Dytran by HBK
HOTTINGER BRÜEL & KJÆR

HUMS AND CBM APPLICATIONS

Advanced sensors for a dynamic world

Dytran accelerometers are specifically developed to meet the challenges of tough airborne environments and are used in Health and Usage Monitoring Systems (HUMS), Condition Based Maintenance (CBM), and Vibration Health Monitoring (VHM) programs to improve operational safety, reduce maintenance costs, and increase aircraft stability.

HUMS and Condition Based Maintenance

Health and Usage Monitoring Systems (HUMS) used for Condition Based Maintenance (CBM) programs and/or Vibration Health Monitoring (VHM) systems rely on accelerometers that have been specifically developed to meet the challenges of tough airborne environments. Dytran accelerometers have been deployed on military and civilian rotorcraft since the late 1980s and are field-proven to meet CAP-753 requirements for the measurement and recording of VHM indicators. We work with all manufacturers of HUMS and VHM systems by providing sensors that enable CBM programs to realize the primary goals of improving operational safety, reducing maintenance costs and increasing aircraft stability.

LOW MASS ACCELEROMETER FOR SMALL STRUCTURES

Model 3062A can be used for rotor track and balance, rotor smoothing, airframe vibration feedback and swashplate bearing wear indicators.

3062A Series: IEPE Airborne Accelerometer

- 0.48 to 10,000 Hz frequency range (±5%)
- Bayonet connector
- Sensitivities (mV/g): 25, 10
- Available in 2 ranges: 200g, 500g
- 40 grams

HANGER BEARING, TAIL ROTOR, DRIVESHAFTS

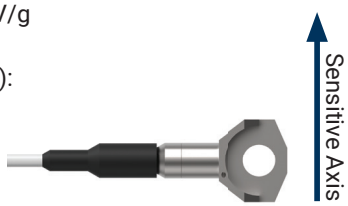
Products in this category measure imbalance, misalignment, and bearing wear in drive shafts and slower-rotating components. This group features the Dytran-innovated “Bracket-Style” mounting configuration that allows installation under the head of a bolt, eliminating the need for a separate mounting bracket. Measurement axis direction varies according to the intended mounting location, allowing orientation of the accelerometer to the axis of greatest motion. Integral cable versions are available in customer selected lengths, check factory for details.

Model 3077A: Single Axis Accelerometer

- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±10%): 1.1 to 5000 Hz
- Weight: 11 grams

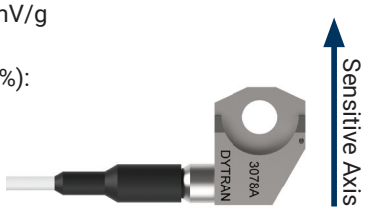
Model 3079A: Single Axis Accelerometer

- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±10%): 1.1 to 3000 Hz
- Weight: 11 grams



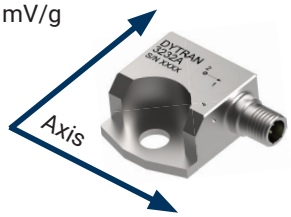
Model 3078A: Single Axis Accelerometer

- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±10%): 1.1 to 5000 Hz
- Weight: 20 grams



3232A Series: Biaxial Accelerometer

- Sensitivities (±10%): 10, 100 mV/g
- Ranges (±): 50, 500 g
- Frequency range (±10%): 33 to 2500 Hz
- Weight: 45 grams



TRANSMISSION, GEARBOX, BEARINGS

This group addresses the main gearbox, accessory gearbox, intermediate and tail rotor gearbox. Select sensors from this group for shaft order 1 (SO1), shaft order 2 (SO2), gear mesh frequency, gear tooth indicators, and bearing wear indicators. This group is characterized by the excellent high-frequency response to 20 kHz and ring-style mounting to accommodate cable and connector orientation.

Model 3168F: Airborne Accelerometer

- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±5%): 1 to 20000 Hz
- Weight: 23 grams

Model 3168D2: Airborne Accelerometer

- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±3dB): 1 to 10000 Hz
- Weight: 42 grams

CUSTOM HIGH TEMPERATURE CONFIGURATIONS/ENGINE HARNESSES

Let Dytran configure a custom sensor/cable/in-line charge amplifier solution for your high-temperature engine monitoring needs. Engine monitoring sensors are nearly always tailored to meet specific requirements for each individual engine manufacturer and Dytran is well-versed at designing high-temperature systems to integrate smoothly with any HUMS/CBM architecture. The products in this section are intended to show some of the possibilities; call or email us today to find out more!

Model 5355: High Temperature Vibration Measurement System

- +1000°F (+538°C) accelerometer operation
- Sensitivity (±10%): 10 mV/g
- Range (±): 500 g
- Frequency r
- 140 grams

ENGINE

Designed for power turbine and gas generator “hot section” locations to measure vibration spectrum during run-up and SO1, SO2 at the shaft origin between engine and transmission. The products are configured using charge-mode (non-amplified) high-temperature accelerometers, an in-line charge amplifier, and interconnecting cables. The combined system operates from IEPE power, or from 28 VDC aircraft power.

Model 5335: High Temperature Vibration Measurement System

- +900°F (+482°C) accelerometer operation
- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±5%): 4.8 to 1400 Hz
- Weight: 400 grams

Model 3823A: Triaxial IEPE Sensor

- +250°F (+121°C) operation
- Sensitivity (±10%): 10 mV/g
- Range (±): 500 g
- Frequency range (±5%): 2.5 to 2000 Hz
- Weight: 8.5 grams

Model 5334: High Temperature Integrated Charge Amplifier System

- +900°F (+482°C) accelerometer operation
- Sensitivity (±5%): 10 mV/g
- Range (±): 500 g
- Frequency range (±5%): 4.8 to 660 Hz
- Weight: 150 grams

Model 3235C3: Charge Mode Accelerometer

- +550°F (+287°C) operation
- Sensitivity (±5%): 200 pC/g
- 5000 Hz upper frequency range (±10%)*
- Weight: 85 grams

** Low frequency response and phase response are a function of the charge amplifier used.*

FLIGHT MONITORING

DC MEMS sensors are used in flight test scenarios where DC response or low-frequency response is the primary concern. DC MEMS accelerometers test for oscillation of the fuselage and tail boom, a phenomenon that can cause catastrophic failure. Low-frequency data is collected while test pilots run the aircraft through a series of maneuvers, or during ground testing. DC MEMS sensors are also used for rigid body motion, modal analysis and landing gear testing.

7500A Series: High Precision Accelerometer

- Sensitivities (±10%): 1000, 400, 200, 80, 40, 20, 10, 5 mV/g
- Ranges (g): 2, 5, 10, 25, 50, 100, 200, 400
- Frequency ranges (±3dB): 0-400 to 0-4000 Hz
- Weight: 13 grams

7503D Series: Triaxial MEMS Accelerometer

- Sensitivities (±10%): 2000, 800, 400, 160, 80, 40, 20, 10
  D9: 800(X&Y), 160(Z), D10: 800 (X&Y), 80(Z) mV/g
- Ranges (g): 2, 5, 10, 25, 50, 100, 200, 400
  D9: ±5(X&Y), ±25(Z), D10: ±5(X&Y), ±50(Z)
- Frequency ranges (±3dB): 0-400 to 0-4000 Hz
  D9: 0-800(X&Y), 0-1500(Z), D10: 0-800(X&Y), 0-2700(Z)
- Weight: 38 grams

CAN-MD® Developer Kit

- CAN-MD® developer kits are available to users to gain familiarity with the system in a bench-top environment and aid users with integration. Details on the developer kit can be found on the Dytran website or by contacting canmd@dytran.com

CAN-MD®: MACHINERY DIAGNOSTICS PLATFORM

CAN-MD® is a radically new sensing approach that eliminates the need for a centralized processing unit or “HUMS box”. This is finally the realization of a distributed processing scenario where all the signal processing is done in the sensor proper. To meet the challenges of today, it is no longer enough for an analog sensor to monitor a process and transmit the information as raw time-domain data back to a central processing system for reduction and analysis.

Our innovative sensing platform integrates a bus-based, digital smart sensor network that processes data within the sensor. Each sensor contains configurable firmware to readily adapt its application to any rotating machine and report those results to a central data logger or ECU, enabling a new era of machine intelligence and communication.

3409A & 3410A: CAN-MD® Accelerometers

- Sensors contain two powerful microprocessors, an A/D converter and auto gain ranging
- Part of the bus-based digital smart sensor system
- Made to provide a standalone vibration sensor that can measure, condition, digitize, process & communicate data directly from the sensor itself; providing distributed processing & significant data reduction
- High-frequency performance, high fidelity piezo sensor
- Electrical isolation
- Hermetically sealed housing

4706A: IEPE to CAN Adapter

4765A: Tachometer Adapter

HBK – Hottinger Brüel & Kjær
www.dytran.com
info@dytran.com