

## Single and dual axis Inclinometer Sensor with Digital (RS485) output

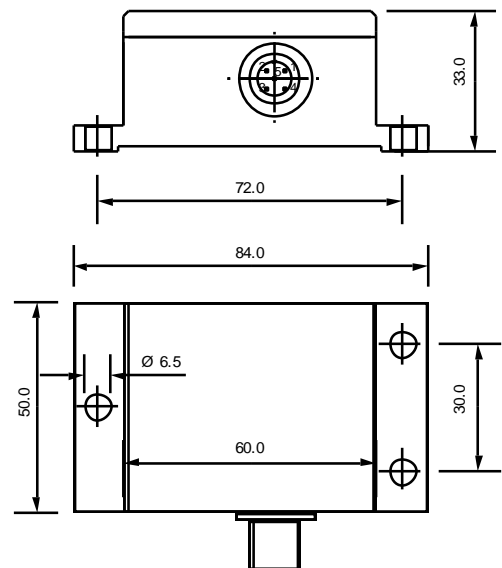
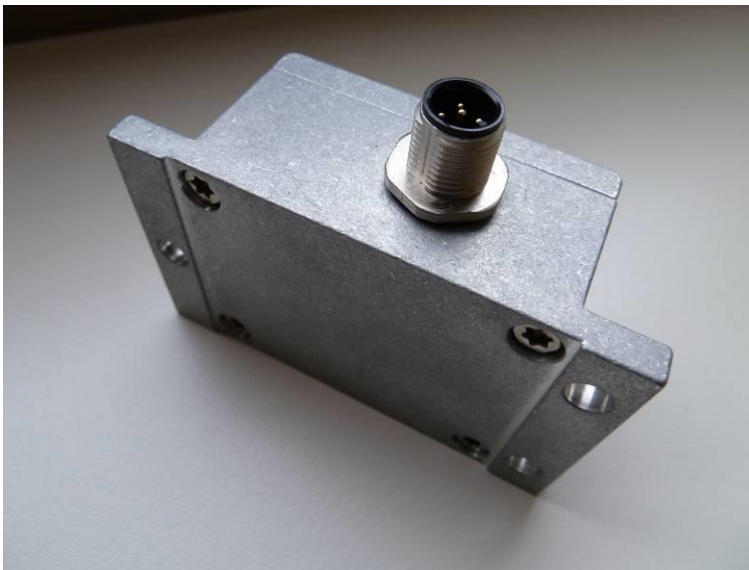
### KAS1001 and KAS1002-Series for inclination and angle measurement

The sensing elements work based on the capacitive principle with a rugged proof-mass. 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 several 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/IP68) which provides three holes for fixation and a commonly used M12 connector (IP68). The digital (RS485) output allows for long connecting lines. Multiple sensors can be connected to the same bus system.

Standard sensors are available as single or dual axis versions with  $\pm 15^\circ$ ,  $\pm 30^\circ$ ,  $\pm 90^\circ$  and new  $\pm 180^\circ$  measuring ranges.

All sensors are calibrated at  $1g/0^\circ$ . Thus a further zero alignment (other than mechanical adjustment to the application) is not necessary but recommended according to the application (command is provided). Acceleration and vibration measuring sensors with other measuring range and output are available.



- High resolution sensor system up to 0,001°
- High repeatability (accuracy at 23°C / 0°) up to 0,01°
- Double temperature compensated with high repeatability
- Sensor is calibrated at 0° / 1g
- Application 0 Point calibration possible
- Power supply 10 ... 36VDC
- Sensor element shock proof  $\geq 20.000g$
- Operation temperature range  $-20 \dots +85^\circ C$
- Rugged water proof metal housing (IP67/IP68)
- Rugged M12 connector (IP68 with closed connector)
- Single and dual axis versions for inclination measuring
- Different measuring values ( $g/^\circ$ ) and sampling rate are user-scalable

#### Options / other sensor types:

- Other measuring ranges
- Dynamic acceleration versions
- Vibration measuring versions
- Customized adaptations
- OEM printed circuit boards available
- IP68 version with 20m PUR cable

## Specifications

Parameter	Conditions	Types					Unit
		KAS1001-06A	KAS1002-51A	KAS1002-52A	KAS1002-41A	KAS1002-42A	
Order codes							
Measuring axis		1	2		1		
Measuring direction			XY		X		
Mounting direction		Vertical	horizontal		horizontal		
Measuring range	Nominal	±180	±30	±90	±15	±30	°angle
Repeatability (Accuracy <sup>1)</sup> )	Typ.at 0° & 23°C	0,04 <sup>6)</sup>	0,03 <sup>6)</sup>	0,04 <sup>6)</sup>	0,01	0,02	°angle
Resolution sensing system <sup>4)</sup>	At 0° angle, typ	0,004	0,003	0,004	0,001	0,002	°angle
Long term stability <sup>2)</sup>	HTB <sup>2)</sup>	0,036 / 10 years <sup>2)</sup>					°angle
gas damping sensing element <sup>5)</sup>	Low pass -3 dB typ.	18					Hz
Operating temperature		-20... +85					°C
Temperature coefficient (0-point) on 0°, repeatable <sup>8)</sup>	-20...85°C typical	±0,008			±0,002		° / °C
Supply voltage	non stabilized	10... 30 (max. 36)					VDC
Housing IP rating	closed connector	IP67/68 <sup>7)</sup>					
Output signal		RS485					
Data rate to buffer <sup>3)</sup>		10'000					Hz
Sampling rate resolution MP <sup>4)</sup>	User selectable	100... 10'000					SpS
		12 <sup>4)</sup>					bit
Baud rates	Approved	TBA: 2400, 4800, 9600, 19200, 38400, 57600, 115200					

<sup>1)</sup> Repeatability / Accuracy

Accuracy on stable (temperature) environment: If sensor is removed and placed again in the same position as before (under same physical environment)

<sup>2)</sup> 10year long term stability

Calculated values from HTB tests of the central sensor system (Sensing-Element, ASIC, frame). Test results available at request.

<sup>3)</sup> Data rate to puffer

Buffer stores 100 measure values with rolling averaging

<sup>4)</sup> Resolution

Averaging increase resolution (Resolution of sensing element is much higher than the 12bits of A/D converter).

<sup>5)</sup> Internal Vibration filtering

The internal gas damping of the proof-mass avoid over shooting and resonance frequency and optimize vibration damping. The sensor itself has a higher sampling rate.

<sup>6)</sup> Power on drift

For repeatability and long term stability apply after stabilisation phase. For the other versions the power on drift too small to be defined.

<sup>7)</sup> IP68 rating

Tested with cable clamp 6 weeks below 10m water

<sup>8)</sup> Temperature dependency

Repeatable: Calibration certificate on request

<sup>9)</sup> Optional cable

PUR cable including M12 connector and open leads

**Order No.:** 10m : 40PKabelM12\_10, 25m : 40PKabelM12\_25

### Connector Pinout

Pin	Function
1	Vin +
2	GND
3	RS485+
4	RS485-
5	Reserved (do not use)
housing	shield

### Pinout of optional Cable<sup>9)</sup>

Function	Colour of wire <sup>9)</sup>
Vin +	brown
GND	white
RS485+	blue
RS485-	black
Reserved (do not use)	grey
shield	

**For more detailed instruction please check files "applications manual"**