaluation of measurements



- You can manage your saved measurements by tapping on “FILES”
- Tap on a file to display the options : “open file”, “rename file” and “delete file”.
- To delete all files tap the button “DELETE ALL FILES” on the lower left part of the screen.

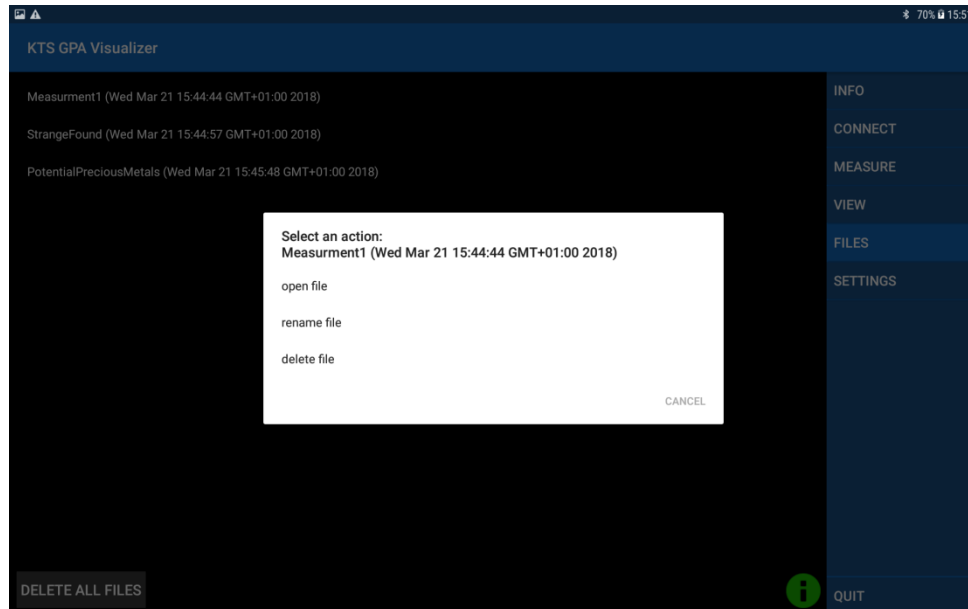


Fig.: 33 - File management

### 5.4.3 Settings for KTS GPA Visualizer

- The following settings can be adjusted by tapping on “SETTINGS”:
  - “Number of columns”: Varies number of columns.
  - “Number of measurements”: Number of measurements in one column.
  - “Language”: Selection between German, English and French. (Note: App will restart after selecting a language).
  - “Reset Settings”: Resets the device to factory settings.
  - “Developer Settings”: Please do not change the developer settings except for “Measure-delay”. Here you can change the time between two measurements. Please note that this option will effect the speed options “SLOW”, “NORMAL” and “FAST” under “MEASURE”



Fig.: 34 – Settings

## 5.5 Reinstallation

If you want to reinstall KTS GPA 3D or Visualizer or you want to use a different Android device, the apk.-files are available on an enclosed flash drive. Just copy the files from the flash drive to your device and execute them. In order to do that you need to allow installation of apps from unknown sources. Go to the settings (gear icon in menu). Scroll down to the “Security” option and tap to open it. “Toggle” the switch of “Unknown sources”. There is no additional software required. The device is ready for use.

## 6 System requirements and license agreements

### 6.1 System requirements

Both KTS GPA 3D and KTS GPA Visualizer run on devices with at least Android 5.0.

Note: Different display dimension can result in a distorted display.

### 6.2 License agreements

The KTS program as well as the entire accompanied electronic or printed documentation is subject to the copyright of KTS-Electronic GmbH & Co. KG. Should parts of the present license regulations feature alterations or expansions in comparison to former program versions, they will also apply to prior versions.

**The present license regulations become effective on May 1st, 2007.**

Through the utilization of the software the user agrees to the present license regulations. The right of use automatically will expire if the license regulations are violated.

### 6.3 Terms of use

After full payment of the invoice amount the customer is allowed to a not-exclusive right of usage of the program listed in the bill. This right is restricted to the owner of the original software. Consequently, the software can be used only on one single computer system at the same time. All present and future copyrights and/or industrial protection rights of the provided programs and of all programs derivative from it, program modules or in this context produced records remain at KTS-Electronic GmbH & Co. KG.

### 6.4 Exclusion of liability

Despite carefully conducted tests mistakes cannot be ruled out. No acceptance of guarantee for the utilization of the program to a certain purpose. Especially no liability is adopted for consequential damages as well as profit and asset losses, that could result from the application of the program and the affiliated documentation.

Alterations in prices and modifications of all sorts in software or documentation shall remain reserved and do not require a separate notification.

## 7 Warranty

We grant repair work free of charge resulting from production failures originated by errors and defects 24 months effective from date of purchase.

According to the following conditions we remedy deficiencies free of charge, if they are evidently based on manufacturing errors or material defects and are reported to us immediately after assessment of damage within **24 months** after delivery to the ultimate buyer.

Defective parts will be repaired gratuitous or will be replaced by efficient parts of our choice. KTS-Electronic GmbH & Co. KG reserves the right to exchange a device by an equal valued replacement unit in case the returned product cannot be required in an appropriate budget time frame.

On-site repairs cannot be demanded. Replaced, resp. exchanged parts will merge into our property.

The guarantee claim expires in cases of improper handling, gross carelessness or when repairs, modifications, additionally installed parts or extensions are carried out from persons which are not authorized on our part to do so.

Guarantee claims will neither effect an extension of the term nor they will implement a new time limit.

Further requirements, in particular such through extraneous causes resulting damages are excluded, unless a commitment is not necessarily the case.

We therefore are not liable for any accidental, indirect or other subsequent damages of any kind, which lead to limited use, data loss, profit setbacks or operating failures.

## **7.1 After expiration date**

KTS-Electronic GmbH & Co. KG can agree upon a service after expiry of guarantee. In this case repairing and shipment will be charged.

## **7.2 Care**

Your GPA 500 XS requires little maintenance, yet there are some items, which you should consider, in order to receive its best functionality.

- Avoid extreme temperatures, since it can be possible that electronic construction units are damaged thereby.
- Protect the electronic housing with a plastic bag in case you should get caught by rain, fog or dust.
- Always keep your equipment clean and dry and wipe off sand and dirt.

## **7.3 Legal note**

Before you start searching please note that monument protection regulations as well as other legal standards are relevant. KTS-Electronic GmbH & Co. KG assumes no responsibility for possible legal violations.

In case of doubts we recommend a comprehensive consultation with an attorney or national monument offices.

## **8 Contact**

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Mondays– Thursdays: 9:00 am to 4:30 pm

Fridays: 9:00 am to 4:00 pm

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