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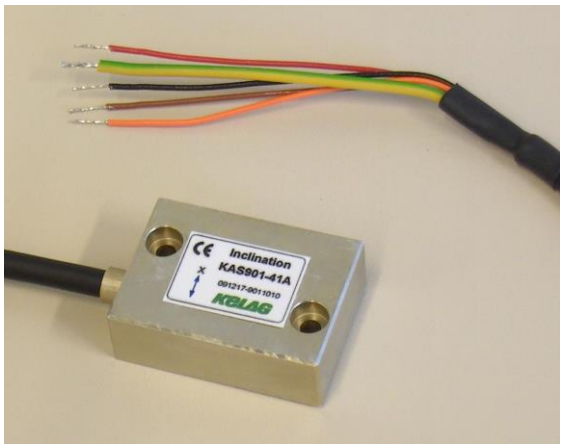
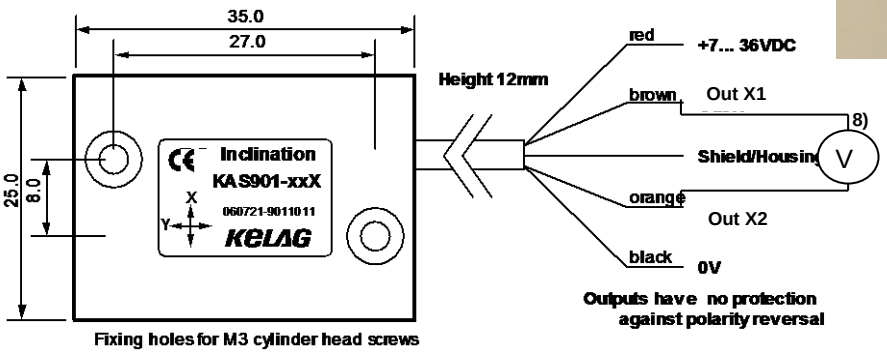
Single Axis Precision Differential Inclination Sensor
KAS901-41 and -42

The sensors are based one 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. The sensor gives two values in the same direction which can be measured in a differentially. **This avoids lot of interferences from outside and increase the resolution and accuracy by factor 2 in comparison with KAS901-01 and -02 [8].**

- **senses in positive and negative direction**
- **static and dynamic acceleration measured**
- **high repeatability <0,01% over range**
- **high resolution <0,001% over range**
- **shock resistance of the pendulum min. 50’000g**
- **temperature range -30 .. +85°C**
- **active and passive temperature compensation**
- **small, solid brass housing with fixing holes**
- **rugged PVC cable**
- **large output span: -4…+4V output over measuring range**
- **power supply requirement: 7... 36 VDC, stabilized**





Other versions in other housings:

- **single and dual axis sensors in rugged IP67 housing with cable or connector and standardized output 4... 20mA, 2...10V and *Modbus***
- **smaller cases and sensors for higher temperatures ranges**

Parameter	Conditions	KAS901-41	KAS901-42	Unit
Measuring range [4]		+/- 15 (0,259)	+/- 30 (0,5)	° (g)
Repeatability at 0° [1]	at 20°C, typ.	0,01	0,01	°
Resolution Noise	At 0°, 20°C At 0°, 20°C	<0,001 0,0004 7	<0,001 0,0004 7	° °/√Hz µg/√Hz
Measuring direction	horizontal	x-axis	x-axis	
Temperature dependency Typically [9]	23…70°C -22…+23°C	0,0015 0,0023	TBA TBA	°/°C °/°C
Cross axis sensitivity [2]	worst case	4	4	%
Damping	-3 dB, typ.	18	18	Hz
Operating temperature range		-30[7] .. +85	-30[7] .. +85	°C
Shock resistance		20’000	20’000	G
Output signal V_{out} [7] Offset = V_{out} in 0° [7] Sensitivity on 0° [4] Sensitivity	Nominal Nominal Nominal Nominal	+/-4 V [8] 0 279,2 [4] 15,444	+/- 4 V[8] 0 139.6 [4] 8,0	V[8] V mV/° V/g
Power supply [3]		7... 36	7... 36	VDC
Analog resitive output load	Vout to Vdd or GND	Min. 10	Min. 10	kOhm
Analog capacitive output load		Max. 20	Max. 20	nF

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:

$$\text{angle} = \arcsin\left(\frac{\text{Vout} - 0\,(\text{Offset})}{\text{Sensitivity}}\right)$$

(paste values without units)
5) Typical values;
6) **Long term stability**: calculated values from HTB tests. Test results available at request.
7) Cable is specified for -15°C for dynamic and -30°C for static applications
8) Differential Voltage between Out X1 and Out X2. Also possible is the measuring on X1 or/and X2 separately: Offset 2.5V, +/- 2V Span
9) Related to sensing element