



**Dynamic Transducers and Systems**

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OG3274A  
REV A, ECN7482, 05/25/11  
REV B, ECN 9494, 05/06/13

## **OPERATING GUIDE**

### **3274A SERIES**

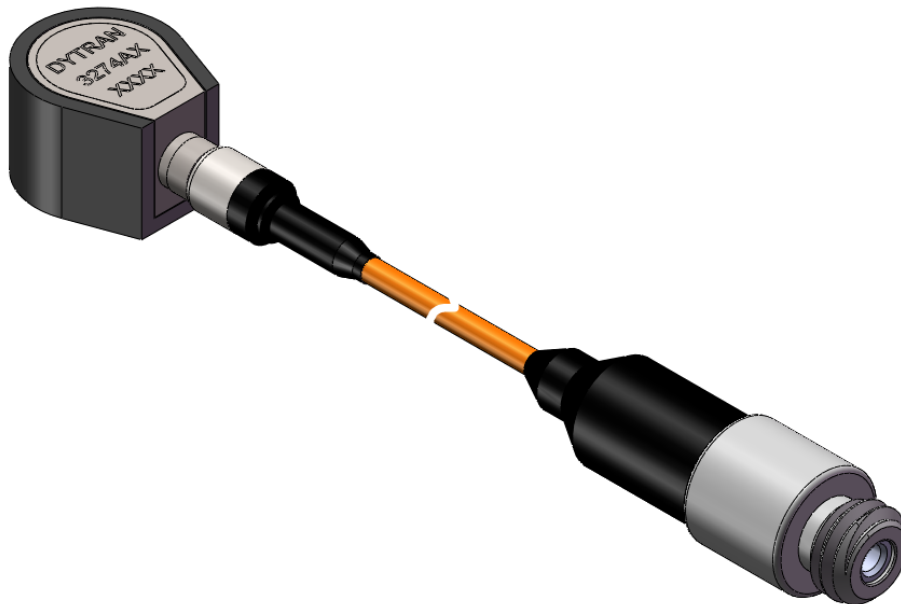
#### **MINIATURE PLANAR SHEAR MODE**

#### **LIVM ACCELEROMETERS WITH REMOVABLE CABLE**

#### **CASE ISOLATED**

#### **IEEE 1451.4 COMPATIBLE**

#### **TRANSDUCER ELECTRONIC DATA SHEET (TEDS) FUNCTION**



**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 other manufacturers' comparable systems designated IEPE.

## OPERATING INSTRUCTIONS

### 3274A SERIES MINIATURE LIVM ACCELEROMETERS

#### INTRODUCTION

3274A series is miniature, Low Impedance Voltage Mode (LIVM) piezoelectric accelerometers designed to mount in spaces inaccessible to other types of accelerometers.

This family of accelerometers utilizes the IEEE 1451.4 Transducer Electronic Data Sheet or "TEDS" function. This function allows the user to query each sensor in a large array of sensors, say, in a large field test, as to model number, serial number, sensitivity and other attributes using a TEDS compatible signal conditioner/data acquisition system.

Featuring a titanium housing and weighing only 2 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.

Designed for adhesive mount, 3274 series may be mounted in very narrow spaces only slightly greater than .3 inch wide, and .24 inch high.

3274A series feature a special 3-56 coaxial connector which mates with a replaceable coaxial cable, with a 10-32 coaxial jack at the end. This cable is model 6003A03.

A built-in impedance converting electronics package converts the high impedance voltage output from the piezoelectric shear mode seismic element to a low impedance voltage able to drive long cables without attenuation.

3274A series feature 3 nominal ranges for +/- 5V output: 1000 g's (5mV/g, 3274A1), 500 g's (10mV/g, 3274A2), and 200 g's (25mV/g, 3274A3).

Ground isolation of the mounting surface is achieved by means of an anodized aluminum cup. The cup helps prevent any signal transmission problems usually associated with ground loops.

#### DESCRIPTION

Refer to outline/installation drawing 127-3274A. 3274A series are constructed in "teardrop" form with a miniature coaxial connector exiting at the end of the teardrop. The case and cover are made of titanium.

The isolation cup is made out of anodized aluminum for low mass and electrical isolation from the mounting surface.

3274A series generates an electrostatic voltage mode signal by stressing a "planar shear" type self-generating piezoelectric crystal element in response to input acceleration. The planar piezoelectric crystals are supported by a flat post and the seismic masses are fastened together by a preload screw.

3274A1 and 3274A2 models feature quartz crystals employed for the sensing elements. This fact allows utilization of voltage amplification design and provides outstanding stability over temperature and time.

3274A3 model uses ceramic crystals for higher sensitivity, lower noise, and superior low frequency response.

Because of its very low mass and high crystal stiffness, all these instruments have a resonant frequency of > 40 kHz. This means that it may be used to measure high frequency vibrations with very little error.

#### THE REMOVABLE CABLE FEATURE

The cable designed for 3274A series is one of the smallest in the industry. Use care when attaching and removing the 6003A03 cable. The knurled cable nut is very small and must be engaged and disengaged carefully and only by hand. Do not, under any circumstances, use a pliers to tighten and loosen 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:** 3274A series are meant to be mounted only using the mounting surface designated on the 127-3274A drawing. Do not mount the unit upside down as it will invert the output signal and void the calibration data on sensitivity and frequency response. Using the top surface of an accelerometer for mounting may adversely cause damage to the cover during a removal operation. This type of damage is not covered by the warranty.

To install 3274A series, it is necessary to select (or prepare) a flat surface to accept the .3 diameter mounting surface of the instrument. 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 accelerometer to the mating surface with the finger and hold for 30 seconds.

Other types of adhesive may be used but consider them carefully. Dental cement is not recommended for this instrument because of 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 accelerometers, 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 3274A series, it is necessary to connect it to a source of constant current in the range of 2 to 20 mA with a compliance voltage of +18 to +30 VDC. Dytran offers a variety of IEPE power units suitable for powering this type of an accelerometer. The output from these power units is a low impedance voltage mode signal which may then be fed directly to the readout instrument(s).

The replaceable cable used with 3274A series (model 6003A03) 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 6010A03 has a 10-32 plug at the end and would be used with power units which have a 10-32 "Sensor" jack. The Model 60011A03 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 3274A series is positive for acceleration toward the top of the unit.

## **UNMOUNTING THE ACCELEROMETER**

In order to "unmount" the accelerometer, use Model 6591A tool. The larger slotted end of the tool is used for this purpose. 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 Returned Material Authorization (RMA) number. This will help us track the repair/recalibration