

## IEPE Accelerometer

### ASC P401A15

Uniaxial  
 IEPE (Integrated Electronics Piezo-Electric)  
 Measurement Range:  $\pm 50$  to  $\pm 500$  g  
 Frequency Range ( $\pm 10$  %): 0.5 Hz to 15 kHz  
 Scale Factor: 10 mV/g to 100 mV/g  
 Stainless-Steel Housing (IP68)



### IEPE Accelerometer

IEPE accelerometers are based on the piezoelectric effect, where an input acceleration causes a force on the seismic mass which leads to a proportional charge generation within the ceramic PZT material. The IEPE (integrated electronics piezo-electric) circuitry features the conversion of the charge to an analog voltage output signal. As opposed to capacitive accelerometers this signal has a high-pass characteristic, which enables highly dynamic measurements with a very high bandwidth of up to 15 kHz ( $\pm 10$  %) even without the detection of static DC components. Further advantage of piezoelectric accelerometers is a high operating temperature range from  $-55$  °C up to  $+150$  °C.

### Description

Piezoelectric accelerometers are based on PZT ceramic and feature a built-in preamplifier and a charge to voltage converter. The accelerometers providing a high full-scale output voltage of  $\pm 5$  V and low broadband noise of  $< 2.5$  mg. The sensors operate on a constant-current supply and use a simple two-wire coaxial cable for power input and signal output.

The accelerometers feature a robust stainless-steel housing with protection class IP68, different mounting options and a detachable cable with configurable length and connectors.

The uniaxial piezoelectric accelerometers ASC P401A15 (side connector) featuring a compact and lightweight design. They therefore, ideally suited for test and measurement applications such as modal and structural analyses in the automotive and aviation sectors, where a basic requirement is lightweight high-frequency accelerometers for minimizing the mass load on the test structures.

### Features

- Shear Type
- Side-Connector
- AC Response
- High Resonance Frequency
- High Shock Resistance
- TEDS Module

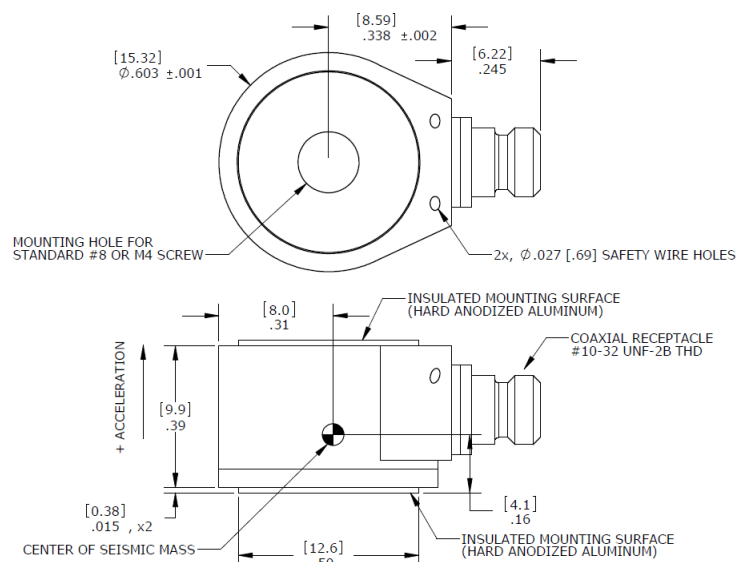
### Options

- Detachable Connector Cables
- Customized Cable Length
- Customized Connector

### Applications

- Structural and Modal Analyses
- NVH and Operational Stability
- Railway Engineering

More applications in several markets are figured out on our web page [www.asc-sensors.de](http://www.asc-sensors.de)



Typical Specification

Dynamic

Measurement Range	g	±50	±100	±500
Scale Factor, Sensitivity (±10 %)	mV/g	100	50	10
Broadband Noise (max)	mg	1.0	1.5	2.5
Frequency Response Range (±5 %)	Hz	1 to 5000		1 to 6000
Frequency Response Range (±1 dB)	Hz	0.5 to 10000		0.5 to 15000
Resonance Frequency	kHz	>33		>43
Transverse Sensitivity	%	<5		

Electrical

Power Supply Voltage	V	18 to 30		
Constant Supply Current	mA	2 to 20		
Offset (bias)	V	10 ± 2 (room temperature)   10 ± 4 (operating temperature range)		
Discharge Time Constant	s	0.8 to 1.2		
Output Impedance (max)	Ω	100		
Isolation	Isolated Mounting Surface			

Environmental

Operating Temperature Range	°C	-55 to +150		
Storage Temperature Range	°C	-55 to +150		
Shock Limit	g	5000		
Protection Class	IP68			

Physical

Sensing Element   Type	PZT   Shear			
Case Material	Stainless-Steel   Anodized Aluminum Mounting Surface			
Connector Sensor Housing	10-32 UNF coaxial			
Mounting	Adhesive   Centre Bolt Through Hole (M4)			
Mounting Thread	M4 Head Cap Mounting Screw			
Mounting Torque	Nm	1.8		
Weight (without cable)	gram	11		
Cable ASC AK-Uniax IEPE 01/xx/BNC (standard)	13 gram per meter   Polyurethane (PUR)   Diameter 3.0 mm   10-32 coaxial connector and BNC connector   -40 °C to +150 °C Temperature Range			
Cable KPU-xxx	Low-Noise-Coaxial   PTFE   10-32 coaxial connector and BNC connector   -55 °C to +200 °C Temperature Range			

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### Sensor Calibration

#### Factory Calibration (supplied with the sensor)

Part Number		#15022	#15022	#15023
Measurement Range (sensor)	g	±50	±100	±500
Applied Frequency (min)	Hz	10	10	10
Applied Frequency (max)	Hz	5000	5000	6000
Input Amplitude	m/s <sup>2</sup>	200	200	200
Reference Frequency for Determination of Scale Factor	Hz	80	80	80

#### Calibration according DIN ISO 17025 (order separately)

Part Number		#12747	#12747	#12747
Measurement Range (sensor)	g	±50	±100	±500
Applied Frequency (min)	Hz	10	10	10
Applied Frequency (max)	Hz	10000	10000	10000
Input Amplitude	m/s <sup>2</sup>	200	200	200
Reference Frequency for Determination of Scale Factor	Hz	80	80	80

#### Remarks:

- The conversion factor 1 g corresponds to 9.80665 m/s<sup>2</sup>.
- If any other calibration procedure is required, don't hesitate to contact us. Our services include both factory calibration and calibration in accordance with DAkkS guidelines.
- Furthermore, sensors have to be calibrated regularly to ensure accurate and precise results. On request we will be glad to remind you of the next scheduled calibration of your sensors.

### Ordering Information

Series	Model	-	Features	Measurement Range
ASC P	401A15 (Side-Connector)		T (TEDS Module already integrated)	51 (±50 g)
				12 (±100 g)
				52 (±500 g)

Example:

**ASC P401A15-T51**

### Accessories

The accelerometers are fabricated for operating with a detachable connector cable which is no part of the product and needs to be ordered separately. Standard is the IEPE plug and play accelerometer cable assembly ASC AK-UniAx IEPE 01/xx/BNC featuring 1-pin MicroCom coaxial connector at sensor side and BNC connector at DAQ as well as different lengths. Optional the cable KPU-xxx featuring different lengths, 10-32 UNF coaxial connector at sensor side and BNC connector at DAQ or customized assembled cables are available on request. Please contact us for further information.

### Safety Precaution for Installing and Operating

This data sheet is a part of the product. Read the data sheet carefully before using the product and keep it available for future operation. Handling, electrical connections, mounting or any other work performed at the sensor must be carried out by authorized experts only. Appropriate safety precautions must be taken to exclude any risk of personal injury and damage to operating equipment as a result of a sensor malfunction.

### Handling

The sensor is packaged in a reliable housing to protect the sensing elements and integrated electronic components from the ambient environment. However, poor handling of the product can lead to damages that may not be visible and cause electrical failure or reliability issues. Handle the component with caution:

- Avoid shocks and impacts on the housing, such as dropping the sensor on hard surface
- Never move the sensor by pulling the cable
- Make sure that the sensor is used within the specified environmental conditions
- Transport and store the sensor in its original or similar packaging
- The sensor should be mounted on a stable flat surface with all screws tightened or other mounting options
- When adhesives are used to mount the sensors, please select the corresponding products according to permanent or removable mounting, ambient temperature range as well as quality of the mounting surface
- Avoid any deformation during mounting the sensor
- Mounting tolerances may have an influence on the measured result

### Electrical

ASC's inertial sensors are working with many established data acquisition systems. However, make sure that a proper DAQ is used, for the corresponding operation principle of the sensor. Furthermore, suitable precautions shall be employed during all phases of shipment, handling and operating:

- Active sensor pins are susceptible to damage due to electrostatic discharge (ESD)
- Make sure that the sensor is used within the specified electrical conditions
- Check all electrical connections prior to initial setup of the sensor
- Completely shield the sensor and connecting cable
- Do not perform any electrical modifications at the sensor
- Do not perform any adaptations on the wiring or connectors while the device under power
- Never plug or unplug the electrical connection while the sensor is under power
- When a certain pin is not used during operation, make sure that the pin is insulated

### Quality

- We have a quality management system according to ISO 9001:2015.
- The Deutsche Akkreditierungsstelle GmbH (DAkkS) has awarded to our calibration laboratory the DIN EN ISO/IEC 17025:2018 accreditation for calibrations and has confirmed our competence to perform calibrations in the field of mechanical acceleration measurements. The registration number of the certificate is **D-K-18110-01-00**.
- All ASC products are **CE**-compliant.

Made in Germany



analyzing



monitoring



testing



measuring