

## Smart Sensor Systems ASC AiSys®

### ASC VibroTherm®

Condition monitoring for smart motor, gears and bearing applications

Internal processing for extracting feature vectors

Adaptable by modular concept

Measurement range: configurable  $\pm 2$  to 8 g or  $\pm 10$  g to  $\pm 40$  g

Temperature measurement: -40 to +125 °C

Aluminum Housing (IP68)

**Made in Germany**



CE

### Smart Sensor Systems ASC AiSys®

Smart sensor systems play a central part in digitization and networking: They enable the basis for numerous monitoring solutions and innovative applications. Based on a modular concept, which contains the complete measuring task from the acquisition of physical input values, through the implementation of complex decision algorithms, to the analysis of the extracted, application-specific feature vectors in one compact sensor system.

#### Description

The smart sensor systems ASC AiSys® VibroTherm® are based on proven MEMS technology and capacitive operating principle. Furthermore, the integrated electronic circuitry enables time-synchronous acquisition and analysis of accelerations and temperature. The acquired data are internally processed while FIR and IIR filters as well as algorithms for extracting feature vectors are already preconfigured. Digitalized g-values, results of frequency analyses and temperature information are accessible by a CAN bus interface which also provides an alarming option based on threshold detection. Further functionalities could be easily implemented due to a modular concept of hardware and firmware components.

The smart sensor systems feature a lightweight, reliable aluminum housing with protection class IP68 and an integrated cable with configurable length as well as a standardized CAN bus interface including already assembled DSUB connector at the cable end.

The smart sensor systems ASC AiSys® VibroTherm® monitor the properties and behavior of components, vehicles or machines, especially when critical vibrations as well as oil temperatures on motors, bearings or gears have to be acquired and analyzed synchronously. Therefore, those systems are ideally suited for condition monitoring in real time. However, the real intelligence consists in merging the historical and current data and using this to determine the future development of the critical parameters. Especially, these analyzes enable predictive maintenance solutions but are also used in digital twins which help to automate process flows and thus make them more efficient.

#### Features

- Internal Processing
- Calculation of g-Values and Acceleration Vector
- Real-time FFT
- Threshold Detection and Alarming for Acceleration and Temperature

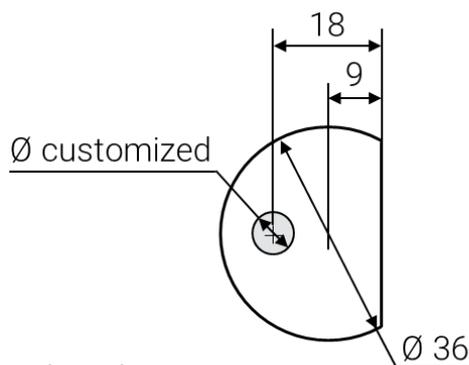
#### Options

- Implementation of further Functionalities and APIs
- Adaption of Components
- Configurable Filter Coefficients

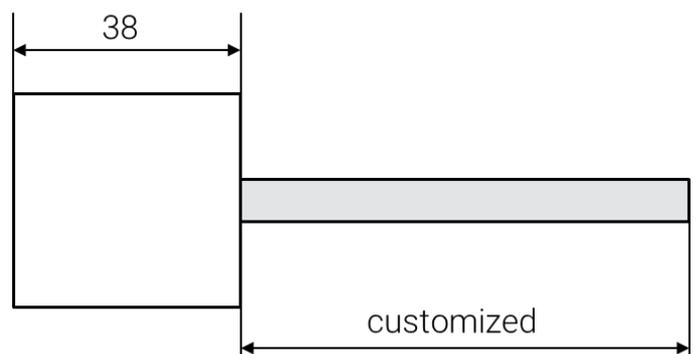
#### Applications

- Condition Monitoring of motors, bearings or gears
- Predictive Maintenance
- Accessible by Digital Twins

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



All dimensions in mm



**Typical Specification for Acquiring the Acceleration**

**Dynamic**

Measurement Range	g	±2	±4	±8	±10	±20	±40
Broadband Noise (over specified frequency range ±5 %)	mg	0.70	0.80	0.95	2.35	2.55	2.85
Noise Density	µg/√Hz	22.5	25.0	30.0	75.0	80.0	90.0
Specified Frequency Response Range (±5 %)	Hz	DC to 1000					
Frequency Response Range (±3 dB)	Hz	DC to 1500			DC to 2400		
Amplitude Non-Linearity	%	0.1	0.4	1.1	0.1	0.5	1.3
Transverse Sensitivity	%	<1 (typ)					

**Electrical**

Power Supply Voltage	V	5 to 40					
Operating Current Consumption	mA	20 to 80 mA (depending on application)					
Isolation		Case Isolated					

**Environmental**

Temperature Coefficient of the Scale Factor (typ)	ppm/K	±100					
Temperature Coefficient of the Offset	mg/K	±0.1 (typ)   ±0.15 (max)			±0.2 (typ)   ±0.75 (max)		
Operating Temperature Range	°C	-20 to +125   -40 to +125 on request					
Storage Temperature Range	°C	-20 to +125   -40 to +125 on request					
Shock Limit	g	5000 (0.5 ms, unpowered)			10000 (0.1 ms, unpowered and powered)		
Protection Class		IP68 Please note: the housing is hermetically sealed and therefore not repairable.					

**Physical**

Sensing Element	MEMS Capacitive (accelerometer) Pt100 (temperature measurement)						
Case Material	Anodized Aluminum						
Connector at Cable End	Standardized CAN bus interface including already assembled DSUB connector						
Mounting	Adhesive   Screw Holes						
Cable	30 gram per meter   AWG 30   Polyurethane (PUR)   Diameter 4.5 mm						

**Features of the Temperature Measurement**

- Single or dual Pt100 measuring resistors
- Measurement range from -40 °C to +125 °C
- Sampling rate 50 Hz
- Resolution 15 bit
- Protective sleeve with a diameter between 5 mm to 12 mm
- Shielded connecting line in 2-, 3- or 4-wire connections
- Fire behavior according to DIN EN 45545
- Shock and vibration resistant according to DIN EN 61373 cat. 3

Smart Sensor Systems ASC AiSys®

Principle of Operation

From acquisition of physical inputs to providing status information – the smart sensor system ASC AiSys® processes measurement data by extracting features from the measurements and relaying them as feature vectors. This is possible because the smart sensor system combines computational power with algorithms and is in bidirectional communication with the other components of the overall system.

As it is shown in the figure below, smart sensor systems ASC AiSys® are converting the acquired raw data to information. That information is accessible through flexible interfaces. Due to the integration of functionalities and features regarding data analyses directly in the smart sensor systems ASC AiSys® the overall system is significantly simplified.



Ordering Information

Do you need a smart monitoring solution? No problem, we have the right sensor system for you! The modular concept allows to adapt all smart sensor systems ASC AiSys® to the exact demands of the application. Please don't hesitate to contact us for further information and detailed discussion of your requirements.

### 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 system 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

The smart sensor systems ASC AiSys® s are working with many established data acquisition systems or communication protocols. However, make sure that a interface is used, for the corresponding operation principle of the sensor system. 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 system is used within the specified electrical conditions
- Check all electrical connections prior to initial setup of the sensor system
- Completely shield the sensor system and connecting cable
- Do not perform any electrical modifications at the sensor system
- 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 system 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