### AC-73 / AC-72 / AC-71 DATA SHEET



# AC-7x Force Balance Accelerometer

### **Overview**

The AC-73 sensor package is a true electro-mechanical triaxial accelerometer designed for broadband earthquake monitoring and 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 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 easily repaired, tilt tested or recalibrated in the field. With the help of the test line the AC-73 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.

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## **Key Features**

- True electro-mechanical force balance accelerometer
- Digital AC-73D version available
- Dynamic range 165 dB
- User selectable full scale range: ± 0.5, 1, 2, 3 or 4 g
- Bandwidth from DC to 200 Hz
- Exemplary offset stability
- Temperature and drift compensation
- Robust suspension system
- Single bolt mounted enclosure with up to ± 10° of levelling adjustment
- Integrated bubble level

The AC-73 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 without mechanical offset adjustment and fine levelling.

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.

All the best features of the analog AC-73 accelerometers are now offered with the new AC-73D version, having a digital interface that is directly compatible to operate with the GMSplusD series recorders with up to 1,000 meter distances using standard Cat5e cables, providing an extremely compact and versatile measuring solution.

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GeoSIG Ltd Wiesenstrasse 39, 8952 Schlieren, Switzerland. Tel.: +41 44 810 21 50





### **AC-7x Force Balance Accelerometer Specifications**

| General Characteristic<br>Versions: | c <b>s</b><br>AC-7x:<br>AC-7xD: |
|-------------------------------------|---------------------------------|
| Configurations***:                  |                                 |
| AC-73 or AC-73i*:                   | *:                              |
| AC-72-H or AC-72i-H                 | HV*:                            |
| AC-72-HV or AC-72i-                 | *:                              |
| AC-71-H or AC-71i-H                 | *:                              |
| AC-71-V or AC-71i-V                 | *:                              |
| Full scale range:                   | ±2 std., =                      |
| Sensor Element                      | user sele                       |

Type:

Dynar Nonlir Accura Cross Bandy Damp Offset Span of Full sc Hyste Sensit Outpu

104

10

10

10

10

10

10

10"

10<sup>-8</sup> 0.001

0.01

Octave-wide frequency-amplitude curves for w Clinkon, J.F., "Modern Digital Seismology - Int in the Engineering World", PhD Thesis, 2004

(cm/s^2)/sqrt(Hz)]

umplitude 10

| AC-7x:   |                              | analog<br>digital |               |                     |                          |
|--|------------------------------|-------------------|---------------|---------------------|--------------------------|
|  | <ul> <li>Triaxial</li> </ul> | Biaxial           | Uniaxial      | Axes<br>X – Y – Z   | Alignment**<br>H – H – V |
| :  |                              |                   |               | X – Y               | H–H                      |
| IV*:   |                              |                   |               | X – Z               | H – V                    |
| :  |                              |                   |               | Х                   | Н                        |
| :  |                              |                   |               | Z                   | V                        |
| * i : Internal sensor ** H: Horizontal, V: Vertical<br>***: add "D" after number of channels for digital version |                              |                   |               |                     |                          |
| ±2 std.<br>user se   | , ± C<br>elect               | ).5, 1<br>able    | , 3 c<br>at f | or 4 g<br>ield      |                          |
| True el<br>force b   | ectr<br>balar                | o-m               | iech<br>acce  | anical<br>lerometer |                          |

|                             | force balance accelerometer           |
|-----------------------------|---------------------------------------|
| nic range:                  | 165 dB (per bin rel. full range)      |
|                             | 156 dB (per bin rel. full scale rms)  |
|                             | 134 dB (0.02 - 50 Hz, integrated PSD) |
| nearity:                    | < 0.1 %                               |
| acy:                        | ±0.4 dB max over the bandwidth        |
| axis sensitivity:           | < 0.5 %                               |
| vidth:                      | DC to 200 Hz                          |
| ing:                        | 0.7 ±0.1 critical                     |
| t drift:                    | 0.0005 g / °C                         |
| drift:                      | 200 ppm / °C                          |
| ale output <sup>NAD</sup> : | ±10 V differential (20 Vpp)           |
| resis:                      | < 0.001 % of full scale               |
| ivity:                      | 2.5 to 20 V/g                         |
| it impedance:               | 47 Ω                                  |
|                             |                                       |

AC-73 Measuring Range in comparison with Size of Earthquake Signals

g

20

40

60

Full Scale 80

100 B

120

140

160

1000



#### Ordering Information Specify:

Version and configuration of AC-7x, full scale range, and other applicable options Link to AC-73 accelerometer response files in IRIS NRL library NAD: Not applicable for AC-7xD digital version.

AC-73

10

1 Frequency [Hz]

100

Housing:

Power

Mounting:

- options sheet
- Watertight IP68 housing<sup>NAD</sup>
- Stainless steel protective housing
- See separate sensor orientation options sheet

#### GeoSIG Ltd Wiesenstrasse 39, 8952 Schlieren, Switzerland. Tel.: +41 44 810 21 50 www.geosig.com

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