DEWESoft®

0 – 10 kHz bandwidth accelerometer and temperature sensor for machine condition monitoring applications.

DEWESoft ASI 1xVIB 50g

DEWESoft ASI 1xVIB 50g is a vibration and temperature measurement probe. Packaged in a small aluminium housing it consists of three sensors: a) single axis accelerometer with 0-10 kHz bandwidth and analog voltage output, b) temperature sensors with I2C interface and c) low-speed triaxial accelerometer with I2C interface. The probe is rated with IP67 ingress protection and -20 to 85 degC temperature range.

Key features:

- 0-10 kHz bandwidth, 50 g range, 25 µg√Hz noise density
- Embedded temperature sensor
- Fits to DEWESoft IOLOITEd 2xASI EtherCAT interface

Typical applications:

- Production robot condition monitoring
- Machine condition monitoring
- Bearing fault detection

Specifications

General specifications:

Operating temperature	-20 … 85 degC
IP rating	IP66
Cable length	2 m
Connector	M8, 8 pin, male
Mounting type	Vertical, M6 thread
Housing material	Aluminium, hard anodized

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

	Min.	Typ.	Max.	Unit
Measurement range		50*		g
Bandwidth (+-10%)		0-10		kHz
Noise (10-1000 Hz)		1		mg rms
Noise (10-10000 Hz)		3		mg rms
0g Offset error (-40...125 degC)		5		g
Nominal sensitivity		40		mV/g
Sensitivity change due to temperature (0...85 degC)		+-2		%
Linearity error		0.1		% FS
Crossaxis sensitivity	-1		+1	%
Sensor module weight		40		gram
Supply voltage		5		V

*contact support@dewesoft.com if 100 g range is desired

Sensitivity deviation over frequency - the graph below shows the sensitivity variation over frequency with respect to the sensitivity at 1000 Hz at which the accelerometer is calibrated. The 95% low and high curves show the limits within which 95% of tested accelerometers are performing.

MonoDAQ-SNS-ACC-1-10k-F Sensitivity Deviation over Frequency
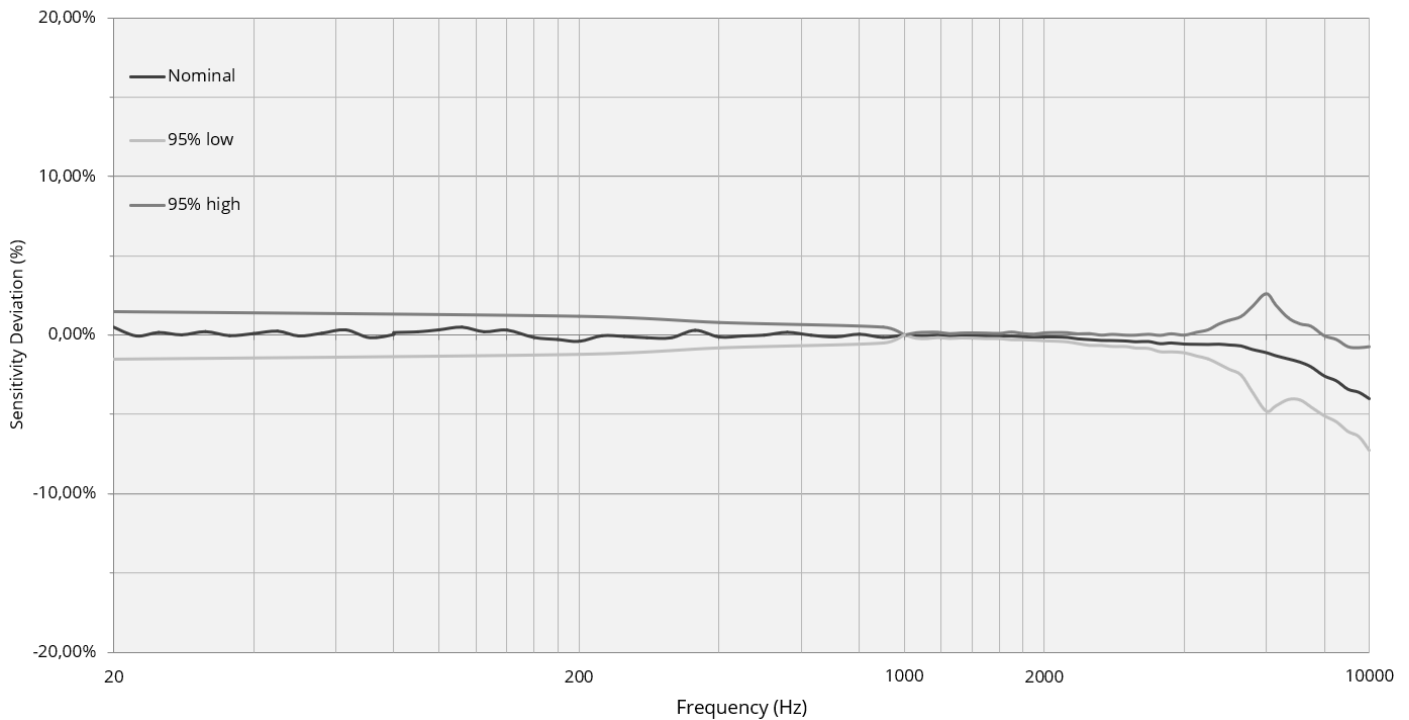
Specifications of the temperature sensor inside the sensor module (I2C):

	Min.	Typ.	Max.	Unit
Measurement range	-40		125	degC
Accuracy (-40 ... 85 degC)		+-3		degC
Resolution		10		bits
Supply voltage		3.3		V

Specifications of the 3-axis MEMS accelerometer inside the sensor module (I2C):

	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		+-10		%
Linearity error		+-0.5		% FS
Crossaxis sensitivity	-1		+1	%
Supply voltage		3.3		V

*default range is 2 g, contact support@dewesoft.com if different range is desired

**higher sample rates are possible, contact support@dewesoft.com if higher sample rate is desired

Principle of operation – single axis analog output accelerometer with 10 kHz bandwidth

The accelerometer requires 5 V excitation voltage on the +5VA pin and outputs analog voltage on the Vout pin according to the specified sensitivity (mV/g). The sensitivity is ratiometric to the excitation voltage. Each accelerometer is shipped with the calibrated sensitivity information at 5.00 V excitation voltage. If the excitation

voltage is lower in the user application, the sensitivity will also be lower accordingly. The accelerometer outputs ½ of the excitation voltage at 0 g. Keep in mind the 0 g drift specification – the accelerometer may not be used for accurate static acceleration measurements due to large offset drift.

**Calibration options** – single axis analog output accelerometer with 10 kHz bandwidth

Each sensor probe's sensitivity is factory calibrated at 1000 Hz. The calibrated sensitivity is supplied with the probe and written inside its I2C EEPROM memory. Frequency response over the 0-10 kHz spectrum is according to the specification in this datasheet. Optionally the probe can be ordered with the accredited calibration certificate.

Principle of operation – triaxial MEMS accelerometer and temperature sensor

The additional two sensors inside the ASI 1xVIB 50g probe use the I2C interface. 3.3 V supply voltage is required if I2C sensors are to be used.

Connector type and pinout

The probe features a direct cable output. Standard cable length is 2 m. Cable end connector is an M8 male thread plug with male pins.
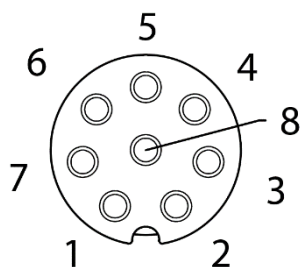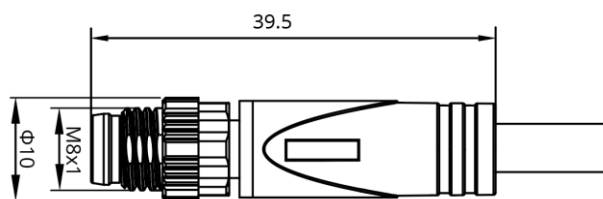
Pin 1 (blue): connection check
Pin 2 (White/Blue): +5VA (5 V analog voltage supply / excitation)
Pin 3 (Orange): Vout (accelerometer analog voltage output)
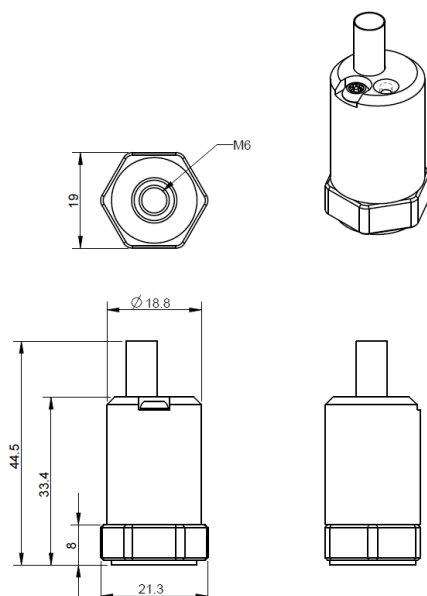Pin 4 (White/Orange): GNDA (analog GND)
Pin 5 (Green): I2C SCL
Pin 6 (White/Green): +3V3 (3.3 V digital power supply for I2C)
Pin 7 (Brown): I2C SDA
Pin 8 (White/Brown): GNDD (digital GND)

Mechanical drawing

Suggested digital interface

DEWESoft ASI 1xVIB 50g sensor probe fits directly to IOLITEd 2xASI device. Up to two sensors can be connected to the device which acquires the analog signal and I2C signals. The IOLITEd 2xASI device has an EtherCAT interface and is supported in Dewesoft X3 software. IOLITEd 2xASI allows the sensors to be distributed around a factory like suggested in the picture below.