

High-temperature Piezoelectric Accelerometer

ASC P401A15



- ▶ Uniaxial
- ▶ IEPE (Integrated Electronic Piezoelectric)
- ▶ Stainless Steel Housing
- ▶ Voltage Output



ASC P401A15



Features

- ▶ $\pm 50g$, $\pm 100g$ and $\pm 500g$ Dynamic Ranges
- ▶ High Temperature ($+150^{\circ}\text{C}$)
- ▶ High Frequency ($\pm 1\text{dB}$, 15kHz)
- ▶ Hermetically Sealed
- ▶ Isolated Mounting Surface
- ▶ Shear Design
- ▶ Centre bolt for 360° cable orientation
- ▶ Miniature size (11 grams)
- ▶ TEDS

Options

- ▶ Customised Cable Length
- ▶ DAkkS Calibration

Applications

- ▶ High Temperature Testing
- ▶ Automotive Testing
- ▶ Laboratory Testing
- ▶ Gearbox Vibration Monitoring
- ▶ General Purpose Vibration & Shock Monitoring
- ▶ Test & Measurement Applications
- ▶ High Frequency Applications
- ▶ HUMS (Health Usage & Monitoring Systems)

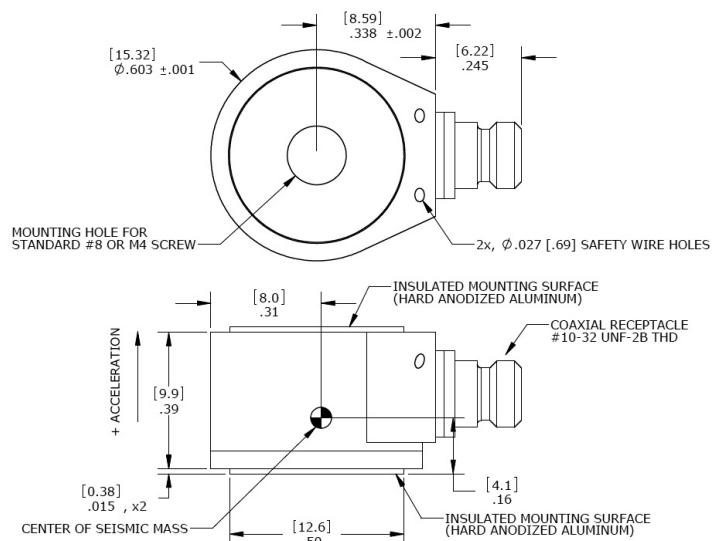
Piezoelectric IEPE Technology

ASC's high-temperature centre bolt accelerometers are made of piezoelectric ceramics and are usable over a wide frequency range from 0.5Hz to 15kHz . The accelerometers are IEPE (Integrated Electronics PiezoElectric) sensors that produce an output voltage proportional to the input acceleration. The sensors feature a built-in preamplifier and a charge to voltage converter that transforms the high-impedance charge output from the piezoelectric ceramic (Lead Zirconate Titanate, PZT) into a low-impedance voltage output that is suitable to drive long cables. ASC's high-temperature IEPE sensors operate on a $2\text{-}20\text{mA}$ constant-current supply and use a two-wire coaxial cable for power input and signal output.

Description

ASC's high-temperature IEPE uniaxial accelerometer, P401A15, is an analog voltage output sensor. Type P401A15 is designed for use in demanding high-temperature (150°C) vibration monitoring applications. The sensor is based on a piezoelectric annular shear design, which provides excellent immunity against base strain and temperature transients.

ASC Type P401A15 features a stainless steel housing that is rugged, corrosion proof and chemical resistant. The sensor incorporates a welded hermetic construction with the industry standard $10\text{-}32\text{ UNF}$ connector and can withstand shocks up to $5000g^{\circ}\text{s}$. Type P401A15 has a through hole for centre bolt mounting, which permits 360° cable orientation. ASC Type P401A15 operates over a wide temperature range from -55°C to $+150^{\circ}\text{C}$.



Typical Specifications

MODEL NUMBER: ASC P401A15

Type: Piezoelectric IEPE High-temperature Accelerometer

DYNAMIC		Range (\pm g)		
		50	100	500
Sensitivity ($\pm 10\%$)	mV/g	100	50	10
Full Scale Output	V		± 5	
Amplitude response: $\pm 5\%$			1 to 5k	1 to 6k
$\pm 1\text{dB}$	Hz		0.5 to 10k	0.5 to 15k
Phase response: $\pm 10^\circ$			1 to 4k	
Non-linearity	%FSO		± 1	
Resonance Frequency	kHz		33	43
Transverse sensitivity (Max.)	%		< 5	
Shock limit	\pm g		5000 (half-sine, 0.3ms)	
Output Polarity			Acceleration in the direction of the arrow (see outline drawing) generates a positive output	

ELECTRICAL

Excitation voltage	V DC		18 to 30	
Supply current	mA		2 to 20	
Bias Voltage	V DC		10 \pm 2 (room temperature) ; 10 \pm 4 (in full temperature range)	
Output Impedance	Ω		< 100	
Startup time (to 90% of bias)	sec		2	
Discharge Time Constant	sec		0.8 to 1.2	
Isolation			Case Isolated	
Spectral Noise	$\mu\text{g}/\sqrt{\text{Hz}}$		1Hz: 800; 10Hz: 300; 100Hz: 100; 1kHz: 50	
Broadband noise (1Hz to 10kHz)	milli g	1	1.5	2.5

ENVIRONMENTAL

Temperature coefficient of sensitivity	%/ $^\circ\text{C}$		-55°C to $+80^\circ\text{C}$: +0.06 ; $+80^\circ\text{C}$ to $+150^\circ\text{C}$: -0.08	
Thermal transient sensitivity	mg/ $^\circ\text{C}$		0.5	
Operating & Storage temperature range	$^\circ\text{C}$		-55 to $+150$	
Sealing			Hermetic	

PHYSICAL

Sensing element / design			PZT / Shear	
Case material			Stainless Steel	
Connector			10-32 UNF	
Mounting			Adhesive / Centre Bolt	
Mounting hole			M4 screw	
Weight (without cable)	gram		11	
Cable			10-32 to BNC Low-noise PTFE	

Note: 1g = 9.80665m/s²

FACTORY CALIBRATION (SUPPLIED WITH THE SENSOR)

Range	50g	100g	500g
Sensitivity	at 160Hz and 10g	at 160Hz and 15g	at 160Hz and 25g
Frequency Response	10Hz to 8kHz		10Hz to 12kHz

CALIBRATION DIN ISO 17025 (ORDER SEPARATELY)*

Range	50g	100g	500g
Frequency Response	I: 0.5Hz to 100Hz (Long-stroke shaker calibration)	I: 0.5Hz to 100Hz (Long-stroke shaker calibration)	I: 0.5Hz to 100Hz II: 10Hz to 15kHz (High-frequency shaker calibration)

ORDERING INFORMATION

ASC P401A15	T	XX
Sensor Type	TEDS	Range
ASC Uniaxial IEPE High- temperature accelerometer		51 ±50g 12 ±100g 52 ±500g

Example: ASC P401A15-T51

ACCESSORIES

Cable Assembly for ASC Uniaxial IEPE Accelerometers	
KPU	XXX
	Cable length in meters
Cable for Uniaxial IEPE Accelerometer	
10-32 UNF to BNC	003: 3m
-55°C to +200°C	006: 6m
	009: 9m

QUALITY

- 1) ASC is ISO 9001:2015 certified
- 2) The Deutsche Akkreditierungsstelle GmbH (DAkkS) has awarded to our calibration laboratory the DIN EN ISO/IEC 17025:2005 accreditation for calibrations and has confirmed our competence to perform calibrations in the field of mechanical acceleration measurements.

* accredited by the German accreditation body (Deutsche Akkreditierungsstelle, DAkkS) to DIN EN ISO / IEC 17025; the pictured DAkkS-ILAC logo refers exclusively to the accredited service