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GeoSIG
swiss made to measure

GSR-18 Strong Motion Recorder / GSD-18 Digitiser

Features

- **Standard 2 GByte Removable Memory**
- **Dynamic Range:**
  111 dB @ 100 SPS
  108 dB @ 200 SPS
- **RMS Noise:**
  5 µV @ 100 SPS
  7 µV @ 200 SPS
- **On-line Diagnostics and Self-Checking System**
- **LED and LCD Status Indication**
- **Detailed Analysis Tool with dedicated GeoDAS Data Analysis Package**
- **Continuous Data Stream Output**
- **Sets New Standards in Price / Performance for 18 Bit Technology**

Outline

The GSR-18 Strong Motion Recorder has a dynamic range of 111 dB @ 100 SPS and 108 dB @ 200 SPS. The standard 3 channel system has selectable sampling rates from 100 to 250 SPS.

A variety of sensors can be connected to the GSR-18 offering solutions for applications in miscellaneous fields.

Various network solutions such as independent or interconnected recording networks and local or central recording networks can be configured easily with highly advanced functions such as on-line surveillance, common trigger and time synchronisation. The standard parameter settings and the user-defined configurations can be transferred easily from the PC to the GSR-18.

Transferring data to PC while recording is possible and can be done also via modem. Optionally available is the dial-up system which allows the GSR-18 to call automatically a predefined telephone number after an event has been recorded.

A comprehensive package of advanced, menu-driven 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. GeoDAS Data Analysis Package is a dedicated evaluation program especially designed by GeoSIG for earthquake and civil engineering data analysis. It contains all necessary functions and performances for detailed evaluation in the frequency domain functions (FFT, Power Spectrum, Response Spectrum). Additional include integration (acceleration-velocity and velocity-displacement), CAV (Cumulated Absolute Velocity), Space (Rotation, Display) and various data filters.

The GSR-18 is also available as GSD-18 Digitiser only integrated into GeoSIG Seismic Network Systems.

The GSR-18 is the ideal, compact and most cost effective 18-Bit approach.

ISO 9001
REGISTERED FIRM

Specifications GSR-18 Strong Motion Recorder / GSD-18 Digitiser

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-18 is stored in an internal EEPROM which secures the configuration set-up independent of any backup battery requirements.

Data Analysis
The GeoDAS program provides basic time history data evaluation in the field. The GSR-18 supplies data available 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 in trade 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 with a single bolt mount, easy to install and to level with three levelling screws. Some sensors can also be built into the GSR-18 unit (internal sensors).

AC-63 Force Balance Accelerometer

Frequency Response:	DC to 100 Hz
Largest signal:	± 2 g Std. (± 1, ± 0.5 g optional)

AC-43 Accelerometer

Frequency Response:	DC to 100 Hz
Largest signal:	± 2 g Std. (± 4, ± 1, ± 0.5 g optional)

AC-23 Geophone-based Accelerometer

Frequency Response:	0.1 Hz to 50 Hz
Largest signal:	± 2 g Std. (± 1, ± 0.5, ± 0.2 g optional)

Anti Aliasing Filter

Filter response type:	FIR (finite impulse response)
Attenuation:	> 110 dB above Nyquist
Filter equation:	contact GeoSIG

Digitiser

Type:	4-Channel 22-Bit Sigma-Delta ADC
Dynamic Range:	111 dB RMS @ 100 SPS 108 dB RMS @ 200 SPS
RMS Noise:	5 µV @ 100 SPS 7 µV @ 200 SPS
Sampling rates:	100, 200, 250 SPS per channel
Bandwidth:	40% of sampling rate

Data Recording

Pre-event-Time:	1 to 30 seconds
Post-event-Time:	1 to 240 seconds

Triggering

Level Triggering

Lower band limit:	0.1 Hz (20 dB / decade)
Upper band limit (Can be turned ON or OFF):	12 Hz (40 dB / decade)
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 Card

Type:	Compact Flash
Recording time:	29 minutes per 2 MByte (@ 3 channels, 200 SPS)
Size:	2 GByte

Removable Memory Card (Standard)

Type:	Compact Flash (PC compatible without additional software)
Size:	2 GByte

Power Supply

Type:	Switched external power supply
Internal battery:	Rechargeable, 12 VDC, 7.2 Ah Lead battery
Power consumption:	130 mA @ 12 VDC
Autonomy:	2 days
Charger:	90 - 260 VAC / 50 – 60 Hz
Time Base	
Standard clock accuracy:	20 ppm (10 min/year @ - 10 °C to + 50 °C)
External time interfaces:	GPS (optional)

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 Intensity Scale (user defined)

Communication

Serial ports:	2 (1 for communication / continuous data stream, 1 for GPS)
Baud rates:	2400, 9600, 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. battery)
Protection:	IP65 (NEMA 12)
Housing Options (Large Housing with Handles):	
Size:	330 x 230 x 180 mm
Weight:	~10 kg (incl. battery)
Protection:	IP66 (optionally IP68)

TCP/IP Communication Option
Using a RS-232-TCP/IP device server, GSR-18 can be seamlessly integrated in a TCP/IP computer network for instrument set-up and data acquisition. Doing so each GSR-18 must be assigned a unique IP Address.

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-18 warning option provides four independent warning / error outputs (relay contacts) based on user selectable criteria. This option allows configuring the GSR-18 as a seismic switch.

Alarms:	2 relay for 2 alarm levels
Alarm levels:	0.1 to 100 % of full scale (User programmable per axis)
Relay Hold-On:	1 to 60 seconds (User programmable)
Capacity:	The contacts are suitable for a low voltage control. In case large load must be switched then external relays should be implemented.
Max voltage:	125VAC / 125 VDC
Max current:	250 mA

Interconnection Capabilities
GeoSIG offers various interconnection options to achieve Common Time, Common Trigger and Communication networks. Please refer to relevant documentation under "Strong Motion Instrument Networks"