

Geochain™ 100 level digital VSP array



GPP- Geochain Power Panel



GSP-1 Data Acquisition panel

Specification

Downhole

| | |
|----------------------------------|---------------------------------|
| Max. No. of Satellites Telemetry | 100 |
| Sample interval | Bandwith Hz ASR satellites |
| 1/4ms | 1600 8 |
| 1/2ms | 800 16 |
| 1ms | 400 32 |
| 1.5ms | 266 48 |
| Dynamic Range | >112dB @ 0dB pre-gain (minimum) |
| A/D convertor | 24 bit Delta-Sigma |
| Distortion | <0.02% |
| DC offset | Self-calibrating |
| Timing accuracy | Better than 10 ppm |
| Max. data rate | 1.536Mbit/second |
| Min. data rate | 256kbit/second |

Surface

| | |
|----------------------|--|
| Recording panel | GSP-1 |
| Software | VSProwess© |
| Cable equalisation | Fully automatic using internal DSP chip |
| Down-going data rate | 2 kbit/second |
| Airgun firing pulse | 60 V, 30ms |
| Test system | Fully automatic with comprehensive report generation |
| PC Interface | USB |
| Power Requirements | 100/230 V AC, 47-63 Hz universal input, 30 watts |
| Operating Temp. | 0-50°C |
| Enclosure | Standard 19" rack mounting |



Commissioning a 16-level Geochain™ array

Main Features

- Ideal for VSP & Microseismic surveys.
- Up to 100 satellites
- Standard 7 conductor wireline
- Real time data transmission
- 3 component-gimballed/fixed
- 24-bit delta sigma convertors
- 180°C temperature rating
- Unique Active Cooling System for continuous operation at 180°C
- 20,000psi & 25,000psi (1400 & 1700 bar) pressure rating
- Up to 200m (>600') between satellites

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Geochain™ - an 8-level array with VRS

General Information

Geochain™ has proved the complete VSP digital seismic system, operating with up to 100 satellites for maximum logging and recording efficiency and was the result of over five years of research and development. The system is made up of individual satellites of our tried and tested ASR-1 borehole geophone of which around 500 are now in use worldwide.

The Geochain™ system has been widely used by major players in the North Sea, North Africa, Gulf of Mexico, Canada and China with outstanding success and, back in 2003, was used by one service company to complete the first ever 25-level survey with conventional wireline in the Gulf of Mexico.

Functionality

The Geochain™ VSP array has been designed for use in open and cased holes using standard 7 conductor wireline. The array is based on the well proven ASR-1 downhole geophone and can be used in wells up to 25,000 psi (1,750 bar) and hole sizes from 3 1/2"-22" (89 to 559mm). The modular construction of the standard (analogue) ASR-1 allows it to be easily converted to digital mode in just minutes.

Our unique active cooling system ACS allows continuous operation up to 180oC and the robust telemetry system will ensure operation in the harshest conditions. Up to 100 satellites can be used in the array and a maximum tool spacing of >600 feet (200m). All the satellites locking arms open and close simultaneously and the entire string can lock into a 95/8" (244mm) well in only 30 seconds. All satellites have a fail safe arm mechanism for retrieval of the string in the event of power failure.

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ASR-1 Specifications

| | |
|------------------------|---|
| Length | 35" (884mm) |
| Diameter | 3" (76mm) |
| Weight | 38lbs (17kg) |
| Locking Range | 22" (559mm) with an arm extender |
| Temperature | 400°F (204°C) |
| Pressure | 20,000psi (1400 bar) ASR - HP 25,000psi (1750 bar) |
| Sensors | Sensor SM-4 HT 10Hz OYO SMC2400 15Hz Omni |
| Mounting | 3 component gimbal 3 component fixed 3 component fixed dual 3 component fixed quad |
| Well deviation Control | 0°-95° |
| Panel | GPP & GSP-1 |

Industry Leading Sensitivities!

| Electronic Digitiser | Sensor Pack Geophones per axis (Total) | Overall Sensitivity |
|----------------------------------|--|---------------------|
| Standard 42dB Gain Digitiser | Single Geophone (3 per pack) | 4,838 V/m/s |
| Standard 42dB Gain Digitiser | Dual Geophone (6 per pack) | 7,700 V/m/s |
| Standard 42dB Gain Digitiser | Quad Geophone (12 per pack) | 10,950 V/m/s |
| Upgrade 54dB High Gain Digitiser | Single Geophone (3 per pack) | 24,750 V/m/s |
| Upgrade 54dB High Gain Digitiser | Dual Geophone (6 per pack) | 47,200 V/m/s |
| Upgrade 54dB High Gain Digitiser | Quad Geophone (12 per pack) | 86,350 V/m/s |

Microseismic Optimisation

"It doesn't matter how fast you sample the data if you can't hear the event!"

Quad sensor pack ideal for high sensitivity microseismic surveys



Combined with High Gain Electronics for very high signal to noise ratios

Geochain™ can accommodate and power a tractor tool for deviated well surveys using auxiliary line 7

A tension head and motion detector provide real time surface read out to prevent tool hang up. A threshold alarm can be set to warn the wireline operator if tension or motion levels change. The downhole distributed electronics features 24 bit Delta-Sigma converters for maximum dynamic range along with real time data transmission and display. Constant synchronisation of the string allows for very long record lengths.

Full in-field processing is provided by our highly praised VSProwess software package (please see our separate datasheet for full details). A Gamma Ray tool or CCL can be used for depth correlation and line 7 is free for use with a downhole source or gyro tool. Any of the ASR-1 satellites can be used in single or dual analogue mode for very hot wells (200°C) or TLC etc. All Inter-Tool Cables (ITC) use standard 7 conductor wireline. The cable heads have graduated weaklinks and composite pressure bulkhead connectors are used throughout. Transmission and display.

