

Calibration, accelerometer, base strain sensitivity, 502.11

Main Characteristics

- Suitable for following vibration transducer :
 - piezoelectric charge accelerometer
 - ICP piezoelectric accelerometer
 - piezovelocimeter
 - capacitive accelerometer
 - piezoresistive accelerometer
- Conform to ISO 5347-13
- Conform to ISA RP 37.2 -1982 (R1995) para 6.6

Introduction

The VibraSens PC based automated base strain sensitivity system consists of a deflected beam, a PC and a 12 bit two channels 200 kS/s data acquisition card. Its operational software is based on National Instrument Labview.

Introduction

In some environmental tests the surface, on which the accelerometer is mounted, is bending and distorting as well as vibrating. If a significant output results from the strains in the accelerometer base caused by the bending and distorting of the mounting surface, then the accelerometer is said to be base strain sensitive.

This sensitivity is expressed in terms of $g/\mu\text{inch}/\text{inch}$. Piezoelectric shear accelerometer are usually the less sensitive. Nevertheless a well decoupled compression accelerometer could have lower base strain rating than a shear mode sensor. For each model, base strain sensitivity is quantified on the specification sheet and can be compared.

Description

The accelerometer is mounting at the inboard end of a cantilever beam, which produces a radius of 1000 inches and a strain of 250 $\mu\text{inch}/\text{inch}$. The beam is 3 inches wide and 0.5 inch thick with a free length of 57 inches. The natural frequency is close to 4.2 Hz. Four strain gauges in full bridge mode are bonded to the beam adjacent to the accelerometer mounting hole. The system is excited by manually deflecting the free end of the beam. The data acquisition simultaneously record the signal from the accelerometer and from the strain gauge bridge. The accelerometer signal is recorded when the strain is exactly 250 $\mu\text{inch}/\text{inch}$. The base strain sensitivity is found by dividing the above accelerometer output by 250 times the accelerometer sensitivity.

Filtering technique

Filtering technique is important as the signal from the accelerometer is low (5mV typical). We have extracted from the strain gauge bridge signal the natural frequency resonance of the beam to set up a tracking filter that enable us to get a narrow band and clean signal from the accelerometer.

Data Storage and output

The system automatically generates a report of the test. The user can then print or saved it in Acrobat PDF format.

Ordering information

To order, specify part number and vibration parameters : **502.11**, Calibration, accelerometer, base strain sensitivity



Specifications

Principle

Base strain sensitivity with deflected beam

Electrical Input

type

- Charge for piezoelectric transducers (single ended or differential)
- Voltage with constant current supply (ICP type)
- Current input with constant voltage supply
- Voltage for velocity transducer (velocity coil)
- Voltage for piezoresistive or capacitive accelerometer

Frequency range

All4.2Hz