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OPERATING GUIDE

MODEL 3225E2

MINIATURE PIEZOCERAMIC PLANAR SHEAR,

CHARGE MODE ACCELEROMETER WITH REMOVABLE CABLE

WITH GROUND ISOLATION FEATURE

This manual contains:
1) Performance Specifications, Model 3225E2
2) Outline/Installation drawing 127-3225E2
3) Operating Instructions, Model 3225E2

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OPERATING INSTRUCTIONS

MODEL 3225E2 MINIATURE LIVM ACCELEROMETER

INTRODUCTION

Model 3225E2 is a miniature, low profile, charge mode piezoelectric accelerometer designed to mount in spaces inaccessible to other types of accelerometers. This model uses the latest in planar shear technology to generate clean low noise signals essentially free from strain sensitivity effects.

Featuring a titanium case and weighing only 0.6 grams, this instrument is ideal for the measurement of shock and vibration of very small, lightweight specimens such as printed circuit boards and board-mounted components.

This miniature accelerometer is permanently bonded into an anodized aluminum isolation cup which electrically isolates the case from the mounting surface precluding annoying “ground loops”.

Designed for adhesive mount, Model 3225E2 may be mounted in very narrow spaces only slightly greater than .30 inch (7.6 mm) wide. The height is .19 inch (4.8 mm).

Model 3225E2 features a special Dytran designed 3-56 coaxial connector which mates with a replaceable coaxial cable that has a 10-32 coaxial jack at the end. This cable is model 6003AXX. (XX is the cable length in feet)

Model 3225E2 is designed to be used with almost any type of charge amplifier from the laboratory electrostatic or vibration types to the in-line converter amplifiers which convert charge mode accels. to low impedance voltage mode (LIVM) operation.

The sensitivity of model 3225E2 is nominally, 1.8 PC/G

DESCRIPTION

Refer to outline/installation drawing 127-3225E2

Model 3225E2 is constructed in "teardrop" form with the integral cable exiting at the end of the teardrop. The case, cover and connector are made from titanium for low mass and high stiffness.

Model 3225E2 generates an electrostatic charge mode signal by stressing a "planar shear" type self-generating piezoceramic crystal element in response to input acceleration. The planar ceramic crystals are supported by a flat post and the seismic masses are fastened together by a preload screw, squeezing the crystals between the mass and the post

When the unit is accelerated along the main axis, the crystals are stressed in shear mode generating an electrostatic electrical charge analogous to this acceleration.

This very high impedance charge mode signal is connected to the 3-56 miniature coaxial connector.

Because of its very low mass and high crystal stiffness, this instrument has a resonant frequency greater than 60kHz. This means that it may be used to measure high frequency vibrations with very little error.

THE REMOVABLE CABLE FEATURE

The cable designed for Model 3225E2 is one of the smallest in the industry. Use care when attaching and removing the 6003AXX cable. The knurled cable nut is very small, of necessity, and must be engaged and disengaged carefully and **only by hand**. Do not, under any circumstances, use a pliers to tighten and loosed this cable nut. Damage would most likely occur to the cable nut and/or to the connector. With reasonable care, the cable and connector should give no problems under normal use.

INSTALLATION

IMPORTANT: Before mounting the Model 3225E2, identify the mounting surface. It is the smooth side of the instrument opposite “Dytran” and “model number” marking on the top surface. **DO NOT MOUNT TO THE TOP SURFACE.** Not only will the signal polarity be reversed and the sensitivity and frequency response be adversely affected but also there is danger of damaging the top cap of the accelerometer when removing it, if mounted in the inverted position. This type of damage is considered abuse and is not covered by the manufacturer's warranty.

To install Model 3225E2, it is necessary to select (or prepare) a flat surface to accept the .30 diameter teardrop-shaped anodized aluminum mounting surface. (Refer to the outline/installation drawing 127-3225E2). As a rule of thumb, the flatter the mounting surface, the better the high frequency response will be. A surface flat to .001 TIR will give excellent results when a thin glue line is used during mounting.

Clean the mounting surfaces with solvents such as alcohol or Freon, etc., to remove debris, oils and greases before mounting.

The recommended adhesives are the "instant" setting cyanoacrylate cements such as Eastman 910 and "Crazy Glue". Apply a very small drop to either mating surface, and simply press the 3225E2 to the mating surface with the finger and hold for 30 seconds. If the adhesive does not set, check the expiration date on the container. It is our experience that when the glue gets old, the first indication is that it will not set up properly. Replace if necessary.

Other types of adhesive may be used but consider them carefully. Dental cement is not recommended for this instrument because if its tenacity. Removal when this adhesive is used may harm the instrument.

In some cases, mounting waxes such as "Petro" wax may be used to mount the 3225E2 but this method is not suitable for measurements at high temperature and high frequency.

Irrespective of which adhesive is used, keep the glue line thin, i.e., don't use too much adhesive. Too much adhesive places a "spring" between the specimen and the instrument. This can create another second order spring mass system (the mass being the weight of the accelerometer) and can cause serious measurement errors at high frequencies.

OPERATION

To operate model 3225E2, it is necessary to connect it to the input of a charge amplifier, 1.e., a special high input impedance amplifier which converts the electrostatic charge signal to a voltage mode low impedance signal which may then be fed to data recorders, ‘scopes, meters, etc.

Dytran manufactures many types of charge amplifiers from the laboratory type model 4165 to the in-line converter types such as model series 4751B and 4705A.

The replaceable cable used with Model 3225E2 (model 6003AXX) is terminated in a jack type (male thread) 10-32 coaxial connector. Dytran manufactures a series of cables suitable as extension cables for this instrument that will mate with this cable. The Model 6010AXX has a 10-32 plug at the end and would be used with power units which have a 10-32 “Sensor” jack. The Model 60011AXX cable has a BNC plug at the end and would be used when the power unit has a BNC “Sensor” jack.

The polarity convention of Model 3225E2 is negative for acceleration toward the top of the unit.

UNMOUNTING THE ACCELEROMETER

In order to "unmount" the Model 3225E2, use the Model 6591A removal tool. Slip the tool over the accelerometer body from the rounded end (as opposed to the connector end) and gently rotate the tool in either direction until the adhesive shears and the instrument is released.

Do not use pliers, wrenches and other tools to remove the instrument as these are certain to mar or otherwise damage the unit.

After unmounting, inspect the mounting surface for traces of residual adhesive and remove completely to be ready for the next installation.

MAINTENANCE AND REPAIR AND RECALIBRATION

The only maintenance necessary is to keep the miniature coaxial connector and other cable connections clean and free from moisture and other contaminants.

Should a problem arise with the accelerometer or should it require routine recalibration, contact the factory for assistance in trouble shooting or returning the instrument for evaluation and/or repair. Do not send the instrument back without first calling the factory to obtain a **R**eturned **M**aterial **A**uthorization (**RMA**) number. This will help us track the repair/recalibration