0 – 10 kHz bandwidth accelerometer and temperature sensor with EtherCAT interface and DEWESoft software.

MonoDAQ-E-gMeter-10k (preliminary)

A vibration and temperature measurement device consisting of a small, low-weight sensor module and a data acquisition module. The sensor box includes a 0-10 kHz bandwidth low-noise 1-axis vibration sensor, a temperature sensor and a 3-axial low speed MEMS accelerometer for orientation identification. The data acquisition node includes the A/D conversion, analog and digital filtering and EtherCAT slave interface.

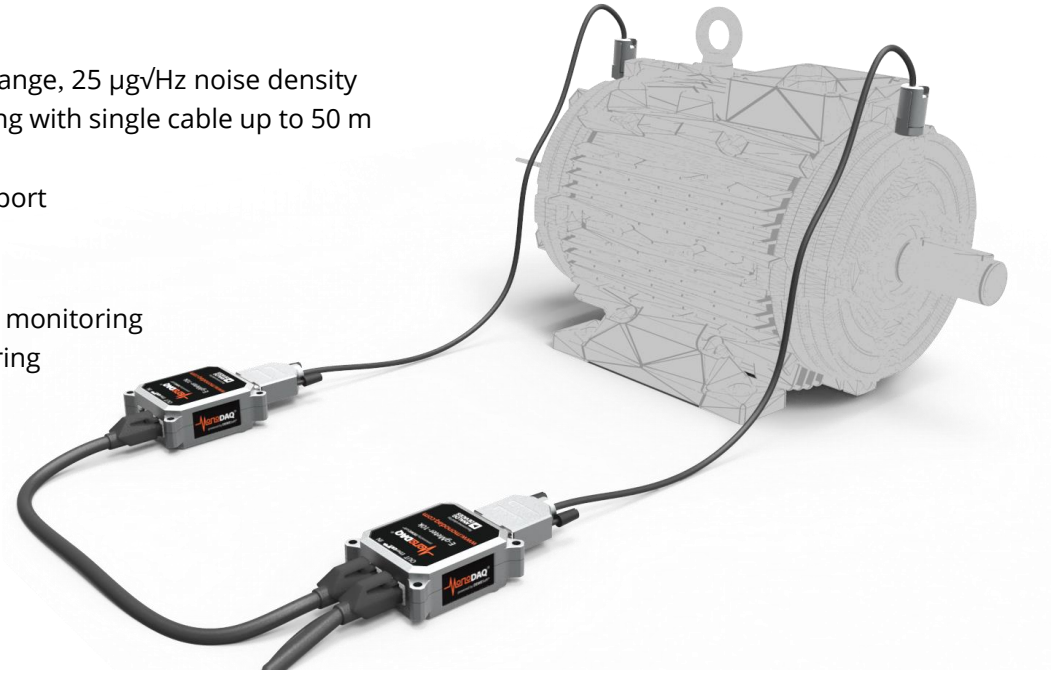
Key features:

- 0-10 kHz bandwidth, 50 g range, 25 µg√Hz noise density
- EtherCAT bus, daisy-chaining with single cable up to 50 m device-device
- DEWESoft X3 software support

Typical applications:

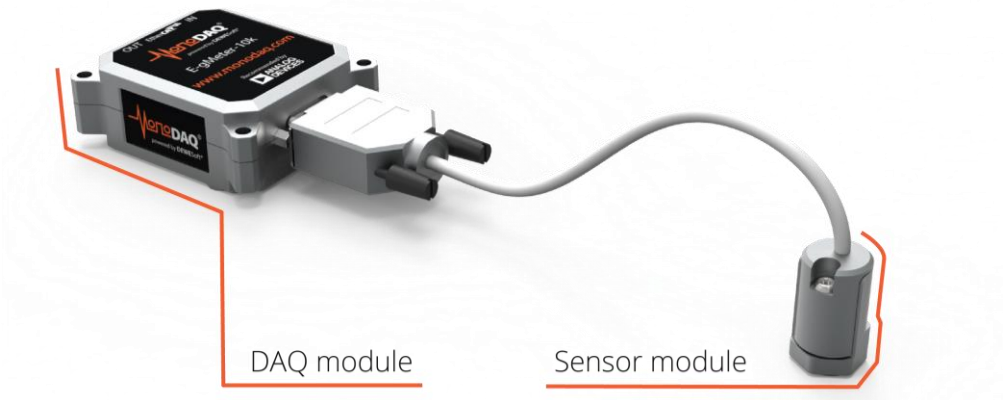
- Vibration and temperature monitoring
- Machine condition monitoring
- Bearing fault detection

Recommended by ANALOG DEVICES



Principle of operation

MonoDAQ-E-gMeter-10k consists of a small, low-weight sensor module that is dislocated from the DAQ module by a <1 m cable to decrease the neccessary mounting space. The sensor module includes three sensors: a single axis low-noise, high-bandwidth accelerometer (0-10 kHz bandwidth, 25 µg√Hz noise density, 50 g range), a temperature sensor (-40 to 125 °C measurement range) and an additional low-speed triaxial DC response MEMS accelerometer (2 g range, 1 S/s sampling speed).



The data acquisition module includes hardware filtering of the high-bandwidth accelerometer, A/D conversion and digital filtering. Analog signal from the high-speed accelerometer is therefore only carried through a short

cable between the sensor module and the DAQ module, decreasing the risk of noise pick-up. Temperature sensor and 3-axial accelerometer transmit data from the sensor module to the DAQ module over the I2C protocol.

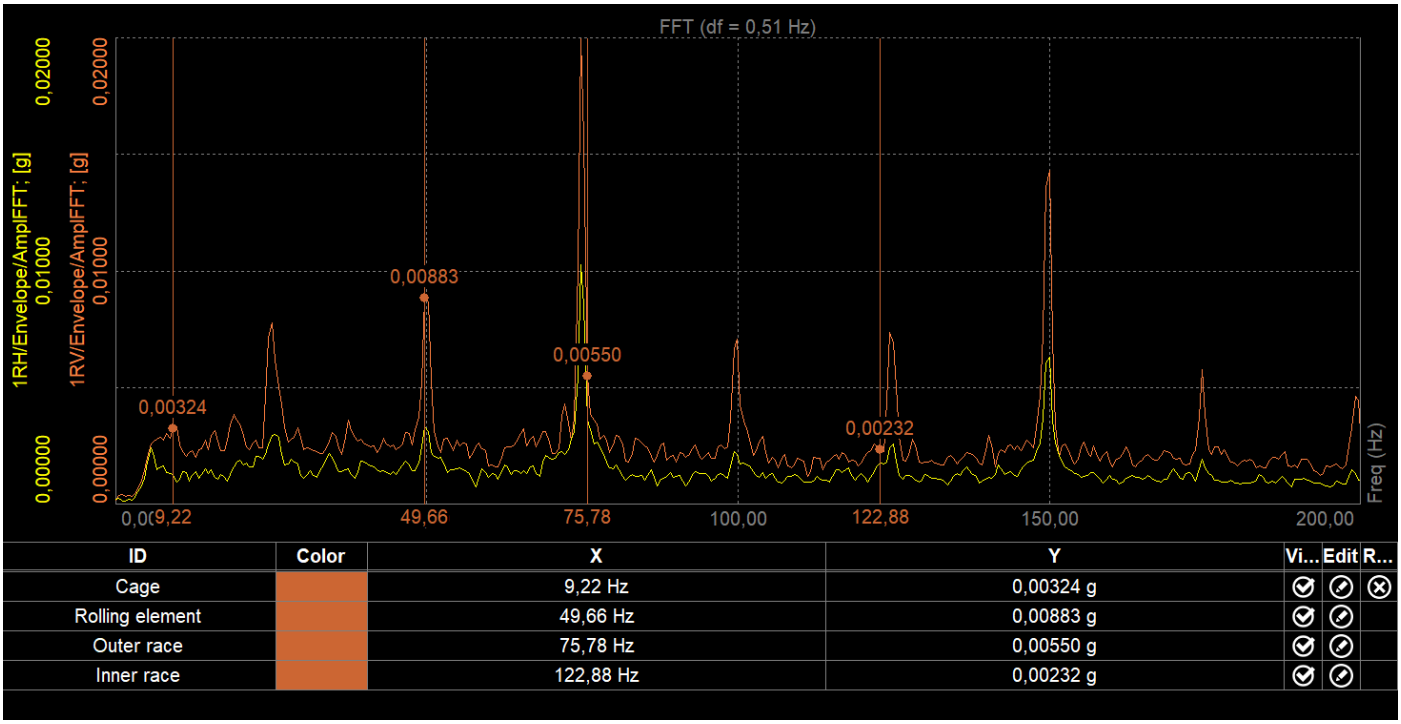
Microprocessor inside the DAQ module transmits the data samples over EtherCAT protocol into DEWESoft software running on a Windows PC, or alternatively to any controller running EtherCAT master on any platform. Scaling is automatic in DEWESoft software, therefore the data in engineering units (g or m/s^2, °C) is readily available to the user. Temperature and 3-axial accelerometer data are available as a channels in DEWESoft software under System monitor channels.

Software – DEWESoft X3

MonoDAQ-E-gMeter-10k is fully integrated into DEWESoft X3 data acquisition and analysis software for Windows. Each device includes the DEWESoft LT-license. No special configuration is neccessary to start acquiring the data as the device is automatically recognized. The software package consists of numerous prebuilt functions that require no programming by the user:

- Time / XY recorder
- FFT recorder
- Scope recorder
- Triggered storing
- Video acquisition
- Statistics (RMS, peak-peak, STDV etc.)
- IIR-, FIR-filters
- Integration, derivation
- Array, vector analysis
- Export to Excel, Matlab, Flexpro, csv, etc.

Subject to additional licenses there are advanced analysis modules available like envelope detection for bearing fault analysis. The module performs envelope detection on the acceleration signal, shows the FFT of the envelope and compares the peaks to the bearing database. The bearing database is included or it can be upgraded with new data by the user.



ID	Color	X	Y	Vi...	Edit	R...
Cage		9,22 Hz	0,00324 g			
Rolling element		49,66 Hz	0,00883 g			
Outer race		75,78 Hz	0,00550 g			
Inner race		122,88 Hz	0,00232 g			

Bearing fault analysis in DEWESoft X3 using Envelope Detection module (not included in LT-license)

DEWESoft can act as a gateway to higher level factory protocols such as OPC UA (subject to additional licence).

MonoDAQ-E series devices can also be directly connected to any controller with standard EtherCAT master functionality.

Specifications

Specifications of the single axis vibration accelerometer inside the sensor module:

	Min.	Typ.	Max.	Unit
Measurement range		50		g
Bandwidth (+-10%)		0-10		kHz
Noise density		25		µg/√Hz
0g Offset error (-40...125 degC)		5		g
Sensitivity temp. drift (-40...125 degC)		+-5		%/degC
Linearity error		0.1		% FS
Crossaxis sensitivity	-1		+1	%
Sensor module weight		20		gram

Specifications of the temperature sensor inside the sensor module:

	Min.	Typ.	Max.	Unit
Measurement range	-40		125	degC
Accuracy (-40 ... 85 degC)		+-3		degC
Resolution		10		bits

Specifications of the 3-axis MEMS accelerometer inside the sensor module:

	Min.	Typ.	Max.	Unit
Measurement range*	2		16*	g
Sample rate		1**		Hz
Resolution		10		bits
0g Offset error	-250		250	mg
0g Offset temp. drift		+-1.2		mg/°C
Sensitivity variation (sensor to sensor)		+-10		%
Linearity error		+-0.5		% FS
Crossaxis sensitivity	-1		+1	%

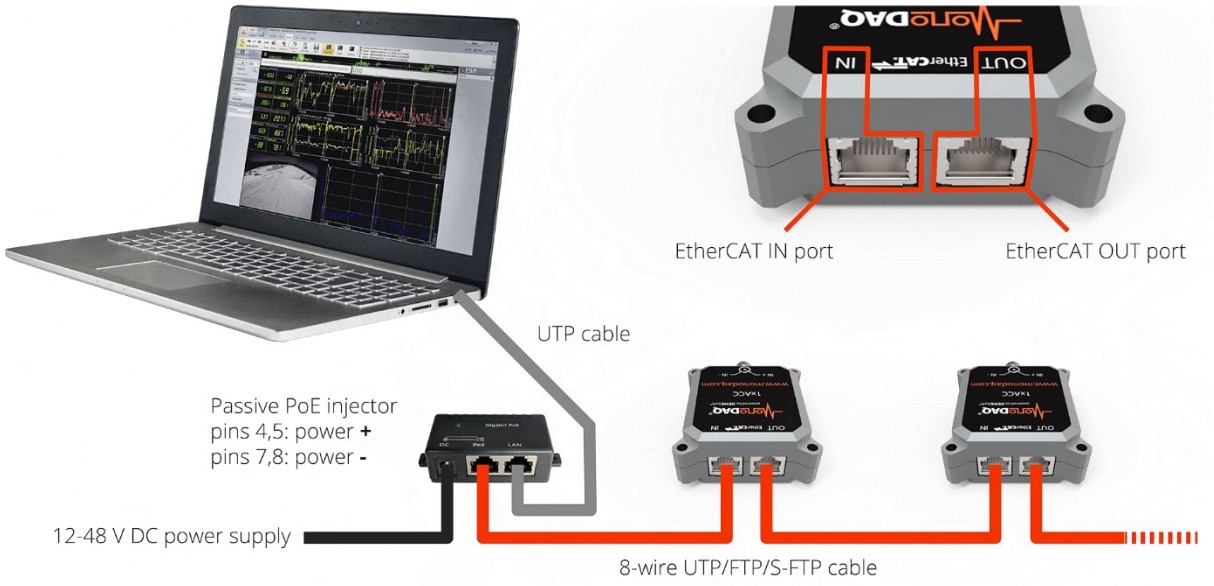
*default range is 2 g, contact support@monodaq.com if different range is desired
**higher sample rates are possible, contact support@monodaq.com if higher sample rate is desired

General specifications of the data acquisition module:

Sampling rate	**40 kS/s**
ADC resolution	24 bit
Digital interface	EtherCAT
Interface connectors	RJ45
Power consumption	1300 mW
Supply voltage	12-48 V
Operating temperature	-20 ... 60 degC
IP rating	IP20

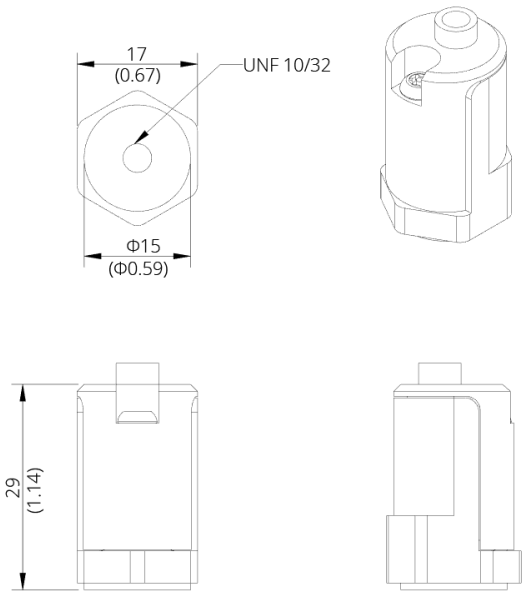
Installation: DAQ modules are daisy chained with a standard network cable. It is recommended that the cable is shielded (SFTP, CAT5e) and has a minimum 24 AWG wire thickness. The cable must have 4 wire pairs. The maximum distance node-to-node is 50 m.

Power supply: Passive PoE power injector is neccessary for merging the EtherCAT signal and power into a single cable.



Power supply voltage	Cable length device-to-device	Cable size	Max. number of devices from a single power supply
24 V	1 m	AWG 24	8
24 V	50 m	AWG 24	4
48 V	1 m	AWG 24	12
48 V	50 m	AWG 24	10

Mechanical drawing – sensor module (not to scale)



Mechanical drawing – DAQ module (not to scale)