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## **OPERATING INSTRUCTIONS**

### **MODEL 3220C**

### **MINIATURE HERMETIC SEALED CHARGE MODE**

### **RING SHEAR ACCELEROMETER**



#### **INCLUDES:**

- 1) Outline/Installation drawing 127-3220C.
- 2) Specifications, Model 3220C.
- 3) General Operating Guide to Charge Mode Accelerometers.

## OPERATING INSTRUCTIONS MODEL 3220C MINIATURE HERMETIC SEALED LIVM ACCELEROMETER

### INTRODUCTION

Model 3220C is a miniature, high-frequency, charge-mode accelerometer which features hermetic sealed construction and ground isolation. All joints in the titanium housing are laser welded and the connector is a special coaxial Dytran glass-to-metal seal design with 5-44 threads. This tiny instrument weighs only 3.5 grams.

Model 3220C features central screw mounting using an insulated 2-56 mounting screw assembly, Model 6165, supplied with each instrument.

The mounting surface is electrically isolated from the body of the instrument and when used with Mod 6165 mounting screw provides an electrically ground isolated installation.

### DESCRIPTION

See outline/Installation drawing 127-3220C included as part of this manual for a dimensional outline of this instrument.

Model 3220C utilizes piezoelectric shear technology and has a through hole for central screw mounting. This design feature allows the 5-44 coaxial connector to be pointed in any radial direction desired for installation in tight corners or where space is at a premium. The unit weighs only 3.5 grams. The body and connector are made of titanium.

### INSTALLATION

Refer to outline/installation drawing 127-3220C included as part of this operating guide.

To mount model 3220C, it is necessary to prepare a flat circular mounting area of .32 minimum diameter. At the center, drill and tap a #2-56 mounting hole to a minimum depth of .125 inches. The mounting surface should be flat within .001 TIR (total indicator reading) for best frequency response. This degree of flatness may be obtained by several machining methods such as spotfacing, grinding, turning, etc.

After preparing the flat surface and drilling and tapping the 2-56 mounting hole, clean the area carefully to remove all chips, burrs, cutting oil, etc. before proceeding with installation. It is important to avoid scratching of the anodized aluminum mounting surface as it is this surface which provides the ground isolation.

Spread a light coating of silicone grease on either mating surface and locate the 3220C over the threaded hole. (Check to ensure that the anodized aluminum washers (2) are in place below the head of the Model 6165 mounting screw assy.)

**NOTE:** DO NOT MOUNT MODEL 3220C INVERTED. THE MOUNTING SURFACE IS DEFINED BY A BLACK ANODIZED WASHER BONDED TO THE BOTTOM OF THE INSTRUMENT. IT IS THIS SURFACE WHICH MUST BE IN CONTACT WITH THE TEST OBJECT.

Pass the Model 6165 mounting screw assy. through the hole in the 3220C and into the tapped hole, tightening the screw by hand until it seats. If this cannot be done, inspect both threads for damage or look for burrs. The mating surfaces should meet squarely and look absolutely flush when viewed from the side. If all looks well, rotate the connector to point in the desired direction and torque the screw in using a torque wrench if possible, to 4 lb-in max. Do not over torque as the 2-56 screw will readily break if the recommended torque is exceeded.

### ADHESIVE MOUNTING

Model 3220C may be adhesively mounted **only** by use of the adhesive mounting pad, Model 6167, available as an accessory from Dytran. The pad is glued to the mounting surface, then the Model 3220C is attached to the pad in the normal manner, i.e., with the Model 6165 mounting screw.

**Do not** glue the 3220C directly to the test surface as the anodized aluminum washer may be disattached when removing the 3220C.

An important point regarding adhesive mounting is that high frequency response may suffer if the glue line between the mounting pad and the test surface is not extremely thin and the adhesive bond is not secure. Outdated adhesive is one of the foremost reasons for poor frequency response with adhesive mounted accelerometers. Check the "use by" date on the outside of the adhesive tube to make sure the adhesive is not out of date.

To adhesively mount the 3220C, it is necessary to prepare (or select) a flat surface similar to screw mounting with the difference being that no tapped hole is required at the center. Carefully clean mating surfaces and place several very tiny drops of an "instant-bonding" cyanoacrylate type adhesive to the mating surface (the surface opposite the .312 dia. raised boss) of the Mod. 6167 mounting pad, press together and hold tightly for one minute. If there is not an excessive amount of adhesive in the joint, the bond will be made instantly and it will be a secure bond. Proceed with the installation of the 3220C to the .312 dia. raised boss of the mounting pad.

To remove the adhesive pad, first remove the 3220C, then simply place a wrench across the hex flats of the pad and rotate with a quick snapping motion. The adhesive will shear instantly and cleanly. Remove excess adhesive with acetone before remounting the adhesive pad again.

## INSTALLATION, CONTINUED

After mounting, connect the electrical cable threading the connector nut onto the 5-44 connector. (Use only low noise treated cable with model 3220C to avoid triboelectric noise generation due to cable motion). Snug up the knurled connector nut firmly by hand. It is not necessary or desirable to use pliers to tighten the cable nut. This may damage either the cable nut, accelerometer connector or both.

It is always good practice to tie the cable down as close to the accelerometer as possible, especially if the expected motion will be such that the cable could be damaged by excessive flexing at the accelerometer connector. If the accelerometer is mounted to a surface which moves relative to the cable tie-down surface, use a strain relief loop to allow the cable to flex in a location other than where it meets the cable connector. Connect the other end of the cable to the charge amplifier and the installation is complete.

## OPERATION

It is strongly suggested that you read the enclosed article, "General Operating Guide to Charge Mode Accelerometers" before proceeding with the operation of the system, especially if you are a first time user of this type of instrumentation.

Model 3220C is designed to be used with a charge amplifier. A charge amplifier is a special type of amplifier which converts the electrical charge output from the accelerometer to a much more usable, lower impedance voltage signal. There are many different charge amplifiers which will work with the Model 3220C. In general, AC-coupled "vibration" type charge amplifiers are better suited to this type of accelerometer than are the DC coupled "electrostatic" charge amps which are designed primarily for use with ultra high impedance quartz type instruments.

An exception to this rule is the Dytran Model 4165 charge amplifier. This model has a "short TC" position which allows use with ceramic sensors such as Model 3220C. If your charge amplifier has a standardization feature, dial in the charge sensitivity of the 3220C (in pC/G) into the standardization pot. The system voltage sensitivity (in mV/G) is then dependent on the sensitivity choice you have made, e.g., 1, 10 or 100 mV/G.

If you are using one of the Dytran in-line charge amplifiers such as Model series 4750 or 4751, the system sensitivity (mV/G) will be the product of the accelerometer sensitivity (pC/G) times the fixed charge amp sensitivity (mV/pC)

Consult the Instruction Manual for your particular charge amplifier before proceeding with operation of the system.

## MAINTENANCE AND REPAIR

The sealed construction of the 3220C precludes field maintenance. If you perceive a problem with the instrument and cannot trace the problem to a faulty cable or charge amplifier, call the factory for assistance. If it is decided that the instruments must be sent to the factory for evaluation and possible repair or replacement, you will be issued a **Returned Material Authorization (RMA)** number to aid in guiding the material through the repair process.

There is no charge for evaluation and we will not proceed with the repair without first notifying you of the cost, if any and receiving your authorization to proceed.