# GeoSIG

ISO 9001 certified

# GSR-24 Seismic Recorder / GSD-24 Seismic Digitiser

## Features

- ❏ **Standard 16 MByte Data Memory (Optional up to 64 MByte)**

- ❏ **24 Bit Digitiser**

- ❏ **Bandwidth to 80 % of Nyquist**

- ❏ **Highest Dynamic Range**

- ❏ **GPS Time Receiver (Option)**

- ❏ **On-Line Diagnostics and Self Checking System**

- ❏ **Quick Installation**

- ❏ **Sets New Standard in Price for 24 Bit Technology**



## Outline

The **GSR-24** Seismic Recorder is a high performance velocity and acceleration acquisition system. In combination with the Radio Telemetry Interface and the acquisition facilities a complete solution is now available on the market for seismic profiling, after shock studies, noise measurements and single station micro seismic networks.

Featuring the latest industrial standard 24 Bit high resolution digitiser the **GSR-24** records signals over **132 dB dynamic range** making it one of the most accurate and flexible portable recorders available on the marketplace. This highest performance allows to acquire micro seismic, broad band and strong motion signals in a single field unit.

**The standard GSR-24** recorder allows **3 signals** from either seismometers, accelerometers or geophones to be acquired using a three component 24 Bit Digitiser, a Control Card, a GPS receiver, a CPU and flash memory. The GSR-24 has a digitiser line output.

A separate **Digitiser GSD-24** is available, which has the same features as the GSR-24, but no memory and therefore no recording facilities.

The line output from the **GSR-24/GSD-24** is available for connection to a radio transmitter. This enables continuous data transmission back to base and at the same time as back up continuous recording.

A comprehensive package of advanced, windows-based analysis software is available. **GeoDAS** is included with the **GSR-18** and can be used on-site for a first impression of the recorded data. **SEISLOG** is included in the Seismic Data Acquisition System consisting of a Laptop or PC and is the base of the recording function for the **GSD-24**. SEISLOG allows also the graphical display of the recorded data.

With the **GeoDAS Data Analysis Package** and **SEISAN,** we provide two dedicated analysis programs for earthquake and civil engineering as well as for seismologist.

The **GSR-24 Seismic Recorder** is the ideal compact and most cost effective **24 Bit** approach.

# Specifications GSR-24 / GSD-24

**Set-up and Configuration**
All the necessary parameter and configuration settings are selectable with the easy-to-use **GeoDAS** Windows program. The configuration of the **GSR-24** is stored in an internal EEPROM which secures the configuration set-up independent of any backup battery requirements.

**SEISLOG**
The **GSR-24/GSD-24** can be used as a seismic digitiser providing 1 second packaged data for direct recording in a PC running the SEISLOG software from Bergen University.

**Data Analysis**
The **GeoDAS** program provides basic time history data evaluation in the field. The **GSR-24** supplies data in binary format or as ASCII files. The **GeoDAS Data Analysis Package** covers the requirements of detailed laboratory analysis for most earthquake and civil engineering applications. Any customary evaluation software package can of course be used as well.

**Sensor**
Various sensors suitable to your application are available. All sensors are housed in a compact case and easy to install and to level.

**Güralp CMG-40T-1 1 second Seismometer**

| | |
|---|---|
| Frequency Response: | 1 Hz to 80 Hz |
| Velocity output: | 2 x 1000 Vs/m |

**Güralp CMG-5T Force Balance Accelerometer**

| | |
|---|---|
| Frequency Response: | DC to 100 Hz |
| Acceleration output: | +/- 2, 1, 0.5, 0.1 g |
| Dynamic range for 2 g F.S: | > 140 dB (0.005 to 0.05 Hz) |
| | > 127 dB (3 to 30 Hz) |

**Anti Aliasing Filter**

| | |
|---|---|
| Filter response type: | FIR Brickwall |
| Attenuation: | > 130 dB above Nyquist |
| Filter equation: | contact GeoSIG |
| Channel to channel skew: | Zero |

**Digitiser**

| | |
|---|---|
| Type: | 3-Channel 24-Bit Sigma-Delta ADC |
| Dynamic Range: | 132 dB @ 50 SPS |
| | 130 dB @ 100 SPS |
| | 128 dB @ 200 SPS |
| Resolution (peak to peak Noise): | 21.9 Bit @ 50 SPS |
| | 21.6 Bit @ 100 SPS |
| | 21.2 Bit @ 200 SPS |
| Sampling rates: | 50, 100, 200 SPS per channel |
| Bandwidth: | 40 % of sampling rate |
| Input range: | +/- 5 V or +/- 20 V |
| Type: | differential input |
| Channel to channel isolation: | 127 dB |

**Data Recording**

| | |
|---|---|
| Pre-event-Time: | 1 to 132 seconds |
| Post-event-Time: | 1 to 100 seconds |

**Triggering**
**Level Triggering:**

| | |
|---|---|
| Lower band limit: | Drift compensated |
| Range: | 0.01 to 100 % of full scale |

**STA/LTA Triggering:**

| | |
|---|---|
| STA-Base: | 0.1 to 10 seconds |
| LTA-Base: | 1 to 100 seconds |
| STA/LTA-Ratio: | 1 to 60 dB |

**On-Board Memory**

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|---|---|
| Memory: | standard 16 MByte Flash Memory, expandable up to 32, 64 MByte on-board |
| Recording time: | 20 minutes (@ 3 channels, 200 SPS, 2 MByte memory) |

**Removable ATA memory card (Optional):**

| | |
|---|---|
| Type: | PC Card ATA Memory (PC compatible without additional software) |
| Size: | 16, 32, 48, 64 MByte |

**Power Supply**

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|---|---|
| Type: | Switched power supply |
| Internal battery: | Rechargeable, 12 VDC, 6.5 Ah Sealed Lead acid battery |
| Power consumption: | 175 mA @ 12 VDC |
| Autonomy: | 38 hours |
| AC voltage: | 230 VAC (115 VAC optional) |
| Internal charger: | 230 VAC (115 VAC optional) |

**Time Base**

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|---|---|
| Standard clock accuracy: | 20 ppm (10 min/year @ - 10 °C to + 50 °C) |
| External time interfaces: | GPS |

**Indicators**

| | |
|---|---|
| Green: | AC Power LED |
| Green: | Run/Stop LED |
| Yellow: | Event/Memory LED |
| Red: | Warning/Error LED |
| LCD display: | User selectable choice of display parameters |

**Communication**

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|---|---|
| Serial ports: | 2 (1 for communication, 1 for GPS) |
| Baud rates: | 2400, 9600, 19200, 38400, 115200 |
| Communication protocol: | TG protocol |
| Protocol securities: | Checksum and software handshaking |
| Communication: | PC/RS-232 port or modem |
| Modem operations: | Auto Dial |

**Environment / Housing**

| | |
|---|---|
| Operational temperature: | - 20 °C to + 70 °C |
| Storage temperature: | - 40 °C to + 85 °C |
| Humidity: | 0 to 100 % RH (non condensing) |
| Type: | Aluminium housing |
| Size: | 280 x 180 x 100 mm |
| Weight: | 7.2 kg (incl. 6.5 Ah battery & charger) |
| Protection: | IP65 (NEMA 12) |

**Housing Options (Large Housing with Handles):**

| | |
|---|---|
| Size: | 330 x 230 x 180 mm |
| Weight: | ~10 kg (incl. 6.5 Ah battery) |
| Protection: | IP66 (optionally IP68) |

**Self Test**
Permanently active, self monitoring and user selectable, periodical system test including comprehensive sensor, memory, filter, real time clock, battery level and hardware tests.

**Seismic Switch / Warning Unit Option**
The **GSR-24** warning option provides four independent warning / error outputs (relay contacts) based on user selectable criteria. This option allows to configure the GSR-24 as a seismic switch.

| | |
|---|---|
| Alarms: | 2 relay contacts |
| Alarm levels: | 0.1 to 100 % of full scale (User programmable) |
| Relay Hold-On: | 1 to 60 seconds (User programmable) |

**GSNet Capabilities**
**GeoSIG** offers various network solutions such as Independent or Interconnected Recording Networks and Local or Central Recording Networks. On-line surveillance, common trigger and time synchronisation are some of the highly advanced functions within the GSNet.

**Specifications subject to change**