Dytran by HBK
HOTTINGER BRÜEL & KJÆR

HIGH TEMPERATURE

Advanced sensors for a dynamic world

High-temperature piezoelectric vibration sensors are crucial for developing and monitoring gas turbine engines, APUs, and similar components in environments up to 1,200°F. These customizable sensors support HUMS and condition-based maintenance programs, enhancing operational safety and efficiency.

High Temperature Accelerometers

The products in this section are easily customizable with user-specified features such as mounting configuration, sensitivity, temperature range, and cable length.

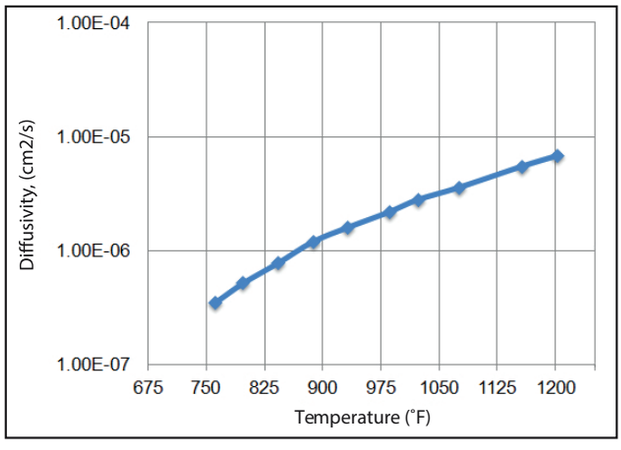
SILVER WINDOW™ TECHNOLOGY: THE DYTRAN ADVANTAGE

When taking measurements in extreme temperatures, the factor of oxygen depletion affects all piezoelectric materials. Dytran Instruments developed the Silver Window™ to overcome such obstacles.

This patented technology is used in our ultra-high temperature sensors: 3,316 Series (1,000°F), Model 3,335C (1,200°F) and 3,262C Series (1200°F). The Silver Window™ allows a diffused oxygen molecule to pass through at high temperatures, replenishing oxygen to the crystal while also maintaining the hermetic seal integrity. With this innovation, the sensor is more robust to resist thermal shocks and provides excellent low-end frequency response measurements. The Silver Window™ is located on the top cover of the accelerometer housing (shown below).

PATENTED DYTRAN TECHNOLOGY

- Assures continuous high temperature operation with no loss of insulation resistance due to oxygen deprivation
- Can operate ef fectively in rapidly changing thermal environments by exhibiting high resistance to thermal-shocks
- Internal components are made from high-temperature-alloys that are “tuned” to a perfect match of thermal coefficients of expansion, stabilizing temperature response characteristics
- Sensing element is electrically isolated from the external case to avoid signal ground loop interference



Typical Diffusivity Rate of O2 Through Silver

ULTRA HIGH TEMPERATURE SENSORS FOR EXTREME ENVIRONMENTS

Model 3335C: Ultra High Temp Accelerometer

Applications: Exhaust, turbine, rocket engine testing, ESS, and HALT/HASS

Features: Integral hardline cable, electrically isolated, charge mode, alloy 600, hermetic

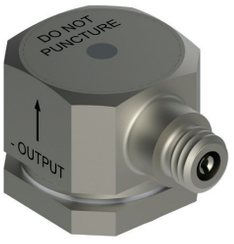
- +1,200°F (+649°C) operation
- Upper-frequency range (±10%): 2,000 Hz*
- Sensitivities: 1 to 2 pC/g
- 35 grams

Model 3316C2: Base Isolated Accelerometer

Applications: Aerospace, turbine, engine and exhaust system monitoring

Features: Low mass, charge mode, miniature design, integral isolated mounting base, Inconel™ housing, hermetic

- +1,000°F (+538°C) operation
- Upper-frequency range (±10%): 5,000 Hz*
- Sensitivities: 1 to 2 pC/g
- 13 grams



Model 3316C7: Miniature Single Axis Accelerometer

Applications: Aerospace, turbine, engine and exhaust system monitoring

Features: Low mass, charge mode, miniature design, integral isolated mounting base, Inconel™ housing, hermetic

- +1,000°F (+538°C) operation
- Upper-frequency range (±10%): 10,000 Hz*
- Sensitivities: 1 to 2 pC/g
- 6 grams

Model 3683C: Ground Isolated Triaxial Accelerometer

Applications: Exhaust and turbine testing

Features: Center bolt mounting allows for perfect alignment of multi-directional cable exit to reduce spiking, charge mode, hermetic, alloy 600

- +1,000°F (+538°C) operation
- Upper-frequency range (±3dB): 3,000*
- Sensitivities: 1 to 2 pC/g
- 65 grams

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

Model 3092C1: High Temperature Accelerometer

Applications: Industrial and general purpose high temperature vibration measurements

Features: Charge mode, hermetically sealed, stainless steel

- Sensitivity: 10 pC/g
- Frequency range (±5%): 5,000 Hz*
- -65 to +760°F (-54 to +404°C)

MULTI-APPLICATION HIGH TEMPERATURE IEPE SENSORS

Model 3030B5H: IEPE Miniature Accelerometer

Applications: ESS, HALT/HASS and vibration control

Features: Design ensures sensitivity stability during rapid, thermal transient conditions, hermetic, IEPE, stainless steel

- +325°F (+163°C) operation
- Frequency ranges (±5%): 5 to 10,000 Hz
- Sensitivity: 10 mV/g
- 7.2 grams

Model 3093M27: Case Isolated Triaxial IEPE Accelerometer

Applications: Powertrain NVH: electric isolation for alternators, starters and EV drive train

Features: Case isolated to prevent ground loop interference and the need for a charge amplifier, titanium, hermetic, TEDS available

- +320°F (+160°C) operation
- Frequency ranges (±3dB%): 1.1 to 10,000 Hz
- Sensitivity: 10 mV/g
- 15 grams

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

Model 3313AH: High Frequency Triaxial IEPE Accelerometer

Applications: Powertrain NVH: electric isolation for alternators, starters and EV drive train

Features: Eliminates the need for a charge amplifier in harsh environments, broad frequency response, low mass, titanium, hermetic

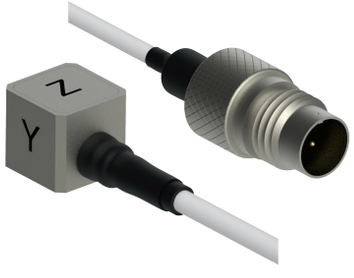
- +325°F (+163°C) operation
- Frequency ranges (±3dB): 1.2 to 10,000 Hz
- Sensitivities: 1, 10
- 4.1 grams

Model 3133A: Ultra Miniature Triaxial IEPE Accelerometer

Applications: Transmission testing, NVH: under hood bracket, powersteering, and valve cover

Features: Eliminates the need for a charge amplifier in harsh environments, reduces mass loading, adhesive mount, ideal low frequency response, 3 ft integral cable, titanium, hermetic

- +320°F (+160°C) operation
- Frequency ranges (±10%): 0.27 to 10,000 Hz
- Sensitivities: 0.2, 1, 2, 5, 10 mV/g
- 0.8 grams



3525A Series: Miniature IEPE Accelerometer

Applications: ESS, HALT/HASS, and automotive hot zones

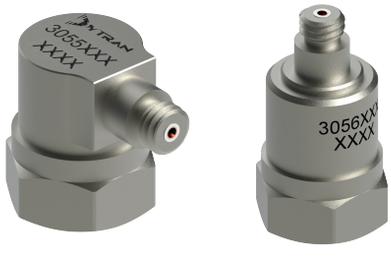
Features: Among the world's first IEPE accelerometers to operate at +392°F continuously, low mass, IEPE, stainless steel, hermetic

- +392°F (+200°C) operation
- Frequency ranges (±10%): 3.3 to 10,000 Hz
- Sensitivity: 10 mV/g
- 6.8 grams

3055F and 3056F Series: IEPE Accelerometer

Features: High Temperature, Base Isolated, Ideal Low Frequency Response, Hermetically Sealed

- Ranges (±): 1,000, 500, 250, 100, 50, 25,10 g pk
- Sensitivities (±5%): 5, 10, 20, 50, 100, 200, 500 mV/g
- Frequency ranges (±10%): 1 to 10,000 Hz
- Weight: 10.0 grams



Model 3543A: High Sensitivity Triaxial IEPE Accelerometer

Applications: Powertrain NVH: electric isolation for alternators, starters and EV drive train

Features: Case isolated to prevent ground loop and EMI interference, titanium, hermetic

- +320°F (+160°C) operation
- Frequency ranges (±10%): 1.3 to 3,000 Hz
- Sensitivity: 100 mV/g
- 15 grams

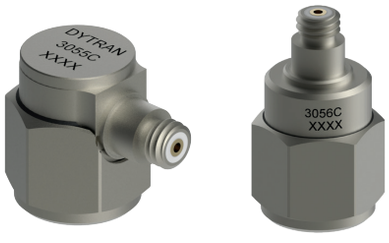
GENERAL PURPOSE CHARGE MODE ACCELEROMETERS

Models 3055C and 3056C: General Purpose Charge Mode Accelerometers

Applications: Modal and structural analysis, vibration control and general purpose vibration monitoring

Features: Base isolated to prevent ground loop and EMI interference, charge mode, low mass, titanium, hermetic, top or side connector options available

- +375°F (+190°C) operation
- Upper-frequency range (±5%): 5,000 Hz*
- Sensitivity: 15 pC/g
- 10 grams

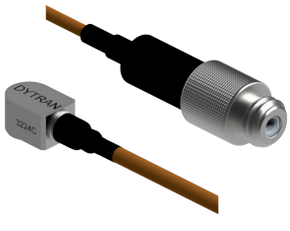


Model 3224C: Ultra Miniature High Frequency Accelerometer

Applications: Low mass test articles, NVH, underhood and fuel line vibrations

Features: Reduce mass loading, adhesive mount, charge mode, titanium, 3-foot integral cable

- +350°F (+177°C) operation
- Frequency range (±10%): 10,000 Hz*
- Sensitivity: 0.25 to 0.45 pC/g
- 0.2 grams



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

Model 3225E1: Ultra Miniature High Sensitivity Accelerometer

Applications: Small test articles, NVH, and mechanical shock

Features: Low mass prevents mass loading test article, teardrop design, negative polarity, adhesive mount, charge mode, titanium, 3 ft cable, low outgassing options

- +350°F (+177°C) operation
- Upper-frequency range (±10%): 10,000 Hz*
- Sensitivity: 1.8 pC/g
- 0.6 grams

Model 3092C1: General Purpose Charge Mode Accelerometer

Applications: Industrial and general purpose high temperature vibration measurements

Features: Consistent performance in harsh environments, low mass, stainless steel, hermetic

- +760°F (+404°C) operation
- Upper-frequency range (±10%): 5,000 Hz*
- Sensitivity: 10 pC/g
- 40 grams

Model 3310C: Base Isolated Low Profile Ultra Miniature Sensor

Applications: ESS, HALT/HASS, and high temperatures with low mass test articles

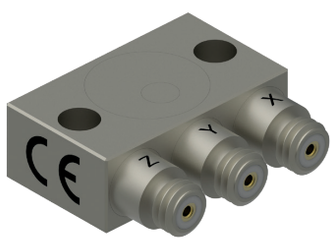
Features: Base isolated to prevent ground loop and EMI interference, 3 ft integral cable, adhesive mount titanium, hermetic

- +500°F (+260°C) operation
- Upper-frequency range (±3dB%): 20,000 Hz*
- Sensitivity: 1.2 pC/g
- 1.8 grams

Model 3443C: High-Temperature Triaxial Accelerometer

Features: Charge mode, low profile, titanium, hermetic, 500°F (260°C) operation

- Sensitivity: 2.7 pC/g
- Upper-frequency range (±10%): 10,000 Hz*
- Weight: 10 grams



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

INDUSTRY-STANDARD TRI-BOLT MOUNT ACCELEROMETERS

Model 3235C2: High Sensitivity Accelerometer

Applications: HUMS, compressor and turbine balance/ monitoring

Features: Case isolated to prevent ground loop interference and common mode noise, differential output, charge mode, stainless steel, hermetic

- +550°F (+287°C) operation
- Upper-frequency range (±15%): 10,000 Hz*
- Sensitivity: 100 pC/g
- 69-85 grams

Model 5335: High Temp. Hybrid Accelerometer System

Applications: Industrial, turbine, and general purpose vibration

Features: Uniquely combines IEPE and charge output technology, case isolated, stainless steel, hermetic

- +900°F (+482°C) operation
- Upper-frequency range (±5%): 1,400 Hz
- Sensitivity: 10 mV/g
- 400 grams

CHARGE AMPLIFIERS

Models 4753 and 4754: In-line Charge Amplifier

- +185°F (+85°C) operation
- Compatible with 3335C, 3316C, 3316C2, 3092C, 3316M1, 3316M2, 3316M3, 3088C

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

Model 4775A4: Differential In-line Charge Amplifier

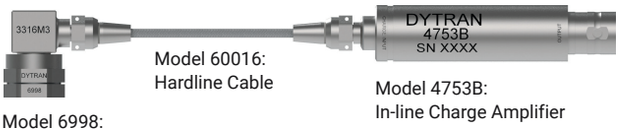
- +185°F (+85°C) operation
- 6-pin connector to 3-pin connector
- Compatible with 3262C

Model 4786A: In-Line Charge Amplifier

- Sensitivities (mV/pC): 1.0/2.5
- Frequency ranges (±3dB): 3 to 1,000 Hz
- -40 to +257°F (-40 to +125°C)

EXAMPLE OF A HIGH TEMPERATURE SINGLE AXIS SYSTEM

Model 3316M3:
High Temperature Accelerometer



Model 60016:
Hardline Cable

Model 4753B:
In-line Charge Amplifier

Model 6998:
Mounting Base

EXAMPLE OF A HIGH TEMPERATURE TRIAXIAL SYSTEM

High Temperature Accelerometers

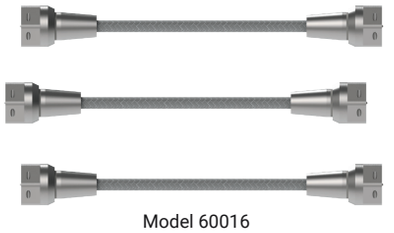
Each of these models has a dierent output polarity allowing for an X, Y, Z conguration when used as a system.

Model 3316C1

Model 3316D2

Model 3316D2

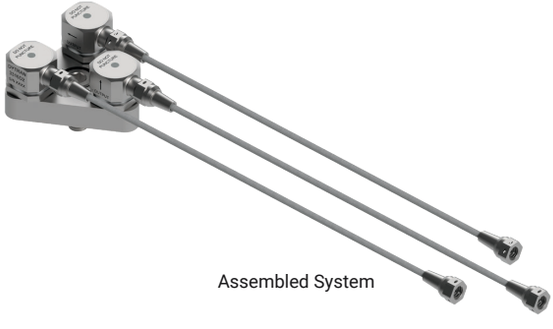
Hardline Cables



Model 60016

Mounting Base and Studs

Model 6460



Assembled System

COMPATIBLE CABLES FOR HIGH TEMPERATURE SENSORS

Dytran designs and manufactures a wide variety of cables for testing and monitoring applications. All cable assemblies are designed and manufactured in the USA. We offer a broad range of standard products as well as custom cables made to customer specifications.

60016A Series: Hardline Cable Assembly

Applications: Turbine engine, helicopter exhaust and aircraft testing

Features: Stainless steel jacket with insulating fiberglass sleeving

- +1,100°F (+593°C) operation
- 10-32 plug to 10-32 plug
- Compatible with 3316C, 3316C2, 3092C, 3316M1, 3316M2, 3316M3

60064A Series: Cable Assemblies

Applications: Exhaust, turbine, ESS and HALT/HASS

Features: Coaxial, Teflon™ jacket, low outgassing

- Coaxial
- 10–32 to BNC plug
- Teflon™ jacket
- –320 to +500°F (–196 to +260°C) operation

6019A Series: Low Noise Cable

Applications: Exhaust testing, ESS and HALT/HASS

Features: Coaxial, Teflon™ jacket, low outgassing

- Coaxial
- 10-32 plug to BNC plug
- TeflonTM jacket
- - 148°F to + 392°F (- 100 to +200°C) operation

6013A Series: Low Noise Cable Assemblies

Applications: Exhaust testing, ESS and HALT/HASS

Features: Coaxial, Teflon™ jacket, low outgassing

- Mini-coaxial
- 10–32 plug to 10–32 plug
- Teflon™ jacket
- - 148°F to + 392°F (- 100 to +200°C) operation

Model 60061A: Right Angle Cable Assembly

Applications: Aerospace, turbine, engine and exhaust system monitoring

Features: Hardline, stainless steel jacket with insulating fiberglass sleeving

- +1,100°F (+594°C) operation
- 10-32 plug to 10-32 plug
- Compatibile with 3316C, 3316C2, 3316M3

6967A Series: Low Noise Armored Cable Assembly

Applications: Exhaust and turbine testing

Features: Triaxial, four conductor, Teflon™ jacket

- +392°F (+200°C) sensor side of cable operation
- 4-pin plug (1/4-28) to (3) BNC plugs
- Compatible with 3543A, 3023AH, 3313A1H, 3093M27, 3023B9T

60136A Series: IEPE Cable Assembly

Applications: Industrial and general purpose high temperature vibration measurements

Features: Coaxial, Teflon™ jacket, white, low noise

- +392°F (+200°C) sensor side of cable operation
- 10-32 plug with hex flats for wrench tightening to BNC plug

6838A Series: Industrial Two Conductor Cable Assembly

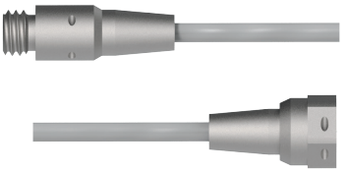
Features: Teflon™ jacket, white, low noise

- +376°F (+191°C) operation
- 2-pin plug to cutoff
- Compatible with 3085C and 3235C

60157A Series: Low Noise Armored Cable Assembly

Features: Hardline, stainless steel jacket with insulating fiberglass sleeving

- +1,100°F (+593°C) operation
- 10-32 plug to 10-32 plug
- Compatible with 3316C, 3316C2, 3092C, 3316M1, 3316M2, 3316M3, 3088C



MOUNTING BASES

Model 6763: Isolated Tri-Mounting Base

- +1,200°F (+649°C) operation
- 10-32 tapped hole
- Stainless steel
- Compatible with 3316C,
- 3316C1, 3316M1, 3316M3

Model 6998: Isolated Mounting Base

- +1,200°F (+649°C) operation
- 10-32 tapped hole
- Stainless steel
- Compatible with 3316C, 3316C1, 3316M1, 3316M3

MOUNTING BLOCKS

Model 6759: Isolated Triaxial Mounting Block

- +1,200°F (+649°C) operation
- 3 X 5-40 thru holes
- Mounting stud 1/4-28 UNF-2A X .380
- Titanium
- Compatible with 3316C, 3316C1, 3316M2

Model 6764: Isolated Triaxial Mounting Block

- +1,200°F (+649°C) operation
- 3 X 10-32 thru holes
- Mounting stud 1/4-28 UNF-2A X .380
- Titanium
- Compatible with 3316M1, 3316M3

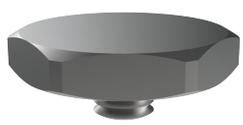
ACCESSORIES

Dytran is known for our innovative sensors and industry leading accessories that enable your sensors to perform better. Visit dytran.com/Accessories or scan the QR code below to view our extensive line of accessories.

Model 6196: Magnetic Mounting Base

Model 6552: Triaxial Mounting Block

Model 6213: Adhesive Mounting Base



Model 6460: High Temperature Tri-Mount Base

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