GeoSIG Ltd
Wiesenstrasse 39
8952 Schlieren
Switzerland

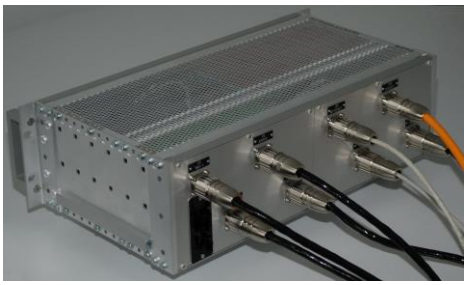
Tel: +41 44 810 21 50
Fax: +41 44 810 23 50
E-mail: info@geosig.com
Web: www.geosig.com

GeoSIG
swiss made to measure

STS Seismic Trip System

Features

- High reliability by using only hardware for the trip signal
- Field proven GeoSIG accelerometer
- Trip on any individual sensor axis or on any vector sum of axes
- Highly flexible analog filtering for the sensor signal to fit project requirements
- Testable analog full chain from sensor up to alarm output
- Permanent monitoring of the connection to the sensor
- Easy maintenance and simple troubleshooting with rich number of test points and indicators
- Protected against misuse with key switch and permanent monitoring
- Permanent digital recording of full waveform
- Digital recorder based on field proven GeoSIG CR-6plus system
- Realtime streaming of digital waveform and system status through Ethernet or Serial interface
- Comprehensive dedicated software package
- Easily integrated in a standard 19" rack
- Independent and autonomous



Applications

- Automatic Seismic Trip System (ASTS)
- Detectors for integration in an ASTS
- Connection to an emergency shutdown system
- Nuclear Reactor protection
- Power Plant protection / stop
- Industrial Process protection / stop

Outline

STS is a state-of-the-art seismic switch / trip system packaged as a 19'' rack module consisting of Slot-in Modules (SiMs) inserted into vertical slots with a remote accelerometer connected to it.

It provides a set of highly reliable alarm contacts as outputs activated by exceedance of acceleration and/or based on state of health.

The STS combines the best of the analog and digital technologies by utilising only hardware for the highly reliable alarms, and digital data acquisition for realtime digital monitoring, recording, playback, in-depth processing and archiving of the sensor signal.

The unit provides full traceability of the sensor signal as well as the system logs, even if no trip was activated; with a buffer spanning to several weeks back.

All of the digital information can also be provided to remote users in the realtime, on demand, continuously and/or periodically.

Specifications STS Seismic Trip System

Sensor

Model:	STS-AC73 *
Type:	True Electro-mechanical Force Balance Accelerometer
Dynamic Range:	165 dB (per bin rel. full range)
Bandwidth:	DC to 200 Hz
Cross Axis Sensitivity:	< 0.5 %
Protection:	IP66 stainless steel protective housing
Power:	24 VDC from STS module
Signal transmission:	Current loop 4 to 20 mA

* other sensor models are available on request

STS Rack – Analog Modules

Power Supply SiM

DC input:	24 VDC (9 - 36 VDC) with DC/DC insulation
Power:	30 W max

Sensor Interface SiM

Input Channels:	3 (for triaxial sensor)
Input Signal:	4 - 20 mA current loop
Sensor Power:	15 or 24 VDC

Analog Filters SiM

Type:	Highpass (HP) and Lowpass (LP) up to 6 poles each
Bandwidth:	0.5 - 10 Hz by default, adjustable per project
Test mode:	Filter disable switch for testing

Trip Level 1 / 2 Comparator SiM

Comparators:	One per each sensor axis, totally 3
Optional:	Vector calculation (analog) before compare
Level adjustment:	By potentiometers and dip-switches
Verification of settings:	Test points on front panel

Alarm Logic SiM

Type:	Fully discrete, no firmware
Numbers of alarms:	4, each with jumper selectable source
Restart:	A restart timer is used to avoid random condition during power up, especially for low trip level having an HP filter set to a low frequency
Control panel:	Test, Acknowledge, Reset buttons for alarms with security key
Status lamps:	One per each alarm and power status

Alarm Outputs SiM

Coil status:	Normally energized or not, user selectable
Hold timer:	Selectable from 0.8 to 5, 15 or 30 seconds
Alarm type:	Latched with acknowledge/reset or hold time

Relays Interface Board

Relays type:	Solid state opto-relays
Contacts type:	2 inverters
Contact verification:	Resistors in parallel and series

STS Rack – Digital Modules

Data Handling SiM

Data Recording:	Continuous and/or event trigger based
Trigger Type:	Level or STA/LTA trigger
Pre- / Post-event-Time:	1 to 720 / 1 to 7200 seconds, typical
Trigger filtering:	User configurable LP, HP or bandpass (BP)
Data Stream:	GSBU, SeedLink (Earthworm compatible)
Storage Memory:	64 GByte removable microSD Card, or higher with policy based intelligent management
Recording format:	miniSEED, optionally with extended information encapsulated into blockette 2000

Digitiser SiM

Channels:	3 channels per SiM (for triaxial sensor)
A/D Converter:	24 Bit Δ–Σ per channel with FIR anti-aliasing
Sampling Rate:	Up to 1000 SPS

Interface Digital/Analog

Type:	Unidirectional analog to digital with insulation

Self-Test and Self-Monitoring (Analog and Digital)

The ERROR alarm by analog part:

The alarm can be activated from various sources: a board is removed, a power supply has an under-voltage condition, a sensor signal is in error or an alarm SiM has a permanent trip.

TEST alarm by analog part:

When the TEST button is pressed on the unit, an alarm is activated. Same if the test line to sensor activated for any reason or the filter switch set to disabled mode.

Digital part:

The digital part receives the alarms status and sends it with the measured acceleration signal to the communication channel. A SOH is built by the digital system and transmitted to the user.

Time base (Digital)

Internal:	Intelligent Adaptive Real Time Clock (IARTC)
External:	NTP (requires Ethernet connection)
Std. TCXO accuracy:	±0.5 ppm (15 s/year) @ +25 °C
Accuracy with NTP:	< ±4 ms typical, assuming reasonable access to NTP servers

Communication Channel (Digital)

Standard:	Ethernet TCP/IP for streaming and SSH or web interface access.
Optional:	Serial port for unidirectional streaming data and system status

User Interface (Analog and Digital)

Analog

Clear indicators and push-buttons allow the operator to easily perform tasks. The unit is also made to operate independently from any operator action. The front panel is populated with test points and indicators to simplify maintenance and troubleshooting tasks. The setting of the trip system (levels, duration, …) is achieved by adjusting potentiometers.

Digital

An intuitive web interface is available for easy configuration with any web browser. Alternatively the configuration file in XML format can be edited on site through the instrument console, exchanged by replacing the memory card, remotely from a server or through SSH. Even if the configuration file can be manually edited at any time, a tool is provided to edit it securely.

When using the serial port for sending data (streaming) and status to an archiving system, the system can be operated only locally through the front panel serial console or connecting directly to the Ethernet port. This gives the full control of the digital part of the system only locally. At all times the analog part remains independent.

Alarms output (Analog)

Alarms:	Trip level 1 and 2, error and test mode.
Contacts:	2 independent relay contacts for each alarm (NO and NC contacts available, normally energized / non energized selectable)
Relay Hold-On:	0.8 to 5, 15 or 30 seconds (fixed) other values on request
Contacts:	Suitable for a low voltage control. In case large loads must be switched then external relays should be implemented
Max voltage:	50 V / 50 mA
Option:	Other relays and output range on request

Environment / Housing

Operational temperature:	0 °C to +50 °C
Storage temperature:	-40 °C to +85 °C
Humidity:	10 % to 90 % (non condensing)
Rack Dimensions:	19'' rack, 3 U, 240 mm depth + connector and front handle
Protection:	IP20, housing with higher protection available on request

Specifications subject to change without notice