TECHNICAL INFORMATION

PREDICTIVE MAINTENANCE SYSTEMS

SENSONICS LTD

SA-3 Safety Seismic Switch



- Frequency Response 0.1Hz to 100Hz
- Sensitivity up to 50V/g
- Unique Self Calibration Facility
- Actuating Range 5mg to 500mg
- Seismically Qualified to IEEE-344

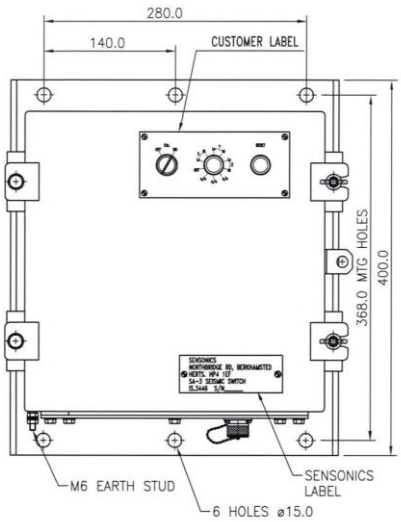
Sensonics type SA-3 safety seismic switch is a tri-axial vibration detection device, suitable for the protection of vulnerable structures from seismic events. The unit features three high sensitivity low noise seismometers and high integrity alarm circuitry. The switch is seismically qualified and features an optional 2 out of 3 voting system.

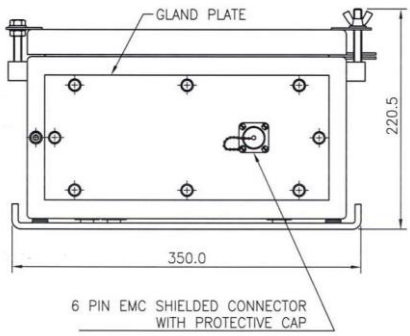
The switch operates on seismic events and when the signal from any axis exceeds the pre-set alarm level, the alarm relay is activated. Failure of any sensor or of the power supply will also cause an alarm relay to be activated. The contact changes from these relays are available for external use.

The detectors of the triaxial seismic switch are high sensitivity piezo-electric accelerometers. The low frequency cut-off point is set to 0.1 Hz (-3dB). The three detectors are positioned at 90° to each other in the robust steel box together with the associated electronics. Each of the detector channels consists of the accelerometer, a pre-amplifier and a compensating amplifier. This latter stage compensates for sensitivity changes of the piezo-electric crystal at different temperatures. The output signal is biased to a DC level and the vibration AC signal is superimposed on the DC voltage. Both the DC and AC voltages are set within +/- 2% tolerance to enable the user to change the accelerometers without re-setting any of the other stages in the seismic switch.

TECHNICAL SPECIFICATION

Sensor Type:	Accelerometer type SP4 / IS.3183.
Type of Motion:	Multiaxial.
Sensing Element:	Piezo electric.
Orientation:	Three axis, mutually at right angles, suitable for use in any attitude.
Material:	Outer weatherproof housing, painted steel.
Mass and Moment of Inertia:	Overall assembly 15Kg. Inertial mass of each sensor: 0.6Kg
Power Supply	220Vac / 110Vac / +24V, <5W
Outputs	(a) Sensor: voltage proportional to acceleration. (b) Seismic switch: seismic and fault alarms, relays normally energised, voltage free. Two sets of change over contacts for seismic alarm in any axis.
Contact Ratings:	Max switching power 60W, 110VA (resistive load). Max voltage 220VAC or DC. Max current 2A.
Measurement Range:	Sensor: 90dB dynamic.
Sensor Frequency Response:	0.1Hz to 1000Hz (3dB).
Seismic Switch threshold range:	>0.005g field adjustable, by axes.
Sensitivity:	Sensor/amplifier: 2V/g – 50V/g, normalised to within +/- 2%.
Frequency Range:	Selectable, 0.1 to 5Hz, 0.1 to 10Hz, 0.1 to 15Hz and 0.1 to 30Hz, (18db/Octave roll-off).
Phase Shift:	negligible between sensors.
Transverse Sensitivity:	less than 1% each axis up to 3.5g.
Limits for Maximum Motion:	20g shock without Damage.
Linearity:	0.1% full scale, each axis.
Hysteresis:	None.
Operating Temperature Range:	-30ºC to +70ºC.
Humidity Effects:	(a) Sensors hermetically sealed. (b) Outer housing sealed to IP.65.
Thermal Transient Effects:	Sensors isolated from thermal shocks.
Effect of Acoustic Fields:	Noise signals filtered out above 100Hz.
Effect of Electrical noise:	No measurable output at 0.5mT 50Hz, less than 0.001g at 10mT, 50Hz., EMC shielded to 60dB at 100MHz.
Earth current / Ground Loops:	All internal circuits isolated from outer housing.
Base-strain Sensitivity:	Sensors isolated from base strains by virtue of mounting design.
Radiation exposure effects:	Unaffected by 200,000 rads over 40yrs.
Calibration facility:	Two internally pre-set ratio levels from single AC input from external source.





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