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AC-63 Triaxial Force Balance Accelerometer

Features

- **Full Scale ± 2 g (± 0.5, ± 1 g optional)**
- **Bandwidth DC to 100 Hz (50 or 200 Hz)**
- **Dynamic Range > 120 dB**
- **Offset stability**
- **Temperature and drift compensation**
- **No installation adjustments required due to Digital Sensor Control (DSC)**
- **Downhole version (AC-63-DH) is also available**
- **Robust suspension system**
- **Single Bolt Mounted Enclosure provides up to ± 10° of Levelling Adjustment**

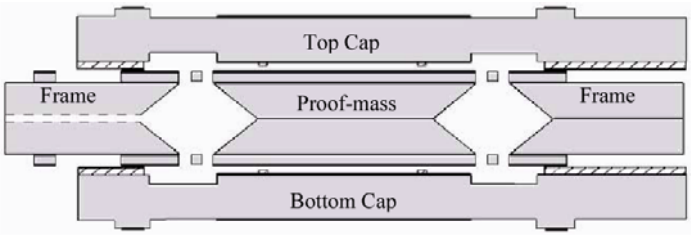
Outline

The AC-63 sensor package is a triaxial accelerometer designed for freefield and industrial applications regarding STRONG-MOTION earthquake survey and vibration monitoring. All these applications require high dynamic, rugged sensors with a minimum of maintenance and a simple method for periodic testing.

The AC-63 accelerometer sensor is based on the latest MEMS (Micro Electro-Mechanical Systems) technology, combined with state of the art circuit design allows to produce this reliable Accelerometer.

The MEMS accelerometer has a variable capacitor design that is operated in a closed-loop configuration with a custom mixed-signal application-specific integrated circuit (ASIC).

The MEMS accelerometer is a wafer stack composed of four individual wafers bonded together. Within the inner two wafers of the stack, and suspended by silicon springs, is a moving structure called the proof-mass. This forms a differential variable capacitance between the surfaces of the moving proof-mass and the fixed caps. As the accelerometer is subjected to vibration, the proof-mass moves between the fixed plates which, in turn, causes a change in the differential capacitance.



Cross-section of the MEMS accelerometer 4 wafer stack

To optimize the performance of the accelerometer, a custom mixed-signal ASIC was designed. As changes in capacitance are sensed, the ASIC applies a restoring electrostatic force to keep the proof-mass in centered position. The feedback force is directly proportional to applied acceleration.

The DC response allows the sensor to be easily repaired, tilt tested or recalibrated in the field. With the help of the TEST LINE the AC-63 accelerometer can be completely tested assuring proper operation and accurate acceleration measurement.

Specifications AC-63 Triaxial Force Balance Accelerometer

General Characteristics

Application: Strong Motion earthquake survey and industrial applications requiring rugged sensors

Configurations:

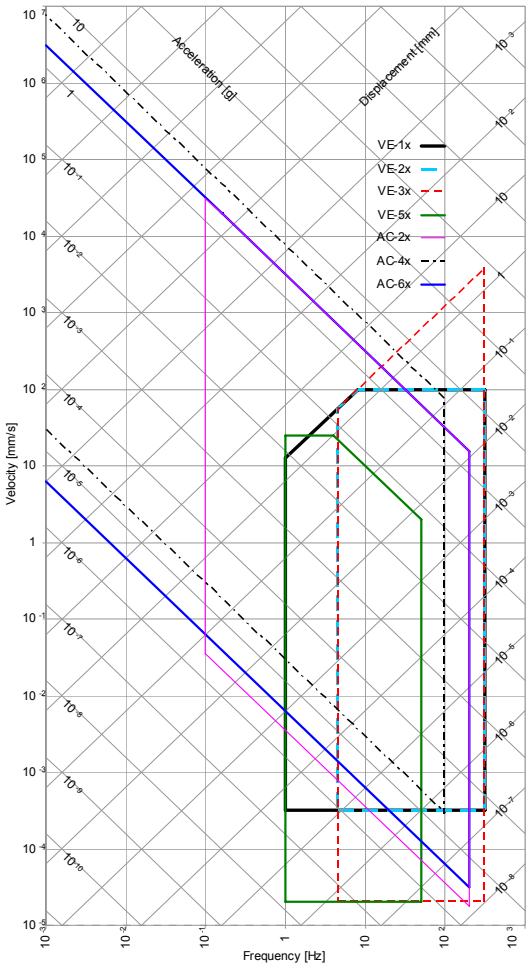
	Triaxial	Biaxial	Uniaxial	Axes X – Y – Z	Alignment** H – H – V
AC-63 or AC-63i*:	■			X – Y – Z	H – H – V
AC-62-H or AC-62-Hi*:		■		X – Y	H – H
AC-62-V or AC-62-Vi*:		■		X (or Y) – Z	H – V
AC-61-H or AC-61-Hi*:			■	X (or Y)	H
AC-61-V or AC-61-Vi*:			■	Z	V

* i : Internal sensor ** H: Horizontal, V: Vertical

Full Scale Range: ± 2 g
optional ± 0.5 or ± 1 g

Sensor Element

Type: Force Balance Accelerometer
Dynamic Range: >120 dB effective at ± 2 g full scale
Nonlinearity: < 0.1 %
Hysteresis: < 0.01 %
Cross Axis Sensitivity: < 0.5 %
Bandwidth: DC to 100 Hz
optional DC to 50 or 200 Hz
Damping: 0.7 critical
Offset Drift: 100 ug / °C
Span Drift: 75 ppm / °C
Full Scale Output: 0 ± 10 V differential (20 Vpp)
optional 2.5 ± 2.5 V single-ended (5 Vpp)
0 ± 5 V differential (5 Vpp)
0 to 20 mA current loop
Measuring Range: See plot



Power

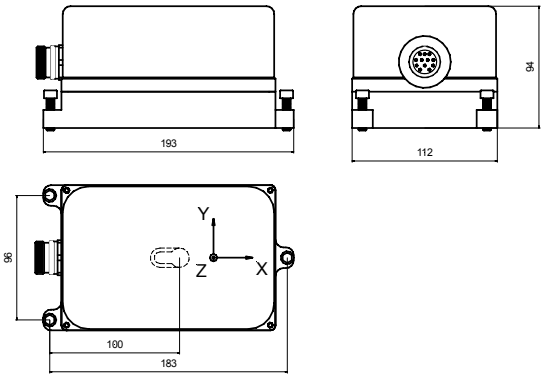
Supply Voltage: 9.2 to 15 VDC, single supply
Consumption: 70 mA @12 V
Connector: Metallic, Shielded, IP67, 12 pins, male
optional MIL, Bendix PT07A 14-19P
Mating: Binder / Coninvers type RC
Overvoltage Protection: All pins are protected

Connector Pin Configuration

Pin 1-2, 3-4, 5-6 Signal output for axis X, Y, Z
Pin 7-8 Test input, Digital test-pulse (0 – 12 V)
Pin 9-10 +12 VDC Power Supply
Pin 11-12 Auxiliary input
Case Shield connection

Environment/Housing

Housing Type: Cast aluminium
Sealed access cover
Housing Size: 193 x 112 x 94 mm
Weight: 3.0 kg
Index of Protection: IP 65
optional IP 68
Temperature Range: - 20 to 70 °C (operating)
- 40 to 85 °C (non-operating)
Humidity: 0 to 100 % (non-condensing)
Orientation: Can be configured for mounting in any position.
Mounting: Single bolt, surface mount, adjustable within ± 10°



Standard AC-6x Floor mounted, Full scale ± 2 g, 2 m cable with sensor mating connector, concrete anchor and user manual on CD

Options

Cable & connector: Sealed cable inlet, replaces connector
Cable with shielded twisted pairs for any length (including mating sensor connector) with open end
Cables for connection to GeoSIG recorder
Connector on user specification mounted at cable end
Housing: Watertight IP68 housing
Downhole housing
Stainless steel protective housing

Ordering Information

Specify: Type of AC-6x, full scale range, and other applicable options