

AC-63 / AC-62 / AC-61 Force Balance Accelerometer

Features

- Full Scale ± 2 g (0.5, 1 or 3 g optional)
- Bandwidth DC to 50 or 100 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 $\pm 10^\circ$ of Levelling Adjustment



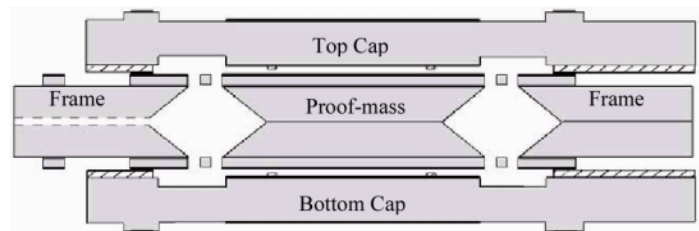
Outline

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 Force Balance 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 / AC-62 / AC-61 Force Balance Accelerometer

General Characteristics

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

Configurations:

AC-63 or AC-63i*:

AC-62-H or AC-62-Hi*:

AC-62-V or AC-62-Vi*:

AC-61-H or AC-61-Hi*:

AC-61-V or AC-61-Vi*:

	Triaxial	Biaxial	Uni-axial	Axes	Alignment**
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

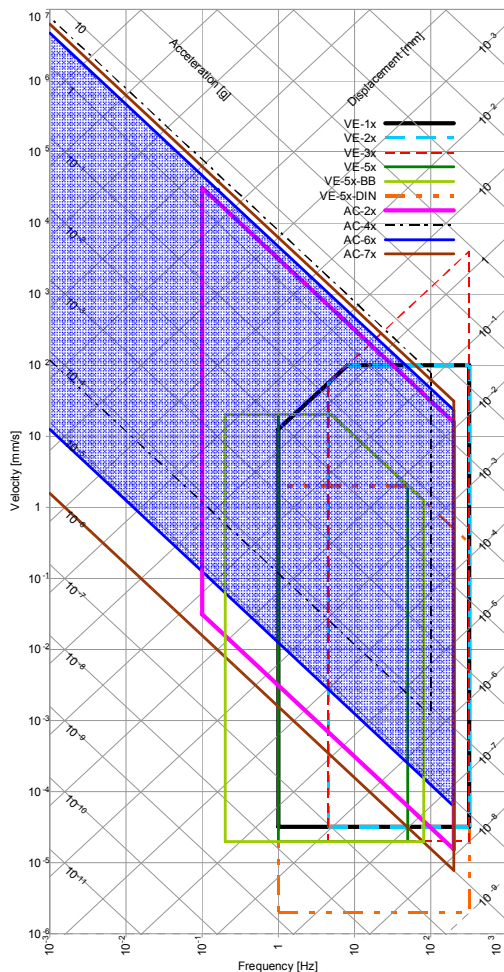
* i : Internal sensor ** H: Horizontal, V: Vertical

Full Scale Range: ± 2 g
optional $\pm 0.5, \pm 1$ or ± 3 g

Sensor Element

Type: Force Balance Accelerometer
 Dynamic Range: >120 dB effective at ± 3 g full scale
 Nonlinearity: < 0.1 %
 Hysteresis: < 0.01 %
 Cross Axis Sensitivity: < 0.2 %
 Bandwidth: DC to 100 Hz
 optional DC to 50 Hz
 Damping: 0.7 critical
 Offset Drift: 100 μ g / °C
 Span Drift: 75 ppm / °C
 Full Scale Output: 0 ± 10 V differential (20 Vpp)
 optional 2.5 ± 2.5 V single-ended (5Vpp)
 0 ± 5 V differential (5 Vpp)
 0 to 20 mA current loop

Measuring Range: See plot



Power

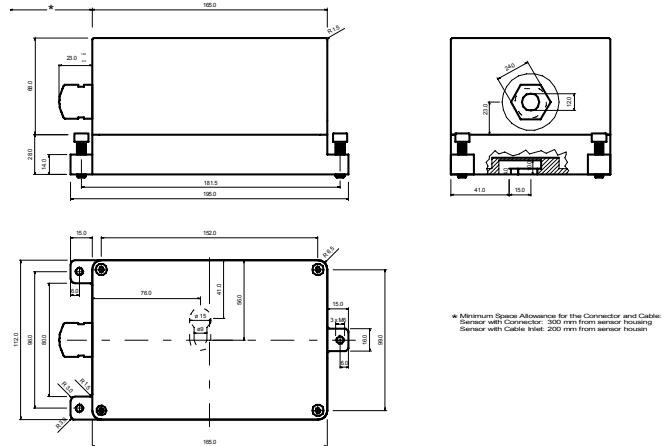
Supply Voltage: 9.2 to 15 VDC, single supply
 Consumption: 70 mA @12 V
 Connector: Metallic, Shielded, IP67, 12 pins, male
 optional MIL, Bendix PT07A 14-19P
 Binder / Coniners type RC
 All pins are protected

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: 195 x 112 x 96 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 $\pm 10^\circ$



Standard AC-6x

Floor mounted, Full scale ± 2 g,
 2 m cable with cable inlet and recorder
 mating connector, concrete anchor bolt
 and user manual on CD

Options

Cable & connector: Cable connector
 Metallic, Shielded, IP67, 12 pins, male
 optional MIL, Bendix PT07A 14-19P
 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 IP 68 housing
 Downhole housing (AC-6x-DH)
 Stainless steel protective housing
 As internal sensor
 Mounting: Wall mounted