SENSORS FOR POWER GENERATION & RECIPROCATING EQUIPMENT

IMI SENSORS
A PCB DIVISION

pcb.com/imi-sensors | 1 800 959 4464

SENSORS FOR POWER GENERATION & RECIPROCATING EQUIPMENT MONITORING

PRESSURE SENSORS AND ACCELEROMETERS FOR PRECISION MEASUREMENT REQUIREMENTS

Throughout its 40-year history, PCB® Piezotronics has been involved with the design and manufacture of sensors and associated signal conditioning instrumentation to address the demanding requirements of the power generation, reciprocating equipment, oil & gas, and petrochemical industries. Whether involved with design evaluations, field testing, compressors, diesel engines, critical component or process monitoring, we can help with off-the-shelf or custom designed equipment to meet your specific needs.

Solid supplier relationships are crucial to the success of any test or monitoring program. With an extensive design engineering team, an experienced staff of field application engineers, full in-house manufacturing capabilities, and 24-hour customer service support, PCB® has what it takes to tackle even the most unique sensor requirements. Manufacturing operations are certified to ISO 9001:2015 QMS Certified by DQS, Inc., AS9100:2016 QMS Certified by DQS, Inc. and calibration procedures accredited by A2LA to ISO 17025. Products are manufactured to meet the specific power generation and petrochemical design requirements, including hazardous area approvals in accordance with ATEX and CSA.

This brochure is intended as an overview to the extensive capabilities available from PCB® in the field of power generation and reciprocating machinery monitoring. Additional information is available at www.imi-sensors.com. As with all PCB® instrumentation, this equipment is complemented with toll-free applications assistance, a worldwide sales and distribution network, and is backed by a no-risk policy, which guarantees Total Customer Satisfaction or your money refunded.

GENERAL APPLICATION AREAS

- Gas Turbine Monitoring
- Combustion Instability Measurement
- Diesel & Gas Engine Monitoring
- Natural Gas Variations
- Wind Turbine Vibration Monitoring

MEASUREMENT TYPES SUPPORTED

- High-Intensity Acoustics and Noise
- Dynamic Pressure Fluctuations, Turbulence and Pulsations
- High Temperature Pressure & Vibration
- Reciprocating Machinery Protection
- Predictive Maintenance

HIGH TEMPERATURE ACCELEROMETERS FOR TURBINE MONITORING

Innovations in high temperature accelerometer technology allow for vibration measurement in extreme heat environments up to +1200 °F (+649°C). Charge amplifiers allow for use with standard data acquisition equipment.

HIGH TEMPERATURE CHARGE ACCELEROMETER KIT

MODEL 600A02

- Kit includes sensor, integral cable, & charge amplifier
- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range: Up to 10 kHz

EXTREME TEMPERATURE CHARGE ACCELEROMETER

MODELS EX600B13 & EX600B14

- Sensitivity: 10 mV/g (EX600B14) or 100 mV/g (EX600B13)
- Measurement Range: ±50 g (EX600B13) or 500 g (EX600B14) pk
- Frequency Range: Up to 3.5 kHz
- One piece construction with integral hardline cable and charge amplifier

VERY HIGH TEMPERATURE CHARGE ACCELEROMETER

MODEL EX619A11

- Sensitivity: 50 pC/g
- Measurement Range: ±500 g pk
- Frequency Range: Up to 3 kHz
- Electrical connector: Integral hardline cable

HIGH TEMPERATURE CHARGE ACCELEROMETER

MODEL EX615A42

- Sensitivity: 100 pC/g
- Measurement Range: ±200 g pk
- Frequency Range: Up to 5 kHz
- Electrical connector: Integral hardline cable

EXTREME TEMPERATURE CHARGE ACCELEROMETER

MODEL EX611A00

- Sensitivity: 10 pC/g
- Measurement Range: ±200 g pk
- Frequency Range: Up to 2.8 kHz
- UHT-12™ element

EXTREME TEMPERATURE CHARGE ACCELEROMETER

MODELS EX357A9X AND EX357E9X

- Sensitivity: 2.3 pC/g (EX357E92/93) 3.3 pC/g (EX357A94/95), 5 pC/g (EX357E90/91)
- Measurement Range: ±1000 g pk
- Frequency Range: Up to 3 kHz
- UHT-12™ element

HIGH TEMPERATURE PRESSURE SENSORS FOR COMBUSTION INSTABILITY MEASUREMENT

In response to market and regulatory requirements, modern power turbine manufacturers have achieved remarkable decreases in emissions. In particular, NOx emissions have been dramatically reduced through new “lean burn” or “dry low NOx” designs. As is typically the case, these advances have come at a price. The low fuel-to-air ratios of these combustors can result in coupled acoustic and heat release pressure oscillations. Even though the magnitude of these oscillations may be low, even small fluctuations (less than 1 psi) can cause high-cycle fatigue in metal parts downstream of the combustors.

Piezoelectric pressure sensors are best suited for detecting and measuring dynamic pressure phenomena in the presence of high static pressures. Turbine applications are often at 300 psi (2068 kPa) static, with dynamic pressures up to +/- 5 psi (34 kPa); a perfect fit for PCB® sensors.

275°F (135°C)

ICP® PRESSURE SENSOR

SERIES 102

- Sensitivities: 10 to 100 mV/psi
- Dynamic Measurement Range: 50 to 5000 psi
- 3/8-24 UNF fitting

500°F (260°C)

HIGH TEMPERATURE PRESSURE SENSOR

MODEL EX171M01

- Sensitivity: 1200 pC/psi
- Dynamic Measurement Range: 10 psi
- Case isolated
- 2-pin MIL connector

1200°F (649°C)

EXTREME TEMPERATURE PRESSURE SENSORS

MODELS 176M03 & 176M12

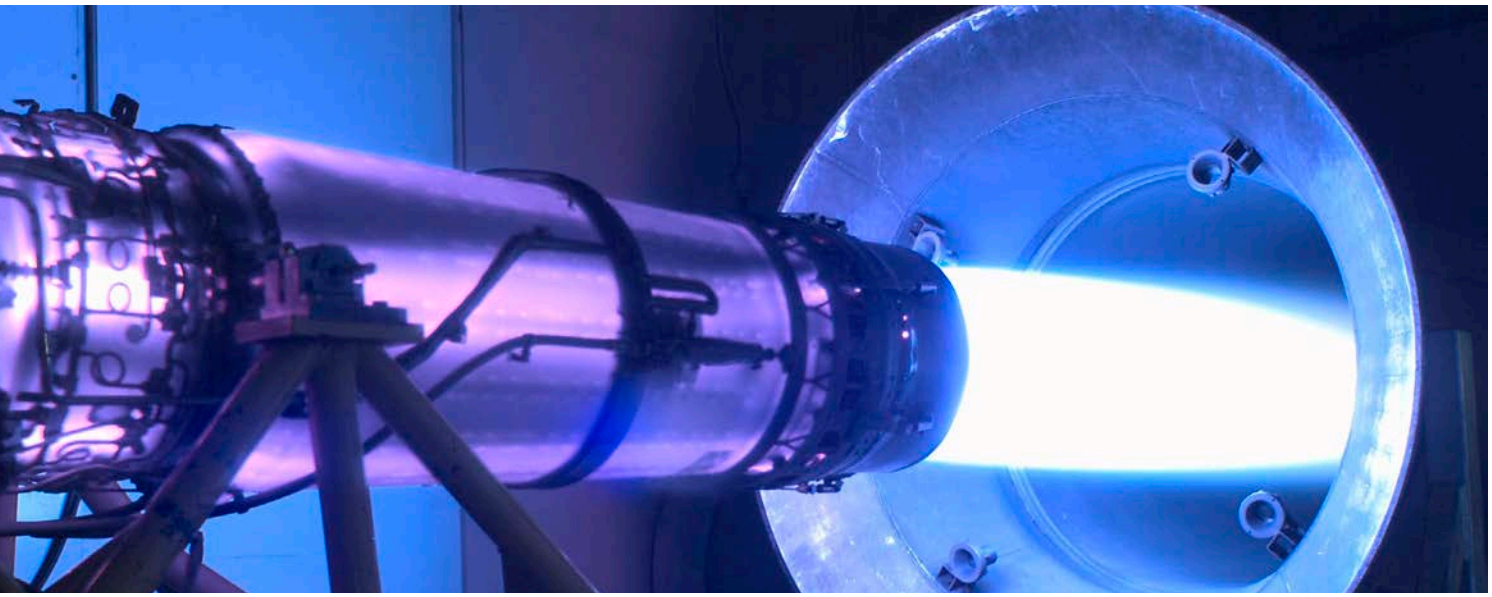
- Sensitivity: 17 pC/psi
- Dynamic Measurement Range: 20 psi
- Case isolated
- Integral hardline cable

1200°F (649°C)

EXTREME TEMPERATURE PRESSURE SENSOR

MODEL 176A02

- Sensitivity: 6 pC/psi
- Dynamic Measurement Range: 725 psi
- Case isolated
- Integral hardline cable



CHARGE AMPLIFIERS

DIFFERENTIAL CHARGE AMPLIFIER
MODEL 422M182

- Sensitivity: 4 mV/pC
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -60 to +185 °F

DIFFERENTIAL CHARGE AMPLIFIER
MODEL EX682A40

- Sensitivity: 10 mV/pC
- Voltage Output: ±2.5 V pk
- Temperature Range (Operating): -40 to +176 °F

DIFFERENTIAL CHARGE AMPLIFIER
MODEL 421B3X

- Configurable sensitivity
- Voltage Output: ±5 V pk
- Temperature Range (Operating): -22 °F to +185 °F

VIBRATION MONITORING ON RECIPROCATING EQUIPMENT

RECIPROCATING MACHINERY PROTECTOR
MODEL (EX)649AX1

- Detects faults / mechanical looseness in reciprocating compressors
- Outperforms impact transmitters
- Continuous trending, with alarm & alert levels for early warning

NATURAL GAS SUPPLY & PETROCHEMICAL INDUSTRY, HAZARDOUS AREA APPROVED SENSORS

Sensors that offer hazardous area approvals are widely used on gas and oil well heads, supply lines, natural gas power engines, multi-stage gas compressors, and other machinery operating in hazardous environments. Piezoelectric pressure sensors offer the capability to detect and monitor dynamic pressure spikes, pulsations, and surges in gaseous or liquid media. Engine pressure sensors offer walk-around or permanent monitoring capability, allowing engine balancing and emissions control. Vibration monitoring has proven effective for determining machinery health, planning maintenance intervals, reducing downtime, and avoiding catastrophic loss.

STATIC PRESSURE SENSOR

SERIES 1503

Monolithic Design
- 1 Piece Thread/Port/Diaphragm
- 17-4 Stainless Steel or Inconel

Output: 4-20 mA

Ranges from 300 to 10,000 psi

Withstands H^2S and Sour Gas Environments

INTRINSICALLY-SAFE VIBRATION TRANSMITTER

MODEL EX641B71

Output: 4-20 mA

Measurement Range: 0.0 to 1 in/sec rms

Frequency Range: 10 to 1000 Hz

ICP® PRESSURE SENSOR

MODELS 121A41, 121A44, 121A45

Sensitivities: 10 to 100 mV/psi

Dynamic Measurement Range: 50 to 5000 psi

Case isolated

2-pin MIL connector

LOW COST ICP® ACCELEROMETER

MODEL EX607A11

Sensitivity: 100 mV/g

Measurement Range: ±50 g pk

Frequency Range: 0.5 to 10000 Hz

Electrical Connector: Molded integral cable

ACCELEROMETERS FOR WIND TURBINE MONITORING

Monitoring vibration levels on wind turbines can help diagnose potential problems at an early stage and help prolong the life of the system. Accelerometers are mounted in various locations within the turbine including the main bearing, the gearbox, and the generator. They can also be used for monitoring the motor in the yaw assembly.

CE

LOW COST ICP®ACCELEROMETER

MODEL 603C01

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Frequency Range: 0.5 to 10000 Hz
- Electrical Connector: 2-Pin MIL-C-5015
- Intrinsically safe version available

CE

LOW COST ICP® ACCELEROMETERS

MODELS 607A11 & 607A61

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Patented Swiveler® mounting for easy installation
- Intrinsically safe version available

CE

LOW FREQUENCY ICP® ACCELEROMETER

MODEL 626B01

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Low frequency

CE

LOW COST ICP® ACCELEROMETER

MODEL 601A01

- Sensitivity: 100 mV/g
- Measurement Range: ±50 g pk
- Low noise

IMI SENSORS
A PCB DIVISION

3425 Walden Avenue, Depew, NY 14043 USA

pcb.com/imi-sensors | imi@pcb.com | 800 959 4464 | +1 716 684 0003

IMI-APP-PowerGen-0922