



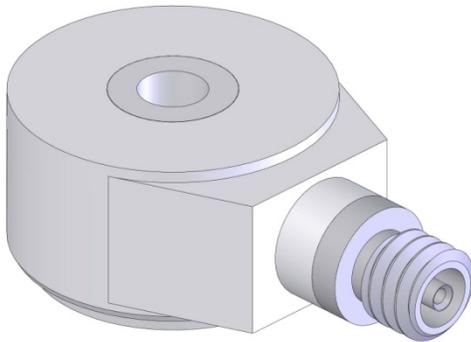
Dynamic Transducers and Systems

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 3220M27

MINIATURE HERMETIC SEALED LIVM™ QUARTZ PLANAR SHEAR ACCELEROMETER, THRU-HOLE MOUNT



INCLUDES:

- 1) Outline/Installation drawing 127-3220M27.
- 2) Specifications, Model 3220M27.
- 3) Operating Instructions, Model 3220M27.
- 4) Paper, "Low Impedance Voltage Mode (LIVM) Theory and Operation"

NOTE: LIVM™ is Dytran's trademark for its line of **Low Impedance Voltage Mode** sensors with built-in amplifiers operating from constant current sources over two wires. **LIVM** instruments are compatible with all comparable systems designated **IEPE**.

OPERATING INSTRUCTIONS MODEL 3220M27

MINIATURE HERMETIC SEALED LIVM ACCELEROMETER

INTRODUCTION

Model 3220M27 is a miniature, high frequency, LIVM accelerometer that features hermetic sealed construction and ground isolation. All joints in the Titanium alloy housing are laser welded and the connector is a special Dytran glass-to-metal seal design.

This tiny instrument, which weighs only 2.7 grams, contains an integral impedance converting IC amplifier chip that provides a low impedance output signal able to drive long cables with little or no effect on sensitivity.

Model 3220M27 is designed to measure vibratory motion over the frequency range from fractions of one Hz to over 5 kHz and over 5000 peak G's amplitude. It can also measure shock phenomena to over ± 5000 peak g's. The nominal sensitivity is 1 mV/g.

Model 3220m27 features central screw mounting with an insulated 2-56 mounting screw assembly, Model 6165, (supplied). The mounting surface is electrically isolated from the body of the instrument by use of an anodized aluminum disc bonded to the bottom surface. When used with Mod 6165 mounting screw, this provides an electrically ground isolated installation.

DESCRIPTION

See Outline/Installation drawing 127-3220M27 included as part of this manual for a dimensional outline of this instrument.

Model 3220M27 utilizes planar shear quartz crystals with two seismic masses preloaded the shear mode crystals to a support post.

Acceleration into the base will stress the masses through the crystals, stressing the crystals in shear mode. The crystals generate an electrostatic charge exactly analogous to the input acceleration.

Central through hole screw mounting allows the 5-44 coaxial connector to be pointed in any radial direction desired when installing. The unit weighs only 2.7 grams. The body and connector are made of Titanium alloy.

INSTALLATION

Refer to outline/installation drawing 127-3220M27 included as part of this operating guide.

To mount model 3220M27, it is necessary to prepare (or find) 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 spot facing, 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 3220M27 over the threaded hole. (Check to ensure that the anodized aluminum washers are in place below the head of the Model 6165 mounting screw assy.)

NOTE: DO NOT MOUNT MODEL 3220M27 UPSIDE DOWN. THE MOUNTING SURFACE IS DEFINED BY A BLACK ANODIZED WASHER BONDED TO THE BOTTOM OF THE INSTRUMENT. THE PERFORMANCE OF THE INSTRUMENT WILL BE ADVERSELY AFFECTED BY MOUNTING IT IN AN INVERTED POSITION.

Pass the Model 6165 mounting screw assy. through the hole in the 3220M27 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 may break if the recommended torque is exceeded.

After mounting, connect the electrical cable threading the 5-44 connector nut onto the 5-44 connector. (Consult the factory for a list of the various cables available for Model 3220M27 to

convert to 10-32 or BNC connectors). Snug up the knurled connector nut firmly by hand. It is not necessary or desirable to use a pliers to tighten the cable nut. This is sure to damage either the cable nut, accelerometer connector or both.

Tie the cable down as close to the accelerometer as possible if the expected motion will be such that the cable could be damaged by excessive flexing. 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 power unit and the installation is complete.

ADHESIVE MOUNTING

Model 3220M27 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 3220M27 is attached to the pad in the normal manner, i.e., with the Model 6165 mounting screw.

NOTE: Never glue the 3220M27 directly to the test object. Removal could damage or disattach the anodized aluminum mounting surface.

An important point regarding adhesive mounting is that you will not obtain high frequency response to specification if the glue line 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 vial to make sure the adhesive is not out of date.

To adhesively mount the 3220M27, it is necessary to prepare or select a flat surface similar to screw mounting with the difference that 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. If there is not excessive amounts of adhesive in the joint, the bond will be made instantly and it will be a secure bond. Proceed with the installation of the 3220M27 to the .312 dia. raised boss of the mounting pad.

To remove the adhesive pad, first remove the 3220M27, then simply place a wrench across the hex flats of the pad and torque with a quick snapping motion. The adhesive will shear instantly and cleanly. Remove excess adhesive with acetone before remounting the adhesive pad again.

OPERATION

Consult the enclosed paper, "LIVM Theory and Operation" for an overview of the operation of LIVM instruments. It shows how the bias monitoring voltmeter on the front panel of most Dytran LIVM power units may be used as a handy troubleshooting tool during post-installation checkout of the system.

MAINTENANCE AND REPAIR

The welded, sealed construction of the 3220M27 precludes field maintenance. If you perceive a problem with the instrument and cannot trace the problem to faulty cable or power unit, call the factory for assistance.

An experienced sales engineer can often solve the problem over the phone. If the instrument must be returned for analysis and/or repair, you will be given a Returned Material Authorization (RMA) number and instructions on returning the unit to the factory.

We will not proceed with a necessary repair without first notifying you of the charges. There is no charge for evaluation.