



# SPACE APPLICATIONS

# ADVANCED SENSORS FOR A DYNAMIC WORLD



The information, descriptions, specifications, photos, and illustrations contained herein are proprietary and may not be copied, reproduced, or used in any manner whatsoever without the express written permission of Dytran Instruments, Inc. Copyright © 2018 by Dytran Instruments, Inc. All rights reserved.

# SPACE VEHICLE, GROUND & FLIGHT TESTING

Rocket boosters and spacecraft are subject to high levels of vibration affecting structures and on-board equipment. Dytran AC and DC response accelerometers monitor structural interactions with propulsion systems and flight control systems that can cause low frequency flight instabilities. Space flight sensors are low outgassing, lightweight, and packaged in hermetically sealed housings to withstand extreme environments.

## Satellite Rocket & Capsule GVT and Modal Testing

Measure and evaluate all aspects of structural dynamics and component response including vibration, modal analysis, and shock in both large and small space structures. For use in characterizing flight and non-flight hardware in ground test vibration laboratories.

### 3224A Series: Ultra Miniature Accelerometer

**Features:** IEPE, titanium, high sensitivity

- Sensitivities (mV/g): 0.2, 1, 2 - 5, 5 - 10, 9 - 14
- 0.3 to 20,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +300°F (-51 to +149°C)



### 3133D Series: Triaxial Accelerometer

**Features:** IEPE, titanium, hermetically sealed, miniature size, adhesive mount, low outgassing, low base strain sensitivity, TEDS options

- Sensitivities (mV/g): 10, 5, 2, 0.7, 0.25
- 0.25 to 10,000 Hz frequency range ( $\pm 10\%$ )
- -67 to +320°F (-55 to +160°C)



### 3274A Series: Miniature Accelerometer

**Features:** IEPE, titanium, hermetically sealed, case isolated

- Sensitivities (mV/g): 25, 10, 5
- 1.1 to 10,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +250°F (-51 to +121°C)



### Model 3225M40: High Temperature Accelerometer

**Features:** Titanium, adhesive mount, low outgassing

- Sensitivity (pC/g): 1.8
- -60 to +350°F (-51 to +177°C)



### Model 3168F: Airborne Accelerometer

**Features:** IEPE, stainless steel, hermetically sealed, case isolated, high frequency response, 360° cable orientation

- 10 mV/g sensitivity
- 1 to 20,000 Hz frequency range ( $\pm 5\%$ )
- -60 to +250°F (-51 to +121°C)



### Model 5850B: Three Range Dynapulse™ Impulse Hammer

**Features:** BNC connector, 3-position sensitivity toggle switch

- Selectable sensitivity of 1, 10 or 100 mV/LbF
- Maximum force of 5,000, 500 or 50 LbF



## High Shock Testing

For explosive bolt, stage separation, drop testing, shipboard shock testing and pendulous mass tests.

### 3200B Series: IEPE Pressure Sensor

**Features:** IEPE, stainless steel, lightweight, high natural frequency of >90 kHz, TEDS options

- Sensitivities (mV/g): 2, 1, 0.5, 0.25, 0.1, 0.05
- 0.35 to 20,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +250°F (-51 to +121°C)



### 3603AXT Series: Mechanically Filtered Triaxial Accelerometer

**Features:** IEPE, hermetically sealed, ground isolated, mechanically and electrically filtered

- Sensitivities (mV/g): 1, 5, 10
- .3 to 5,000 Hz frequency range ( $\pm 3\text{dB}$ )
- -60 to +250°F (-51 to +121°C)



## Dynamic Pressure Sensors

Piezoelectric pressure sensors measure small to large dynamic perturbations (typically in the range of 1Hz to tens of thousands of Hz) in the presence of high static pressure heads in closed systems, or in free-field conditions. Typical piezo microphone applications include acoustic chambers or other situations where a vibration environment is created as a result of high level acoustic noise.

### 2006V Series: IEPE Pressure Sensor

**Features:** IEPE, stainless steel hermetically sealed, case isolated, ATEX certified, acceleration compensated

- Sensitivities (mV/psi): 100, 50, 10
- 8,000 psi maximum pressure
- -40 to +250°F (-40 to +121°C)



### Model 2013D: IEPE Sound Pressure Sensor

**Features:** IEPE, hermetically sealed, fast rise time, high natural frequency, excellent linearity, high intensity

- 2,000 mV/psi sensitivity
- 20 psi maximum pressure
- -60 to +250°F (-51 to +121°C)





## Structural Flight Test & Engine Test Stand

AC & DC response space flight sensors are used to acquire modal analysis, damping, resonant frequency, and load data during flight. Vibration in cold flows sections are addressed with IEPE cryogenic accelerometers and DC-MEMS sensors are for modal & load analysis.

### Model 3143M16: Cryogenic Triaxial Accelerometer

**Features:** IEPE, hermetically sealed, low profile, miniature size, 360° cable orientation, excellent linearity

- 10 mV/g sensitivity
- 1.6 to 5,000 Hz frequency range ( $\pm 5\%$ )
- -320 to +250°F (-196 to +121°C)



### Model 3334A1: Cryogenic Accelerometer

**Features:** IEPE, titanium, hermetically sealed, miniature size

- 10 mV/g sensitivity, 500g range
- 1 to 10,000 Hz ( $\pm 5\%$ )
- -320 to +250°F (-196 to +121°C)



### Model 7500M11: High Precision MEMS Accelerometer

**Features:** Hermetically sealed, differential output, variable capacitance accelerometer

- 5 mV/g sensitivity
- 0 to 300 Hz frequency range (3dB)
- -67 to +257°F (-55 to +125°C)



### Model 3306A1: Cryogenic Accelerometer

**Features:** IEPE, stainless steel, hermetically sealed, case isolated, two-pole low pass filter, stable Mosfet amplifier technology

- 5 mV/g sensitivity
- 1.6 to 2,500 Hz frequency range ( $\pm 3\text{dB}$ )
- -320 to +300°F (-195 to +149°C)



### 3233AT Series: Triaxial Thru Hole Accelerometer

**Features:** IEPE, titanium, hermetically sealed, case isolated, 360° cable orientation, TEDS options

- 1,000 mV/g sensitivity
- All axes: 0.5 to 3,000 Hz frequency range ( $\pm 5\%$ )
- -60 to +200°F (-51 to +90°C)



### Model 3533A: Triaxial Accelerometer with TEDS

**Features:** IEPE, titanium, hermetically sealed, case isolated, 360° cable orientation, TEDS options

- 5 mV/g sensitivity
- 3.3 to 1,000 Hz frequency range ( $\pm 5\%$ )
- -60 to +250°F (-51 to +121°C)



### 3153AXT Series: Triaxial Accelerometer with TEDS

**Features:** IEPE, stainless steel, hermetically sealed, ground isolated, stud mounted

- Sensitivities (mV/g): 100, 50, 10
- 0.7 to 5,000 Hz frequency range ( $\pm 5\%$ )
- -40 to +185°F (-40 to +85°C)



### 3145D Series: Triaxial Accelerometer

**Features:** IEPE, titanium, hermetically sealed, case isolated, low profile, TEDS options

- Sensitivities (mV/g): 100, 50, 10
- 0.5 to 3,000 Hz frequency range ( $\pm 5\%$ )
- -60 to +185°F (-51 to +85°C)



## Custom Low Outgassing Cables

### Model 6002A

- 10-32 plug to pigtailed



### Model 6017A

- 5-44 plug to 10-32 plug



### Model 6105A

- 4 pin 1/4-28 to (3) 10-32 plugs



### Model 6650A

- 3-56 plug to 10-32 jack



### Model 6997A

- 4 pin 1/4-28 to (3) BNC connectors



### Model 60025A

- 4 pin long nose connector to (3) 10-32 plugs



### Model 60030A

- 1/4-28 4-pin to (3) BNC connectors



### Model 60050A

- 1/4-28 4 pin plug to flying leads



### Model 60051A

- 10-32 plug to 10-32 plug





# SPACE VEHICLE, GROUND & FLIGHT TESTING

## Hot Firing/Engine Test Stand Vibration

Measure vibration on or near engines, nozzles, pumps, impellers, high frequency bearings, shafts and electronics enclosures mounted in high temperature areas during hot firings.

### Model 3309A: High Temperature Accelerometer

**Features:** Charge mode, stainless steel, hermetically sealed, case isolated, 360° cable orientation

- 5 pC/g sensitivity
- 5,000 Hz upper frequency range ( $\pm 5\%$ )
- -60 to +482°F (-55 to +250°C)



### 3225F Series: Miniature Accelerometer

**Features:** IEPE, titanium, adhesive mount, low outgassing, TEDS options

- Sensitivities (mV/g): 10, 5, 1
- 10,000 Hz upper frequency range ( $\pm 10\%$ )
- -60 to +250°F (-51 to +121°C)



### Model 3316M3: High Temperature Accelerometer

**Features:** Charge mode, Inconel™, hermetically sealed, miniature size

- 1 - 2 pC/g sensitivity
- [4] to 10,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +1,000°F (-51 to +538°C)



### Model 3255C: Charge Mode Accelerometer

**Features:** Charge mode, titanium, hermetically sealed, robust

- 15 pC/g sensitivity
- [5] to 5,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +375°F (-51 to +190°C)



### Model 3092C: High Temperature Accelerometer

**Features:** Charge mode, hermetically sealed, stainless steel

- 3.5 pC/g sensitivity
- [1] to 5,000 Hz frequency range ( $\pm 10\%$ )
- -60 to +900°F (-51 to +482°C)



## CVLD Accelerometers

These sensors are designed with an advanced, internal electrical circuit to simulate a CVLD (Constant Voltage Line Driver) sensor. This allows for variable capacitance DC MEMS acceleration measurements to be made over data acquisition channels normally reserved for current mode sensors. These CVLD sensors are tailored for use in the following applications; flight testing, flutter testing, and low frequency aircraft/airframe vibration measurements.

### 7506A Series: Variable Capacitance Accelerometer

**Features:** DC response, stainless steel, hermetically sealed, ultra low noise, current output, 4-20 mA loop compatible

- Sensitivities ( $\mu\text{A/g}$ ): 100, 13
- 0 to 300 Hz frequency range (-3dB)



CVLD Technology

### Model 7563A: Variable Capacitance Triaxial Accelerometer

**Features:** Stainless steel, hermetically sealed, case isolated, differential output, 4-20 mA loop compatible

- 2,500  $\mu\text{A/g}$  sensitivity
- 0 to 400 Hz frequency range (-3dB)



CVLD Technology

### Model 7508A: Variable Capacitance Accelerometer

**Features:** DC response, stainless steel, hermetically sealed, ultra low noise, current output, 4-20 mA loop compatible

- 13  $\mu\text{A/g}$  sensitivity
- 0 to 2,500 Hz frequency range (-3dB)



CVLD Technology



SB\_09-18

818-700-7818

WWW.DYTRAN.COM

AS9100 CERTIFIED  
A2LA ACCREDITED TO ISO 17025  
ISO 9001 CERTIFIED

