

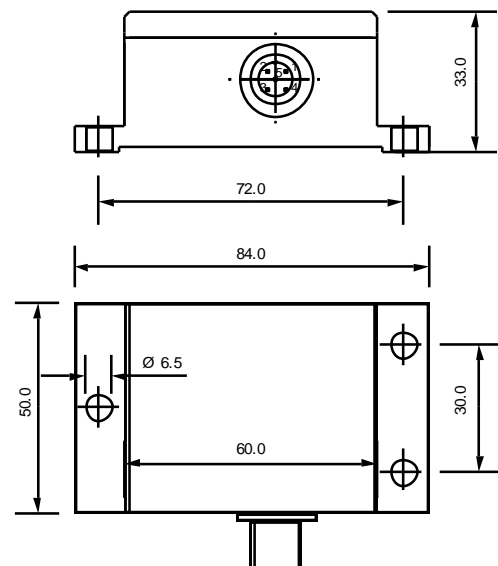
High resolution Inclinometer (Accelerometer) KAS211-Serie

The sensing elements work based on the capacitive principle. They feature high precision and high shock resistance, resulting among others from the improved **bulk** micro electro mechanical system, made of high purity silicon. Due to the especially appropriate structure, no drifts caused by deformation of the sensing mass are expected even after severe hits. The gas damping inside the sensing element prevents resonance oscillations or overshooting of the sensing mass.

The sensor is mounted in a water proof housing (IP67/68) which provides three holes for fixation and a commonly used M12 connector (IP67/68). The 4 ... 20mA output allows for long connecting lines. Using an appropriate resistor, the current output can be converted to a 1 ... 5V or 2 ... 10V voltage signal.

This sensors are available in dual axis versions with +/-30°...+/-90° (KAS201-Serie), +/-1,5...8° (KAS211-Serie), +/- 2...4g (KAS202-Serie) and +/- 6...18g (KAS203-Serie) measuring ranges.

All sensors are calibrated at 1g/0°. Thus a further zero alignment (other than mechanical adjustment to the application) is not necessary.



- 4 ... 20mA (3-wire) current output
- high repeatability < 0,01°
- high resolution: 0,005mA = 0,001°
- Dual pendulum system for higher accuracy
- Active and passive temperature compensated
- Sensor is calibrated at 0° / 1g
- Sensor element shock proof $\geq 20.000g$
- Operation temperature range -40 ... +85°C
- Rugged water proof metal housing
- Rugged M12 connector (IP67/68 with closed cap)
- Three wire interface, reverse polarity protected

Options/other versions:

- Dual axis +/- 30...90° versions
- +/- 2...18g dual axis versions
- Two wire (current loop) versions
- IP68/69 Cable-Version available
- Digital output with +/- 15...180° range
- Customized adaptations in small quantities possible

Specifications

Parameter	Condition	KAS211 -41	KAS211 -42	KAS211 -44	KAS211 -45	Unit
Measuring range ⁴⁾	nominal	+/- 1,5 0,026	+/- 3 0,052	+/- 6 0,104	+/- 8 0,139	° g
Measuring direction		X (horizontal)				
Repeatability at 0°/1g ¹⁾	20°C typ.	0,01 0,17				° mm/m & mg
Resolution at 0°/1g	20°C typ.	<0,001				°
Noise (Sensor element)		<0,017				° mm/m & mg
Temperature dependency ⁹⁾ at 0°/1g	23...70°C	0,0015 0,026				° / °C mm/m °C
Typically ⁹⁾	-22...+23°C	0,026 0,0023 0,04 0,04				mg °C ° / °C mm/m °C mg °C
long term stability ⁵⁾⁶⁾ at 0°/1g	10 Jahre ⁶⁾	0,036 0,63				° mm/m & mg
Cross axis sensitivity ²⁾	max. / typ	4/1				%
Damping (vibration) ⁵⁾	-3 dB	18				Hz
Operating temperature range	not condensing	-40... +85				°C
Shock resistance ⁷⁾	min.	20'000				g
Output signal I _{out}	nominal	4...20				mA
Output signal I _{out} at 0°/1g -position	nominal	12				mA
Sensitivity at 0°/1g	nominal nominal	5,6 3,25	2,8 6,5	1,4 13,0	0,933 17,375	mA/° mg & mm/m /mA
Power supply ³⁾	stabilized	20... 30				VDC
Connection		M12male				
Water resistance ⁸⁾		IP67/68/69 ⁸⁾				IP-class

- 1) **Repeatability:** maximum offset on horizontal position 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) **Measuring range:** Trigonometric function:

$$\text{angle} = \arcsin\left(\frac{I_{\text{out}} - 12(\text{Off set})}{\text{Sensitivity}}\right)$$
 (paste values without units)
- 5) Typical values
- 6) **Long term stability:** calculated values from HTB tests. Test results available at request.
- 7) Related to sensing element
- 8) IP69 : cable with cable clamp instead of connector

More detailed connection instruction please sees in the files “applications basics” and “user guide”