



Dynamic Transducers and Systems

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OPERATING GUIDE

MODEL SERIES 3035B & 3035BG

HIGH SENSITIVITY MINIATURE, HERMETICALLY SEALED

IEPE ACCELEROMETERS

Model series 3035B & 3035BG feature very low mass and hermetically sealed construction. Hermeticity is obtained by all-welded construction and a glass-to-metal sealed connector. Electrical connections are via a transverse mounted 5-44 coaxial connector. Model 3035BG is the adhesive mount version of Model 3035B. There is no mounting stud on 3035BG. All other specifications are identical

This guide contains:

- 1) Operating instructions, Series 3035B & 3035BG.
- 2) Specifications, Model 3035B & 3035BG
- 3) General operating guide for **IEPE** Dynamic Transducers.

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 INSTRUCTIONS, MODEL SERIES 3035B AND 3035BG MINIATURE IEPE ACCELEROMETERS

INTRODUCTION

Dytran's Model Series 3035B consists of 4 specific models of miniature LIVM accelerometers with 5-40 integral mounting studs with four different sensitivities, as follows:

Model	Sensitivity
3035B	100 mV/g
3035B1	10 mV/g
3035B2	50 mV/g
3035B3	5 mV/g

The series 3035BG consists, similarly, of 4 specific models of adhesive-mounted accelerometers, similar in all respects to the 3035B series but with no integral mounting stud. The sensitivities are as follows

Model	Sensitivity
3035BG	100 mV/g
3035BG1	10 mV/g
3035BG2	50 mV/g
3035BG3	5 mV/g

DESCRIPTION

The Model Series 3035B are miniature single axis accelerometers weighing only 2.5 grams. The self-generating planar shear mode piezoceramic seismic elements convert acceleration (shock or vibration) into analogous electric charge signals. These very high impedance signals are fed into a tiny on-board IC Mosfet input charge amplifier which converts the charge signal into a low impedance voltage signal, lowering the impedance level by ten orders of magnitude allowing these instruments to drive long cables with very little signal loss and negligible effect on sensitivity and frequency response.

Simple constant current power units supply power to operate the integral IC amplifiers and separate the dynamic signal from the DC bias level of the internal amplifiers. Coaxial cable or even twisted pair leads may be used to connect accelerometer to power unit.

Many readout instruments now incorporate LIVM power units to power this type of instrumentation so external power units may not be necessary.

Series 3035B features hermetic sealed construction for normal operation in moist and dirty environments. Hermeticity is obtained by laser welded housings and hermetically sealed coaxial connectors.

INSTALLATION, SERIES 3035B

To install these accelerometers, it is necessary to prepare (or find) a flat mounting area of at least 1/4 inch diameter (Ø.250). Ideally, the mounting surface should be flat to .001 in. TIR. The flat mounting surface ensures intimate contact between accelerometer base and mounting surface for best high frequency transmissibility, thus accuracy.

At the center of the mounting area, drill and tap a mounting port in accordance with instructions on drawing 127-3035B. Clean the area to remove all traces of machining chips, burrs, etc.

Next, thread the integral mounting stud of model 3035B into the tapped hole. The stud should enter easily and thread in up to the point where the mounting surface of the accelerometer meets the test mounting surface. Check to see that the mating surfaces are meeting properly, i.e., that they are meeting flush and that there is not an angle formed between the two surfaces indicating that they are not co-planar. If this condition is observed, torquing the accelerometer down will strain the base possibly causing poor frequency response and even erroneous reference sensitivity. Inspect the perpendicularity of the tapped hole.

After ensuring that the surfaces meet squarely, back the accelerometer out and spread a light coating of silicone grease, or other lubricant, on either of the mating surfaces and thread the accelerometer back into the tapped hole by hand, then torque the 3035B to the mating surface with 8 to 10 lb-inches of torque, preferably measuring the torque with a torque wrench torquing on the hex surface only.

Proper torque will ensure the best high frequency performance from the instrument as well as repeatability of sensitivity when mounting and remounting.

Remember, the 5-40 integral stud is very small and overtorquing can break it.

MOUNTING PREPARATION, MODEL 3035BG

Series 3035BG is designed for adhesive mounting.

To install Series 3035BG, is necessary to prepare (or find) a flat mounting area of at least 1/4 inch diameter (Ø.250). Ideally, the mounting surface should be flat to .001 in. TIR. The flat mounting surface ensures intimate contact between accelerometer base and mounting surface for best high frequency transmissibility, thus accuracy.

Clean mounting surfaces with solvent if necessary to remove all traces of oils and other impurities including burrs or any matter which could preclude intimate contact between mating surfaces.

Apply a light coating of cyanoacrylate adhesive (or other type of suitable adhesive) to either mounting surface, position the accelerometer in the desired cable orientation and press the accelerometer firmly onto the mounting surface and hold for several seconds.

NOTE: It is important when mounting adhesive mount accelerometers that the glue line is as thin as possible consistent with a secure installation, for best high frequency response.

CABLES

Dytran manufactures several cables to connect these accelerometers to various power units. Model 6014A is a coaxial cable with 5-44 connector at one end and a 10-32 plug at the other. Model 5040A has a 5-44 connector at one end and a BNC plug at the other. Consult the factory at time of purchase to ensure that you get the cable that best suits your needs. The length of cable is controlled by a number following the basic cable model designation. e.g., a 6014A10 is a 10 foot long cable, etc.

Connect the cable to the accelerometer snugging up the 5-44 threaded cable lock ring tightly by hand.

NOTE: Do not use a pliers or vise grips on the knurled lock ring. This could damage the connector of the 3035B and/or the cable connector.

To avoid stressing the cables which could lead to early failure, especially under larger excursions of the test object, it is good practice to tie the cable down to a fixed surface near the mounting area at a point approximately one inch from the accelerometer.

If there is excessive motion between the accelerometer and the nearest tie point, allow a strain loop of cable to let relative motion occur without stressing the cable.

Connect the other end of the cable to the "Sensor" jack of the Dytran power unit (Models 4102, 4120, 4110, 4114, etc.), or other source of constant current DC power, and switch the power on.

Observe the monitor voltmeter located at the front panel of each of the power units. If the meter reads in the mid-scale region, (labeled "Normal"), this tells you that the cables, accelerometer and power unit are functioning normally and you should be able to proceed with the measurement.

Check for shorts in the cables and connectors if the meter reads in the "Short" region. Check for open cables or connections if the meter reads in the "Open" area. In this manner, the meter becomes a trouble shooting tool for the measurement system.

Consult the guide "LIVM Theory and Operation", included with this manual, for a more complete guide to using the fault monitor meter as a trouble shooting tool.

HIGH FREQUENCY RESPONSE

All piezoelectric accelerometers are basically rigid spring mass systems, i.e., second order mechanical systems with essentially zero damping. As a result, these instruments will exhibit a rising characteristic as the resonant frequency is approached. A filter incorporated into Model 3035B & 3035BG compensates for this rise to extend the useable frequency range of this unit.

The upper frequency at which the sensitivity may increase or decrease by 5% is approximately 10,000 Hz, the frequency to which the 3035B & 3035BG are calibrated. The accelerometer is usable above this frequency but to use it above 10,000 Hz, it must be calibrated at the specific frequencies of intended use because sensitivity deviations will increase drastically as you greatly exceed this high frequency calibration limit. Consult the factory for special calibrations required above 10 kHz.

CAUTIONS

- Do not store or use the accelerometer above 300°F. To do so can damage the IC amplifier.
- Do not allow cables to vibrate unrestrained. This will eventually destroy the cable and could lead to system inaccuracies.
- If the accelerometer is to be used in rapidly changing thermal environments, call the factory to ask about our thermal insulating boots.
- Avoid dropping or striking the accelerometer, especially against rigid materials such as concrete and metals. While accelerometer is intrinsically protected against shock induced overloads, the very high overloads induced by dropping can do permanent damage to the MOSFET amplifier or to the mechanical structure of the accelerometer. This type of damage is not covered by the warranty.

MAINTENANCE AND REPAIR

The welded construction of the series 3035B & 3035BG precludes field repair.

Should the mounting surface become distorted, nicked and otherwise distressed, so as to make operation suspect, return the instrument to the factory for repair. We can take very fine machine cuts off the mounting surface to restore the flatness to original specifications.

Should the electrical connector become contaminated with moisture, oil, grease, etc., the entire instrument may be immersed in degreasing solvents to remove the contaminants. After degreasing, place the instrument in a 200 to 300 degree F oven for one hour to remove all traces of the solvent.

Should a problem be encountered with the operation of the instrument, contact the factory for trouble shooting advice. Often our service engineers may point out something which may have been overlooked and which may save the expense and time of returning the 3035B to the factory.

If the instrument must be returned, the service department will issue you a **Returned Materials Authorization (RMA)** number to aid in tracking the repair through the system. Do not send the instrument back without first obtaining an RMA number. At this time you will be advised of the preferred shipping method.

A short note describing the problem, included with the returned instrument, will aid in trouble shooting at the factory and will be appreciated.

We will not proceed with a non-warranty repair without first calling to notify you of the expected charges. There is no charge for evaluation of the unit.