# GD-10 Resistivity and IP Imaging System

RES/IP/SP

Product Introduction

GD-10 is developed based on the latest digital and analog circuitry technique, making it the world leading multi-functional direct current (DC) method instrument. This equipment can be adopted in self-potential (SP), apparent resistivity and induced polarization (IP) surveys. Not only GD-10 supports regular ERT survey configurations, subsurface profiling using both 2D and 3D survey arrays are also supported. GD-10 is powerful in conventional surface ERT surveys, borehole testing, mining tunnels, marine and submarine surveys. Online monitoring mode is readily available for GD-10 to initiate remote automated survey and realize long-term unmanned field monitoring.
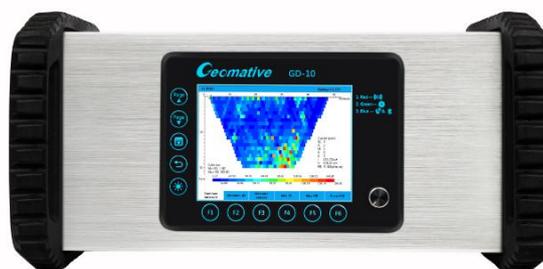
As for high-powered IP survey, the transmission module of GD-10 can be connected to external DC power supply up to 1200V (peak-to-peak 2400V) and output current up to 6A. GD-10 is highly compatible with

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independent external transmitter and implemented in extremely high-powered IP survey (>7200W). The unique IP profiling functionality is similar to ERT method, in which the cross-section profiling can be performed through multi-channel acquisition within single electrodes layout, thus enhancing the overall field survey efficiency.

In ERT survey, electrode placement impacts the overall survey efficiency. Field survey performance highly relies on the volume and weight of the cabling system, layout efficiency, module reliability and the robustness to adapt to environment and client demand. Geomative integrated the advantages of both conventional centralized cabling system and distributed cabling system, incorporating the low-cost and high reliability of the former with the high efficiency and infinitely extensible cable sections of the latter system. A distributed-centralized compacted cabling technique is hence developed, the Geomative. Each cable section is either 5 or 10 takeouts and is controlled through a centralized exchange control at the either end of the cabling heads, while the communication between the cabling heads and the measurement host adopted a distributed controlling approach. Not only long 2D cross-section profiling survey can be performed, 3D cross-section profiling is also feasible using this system which can be laid out simply, robust, and of high reliability.
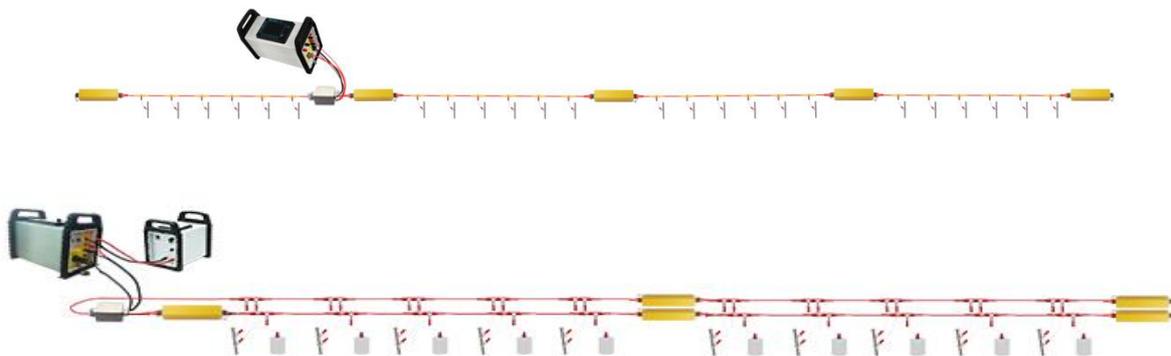
GD-10 adopted modularized design and fully upgradable scheme, lowering the hardware maintenance and replacement cost. When clients intend to upgrade the purchased instrument, clients will only need to purchase corresponding license authorization and modules. Subsequent upgrades can be performed online through Geomative Studio directly and pre-purchased hardware resources are fully utilized. Furthermore, Geomative Studio software facilitates GD-10 geo-electrical measurement system to realize two major features:

● Engineering management mode enables client to manage complicated task particulars and measurement data from field surveys;
● Array configuration management function saves client the field operation time and enhance survey efficiency.

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Geomative

Main applications :

-Energy resources exploration

-Metal and non-metal mining resources prospecting

-Groundwater resources exploration

-Underground contamination variation detection

-Well electrical resistivity testing

-Interwell tomography

-Urban engineering exploration

-Cavity exploration& pile foundation bedrock

-Seawater intrusion detection

- Borehole/Cross-borehole investigation

-Geological mapping

-Archeological studies

-Real-time monitoring of landslides, tailings dams.

-Sediment detection of river, lake& reservoir

-Surface or underwater surveys in the ocean

Product Function

1D Resistivity or IP

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.

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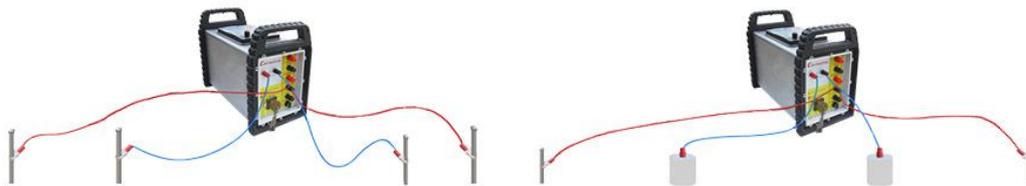
1D array scripts

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

2D ERT Resistivity or IP Scanning

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

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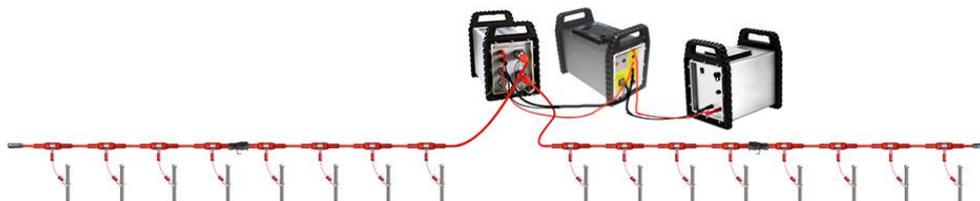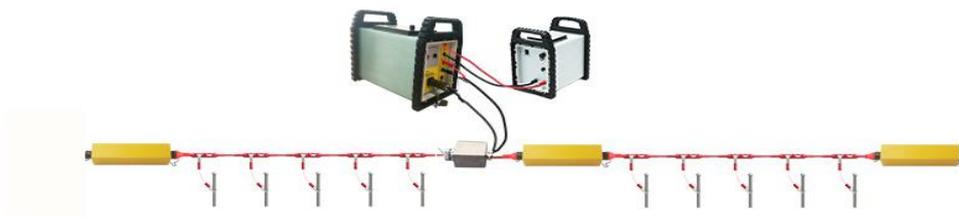
The 2D array

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 ERT Resistivity or IP Scanning

Using GD-10 ERT measurement system, the sectional centralized cabling layout can be deployed robustly in a snakelike layout pattern to perform 3D ERT and IP survey. Up to 3200W (800V*4A) can be transmitted under this mode. If ERT cabling is insufficient, limited cabling can be deployed in a dual-direction shifting combination or multiple paralleled 2D survey line data fusion method to cover a larger 3D region.
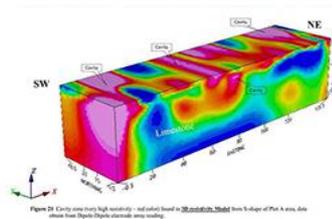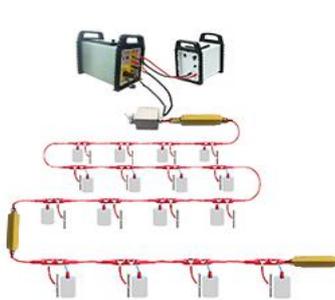

The 3D Array script
Wenner（α）
Wenner（β）
Schlunmberger
Dipole-Dipole
Pole-Dipole
Pole-Pole
Mid gradient

High-powered IP mid Gradient Scanning

Geomative is the first in the industry to adopt ERT modules in the high-powered IP mid-gradient cross-sectional profiling. Similar to the ERT method, clients can deploy a pair of AB electrodes and multiple sets of non-polarizable electrodes. AB transmitting electrode is connected to the AB terminal port on the monitoring host, while the non-polarizable electrodes are connected to the ERT cables takeouts. During IP survey, the host instrument emits electrical signal simultaneously and sequentially select MN electrodes in automated mode. Under sufficient amount of cabling and electrodes, the whole lateral cross-sectional profiling can be accomplished in one run, with a significant enhancement in survey efficiency. If signal

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emission is performed using external transmitter, clients can simply connect the AB terminal port of GD-10 host to the emission circuit in series. GD-10 will automatically monitor and detect the transmitted electrical signals, triggering and synchronizing the MN acquisition channels simultaneously.
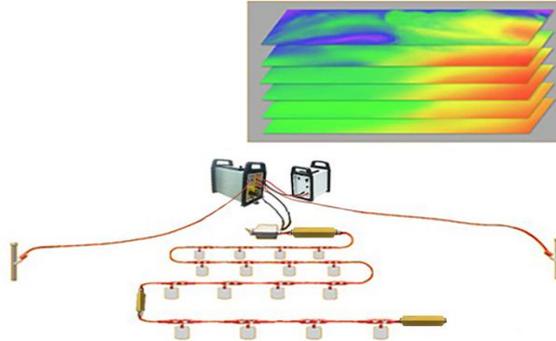
Features

GD-20 system has rich and powerful software functionalities, assisting clients to resolve multiple complications during field survey, enhancing survey efficiency and data quality. Detailed functionality is introduced 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 adopted 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,

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when they have sufficient budget and demands for more advanced model, they can easily upgrade their instruments through license upgrading and purchasing relevant accessories.
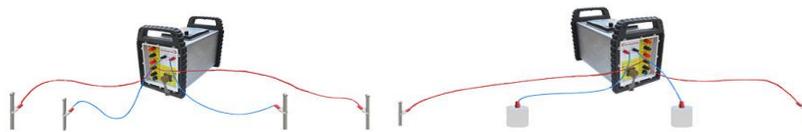
GD-10 monitoring host models are comprised of Senior、Advance、Supreme 2D/3D、Supreme 2D+/3D+. Detailed introductions to all the models are as follows:

1. GD-10 Senior

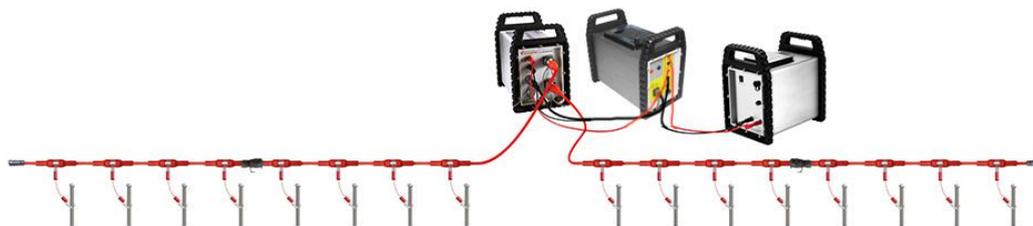Function: SP,1D VES/IP,2D RES imaging
Power: 1200V/6A,7200W
Support online function upgrade

2. GD-10 Advanced (Centralized layout)
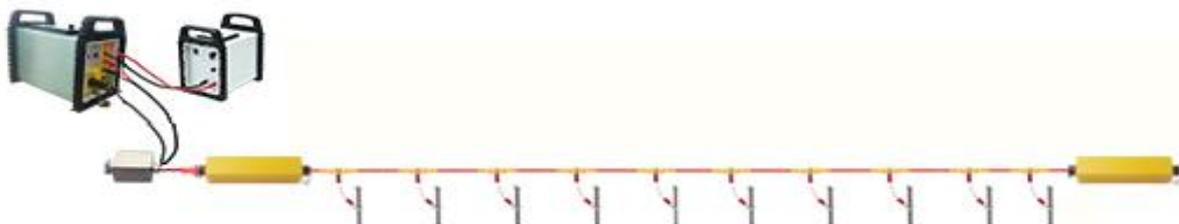
Function: SP,1D RES/IP,2D ERT Imaging
Power: 800V*2A,1600W

3. GD-10 Supreme 2D/3D (Distributed layout)
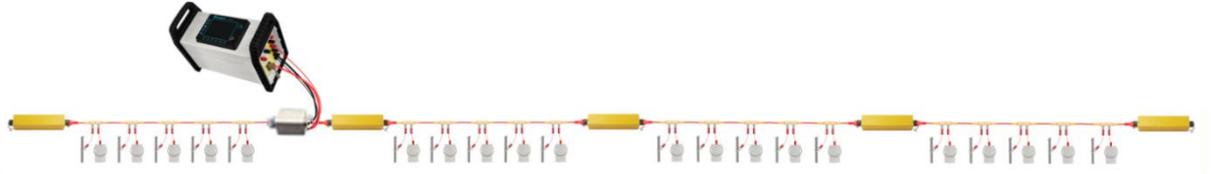
Function: SP,1D RES/IP ,2D/3D ERT imaging
Power: 800*2A,1600V

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![Geomative logo]

4. GD-10 Supreme+ 2D+/3D+   (Distributed layout)

Fuction: 1D/2D/3D RES/IP/SP Imaging
Power:800V*4A,3200V

Product Features

GD-10 series adopts the 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.
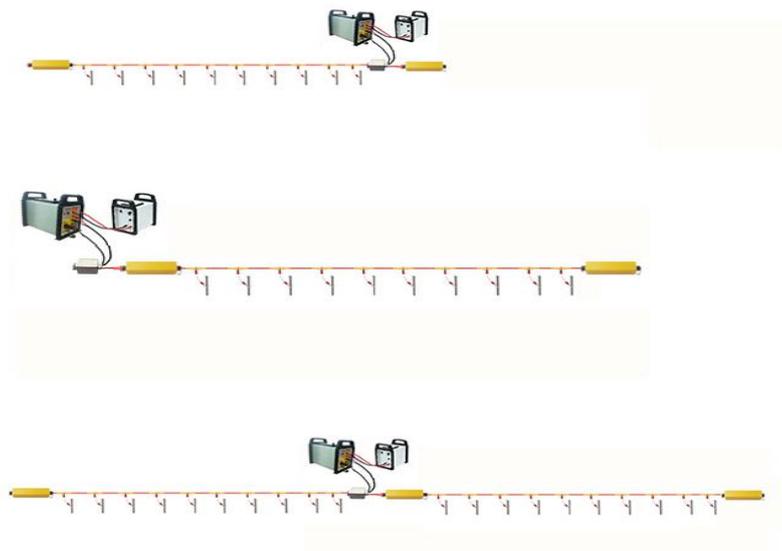
Multi-dimensional data display, precise positioning, discovering and handling all the problems on site.

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.

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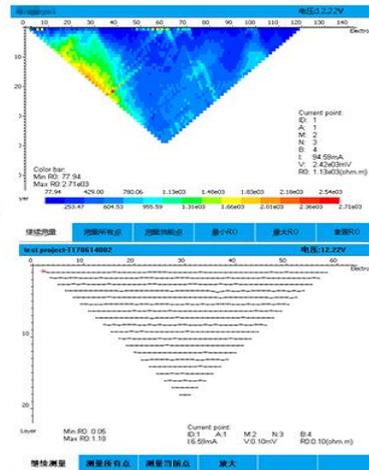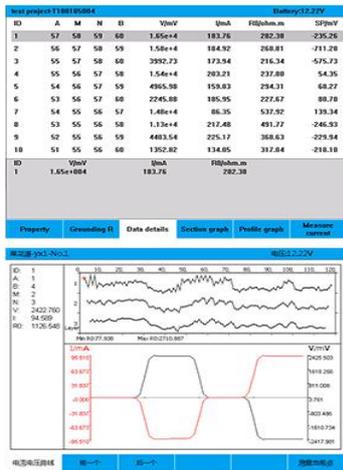
Rich array database and customized array scripts

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.

Adapt to complex test environment

- 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.
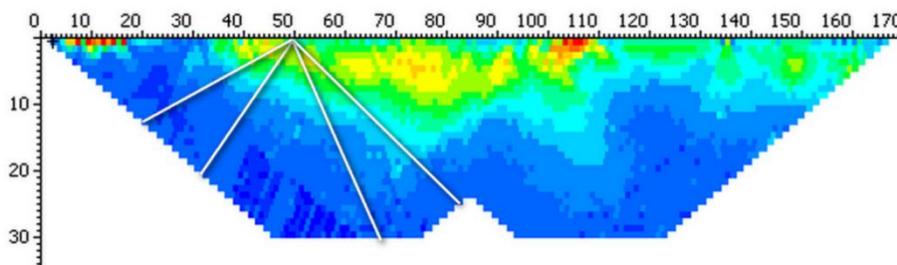

## Robust, efficient, simple cabling placement, dual-takeout mode doubles up current threshold value

- In dual-takeout mode, the upper limit of the varying current increases from 2A to 4A, enhancing signal and data quality simultaneously.

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- Rapid cabling placement, flexible monitoring host placement location and can be placed arbitrarily at any cable connectors.
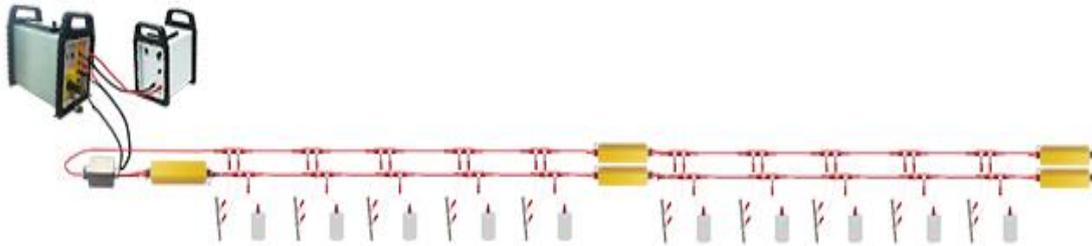
Powerful and efficient rolling and 3D Scanning

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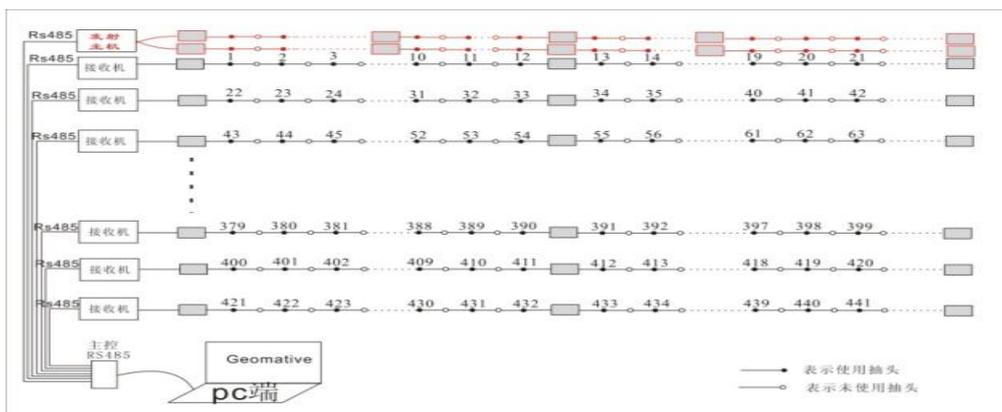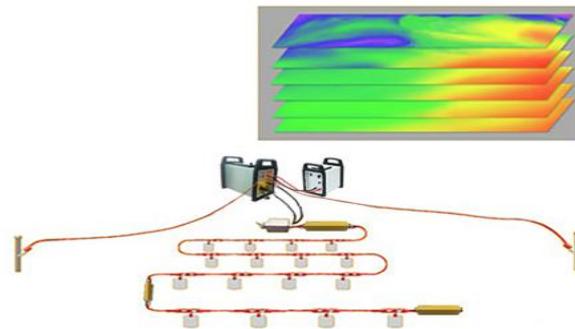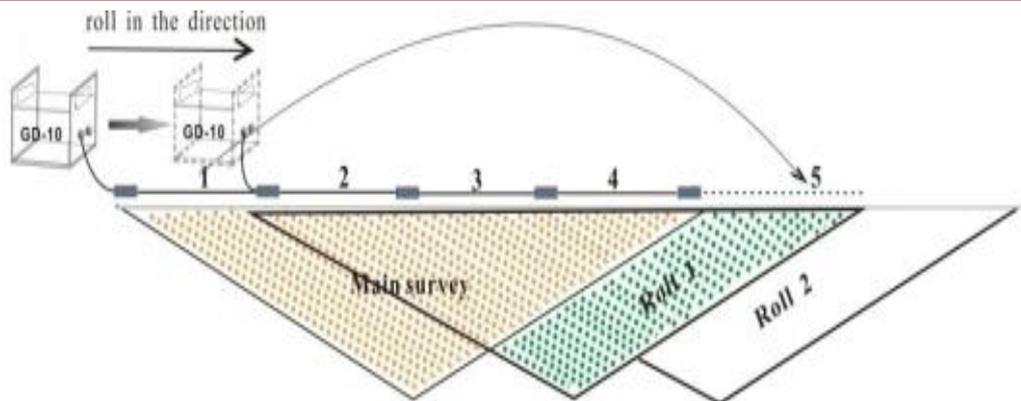
Perfect DC Power Supply Solution

1. 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.
2. 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.
3. 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%.
4. BP-250power 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

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Specification

Transmitter

Maximum Tx Power : 7200W; 3200W; 1600W

Maximum Tx Voltage : 800V; 1200V

Maximum Tx Current : 6A; 4A; 2A

Current accuracy : Better than 0.3%

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

External power : DC24~60V

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

I/O Port 　:　USB,RS485

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