MEMS Piezoresistive Accelerometer

ASC 66C2

Uniaxial
Piezoresistive
Measurement Range: ±6000
Residual Noise: <10 µV
Frequency Range (±5 %): DC to 4000 Hz
Aluminum Housing
Made in Germany

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The key components in piezoresistive accelerometers are high-quality micro-electro mechanical systems (MEMS) that are fabricated from piezoresistive silicon. A bending due to external forces causes deformation of the resistors, leading to a change in its resistance. The resistors are configured into a Wheatstone bridge circuit, which provides a change of the voltage output signal that is proportional to acceleration. This technology also enables the measurement of dynamic or static and constant accelerations. Furthermore, very high measurement ranges are achievable due to the mechanical design.

Description

The piezoresistive accelerometers are based proven MEMS technology, in which four variable resistors are configured as a Wheatstone bridge. The uniaxial ASC 66C2 features a wide dynamic range from 0 Hz to 4 kHz and outstanding impact resistance up to 10,000 g. In addition, the lightweight design allows its use in applications where the mass load of the test structures has to be minimized.

The sensors feature a lightweight, reliable aluminum housing with protection class IP65 and an integrated cable with configurable length and connectors.

Piezoresistive accelerometers are used in high-impact and shock applications such as side and frontal impact tests in the automotive sector. With a measuring range of up to 6,000 g they therefore belong to the category of ASC crash sensors, which can be configured with TEDS and EQX data.

Features

- Wheatstone Bridge Circuit
- DC Response, Gas damped
- Very High Shock Resistance
- Lightweight and Compact Design

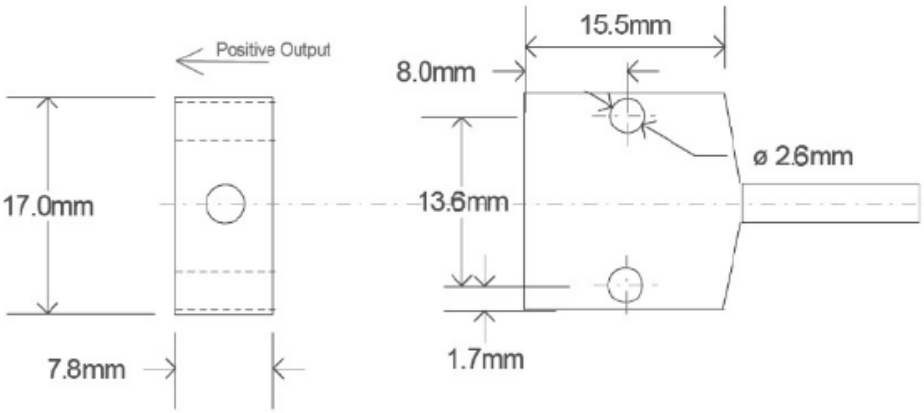
Options

- Customized Cable Length
- Customized Connector
- TEDS Module

Applications

- Automotive Crash Testing
- High Impact and Shock Measurements
- Drop Tests

More applications in several markets are figured out on our web page **www.asc-sensors.de**



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Typical Specification

Dynamic

Measurement Range	g	±6000
Scale Factor (sensitivity)	mV/g	0.10 Please note: Output is ratiometric to Excitation Voltage
Frequency Response Range (±5 %)	Hz	0 to 4000
Resonance Frequency	kHz	26
Amplitude Non-Linearity	% FSO	2.0
Transverse Sensitivity	%	<3

Electrical

Excitation Voltage	V	3 to 10
Offset (bias)	mV	±25
Residual Noise	µV	<10
Insulation Resistance	MΩ	>100
Isolation		Case Isolated

Environmental

Temperature Coefficient of the Scale Factor	%/K	-0.15
Temperature Coefficient of the Offset (max)	g/K	±1
Operating Temperature Range	°C	-40 to +100
Storage Temperature Range	°C	-40 to +100
Shock Limit (0.1 ms, half-sine)	g	10000
Protection Class		IP65

Physical

Sensing Element		MEMS piezoresistive
Case Material		Anodized Aluminum
Connector at Cable End		Optional
Mounting		Adhesive | Screw Holes
Weight (without cable)	gram	5
Cable		13 gram per meter | AWG 30 | Polyurethane (PUR) | Diameter 3.0 mm

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Sensor Calibration

Factory Calibration (supplied with the sensor)

Part Number		#14851
Calibration Method	Medium-frequency Sinusoidal	Pendulum
Measurement Range (sensor)	±6000	±6000
Description	Applied Frequency Range from 40 Hz to 4000 Hz at 200 m/s² Input Amplitude, Reference Frequency for Determination of Scale Factor is 80 Hz.	5 shocks at 100 g

Calibration according DIN ISO 17025 (order separately)

Part Number		#14722
Calibration Method	Medium-frequency Sinusoidal	Pendulum
Measurement Range (sensor)	±6000	±6000
Description	Applied Frequency Range from 25 Hz to 4500 Hz at 200 m/s² Input Amplitude, Reference Frequency for Determination of Scale Factor is 80 Hz.	One shock each at 50 g, 100 g, 150 g and 200 g

The conversion factor 1 g corresponds to 9.80665 m/s². 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.

Cable Code / Pin Configuration (4 Wire System)

Pin		Color Code	Description
1	Supply +	Red	Excitation voltage +3 to +10 VDC
2	Supply -	Black	GND
3	Signal +	Green	Positive, analog output voltage signal
4	Signal -	White	Negative, analog output voltage signal

Ordering Information

Series	Model	-	Range [g]	-	Cable Length [m]	Connector & Pinout
ASC 6	6C2		6k		6	A

Example:

ASC 66C2-6k-6A

Ordering information are based on standard configurations. All customized versions regarding connector and/or pinout will lead to a corresponding product match code. Standard length of the integrated cable is 6 meters. However, different customized cable lengths are possible on request. Standard version has no connector at the cable end which is identified by "A" in the product match code. However, it is possible to assemble almost all connector types during production.

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 adaptions 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.

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