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OPERATING GUIDE

MODEL 3093M8 MINIATURE HIGH SENSITIVITY

TRIAXIAL IEPE ACCELEROMETER

WITH SINGLE 4-PIN CONNECTOR,

INTERNALLY CASE GROUND ISOLATED

WITH IEEE 1451.4 COMPATIBLE

TRANDUCER ELECTRONIC DATA SHEET (TEDS) FUNCTION

Model 3093M8 is a miniature, **I**ntegrated **E**lectronics **P**iezo**E**lectic (IEPE) triaxial accelerometer featuring a single, transverse mounted, 4-pin electrical connector. This feature allows the 3093M8 to be used in situations where vertical space is limited. Model 3093M8 is internally case ground isolated. The TEDS function allows the user to program sensitivity, model number, serial number, and other attributes of the sensor which can then be recalled on command. The sensitivity of each of the three orthogonal axes of Model 3093M8 is nominally 100 mV/G

This Guide contains:
1) Specifications, Model 3093M8
2) Outline/Installation Drawing 127-3093M8

NOTE: IEPE is an acronym for Integrated Electronics Piezoelectric types of low impedance voltage mode sensors with built-in amplifiers operating from constant current sources over two wires. **IEPE** instruments are compatible with other comparable systems labeled **LIVM**™.

OPERATING GUIDE

MODEL 3093M8 TRIAXIAL ACCELEROMETER WITH TEDS

INTRODUCTION

Model 3093M8 is a miniature three-axis accelerometer using the latest in piezoceramic planar shear technology coupled with 2-wire internal LIVM electronics.

This transducer includes the IEEE 1451.4 Transducer Electronic Data Sheet or “TEDS” function. This function allows the user to query each sensor for the data sheet information and identity during field-testing using a TEDS compatible signal conditioner/data acquisition system.

This instrument contains three miniature piezoceramic planar shear mode accelerometer elements mounted to a single ground-isolated support and welded into a stainless steel housing. The three elements are mounted orthogonal to each other so that they can measure the complete motion of a point.

Model 3093M8 mounts with a 10-32 UNF-2B threaded hole into very small spaces since its vertical dimension is .61 in. It weighs only 10 grams.

LIVM (Low Impedance Voltage Mode) design means that three miniature charge amplifiers are built into the instrument, one for each axis, to lower the impedance of the piezoceramic elements by many orders of magnitude. This technique allows the driving of long cables without affecting sensitivity and the use of very simple constant current type power units.

All elements are internally isolated from the outer case and are enclosed by a faraday shield for improved noise immunity.

DESCRIPTION

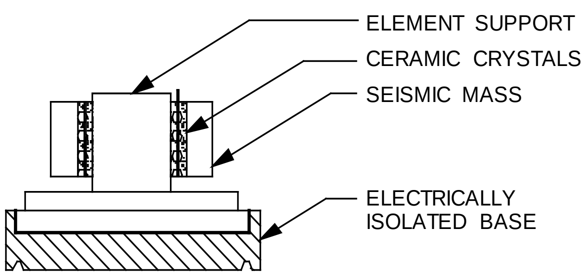

Figure 1 Representative cross section, 3093M8 element assembly

Refer to the outline/installation drawing 127-3093M8 for the dimensions of Model 3093M8.

The electrical connections from the charge amplifiers for each element are brought out to the contacts of a single four-pin connector mounted transversely to one vertical face of the housing. The three-signal/power connections to the elements are connected to each of three pins while the three ground returns for the elements are tied together to one common pin of the four-pin connector. The case of this instrument is electrically isolated from electrical signal/power ground.

The performance specifications and criteria for Model 3093M8 are delineated on the specification sheet included with this operating guide.

INSTALLATION

This accelerometer is designed for 10-32 UNF-2B threaded mounting. If the accelerometer is mounted with adhesives on any other surface, its calibration cannot be guaranteed.

The selected (or prepared) mounting area should be flat to within .001 in TIR for best high frequency response.

> **NOTE:** Before mounting, be sure to clean the mounting surface thoroughly to avoid inclusion of machining chips and other debris between mating surfaces. Intimate contact between mating surfaces is important for best performance.

If a fair amount of motion is expected during the test, it is good practice to tie the cable down to a stationary point as close as possible to the accelerometer (but not closer than 1 inch) to avoid potentially damaging cable whip.

You are now ready to connect the 3093M8 to the power unit.

OPERATION

The Dytran power unit specifically designed to power the Model 3093M8 is the Model 4113B. This line-powered unit has a 4-pin connector jack similar to that on the 3093M8. Cable Model 6811AXX connects the 3093M8 to the power unit. (‘XX’ is the cable length in feet)

Connect the 6811XX cable to Model 3093M8 by first rotationally aligning the locating tab, then engaging the rotating threaded collar and threading the collar on, hand tight.

Connect the other end of the cable to the 4-pin connector on the power unit and tighten threaded collar hand tight. As previously noted, tie cable down within 1 inch or so of the instrument if excessive displacement of the accelerometer is expected.

Apply power to the power unit and allow several seconds for coupling capacitors to fully charge. Rotate the channel selector knob through the first three positions to monitor the bias voltage of each of the three accelerometer element assemblies to check for normal operation. The bias voltage level appears on the front panel mounted voltmeter on the 4113B.

Consult the paper, "Low Impedance Voltage Mode (LIVM) Theory and Operation", included as part of this manual, for instructions in using the bias monitoring voltmeter on the power unit as a check for normal operation and as an effective trouble shooting aid.

Although only one axis of the 3093M8 may be monitored with the front panel meter on the 4113B, each axis is continuously outputting data at the respective output jack at all times. Selecting a channel for bias monitoring does not affect the signal from that channel.

Connect each of the three BNC ‘Output’ jacks of the power unit to the readout instrument or data collector and proceed with the measurement. The sensitivities of each of the three axes are directly in mV/G and are specified precisely in the IEEE 1451.4 Transducer Electronic Data Sheet or “TEDS” function as well as the calibration certificate supplied with each instrument.

Be sure to check the orientation of each axis with the markings on the instrument upper surface and/or the outline/installation drawing supplied with the Operating Guide. The polarity of each axis is also define with arrows engraved in the top surface of the 3093M8 and again, on the outline/installation drawing 127-3093M8. The arrows indicate the direction and sense of motion of the accelerometer that will produce positive-going output signals. The vertical axis, axis 3, produces positive-going output voltage when the accelerometer is accelerated upward, i.e., away from the mounting surface.

REMOVAL (OR UN-INSTALLATION)

It is very important when removing this instrument to remember that, although it is built to be very rugged, it is a sensitive measuring instrument and as such should be treated gently when being removed from its installation. Never remove the accelerometer by using the 4-pin connector for leverage. Simply grip two opposing flats with an adjustable or open-end wrench and gently twist the instrument until the threaded attachment is freed. This method avoids any trauma to the instrument and will help ensure a long life for the accelerometer.

MAINTENANCE AND REPAIR

This instrument is not field repairable. No maintenance is required, or possible. If a problem occurs, contact the factory for help. You will be assigned a Returned Material Authorization (RMA) number should the instrument have to be returned to the factory for evaluation. A short note describing the problem will facilitate the repair procedure.

There is no charge for evaluation of the instrument and we will perform no repair work until you are notified of any charges.

It is good practice to return the instrument to the factory for recalibration from time to time with frequency of recalibration dependent on usage intensity and frequency.