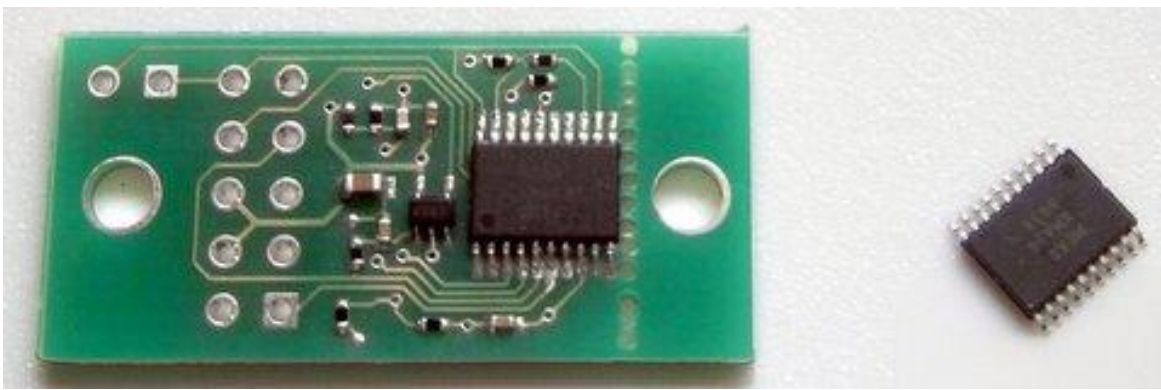


KMA36 Demoboard

Linear measurement with a magnetic pole stripe (I²C-Mode)



KMA36 / Demo board

Version: 1.0

July 2012

Please use also [KMA36 white paper](#) and [KMA36 data sheet](#)

KMA36 Demoboard

Linear measurement with a magnetic pole stripe (I²C-Mode)

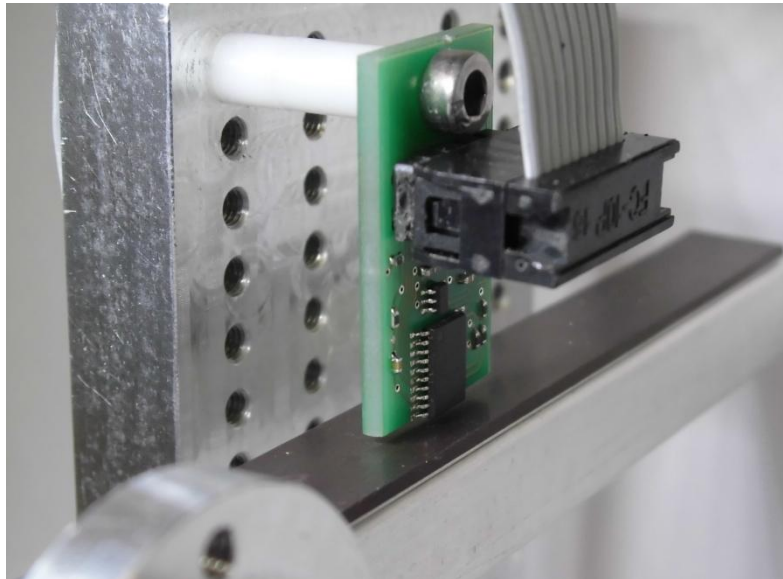


Fig. 1: Setup for linear measurement with a magnetic pole stripe

You can use the KMA36 demo board in combination with a magnetic stripe for linear measurement. This document describes the operation in I²C-Mode (Supplementary instructions can be found in the documents “KMA36 white paper” and “KMA36 data sheet”).

KMA36 – technical key data

Max. resolution	±70 µm
Max. absolute range of measurement	10 mm
Max. incremental range of measurement	2³² x 10mm = 42.949 km
Digital resolution	13 Bit / 0.04 degree
Operation power supply range	3.0 – 5.5V
Operating temperature	- 25 – +85 °C
Average current	10 – 30 mA
Sleep current	1.2 mA
Data Update rate	24 – 720 Hz
I2C Clockrate	Up to 100 kBit/s

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Setup

For restoring the standard configuration (s. white paper) please apply two solder connections on the back of the board (Fig. 2.)

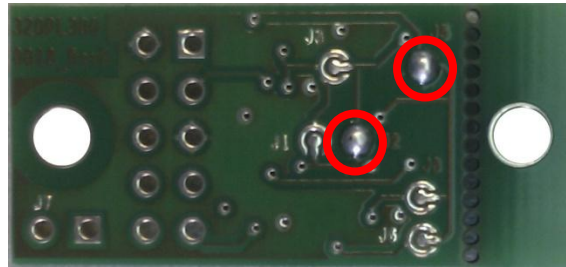


Fig. 2: Position of junctions

For contacting the circuit board (PCBA) you can solder a double-row pin header (pitch 2.54 mm) (Fig 3). Please use the white paper for detailed information about the pin configuration.

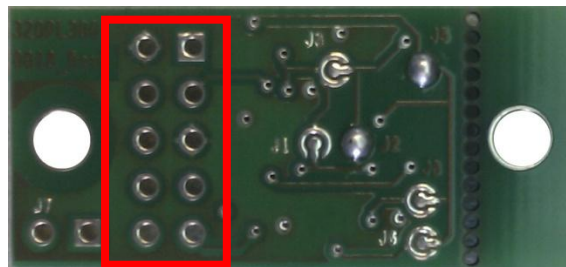


Fig. 3: Position of contact pins

For performing a linear measurement, please remove a part of the PCB. Remove the superfluous part at the perforated site (s Fig. 3).

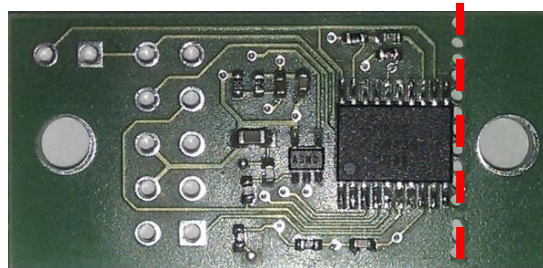


Fig. 4: Preparation of the PCB

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Please position the demo board perpendicularly above the magnetic stripe, to reach a maximum accuracy (Fig. 4). The outer edge of the sensor chip has to be placed in the middle of the magnetic stripe. The optimal distance (air gap) between sensor and magnetic stripe is 0.1 mm

The KMA36 sensor is optimized for magnetic stripes with a pole pair length of 5 mm. To achieve optimal results, please use comparable magnetic stripes.

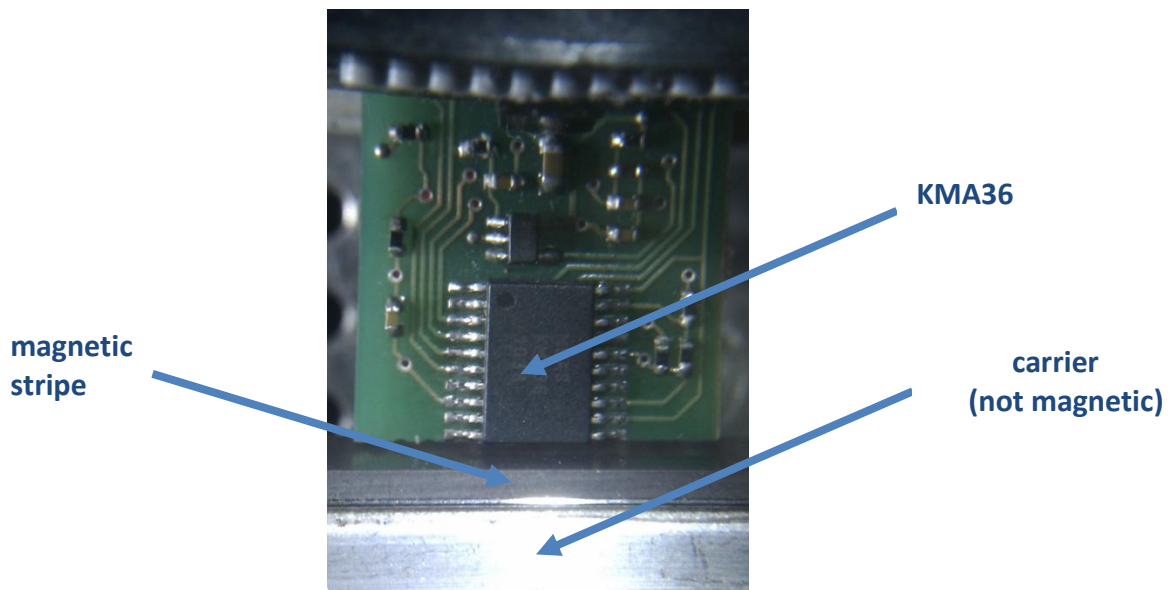


Fig. 4: Linear setup

Please note that magnetic anomalies occur at the cutting edges of the magnetic stripe. To avoid inaccuracies the measurement should not start at the edge but with a distance to the edge of at least 5 mm (Fig 5)

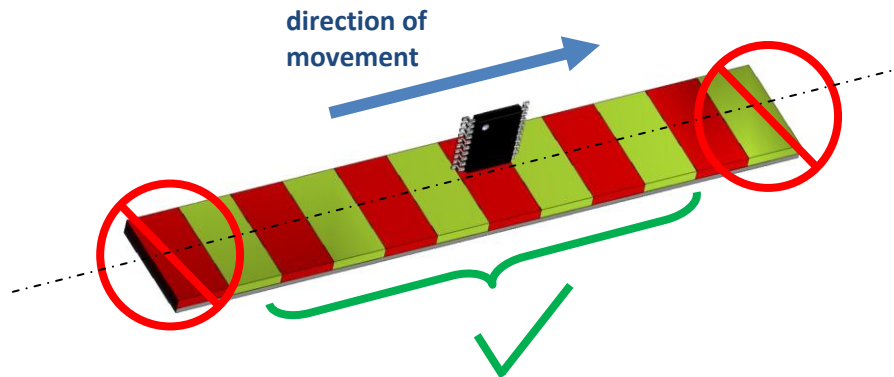


Fig. 5: ideal measurement range

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Measurement

Please configure the sensor via I²C at the beginning of the measurement (Supplementary instructions can be found in the datasheet and the white paper). To perform a linear measurement the linear mode has to be activated (set LIN-Bit in KCONF register). Furthermore we recommend to work with an oversampling of 32 (OVCS-Bits in KCONF register) and a resolution of 32768 (KRES register).

If required, the incremental counter can also be activated (set CNT-Bit in KCONF register). With activated incremental counter the number of overrun pole pair can be read out (Supplementary information is given in the datasheet and the white paper).

The previously described configuration leads to a measurement result as shown in Fig. 6.

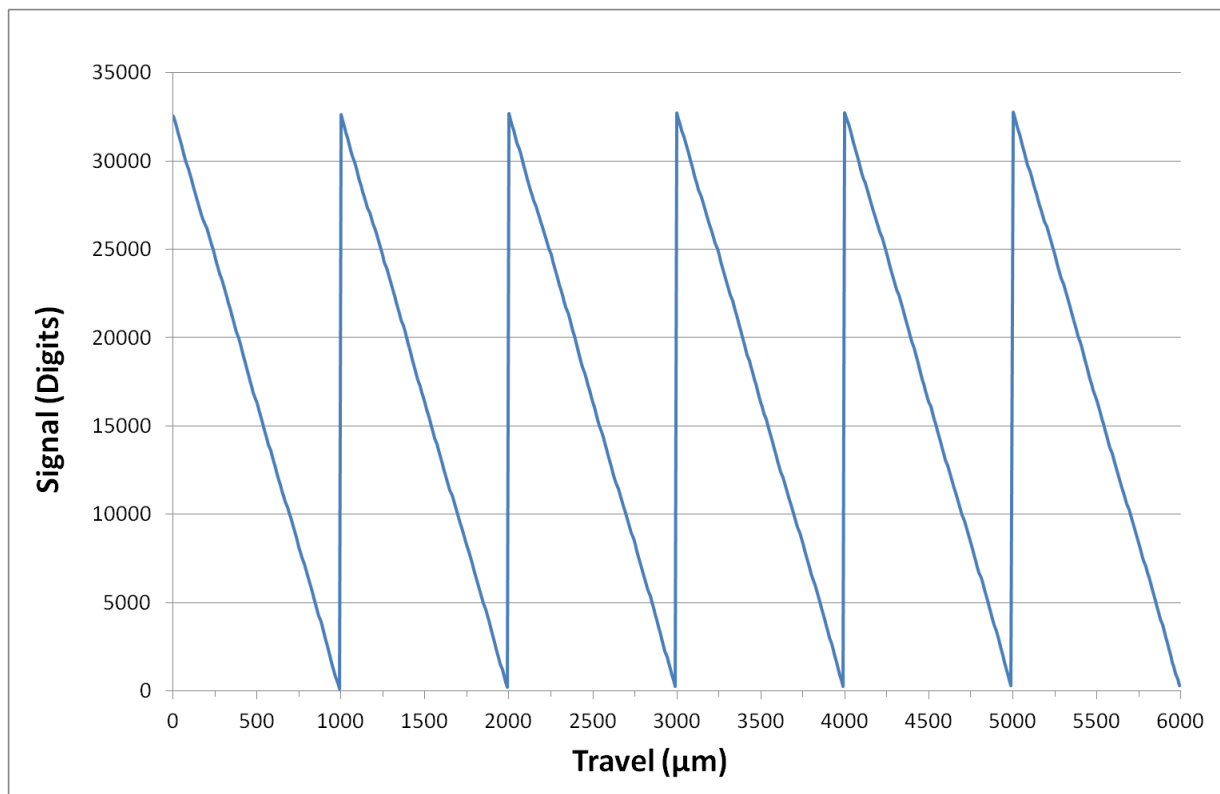


Fig. 6: measurement result

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With commercial magnetic stripes and optimal configuration an accuracy of $\pm 70 \mu\text{m}$ can be reached. If the air gap is increased the measurement error will increase also. (Fig. 7)

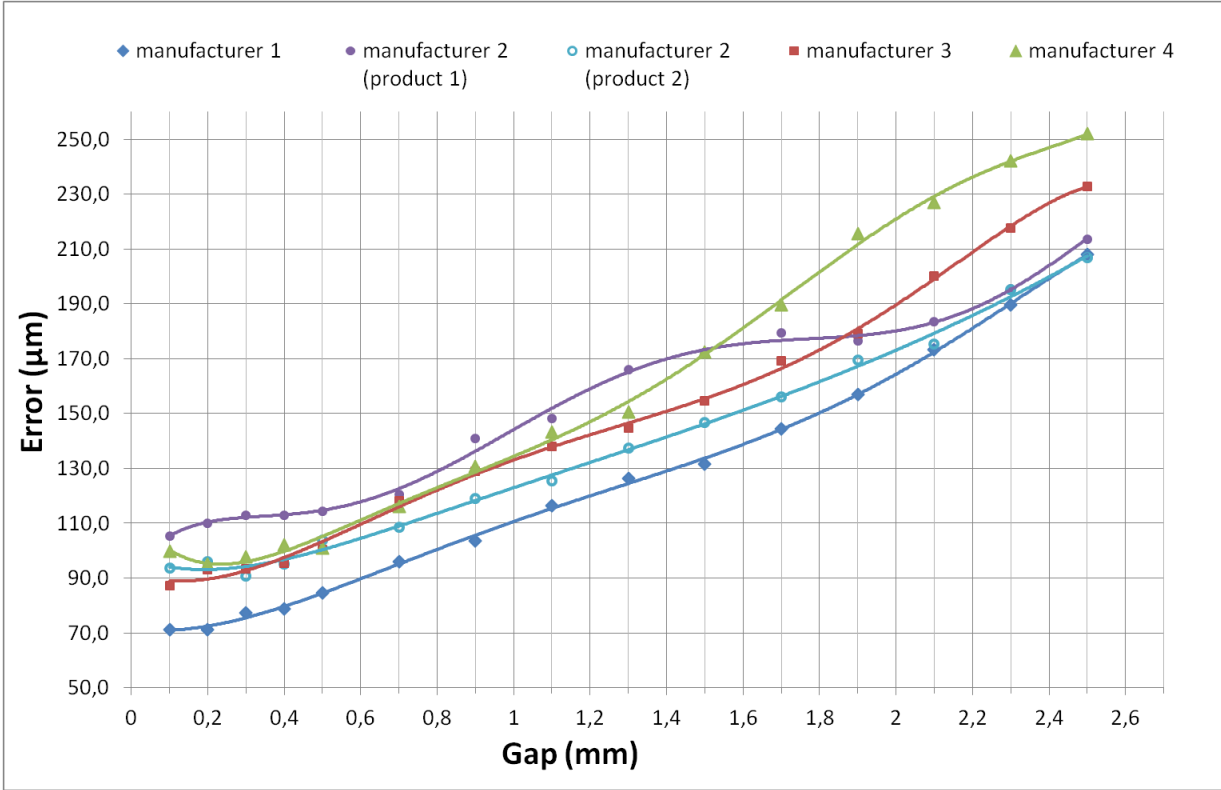


Fig. 7: accuracy vs. air gap

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