

GSR-16LFDC / GSR-12LFDC Strong Motion Recorder

Features

- Force Balance Accelerometer
- 128 MByte Onboard Memory (Optionally up to 2 GByte)
- On-line Diagnostics and Self-Checking System
- LED and LCD Status Indication
- Detailed Analysis Tool with dedicated GeoDAS Data Analysis Package
- Compact and user-friendly
- Quick Installation
- Minimized Maintenance
- Broad Application Field



Outline

The GSR-xxLFDC is a versatile data acquisition system that represents the state of the art technology in earthquake monitoring with the incorporated high performance Force Balance Accelerometer.

The sensor signals are captured by an A/D converter and digitally filtered to increase accuracy and to provide reliable and stable performance.

GSR facilitates various parameters allowing the user to configure the instrument simply and specifically to the desired requirements.

A variety of trigger conditions can be selected to start data recording on the onboard memory, optionally removable, for later analysis. Recorded event data can be conveniently transferred to a local or remote computer using the serial interface. Transferring the recorded event data while recording another event is also possible.

An optional dial-up system facilitates to call automatically a predefined telephone number after an event has been recorded.

Optionally several interconnected instruments can be deployed to achieve a comprehensive Building Earthquake Monitoring System, which is becoming a worldwide standard in many metropolitan areas for especially buildings with 6 or more stories. GSR-xxLFDC is the ideal, compact and most cost effective Earthquake Monitoring System and is approved and renowned in numerous countries and states.

GSR is delivered with GeoDAS, a graphical Microsoft Windows-based application running under Windows 98/NT4/2000/XP. GeoDAS has user-friendly capabilities for GeoSIG instruments, for instrument configuration and state of health monitoring as well as data acquisition locally or remotely. Optionally a richly configured set of data analysis tools can be activated within GeoDAS.

Specifications GSR-16LFDC / GSR-12LFDC Strong Motion Recorder

Set-up and Configuration

All of the instrument configuration and operation settings are selectable via the GeoDAS software. The configuration of the GSR is stored in non volatile memory which secures the configuration independent of any backup battery requirements.

Data Analysis (Optional)

The GeoDAS program, if activated, provides comprehensive data evaluation. Once a data file is opened the analysis menu is available for functions like FFT, response and terzband spectras, etc. for example for initial rough estimation of mode and natural frequencies of structures.

Sensor

AC-43 Accelerometer
Frequency Response: DC to 100 Hz
Full Scale: ± 2 g Std
Optional ± 0.625 , ± 1 , ± 4 or ± 5 g
Noise: GSR-12LFDC: < 0.350 mg
GSR-16LFDC: < 0.080 mg

Analog Filtering

Antialiasing filter: 6th order Butterworth
Bandwidth: DC to 50 Hz (315 Hz)
Damping: 120 dB / decade
Signal to noise ratio: > 102 dB

Digitiser

A/D Converter: 12 and 16 Bit respectively
Least significant bit for 12 Bit: 0.025 % of full scale
Least significant bit for 16 Bit: 0.0015 % of full scale
Sampling rates: 100, 200, 250 SPS per channel
Bandwidth: 40% of sampling rate

Data Recording

Pre-event-Time: 1 to 20 seconds
Post-event-Time: 1 to 240 seconds
Compression factor: 2.5 typically

Triggering

Hardware Triggering (optional)

External switch to manually trigger.
Not to be used with Interconnection.

Level Triggering

Lower band limit: 0.1 Hz (20 dB / decade)
Upper band limit: 12 Hz (40 dB / decade)
Range: 0.1 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

Memory: 128 Mbytes Flash Memory
Recording time: 29 minutes per 2 Mbytes
(@ 3 channels, 200 SPS)

Removable ATA memory card (Optional)

Type: PC Card ATA Memory
(PC compatible without additional software)
Size: 128, 256, 512 Mbyte, 1, 2 GByte

Power Supply

Type: Switched power supply
Internal battery: Rechargeable, 12 VDC, 7.2 Ah
Lead battery
Power consumption: 1 W @ 12 VDC typically
Autonomy: 2 days
Charger: 90 - 260 VAC External Power Supply

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

Communication

Serial ports: 2 (1 for communication, 1 for GPS)
Baud rates: 1200, 2400, 4800, 9600, 38400, 57600, 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 % (non condensing)
Type: Aluminium housing
Size: 280 x 180 x 100 mm
Weight: 7.2 kg (incl. 7.2 Ah battery)
Protection: IP65 (NEMA 12)

TCP/IP Communication Option

Using a RS-232-TCP/IP device server, GSR can be seamlessly integrated in a TCP/IP computer network for instrument setup and data acquisition. Doing so each GSR can 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 warning option provides two independent warning / error outputs (relay contacts) based on user selectable criteria. This option allows to configure the GSR as a seismic switch.

Alarms: 2 relay for 2 alarm levels
1 relay for equipment fault alarm
Alarm levels: 0.1 to 100 % of full scale
(User Programmable per axis)
Relay Hold-On: 1 to 60 seconds
(User Programmable)

Interconnection

GeoSIG offers various interconnected network solutions which enable Common Timing, Common Triggering and Collective Data Acquisition facilities. Please see separate technical note about interconnection possibilities of GeoSIG Instruments.

Exceptionally GSR-xxLFDC is designed to be used in Building Earthquake Monitoring Systems utilizing interconnection option, for which an example can be seen below.

