

# Uniaxial accelerometer

## High temperature accelerometer

Type 8211A



Accelerometer Type 8211A... is designed for permanent vibration monitoring as well as for R&D application where size and weight have to be minimal.

- Permanent temperature range  $-55 \dots 700 \text{ }^{\circ}\text{C}$
- Short time operating temperature  $-55 \dots 1\,000 \text{ }^{\circ}\text{C}$
- Internally case isolated; differential charge output
- Frequency response up to 5 kHz ( $\pm 10 \%$ )
- Highest reliability
- Not pyroelectric
- Dimensions: 16.6 x 16.6 x 29.5 mm, Weight: 30 gramm
- ATEX / IECEx certified

### Description

Core of the sensor is the single crystal PiezoStar measuring element, which has a temperature capability of up to  $1\,000 \text{ }^{\circ}\text{C}$  and without any pyroelectric effect. The sensor features a shear design, which significantly reduces the influence of temperature and base strain. Other features are high frequency response, a hermetic construction of the housing and a small design.

The sensitive axis of the sensor lies in the Z - direction.

To reach highest resolution in harsh environment, the sensor provides a differential signal output and features an internally case isolated design. The integrated hardline cable is robust, low noise and has a temperature rating of over up to  $1\,000 \text{ }^{\circ}\text{C}$ . The cable is available in a standard length of 3 m as well as in customer specific lengths.

The accelerometer is available in an ATEX / IECEx certified version for applications in hazardous areas.

### Application

Main applications are condition monitoring of gas turbines, structural analysis of turbomachinery and general purpose high temperature applications in industrial and R&D environment, which require:

- Temperature capability up to  $1\,000 \text{ }^{\circ}\text{C}$
- Ex-certification for use in potentially explosive environment
- Integrated hardline cable
- EMI immune measuring chain

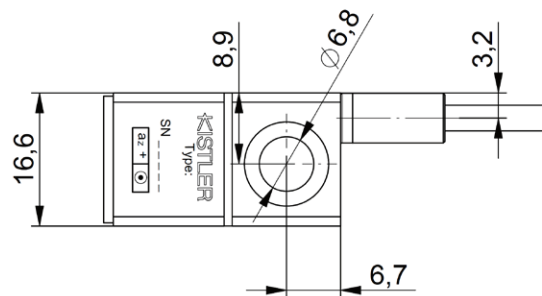
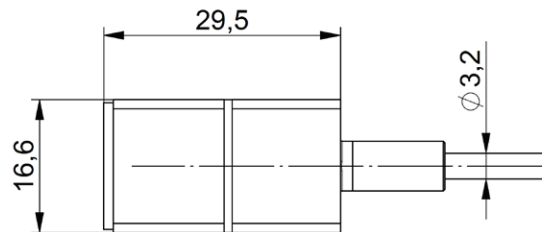
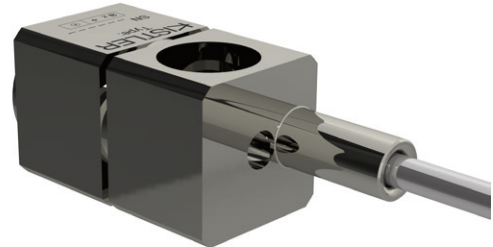


Fig. 1: Accelerometer dimensions

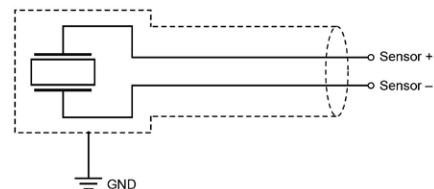


Fig. 2: Electrical schematic, 2-wire, internally case isolated

8211A\_003-340e-06.25

**Technical data<sup>1)</sup>**
**Dynamic characteristics**

Sensitivity @ 159.15 Hz	pC/g	4.7 ± 10 %
	pC/ms <sup>-2</sup>	0.48 ± 10 %
Measuring range	g <sub>pk</sub>	±500
	ms <sup>-2</sup>	±4905
Frequency response		
upper freq. (+5 %)	Hz	1 ... 4200
upper freq. (+10 %)	Hz	1 ... 5200
lower freq. (–3 dB) <sup>2)</sup>	Hz	0.5
Resonance frequency, typical		
@ 25 °C	kHz	>16.5
@ 480 °C	kHz	>10
Thermal sensitivity shift (RT - T <sub>700°C</sub> , theoretical value from crystal data)	%	17
Max. transverse sensitivity w/ 5 m hardline cable (@ 20 Hz, 0.5 g RMS)	%	<5.5
Non linearity	%	<1

<sup>1)</sup> Reference temperature for performance specifications is 25 °C unless otherwise noted.

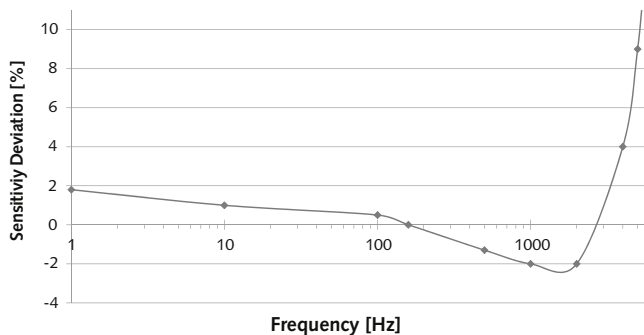
<sup>2)</sup> In combination with Kistler differential charge amplifier Type 5181, 5183, 5185.


Fig. 3: Typical frequency response; relative to reference value at 159 Hz

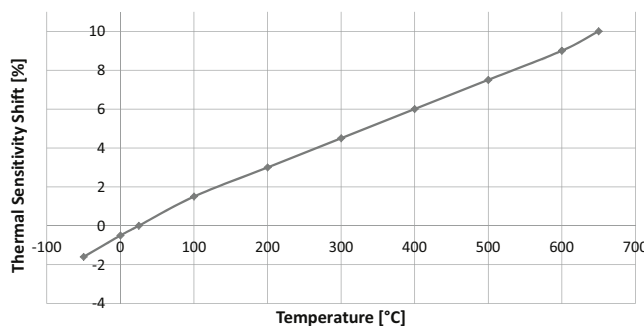


Fig. 4: Typical thermal sensitivity shift

**Electrical characteristics**

Insulation resistance		
Pin – Pin @ 25 °C	Ω	≥1·10 <sup>10</sup>
Pin – Pin @ 700 °C	Ω	≥1·10 <sup>4</sup>
Pin – Case @ 25 °C	Ω	≥1·10 <sup>10</sup>
Pin – Case @ 700 °C	Ω	≥1·10 <sup>4</sup>
Capacitance w/ 0.5 m cable		
Pin – Pin @ 25 °C	pF	<250
Pin – Case @ 25 °C	pF	<200
Polarity		
Acceleration in plus Z- direction	charge	negative

**Environmental characteristics**

Operating temperature range sensor and hardline cable		
Continuous	°C	–55 ... 700
Extreme <sup>3)</sup>	°C	700 ... 1 000
Operating temperature range termination		
LEMO PCA.0S.302	°C	–55 ... 180
7/16" -27 UNS-2A	°C	–55 ... 200
Open leads	°C	–55 ... 180
Humidity (ingress protection)		Hermetically sealed (IP68)
Max. ambient pressure @T <sub>max</sub>	bar	50
Sinusoidal vibration limit	ms <sup>-2</sup> <sub>pk</sub>	±15 000
Shock limit (1ms half sine)	ms <sup>-2</sup> <sub>pk</sub>	±25 000
Base strain sensitivity	gpk/με	<5·10 <sup>-5</sup>

<sup>3)</sup> For detailed information please contact the local Kistler sales office.

Technical data (continuation)

Hazardous area

Type of protection		
Ex-nA	ATEX	II 3G Ex nA IIC T6 ...T710 °C Gc SEV 17 ATEX 0140X
	IECEX	Ex nA IIC T6 ...T710 °C Gc IECEX SEV 17.0012X
Ex-ia	ATEX	II 1G Ex ia IIC T6 ...T710 °C Ga SEV 17 ATEX 0140X
	IECEX	Ex ia IIC T6 ...T710 °C Ga IECEX SEV 17.0012X
Entity parameter (intrinsic safe) <sup>3)</sup>		
Ui	V	≤30
Ii	mA	≤130
Ci	pF	≤410
Li	μH	0
Pi	W	≤0.8

<sup>3)</sup> Special conditions for safe use in potentially explosive areas are described in the instruction manual

INCONEL alloy 600 are registered trademarks of INCO family of companies.

Physical characteristics

Weight sensor and cable	gram	50 + 47 g/m
Sensing mode		shear
Material		
Case		INCONEL alloy 600
Cable jacket		INCONEL alloy 600
Wire		Nickel
Mounting		1x M6x18 (4 N·m)

Sensor configuration and hardline cable termination options

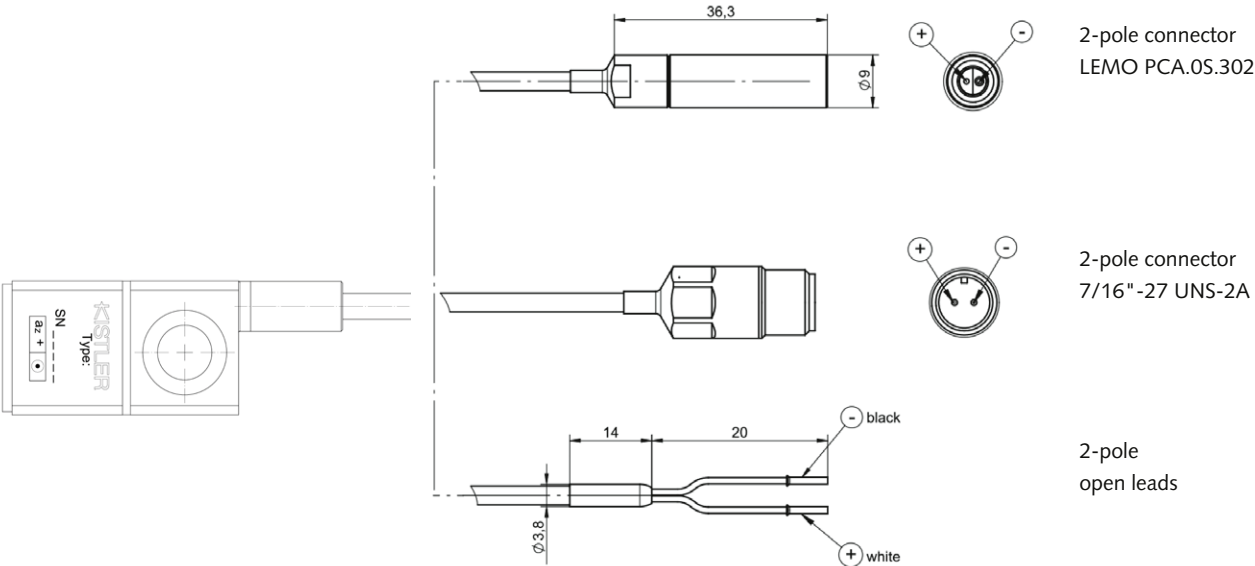


Fig. 5: Configuration options

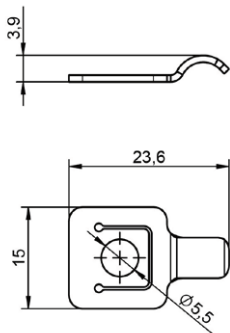


Fig. 6: Mounting bracket for hardline cable  
Type 1423A1

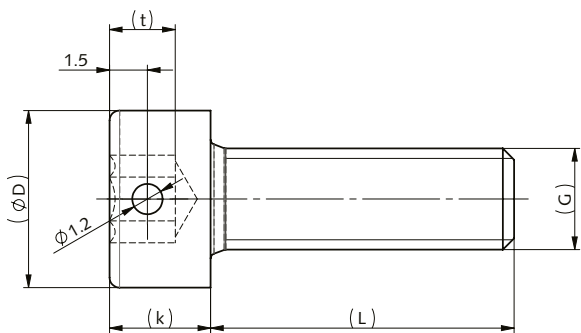


Fig. 7: Mounting screw  
Type 8445AS3 M6 for square footprint, <350°C  
Type 8445AS3HT M6 for square footprint, >350°C

**Scope of delivery**

- High temperature sensor 8211A...
- individual calibration sheet

**Optional accessories**

- |                                       | <b>Type/Mat. No.</b> |
|---------------------------------------|----------------------|
| • High temperature mounting screw     | 8445AS3HT            |
| • Mounting screw                      | 8445AS3              |
| • Mounting bracket for hardline cable | 1423A1               |
| • High temperature thread paste       | 1059                 |
| • Softline cable                      | 1652A...             |
| • Differential charge amplifier       | 5181/83/85           |

**Ordering key**

		Type 8211				
		A	1	C	J	
<b>Ex-certification</b>						
No Ex-certification	-					
Ex-ia; Ex-nA	E					
<b>Hardline cable termination</b>						
Lemo 2-pol. connector	A					
7/16" 2-pol. connector	B					
Open leads	C					
<b>Cable lenght</b>						
3 m	03					
SP 0.5 ... 5 m	SP					

\*Further lengths 10m/15m/20m/25m on request