712-1982

BOSCH

Piezoelectric vibration sensors

Measurement of structure-borne noise/acceleration

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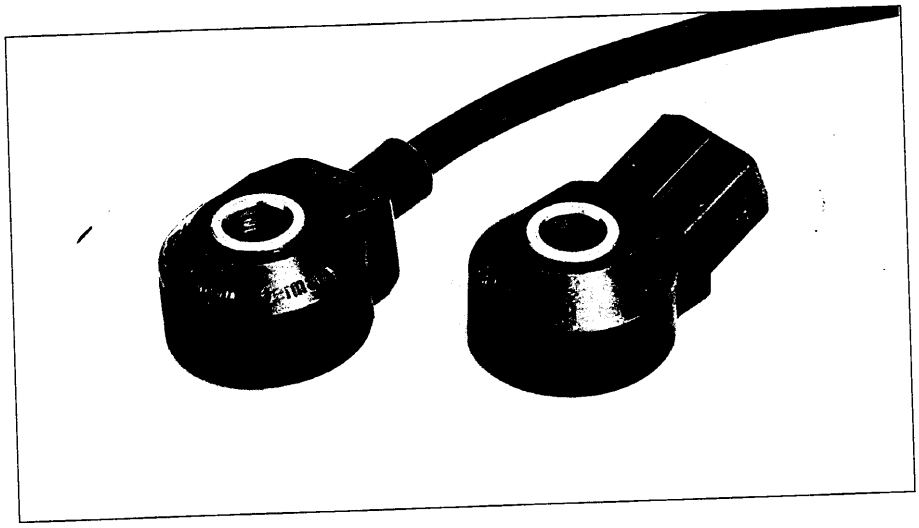
a/U

- Reliable detection of structure-borne noise for protecting machines and engines
- Piezoceramic with high degree of measurement sensitivity
- Sturdy compact design



Application

Vibration sensors of this type are suitable for the detection of structure-borne acoustic oscillation as can occur for example in the event of irregular combustion in engines and on machines. Thanks to their ruggedness, these vibration sensors can be used even under the most extreme operating conditions.

Areas of application:
- Knock control on internal-combustion engines
- Protection of machine tools
- Detection of cavitation
- Monitoring of bearings
- Theft-deterrent systems

Design and function

On account of its inertia, a mass exerts compressive forces on an annular piezoceramic element in time with the oscillation producing the excitation. These forces result in charge transfer within the ceramic and a voltage is generated between the top and bottom of the ceramic element. The voltage is picked-off by way of contact discs – in many cases it is filtered and integrated – and made available as a measuring signal. Vibration sensors are securely bolted to the particular object to be measured, so as to route the vibration at the measurement location directly into the sensors.

Sensitivity:
Every vibration sensor has its own individual response characteristic which is closely linked to its measurement sensitivity. This is defined as the output voltage per unit of acceleration due to gravity (see characteristic curve). The production-related sensitivity scatter is acceptable for applications where the prime task is to record the occurrence of vibration, its severity being of secondary importance.
The low voltages supplied by the sensor can be evaluated using a very high impedance voltage amplifier.

Technical data / Range

Frequency range		1 kHz ... 20 kHz
Measuring range		≈ 0.1 ... 400 g [1]
Sensitivity at 5 kHz		26 ± 8 mV/g
Linearity between 3 ... 15 kHz at resonances		± 15 % of the 5-kHz-figure (15 ... 39 mV/g)
Dominant resonant frequency		> 20 kHz
Self-impedance		> 1 MΩ
Capacitance range		800 ... 1600 pF
Temperature-dependency of the sensitivity		≤ 0.06 mV/(g · °C)
Operating temperature range:		
Type 0 261 231 006		– 40 ... + 130 °C
Type 0 261 231 007		– 40 ... + 130 °C
Type 0 261 231 040		– 40 ... + 130 °C
Type 0 261 231 018	sustained:	– 40 ... + 150 °C
	100 hrs:	– 40 ... + 180 °C
Permissible oscillations	sustained	≤ 80 g
	short-term	≤ 400 g

Installation		
Fastening screw	Grey cast iron	M 8 x 25; Quality 8.8
	Aluminum	M 8 x 30; Quality 8.8
Tightening torque (oiled permitted)		20 ± 5 N · m
Installation position		Arbitrary

[1]) g = 9.81 m · s^{-2} (acceleration due to gravity)
Resistant to industrial climate and saline fog.

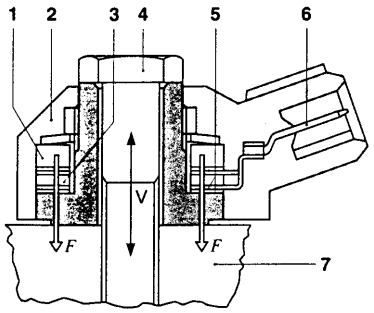
Range

Sensor	
Without cable, 2 pole	**0 261 231 006**
With cable, 3 pole	
Length 370 mm, up to 130 °C	**0 261 231 007**
Length 500 mm, up to 150 °C	**0 261 231 018**
Length 930 mm, up to 130 °C with gold-plated contacts	**0 261 231 040**

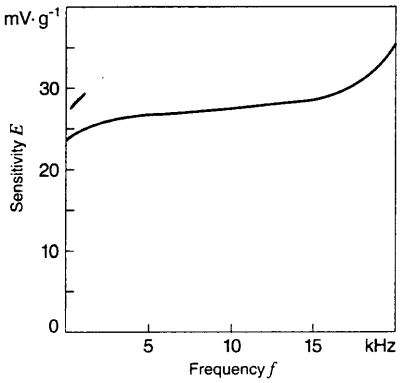
Accessories

Sensor	Connector
0 261 231 006 712 1982	**1 237 000 036**
0 261 231 007 712-1994	**1 237 000 039**
0 261 231 018	**1 237 000 039**
0 261 231 040	**1 237 000 039**

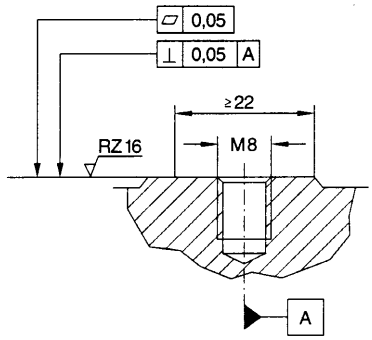
Vibration sensor (design)
1 Seismic mass with compressive forces F,
2 Housing, 3 Piezoceramic, 4 Screw,
5 Contact, 6 Electrical connection,
7 Machine block, V Vibration.



Response characteristic as a function of frequency

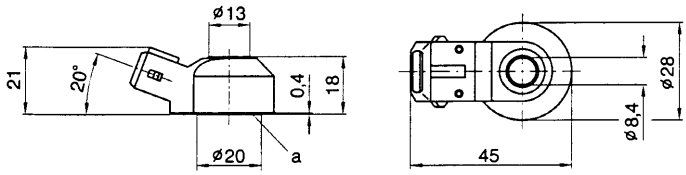


Mounting hole

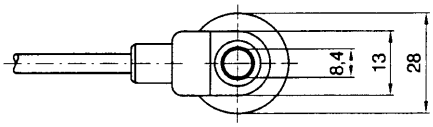


Dimension drawing
a Contact surface.

0 261 231 006

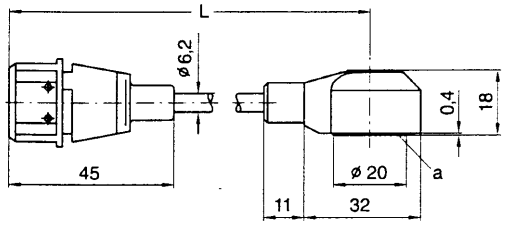


0 261 231 007/018

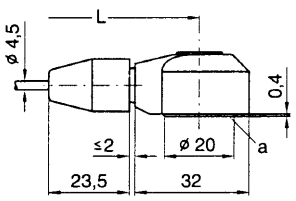


Part No.	L mm
... 007	370 ± 10
... 018	500 ± 10
... 040	930 ± 40

0 261 231 007



0 261 231 018/040



Evaluation:
This sensor's signals can be evaluated using an electronic module. This is described on Pages 22/23.

Installation instructions
The sensor's metal surfaces must make direct contact. The sensors are not to be fastened using washers of any type.
The mounting-hole contact surface should be of high quality to ensure low-resonance sensor coupling at the measurement point.
The sensor cable is to be laid such that there is no possibility of sympathetic oscillations being generated.

Connector-pin assignments
Pin 1, 2 Measurement signal
Pin 3 Shield, dummy

Explanation of symbols:
E Sensitivity
f Frequency
g Acceleration due to gravity