MEMS Capacitive Accelerometer – Digital Interface

ASC DiSens® MD

Triaxial
MEMS Capacitive
Measurement Range: Configurable ±2 to ±8 g
Output Signal: EtherCAT
Software: Including License Dewesoft X3
Aluminum Housing
Made in Germany

MEMS Capacitive Accelerometer

The key components in capacitive accelerometers are high-quality micro-electro-mechanical systems (MEMS). 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 ±8 g and within a bandwidth of up to 1 kHz. Other advantages of capacitive accelerometers are their outstanding temperature stability, excellent response behavior and achievable resolution.

Description

The triaxial ASC DiSens® MD combines accelerometers that are based on proven MEMS technology with a capacitive operating principle and integrated data acquisition. The digital EtherCAT interface allows configuration and data transmission without additional hardware. The ASC DiSens® MD is delivered with a full-license for the extensive Dewesoft X3 software package. Dewesoft X3 is a highly innovative DAQ software for the acquisition and analysis of measurement data. It also supports the integration of additional sensor technologies and types, which ensures synchronization of the measured data.

The accelerometers feature a reliable aluminum housing with protection class IP20. Due to daisy chaining up to 12 sensors can be connected and operated simultaneously.

The flexible configuration options make the ASC DiSens® MD suitable for use in many applications. In addition, live data analysis via Dewesoft X3 allows the verification of measurement data, which is especially advantageous in test bench applications, test drives and extensive measurements in structural health monitoring.

Features

- EtherCAT Interface
- Operating up to 12 Sensors by Daisy Chaining Mode
- Integrated Data Acquisition System and Software
- Measurement Range Selection during Operation
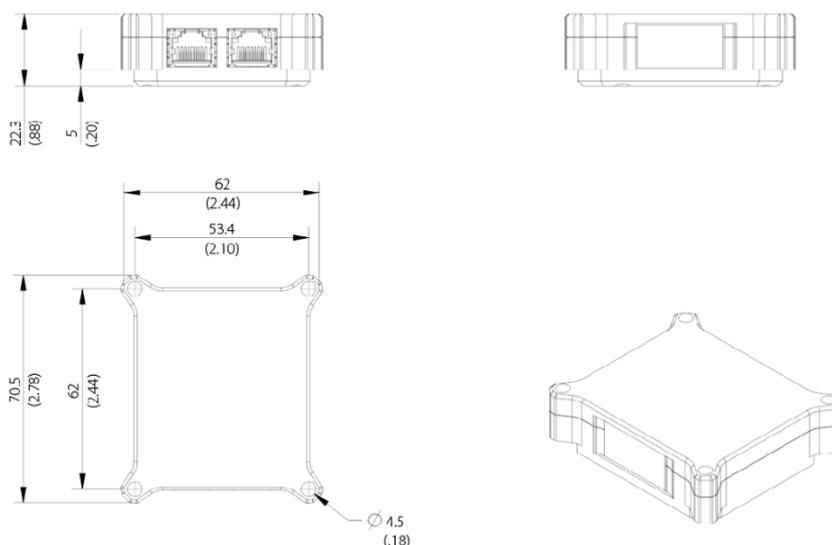- Passive PoE Power Injector and USB-to-12 V Power Supply

Options

- Customized Connector Cable

Applications

- Test Bench Application
- Plug&Play Measurements
- Structural and Modal Analyses

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

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Typical Specification

Dynamic

Selectable Measurement Range	g	±2 to ±8
Offset (bias)	mg	±25 (typ) | ±75 (max)
Noise Density	µg/√Hz	25
Bandwidth (±3 dB)	Hz	1000
Amplitude Non-Linearity	% FSO	<0.1 (typ)
Transverse Sensitivity	%	<1

Electrical

Power Supply Voltage	V	12 to 48
Operating Power Consumption	mW	1300

Environmental

Temperature Coefficient of the Scale Factor (max)	ppm/K	±100
Temperature Coefficient of the Offset (max)	mg/K	±0.02 (typ | ±0.15 (max)
Operating Temperature Range	°C	-20 to +60
Storage Temperature Range	°C	-20 to +60
Protection Class		IP20

Physical

Sensing Element		MEMS Capacitive
Case Material		Aluminum
Connector at Sensor Housing		RJ45
Mounting		Screw Holes (4x M4)
Weight (without cable)	gram	105
Cable		Passive PoE Power Injector and USB-to-12 V Power Supply

Ordering Information

Series	Model
ASC DiSens®	MD-2/4/8-D3

Example:

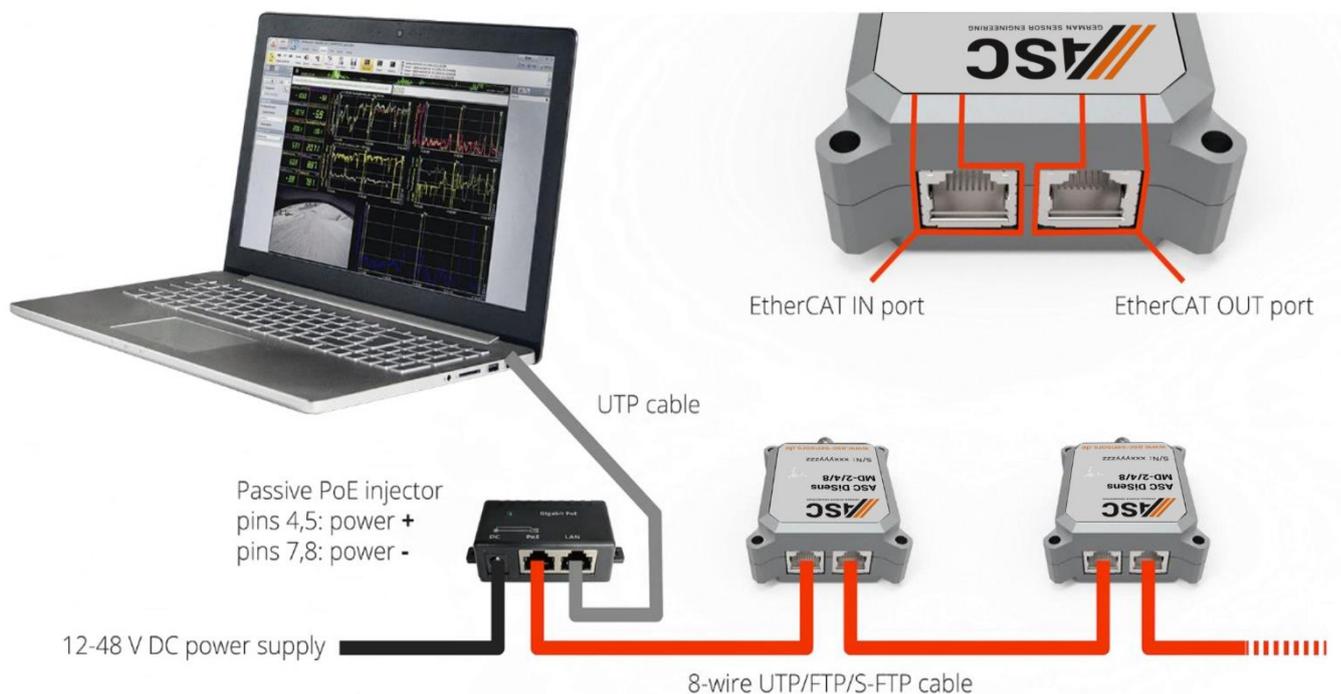**ASC DiSens® MD-2/4/8-D3**

ASC DiSens® MD

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Quick Start Guide

Step 1: Connect Signal and Power

To get started, connect the ASC DiSens® MD device using the PPoE-Inline power injector. You will need an RJ45 network card port on the PC and a USB port for power a single ASC DiSens® MD. Signal and power is transmitted from the injector to the device over the same cable. Do not plug the powered network cable into the PC network port. It may damage the PC.

To connect multiple devices, simply daisy-chain them. Please note that a USB port can only power a single device. To get started, connect the ASC DiSens® MD devices as indicated in the schematic below using a power package (not part of the delivery) when more than one sensor is used. Keep in mind the IN and OUT labels of the EtherCAT (RJ45) ports. The port closer to the master (PC or controller) is always IN port.

EtherCAT IN port   EtherCAT OUT port

UTP cable

Passive PoE injector
pins 4,5: power +
pins 7,8: power -

12-48 V DC power supply

8-wire UTP/FTP/S-FTP cable

Step 2: Download and install Software

Download the software installation files from the following location:

https://download.dewesoft.com/list/dewesoft-x3/dewesoft-x3-official-release-version

Please note that you can run 32-bit software version on a 64-bit processor, but you cannot run a 64-bit version on a 32-bit processor. Unpack and install DEWESoft by running the "DEWESoft_X3_Installer.exe" and following the instructions.

Step 3: Configure the Device

Ensure that EtherCAT devices are properly connected to the PC (see Step 1). After launching DEWESoft X3 software, navigate to the "Options/Settings/Devices" menu. You should see the connected devices in the list. Figures below show how to access the "Options/Settings/Devices" screen and a single ASC DiSens® MD device connected in the list.

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Clicking OK will exit the "Settings" screen and bring you back to the "Channel Setup". Depending on the type of connected ASC DiSens® MD devices, the channels from the devices will show up in three different tabs of the DEWESoft "Channel Setup". Analog input channels will be shown in the "Analog In" tab and digital inputs will be shown in "Digital In" tab. Output channels (digital or analog) will be shown in "Analog/digital Out" tab. If any of the tabs are not shown, you can pull them up by clicking the More… plus button. The tabs will be greyed out if no associated hardware is connected.

To configure the analog input settings like measurement type, range, excitation and sensor scaling, click the "Setup" button on the right end of the channel grid. Individual channel setup screen pops up that allows quick and simple setup of the amplifier. When the channels are configured, you can click the "Measure" button in the top menu to start the measurement.
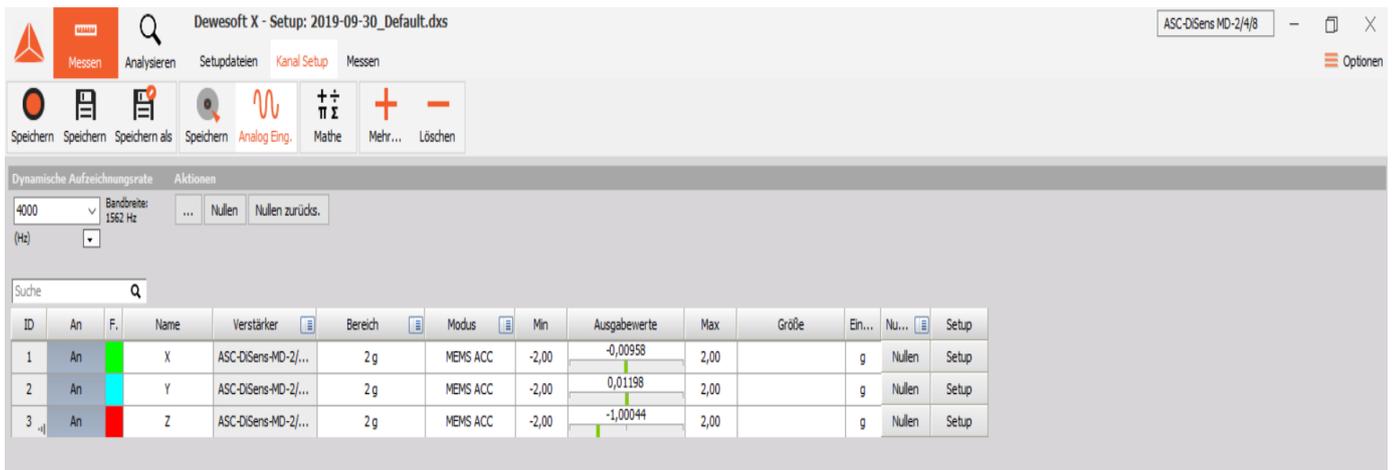
Step 4: Learn more

There are several presentation videos on different DEWESoft functionalities available on the DEWESoft website:

https://training.dewesoft.com/online

https://dewesoft.com/products/daq-software/dewesoft-x

ASC DiSens® MD

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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 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.

Made in Germany

analyzing   monitoring   testing   measuring

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