



g ASC OS-225MF-PG
MEMS Capacitive Accelerometer



SPECIFICATIONS

- Biaxial
- MEMS Capacitive
- Measurement Range: ± 2 to ± 200 g
- Noise Density: 10 to 680 $\mu\text{g}/\sqrt{\text{Hz}}$
- Frequency Range ($\pm 5\%$): DC to 2900 Hz
- Stainless-Steel Housing (IP68)
- Made in Germany

MEMS CAPACITIVE ACCELEROMETER

The key components in capacitive accelerometers are high-quality micro-electromechanical systems (MEMS) that feature excellent long-term stability and reliability. This technology enables the measurement of static (DC) and constant accelerations, which can be used to calculate the velocity and displacement of moving objects. Depending on the design of the spring-mass-damping system, however, it is also possible to detect dynamic (AC) accelerations with amplitudes up to ± 200 g and within a frequency response range of up to 2.9 kHz ($\pm 5\%$) or 7 kHz (± 3 dB). Other advantages of capacitive accelerometers are their outstanding temperature stability, excellent response behavior and achievable resolution.

DESCRIPTION

The accelerometers of type ASC OS-225MF-PG are based on proven MEMS technology and capacitive operating principle. The integrated electronic circuitry enables a differential analog voltage output (± 2.7 V FSO) and flexible power supply voltage from 5 to 40 VDC. The MF (Medium Frequency) accelerometers from ASC provide a wide frequency response range from 0 Hz to 7 kHz (± 3 dB) and an extremely robust design with shock resistance up to 6,000 g.

The sensors feature a robust, reliable stainless-steel housing with protection class IP68 and an integrated cable with configurable length and connectors.

The hermetically sealed housing of the accelerometers is ideal for very harsh environmental conditions, e.g. bogie stability tests and monitoring applications in rail transport or condition monitoring of vehicles and their components in the construction sector.

FEATURES

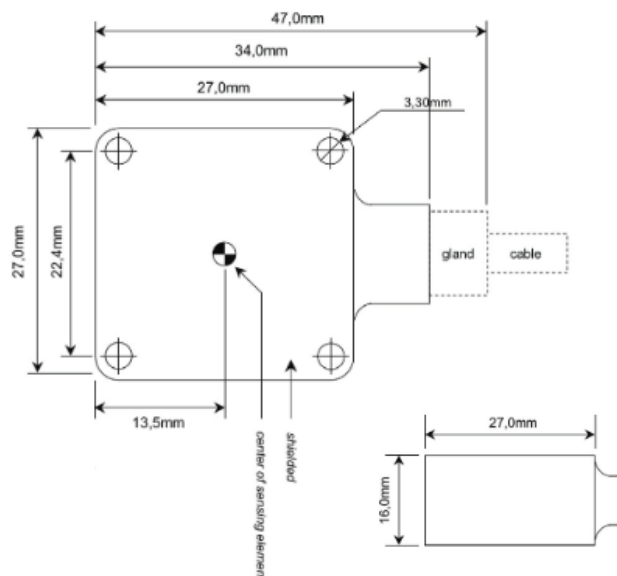
- Low Noise Differential Voltage Output
- DC Response, Gas damped
- Very High Shock Resistance
- Excellent Offset and Scale Factor Stability

OPTIONS

- Customized Cable Length
- Customized Connector
- TEDS Module
- V4A Stainless-Steel Housing

APPLICATIONS

- Railway Engineering
- Condition Monitoring
- Structural Health Monitoring





TYPICAL SPECIFICATION

Dynamic

Measurement Range	g	±2	±5	±10	±30	±50	±100	±200
Scale Factor (sensitivity)	mV/g	1350	540	270	90	54	27	13.5
Noise Density	µg/√Hz	10	20	35	100	170	340	680
Specified Frequency Response Range (±5 %)	Hz	0 to 700	0 to 1150	0 to 2000	0 to 2300	0 to 2700	0 to 2900	0 to 2500
Frequency Response Range (±3 dB)	Hz	0 to 1150	0 to 1900	0 to 3200	0 to 4000	0 to 4500	0 to 5000	0 to 7000
Amplitude Non-Linearity	% FSO	<0.1 (typ) <0.3 (max)						
Transverse Sensitivity	%	<1						

Electrical

Power Supply Voltage	V	5 to 40						
Operating Current Consumption	mA	<10						
Offset (bias)	mV	±10						
Broadband Noise (over specified frequency range ±5 %)	µV	250	310	410	440	475	490	460
Resistive Load	kΩ	1000						
Isolation		Case Isolated						

Environmental

Temperature Coefficient of the Scale Factor	ppm/K	120 (typ) 20 to 220 (max)						
Temperature Coefficient of the Offset (max)	mg/K	±0.2	±0.5	±1	±3	±5	±10	±20
Operating Temperature Range	°C	Standard with Cable K3: -15 to +70 Optional with Cable K4: -20 to +100						
Storage Temperature Range	°C	- 55 to +125						
Shock Limit (0.1 ms, half -sine)	g	6000						
Protection Class		IP68						
		Please note: the housing is hermetically sealed and therefore not repairable.						

Physical

Sensing Element	MEMS Capacitive							
Case Material	Stainless - Steel							
Connector at Cable End	Optional							
Mounting	Adhesive Screw Holes							
Weight (without cable)	gram	68						
Cable K3 (standard)	22 gram per meter AWG 30 Polyurethane (PUR) Diameter 3.75 mm waterproof							
Cable K4 (optional)	29 gram per meter AWG 30 Fluorethylenpropylen (FEP) Diameter 3.75 mm waterproof							



■ SENSOR CALIBRATION

Factory Calibration (supplied with the sensor)

Part Number								
Measurement Range (sensor)	g	±2	±5	±10	±30	±50	±100	±200
Applied Frequency (min)	Hz	1	10	10	10	10	10	10
Applied Frequency (max)	Hz	100	1150	2000	2300	2700	2900	2500
Input Amplitude	m/s ²	5	5	50	100	200	200	200
Reference Frequency for Determination of Scale Factor	Hz	16	80	80	80	80	80	80

Calibration according DIN ISO 17025 (order separately)

Part Number								
Measurement Range (sensor)	g	±2	±5	±10	±30	±50	±100	±200
Applied Frequency (min)	Hz	0.5	10	10	10	10	10	10
Applied Frequency (max)	Hz	150	1900	3200	4000	4500	5000	7000
Input Amplitude	m/s ²	5	5	50	100	200	200	200
Reference Frequency for Determination of Scale Factor	Hz	16	80	80	80	80	80	80

Remarks:

- The conversion factor 1g 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 (6 WIRE SYSTEM)

The standard sensitive directions of the biaxial sensor ASC OS -225MF - PG are the X - axis and Y - axis. Upon request all other combinations of sensitive directions are possible (X and Z or Y and Z) while the color code of the corresponding sensitive directions is always the same.

Pin		Color Code Cable Type K3	Color Code Cable Type K4	Description
1	Supply +	Red	Red	Power: supply voltage +5 to +40 VDC
2	Supply -	Brown	Black	Power: GND
3	Signal +	White	Green/Purple	X - Axis: positive, analog output voltage signal for differential mode
4	Signal -	Grey	White/Purple	X - Axis: negative, analog output voltage signal for differential mode
5	Signal +	Yellow	Green/Grey	Y - Axis: positive, analog output voltage signal for differential mode
6	Signal -	Pink	White/Grey	Y - Axis: negative, analog output voltage signal for differential mode
7	Signal +	Green	Green	Z - Axis: positive, analog output voltage signal for differential mode
8	Signal -	Blue	White	Z - Axis: negative, analog output voltage signal for differential mode



CABLE CONFIGURATION

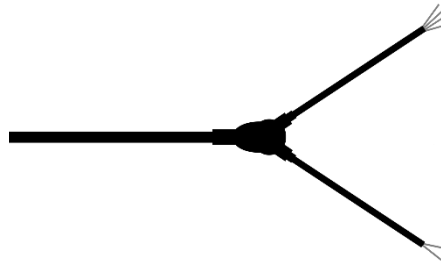
6 Wire System - 6L

Common power supply for all axes, no cable switch



6 Wire System - 6L2

Common power supply for all axes, including cable switch



ORDERING INFORMATION

Series	Model	- Range [g]	- Cable Length [m]	- Connector & Pinout	- Cable	- Cable Configuration
ASC OS	- 225MF-PG	002	6	A	K3	6L
		005				6L2
		010				
		030				
		050				
		100				
		200				

Example:

ASC OS-225MF-PG-002-6A-K3-6L

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 meter. 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.
- The standard sensitive directions of the biaxial sensor ASC OS-225MF-PG are the X-axis and Y-axis. Upon request all other combinations of sensitive directions are possible (X and Z or Y and Z).



■ 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
- 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 pictured DAkkS-ILAC logo refers exclusively to the accredited service.
- All ASC products are  - compliant.

