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GeoSwitch Seismic Switch

Features

- ❒ **Three independent seismic relays**
- ❒ **Seismic event and equipment fault alarms**
- ❒ **Redundant Quadruplet Matrix (RQM)™ of triaxial MEMS accelerometers**
- ❒ **Internal maintenance free power backup**
- ❒ **Non-battery power autonomy**
- ❒ **Intuitive LCD display and LED indicators**
- ❒ **Automatic self-checking**
- ❒ **Easy installation and maintenance**
- ❒ **Bluetooth or USB console and serial MODBUS interfaces**
- ❒ **Intuitive GeoSwitch Configurator™ software for Windows and Mac OS X**
- ❒ **Push buttons for the easiest user interaction**
- ❒ **Complies with EU, ASME, ASCE, ICC regulations**

Outline

GeoSwitch is packed with many dominant distinctive features offering approvingly reliable protection for people, critical assets, devices and industrial processes. Delivering highly accurate detection of a strong earthquake or structural vibration with various safe shut down options. GeoSwitch has a broad range of applications such as Industrial Processes, Chemical Processes, Gas Valves, Hazardous Systems, Solenoids, elevators, walkways, Electronic gates and doors.

GeoSwitch provides a complete seismic switch system including four rugged triaxial accelerometers organized in GeoSIG RQM™ format and a digital threshold detection circuitry for up to three independent switch levels, output relays, and power backup.

GeoSwitch is housed in a versatile industrial rated enclosure with a single cable inlet for all connections.

Ideally suited for accurate monitoring of strong ground motions to control relay contacts at different acceleration levels for warning and/or alarm functions the GeoSwitch provides user programmable set-points over the full measuring range available.

Key features of the GeoSwitch include a wide selection of secure user interaction options including the built-in on demand Bluetooth, or the hardware ports of USB and serial MODBUS.

The USB console interface conveniently located under the transparent hood of the unit provides the simplest installation and maintenance under any condition using the GeoSwitch Configurator™ software.

Compensation for non-level mounting is provided by the GeoSwitch's sophisticated digital electronics, therefore high-precision leveling is not required.

The non-battery and maintenance free backup power guarantees proper functionality even if the power is lost at the moment of disaster.

A large and clear multi-line LCD screen as well as system status LEDs are only some of the unique features of the GeoSwitch, which provides clear and immediately useable information about the system status, latest sensor values, list and details of the last several events, as well as any relevant notifications it may provide.

Not only the versatility and user friendly interface but also the internal digital circuitry of the GeoSwitch has several advanced features, which implements the decades of GeoSIG experience in monitoring strong ground motions into this unique and reliable seismic switch.

GeoSwitch performs automatic system tests continuously on each sensing and processing component which yields a truly reliable unit. An error indicator is illuminated if a system trouble is detected, for which one of the relays can be assigned as well.

The cable terminal port of the GeoSwitch provides the easiest connectivity and a host of services to any remote operator. The state-of the art MODBUS interface allows integration of the GeoSwitch into existing infrastructures.

GeoSwitch Seismic Switch Specifications

General

GeoSwitch monitors the ground motions in three orthogonal axes (one vertical and two horizontal). Relay contacts change state (open or close) when ground motion exceeds selected levels of acceleration.

Sensor

Type:	Triaxial MEMS
Quantity:	4 sensors
Redundancy:	Redundant Quadruplet Matrix (RQM)™
Full Scale Range:	±2, 4, 6, 8 or 16 g, software selectable
Frequency Response:	DC – 50 Hz
Noise:	0.15 mg/sqrt(Hz)
Shock resistance:	3000g, 0.5 ms; 10'000, 0.1 ms

Digitiser

Channels:	3
Resolution:	16 bit with anti-aliasing filter

Trigger

Combinable types:	Threshold, Threshold & Fault, Vector sum, Vector sum & Fault, Power, Fault, Heartbeat.
Range:	0.001 – 16.0 g. Individually selectable for each channel or on the vector sum of all channels.
Bandpass Filters:	0.5 – 10.0 Hz, 1.0 – 10.0 Hz, 1.0 – 7.7 Hz, 2.0 – 3.0 Hz, 0.1 – 15 Hz (20 dB/decade).
Window:	2.0 – 6553.5 s.

Relays

Setpoints:	Up to 3 one per alarm level plus equipment fault on error or other free combination of Trigger types.
Setpoint Memory:	Non-volatile memory retains settings if power is lost.
Contacts:	500 mA at 60 VAC/VDC with typical 10 ms set time. Normally Open or Normally Closed, user configurable.
Hold Time:	0.1 – 6553.5 s, reset automatically. 0 sec, latched.
External Reset Contact:	Confirmation of events or device reset.
Buzzer:	User selectable, triple beep every 10 s.

Self Test

Continuous self-monitoring. System tests include comprehensive check of sensors, real time clock, supercap charge level, external power and hardware. The unique RQM™ organization allows permanent monitoring of the individual sensor cells and facilitates the use of healthy sensors for earthquake detection, thus minimizes the probability of false / missed alarms.

In case of a system problem the user will be informed by an indicator and the assigned relay contact. Additionally system status can be monitored through console or MODBUS interface.

A warning indicator is illuminated if user's attention or maintenance is required.

Power

Input:	9 – 18 VDC. Optional higher ranges.
Autonomy:	> 400 s with maintenance-free supercap; Up to several days with optional battery.
Adapter:	Optional 115/230 VAC, 50/60 Hz, switched.
Consumption:	0.5 W typical running. 6 W max at start up, to charge supercap.

Communication / User Interface

LCD-display:	Demonstrates key parameters including system time and number of registered events for each relay. Can show history of up to 10 last events for each relay.
LED indicators:	POWER, WARNING, ERROR, ALARM1, ALARM2, ALARM3.
Push Buttons:	"Up", "Down", "Select" (to navigate on LCD).
MODBUS:	RS-232 or RS485 (jumper selectable) interface. Slave address:1 – 247. Baud rates are 9600, 19200, 38400, 57600, 115200.
Console:	USB, optionally Bluetooth.

GeoSwitch Configurator software for Windows and Mac OS X.

Connectivity

USB or Bluetooth:	On USB type B socket for - system configuration, - listing of PGA values from the last events, - link with GeoSwitch Configurator™.
Bluetooth:	Optional wireless interface for - system configuration, - listing of PGA values from the last events, - link with GeoSwitch Configurator™.
Serial MODBUS:	On spring terminals for - system configuration, - listing of PGA values from the last events, - periodical PGA polling.
Relay contacts:	On spring terminals.

Environment / Housing

Operational Temp.:	- 20° C to + 70° C
Storage Temp.:	- 40° C to + 85° C
Humidity:	0 % to 100 % RH (non condensing)
Housing Type:	UV stabilized Polycarbonate with UL94-HB flammability rating. Optional non-transparent lid. Optional aluminum or steel housing. Optional EX-proof housing.
Dimensions:	171 x 121 x 55 mm (201 mm with mounting flanges)
Weight:	250 gram
Protection:	NEMA 4/4X, IP65

International / Regional / National Standards

GeoSwitch is designed in full compliance to the following standards and therefore to all other international or national standards that are in parallel with these:

EU EN 81-77:2013:	European Standards, Safety rules for the construction and installations of lifts
ASME A17.1-2007:	American Standards, Safety Code for Elevators and Escalators
ASCE 25-97:	American Standards, Seismic gas shutoff valves
ICC-ESAC156-2007:	International Code Council, Acceptance Criteria For Seismic Certification By Shake-Table Testing Of Nonstructural Components