GD-10 Resistivity and IP Imaging System

RES/IP/SP

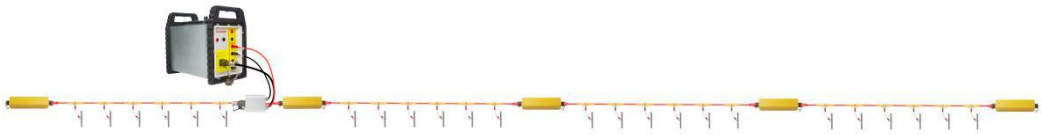
Product Introduction:

GD-10 series is a world-leading multi-functional direct current (D.C.) geo-electrical instrument, developed based on the latest digital and analog circuitry technique. This series can be applied to self-potential (SP), apparent resistivity and induced polarization (IP) tests. GD-10 is able to support conventional electrical sounding and subsurface profiling tests with 2D and 3D arrays. Not only GD-10 is able to be applied to traditional ground measurements, but also is it able to support borehole logging, coal mine tunnels, marine and submarine surveys. Moreover, GD-10 has online real-time monitoring system, available for remote automatic test and applicable to long-term unmanned field monitoring.

As for high-powered IP test, the transmission module of GD-10 can be externally connected with a DC power supply up to 1200V (peak-to-peak 2400V) and output current is up to 6A. GD-10 is highly compatible with an independent external transmitter and applicable for higher-power IP test. (>7200W). The unique scanning function of GD-10 is similar to ERT method, by which the horizontal cross-section profiling survey can be performed through the continuous multi-electrode acquisition with only one time of electrodes layout, thus enhancing the fieldwork efficiency.

In ERT test, the multi-electrode cable wiring way has the biggest influence on the construction efficiency. The cable volume, weight, wiring efficiency, component reliability, and flexibility to adapt to a variety of environments and needs are very important.

Geomative integrates the advantages of traditional centralized wring mode that are higher reliablility and lower cost and advantages of regular distributed wiring mode that are cable layout of higher efficiency and profiling measurements of infinite extension. Based on all the advantages above, Geomative has developed a unique segment-concentrated distributed technology.
A cable has 5 dual takeouts or 10 single takeouts, through a centralized swapping control performed by two switch relays. A distributed control is conducted between the host and switch relay which is not only applicable for long-section ERT test, but also applicable for IP test.



GD-10 adopts modularization and upgradeable design concept, decreasing the cost of hardware maintenance and replacement. When clients intend to upgrade the purchased instrument, they only need to buy the licensing function and standard accessories. The following upgrade can be performed online on Geomative Studio software, making pre-purchased hardware resources are fully utilized. Furthermore, by means of Geomative Studio, GD-10 system realizes two features as follows:

- The engineering management mode enables clients to manage complicated tasks and measurement data of fieldwork.
- The array script management helps clients to shorten working time in the field and enhances working efficiency.

Main Applications:

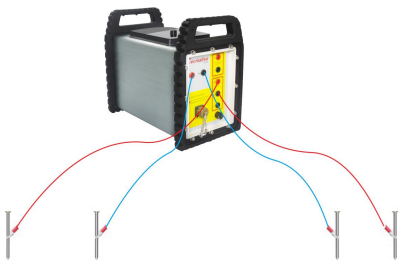
- ★ Mining prospecting
- ★ Groundwater exploration
- ★ Geotechnical engineering investigation

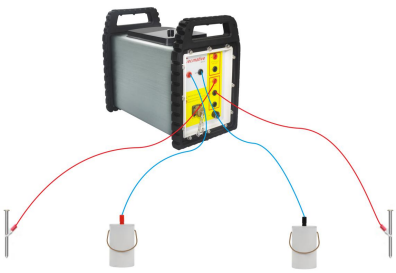
- ★ Detection of Karst cave and fractures
- ★ Geological mapping
- ★ Archeological studies
- ★ Bore-hole logging / cross-hole survey
- ★ Dam leakage investigation
- ★ Seawater Intrusion Survey
- ★ Real-time monitoring of natural hazards,soil remediation and tailing dams
- ★ Sediment Detection of rivers and lakes

Function Introduction:

1D VES Resistivity/ IP /SP

In 1D VES survey, transmission up to full power 7200W (1200V*6A) can be emitted to allow excited pulse signals to reach deeper strata. For small signals, up to 255 stacking amounts are allowed to enhance measurement accuracy. Prior to field testing, measurement array configurations and the electrode scanning parameters can be inputted into the monitoring host, thus reducing the time spent in field to enter the survey parameters and increase survey productivity.



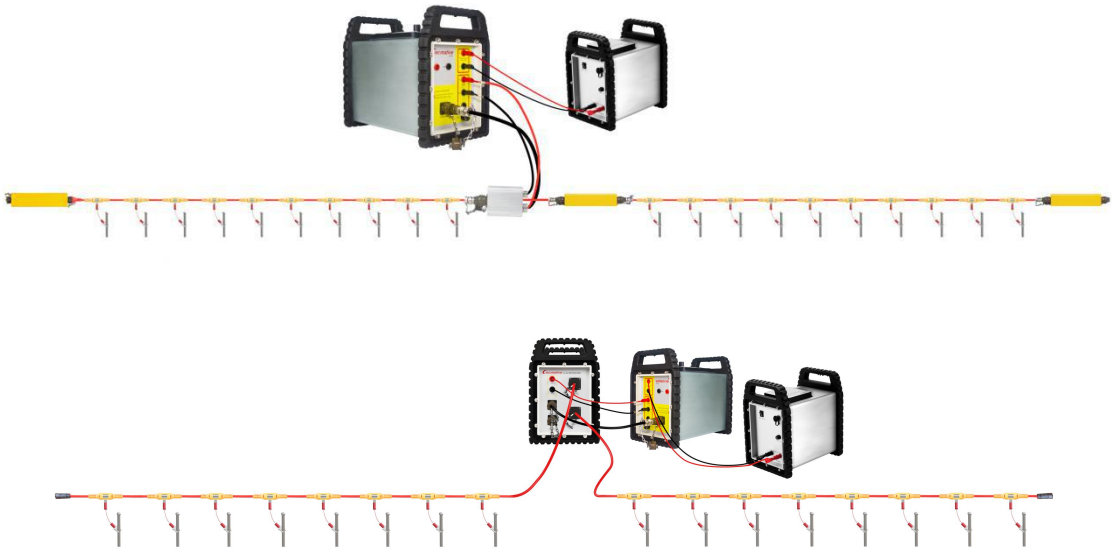


1D array scripts

4P-VES	Composite Profiling
Dipole VES	3P-VES
Mid-grandient	User defined

2D ERT or IP Scanning

GD-10 ERT (Electrical Resistivity Tomography) and IP imaging system are capable of conducting cross-section profiling by 2D resistivity and IP method in the field. Through the array script management on Geomative Studio, clients can pre-define survey parameters on PC prior to the fieldwork. Up to 3200W (800V*4A) transmission power can be deployed in the field. GD-10 is equipped with both centralized cabling and distributed cabling system, to fulfill any complex field environment.



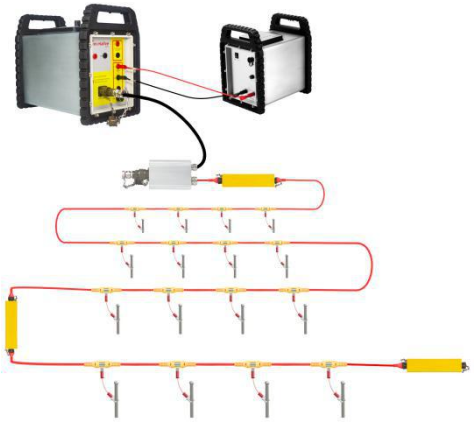
The 2D array

Wenner（β）	Wenner（γ）
Pole-Dipole（AMN）	Dipole-Pole（MNB）
Pole-Pole（AM）	Dipole-Dipole
Schlumberger	Wen-Sch
Edge Gradient	Double Side-3P
Cross-Hole Dipole	Bipole Up-Hole
Customized	

3D Resistivity or IP Scanning

The GD-10 ERT system adopts a snakelike cable arrangement, based on the segment-concentrated distributed wiring mode. It can be applied to 3D ERT and IP test, up to

3200W (800V*4A). If multi-electrode cables are not enough, we can take advantage of a limited wiring mode and bidirectional moving combination or parallel measurement of 2D cross-section profiling to cover larger 3D testing area.



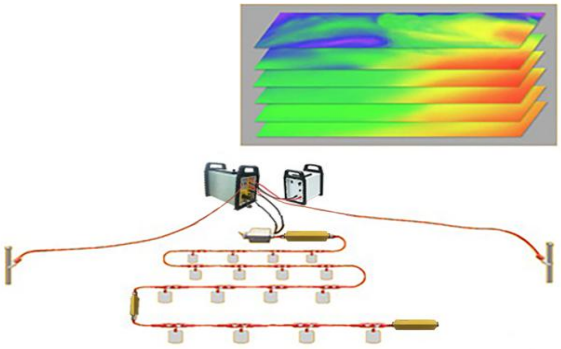
The 3D Array script

Wenner（α）
Wenner（β）
Schlunmberger
Dipole-Dipole
Pole-Dipole
Pole-Pole
Mid gradient

High-powered IP mid Gradient Scanning

In the field of geophysical study, Geomative firstly adopted high density modules to make a scanning test of high-powered IP mid-gradient array. Similar to the high density method, clients can deploy a pair of AB electrodes and multiple sets of non-polarizable electrodes. AB transmitting electrodes are connected with the AB terminals of GD-10 host, while the non-polarizable electrodes are connected with the dual takeouts of multi-electrode cables. In the process of IP test, the host continuously emits electrical signals and automatically selects MN electrodes in sequence. With sufficient cables and electrodes, the entire horizontal profiling can be scanned by one transmission. The testing efficiency is obviously enhanced.

If an external transmitter is used for launch, AB terminals of GD-10 only needs to be connected with the launching circuit in series.The GD-10 will automatically monitor the emission current, trigger and synchronously acquire MN channel.



Features:

GD-10 system has rich and powerful functions, assisting clients to resolve various difficulties in the field, enhancing testing efficiency and data quality. Here are the detailed functions below:

- Set the starting/ending electrode
- Skip take-out
- Ignore take-out
- Starting/ending layer
- Ground resistance
- Multi-dimensional data display
- Rolling along
- Stacking
- Samling interval

Software Upgrading and Scalability

GD-10 adopts upgradeable design where the embedded software is fully upgradeable. All clients are entitled to lifetime software upgrade service and enjoy the following benefits!

Gather demands and suggestions from clients worldwide and develop new functionalities, which would be implemented in new software versions to share these whole new global experiences.

Apart from software upgrades, GD-10 also provides high, medium, entry class level hardware, enabling every client to find models suited to their budget and requirements. As our clients' business expands, when they have sufficient budget and demands for more advanced model, they can easily upgrade their instruments through license upgrading and purchasing relevant accessories.

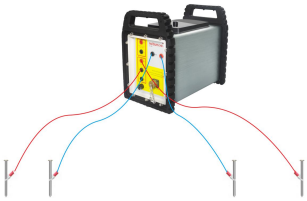
GD-10 monitoring host models are comprised of Basic, Senior, Advanced, Supreme 2D/3D, Supreme 2D+/3D+. Detailed introductions to all the models are as follows:

★ **GD-10 Basic**

Function: SP, Res for 1D VES

Power: 1200V*6A, 7200W

Online functionally upgradeable

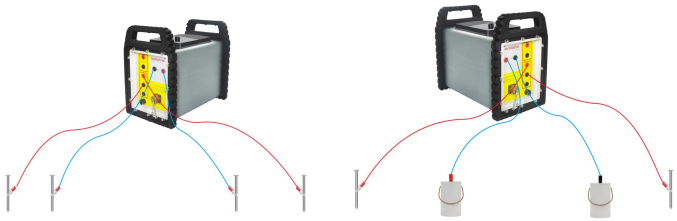


★ **GD-10 Senior**

Function: SP, Res, IP for 1D VES

Power: 1200V*6A,7200W

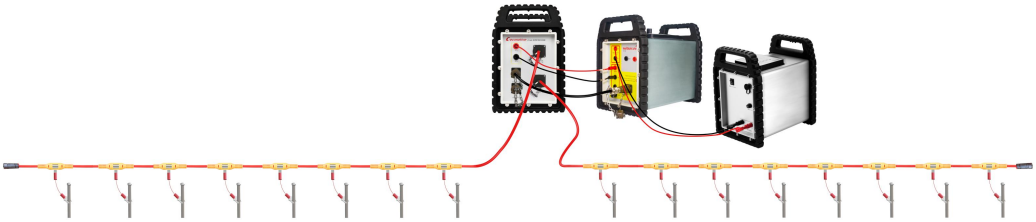
Online functionally upgradeable



★ **GD-10 Advanced (Centralized layout)**

Function: SP,RES, IP for 1D VES & SP, Res for 2D Imaging

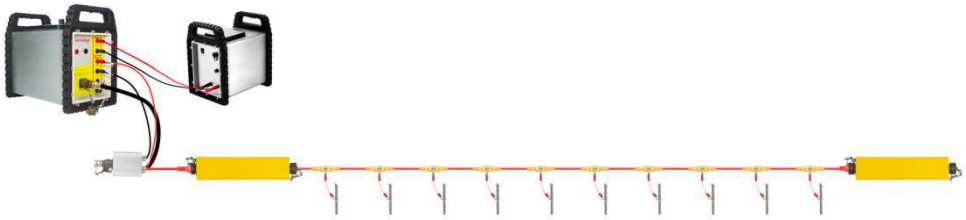
Power: 800V*2A,1600W



★ **GD-10 Supreme 2D/3D (Distributed layout)**

Function: SP, Res, IP for 1D VES & SP, Res for 2D/3D imaging

Power: 800*2A,1600W



★ **GD-10 Supreme+ 2D+/3D+ (Distributed layout)**

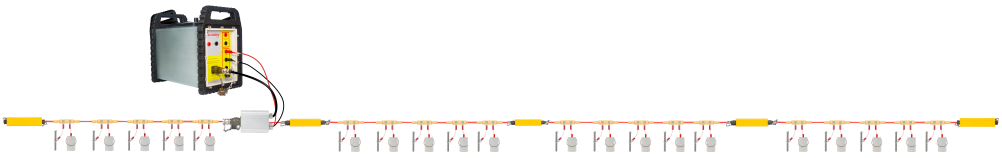
Fuction: ReS, IP, SP for 1D VES, 2D, 3D Imaging

Power:800V*4A,3200W

Product Features:

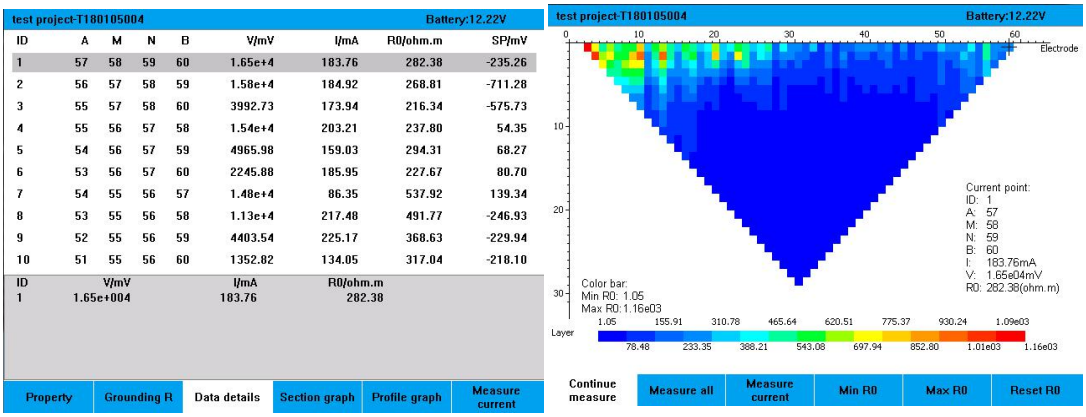
1. Unique segment-centralized distributed wiring mode

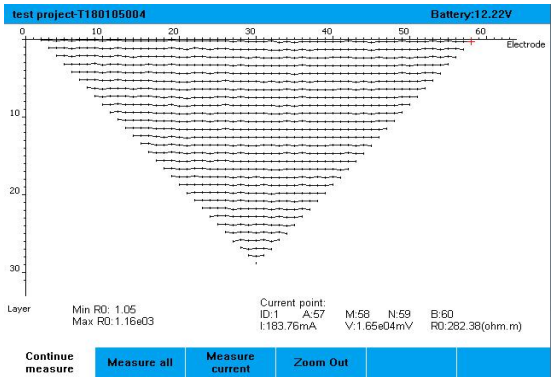
GD-10 supreme and supreme+ are designed with unique segment-centralized distributed wiring mode. This technique fully integrates the advantages of both conventional centralized cabling system and distributed cabling system, incorporating the advantages of simple cabling placement and long profiling survey from distributed system, and the simple, reliable and low-cost characteristic from centralized cabling system.

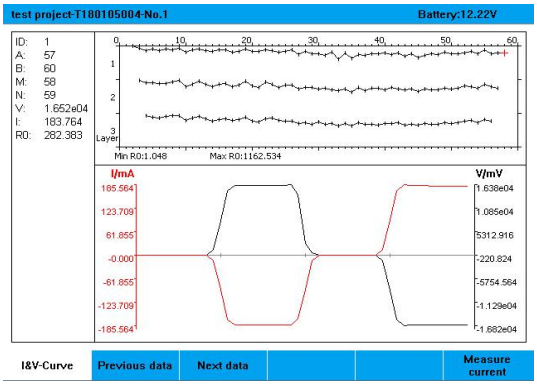


2. Multi-dimensional data display, precise localization and problems solved in the field.

The system mainframe provides a very rich software functions to help users make targeted adjustments to the different application scenarios, and truly, completely and objectively record all kinds of environmental information and testing process information during the testing process as much as it can.





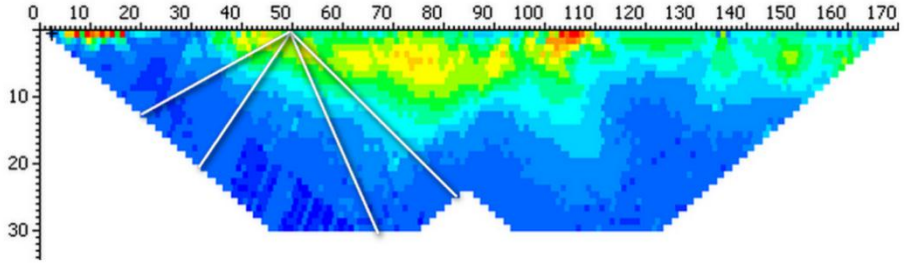


3. Diversified array database and customized array scripts

Different geophysical exploration may encounter vast difference in their survey objective, environment, approach, response signal and so on. Survey methods should hence be robust and flexible enough to tackle all possible scenarios. Based on programmable and customizable survey concept, Geomative introduced survey scripting method, enabling clients to plan detailed survey configurations, electrode location and stacking amount, prior to their field surveys.

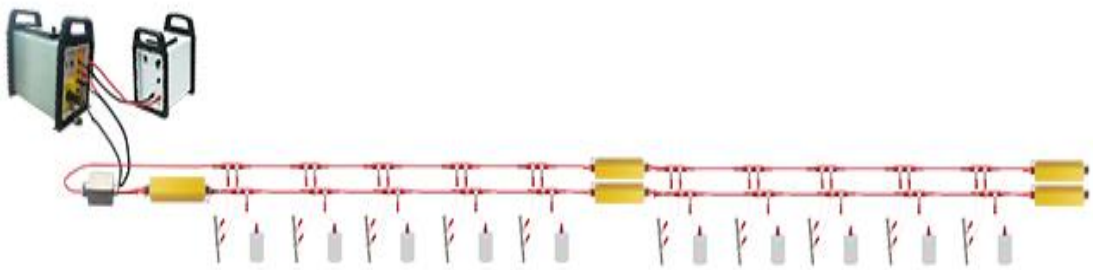
4. Adaptable to complex test environments

- Takeout skipping function can be used to increase survey spacing, up to four takeout spacing skipping is supported.
- When arbitrary takeouts cannot be connected to electrodes or is broken, takeout skipping function can be activated to resolve this issue to prevent anomalies in measured dataset.
- The grounding resistance is straightforward, can locate the fault electrode immediately, and process and retest.

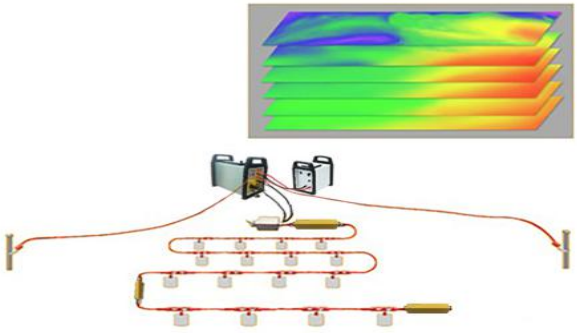


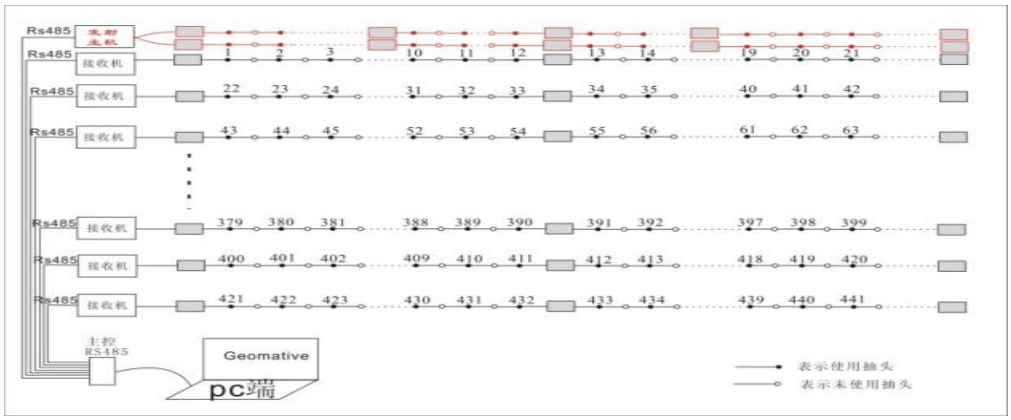
5. Simple wiring way and dual-takeout mode doubling current value

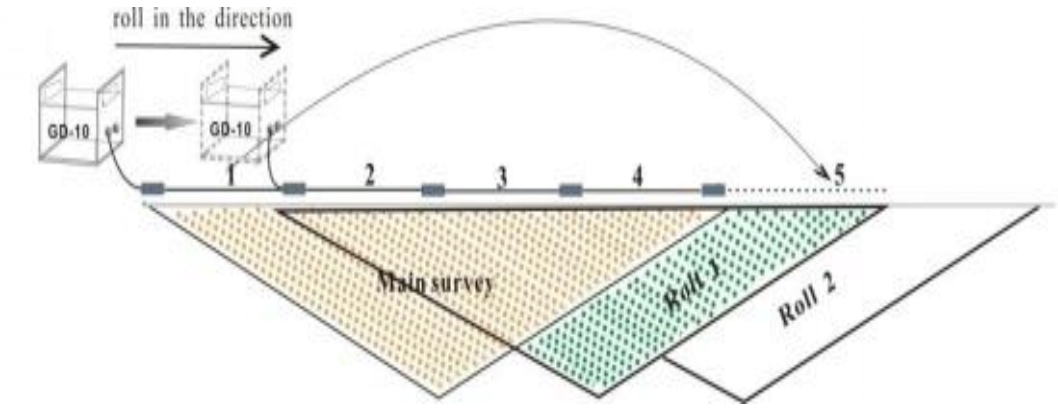
- In dual-takeout mode, the upper limit of the varying current increases from 2A to 4A, enhancing signal and data quality simultaneously.
- Rapid cabling placement, flexible monitoring host placement location and can be placed arbitrarily at any cable connectors.



Powerful and efficient rolling and 3D Scanning







6. Perfect DC Power Supply Solution

★ BP-145 power supply supports three voltage levels of 48V, 96V and 144V, with maximum current of 2A. At most four sets of BP-145 linked in series support higher output voltage up to 600V. It brings high stability, reliability and C/P value.

★ BP-450 power supply, inside lithium battery of compact and high C/P value, supports three voltage levels of 150V, 300V and 450V with over current protection.

★ GP-5000 current rectifier supports a maximum power of 5KW, established on the latest digital power supply technique with adjustable output voltage range of 50-1000V, maximum current of 5A and conversion efficiency over 90%.

★ BP-250 power supply booster for D.C. electrical method. This device assists clients to generate D.C. transmitting source up to 250V in the field, only in need of a regular battery of 24V, supporting 0.5A constant current output.

BP-145

BP-450

BP-250

GP-5000

Technical Specification:

Transmitter

Maximum Tx Power : 7200

Maximum Tx Voltage :1200V

Maximum Tx Current : 6

Current accuracy : Better than 0.3%

Host Protection : IP65, over-current, over-voltage, short circuit

Pulse type : square wave

Pulse width : 1s、2s、4s、8s、16s、32s、64s

Input impedance : ≥200MΩ

Receiver

Manual iteration : 1~255 times

Automatic iteration: 1~10 times

Voltage range : ±24V

SP compensation : ±10V

Noise rejection : ≥120dB

Dynamic Averaging : 24bits A/D conversion

Accuracy : 0.3%±1uV

Precision: 0.1%

Others

Weight : 8KG

Size : 39cm*20cm*29cm

Storage temperature : -20℃~+60℃

Working temperature : -10℃~50℃

Operating humidity : ≤95%

Memory capacity : 8GB

Charging voltage : 120~250VAC（50HZ/60HZ）

Display screen : 5.7-inch full-color LCD screen, 640*480

Waterproof Rating : IP67

External power : DC24~60V

Battery : 16.8V lithium build-in battery/Support external 24V battery

I/O Port ： USB, RS485