AC-7X-DH Force Balance Accelerometer

Overview

The AC-73-DH sensor package is a true electro-mechanical triaxial downhole accelerometer designed for broadband earthquake monitoring as well as applications requiring highly sensitive and rugged sensors with minimum maintenance and a simple method for periodic testing.

The rugged mass suspension moving coil system improves the signal to noise ratio. The magnetic system and capacitive position sensors offer symmetrical controls for the accurate electronic centring of the mass. At rest the accelerometer mechanism is in balance and no electrical output is generated.

In case of a ground motion, AC-73-DH yields an electrical output proportional to the current used to keep the mass centred. This output signal is precisely calibrated to provide a signal at the utmost accuracy and with a lowest possible noise level. The symmetrical positioning system incorporated with the force balance accelerometer principle, the accelerometer faithfully keeps its scaling and calibration even under extreme conditions.

The DC response allows the sensor to be tilt tested or recalibrated in the field. With the help of the test line the AC-73-DH accelerometer can be completely tested assuring proper operation and accurate acceleration measurement. This test line is internally connected to the external world only when a given command is sent to the sensor to avoid any noise pick-up through the test input.

Key Features

- True electro-mechanical force balance accelerometer
- Built-in compass as well as tilt, temperature and humidity sensors
- Extremely robust downhole housing
- Suitable for borehole diameters of 100 mm and larger
- Proprietary iSensor™ interface
- Dynamic range 165 dB
- Full scale range: ± 0.5, 1, 2, 3 or 4 g
- Bandwidth from DC to 200 Hz
- Integrated bubble level

The AC-73-DH is equipped with electronic offset adjustment features that make its installation very user friendly. This powerful feature allows the users to install the AC-73-DH without mechanical offset adjustment and fine levelling.

The advanced iSensor™ interface allows easy deployment using built-in hardware like compass as well as tilt, temperature and humidity sensors.

The sensor can be powered from 9.5 to 18 VDC source with the advantage that its power input is insulated from the sensor's electronic ground. This avoids ground loops and reduces noise induced through the power supply.

AC-7X-DH Force Balance Accelerometer

Specifications

General Characteristics

Configurations***:

	Triaxial	Biaxial	Uniaxial	Axes	Alignment**
AC-73 or AC-73i*:	■			X – Y – Z	H – H – V
AC-72-H or AC-72i-H*:		■		X – Y	H – H
AC-72-HV or AC-72i-HV*:		■		X – Z	H – V
AC-71-H or AC-71i-H*:			■	X	H
AC-71-V or AC-71i-V*:			■	Z	V

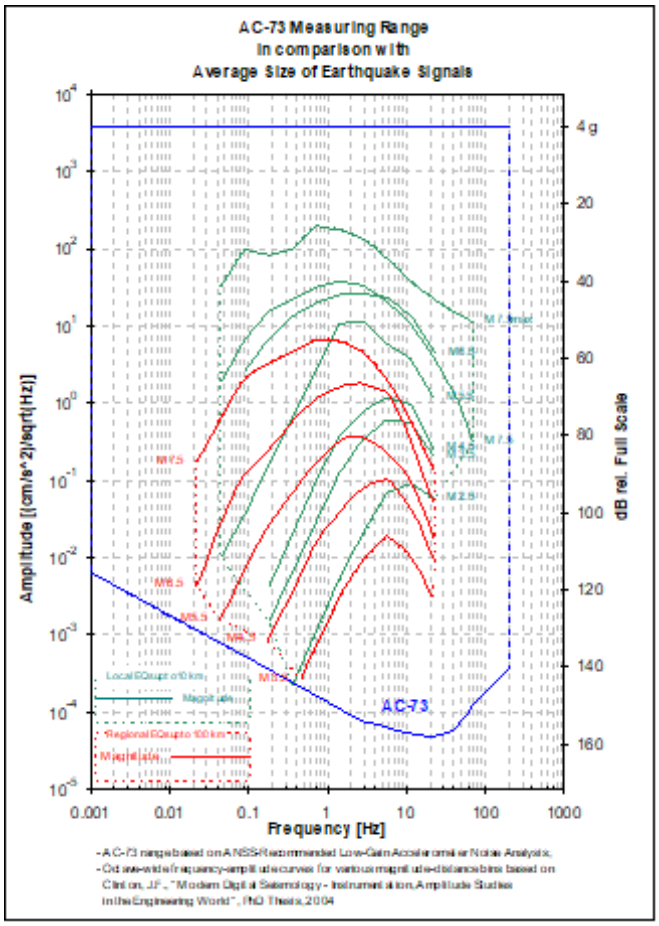
* i : Internal sensor ** H: Horizontal, V: Vertical

***: add "D" after number of channels for digital version

Full scale range: ±2 std., ± 0.5, 1, 3 or 4 g

Sensor Element

Type:	True electro-mechanical force balance accelerometer
Dynamic range:	165 dB (per bin rel. full range) 156 dB (per bin rel. full scale rms) 134 dB (0.02 – 50 Hz, integrated PSD)
Nonlinearity:	< 0.1 %
Cross axis sensitivity:	< 0.5 %
Bandwidth:	DC to 200 Hz
Damping:	0.7 ±0.1 critical
Offset drift:	0.0005 g / °C
Span drift:	200 ppm / °C
Full scale output:	0 ±10 V differential (20 Vpp)
Hysteresis:	< 0.001 % of full scale
Sensitivity:	2.5 to 20 V/g
Output impedance:	100 ohms



iSensor™ Interface

iSensor™ interface is a state-of-the-art innovative and proprietary hardware and software interface developed by GeoSIG, which allows through its special computer software the operation, control, logging and data export for the built in:

- compass
- tilt sensor
- temperature sensor
- humidity sensor

Power

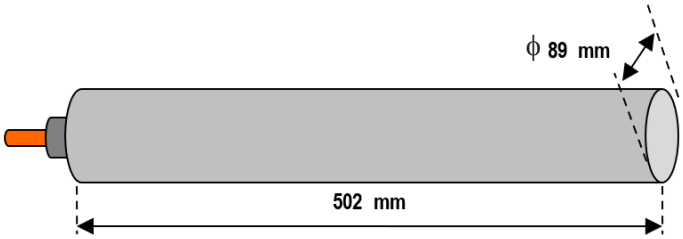
Power input:	Insulated
Supply voltage:	9.5 to 18 VDC, single supply
Consumption:	80 mA typical, 120 mA max. @15 VDC
Overvoltage protection:	All pins are protected with double stage barrier

Connector Pin Configuration

Pin 1-2, 3-4, 5-6	Signal output for axis X, Y, Z
Pin 7-8	Test input, Digital 0/12 V / GND
Pin 9-10	12 VDC insulated power supply input
Pin 11-12	iSensor™ interface (RS-485)
Case	Shield connection

Environment/Housing

Housing type:	Austenitic stainless steel
Housing size:	ϕ89 mm x 502 mm
Weight:	7.5 kg (typical configuration)
Index of protection:	Watertight up to 10 bar (100 m)
Temperature range:	-20 to +70 °C (operating) -40 to +75 °C (non-operating)



Standard AC-7x-DH Full scale ± 2 g, with cable inlet and surface junction box

Options

Cable & connector:
- See separate cable and connector options sheet
- Connector on user specification can be mounted at cable end

Surface control unit:
- iSensor interface

Ordering Information

Specify: Type of AC-7x-DH, full scale range, depth of deployment, cable length, and other applicable options