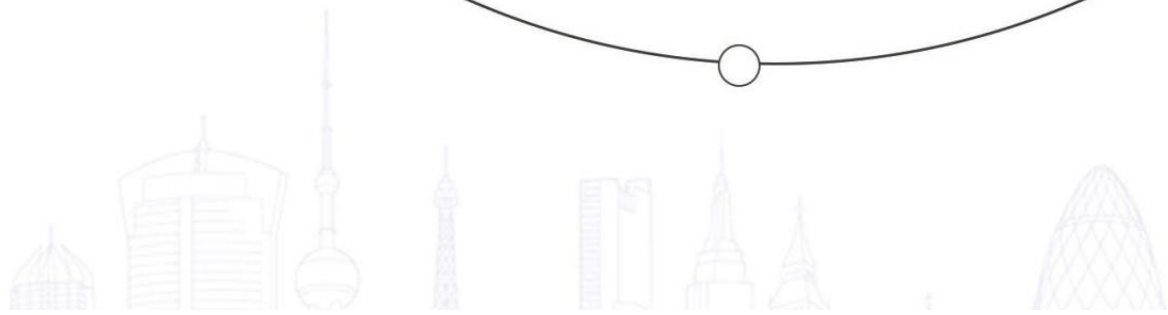


Multi-Channel Speedy Groundwater Detector

Operation Instructions



Contents

1 Instrument overview	2
2 Main features	2
3 Introduction of the working principle of the instrument	3
3.1 Electromagnetic wave propagation theory, Helmholtz equation	4
3.2 Wave group resistance and resistivity	4
3.3 Skin depth	5
4 Instrument Instruction and Main parameters	6
4.1 Instrument Instruction	6
4.2 Main parameters	9
5 System Login and Registration	10
5.1 System instruction	10
5.2 Registration and Login Operation Methods	10
6 Connection Status and Instrument Settings	12
6.1 Connection Status	12
6.2 Instrument settings	13
6.2.1 Unregistered login users	14
6.2.2 Registered and logged-in users	15
7 New Measurement	19
8 File Browsing	23
8.1 Unregistered login users	23
8.2 Registered logged-in user	24
9 Plot	26
10 System settings	32
11 Instrument field connection method	33
11.1 Single Channel Connection	33
11.1.1 Wired Electrode Connection Mode	33
11.1.2 Wied Magnetic Sensor Connection Method (optional)	34
11.2 12 Channel Instrument Connection Mode	35
11.3 24 Channel Instrument Connection Mode	36
11.4 36 Channel Instrument Connection Mode	37
11.5 48 Channel Instrument Connection Mode	37
11.6 60 Channel Instrument Connection Mode	38
11.7 Connection method of multiple wired electromagnetic probes	39
12 Method for Setting Up Field Survey Lines	40
12.1 Parallel layout of linear profiles	40
12.2 The method of laying out in a cross pattern or diagonal pattern along a straight line section	41
12.3 Layout Method of Circular Section	42
12.4 Wiring Principles	42
13 Precautions for Using the Instrument	43

This operation manual is applicable to the following instruments:

Series model	Compatible with 1-60 channels (standard single channel MN, optional multi-channel MN/TT)
Speedy groundwater detector	ADMT-200ZN
	ADMT-400ZN
	ADMT-800ZN

1 Instrument overview

The ADMT series Fast multi-channel water finder is an intelligent water finder that integrates 1-60 channels. It features real-time data collection, data processing, automatic imaging, AI analysis, and multi-terminal data sharing. It is equipped with an Android 7-inch high-definition touchscreen with a resolution of 1024*600. The number of channels of the main unit can be automatically identified according to the connected accessories. The specially designed aviation plug-in multi-function interface and touch switch automatically generate a graph after data collection is completed, and the data can be viewed and analyzed on instrument screen, mobile phone screen and computer screen.

The multi-channel simultaneous input measurement solves the defect of the MT field source changing at any time, can obtain a relatively stable field source, and the repeatability measurement consistency is very good. Through the multi-channel simultaneous input measurement, the big data of the high-density method measurement can be obtained, breaking through the depth limit of the traditional high-density electrical method instrument, the exploration depth can reach up to 800 meters.

2 Main features

1. The main unit is compatible with multiple channels such as 1, 12, 24, 36, 48, 60, etc. The number of channels can be selected during measurement;
2. Multiple depth modes can be selected within the maximum depth range for measurement, and the minimum single sampling time is only 15 seconds;
3. Standard 7-inch touchscreen for Android system, instant data processing, real-time mapping, AI analysis, etc;
4. The multi-functional interface of the aviation plug integrates sensors and MN cables, and the Type-C interface integrates charging and data transmission functions;
5. The high-performance heat sink enhances instrument performance by 30%, with MN and TT measurement modes;
6. Supports wireless projection, multi-screen interaction, and data processing and mapping with three screens of mobile phone or tablet and PC;
7. Built-in high-performance removable lithium battery that can be charged and used with mobile phone chargers, power banks, and in-car mobile phone chargers.

3 Introduction of the working principle of the instrument

The ADMT series of products utilize the natural electromagnetic field of the earth as the working field source to study the electrical structure of the earth's interior. Based on the principle that electromagnetic waves of different frequencies have different skin depths in conductive media, they measure the earth's electromagnetic response sequence from high frequency to low frequency at the surface, study the electrical change differences of geological bodies at different depths underground, and determine the occurrence state of underground geological bodies.

3.1 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:

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

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

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

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

$$k = -i \omega \mu \sigma \quad (3)$$

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:

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

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:

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

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

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

3.3 Skin depth

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

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

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.

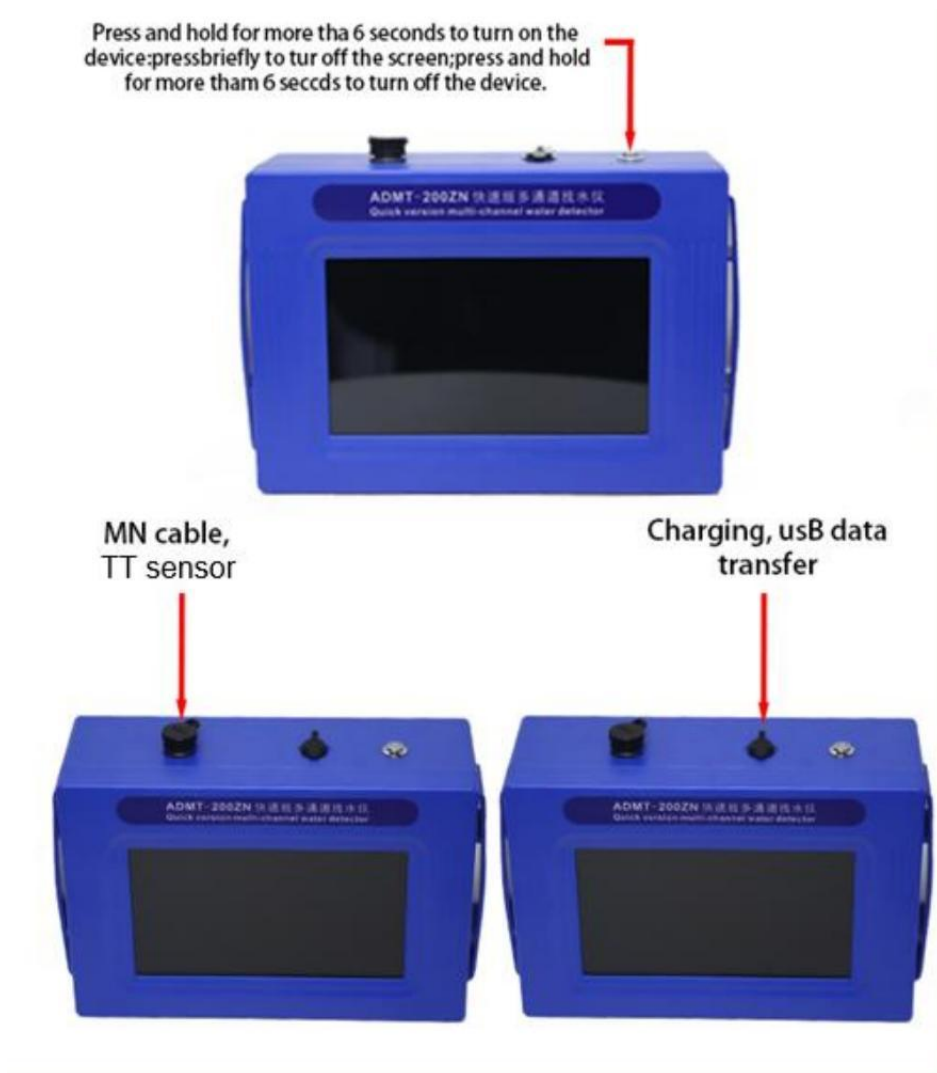
4 Instrument Instruction and Main parameters

4.1 Instrument Instruction

This series of instruments comes pre-installed with Aido Find Water software. When the instrument power is turned on, the screen displays the main interface function menu of system Settings, connection mode (USB connection), instrument Settings, file browsing, and new measurement (Figure 1). The product name and model are displayed in the middle of the screen, and V7.1.46 #V1.0 is shown below the avatar in the upper left corner. The part before the # indicates the version number of the upper computer software, and the part after the # indicates the version number of the lower computer software. Hollow avatars represent not logged in, and solid avatars represent logged in. The battery icon in the upper right corner represents the battery level, the data in the middle represents the level, the solid icon indicates that the upper and lower computers of the instrument are working properly, and the hollow icon indicates that the upper and lower computers are not working properly.



(Figure 1)



(Figure 2)

Standard aviation cable connectors and specially designed electrode connectors are structurally more stable. The cable nodes have built-in low-power, high-performance control measurement circuits for easier connection and more accurate measurement. Tensile and waterproof structure design, alloy rust-proof metal contacts and cable sealing in one. The electrode hammer can be hammered, pulled, used as a handheld electrode handle, and stepped on; Special alloy electrode, hammerable, pull-out, insertable.



Figure 3

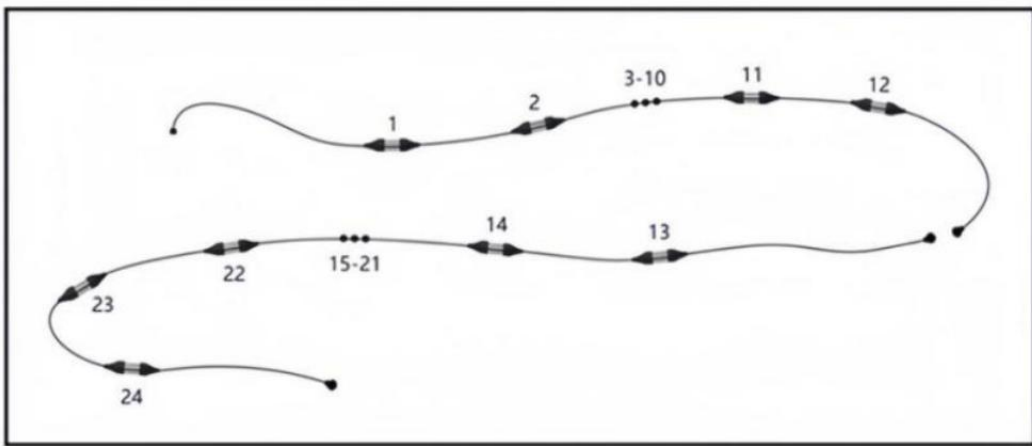


Figure 4 High-density cascaded

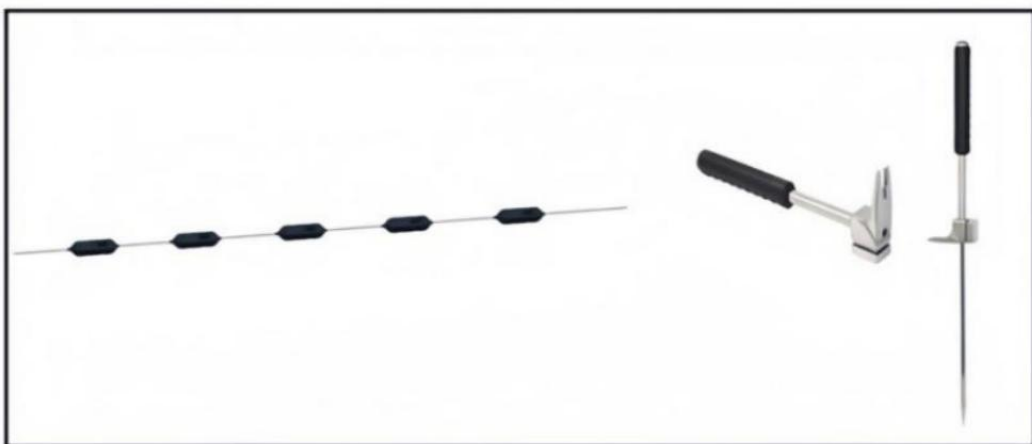


Figure 5 High-density cascaded electromagnetic sensor cable

Figure 6 Specialized multi-functional electrode hammer

4.2 Main parameters

Parameter\Model	ADMT-200ZN	ADMT-400ZN	ADMT-800ZN
Max Depth (m)	≤200	≤400	≤800
Scan interval	10m		
Channel Options	Compatible with 1-60 channels (standard with single MN channel, multiple MN and TT accessories are optional)		
Operating Model	MN/TT		
Frequency Range	0.1-6500HZ		
Filtering	FFT		
Filter Resolution	0.01mV±2%		
Sampling time	15s		
Connection	Six-core aviation plug connector (including MN cable/TT sensor), (charging port/USB signal transmission integrated interface), Wifi 5, Bluetooth 4.2		
Display	7-inch IPS high-brightness touch landscape screen		
Screen Resolution	1024*600		
OS	Android 13		
CPU	RK 3568		
GPU	Mali G52		
RAM	LDDR4/4GB		
Storage	32GB		
major Function	Automatic analysis, free software upgrade, channel compatibility, deep segmentation settings, real-time curve graph, contour color map		
Other Function	GNSS, optional 4G communication		
Battery	6000mAh		
Size	24.6*17.4*8.2cm		

5 System Login and Registration

5.1 System instruction

For the first use of this instrument, it is recommended to register and log in by sending the login password via mobile phone number in an environment with network connection. After logging in, the mobile phone number or registered account can be logged in through the mobile phone "AiduWater APP" or the WEB data processing system on the web page. The data backed up in the cloud of the instrument can be synchronized. It also enables related functions such as custom data processing parameters, custom AI analysis models, and online software upgrades.

Of course, unregistered users can also perform instrument Settings, data collection, automatic mapping and AI analysis, but the relevant parameters can only be the default Settings of the instrument at the factory.

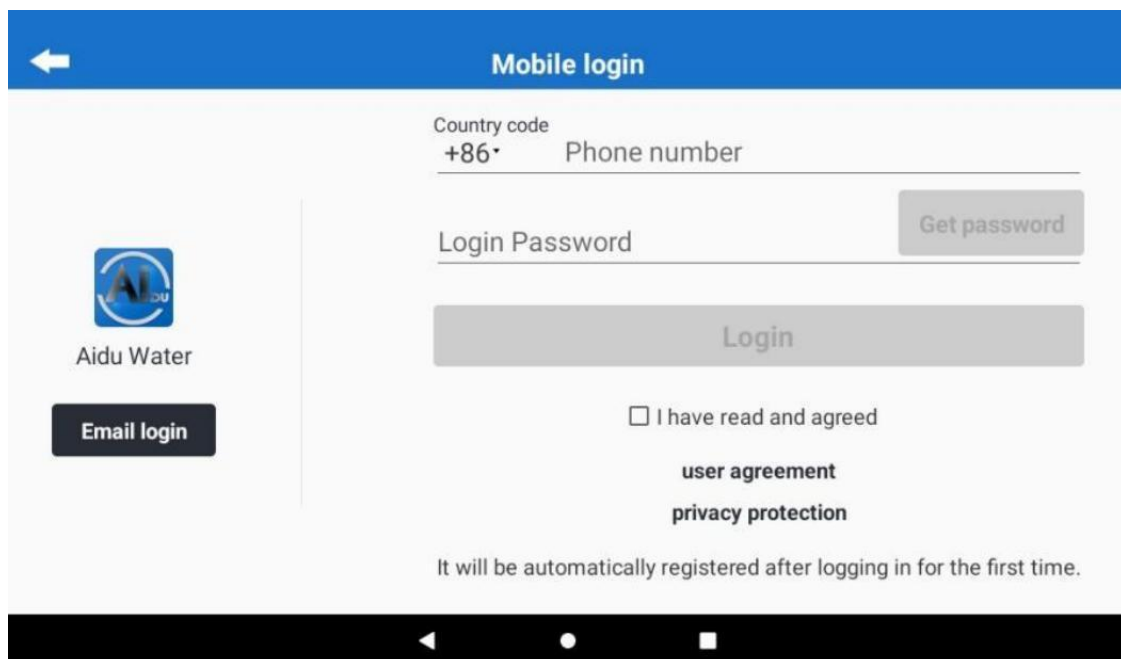
5.2 Registration and Login Operation Methods

First, connect to a nearby network via instrument WiFi. After clicking the Settings menu, click "wifi" to search for nearby WiFi networks and select a valid WiFi network name and password to connect to the relevant network. If there is no connected WiFi network in the environment, you can use your mobile phone to turn on the WiFi hotspot network for the instrument to connect to the network.

Next, after the instrument is connected to the network, click the icon in the upper left corner or click "User Login" in system Settings to log in and register (Figure 7). You can choose two login methods: "Mobile phone Number login" and "Email login". It is recommended to choose "Mobile phone Number Quick Login" and enter the mobile phone number to

send the login password. The login password received will remain valid until the next sending. It can be used for the next login or on other devices. It is recommended to obtain the login password once and not send it repeatedly. Save it for long-term use.

Special note: If the instrument is not connected to the network or the network is abnormal, it will prompt that the login password failed to be sent. Some networks (especially international networks) may have delays. Even if the sending is successful, it will take 1 to 5 minutes to receive the login password. Please be patient.

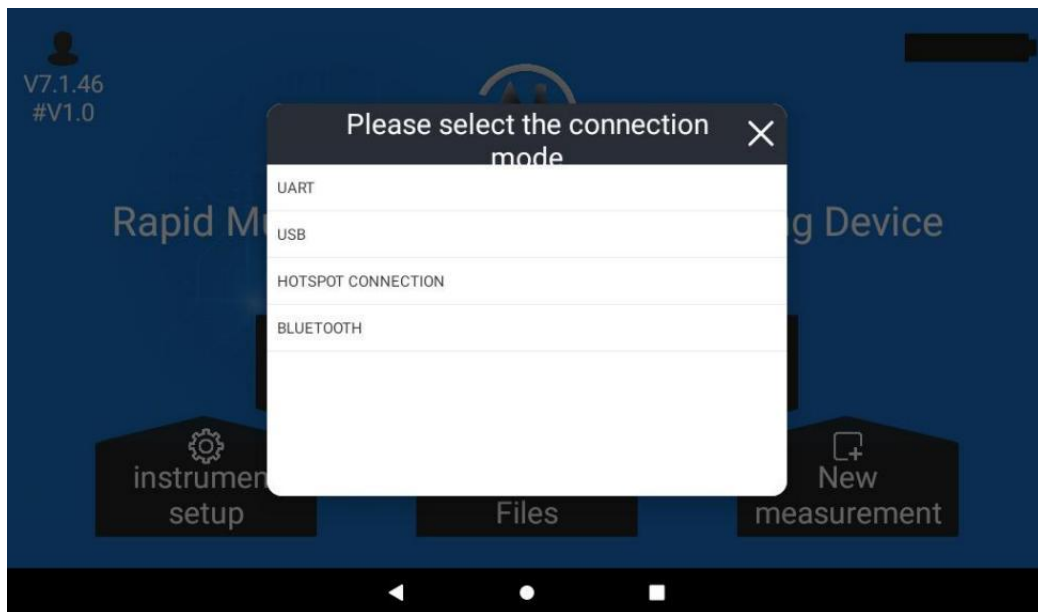


(Figure 7)

6 Connection Status and Instrument Settings

6.1 Connection Status

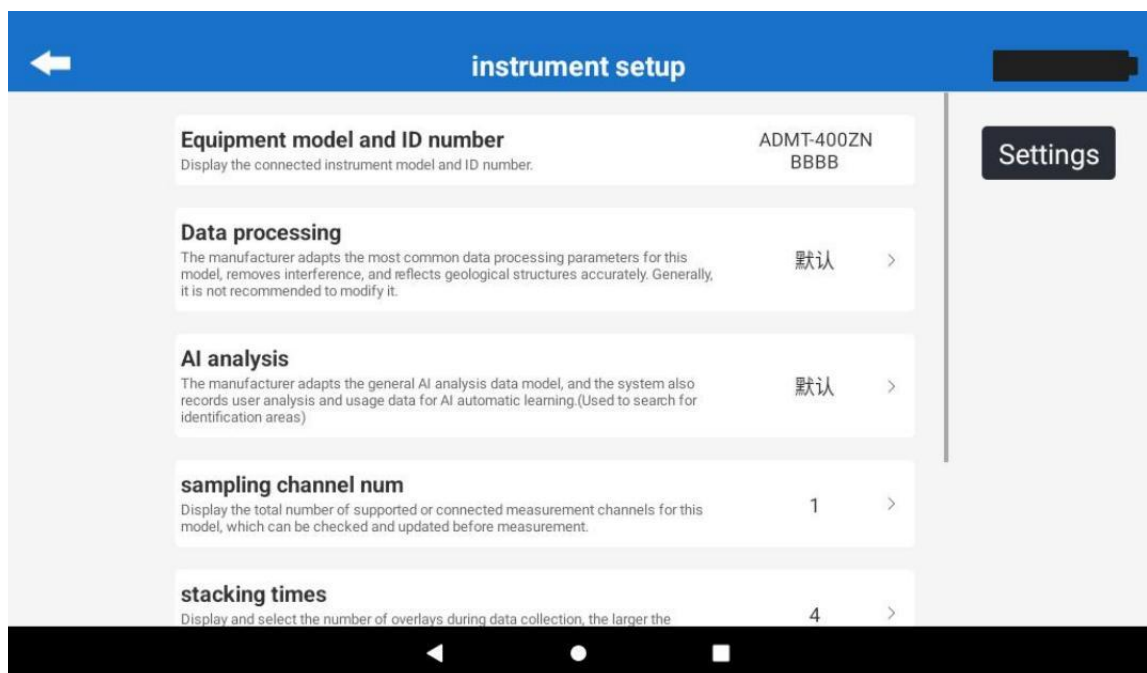
The main interface of the instrument software system has display operation menus for USB, UART, HOTSPOT CONNECTION, and BLUETOOTH. Generally, this series of instruments is "USB" by default when leaving the factory. The battery icon in the upper right corner is a solid icon, indicating that the upper and lower computers of the instrument are working properly. If the icon is hollow or the menu does not show "USB", you need to click the menu to select USB (Figure 8). The pre-installed AiduWater software in this series provides four instrument connection methods, but this series of water finder only uses "USB", and other connection modes are invalid. Please confirm whether the connection method is set to "USB" when using.



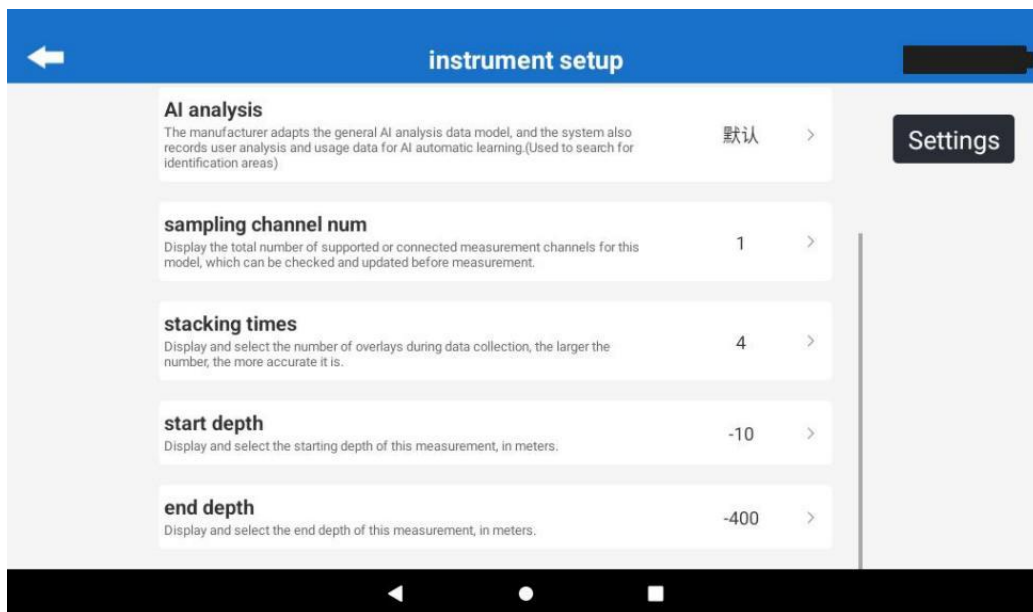
(Figure 8)

6.2 Instrument settings

Open the "instrument setup" menu and display parameter Settings interfaces such as device model and ID number, data processing, AI analysis, number of sampling channels, stacking times, start depth, end depth, etc. on the instrument setup page (Figures 9, 10). The device model and ID number do not need to be set. Just check if the displayed model matches the device model being used. The ID number is the instrument identity code and can be provided during after-sales service. If the device model or ID number is not displayed and only a red dot is shown, it indicates that the instrument connection mode is incorrect. Please go back to the main menu and set the connection mode to "USB " (Figure 8).



(Figure 9)

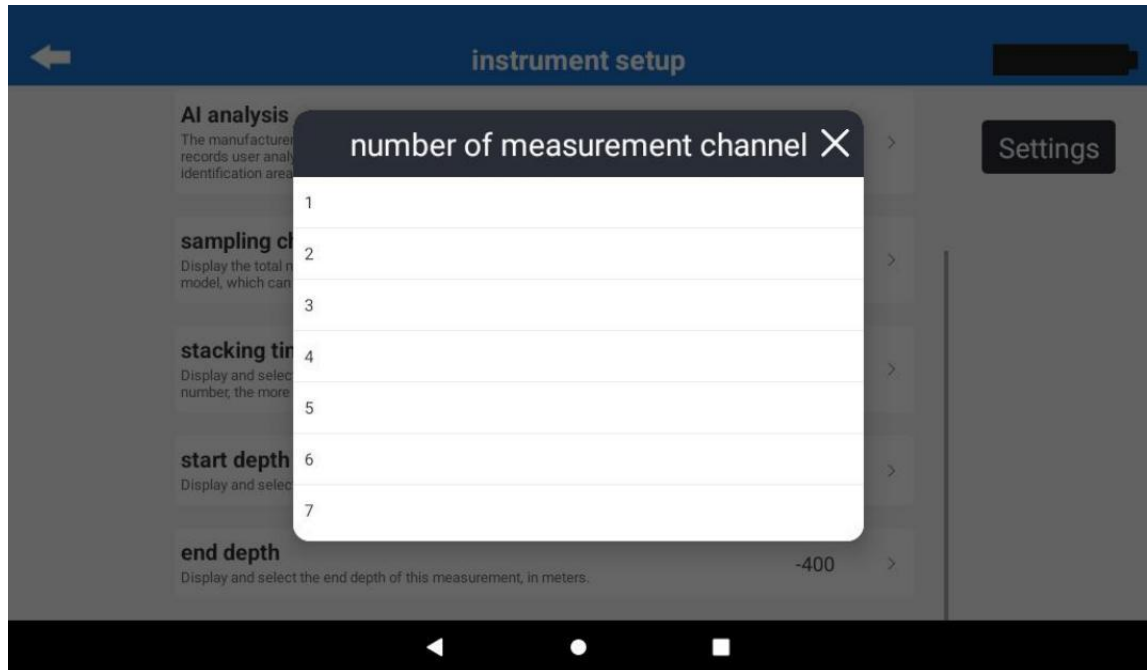


(Figure 10)

6.2.1 Unregistered login users

When the user is not registered and logged in, the device model and ID number can also be viewed. Parameters for data processing and AI analysis cannot be set, only the "default" of the local model can be used to set the number of sampling channels, overlay times, start depth, and end depth.

"sampling channel num": When setting the number of sampling channels, you need to connect in advance the maximum number of multi-stage connection cables to be used for this measurement. Each cable is 12 channels, and up to 5 cables can be connected for a total of 60 channels. [The cascade cable is optional and can be purchased when or after the instrument is purchased] Click on the number of sampling channels (Figure 11), update the channel data and select the maximum number of channels for this measurement. If the cascade cable is not connected, it can only be 1.



(Figure 11)

Stacking Times: 1 to 100 overlays, default 5. The more Settings there are, the higher the accuracy, but the longer the measurement time.

Start Depth: You can set the start depth of the measurement, and the start depth cannot be greater than the end depth.

End Depth: The end depth or maximum depth of the measurement can be set, and the maximum depth varies depending on the model.

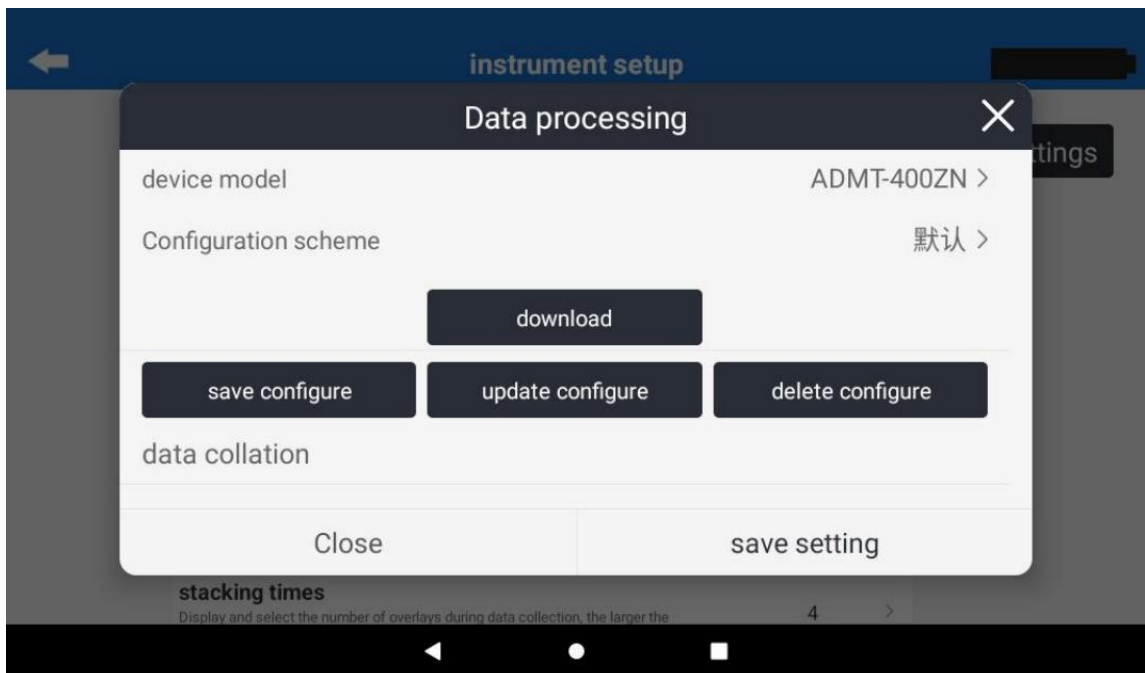
Once the Settings are complete, click Settings to finish this setting, and you will be prompted to jump to the new measurement function.

6.2.2 Registered and logged-in users

Registered and logged-in users, in addition to enjoying the relevant Settings for unregistered and logged-in users (refer to 6.2.1 for Settings), can also update synchronization and customize the internal parameters of "data processing" and "AI analysis". Note: The

following operations are valid only when connected to the Internet.

The steps for setting the "data processing" parameter are as follows: Click "data Processing" to enter the parameter setting interface (Figure 12), which shows the device model, configuration scheme, synchronization parameter, add scheme, modify scheme, delete scheme, etc. You can save the Settings or turn them off without saving.



(Figure 12)

Device model: Display the local device model and check if it matches the device in use;

Configuration scheme: There are default, user-defined configuration options under this account to choose from, and if custom parameters are available, refer to the addition options below;

download: You can synchronously download the default product parameters and the custom configuration under the user account, which must be effective when connected to the Internet.

Save configure: Click "save configure " to modify the Settings of parameters related to data correction, data organization, data

smoothing, likelihood resistivity inversion, etc. After setting, save the current configuration scheme to the account and select your own configuration scheme in the configuration scheme because the custom scheme will be more suitable for the user's region or user's habits. Introduction to parameter Settings:

[Data correction] is the removal of abnormal measurement point data that is too high or too low due to environmental interference or other interference during the measurement process. The larger the amplitude of the correction, the greater the fluctuation range of the corrected data. For example, if the correction amplitude is 0.2 or 0.3, the corrected data may fluctuate within 20% or 30% of the original data; The larger the correction threshold input value, the greater the deviation of the data after bad point correction. If the correction threshold is too large, the data is prone to significant deviation; If the threshold is too small, the corrected data may differ significantly from the actual data. And data correction is divided into three axes of correction: X, Y, and Z. X is the horizontal direction, usually between measurement points. Y is the vertical direction, usually depth or line direction. Z is the dimension of the overall data.

[Data collation] is the overall filtering process based on the X, Y, Z dimensions, set to 0 for no collation, set to 1 for collation, X is horizontal, generally refers to the measurement points, Y is vertical, usually depth or line direction, Z is the dimension of the overall data.

[Data Smooth] Data smoothing can reduce the peak and valley values between adjacent data, smooth the curve and lower noise, making the image effect more smooth and flowing. You can choose from 3-point, 5-point, 7-point, 3 times 5-point, 3 times 7-point and other smoothing methods according to your needs.

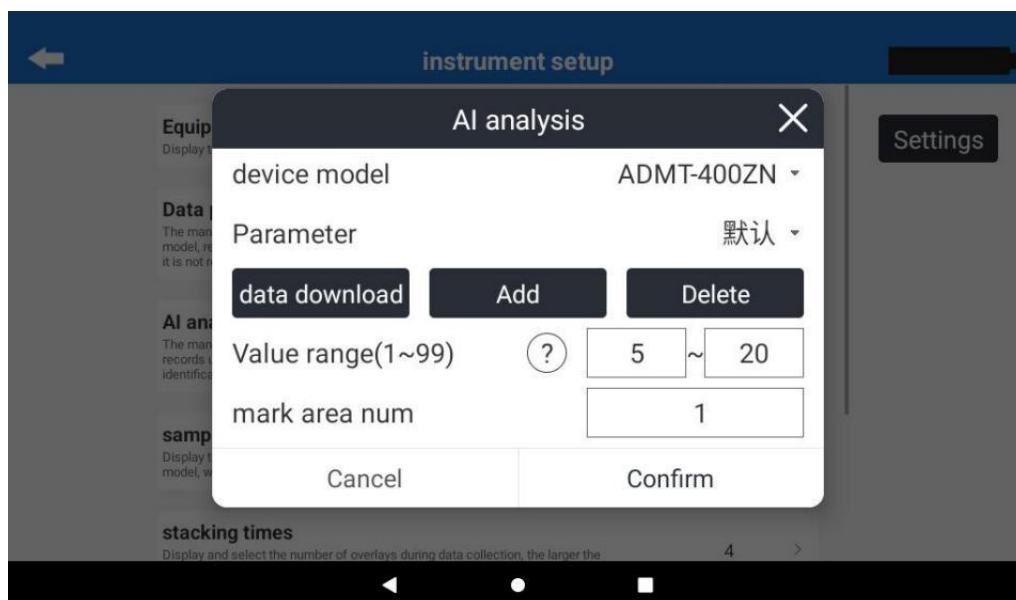
[apparent resistivity inversion] In apparent resistivity inversion,

the original data is normalized and modeled, and the original measured electric or electromagnetic values are inverted to form the ground resistivity according to a certain model algorithm. This is not the real resistivity and is similar to resistivity, so it is named "quasi-resistivity", which can also be understood as apparent resistivity. Inversion model selection is typically 0.1-0.9 model data. The larger the model value, the faster the formation resistivity changes. The model coefficient is generally set to 1, and this step is not performed when it is set to 0.

Update configure: Click "update configure " to modify the relevant parameter Settings of the current configuration scheme.

Delete configure: Clicking "delete configure" removes the custom scheme currently selected;

The steps to set the data of the model related to "AI analysis" are as follows: Click "AI Analysis" to enter the AI Analysis-related parameter Settings interface (Figure 13), and the following operations need to be performed in an online state to be effective.



(Figure 13)

Device model: Display the local device model and check if it matches the device in use;

Parameter: There are default, AI-recommended, and user-defined parameter types under this account to choose from. If you have a custom parameter type, refer to Add below.

Data download: You can simultaneously download the latest default, AI recommended, and user-defined parameter types for this model of product;

Add: Set the value range (1 to 99), which can be understood as a percentage of the apparent resistivity. Setting 5 to 20 can be understood as selecting the area where the apparent resistivity data is 5 to 20 percent of all data as the anomaly area, and the labeled area data is only marked by AI analysis as a few anomaly ranges. Set both of these data and click "Add" to complete the addition of this parameter type.

Delete: Click Delete to delete all custom parameter types under this account. Only individual groups can be deleted. Default or AI recommended system parameter types cannot be deleted.

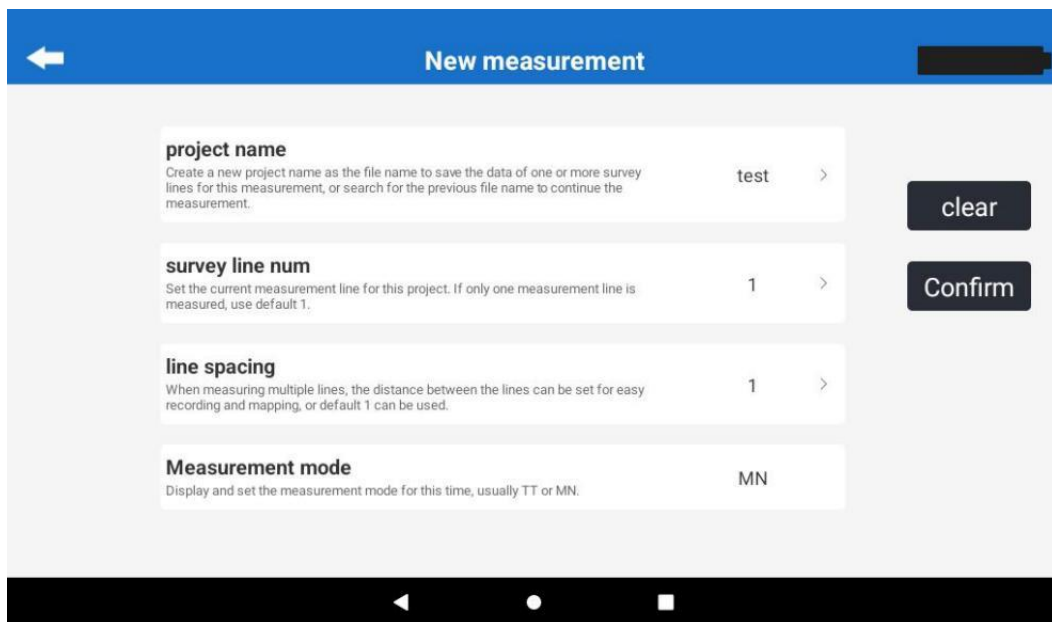
Confirm: Click Confirm to complete this setup;

Cancel: Click Cancel to abandon this setting;

7 New Measurement

Select and click "New Measurement" or the menu that prompts you to enter "New Measurement" after the instrument setup is complete In the "New Measurement" menu, you can set the relevant parameters for this sampling measurement, such as the new item, the number of measurement lines, the line spacing, and the measurement mode (Figure 14). Note: Do not enter the "New Measurement" page if the instrument is not properly connected or connected incorrectly.

Create a new project: Clicking on "project name" will enter a text input box. You can enter a project name in either Chinese, English or numbers. This project name is used to store the data files of this survey area or this time. You can also click "Select Project" to find a previously set project for a make-up test. When conducting a make-up test, the relevant parameters in the instrument Settings should be consistent with the previous file. Note: Symbol input is not supported for item names.



(Figure 14)

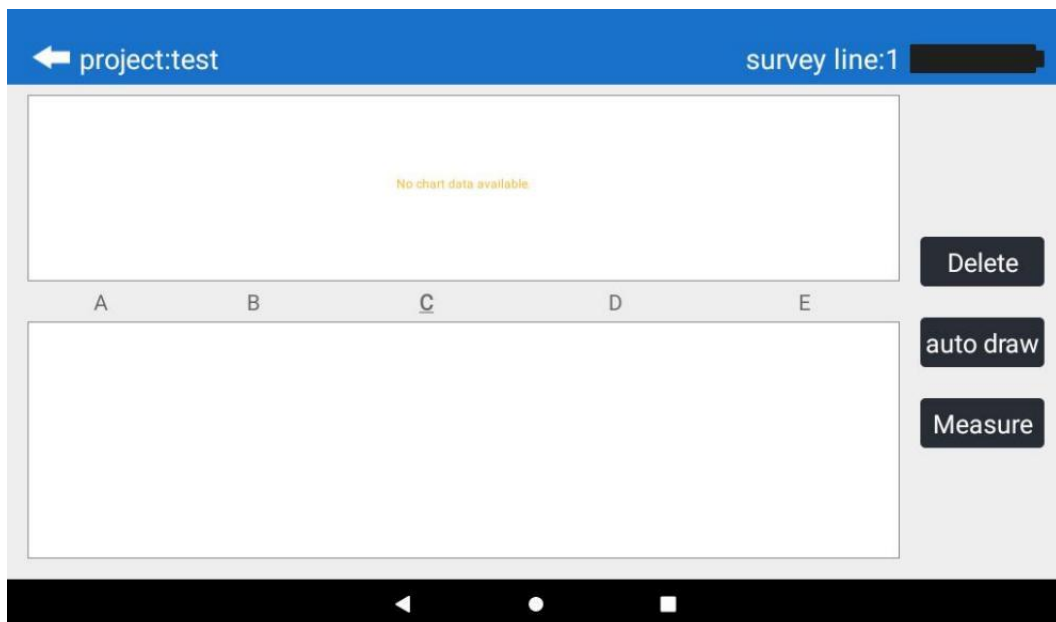
Which line: You can set the current measurement to which line. The instrument supports measuring multiple lines under the same project name to construct a survey area. The project name of the survey area is convenient for data file saving and supports 3D plotting when automatically plotting later. If the new project is only used as a single line and not as a survey area file, it can be omitted and the default 1 can be used.

Line spacing: What is the distance between multiple lines in the survey area, usually in meters. If only by number or the project file is just a single line file, it can be left unset and use the default

1.

Measurement mode: Generally MN or TT mode. Here it is the confirmation and view measurement mode, which cannot be set. The default display is "MN". If an electromagnetic sensor (probe) is connected, first set the "sampling channel number" to update the channel number, and then the system will automatically identify the measurement mode. When using the continuous measurement line, it will be automatically recognized as "MN", and when using the continuous probe, it will be "TT".

Click "Confirm" to enter the measurement page (Figure 15).

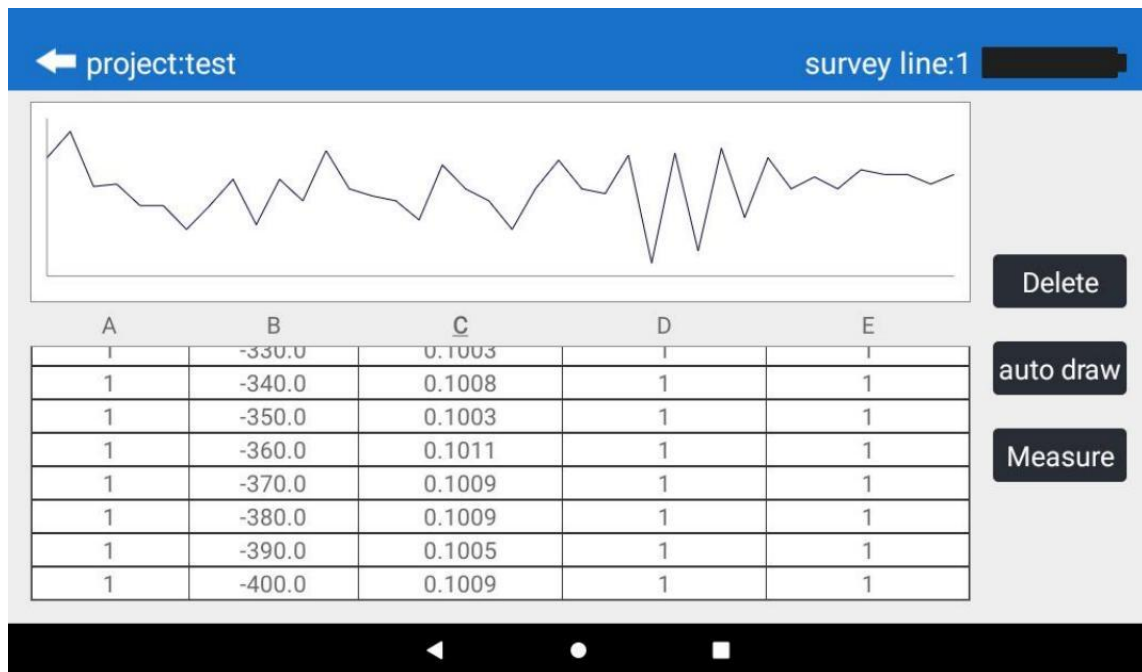


(Figure 15)

Measurement Sampling: Click "Measure" to enter measurement sampling. The system will first perform channel detection, which is automatically completed by the system. When the detection is completed, a pop-up window will prompt that the detection is completed. Click "Confirm" to display the connection status of all channels. Blue indicates that the channel connection is normal and can be measured normally. Red indicates that there is a measurement break or abnormal

connection in the channel. You need to check if the channel cable is properly connected, check if the grounding electrode is in good condition and then test the channel again, or manually confirm that there is no abnormal condition and then click "Continue Measurement" to enter measurement sampling.

After completing this measurement sampling, A line graph of the current measurement results will be displayed, with data shown below, where A, B, C, D, and E represent the measurement point number, measurement depth, apparent resistivity, current channel number, and total channel number respectively (Figure 16).

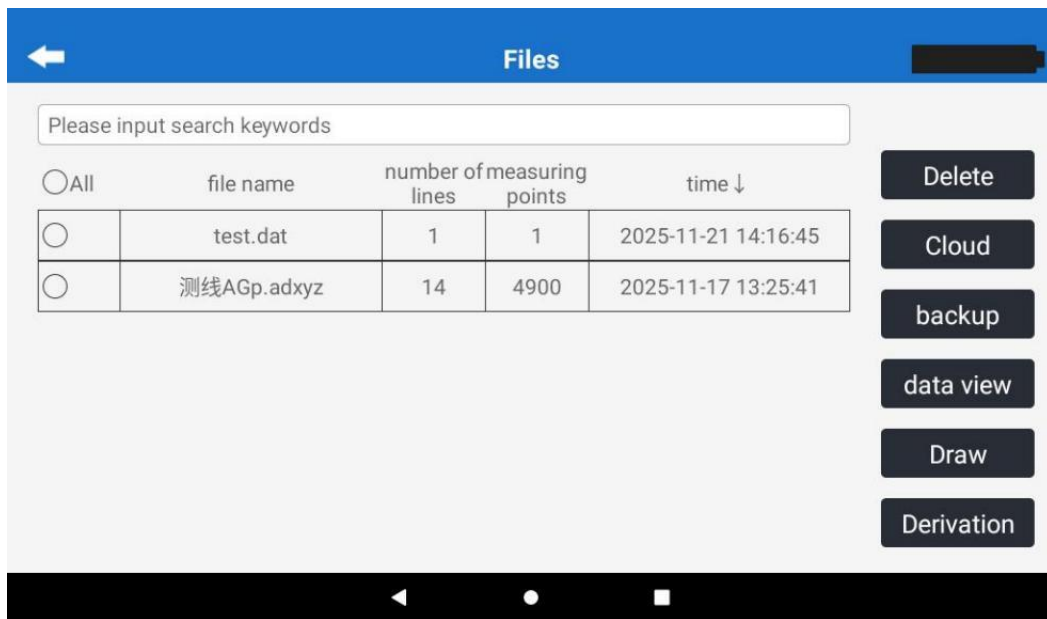


(Figure 16)

After completing the measurement, you can click "Auto-Draw" to enter the drawing page. (Refer to Article 9 Plotting)

8 File Browsing

Click "Files" on the main interface of the instrument to enter the file browsing interface. The left side shows the data measured by this instrument or the data synchronized under this user account, with functions such as deletion, cloud, backup, view, plotting, export, etc. (Figure 17).



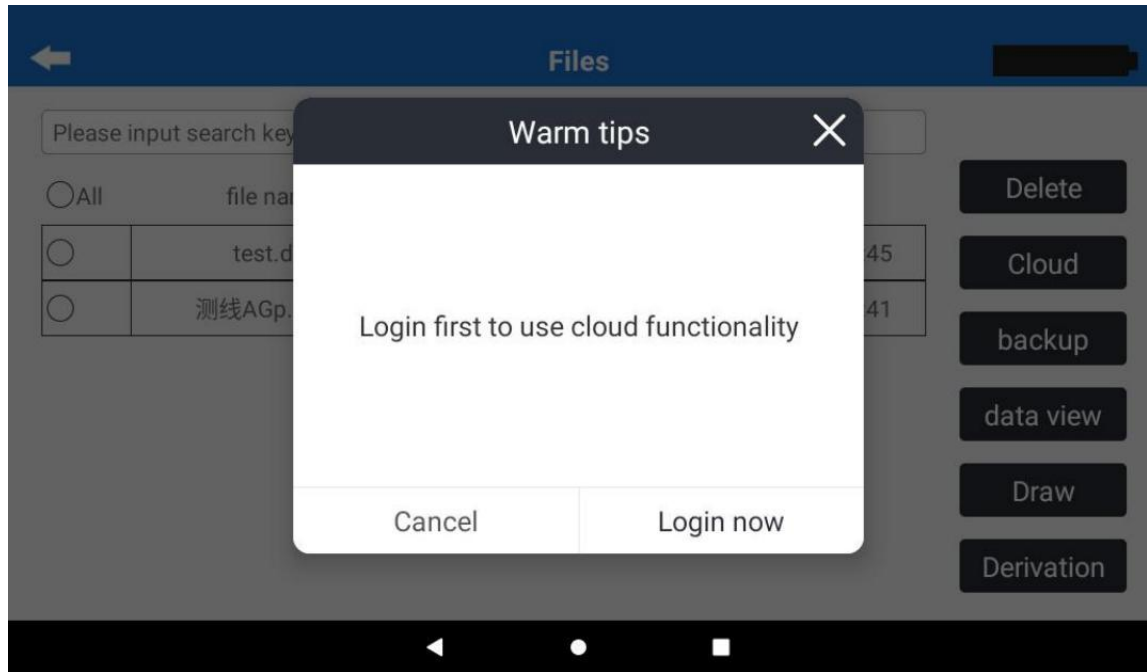
(Figure 17)

8.1 Unregistered login users

Unregistered logged-in users can use delete, view, draw, and export features, while cloud and backup require registered logged-in users with an Internet connection;

Delete: Select a project file and click Delete to delete the file.

Cloud, Backup: Unregistered and unlogged users clicking on "Cloud" and "Backup" will prompt the system to enter the user registration and login interface (Figure 18) to prompt the user to enter registration and login. For specific registration and login, refer to the relevant operations in Article 5.



(Figure 18)

Data view: Select a project file and click View to delete and open the file to view the file data;

Draw: Select a project file and click Drawing to automatically draw O2D, N2D, AI, LG, 3D, and perform AI automatic analysis. (Refer to the instructions for drawing in Article 9 for details)

Derivation: Some of the company 's instrument data can be exported. There is no Android touchscreen, but Bluetooth export function is available. Please refer to the product manual for details.

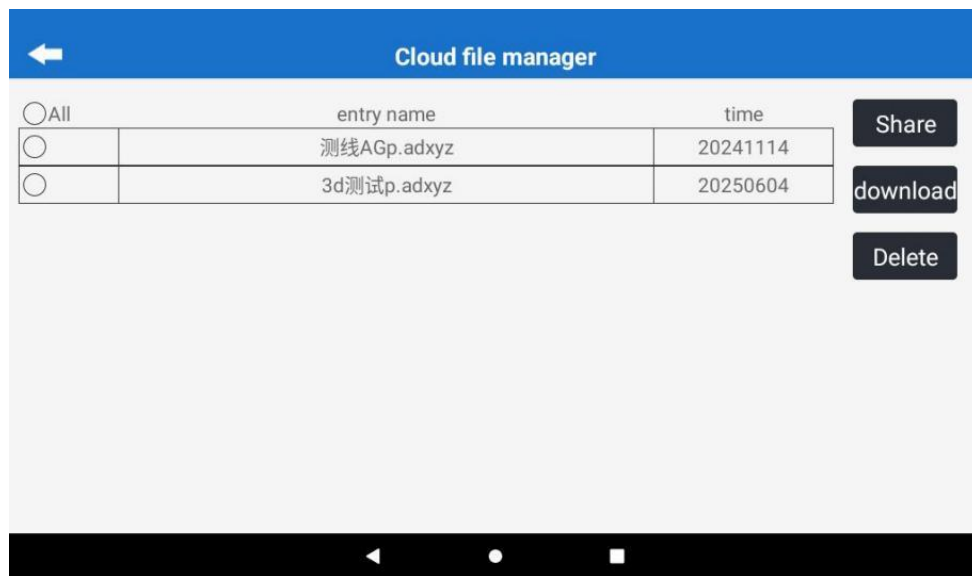
8.2 Registered logged-in user

Registered logged-in users have access to all features, including delete, view, draw, and export, as well as cloud and backup, provided they have an Internet connection.

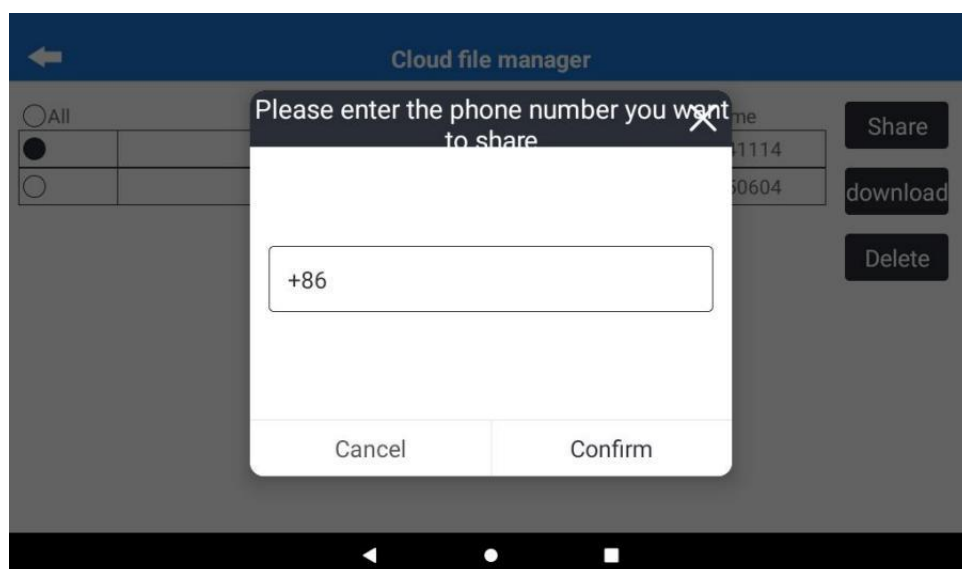
Clicking on "Cloud" leads to the cloud operation interface (Figure 19), where you can share, download and delete cloud-related data files. Share: Click "Share" to enter the file sharing interface (Figure 20), enter the mobile phone number of the user you want to share, and you

can share with other users of the unit, friends, and other registered users with mobile phone numbers. [The software system only defaults to +86 for Chinese area codes. For other maps, please refer to this and add an international area code before your phone number]

Users of other mobile phone numbers can log in to the PC or mobile APP software and click "Download" to download the shared data file and perform other related operations.



(Figure 19)



(Figure 20)

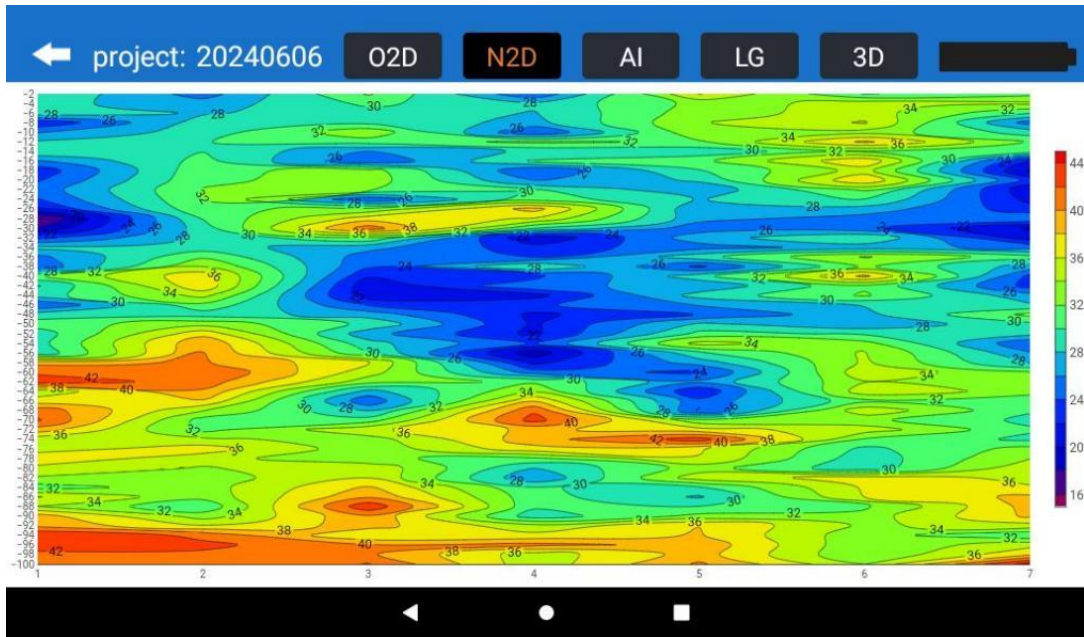
Download: Click "download" to connect to the Internet to check the data saved in the cloud under this account, and select the data file you want to download to your local device. The download operation may not succeed if there is an abnormal login or network issue.

Delete: Select the name of the file you want to delete, click Delete and it will prompt "Confirm to delete the selected file? Once deleted, it cannot be restored. Click "Confirm" to confirm the deletion, and click "Cancel" to cancel the deletion.

Backup: Click "Back Up" for example - back up data to the cloud and "View" - view the data of the selected file.

9 Plot

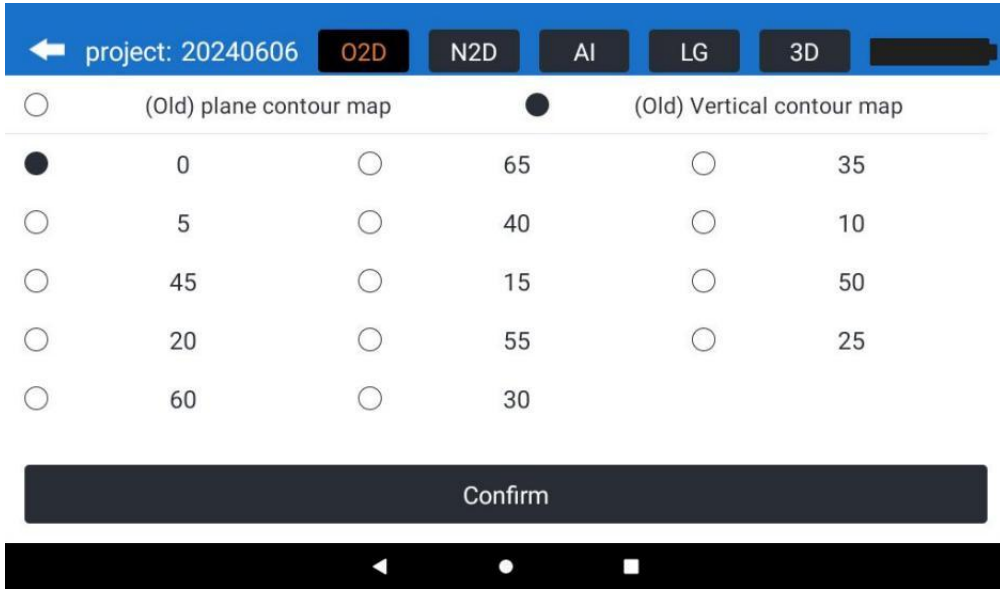
After the measurement is completed, you can enter the drawing function through "Auto Drawing" on the measurement interface, or you can enter File browsing in the main interface of the instrument, select the corresponding file to enter the "Draw" function. For the first time entering the drawing function, the default is the new version of the vertical contour map of "N2D" (Figure 21), and you can switch O2D, N2D, AI, LG, 3D to draw other renderings. "O2D" is for the old version of the contour map, "N2D" is for the new version of the contour map, "AI" is for AI auto-analysis, "LG" is for curve graphs, and "3D" can draw 3D renderings. Both "O2D" and "N2D" contour maps can be switched to draw vertical contour maps or planar contour maps by clicking the button, and "3D" can be switched to select 3D maps or 3D slice maps, but these three types of graphics switch data files as survey area project files containing data of three or more survey lines.



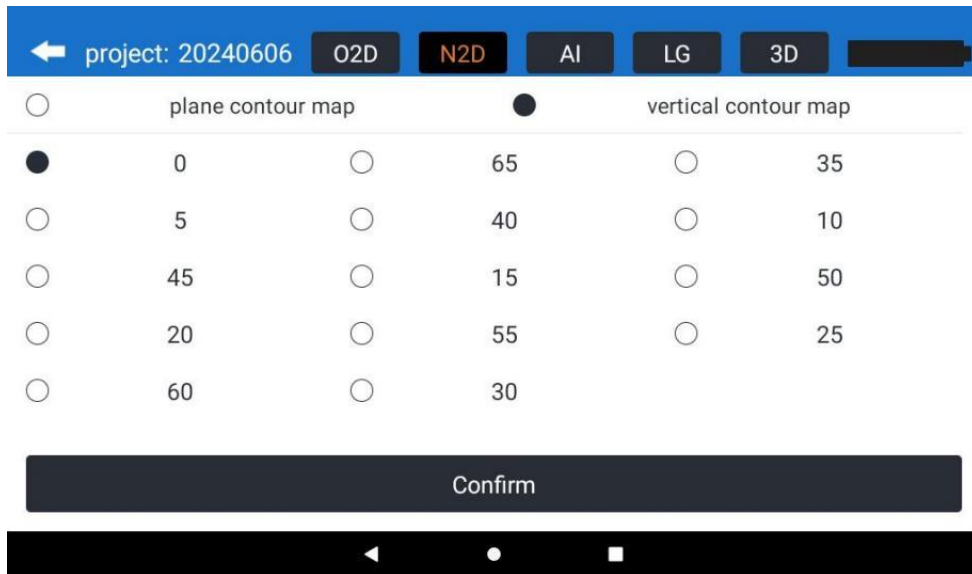
(Figure 21)

The method to switch the contour map in the old version of "O2D" was: after clicking "O2D", the system would pop up a switch dialog box for planar and vertical contour (Figure 22); The new version of the "N2D" contour map switches as follows: After clicking "N2D", the system pops up a dialog box for switching between planar and vertical equivalents (Figure 23).

When selecting the vertical contour map, multiple line numbers under the project file will be listed for selecting a certain line to create the vertical profile effect. When selecting the planar contour map, multiple depth data under the project file will be listed for selecting data of the same depth each for creating the planar profile effect.



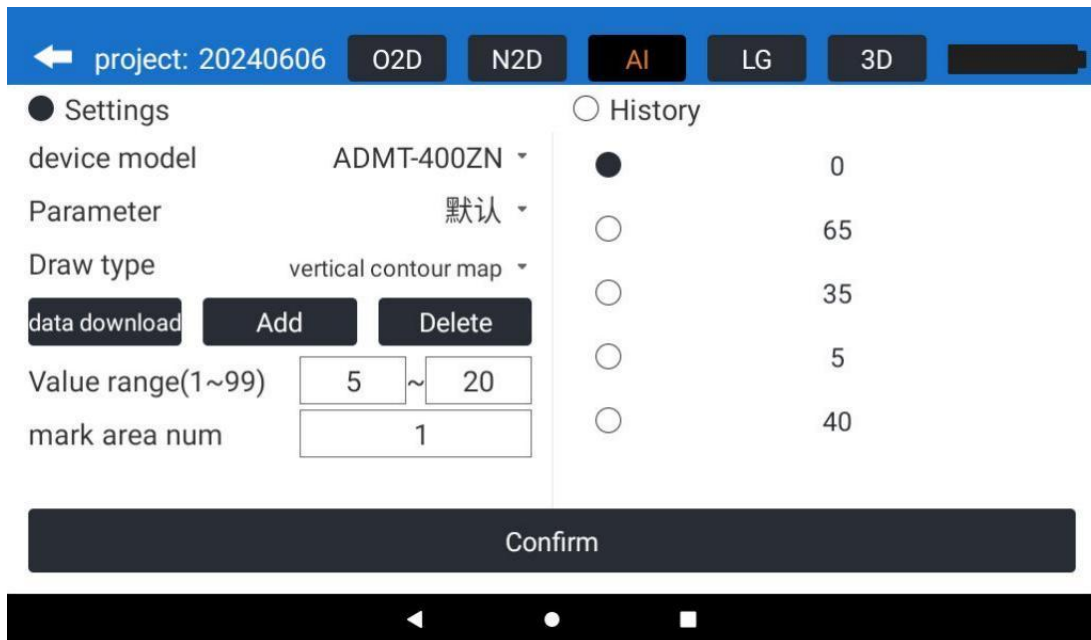
(Figure 22)



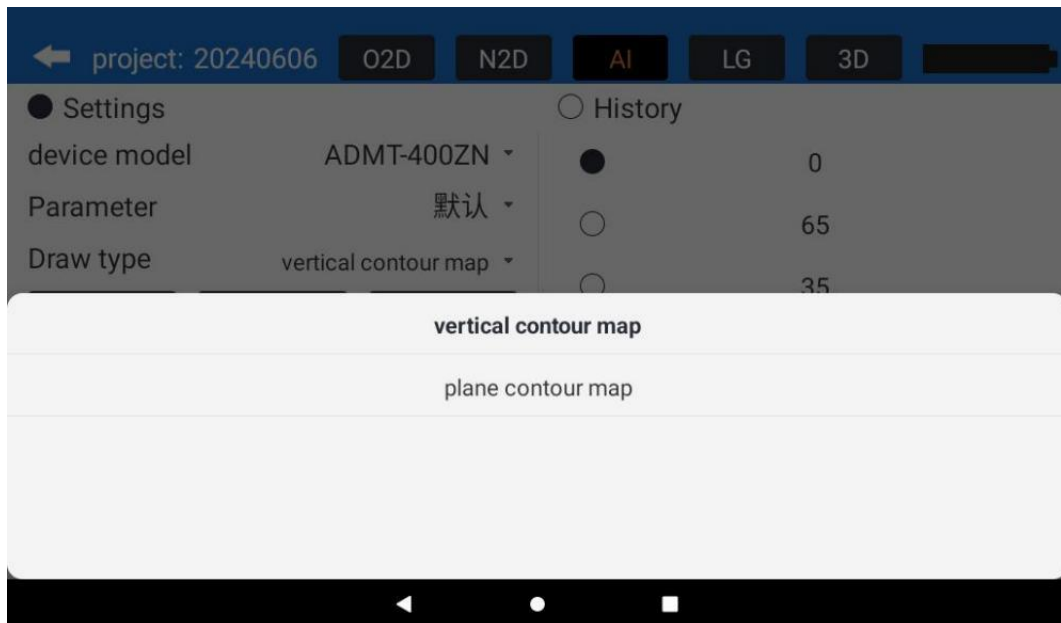
(Figure 23)

AI Analysis: Click "AI" to enter the AI Analysis function (Figure 24), the front part shows the AI analysis parameter Settings. [If the Settings are abnormal, please complete the Settings again. The Settings method can be referred to AI Analysis Settings in 6.2.2.] If the Settings are normal, select whether you want to analyze the vertical profile or the planar profile (Figure 25), which of the lines is the vertical or

which is the plane at the same depth.



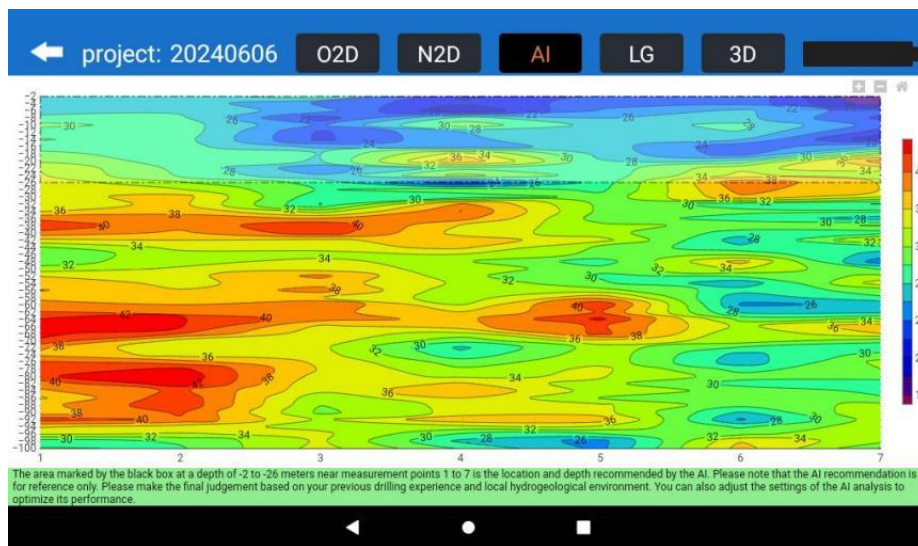
(Figure 24)



(Figure 25)

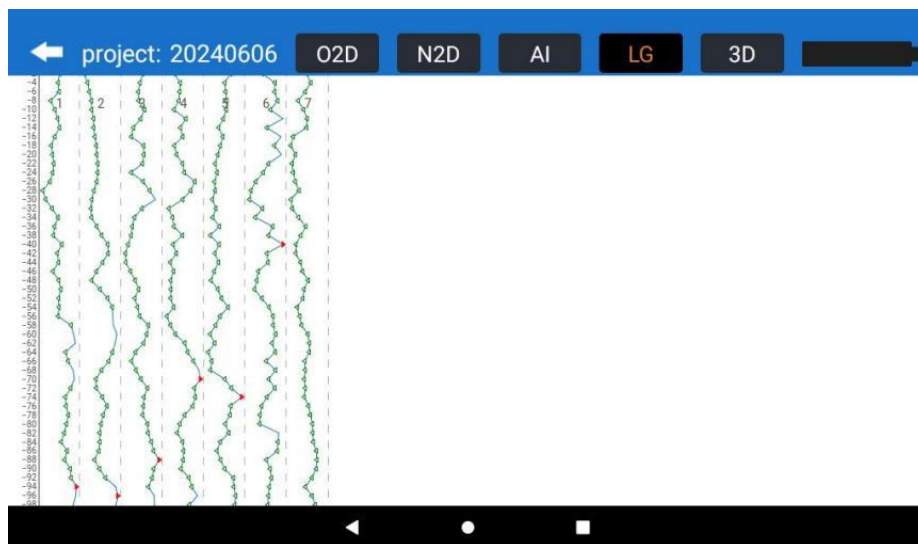
If a vertical profile of a certain survey line in the survey area file is selected for AI automatic analysis, the analysis results will be indicated in text below the graph after the analysis is completed (Figure 26), and the AI analysis area will also be marked.

Selecting History will load data that has undergone AI analysis in the past.



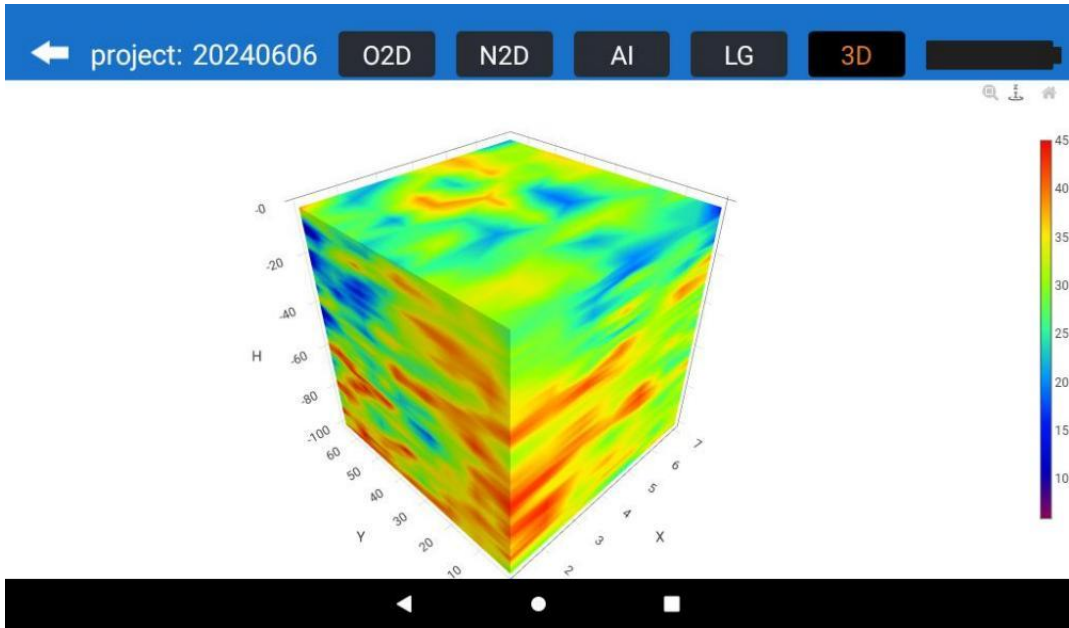
(Figure 26)

Curve Graph: Click "LG" to draw the curve graph, and you also need to select either the planar curve graph or the vertical curve graph;

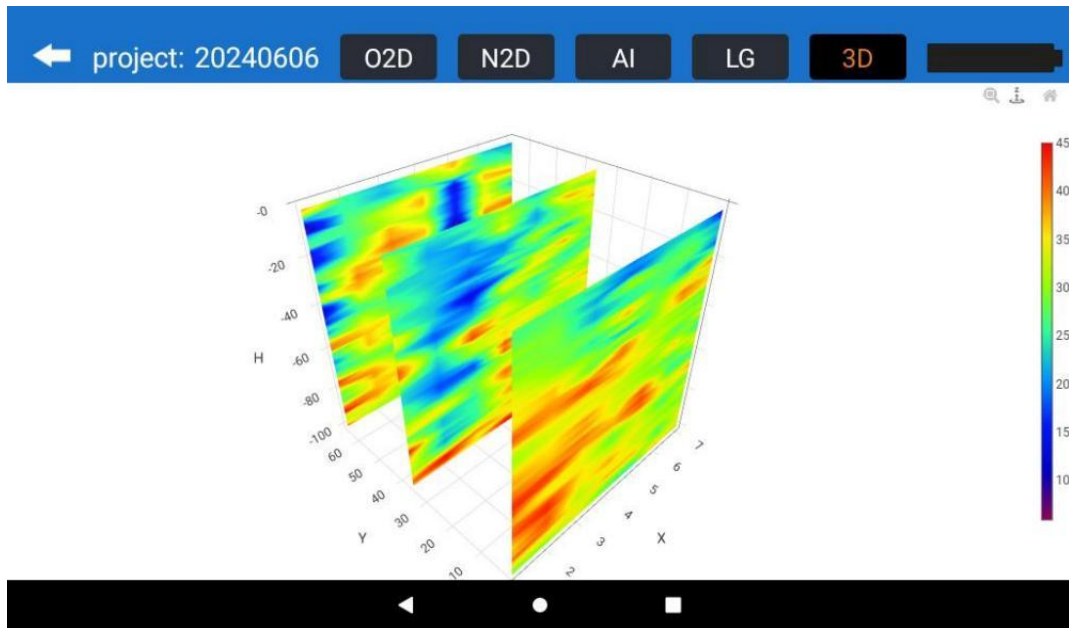


(Figure 27)

3D map: "3D" is a 3D contour map. You can choose either a 3D map (Figure 28) or a 3D slice map (Figure 29). In a 3D slice map, you need to choose to slice based on depth measurement or line measurement or point measurement increment.

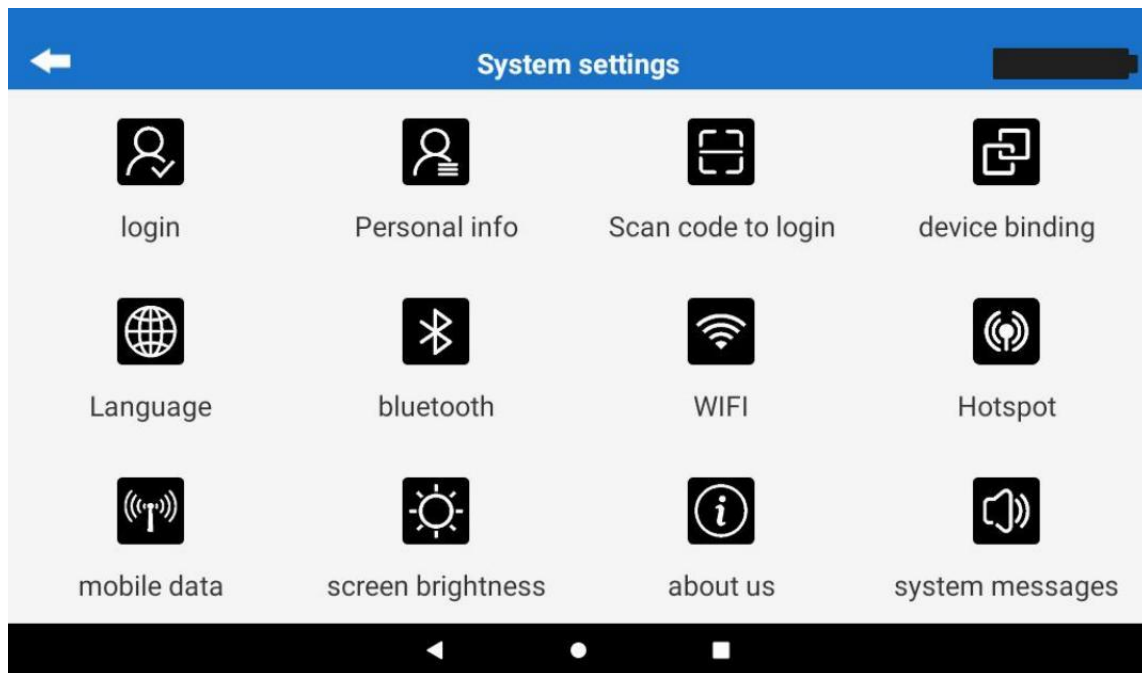


(Figure 28)



(Figure 29)

10 System settings



(Figure 30)

The system Settings page includes user login (logout), personal information, scan login, device binding, language, Bluetooth, WIFI, hotspot, mobile data, screen brightness, About Us, system messages, etc.

User Login (logout): Log in or log out;

Personal Information: Personal account information that can be logged out or modified;

Scan to log in: Scan to log in to the web-based Aidu Data Management system and perform related operations such as graph analysis on the WEB page;

Device binding: The device information bound under the account can be added or unbound;

Language: Can switch between English, French, Russian, Korean and more than ten other languages;

Bluetooth: Turn on system Bluetooth; WIFI: Turn on system WiFi connection;

Hotspot: Open a system hotspot or hotspot connection;

Mobile Data: To turn mobile data on and off, the model must support mobile data and an optional data card is required; Screen brightness: Adjust the screen brightness;

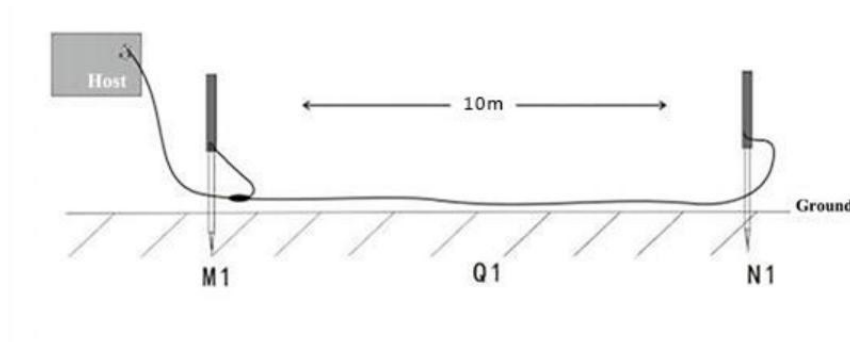
About Us: Software updates can be checked (Internet connection required), user agreement and privacy protection policy can be consulted;

System Message: Under development;

11 Instrument field connection method

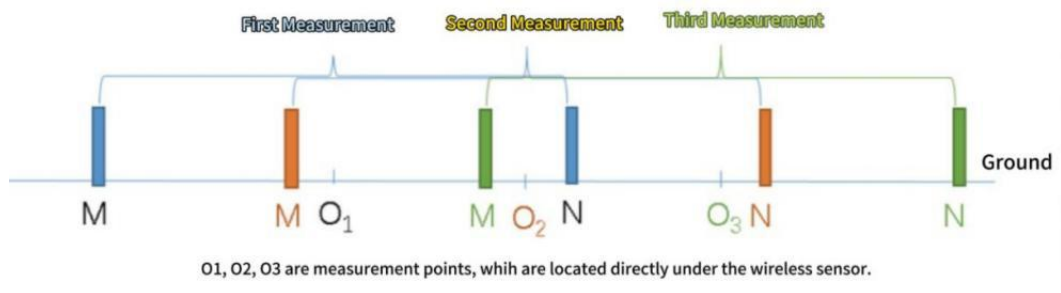
11.1 Single Channel Connection

11.1.1 Wired Electrode Connection Mode



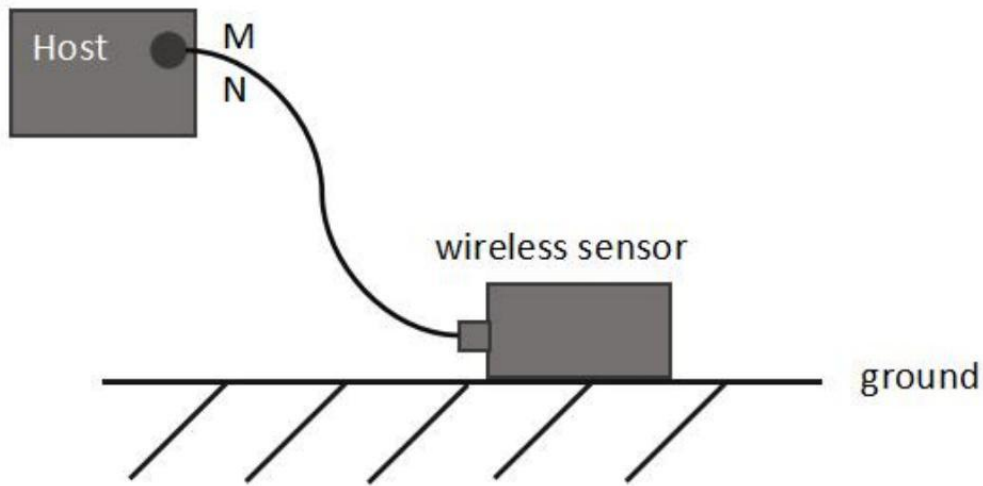
(Figure 31)

After the instrument is turned on, connect the instrument as shown above (Figure 31), insert the M and N measurement electrodes into the ground, and start sampling. The measurement point is at the center of the two M and N electrode rods. Click "Measure" at the first measurement point to complete the instrument collection and display the collected data at that point. Then move the M and N electrodes in the same direction at a certain point distance to the second measurement point and click "Measure" again to sample and measure at the second measurement point (Figure 32). And so on, until the entire profile measurement is completed.



(Figure 32)

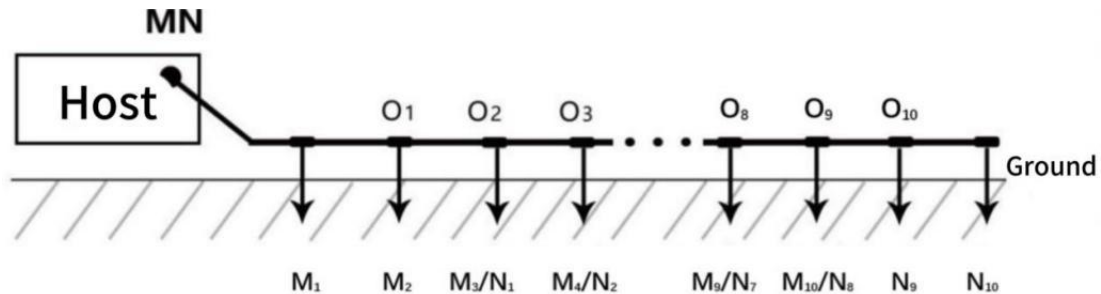
11.1.2 Wied Magnetic Sensor Connection Method (optional)



(Figure 33)

After the instrument is turned on, connect the instrument as shown above (Figure 33), place the sensor flat on the ground, click "Measure" to start sampling, and the measurement point is directly below the sensor. There is no requirement for the orientation of the sensors, but the orientation of the sensors at each measurement point on a measurement line must be consistent. After the instrument prompts that the measurement at this point is completed, move the sensor in the same direction at a certain point distance to the second measurement point position, and then click "Measure" again to sample and measure at the second measurement point. And so on, until the entire profile measurement is completed.

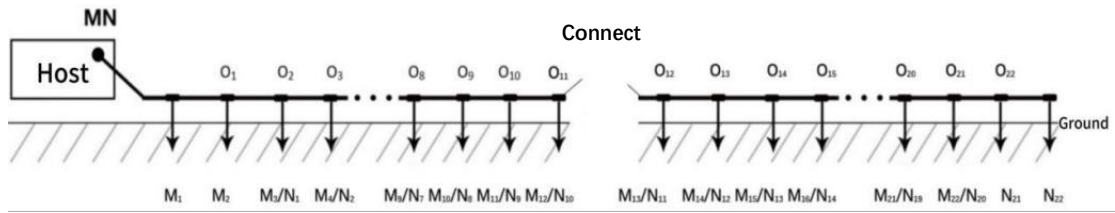
11.2 12 Channel Instrument Connection Mode



(Figure 34)

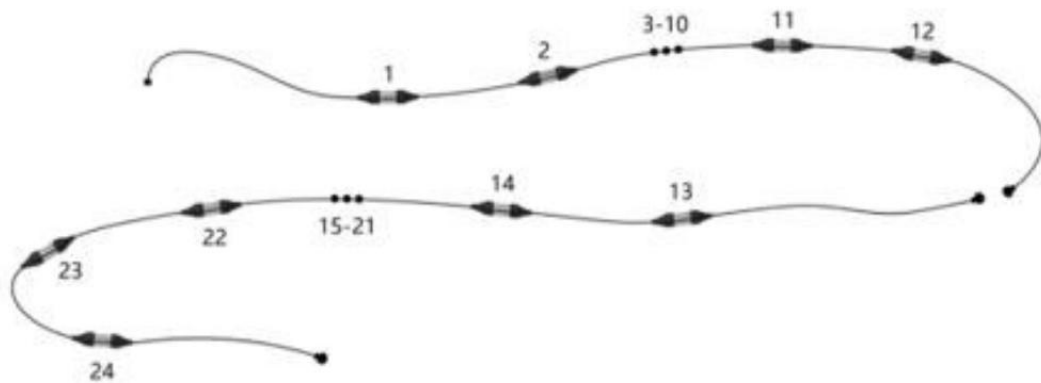
After the instrument is turned on, connect the instrument as shown above (Figure 34), lay out the measuring cable along the direction of the measuring line, insert the electrode into the ground, and connect the electrode to the measuring cable through the metal retaining ring. You can start sampling when it is ready. The 12-channel instrument can collect data from 10 measurement points in one measurement. The measurement points are the center points of the MN electrode, that is, the second electrode is the position of the first measurement point, the third electrode is the position of the second measurement point, and so on, and the last measurement point is at the penultimate electrode. After the measurement is completed, the second profile can be sampled and measured. And so on, until the entire profile measurement is completed.

11.3 24 Channel Instrument Connection Mode



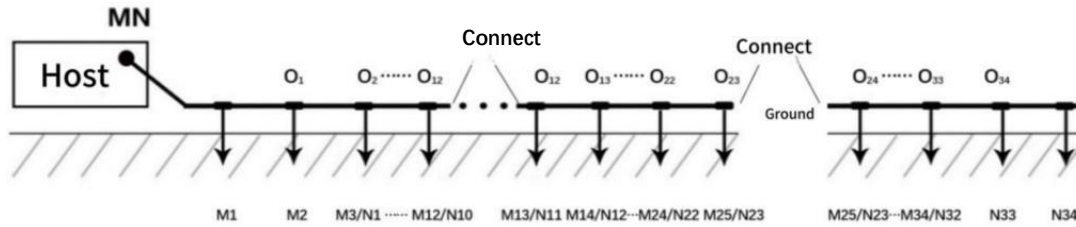
(Figure 35)

Connect the two 12-channel measurement cables together, spread them out along the direction of the measurement lines, place the instrument on a section of the cable with a navigation plug-in interface, insert the electrodes into the ground, and connect the electrodes to the measurement cables through metal clamps (FIG. 35, FIG. 36). When ready, start the sampling. The 24-channel instrument can collect data from 22 measurement points simultaneously in one measurement; The measurement point is the midpoint of the MN electrode, that is, the second electrode is the position of the first measurement point, the third electrode is the position of the second measurement point, and so on, the last measurement point is at the penultimate electrode. After the measurement is completed, the second profile can be sampled and measured, and so on, until the entire profile measurement is completed.



(Figure 36)

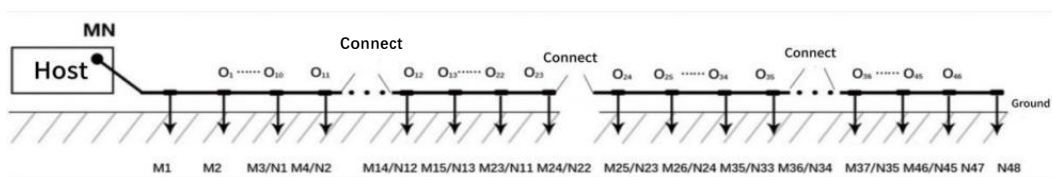
11.4 36 Channel Instrument Connection Mode



(Figure 37)

Connect three 12-channel measurement cables together, spread them out along the direction of the measurement lines, place the instrument on a section of the cable with a navigation plug-in interface, insert the electrodes into the ground, and connect the electrodes to the measurement cables through metal clamps (Figure 37). When ready, start the sampling. The 36-channel instrument can collect data from 34 measurement points simultaneously in one measurement; The measurement point is the midpoint of the MN electrode, that is, the second electrode is the position of the first measurement point, the third electrode is the position of the second measurement point, and so on, the last measurement point is at the penultimate electrode. After the measurement is completed, the second profile can be sampled and measured, and so on, until the entire profile measurement is completed.

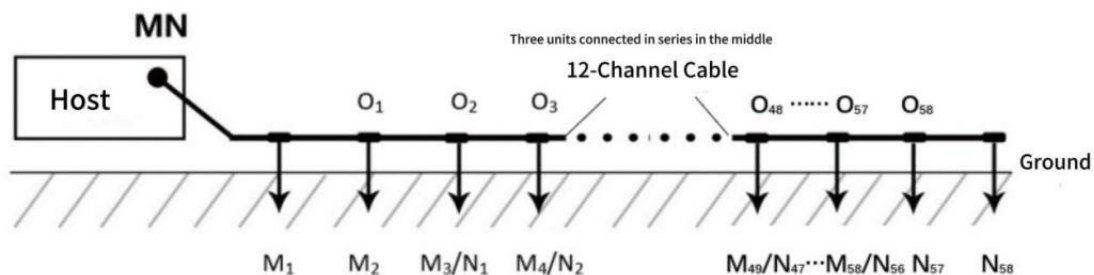
11.5 48 Channel Instrument Connection Mode



(Figure 38)

Connect four 12-channel measuring cables together and spread them out along the direction of the measuring lines. Place the instrument on the section of the cable with the navigation plug-in interface, insert the electrodes into the ground, and connect the electrodes to the measuring cables through metal clips (Figure 38). When ready, start the sampling. The 48-channel instrument can collect data from 46 measurement points simultaneously in one measurement; The measurement point is the midpoint of the MN electrode, that is, the second electrode is the position of the first measurement point, the third electrode is the position of the second measurement point, and so on, the last measurement point is at the penultimate electrode. After the measurement is completed, the second profile can be sampled and measured, and so on, until the entire profile measurement is completed.

11.6 60 Channel Instrument Connection Mode

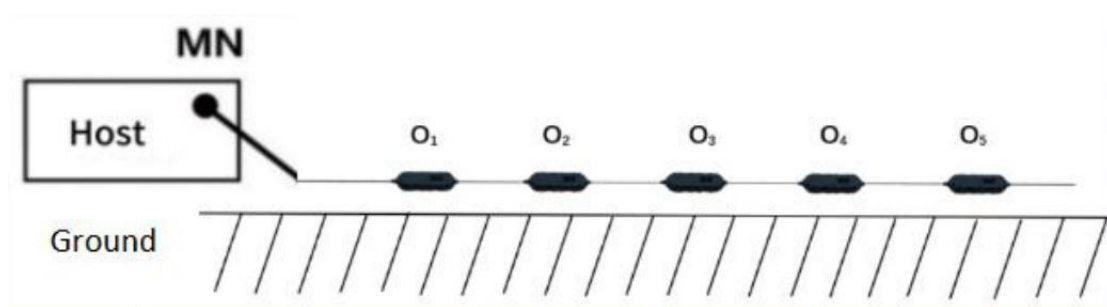


(Figure 39)

Connect five 12-channel measurement cables together, spread them out along the direction of the measurement lines, place the instrument on a section of the cable with a navigation plug-in interface, insert the electrodes into the ground, and connect the electrodes to the measurement cables through metal clamps (Figure 39). When ready, start sampling. The 60-channel instrument can collect data from 58 measurement points simultaneously in one measurement; The measurement

point is the midpoint of the MN electrode, that is, the second electrode is the position of the first measurement point, the third electrode is the position of the second measurement point, and so on, the last measurement point is at the penultimate electrode. After the measurement is completed, the second profile can be sampled and measured, and so on, until the entire profile measurement is completed.

11.7 Connection method of multiple wired electromagnetic probes



(Figure 40)

After the instrument is turned on, connect the instrument as shown above (Figure 40 shows 5 sensors), spread out along the measurement line direction, place the instrument on the section of the cable with the air plug interface, and place the electromagnetic sensor at the corresponding 0 point. You can start sampling when it is ready.

Instruments using high-density cascade electromagnetic sensors can collect data from multiple measurement points simultaneously. (1 channel 1 measurement point)

Type of high-density cascaded electromagnetic sensor

AD-5D2.5H1-6P	5 channels, sensor 2.5 meter spacing H1 probe
AD-5D5H1-6P	5 channels, sensor 5 meter spacing H1 probe
AD-10D2.5H1-6P	10 channels, sensor 2.5 meter spacing H1 probe
AD-10D5H1-6P	10 channels, sensor 5 meter spacing H1 probe

The measurement points are located directly below the sensors, that is, the first sensor is the position of the first measurement point, the second sensor is the position of the second measurement point, and so on, the last measurement point is at the position of the last sensor. After the measurement is completed, the position can be quickly changed for a second profile sampling measurement, and so on, until the entire profile measurement is completed.

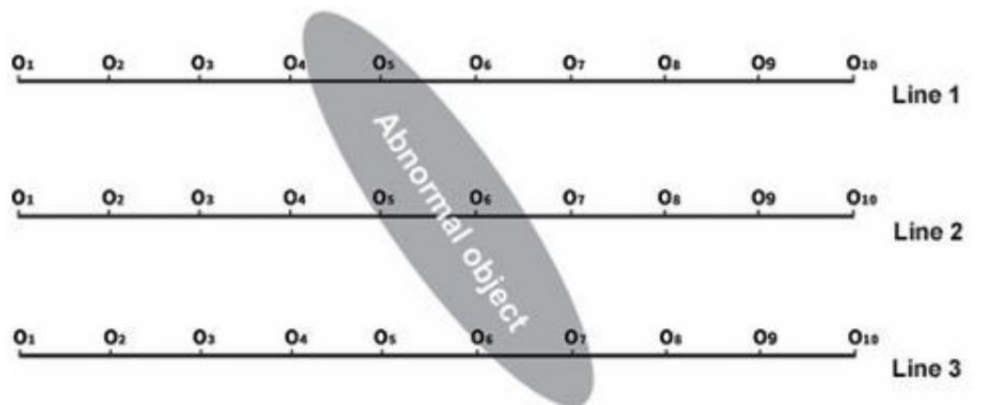
12 Method for Setting Up Field Survey Lines

The layout of the survey line is a very important part of exploration. The quality of the layout of the survey line will directly affect the measurement accuracy and the improvement of the anti-interference ability. The basic principle is that the direction of the survey line should be as perpendicular as possible to the direction of the exploration target body, the straight profile should be as straight as possible, the circular profile should be as round as possible, and the ground should be as flat as possible. Choose different mapping methods based on the actual topography and landforms.

12.1 Parallel layout of linear profiles

The linear profile is the most commonly used layout method, and a multi-linear profile is formed by multiple parallel linear profiles, which can quickly determine the direction of the exploration target. First, assume and determine the direction of the exploration target and lay out the survey lines perpendicularly to the direction of the exploration target (Figure 41). One or more linear profiles can be laid out. Generally, 2-3 survey lines can be laid out to quickly identify the direction of the object. Multiple linear profiles are laid out according to the length of the exploration target. The direct

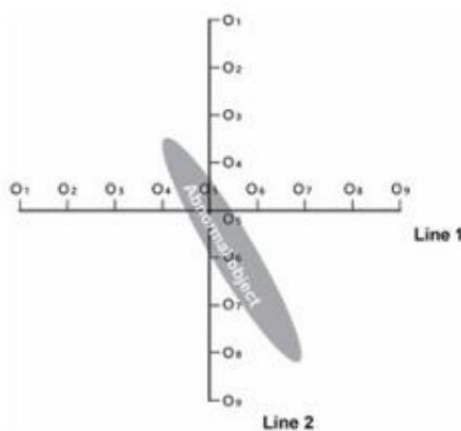
distance between each linear profile is called the line distance, which is generally \leq the length of the exploration target. The unit is meters.



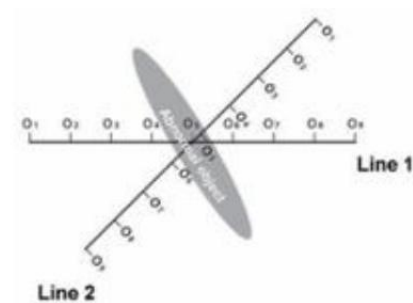
(Figure 41)

12.2 The method of laying out in a cross pattern or diagonal pattern along a straight line section

When an anomaly is found after measuring one linear profile or when the site is limited and it is difficult to set up multiple linear profiles, a cross (Figure 42) or a diagonal cross (Figure 43) can be used to set up a second linear profile. Combining the anomaly areas of the two linear profiles can repeatedly confirm the existence of the exploration target and also assist in determining the general direction of the exploration target.



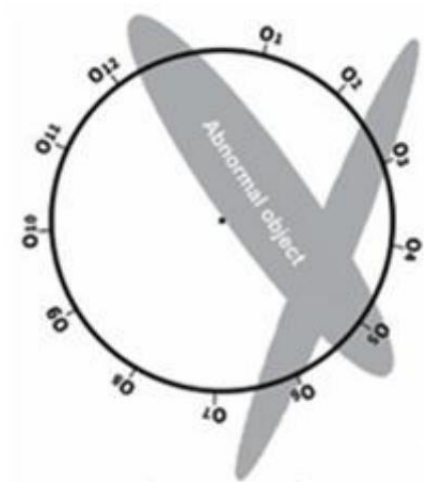
(Figure 42)



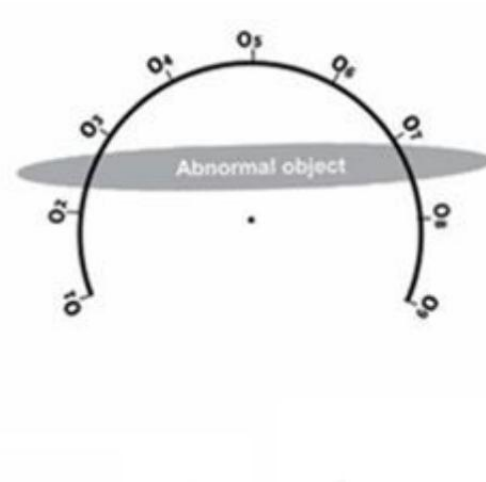
(Figure 43)

12.3 Layout Method of Circular Section

When the survey site in some areas is indeed narrow or there are point-like distracts such as transformers or signal transmission towers nearby, a circular (Figure 44) or semi-circular (Figure 45) profile is set up with the site or distracts as the center for measurement, and the direction and position of the exploration target objects (water veins, ore veins, etc.) can also be quickly traced.



(Figure 44)



(Figure 45)

12.4 Wiring Principles

1. The lines should be laid out as vertically as possible to the direction of the anomaly body, with straight sections as straight as possible, circular sections as round as possible, and the ground as flat as possible. The straight line can be determined by using a compass or a benchmark with three points in a straight line.

2. When measuring on a slope, try to set up at the same altitude. If it is impossible to set up at the same height, try to set up in the direction of the same slope or a gentler slope. The height difference between adjacent points should preferably not exceed 2 meters.

3. The test lines should be as far away as possible from high-voltage transmission lines and telephone lines. When they cannot be far away, the direction of the wiring should be as parallel as possible to them.

13 Precautions for Using the Instrument

1. Please check the battery power of the device regularly and charge it regularly. Keep the battery fully charged during working hours and turn off the power in time after work.

2. Please charge with the original charger. Non-original chargers may cause damage to the instrument.

3. The device should be kept by a designated person during transportation or use to prevent it from being subjected to violent shock, impact and water and moisture.

4. During the measurement process, try to keep the main unit at the maximum distance from the measurement line or probe.

5. After each operation, keep the equipment and MN electrode clean and place them in a well-ventilated and dry area.

6. If the MN electrode or electromagnetic sensor is not connected, the channel will show red when the detection channel is abnormal. Please check the connection of the electrode or electromagnetic sensor. In MN mode, also check the insertion of the electrode into the ground.

7. When the measurement data at each measurement point is small and the values are basically the same during the equipment measurement, it may be an instrument failure. Please contact after-sales for confirmation.

ADMT ZN Series Multi-Channel Water Finder (Rapid Version) manual

How to use it video: <https://youtu.be/5wRiuCcZVQU?si=UtvxueZQ58k3mzdr>

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