Two Axis Acceleration and Vibration Sensor up to 18g
KAS903 and KAS933 Series for cost sensitive vibrations applications

The sensors are based on an advanced “bulk micro machined” technology. The three dimensional structure of these sensors comprise a pendulum made of mono crystalline silicon. The pendulum is hermetically enclosed between two silicon discs. From this construction results a long term stable, high resolution und shock resistant sensor. A gas damping prevents overshooting and interfering resonance oscillation. An ASIC measures the capacitive change caused by the movement of the pendulum.

Those sensors need no separate adapter and can be used easily on e.g. SPS-Devices or standard oscilloscopes. The gas damping into the sensing element eliminates negative effect like resonance frequency problems and over-shooting effects. The sensor offers excellent low pass filtering which is necessary in a wide band of vibrations-applications. There are other sensitivity and ban-pass-filter parameters possible on request.

- senses in positive and negative direction
- static and dynamic acceleration measured
- high repeatability up to 0,05% over range
- high resolution: up to 0,005% over range
- shock resistance of the pendulum min. 20'000g
- Temperature range -30 … +85°C
- active and passive temperature compensation
- small, solid metal housing with fixing holes
- M8 sensor plug connector or rugged PVC cable
- Large output span: 0,5 … 4,5V output over measuring range
- Power supply requirement: 7… 30 VDC, stabilized
- Traceable calibration certificate for mV/g on 1g/150Hz on certified Shaker available on request
### Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>KAS903-11A KAS933-11A</th>
<th>KAS903-12A KAS933-12A</th>
<th>KAS903-01A KAS933-01A</th>
<th>KAS903-02A KAS933-02A</th>
<th>KAS903-21A KAS933-21A</th>
<th>KAS903-22A KAS933-22A</th>
<th>Units</th>
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<tbody>
<tr>
<td>Measuring range 4)</td>
<td>+/- 6 9)</td>
<td>+/- 6 9)</td>
<td>+/- 12 13)</td>
<td>+/- 12 13)</td>
<td>+/- 18 13)</td>
<td>+/- 18 13)</td>
<td>g</td>
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<tr>
<td>Repeatability at 0° (horizontal position) 1)</td>
<td>20°C, typ.</td>
<td>&lt;4</td>
<td>&lt;4</td>
<td>&lt;4</td>
<td>&lt;6</td>
<td>&lt;6</td>
<td>mg</td>
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<tr>
<td>typ. Resolution at 0° / 1g Noise</td>
<td>DC 400Hz</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>mg</td>
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<tr>
<td>typ. Offset temperature dependency</td>
<td>-13...37°C</td>
<td>1.25</td>
<td>1.25</td>
<td>1.25</td>
<td>1.9</td>
<td>1.9</td>
<td>mg / °C</td>
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<tr>
<td>long term stability 6)</td>
<td>10 years 6)</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>11</td>
<td>11</td>
<td>mg</td>
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<tr>
<td>Measuring direction</td>
<td>x, y</td>
<td>x, y</td>
<td>x, y</td>
<td>x, y</td>
<td>x, y</td>
<td>x, y</td>
<td>Axis</td>
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<tr>
<td>Damping (ban pass filtering)</td>
<td>-3 dB</td>
<td>400</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>1000</td>
<td>Hz</td>
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<td>Operating temperature range</td>
<td>-30 8) ... +85 8)</td>
<td>-30 8) ... +85</td>
<td>-30 8) ... +85</td>
<td>-30 8) ... +85</td>
<td>-30 8) ... +85</td>
<td>-30 8) ... +85</td>
<td>°C</td>
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<td>Shock resistance Chip</td>
<td>20'000</td>
<td>20'000</td>
<td>20'000</td>
<td>20'000</td>
<td>20'000</td>
<td>20'000</td>
<td>g</td>
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<tr>
<td>Output signal Vout</td>
<td>Nominal 7)</td>
<td>0.5 ... 4,5</td>
<td>2.5 7)</td>
<td>0.5 ... 4,5</td>
<td>2.5 7)</td>
<td>0.5 ... 4,5</td>
<td>2.5 7)</td>
<td>V</td>
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<tr>
<td>Offset = Vout in 0° / position 7)</td>
<td>Nominal 7)</td>
<td>0.333 7) 9)</td>
<td>0.333 7) 9)</td>
<td>0.166 7)</td>
<td>0.166 7)</td>
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<td>Power supply 3)</td>
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<td>Weight without cable</td>
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<td>22</td>
<td>g</td>
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<tr>
<td>Analog resistive output load</td>
<td>Vout to Vdd or GND</td>
<td>min. 10</td>
<td>min. 10</td>
<td>min. 10</td>
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<td>Analog capacitive output load</td>
<td>max. 20</td>
<td>max. 20</td>
<td>max. 20</td>
<td>max. 20</td>
<td>max. 20</td>
<td>max. 20</td>
<td>nF</td>
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</table>

1) Repeatability: maximum offset occurring with position change after return to initial position (corresponds to achievable precision, including temperature hysteresis after temperature compensation and linearization).
2) Cross axis sensitivity: maximum error occurring with (additional) inclination or acceleration from another direction than the measuring plane.
3) Supply stabilized
4) Not relevant
5) Typical values
6) Long term stability: calculated values from HTB tests. Test results available at request.
7) Deviation should not be higher than approx. +/- 2% on 0-Point and +/- 4% in sensitivity. Calibration protocol available on request.
8) Cable is specified for -15° for dynamic and -30° for static applications. High flexible cables for high dynamic applications are available on request.
9) Related to production procedure the deviation can be bigger, see also 7)
Connection

Wire Variant KAS90x-xx

![Wire Variant KAS90x-xx](image1)

Red: +7 …30 VDC
Black: 0 VDC
Braun: Out X
Orange: Out Y
Shield: Casing

The outputs are not protected!

Plug Variant KAS93x-xx

![Plug Variant KAS93x-xx](image2)

1  +7 …30 VDC
2  0 VDC
3  Out X
4  Out Y

The outputs are not protected!

Mechanical installation

X-Axis

Y-Axis

![X-Axis](image3)

0.5…2.5V

0° = 2.5V

2.5…4.5V

![Y-Axis](image4)

0.5…2.5V

0° = 2.5V

2.5…4.5V