



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

## sMICA-ACC [P/N:72SMICAACCR01]

sMICA-ACC 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 IP66 ingress protection and -20 to 85 degC temperature range.

### Key features:

- 0-10 kHz bandwidth, 50 g range, 25  $\mu\text{g}/\sqrt{\text{Hz}}$  noise density
- Embedded temperature sensor
- Fits to MonoDAQ-E-ASI-2-T EtherCAT interface
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### Typical applications:

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

### Specifications

General specifications:

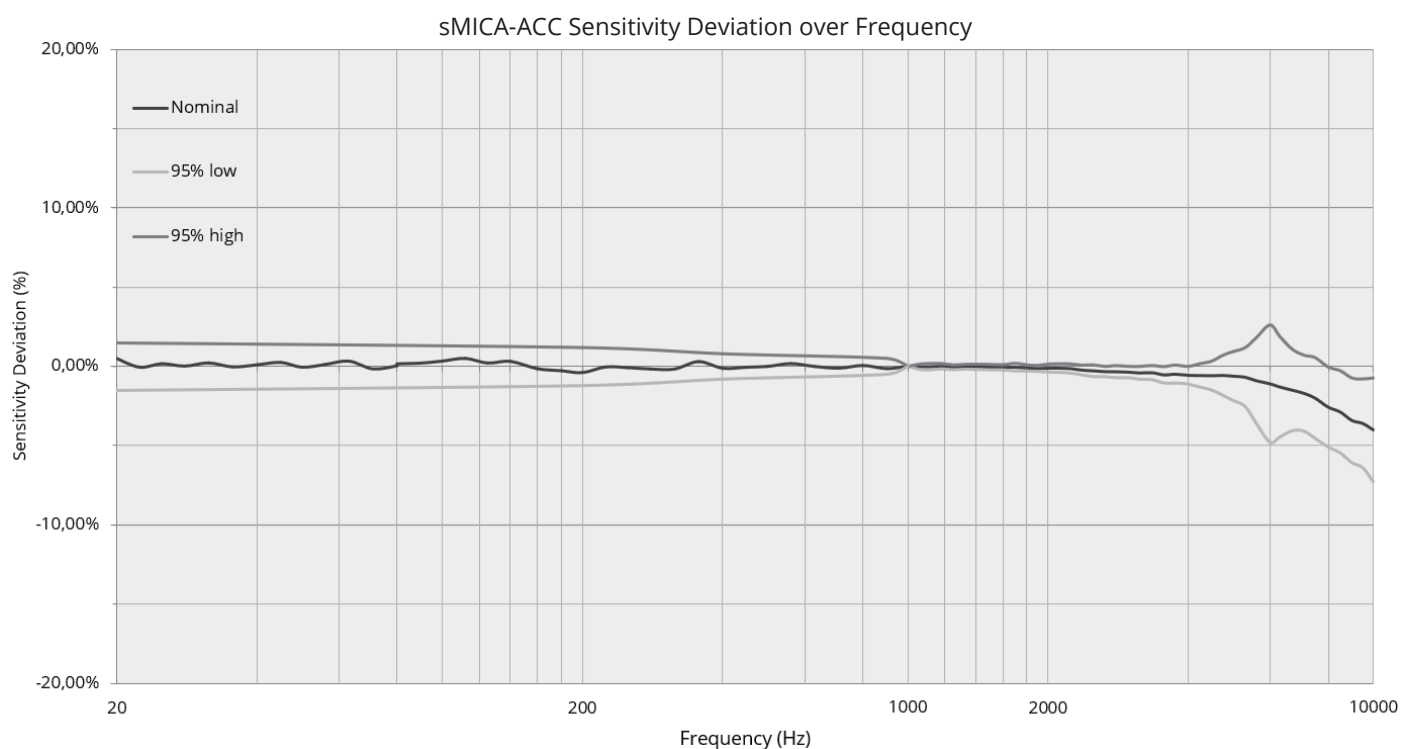
<b>Operating temperature</b>	-20 ... 85 degC
<b>IP rating</b>	IP66
<b>Cable length</b>	2 m
<b>Connector</b>	M8, 8 pin, male
<b>Mounting type</b>	Vertical, M6 thread
<b>Housing material</b>	Aluminum, hard anodized



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

	Min.	Typ.	Max.	Unit
<b>Measurement range</b>		50*		g
<b>Bandwidth (+-10%)</b>		0-10		kHz
<b>Noise density</b>		25		$\mu\text{g}/\sqrt{\text{Hz}}$
<b>0g Offset error (-40...125 degC)</b>		5		g
<b>Nominal sensitivity</b>		40		mV/g
<b>Sensitivity change due to temperature (0...85 degC)</b>		+2		%
<b>Linearity error</b>		0.1		% FS
<b>Crossaxis sensitivity</b>	-1		+1	%
<b>Sensor module weight</b>		40		gram
<b>Supply voltage</b>		5		V

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.



Specifications of the temperature sensor inside the sensor module (I2C):

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

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

	Min.	Typ.	Max.	Unit
<b>Measurement range*</b>	2		16*	g
<b>Sample rate</b>		1**		Hz
<b>Resolution</b>		10		bits
<b>0g Offset error</b>	-250		250	mg
<b>0g Offset temp. drift</b>		+1.2		mg/°C
<b>Sensitivity variation</b>		+10		%
<b>Linearity error</b>		+0.5		% FS
<b>Crossaxis sensitivity</b>	-1		+1	%
<b>Supply voltage</b>		3.3		V

\*default range is 2 g, contact [jp@HARTING.com](mailto:jp@HARTING.com) if different range is desired

\*\*higher sample rates are possible, contact [jp@HARTING.com](mailto:jp@HARTING.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

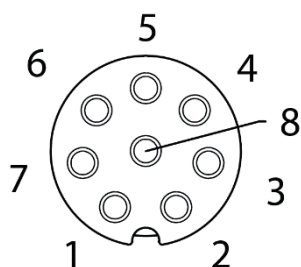
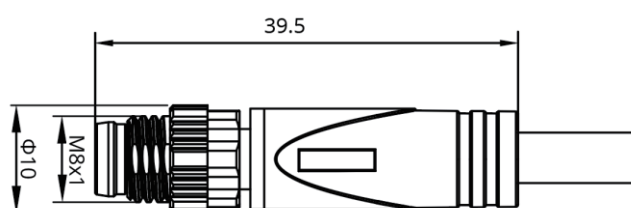
Each sensor probe's sensitivity is factory calibrated at 1000 Hz. The calibrated sensitivity is supplied with the probe and written inside its I2C EEPROM memory. Frequency response over the 0-10 kHz spectrum is according to the specification in this datasheet. Optionally the probe can be ordered with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

### Principle of operation – triaxial MEMS accelerometer and temperature sensor

The additional two sensors inside the sMICA-ACC probe use the I2C interface. 3.3 V supply voltage is required if I2C sensors are to be used.

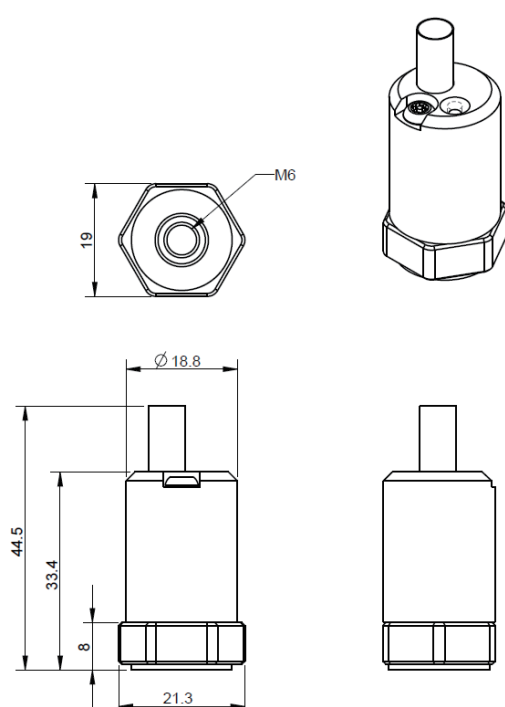
### Connector type and pinout

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



**Customer testimonial**

» sMICA-ACC gives us a flat frequency response up to 10 kHz which even much more expensive accelerometers find difficult to match. This presents an ideal widescale solution for early failure detection in our predictive maintenance applications in automotive industry production lines.«

**Kenji Nogata, HARTING K.K.**

