Dynamic Transducers and Systems
21592 Marilla St. • Chatsworth, CA 91311 • Phone 818-700-7818
www.dytran.com • e-mail: info@dytran.com

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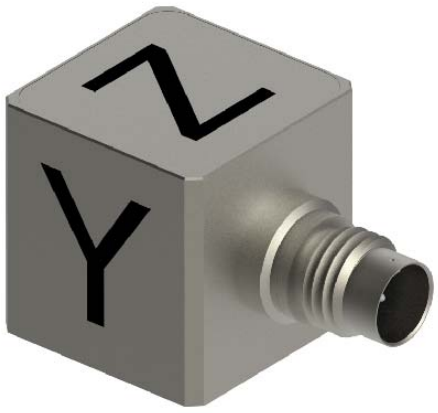
OPERATING GUIDE

MODEL 3543A MINIATURE HIGH SENSITIVITY

TRIAXIAL IEPE ACCELEROMETER

WITH SINGLE 4-PIN CONNECTOR,

INTERNALLY CASE GROUND ISOLATED AND STUD MOUNTED



NOTE:
Model 3543A is a miniature, **I**ntegrated **E**lectronics **P**iezoelectric (**IEPE**) triaxial accelerometer featuring a single, transverse mounted, 4-pin electrical connector. This feature allows the 3543A to be used in situations where vertical space is limited. Model 3543A is internally case ground isolated. Model 3543A has a 10-32 tapped hole in the base for stud mounting.

This Guide contains:

1) Specifications, Model 3543A
2) Outline/Installation Drawing 127-3543A

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 3543A TRIAXIAL ACCELEROMETER

INTRODUCTION

Model 3543A is a miniature, three-axis accelerometer using the latest in piezoelectric planar shear technology and coupled with an IEPE amplifier.

This instrument contains three miniature piezoelectric planar shear mode accelerometer elements mounted to a single ground-isolated central support encased within a titanium housing. The three elements are mounted orthogonal to each other so that they can measure the complete motion of a point.

Model 3543A mounts by means of a tapped 10-32 hole in the base. This tapped hole accepts a model 6200 10-32 stud or a model 6213 adhesive mounting base to facilitate mounting. Model 3543A's height is .59 in. and it weighs only 15 grams.

IEPE design means that a miniature IEPE amplifier is built into the instrument, to lower the impedance of the piezoelectric 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.

DESCRIPTION

Refer to the outline/installation drawing 127-3543A for the dimensions of Model 3543A.

The electrical connections from the miniature amplifier 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 terminals of the amplifier are connected to each of three pins while the three ground returns for the elements are tied together to one common ground return pin of the four-pin connector. The case of this instrument is electrically isolated from this electrical signal/power ground.

The housing and connector shell of model 3543A are made from Titanium alloy for low mass.

The performance specifications and criteria for Model 3543A are delineated on the specification sheet included with this operating guide.

INSTALLATION

Select a smooth surface approx. 5/8 (.625) in. in diameter and clean off all oil, debris, contaminants or foreign matter that would prevent a good bond. Various adhesives may be use to mount Model 3543A but the adhesives of choice for ease of use are any of the cyanoacrylate "instant" adhesives. They are tough and they set almost instantly. They also do not require a thick bond line which is good for high frequency response. 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 3543A to the power unit.

OPERATION

The recommended power unit for Model 3543A is the four channel 4114B1. This power unit has four channels so it can power each of the three channels of the 3543A with one channel left over for powering another IEPE sensor if necessary. Model 4114B1 has a switch-selected front panel voltmeter to aid in system troubleshooting.

The recommended cable for Model 3543A is the Model 6811AXX (XX = length in feet). This cable has a four-pin connector at one end that mates with the connector of the 3543A. The other end terminates into 3 BNC plugs labeled, Axis 1, Axis 2 and Axis 3.

Connect the 4-pin connector of the cable to the connector of the 3543A, taking care to align the connectors properly using the alignment groove on the cable connector to engage the matching tab on the 3543A connector. Press the connectors together to engage the screw threads and rotate the cable nut until the connectors mate fully. Hand-tighten the cable nut. Don't use pliers to tighten.

Connect the BNC cable connectors to three of the BNC "Sensor" connectors on the Model 4114B1. We suggest the you connect axis (1) of the 3543A to channel (1) of the power unit, and so forth. This will make it easier to remember which axis of the accelerometer you are monitoring with the front panel voltmeter.

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 4114B1.

Although only one axis at a time, of the 3543A, may be monitored with the front panel meter on the 4114B1, 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 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 3543A and again, on the outline/installation drawing 127-3543A. 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 strike the unit to break it free from its mounting surface. Simply grip two opposing flats of the mounting base with an adjustable or open-end wrench and gently twist the base until the adhesive bond shears. 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 need 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 also 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.