艾都慧测

ADMT 系列产品

ADMT SERIES PRODUCTS

操作手册

OPERATION MANUAL

中国制造 · MADE IN CHINA

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一、仪器概述

ADMT 系列产品是我公司联合桂林理工水文地质勘查研究院研制设计的新一代智能仪器，在 50 多年研发设计和勘查使用的基础上，把复杂数据计算方法利用手机或平板电脑实现计算反演、快速制图，可以快速绘制 2D、3D 等值线图和曲线图、数据云备份，并具有AI自动分析等智能化功能。

仪器使用MN电极或无线电磁传感器（探头）进行信号输入，不需要拉线，走、停即可测量。仪器拥有诸多创新设计，更加智能、高效、精准，获得多项发明专利 （专利号：201310205318.9、201110454869.X、202121767124.4、201821856743.9）。特别是发明专利“地球电磁场场源修正的物探方法及测量装置”201310205318.9 的场源修正功能解决了天然电场场源强度大小不一致及随时变化的缺点。

在长达近20年的实践上，广泛与人工直流电法仪器对比试验，获得非常好的异常曲线一致性，在某些接地条件不是很好的地区取得比人工直流电法类仪器更加真实的异常曲线。得到广大客户的普遍认可和支持。

二、仪器主要特点

1．使用方便：通过手机或平板电脑、PC 等均可以进行数据处理和制图。

2．数据导出灵活：可以通过蓝牙、数据线、U 盘等多种传输方式进行数据导出。

3．可无线探测：MN 可以使用电极或可选配无线电磁传感器（磁探头）进行信号输入，无线电磁传感器不需要拉线，走、停即可测量。

4．专家后台分析：通过手机 APP 直接上传现场照片、数据、效果图等让在线专家辅助数据分析。

5．先进高效：多重创新设计、获得多项发明专利大大提高勘探速度和精度。

三、仪器工作原理简介

ADMT 系列产品利用大地天然电磁场作为工作场源，研究地球内部的电性结构，依据不同频率的电磁波在导电媒质中具有不同趋肤深度的原理，在地表测量由高频至低频的地球电磁响应序列，研究地下不同深度地质体的电性变化差异，确定地下地质体的赋存状态。

1.电磁波传播理论、亥姆霍兹方程

地面电磁波发送到地下，电磁波在岩土中的传播遵循 Maxwell 方程。如果假设大多数地下岩土为无磁性物质，并且宏观上均匀导电，不存在电荷积累，那么 Maxwell 方程就可简化为：

$$\left.\begin{aligned}\nabla^2 H + k^2 H = 0\\ \nabla^2 E + k^2 E = 0\end{aligned}\right\} \quad (1)$$

式中 k 称为波数（或传播系数）

$$k = [\omega^2 \mu\varepsilon - i\omega\sigma\mu]^{\frac{1}{2}} \quad (2)$$

考虑到传播系数 k 为复数，令 k = b + ia，其中：a 称为相位系数，b 称为吸收系数。

在 ADMT 系列天然电场物探仪测量的电磁波频率范围内（0.1Hz~5KHz）,通常可以忽略位移电流，这时 K 进一步简化为：

$$k = -iouo \quad (3)$$

2.波阻抗与电阻率

有亥姆霍兹方程变化的磁场感生出变化的电场，我们有磁电关系：

$$\frac{E}{H} = -\frac{i\omega\rho}{k} \quad (4)$$

表面阻抗 Z 定义为地表电场和磁场水平分量的比值。在均匀大地的情况下，此阻抗与入射场的极化无关，和地电阻率以及电磁场的频率有关：

$$Z = \frac{E}{H} = \sqrt{\omega\mu\rho}e^{i\pi/4} \quad (5)$$

（5）式可用于确定大地的电阻率：

$$\rho = \frac{1}{5f}\left|\frac{E}{H}\right|^2 \quad (6)$$

3.趋肤深度

在无磁性介质中，趋肤深度公式为：

$$\delta \approx 503\sqrt{\rho/f} \quad (7)$$

由上式可知，电磁波的穿透深度与频率、电阻率有关系。频率一定，电阻率越高穿透深度越大，电阻率一定，频率越低穿透深度越大。

四、仪器介绍

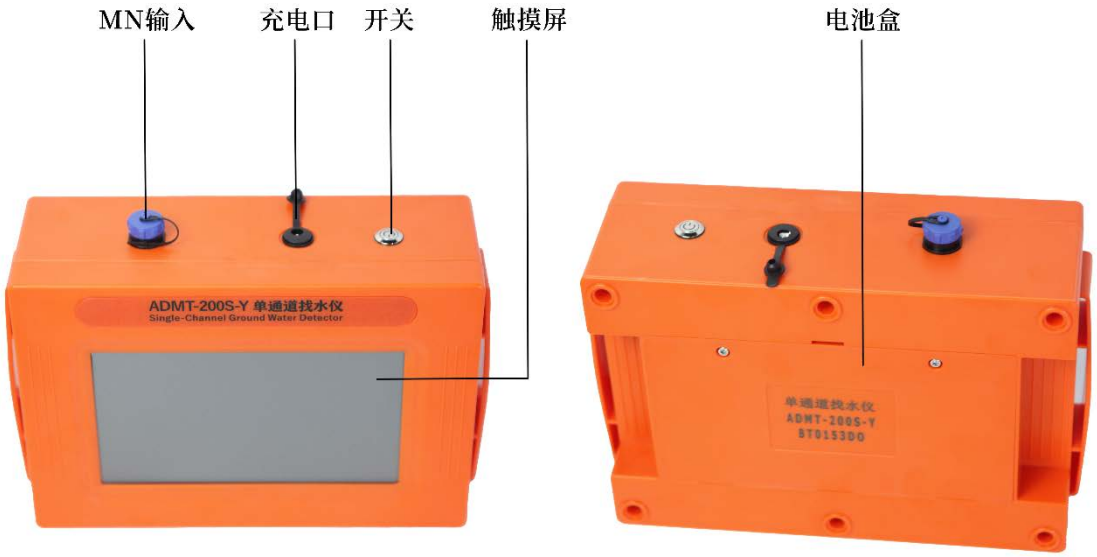


图 1

五、主要型号和技术参数

型号 / 参数	ADMT-200S-Y	ADMT-300S-Y
测量深度(m)	≤200	≤300
通道输入	1 道 MN/TT 输入	
深度分层	5m	
连接方式	蓝牙	
操作显示	7 寸安卓触摸屏	
主要功能	绘制曲线图，数据导出，连接手机绘 2D/3D 图、AI 分析，电池可拆卸	
频率范围(HZ)	1-8K	
测量模式	MN/TT	
分辨率	0.1mV±5%	
采样时间（s）	130	
电池功耗	4W	
主机重量	1.30kg	

六、仪器操作方法

打开仪器电源后进入开机欢迎界面，一般显示该仪器型号名称。点击屏幕任意地方进入仪器主界面（如图 2）。



图 2

6.1 测量

在主界面单击“测量”，进入测量界面，进行测量相关操作如图 3。



图 3

新建文件：单击“新建文件”，建立新的文件。

输入测线号：单击“输入测线号”白色输入框，弹出数字键盘显示如下图（图4），输入新的测线号，单击“Enter” 完成输入；如测线号已存在，则提示“文件已存在，请重新输入”。

提示：仪器能够存储800条测线号，输入的测线号为000-799。



图 4

输入测点增量：单击“输入测点增量”白色输入框，弹出数字键盘，输入测点增量（主要为了手机绘图时看图方便，一般可以固定设置成 10 或者 20），单击“Enter” 完成输入。

选择测量方式：根据仪器连接方式可以选择“磁探头”或者“电极”测量。 单击右上角“×”表示关闭当前界面，返回到上一界面。设置完成之后，单击“确定”进入测量操作界面，如图 5。



图 5

删除：单击“删除”，仪器显示“你确定要删除当前测点测数据吗？”，如需删除单击“是”，如不需则单击“否”。删除完后，测点数目减 1。

测量：单击“测量”，仪器开始测量，重复操作直至测量完整条测线（点号≤100）。由于本仪器每条测线最多存储 100 测量点，如果当点号为 100 时（“N ＝ 100”），继续按确认键进行采样，仪器不会进行测量，而是在提示信息区出现“ERROR”错误提示，必须新建测线，再进行测量操作。

单击右上角“×”表示关闭当前界面，返回到上一界面。

补测文件：单击“补测文件”，测量需要继续测量的测线。

输入补测测线号：单击“输入测线号”白色输入框，弹出数字键盘，输入需要补测的测线号，单击“Enter” 完成输入如图 6（见下一页）。



图 6

单击“确定”，进入测量操作界面。补测测线的参数与该测线建立时设置的参数一样。

单击右上角“×”表示关闭当前界面，返回到上一界面。

6.2 查看

在主屏幕，单击“查看”进入查看界面，如下图（图 7）。



图 7

查看 目录：单击“查看目录”，显示仪器中所有的测线号。

查找文件：单击“查找文件”，查看需要查看的测线。

输入待查看测线号：单击“输入测线号”白色输入框弹出数字键盘，输入需要查看的测线号，单击“Enter” 完成输入，如图 8（见下一页）。



图 8

单击“确认”，进入查看界面，如图 9。

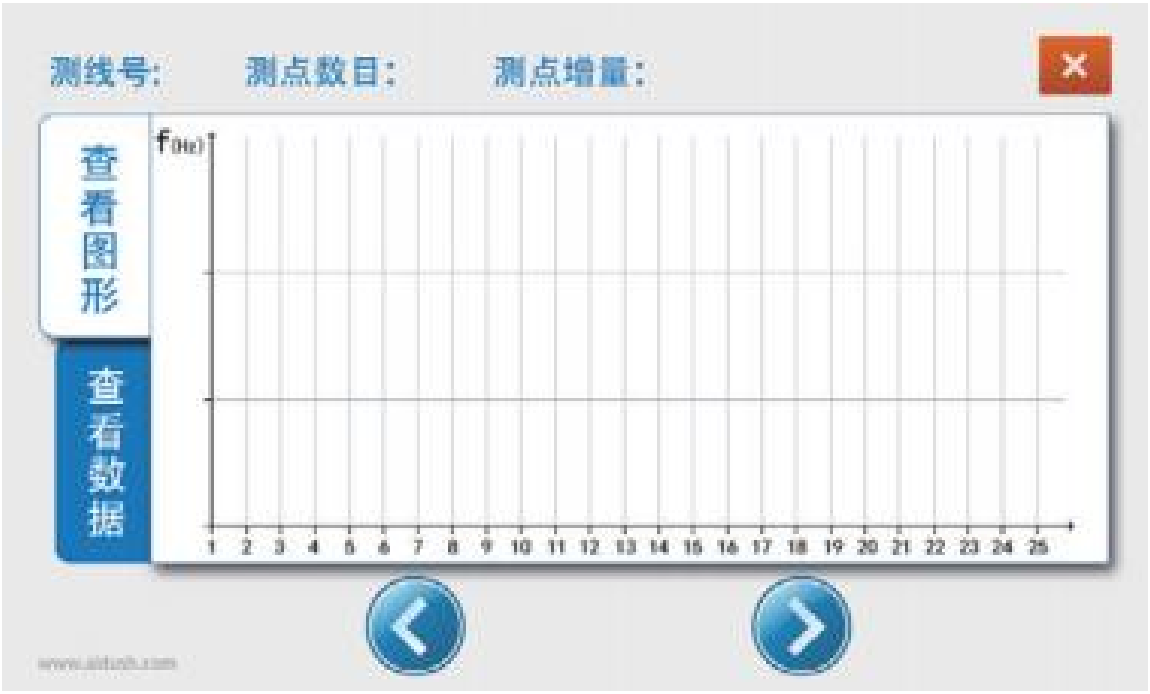


图 9

单击右上角“×”表示关闭当前界面，返回到上一界面。

6.3 删除

在主屏幕，单击“删除 ”，进入到删除界面，如图 10（见下一页）。



图 10

查看 目录：单击“查看目录”，显示仪器中所有的测线号。

删除单个：单击“删除单个”，删除单个文件。

输入删除测线号：单击“输入测线号”白色输入框弹出数字键盘，输入需要删除的测线号，单击“Enter” 完成输入。单击“确认”，仪器删除选中测线号。

删除所有：单击：“删除所有”，仪器显示“删除仪器内所有测量数据”，如需删除单击“确认”。

单击右上角“×”表示关闭当前界面，返回到上一界面。

6.4 传输

在主屏幕，单击“传输”进入传输界面，如图 11。



图 11

查看 目录：单击“查看目录”，显示仪器中所有的测线号。

U 盘传输：传输单个文件。

输入传输测线号：单击“输入测线号”白色输入框，弹出数字键盘，输入需要传输的测线号，单击“Enter” 完成输入。然后单击“确认”，仪器弹出“设备已准备好，请插入 U 盘”，此时插入 U 盘，仪器开始传输数据，如不需要，则单击“取消”，如图 12。



图 12

传输所有测量数据：仪器显示“传输所有测量数据！”如图 13，如需传输单击“确定”。仪器弹出“设备已准备好，请插入 U 盘”，此时插入 U 盘，仪器开始传输数据；如不需要，则单击“取消”。



图 13

蓝牙传输：单击“蓝牙传输”，显示“进入蓝牙传输模式！”，如需蓝牙传输数据，单击“确定”键。仪器显示“设备已准备好，等待手机蓝牙的命令！”如图 17（见下一页）。如不需要则单击“取消”或者右上角“ ×”返回上界面。



图 14

请确保手机 APP 与仪器已通过手机蓝牙功能连接（手机 APP 下载、连接方法见《单通道找水仪使用指南》）打开手机 APP“艾都找水”，点击“蓝牙连接” 图标如图 15， 搜索到对应型号后配对确认，进入“仪器设置”界面如图 16。如不需要，单击左上角“←”可返回 上一界面。



图 15



图 16

点击 “文件浏览”按钮，进入界面如图 17（见下一页），选择“导出”需要导入手机的文件号点击确定，数据导出成功进入界面如图 18（见下一页）。



图 17



图 18

关闭窗口，可查看导入的文件。如图 19。

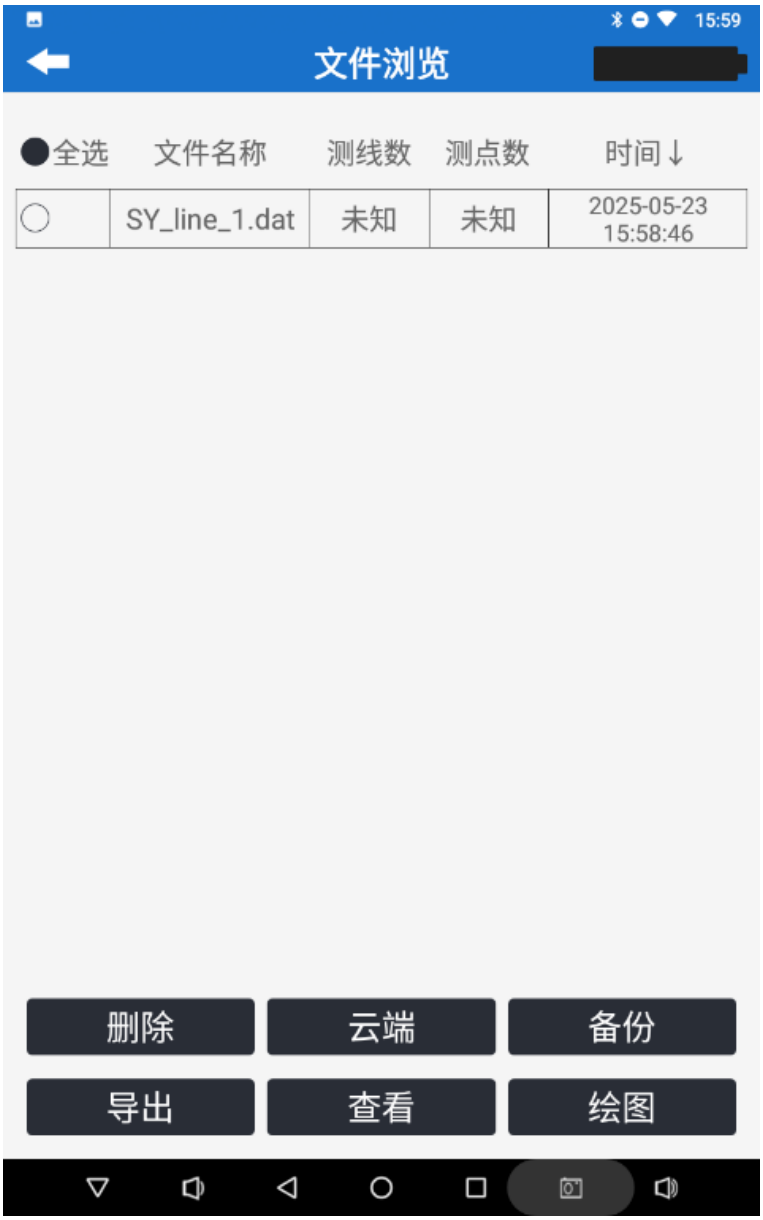


图 19

6.5 设置

在主屏幕单击“设置”，进入设置界面，如图 20。



图 20

亮度 占比：调节仪器屏幕亮度。

调节亮度：移动滑动条，调节屏幕的亮度。

采样次数：单击“采样次数”白色输入框，选择合适的采样次数，点击“确定”。

时间与 日期设置：单击“时间与日期”空白输入框，输入日期、时间，按“Enter”键完成输入，如图 21 所示。



图 21

图形坐标 ：改变测量数据显示方式，点击“相对坐标”或者“绝对坐标”左边的小方框，显示“✓”完成选择，然后单击“设置”，完成参数设置。

七、绘图

可以通过艾都找水 APP 的“绘图”绘制 2D、3D 等值线图 和曲线图。

7.1 数据查看

通过打开艾都找水 APP 内的“文件浏览”，找到需要查看的数据文件如图 22。



图 22

7.2 绘图

在 APP 文件浏览界面选择“绘图”，可选择等值线图、AI分析、曲线图、3D图、3D切片图。

1.“O2D”为旧版等值线图，“N2D”为新版等值线图，两种等值线图都可以点击按钮选择绘制垂向等值线图或平面等值线图；

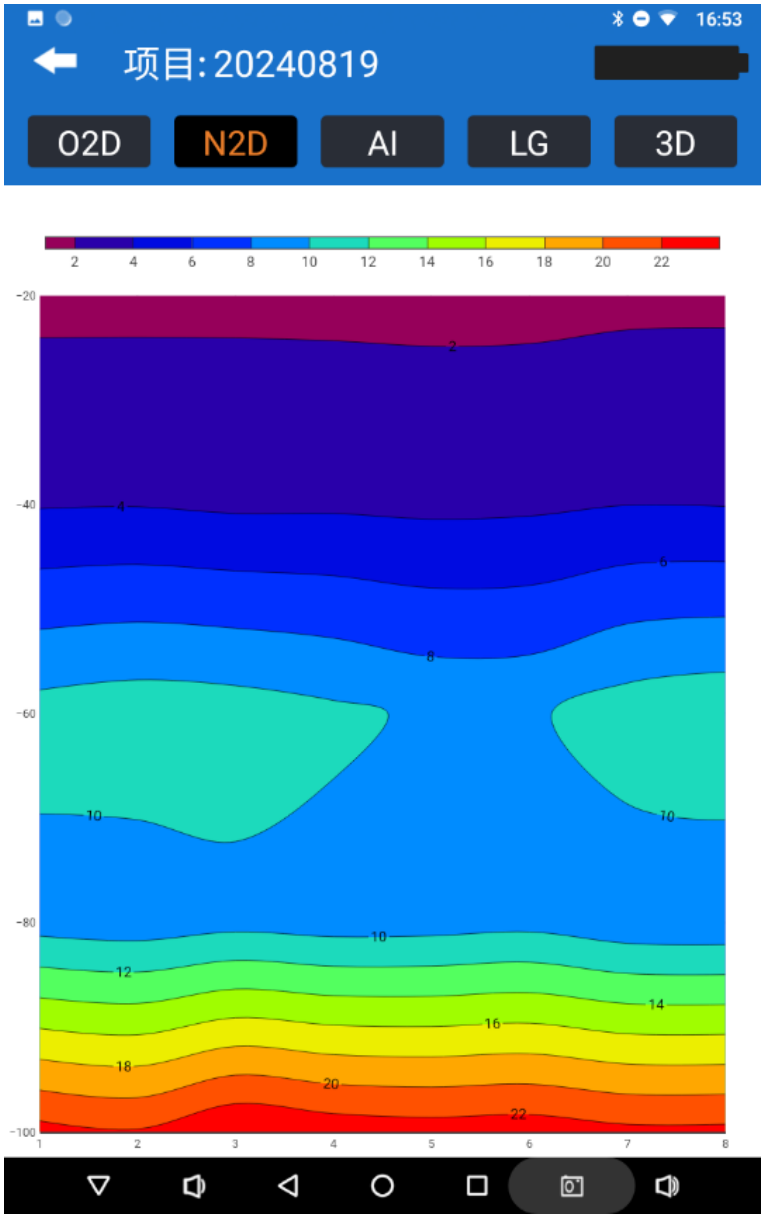


图 23

2. “AI”为AI分析作图，进入后需要先对AI分析进行参数分析，并且选择测线，选择历史可以加载过往进行AI分析的数据；

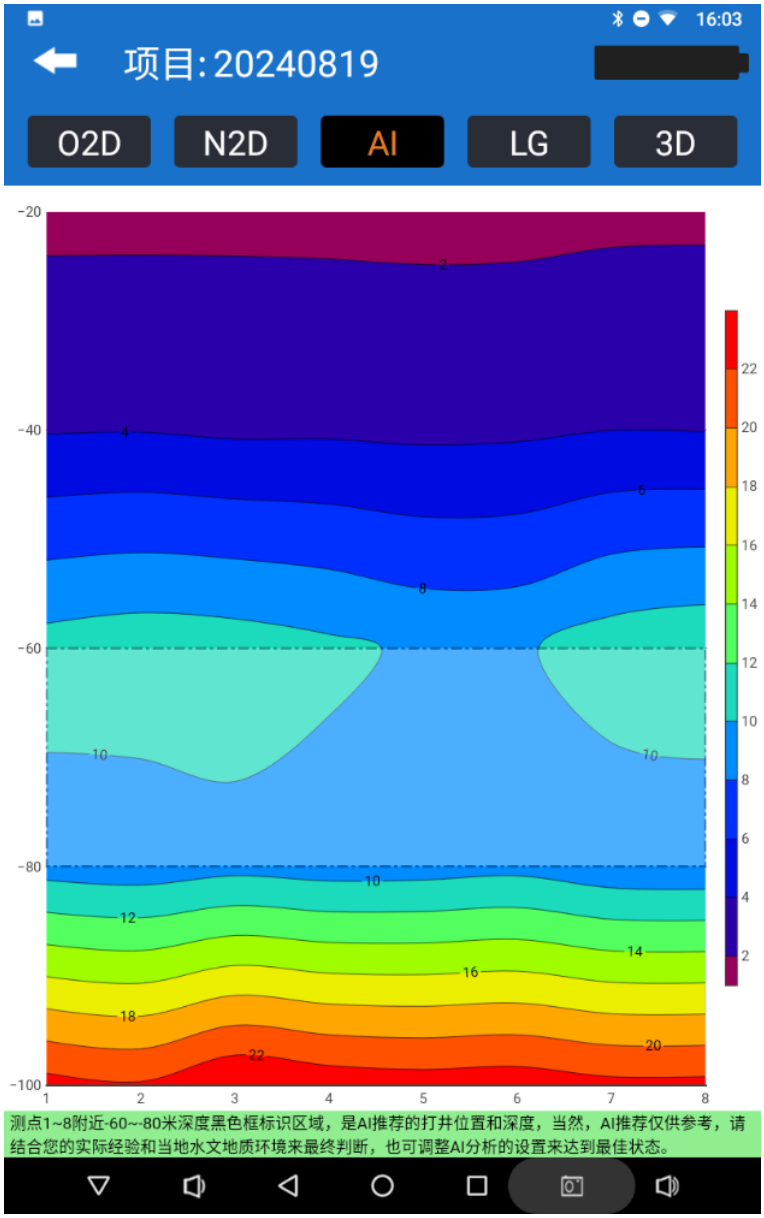


图 24

3.“LG”为曲线图，可以选择平面曲线图或者垂向曲线图，可以选择需要显示的测点号进行绘制；

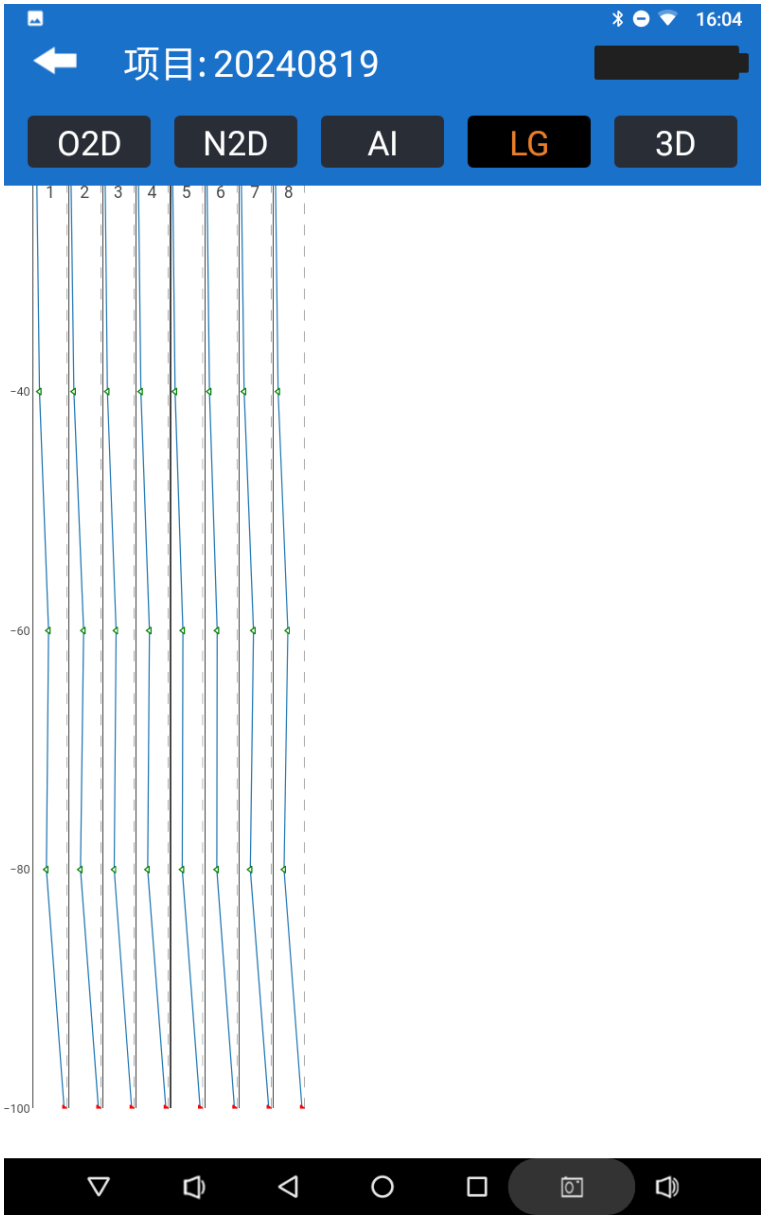


图25

4.“3D”为3D等值线图，可以选择3D图或3D切片图，在3D切片图中需要选择根据测深或测线或测点增量进行切片。

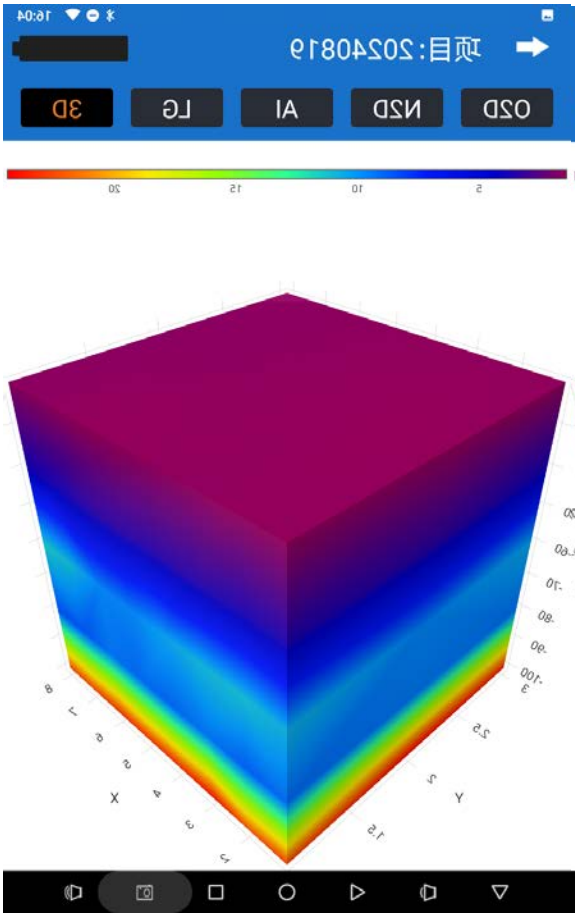


图 26

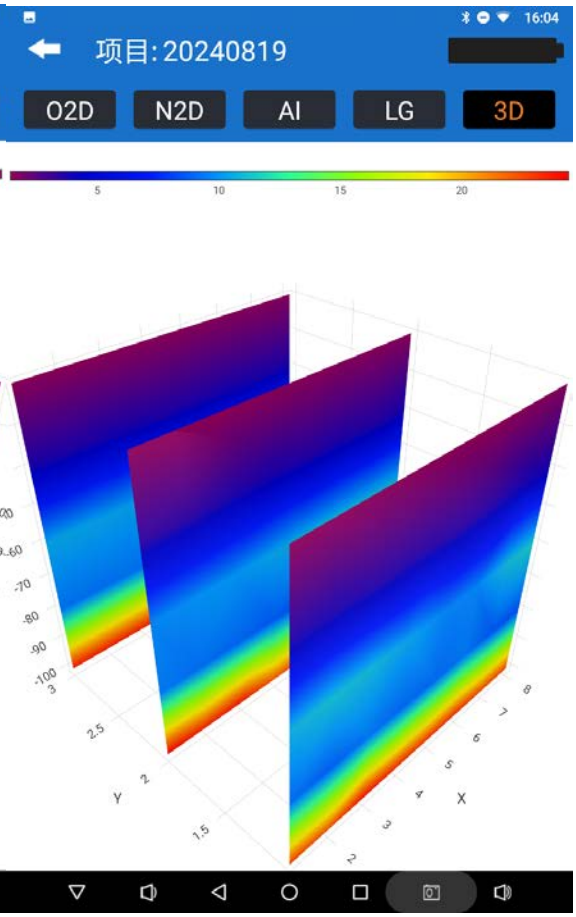


图 27

八、仪器野外操作方法

8.1 仪器连接示意图

合金一体电极锤、测线连接方式，如图 28。

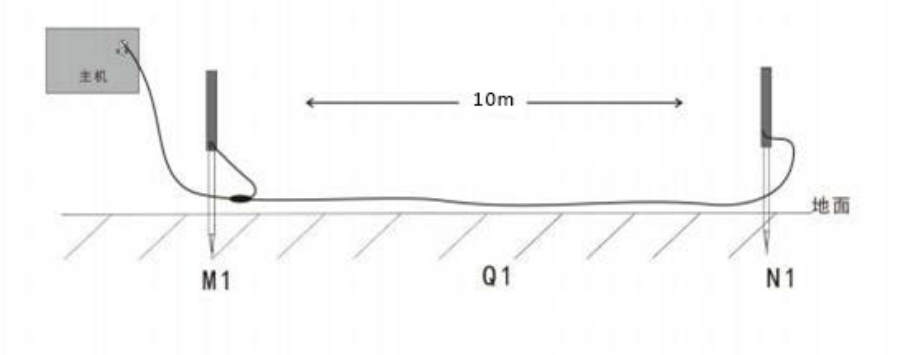


图 28

无线传感器连接方式（选配），如图 29。

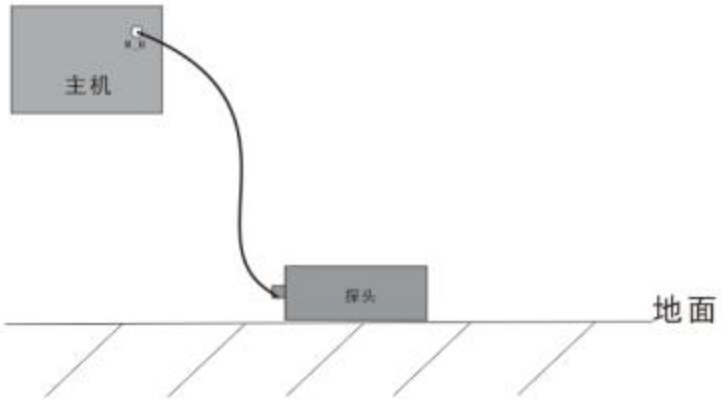


图 29

8.2 布线原则

1、测量导线布设应垂直异常体的走向。

2、测量导线应尽可能地远离高压输电线和电话线，当不能远离时，布线尽可能与其平行。

3、如果布线时，导线浸入水中，需进行漏电检查。

4、布线时尽可能保证 M、N 电极在同一平面。

8.3 电极拉线测量方法

仪器开机后,按图 28 所示连接好仪器，将 M、N 测量电极插地，开始采样，测点位 置为两根 M、N 电极棒的中心位置。该点采样结束后以一定的点距往相同方向移动 M、 N 电极，进行第二个测量点采样测量如图 30。以此类推，直至完成整条剖面测量。

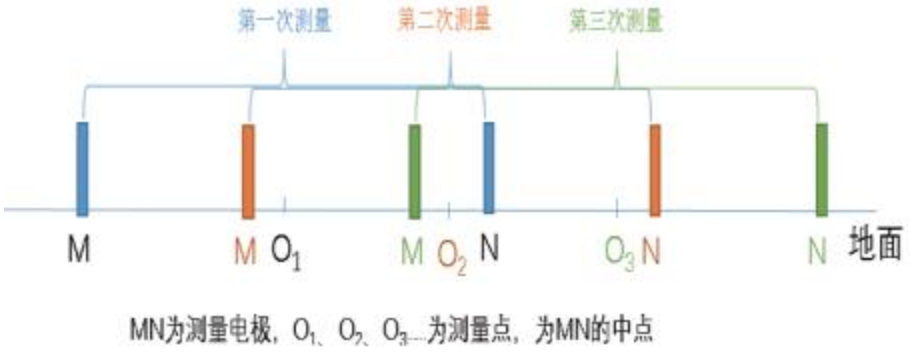


图 30

8.4 无线传感器测量方法

仪器开机后,按图 29 所示连接好仪器，将传感器放在地面上，开始采样，测量点为传感器正下方位置。该点采样结束后以一定的点距往相同方向移动传感器，进行第二个测量点采样测量如图 31 所示。以此类推，直至完成整条剖面测量。

在野外工作时，为了确保数据的准确性，在测量的时候应该注意以下几点：

（1）用罗盘或标杆三点一线的方法确定测线方向，并且尽量保证测线为直线。

（2）采用电极测线方式视测区电场信号大小及其他因素确定 M 、N 之间的距离（常用 5—10 米），并在同一条测线上保持统一的距离；采用传感器方式保持探头的方向一致。

（3）测量点为 M、N 的中点，在同一条测线上保持相同的点距。

（4）尽量保持 M N 电极的接地条件的一致性。

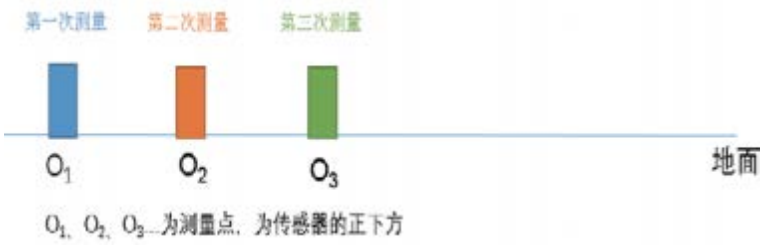


图 31

九、使用仪器的注意事项

- 工作前请检查仪器电量是否充足，为节省电量，工作结束后，请关闭电源。
- 仪器在运输或使用过程中需由专人保管，以免受到剧烈震动、撞击、进水。
- 每天工作结束后，应除去仪器表面灰尘保持干净，并放置在通风干燥处。
- 测量电极使用后应除去表面的泥土等保持干净。
- 仪器外壳贴有防拆封条，请勿擅自撕开，撕开后将不予保修。
- 仪器采用智能选频，为保证测量精准，首次测量时，请删除数据再测量。
- MN 电极或者电磁传感器未连接或断开时会提示测量失败，请检查线路是否连接牢固。
- 仪器测量中，如遇到每个测点的测量数据都偏小且数值基本一致时，可能是仪器故障，请联系售后确认。

1. Instrument Overview

The ADMT series products are a new generation of intelligent instruments developed and designed by our company in collaboration with Guilin Institute of Hydrogeological Exploration and Research. Based on more than 50 years of research and development, design, and exploration, the complex data calculation methods are used to calculate inversion and quickly map using mobile phones or tablets. It can quickly draw 2D and 3D contour lines and curves, data cloud backup, and has intelligent functions such as AI automatic analysis.

The instrument uses MN electrodes or wireless electromagnetic sensors (probes) for signal input, without the need for wires, and can measure by walking or stopping. The instrument has many innovative designs, making it more intelligent, efficient, and accurate, and has obtained multiple invention patents (patent numbers: 201310205318.9, 201110454869. X, 202121767124.4, 201821856743.9). In particular, the field source correction function of the invention patent "Geophysical Exploration Method and Measurement Device for Earth Electromagnetic Field Source Correction" 201310205318.9 solves the disadvantages of inconsistent and constantly changing strength of natural electric field sources.

In nearly 20 years of practice, extensive comparative experiments with artificial DC electrical instruments have achieved very good consistency in abnormal curves, and in some areas with poor grounding conditions, more realistic abnormal curves have been obtained than artificial DC electrical instruments. Received widespread recognition and support from customers.

2. Main Features

1. Easy to use: The instrument can be used for data processing, mapping, and AI analysis through mobile phones, tablets, PCs, etc.
2. Flexible data export: Data can be exported through various transmission methods such as Bluetooth, data cable, USB flash drive, etc.
3. Wireless detection: MN can use electrodes or optional wireless electromagnetic sensors (magnetic probes) for signal input. Wireless electromagnetic sensors do not require wires and can measure while walking or stopping.
4. Advanced and efficient: Multiple innovative designs and obtaining multiple invention patents greatly improve exploration speed and accuracy.

3. Introduction working principle

The ADMT series instruments use natural electromagnetic field of the earth as the working field source to study the electrical structure inside the earth. According to the principle that different frequencies of electromagnetic waves have different skin depths in the conductive coal, the surface is measured from high frequency to The low-frequency Earth electromagnetic response sequence studies the difference in electrical variation of geological bodies at different depths in the subsurface and determines the occurrence of underground geological bodies.

1. Electromagnetic wave propagation theory, Helmholtz equation

Ground electromagnetic waves are sent to the ground, and the propagation of electromagnetic waves in the earth and soil follows the Maxwell equation. If it is assumed that most of the subterranean geotechnical soil is non-magnetic and is uniformly conductive macroscopically, there is no charge accumulation, then the Maxwell equation can be simplified to:

$$\left.\begin{aligned}\nabla^2 H + k^2 H = 0\\ \nabla^2 E + k^2 E = 0\end{aligned}\right\} \quad (1)$$

where k is called the wave number (or propagation coefficient)

$$k = [\omega^2 \mu\varepsilon - i\omega\sigma\mu]^{\frac{1}{2}} \quad (2)$$

Considering that the propagation coefficient k is a complex number, let k = b + ia, where: a is called the phase coefficient and b is called the absorption coefficient.

In the electromagnetic frequency range measured by the ADMT series of natural electric field geophysical instruments (0.1 Hz to 5 kHz), the displacement current can usually be ignored, and K is further simplified as:

$$k = -iwuo \quad (3)$$

2.Wave group resistance and resistivity

A magnetic field with a change in the Helmholtz equation induces a

changing electric field, and we have a magnetoelectric relationship:

$$\frac{E}{H} = -\frac{i\omega\rho}{k} \tag{4}$$

The surface impedance Z is defined as the ratio of the surface electric field and the horizontal component of the magnetic field. In the case of uniform earth, this impedance is independent of the polarization of the incident field and is related to the earth resistivity and the frequency of the electromagnetic field:

$$Z = \frac{E}{H} = \sqrt{\omega\mu\rho}e^{i\pi/4} \tag{5}$$

The formula can be used to determine the resistivity of the earth:

$$\rho = \frac{1}{5f}\left|\frac{E}{H}\right|^2 \tag{6}$$

3. Skin depth

In non-magnetic media, the skin depth formula is:

$$\delta \approx 503\sqrt{\rho/f} \tag{7}$$

It can be seen from the above equation that the penetration depth of electromagnetic waves is related to frequency and resistivity. The frequency is certain, the higher the resistivity, the greater the penetration depth, the higher the resistivity, and the lower the frequency, the greater the penetration depth.

4. Instrument Introduction

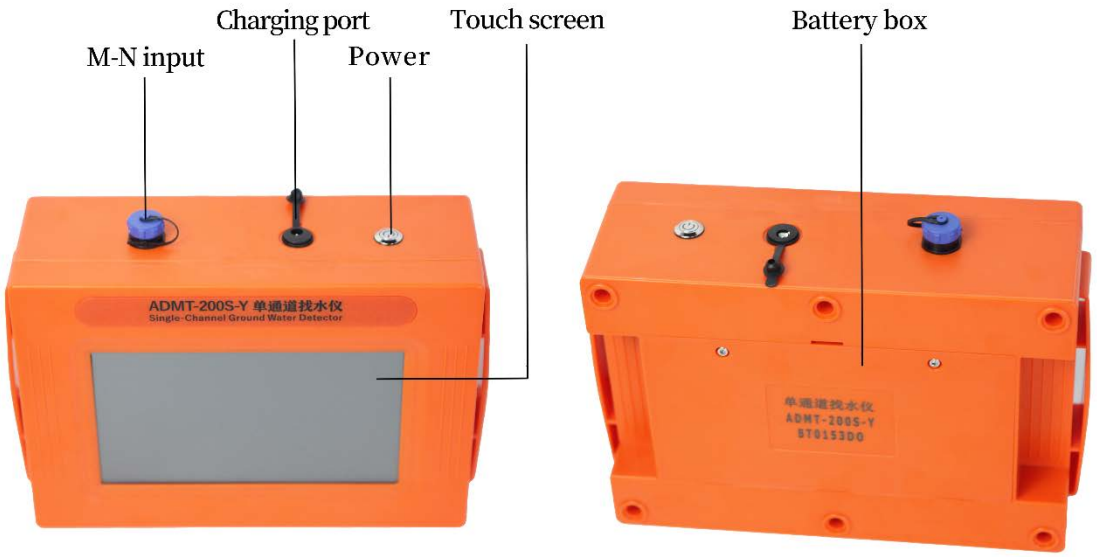


Figure 1

5. Main models and technical parameters

Model / Parameter	ADMT-200S-Y	ADMT-300S-Y
measured depth(m)	≤200	≤300
channel input	Single channel MN/TT input	
Depth interval	5m	
Connection type	Bluetooth	
operating display	7-inch Android touch screen	
Main function	Draw curve graphs, export data, connect to mobile phones to draw 2D/3D graphs, conduct AI analysis, and have detachable batteries	
Frequency range (HZ)	1-8K	
Measuring mode	MN/TT	
Resolution ratio	0.1mV±5%	
Sampling time	130s	
Battery power consumption	4W	
Main host weight	1.30kg	

6. Instrument operation method

Turn on the power and press anywhere of the screen it will enter the operation interface (as Figure 2 shows).

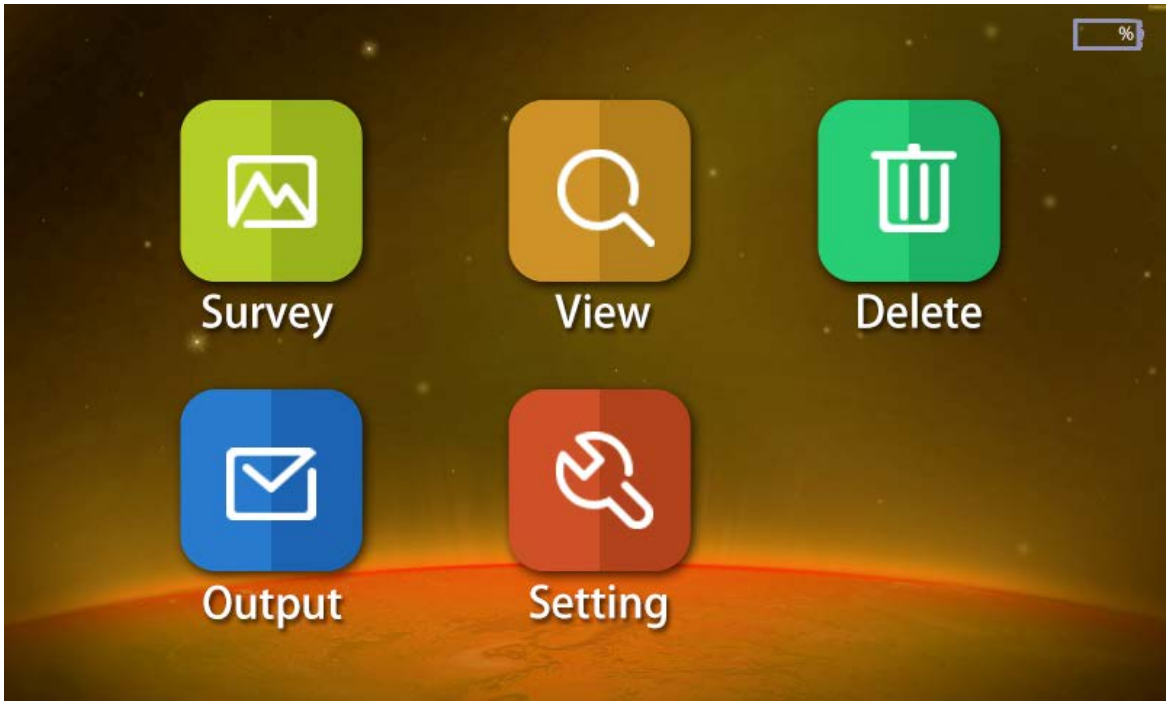


Figure 2

6.1 Measure

Click “Survey” on the main interface to start the measurement setting. The setting interface like Figure 3 shows

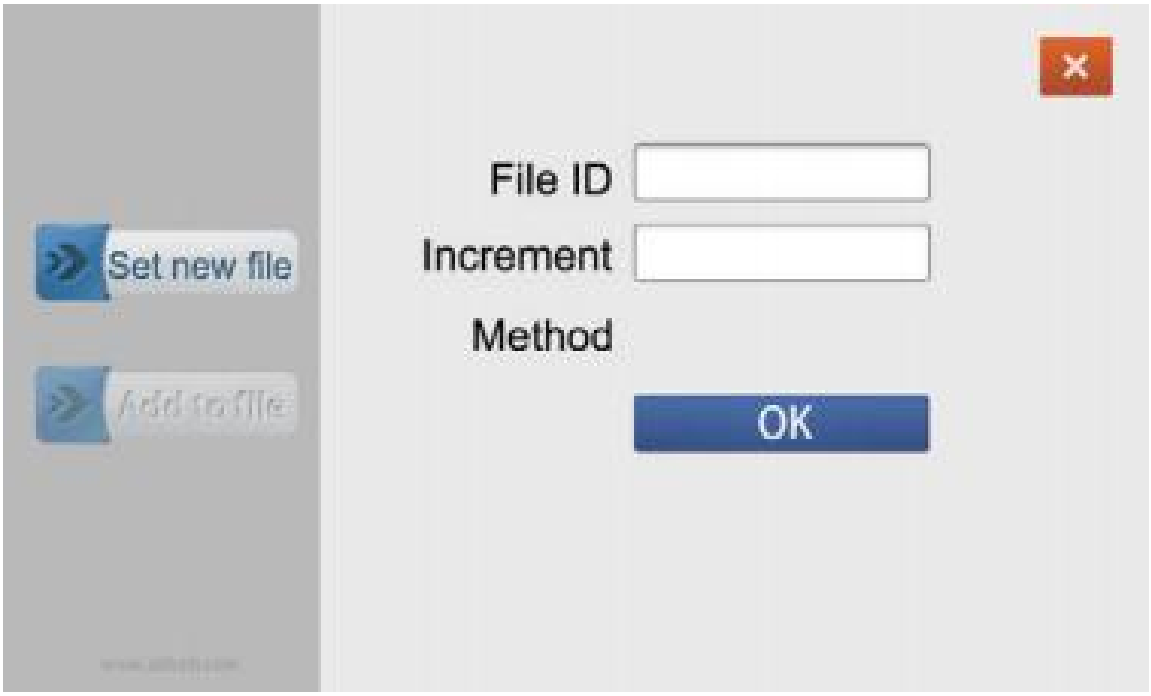


Figure 3

New File: Click ″ Set new file ″ to create a new file.

Press the blank area beside the “File ID”, then input a number to name the file (as the Figure 4 shows).



Figure 4

Input the increment: 10 or 20, choose one number to input.

Method: If you purchase the wireless sensor, choose “Meg” , otherwise , choose “Elec”.

Press “OK” to complete the set and enter to the measurement operation interface (like Figure 5 shows)

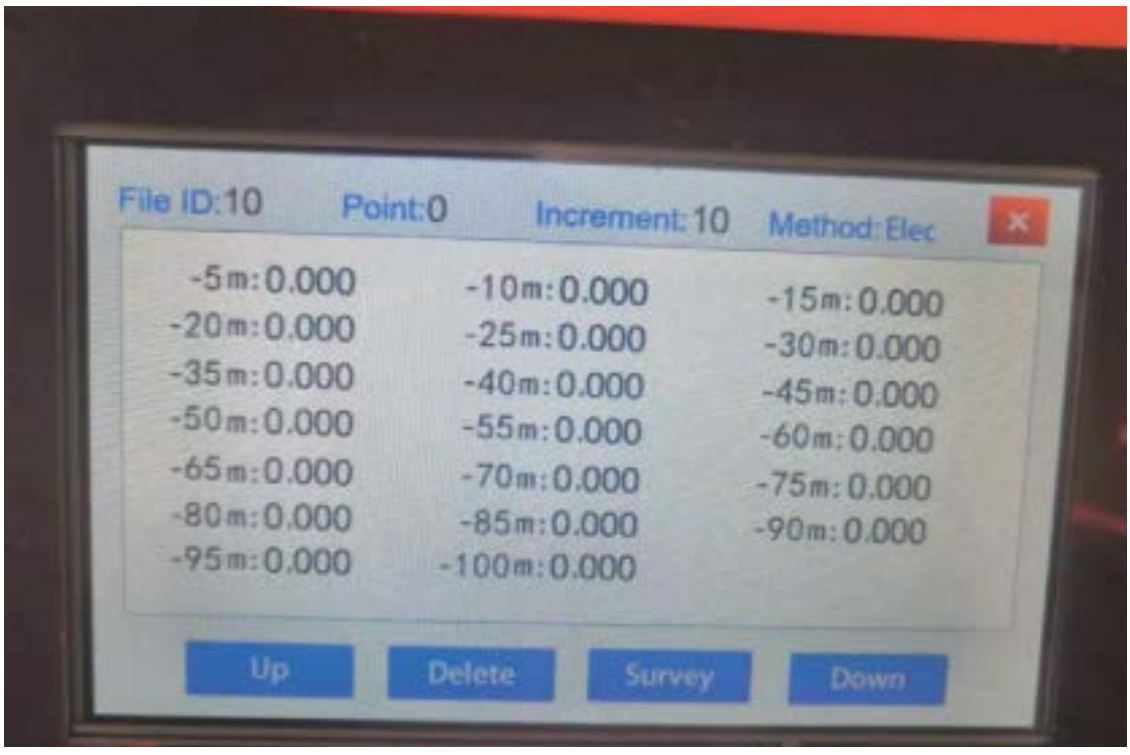


Figure 5

Delete: Click "Delete", and the instrument will display "Are you sure you want to delete the current measurement data?". If you want to delete it, click "Yes". If not, click "No". After deletion, reduce the number of measurement points by 1.

Measurement: Click "Survey" and the instrument will start measuring. Repeat the process until the entire measurement line (point number ≤ 100) is measured. Due to the fact that each measurement line of this instrument can store up to 100 measurement points, if the point number is 100 ("N=100") and you continue to press the confirm button for sampling, the instrument will not perform the measurement. Instead, an "ERROR" error message will appear in the prompt information area, and a new measurement line must be created before proceeding with the measurement operation.

Click the "×" in the upper right corner to close the current interface and return to the previous interface.

Supplementary measurement file: Click on "Add to file" to measure the measurement line that needs to be continued.

Enter the supplementary survey line number: Click on the white input box of "Enter Survey Line Number", a numeric keypad will pop up, enter the survey line number that needs to be supplemented, and click "Enter" to complete the input as shown in Figure 6.



Figure 6

6.2 View The Data

Press “View” at the main interface to enter (like Figure 7 shows):

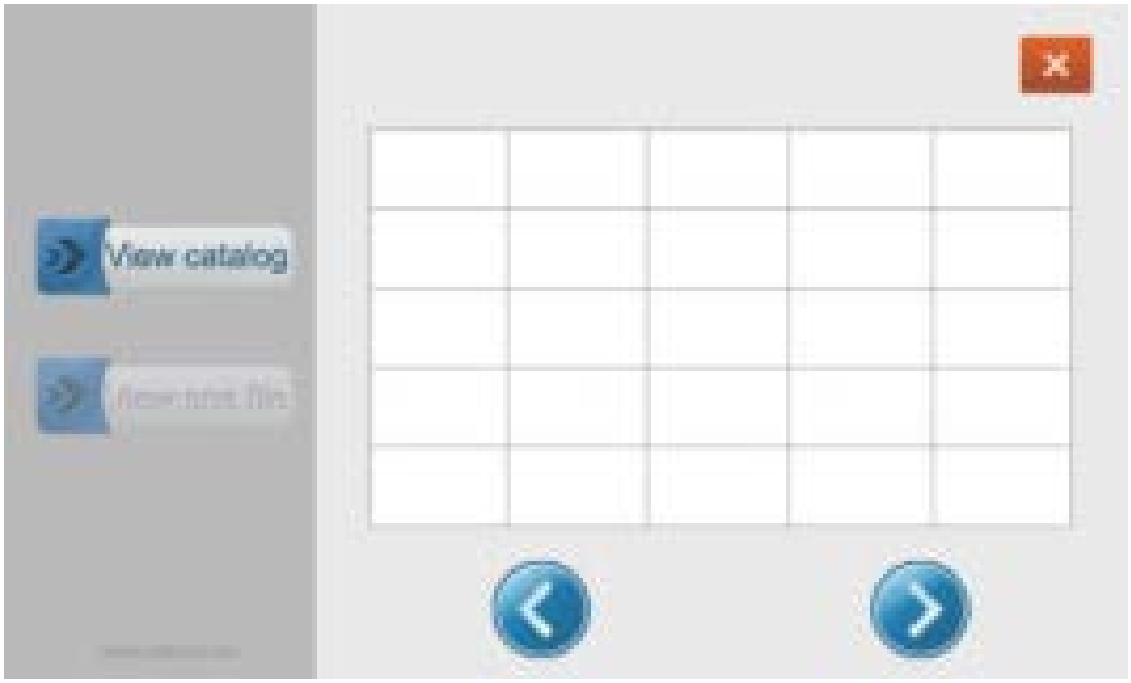


Figure 7

View catalog: means view all the file

View one file: Means view the file you want to check。 For example view one file.(like Figure 8 shows)

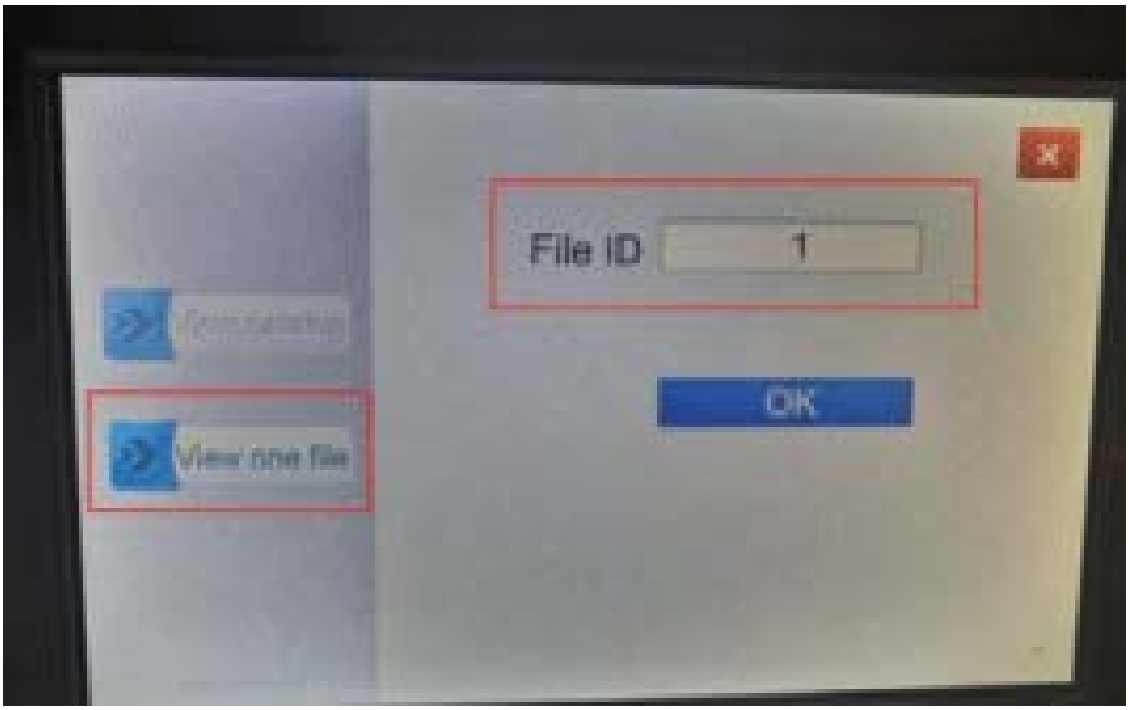


Figure 8

Press “OK”, to check (like Figure 9 shows):



Figure 9

Click the "×" in the upper right corner to close the current interface and return to the previous interface.

6.3 Delete

Press the “Delete” at the main interface it will shows(like Figure 10):

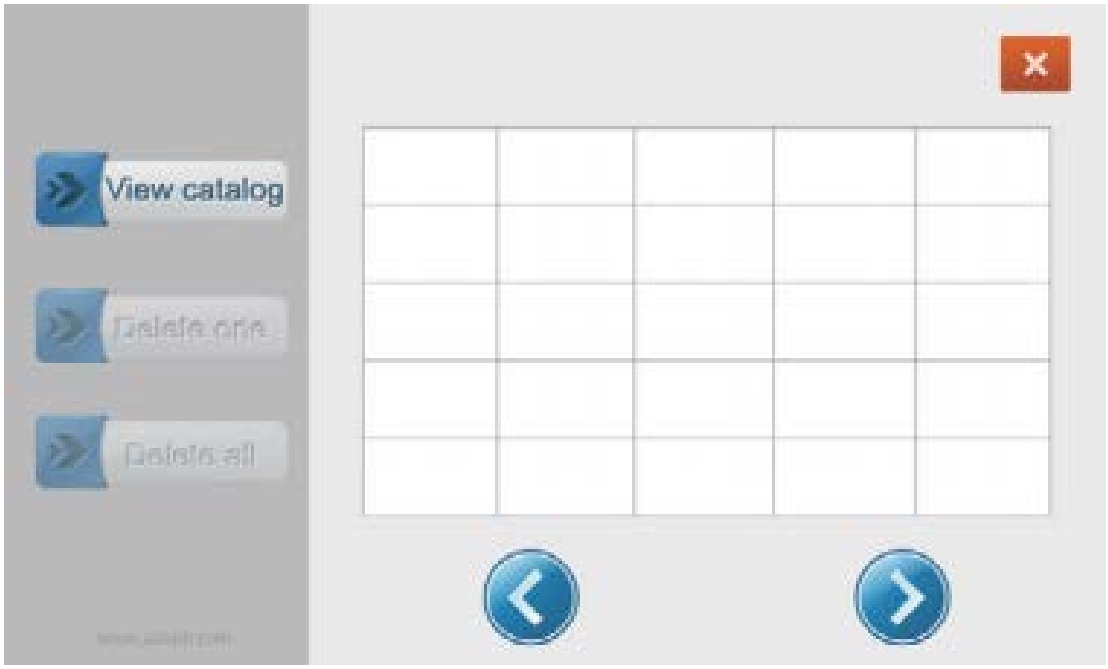


Figure 10

View catalog: click this button will show all the files.

Delete one: Click this button you can choose one file to delete.

Delete all: This button means you want to delete all the data you have measured. The device will remind you if you want to clear all stored data. Press “OK” to remove all of them.

Click “×” to back to the last interface.

6.4 Output

On the main screen, click "Output" to enter the transfer interface, as shown in Figure 11.

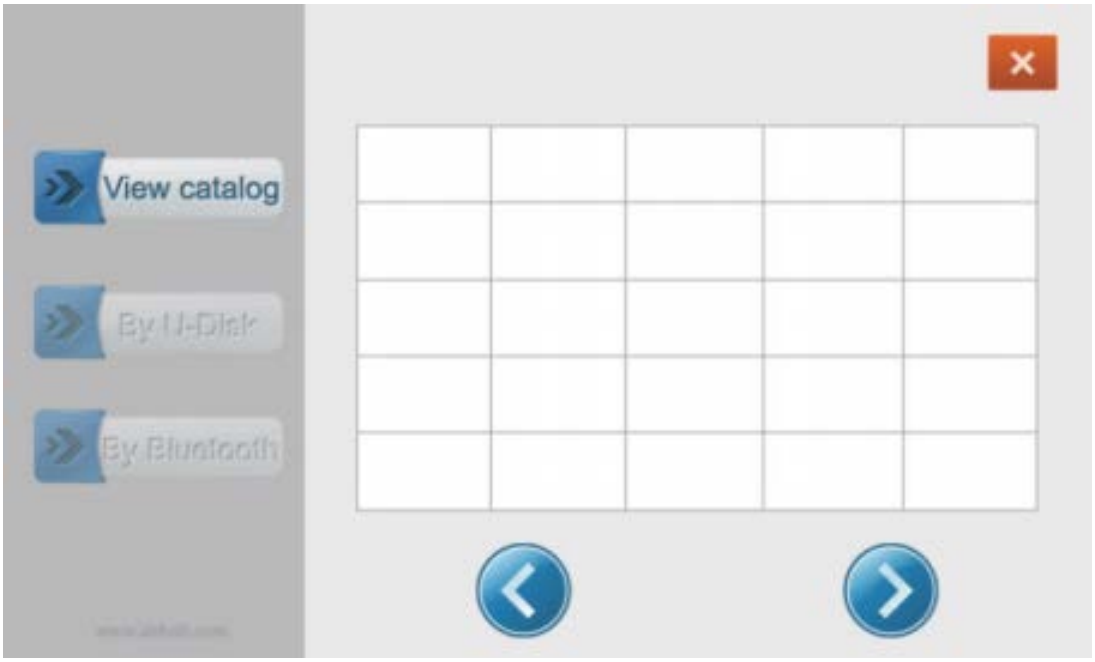


Figure 11

View Catalog: Click "View Catalog" to display all the line numbers in the instrument.

USB transfer: transfer a single file.

Enter transmission line number: Click on the white input box of "Enter Line Number", a numeric keypad will pop up, enter the line number to be transmitted, and click "Enter" to complete the input. Then click 'Confirm', and the instrument will pop up 'Device ready, please insert USB drive'. At this point, insert the USB drive and the instrument will start transferring data. If not needed, click 'Cancel', as shown in Figure 12.



Figure 12

Transfer all measurement data: The instrument displays "Output all survey data!" as shown in Figure 13. To transfer, click "OK". The instrument pops up the message "Detector is OK for outputting. Please insert U-Disk!". At this point, insert the USB flash drive and the instrument begins to transfer data; If not needed, click "No".

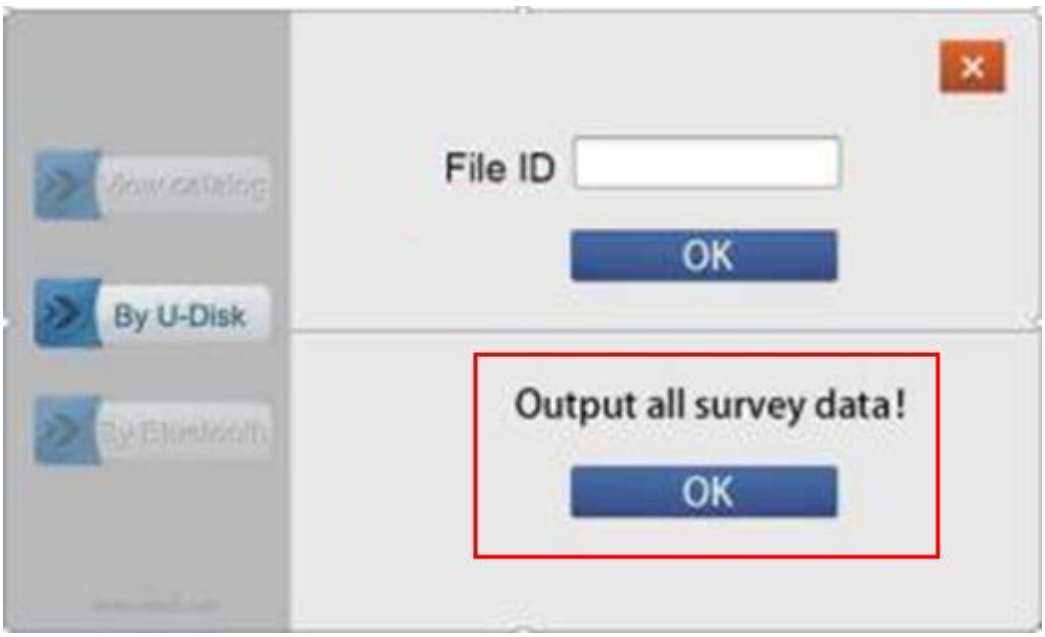


Figure 13

Bluetooth transmission: Click on "Bluetooth transmission" and it will display "Enter Bluetooth transmission mode!". If you need Bluetooth transmission data, click the "OK" button. The instrument displays " Detector is OK for outputting. Wait for the phone command!" as shown in Figure 14. If not needed, click " Ignore" or the "×" in the upper right corner to return to the upper interface.

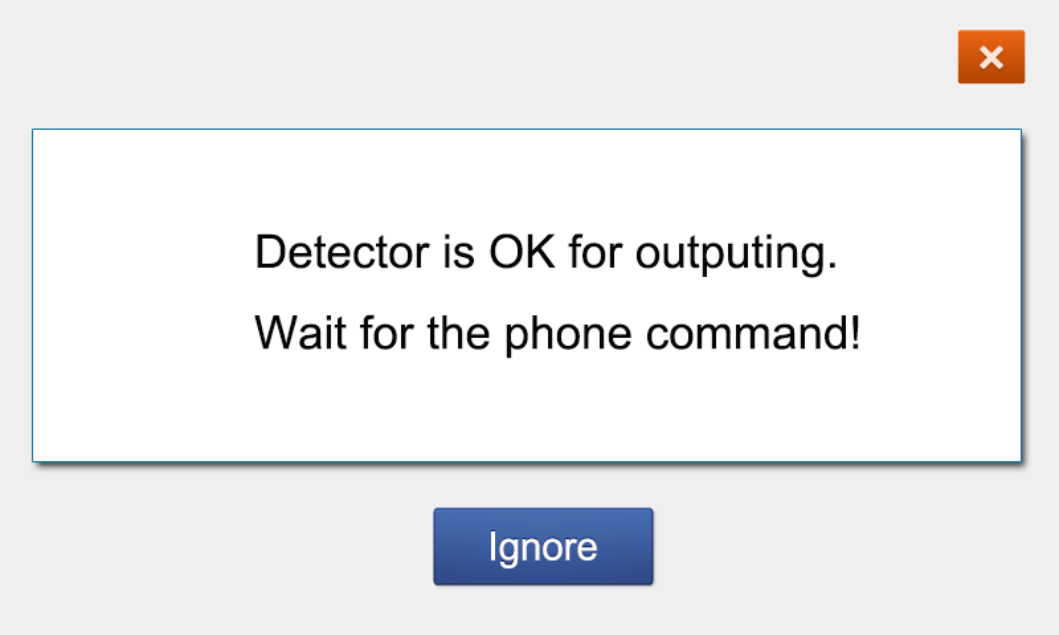


Figure 14

Please ensure that the mobile app and the instrument are connected through the Bluetooth function of the mobile phone (refer to the "Single Channel Water Detector User's Guide" for the download and connection method of the mobile app). Open the mobile app "Aidu Water", click on the "Bluetooth Connection" icon as shown in Figure 15, search for the corresponding model, and confirm pairing. Enter the "instrument setup" interface as shown in Figure 16. If not needed, click on the "←" in the upper left corner to return to the previous interface.

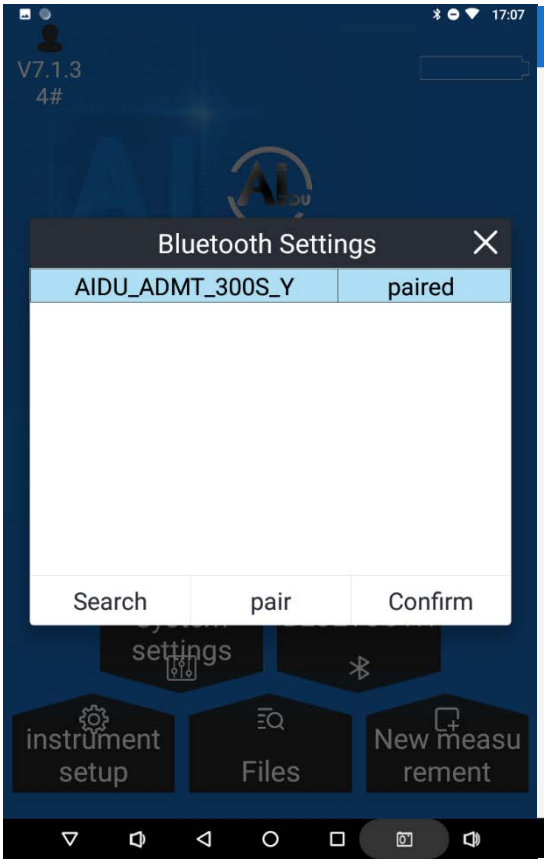


Figure 15

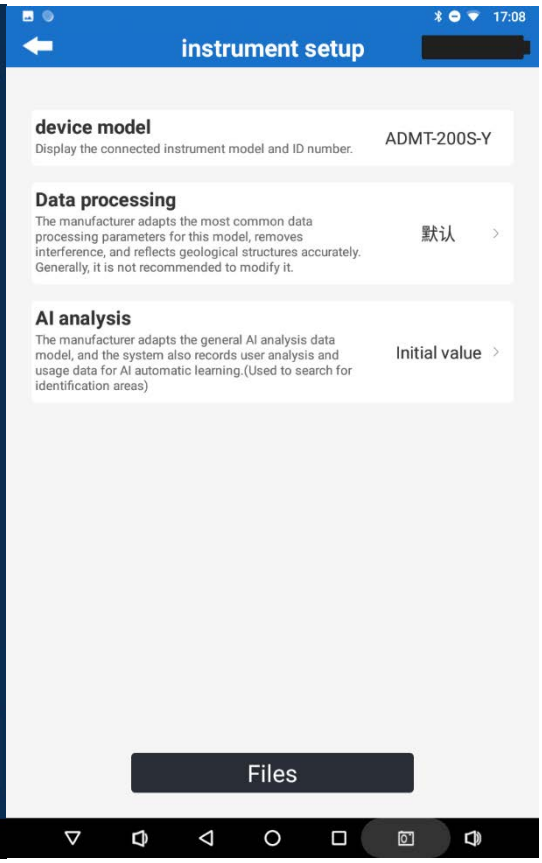


Figure 16

Click the "Files" button to enter the interface as shown in Figure 17. Select "Derivation" and click "CONFIRM" to import the file number of the phone. The data export is successful and enters the interface as shown in Figure 18.

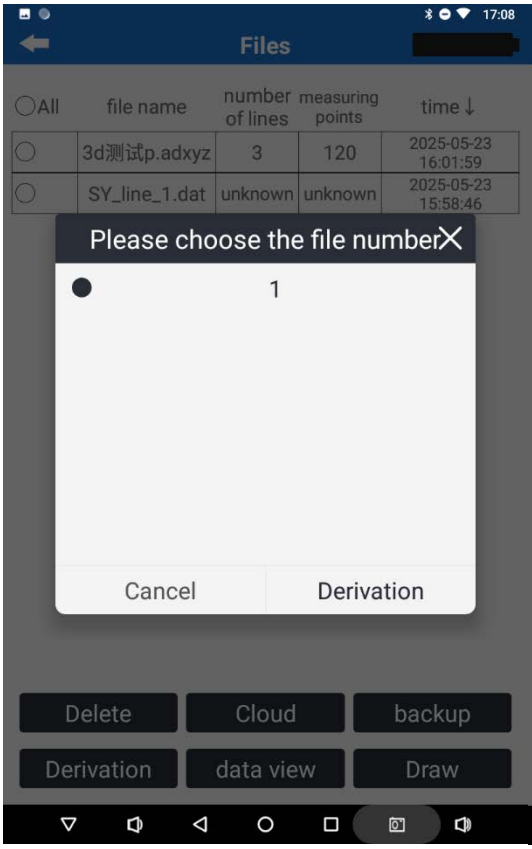


Figure 17

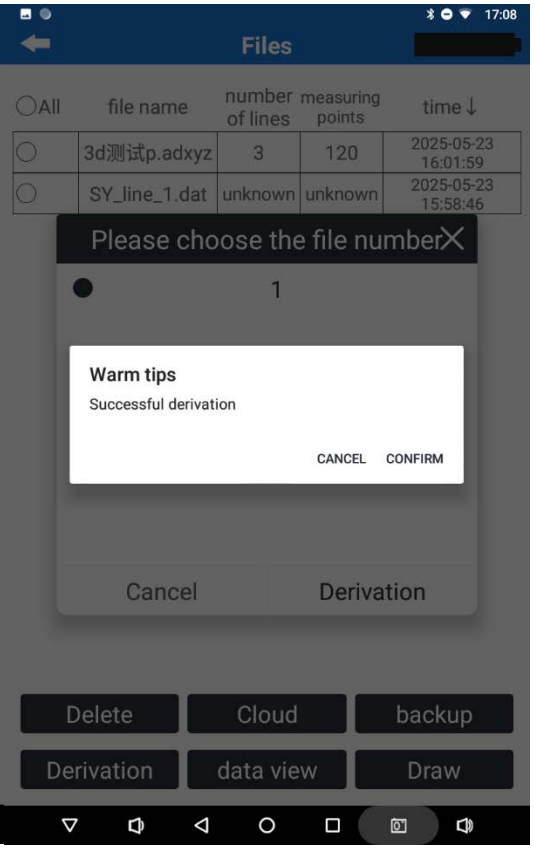


Figure 18

Close the window to view the imported file. As shown in Figure 19.

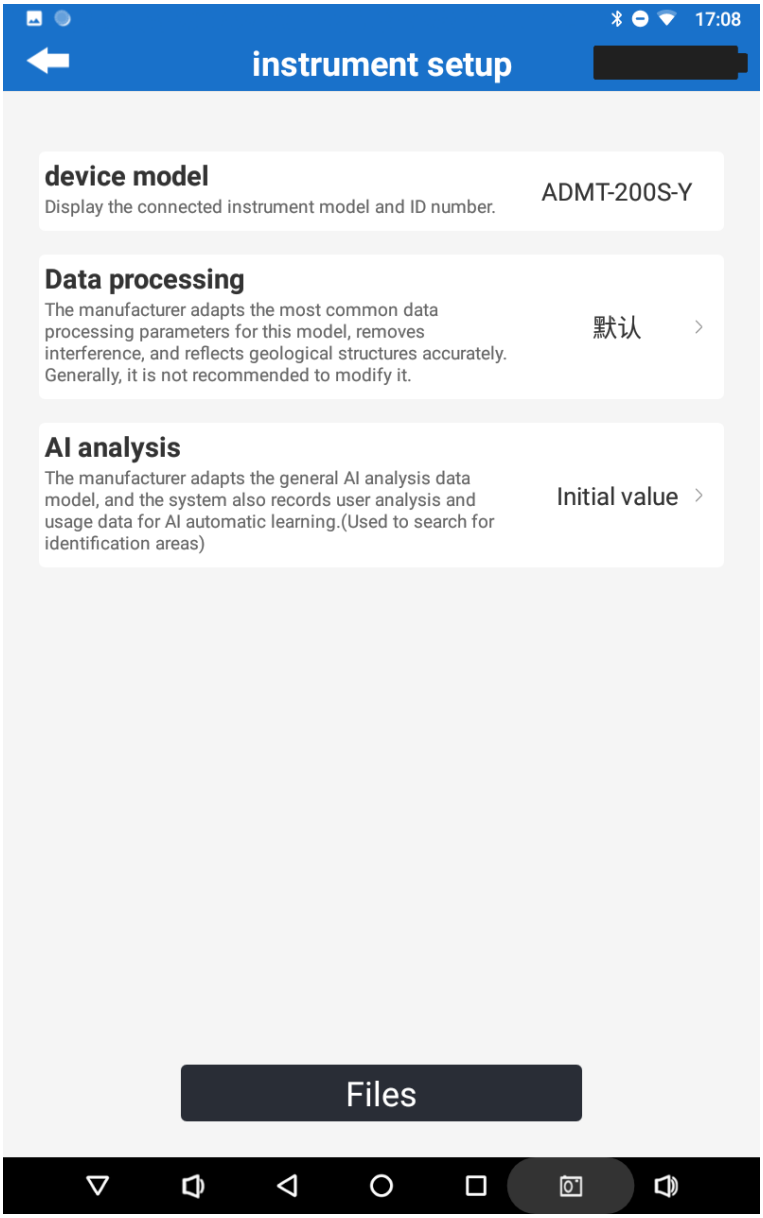


Figure 19

6.5 Setting

Click on "SET" on the main screen to enter the settings interface, as shown in Figure 20.

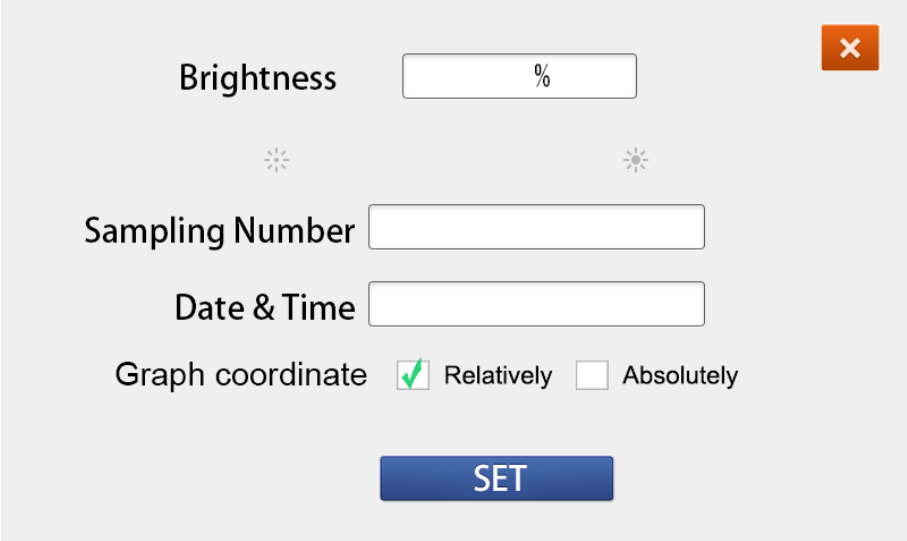


Figure 20

Brightness ratio: Adjust the brightness of the instrument screen.

Adjust brightness: Move the slider to adjust the brightness of the screen.

Sampling frequency: Click on the white input box of "Sampling Number", select the appropriate sampling frequency, and click " Enter ".

Time and Date Settings: Click on the blank "Date&Time" input box, enter the date and time, and press the "Enter" key to complete the input, as shown in Figure 21.

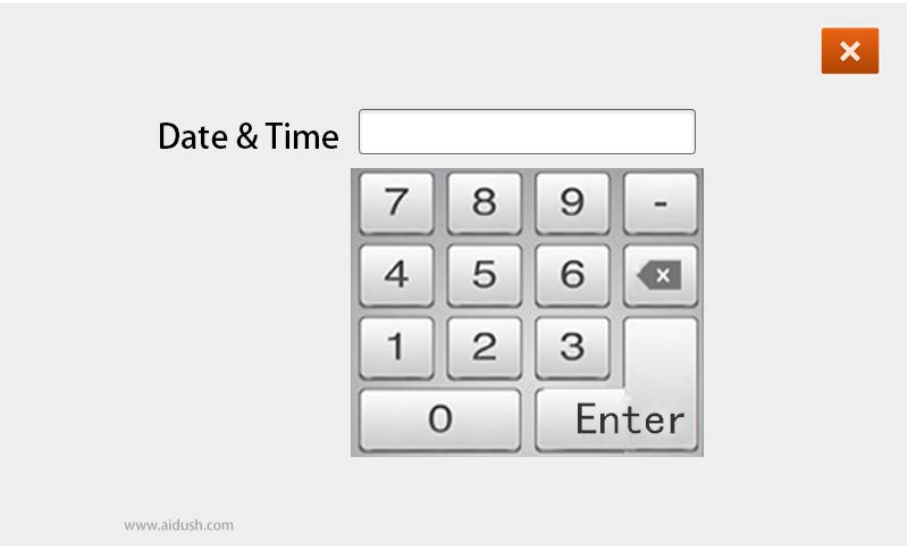


Figure 21

Graphic coordinates: Change the display mode of measurement data, click on the small box to the left of "Relative" or "Absolute", display "✓" to complete the selection, and then click "SET" to complete the parameter settings.

7. Draw

Draw 2D, 3D, and curve graphs through the "Draw" feature on the Aidu Water app.

7.1 data view

Open the "Files" in the Aidu Water app and find the data file you want to view, as shown in Figure 22.



Figure 22

7.2 Draw

Select "Draw" on the APP file browsing interface to choose contour maps, AI analysis, curve maps, 3D maps, and 3D slice maps.

1. "O2D" is the old version isoline map, and "N2D" is the new version isoline map. Both isoline maps can be selected by clicking the button to draw vertical isoline maps or planar isoline maps;

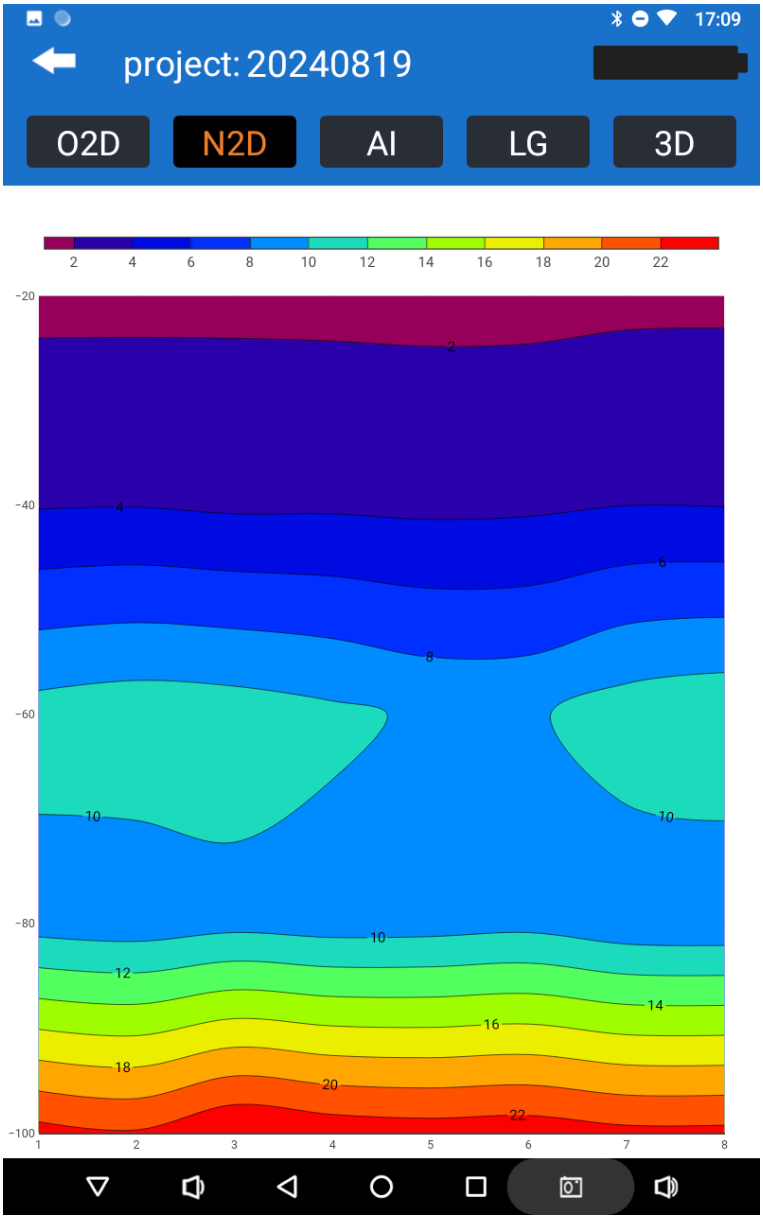


Figure 23

2. "AI" is used for AI analysis and plotting. After entering, it is necessary to first perform parameter analysis on the AI analysis, select the measurement line, and select history to load data from past AI analysis;

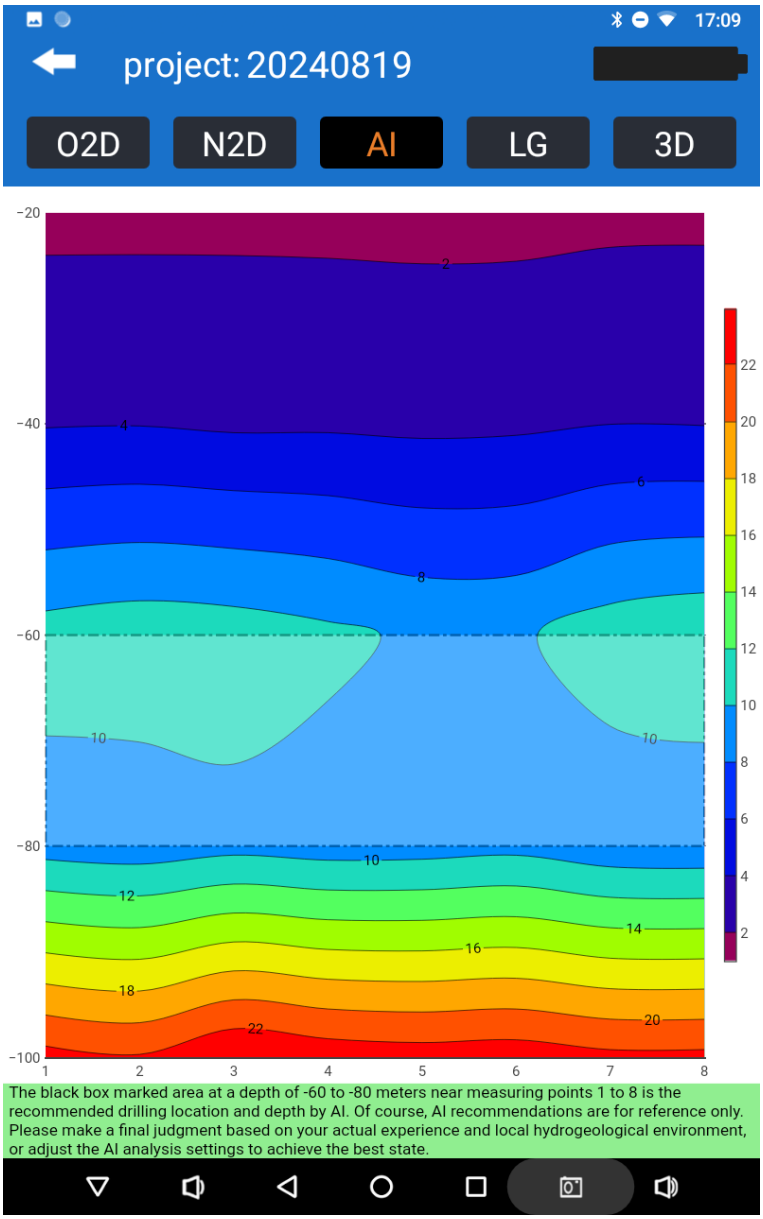


Figure 24

3. "LG" is a curve chart, which can be selected as a planar curve chart or a vertical curve chart. The measurement point number that needs to be displayed can be selected for drawing;

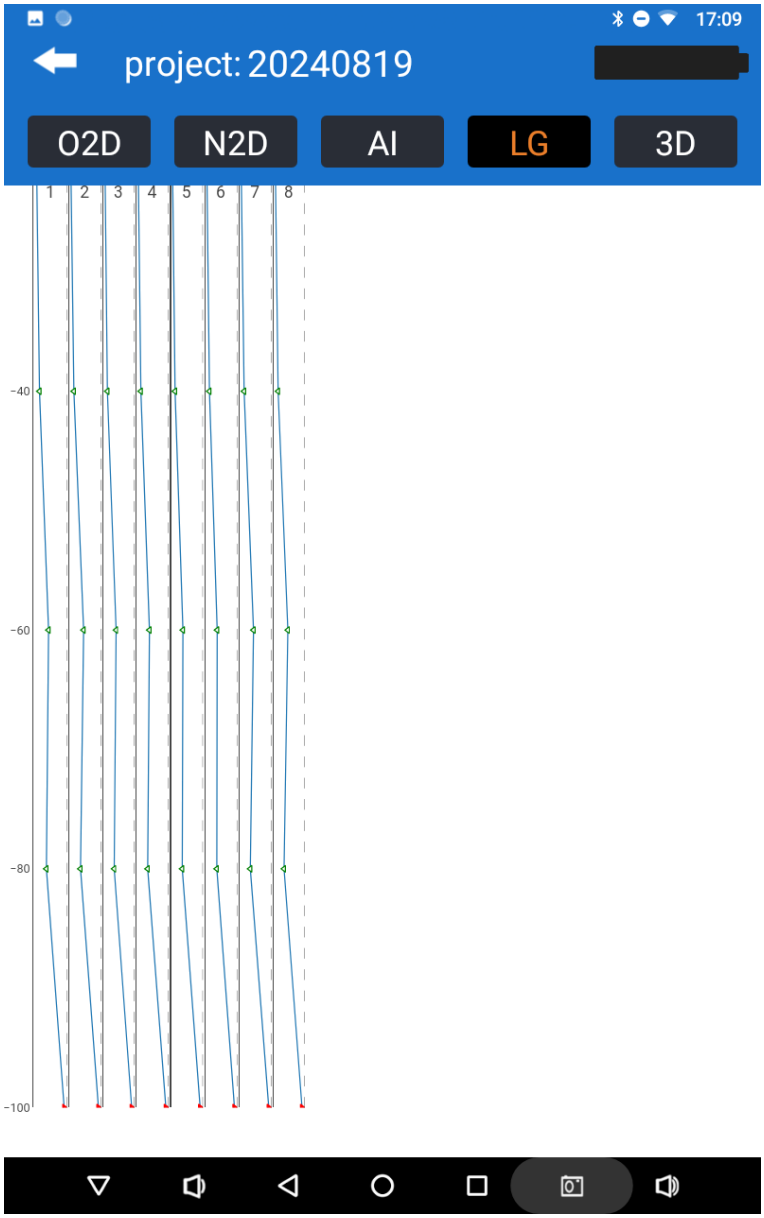


Figure 25

4. "3D" is a 3D isoline map, which can be selected as either a 3D map or 3D slice map. In the 3D slice map, it is necessary to choose to slice according to the depth measurement or measurement line or measurement point increment.

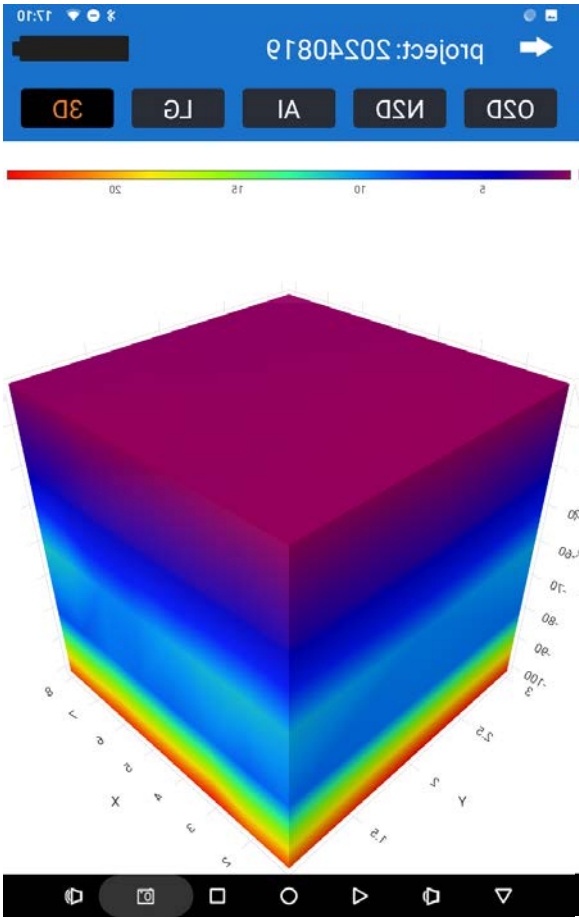


Figure 26

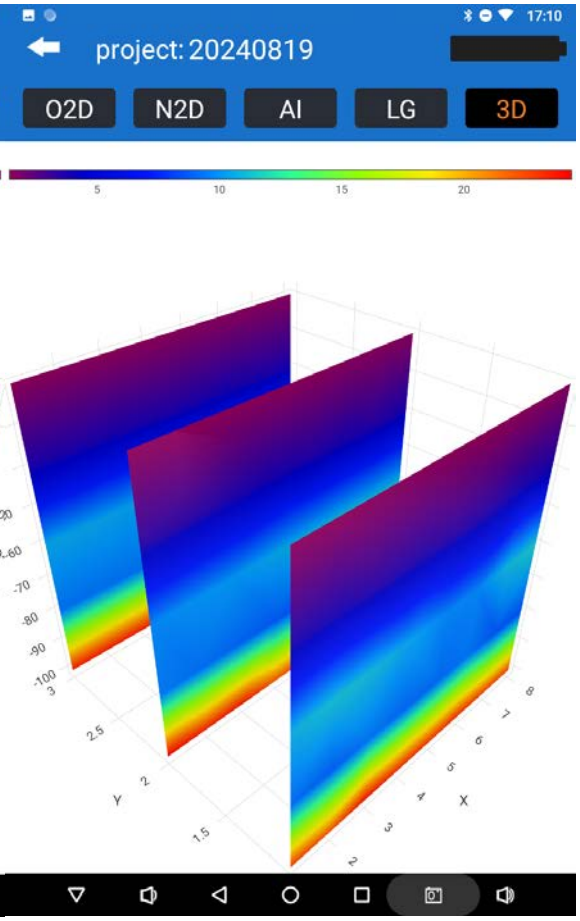


Figure 27

8. Field operation methods

8.1. Device connection illustration

Connection way of electrodes, like Figure 28.

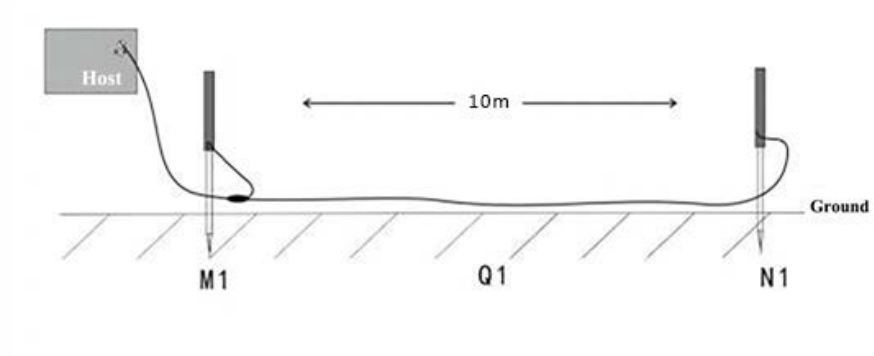


Figure 28

Connection way of wireless sensor probe (optional configuration), See Figure 29.

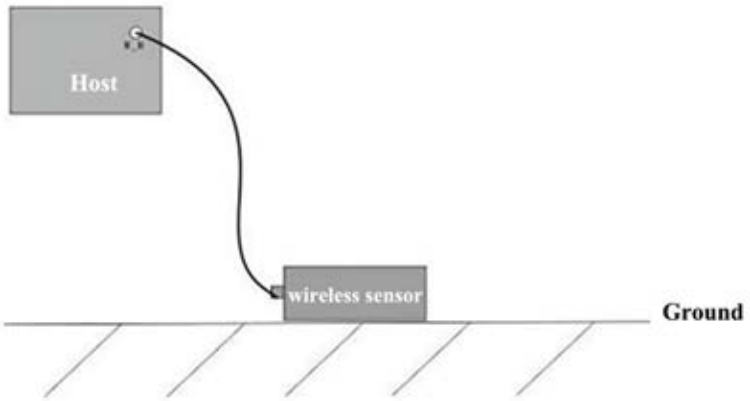


Figure 29

8.2 Principles of setting measure line (profile)

1. The line should be perpendicular to the direction of the abnormal body.

2. The test line should be as far away as possible from the high-voltage power lines and telephone lines. If can't be far away, keep parallel with them.

3. If the calbe is immersed in water ,it needs to be checked for leakage.

4. Make sure that the M and N electrodes are on the same plane when set the line.

8.3 Electrode wire measurement method

Connect the instrument as shown in Figure 28 .Insert M and N measuring electrodes to ground and start data sampling, The measuring point position is the center position of the M and N electrode rods. Move the M and N electrodes in the same direction with a certain distance to perform the second point sampling measurement after the first point sampling is completed. (see Figure 30) . Repeat the operation until the all points of the profile has been measured.

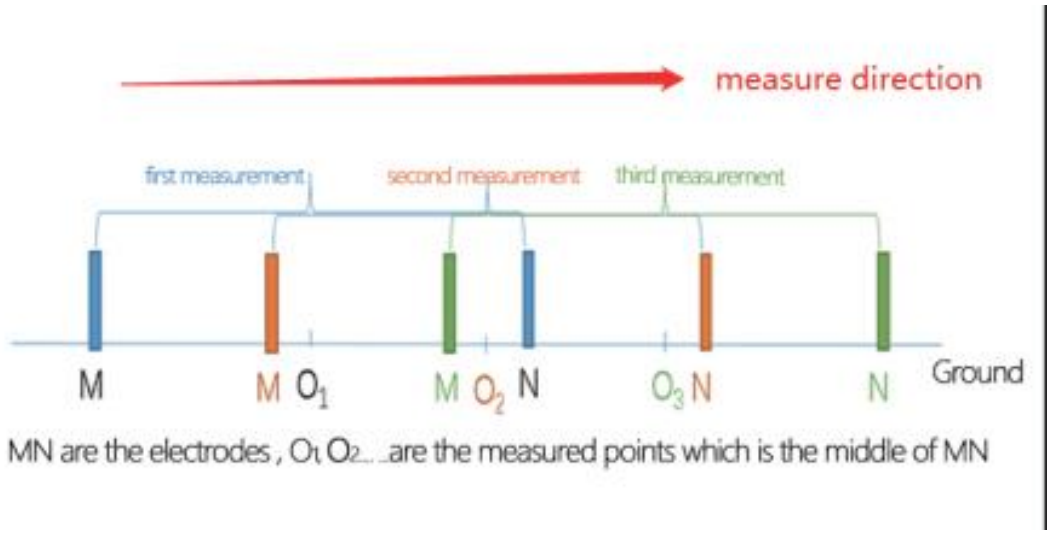


Figure 30

8.4 Wireless sensor measurement method

After turning on the instrument, connect it as shown in Figure 29, place the sensor on the ground, and start sampling. The measurement point is directly below the sensor. After the sampling of this point is completed, move the sensor in the same direction at a certain point distance to perform the second measurement point sampling measurement as shown in Figure 31. Repeat this process until the entire profile measurement is completed.

When working in the field, in order to ensure the accuracy of data, the following points should be noted during measurement:

(1) Use a compass or benchmark to determine the direction of the survey line at three points and one line, and try to ensure that the survey line is a straight line.

(2) Determine the distance between M and N (usually 5-10 meters) based on the size of the electric field signal and other factors in the measurement area using electrode measurement line method, and maintain a uniform distance on the same measurement line; Use sensors to keep the direction of the probe consistent.

(3) The measurement points are the midpoints of M and N, and the same point distance is maintained on the same measurement line.

(4) Try to maintain consistency in the grounding conditions of the MN electrode.

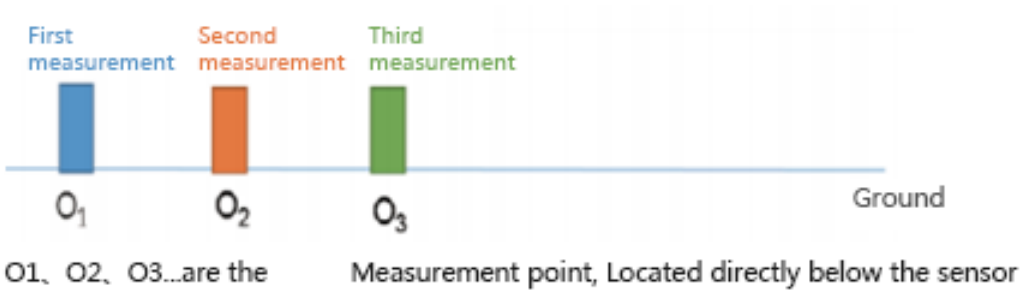


Figure 31

9. Notes on using the instrument

9.1 Before starting work, please check if the instrument's battery is sufficient. To save power, please turn off the power after work.

9.2 The instrument needs to be kept by a dedicated person during transportation or use to avoid severe vibration, impact, and water ingress.

9.3 After work every day, the instrument surface should be cleaned of dust and placed in a ventilated and dry place.

9.4 After use, the measuring electrode should be kept clean by removing any dirt or debris from the surface.

9.5 The instrument casing is affixed with a tamper proof seal. Please do not tear it open without authorization, as it will not be covered by warranty.

9.6 The instrument adopts intelligent frequency selection. To ensure accurate measurement, please delete the data before measuring for the first time.

9.7 When the MN electrode or electromagnetic sensor is not connected or disconnected, it will prompt measurement failure. Please check if the circuit is firmly connected.

9.8 In instrument measurement, if the measurement data of each measuring point is small and the values are basically the same, it may be an instrument failure. Please contact after-sales for confirmation.

艾都慧测

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