

g ASC OS-115LN
MEMS Capacitive Accelerometer



SPECIFICATIONS

- Uniaxial
- MEMS Capacitive
- Measurement Range: ± 2 to ± 400 g
- Noise Density: 7 to 400 $\mu\text{g}/\sqrt{\text{Hz}}$
- Frequency Range ($\pm 5\%$): DC to 2000 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 ± 400 g and within a frequency response range of up to 2 kHz ($\pm 5\%$) or 4.2 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-115LN are based on proven MEMS technology and capacitive operating principle. The integrated electronic circuitry enables a differential analog voltage output (± 4 V FSO) and flexible power supply voltage from 6 to 40 VDC. The LN (Low Noise) accelerometers from ASC provide an outstanding noise performance from 7 to 400 $\mu\text{g}/\sqrt{\text{Hz}}$ which is essential for demanding measurements of smallest frequencies and amplitudes.

The sensors feature a robust, reliable stainless-steel housing with protection class IP68 and a detachable 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

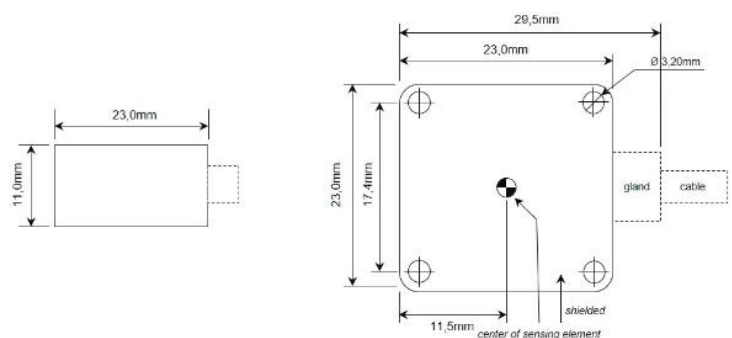
- Very Low Noise Differential Voltage Output
- DC Response, Gas damped
- High Shock Resistance
- Excellent Offset and Scale Factor Stability
- Detachable Connector Cable

OPTIONS

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

APPLICATIONS

- Railway Engineering
- Condition Monitoring
- Structural Health Monitoring





TYPICAL SPECIFICATIONS

Dynamic

| | | | | | | | | | |
|---|--------|--------------------------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Measurement Range | g | ±2 | ±5 | ±10 | ±25 | ±50 | ±100 | ±200 | ±400 |
| Scale Factor (sensitivity) | mV/g | 2000 | 800 | 400 | 160 | 80 | 40 | 20 | 10 |
| Noise Density | µg/√Hz | 7 | 12 | 18 | 25 | 50 | 100 | 200 | 400 |
| Specified Frequency Response Range (±5 %) | Hz | 0 to 250 | 0 to 400 | 0 to 700 | 0 to 1300 | 0 to 1600 | 0 to 1700 | 0 to 1900 | 0 to 2000 |
| Frequency Response Range (±3 dB) | Hz | 0 to 525 | 0 to 800 | 0 to 1100 | 0 to 1750 | 0 to 2100 | 0 to 3000 | 0 to 3600 | 0 to 4200 |
| Amplitude Non - Linearity | % FSO | <0.15 (typ) <0.5 (max) | | | | | | | |
| Transverse Sensitivity | % | <2 (typ) <3 (max) | | | | | | | |

Electrical

| | | | | | | | | | |
|---|----|---------------|-----|-----|-----|-----|-----|-----|-----|
| Power Supply Voltage | V | 6 to 40 | | | | | | | |
| Operating Current Consumption | mA | <10 | | | | | | | |
| Offset (bias) | mV | ±80 | ±80 | ±40 | ±40 | ±40 | ±40 | ±40 | ±40 |
| Broadband Noise (over specified frequency range ±5 %) | µV | 225 | 195 | 190 | 145 | 160 | 165 | 175 | 180 |
| Output Impedance | Ω | 90 | | | | | | | |
| Isolation | | Case isolated | | | | | | | |

Environmental

| | | | | | | | | | |
|---|-------|---|------|------|------|------|------|------|------|
| Temperature Coefficient of the Scale Factor (max) | ppm/K | ±200 | | | | | | | |
| Temperature Coefficient of the Offset (max) | mg/K | ±0.8 | ±2 | ±4 | ±10 | ±20 | ±40 | ±80 | ±160 |
| Operating Temperature Range | °C | Standard with Cable K1: -15 to +70 Optional with Cable K2: -55 to +125 | | | | | | | |
| Storage Temperature Range | °C | -55 to +125 | | | | | | | |
| Shock Limit (max peak) | g | 2000 | 2000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| Protection Class | | IP68 Please note: the housing is hermetically sealed and therefore not repairable. | | | | | | | |

Physical

| | | | | | | | | | |
|--------------------------|---|----|--|--|--|--|--|--|--|
| Sensing Element | MEMS Capacitive | | | | | | | | |
| Case Material | Stainless - Steel | | | | | | | | |
| Connector Sensor Housing | 4-pin Comtronic (male) | | | | | | | | |
| Connector at Cable End | Optional | | | | | | | | |
| Mounting | Adhesive Screw Holes | | | | | | | | |
| Weight (without cable) | gram | 31 | | | | | | | |
| Cable K1 (standard) | 14 gram per meter AWG 30 Polyurethane (PUR) Diameter 3.05 mm waterproof | | | | | | | | |
| Cable K2 (optional) | 15 gram per meter AWG 30 Fluorethylenpropylen (FEP) Diameter 2.75 mm waterproof | | | | | | | | |



■ SENSOR CALIBRATION

Factory Calibration (supplied with the sensor)

| Part Number | | | | | | | | | | |
|---|------------------|-----|-----|-----|------|------|------|------|------|--|
| Measurement Range (sensor) | g | ±2 | ±5 | ±10 | ±25 | ±50 | ±100 | ±200 | ±400 | |
| Applied Frequency (min) | Hz | 1 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Applied Frequency (max) | Hz | 100 | 400 | 700 | 1300 | 1600 | 1700 | 1900 | 2000 | |
| Input Amplitude | m/s ² | 5 | 5 | 50 | 100 | 200 | 200 | 200 | 200 | |
| Reference Frequency for Determination of Scale Factor | Hz | 16 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | |

Calibration according DIN ISO 17025 (order separately)

| Part Number | | | | | | | | | | |
|---|------------------|-----|-----|------|------|------|------|------|------|--|
| Measurement Range (sensor) | g | ±2 | ±5 | ±10 | ±25 | ±50 | ±100 | ±200 | ±400 | |
| Applied Frequency (min) | Hz | 0.5 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | |
| Applied Frequency (max) | Hz | 150 | 800 | 1100 | 1750 | 2100 | 3000 | 3600 | 4200 | |
| Input Amplitude | m/s ² | 5 | 5 | 50 | 100 | 200 | 200 | 200 | 200 | |
| Reference Frequency for Determination of Scale Factor | Hz | 16 | 80 | 80 | 80 | 80 | 80 | 80 | 80 | |

Remarks :

- 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 Cable Type K1 | Color Code Cable Type K2 | Description |
|-----|----------|-----------------------------|-----------------------------|--|
| 1 | Supply + | Blue | Red | Power supply voltage +6 to +40 VDC |
| 2 | Supply - | Brown | Black | Power GND |
| 3 | Signal + | Black | Green | Positive, analog output voltage signal for differential mode |
| 4 | Signal - | White | White | Negative, analog output voltage signal for differential mode |



ORDERING INFORMATION

| Series | Model | - Range [g] | - Cable Length [m] | Connector & Pinout | - Cable |
|--------|--------|-------------|--------------------|--------------------|---------|
| ASC OS | -115LN | 002 | 6 | A | K1 |
| | | 005 | | | K2 |
| | | 010 | | | |
| | | 025 | | | |
| | | 050 | | | |
| | | 100 | | | |
| | | 200 | | | |
| | | 400 | | | |

Example:

ASC OS-115LN-002-6A-K1

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.



■ 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 **CE** - compliant.

