



tomography equipment

p-wave

power supply



IPG5000 | Impulse Generator

source



SBS42 | P-Wave Source

receiver



BHC4 | Hydrophone String

description

The impulse generator IPG5000 (formerly named IPG1005) is the high voltage supply to the seismic borehole sources SBS42 and BIS-SH. The energy is stored in a large capacitor bank which discharges through a mechanical switch. The IPG5000 is controlled by a remote control unit (RCU). The RCU allows the user to start the seismic survey by a single or continuous shot release. The repetition rate is selectable under continuous operation. The RCU is connected to the seismograph to send an accurate time break.

The borehole source SBS42 generates compressional waves (P) in water filled boreholes. The seismic signals are highly repeatable. Energy released by the IPG5000 discharges through a coaxial cable terminated by two adjacent spark electrodes. The spark discharge vaporizes water by a high-pressure plasma. This generates vapour bubbles which expand and collapse, thereby generating high-frequency seismic waves.

The hydrophone string BHC4 is used to receive P-waves in water filled boreholes. The BHC4 consists of a downhole cable containing a Kevlar tension string and a number of moulded hydrophones at pre-defined intervals. Each hydrophone consists of a sensor with a pre-amplification board. The electronic boards are powered from the surface by a bank of rechargeable AA cells. The cable is terminated by a connector to the seismograph.

technical details

Impulse voltage: 5000 V
Impulse energy: 1000 J
Power supply: 230 V/110 V
Shot release: Single or continuous
Repetition rate: 8 s
(or freely selectable between 3 and 8 s)
Dimensions: 52 x 32 x 53 cm
Weight: 60 kg
Special features: Impulse counter, test trigger, emergency OFF button, intern/extern operation
RCU: Single or continuous shot release, impulse counter, test trigger, trigger output, emergency OFF button

Generated wave types: P
Signal frequencies: Up to 5 kHz
(depending on geology and borehole distance)
Operational depth: Up to 400 m
Source length: 645 mm
Source diameter: 45 mm
Source weight: 3.8 kg
Cable weight per metre: 206 g
Cable strength: 3400 N
Borehole diameter: Min. 50 mm
Clamping system: Not required
Depth indicator: Cable marking every 2 m
Connector: To impulse generator IPG5000
Storage: On drum

Hydrophone sensor: SQ54 or AQ2000
Frequency response: Flat from 1 to 10.000 Hz
Pre-Amplification: 4 or 10 x
Power supply: AA cells
(battery box on surface)
Operational depth: Up to 500 m
Number of hydrophones: 24
(others on request)
Hydrophone interval: 1 m (others on request)
Hydrophone diameter: 38 mm
Cable weight per metre: 200 g
Cable strength: 4700 N
Borehole diameter: Min. 50 mm
Depth indicator: Cable marking every 2 m
Connector: To any seismograph
Storage: On drum



power supply



IPG5000 | Impulse Generator

source



BIS-SH | S-Wave Source

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MBAS | Multistation Borehole Geophone

description

The impulse generator IPG5000 (formerly named IPG1005) is the high voltage supply to the seismic borehole sources BIS-SH and SBS42. The energy is stored in a large capacitor bank which discharges through a mechanical switch. The IPG5000 is controlled by a remote control unit (RCU). The RCU allows the user to start the seismic survey by a single or continuous shot release. The repetition rate is selectable under continuous operation. The RCU is connected to the seismograph to send an accurate time break. Alternatively, the impulse generator IPG800 and the seismic borehole source BIS-SH-DS can be used for S-wave tomography.

The borehole source BIS-SH generates horizontally polarized shear waves (SH) and compressional waves (P). The seismic signals are highly repeatable. The source works in dry or water filled boreholes and can be used in vertical or horizontal boreholes. Energy released by the IPG5000 discharges through a system of electromagnetic coils which generate a mechanical impact to the borehole wall. The borehole source is coupled to the borehole wall by a pneumatic clamping system (inflatable bladder). The orientation of the source is controlled from surface by a torsionally stiff hose.

The multistation borehole acquisition system (MBAS) is a digital three-component geophone string used to receive P- and S-waves in dry or water filled boreholes. Up to ten individual stations with tri-axial sensors can be connected. The stations are aligned to ensure that the sensors are oriented in same direction. The system can be oriented from the surface by a torsionally stiff hose. Each station is clamped to the borehole wall by two pneumatic cylinders. An external trigger can be plugged into the USB interface on surface which is connected to a laptop. The operation is entirely controlled by the acquisition software. A separate seismograph is not required.

technical details

Impulse voltage: 5000 V
Impulse energy: 1000 J
Power supply: 230 V/110 V
Shot release: Single or continuous
Repetition rate: 8 s
 (or freely selectable between 3 and 8 s)
Dimensions: 52 x 32 x 53 cm
Weight: 60 kg
Special features: Impulse counter, test trigger, emergency OFF button, intern/extern operation
RCU: Single or continuous shot release, impulse counter, test trigger, trigger output, emergency OFF button

Generated wave types: SH/P
Signal frequencies: Up to 4 kHz
 (depending on geology and borehole distance)
Operational depth: Up to 100 m
Source length: 880 mm
Source diameter: 65 mm
Source weight: 8.5 kg
Cable weight per metre: 665 g
Borehole diameter: 75-100 mm
 (or larger if spacers are used)
Clamping system: Inflatable bladder
Orientation: Torsionally stiff hose
Depth indicator: Cable marking every 2 m
Connector: To impulse generator IPG5000
Storage: On drum

Natural sensor frequency: 30 Hz
Sensor arrangement: Tri-axial
Operational depth: Up to 100 m
Max. number of stations: 10
Station interval: 1 or 2 m
Station length: 735 mm
Station diameter: 65 mm
Station weight: 2.5 kg
Cable weight per metre: 460 g
Borehole diameter: 75 mm
Clamping system: Pneumatic cylinders
Orientation: Torsionally stiff hose
Depth indicator: Cable marking every 2 m
Storage: On drum and in boxes
Digitisation:
Design: Micromed
Power supply: PC USB interface
A/D conversion: 24 bit
Sampling frequencies: 256-32768 Hz
Trace length: Max. 4 s
Trigger: TTL, geophone
Software: Soilsy (Micromed)