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## OPERATING GUIDE

### MODEL 3293A MINIATURE TRIAXIAL LIVM ACCELEROMETER

WITH SINGLE 4-PIN CONNECTOR,

CASE GROUNDED



Model 3293A is a low-noise, high sensitivity, miniature LIVM triaxial accelerometer featuring a single, transverse mounted, 4-pin electrical connector. This feature allows the 3293A to be used in situations where vertical space is limited. Model 3293A is case grounded. The 3293A is a 500mV/g accelerometer.

This Guide contains:

- 1) Specifications, Model 3293A
- 2) Outline/Installation Drawing 127-3293A
- 3) Operating Instructions, Model 3293A

**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 labeled **IEPE**.

# SPECIFICATIONS, MODEL 3293A TRIAXIAL ACCELEROMETER

## SPECIFICATIONS

## UNITS

### PHYSICAL

WEIGHT	8.8	grams
SIZE (WIDTH x HEIGHT x LENGTH)	0.55 x .37 x .89	inches
MOUNTING	5-40 UNF INTERNAL THD	
CONNECTOR [1]	4-PIN	
MATERIAL, HOUSING/CONNECTOR	TITANIUM ALLOY	

### PERFORMANCE

SENSITIVITY, $\pm 10\%$ [2]	500	mV/g
RANGE, F.S. (each axis)	$\pm 7$	g
FREQUENCY RESPONSE, $\pm 10\%$	0.25 to 4000	Hz
PHASE RESPONSE, $\pm 5^\circ$	1 to 3000	Hz
ELEMENT NATURAL FREQUENCY	$> 15$	kHz
ELECTRICAL NOISE FLOOR	.0002	grms
LINEARITY, MAX [3]	1	% FS
TRANSVERSE SENSITIVITY, MAX	6	%
SIGNAL POLARITY	POSITIVE FOR MOTION IN DIRECTION OF ARROWS ON HOUSING	

### ENVIRONMENTAL

MAXIMUM VIBRATION	$\pm 50$	gpk
MAXIMUM SHOCK	1000	gpk
TEMPERATURE RANGE	-60 to +185	°F
ENVIRONMENTAL SEAL	HERMETIC	
COEFFICIENT OF THERMAL SENSITIVITY	.07	%/°F

### ELECTRICAL

SUPPLY CURRENT RANGE, (each axis) [4]	2 to 20	mA
COMPLIANCE (SUPPLY) VOLTAGE RANGE (each axis)	+18 to +30	VDC
OUTPUT IMPEDANCE, TYP.	150	Ohms
OUTPUT BIAS VOLTAGE	+11 to +13	VDC
DISCHARGE TIME CONSTANT, NOM.	1.0 to 1.5	sec
GROUND ISOLATION	CASE GROUNDED	

**SUPPLIED ACCESSORIES:** MODEL 6580, MOUNTING STUD 5-40 TO 5-40

- [1] Connector mates with Dytran cable assy. Model 6811AXX or 6824AXX. (xx = length in feet)
- [2] Reference sensitivity measured at 100 Hz, 1 grms per ISA RP 37.2
- [3] Linearity is % of specified full scale (or any lesser full scale range), zero-based best-fit straight line method.
- [4] Power only with LIVM Dytran constant current type power unit. If power is applied without current limiting protection, the internal amplifier will be immediately destroyed.

## OPERATING INSTRUCTIONS

### MODEL 3293A TRIAXIAL ACCELEROMETER WITH TEDS

#### INTRODUCTION

Model 3293A is a miniature three-axis accelerometer using the latest in ceramic shear technology coupled with 2-wire internal LIVM electronics.

This instrument contains three miniature ceramic laminar shear mode accelerometer elements mounted to a single support and welded into a titanium housing. The three elements are mounted orthogonally to each other so that they can measure the complete motion of a point.

Model 3293A has an internal 5-40 thread for stud mounting.

LIVM (Low Impedance Voltage Mode) design means that three miniature IC amplifiers are built into the instrument, one for each axis, to lower the impedance of the ceramic seismic elements by many orders of magnitude. This technique allows the driving of long cables without affecting sensitivity and the use of very simple constant current type power units.

#### DESCRIPTION

Refer to the outline/installation drawing 127-3293A for the dimensions of Model 3293A.

This novel accelerometer features three modular style ceramic elements mounted to a single vertical post. Each planar shear mode element is connected to a miniature IEPE amplifier. The element assembly is mounted in a titanium housing.

The electrical connections from the elements are brought out to the contacts of a four-pin connector mounted transversely to a vertical face of the housing. The three signal/power connections to the elements are connected to three separate pins while the three ground returns for the elements are tied together to one common pin of the four-pin connector. The case of this instrument is connected to electrical ground.

The performance specifications and criteria for Model 3293A are delineated on the specification sheet included with this operating guide.

#### INSTALLATION

Select a smooth surface approx. .70 in diameter and clean off all debris which would preclude an intimate surface contact. Although the 3293A has an internal thread for mounting, it may also be adhesively mounted. Various adhesives may be used to mount Model 3293A but the adhesives of choice for ease of use are any of the cyanoacrylate "instant" adhesives. They are tough and they set almost instantly. They also do not need a thick bond line which is good for high frequency response. The selected (or prepared) mounting area should be flat to within .001 in TIR for best high frequency response.

**NOTE:** Before mounting, be sure to clean the mounting surface thoroughly to avoid inclusion of machining chips and other debris between mating surfaces. Intimate contact between mating surfaces is important for best performance.

Spread a light layer of adhesive on the mounting surface and apply the 3293A to the mounting area in the desired orientation and press and hold firmly for several seconds.

If a fair amount of motion is expected during the test, it is good practice to tie the cable down to a stationary point as close as possible to the accelerometer (but not closer than 1 inch) to avoid potentially damaging cable whip. You are now ready to connect the 3293A to the power unit.

#### OPERATION

The 3293A may be operated with standard IEPE signal conditioners.

Be sure to check the orientation of each axis with the markings on the instrument upper surface and/or the outline/installation drawing supplied with the Operating Guide. The polarity of each axis is also defined with arrows marked on the side surface of the 3293A and again, on the outline/installation drawing 127-3293A. The arrows indicate the direction and sense of motion of the accelerometer that will produce positive-going output signals. The vertical axis, axis Z, produces positive-going output voltage when the accelerometer is accelerated upward, i.e., away from the mounting surface.

## **REMOVAL (OR UNINSTALLATION)**

It is very important when removing this instrument to remember that, although it is built to be very rugged, it is a sensitive measuring instrument and as such should be treated gently when being removed from its installation. Never strike the unit to break it free from its mounting surface. Simply grip two opposing flats with an adjustable or open-end wrench and gently twist the instrument until the mounting interface (stud or adhesive) is broken. This method avoids any trauma to the instrument and will help ensure a long life for the accelerometer.

## **MAINTENANCE AND REPAIR**

This instrument is not field repairable. No maintenance is required, or possible. If a problem occurs, contact the factory for help. You will be assigned a Returned Material Authorization (RMA) number should the instrument have to be returned to the factory for evaluation. A short note describing the problem will facilitate the repair procedure.

There is no charge for evaluation of the instrument and we will perform no repair work until you are notified of any charges.

It is good practice to return the instrument to the factory for recalibration from time to time with frequency of recalibration dependent on usage intensity and frequency.