

FBA-23DH

Borehole Accelerometer For Accelerograph Systems

Interest in measuring ground accelerations at depth is stronger today than ever before. Analyses of damage from large earthquakes have proven the importance of soil response in contributing to the reaction of structures. Scientists are particularly interested in monitoring site response from smaller earthquakes, in order to better understand and predict response to large earthquakes.

Kinometrics' FBA-23DH provides a powerful tool for subsurface monitoring of seismic motion. The downhole stainless steel cylindrical casing is rated to a depth of 700 meters.

The fluxgate magnetometer option enables orientation of the system in the bottom of the hole without the use of expensive casing fixtures or field procedures.

The EPRI-Youd Wedging System provides a reliable means of locking the package in the hole, and retrieving it for periodic maintenance and inspection.

General Description

The FBA-23DH accelerometer is a spring-mass device using variable capacitance transduction and electromagnetic feedback. Three sensors are mounted orthogonally in a rigid internal frame, anchored to the case at top and bottom. The optional compass nests in the bottom of the frame.

The downhole case is constructed of 316 stainless steel, rated at 1000 psi (depth of 700 meters or about 2300 feet). Electrical connections are made by means of a waterproof, armored cable and connector assembly supplied with the sensor package. The cable comes with a Kevlar internal strain member rated at 1600 Kg axial load. This should eliminate the need for a separate strain cable, especially if there is water in the hole.

Optional Orientation Compass

The all new, optional internal, fluxgate magnetometer compass provides instantaneous readout of sensor orientation at the bottom of the hole during installation. The compass can be autocalibrated at the site to compensate for the dip in the earth's magnetic field, and for the hard and soft magnetic effects of the downhole package. The software supplied allows communication with the compass using an IBM compatible PC and displays the package orientation, both graphically and numerically.

Optional EPRI-YOUD Wedging System

The EPRI-Youd Wedging System provides for rigid connection of the FBA-23DH package to a cased hole, while providing the means for retrieval. A system of split cylindrical wedges allows the package to move freely through the hole, and be tightly locked at the bottom. A release cable frees the wedges so that the entire assembly can be retrieved. The EPRI-Youd Wedging System is useful for long term installations where periodic maintenance is expected.

Optional Wellhead Junction Box

The optional wellhead junction box provides improved protection for the FBA-23DH from lightning induced transients (using gas arrestors and transzorbs), allows easy connection of the downhole cable to the recorder cable, and allows connection to the orientation compass using a standard DB25 RS-232 connector.

Specifications

Full Scale Range: ± 1.0 g (.1, .25, .5 and 2 g optional)

Natural Frequency: 50 Hz

Normal Damping: 70% critical

Output (full scale): ± 2.5 V into 10,000 ohms

Zero Offset: Less than 25 mV

Cross-axis Sensitivity: Less than .03 g/g

Linearity: Less than 1% of full scale

Noise: From 0 to 50 Hz, less than ± 2.5 μ V

Dynamic Range: 130 dB from 0 to 50 Hz 140 dB from 0 to 10 Hz Using 2-channel coherence method **Power:** ± 12 Vdc, 2.5 mA per axis

Calibration: Electrical commands can be applied to produce damping and natural frequency outputs **Turn-on**

Time: Operational within 0.1 seconds after power is applied

Physical Characteristics

Operating Temperature: -20° to 70° C (0° to 160° F) Temperature Effects (Zero drift and sensitivity change) Less than 2% of full scale

FBA-23DH Housing: Watertight to 1000 psi, 75 mm diameter x 470 mm (3" x 18-3/4") stainless steel **Weight:** 6 kg (13.25 pounds)

Information from Kinometrics web site: www.kinometrics.com