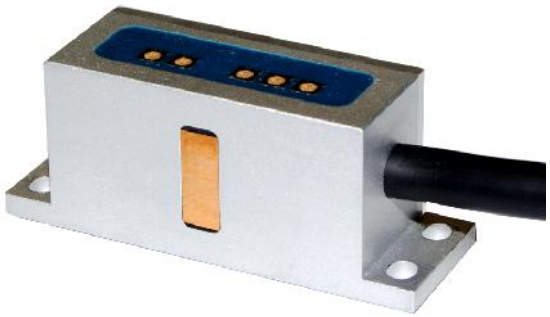
Magnetic gear wheel encoder RGK2G-A with anlog output signals



Contactless incremental encoder for measuring rotary motion

- High-resolution measurement of rotational speed and rotational angle up to 60,000 1/min
- Rotational direction recognition
- Robust, not sensitive to dirt
- Temperature stability up to 110°C
- High EMC and ESD stability
- Bespoke specifications due to a flexible design principle

- Potentiometer or I2C interface for the fine-tuning of signal parameters if required

- Use in drive spindles of machine tools
- Installation in drive motors

Output signals

- SIN- and COS signals with 1Vpp
- Reference signal
- Remote Sense RS_UB
- Supply voltage UB = 5V
- Reverse voltage protection
- Short-circuit proof

Principle of measurement

- Magnetic, contactless gauging of the steel gear wheels with module M = **0.3** or **0.5**
- Use of magneto-resistive (GMR) sensor elements
- High degree of measurement accuracy when using e.g. type **ZR3-256/Di** or **ZR5-256/Di** measuring gear wheels

Design

- Robust metal sensor housing
- GMR-Sensor elements
- Frontal coverage of the sensor elements using metal foil to act as extra protection against ESD impulses
- Electronics for signal conditioning
- Complete sealing of sensor interior
- Screened connection cable with AWG26
- Optional connector plug

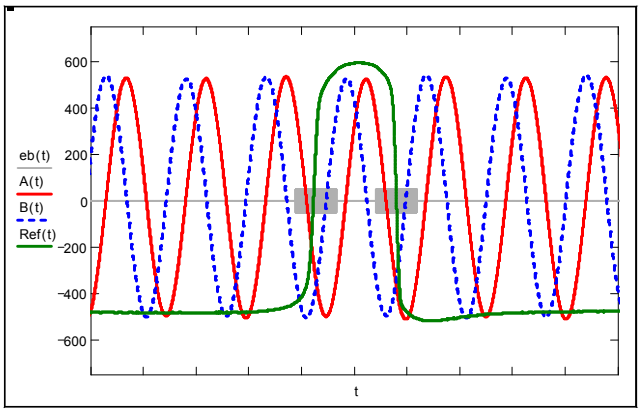
RGK2G-A-M3

... for gear wheel module M = 0.3

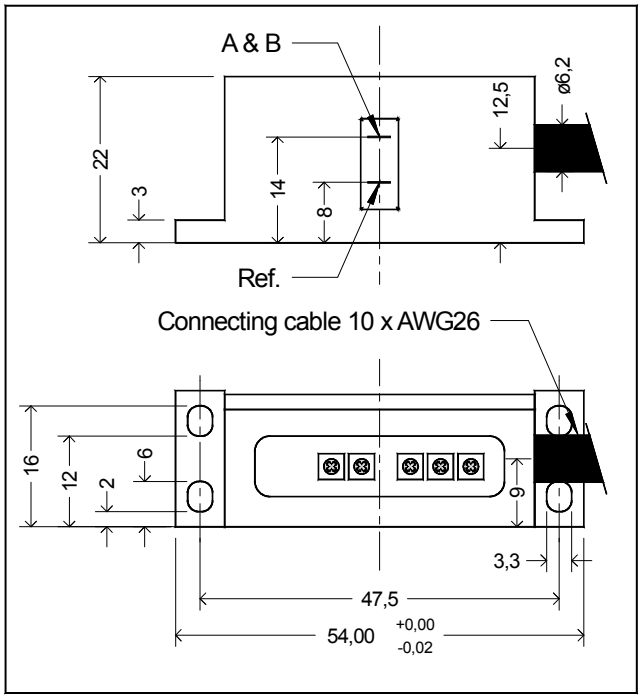
RGK2G-A-M5

... for gear wheel module M = 0.5

Magnetic gear wheel encoder RGK2G-A
Specifications



Typical signal aspect. The signal spurs A, B and ref. are depicted. The area highlighted in grey shows the optimal position of the 0 channels for the ref. signals (area of unambiguousness).



Signal parameters

Before delivery, each encoder is balanced at the nominal distance encoder - gear wheel do = 0.1mm (for M = 0.3) and 0.3mm (for M = 0.5) on optimal signal values (amplitude 1 Vpp, offset 0 mV, phase 90°, unambiguousness of the reference pulse; signal aspect type - see figure).

The signal parameters may deviate from the optimal values due to subsequent tolerances of attached parts, gear wheel quality and the influence of temperature and rotational speed.

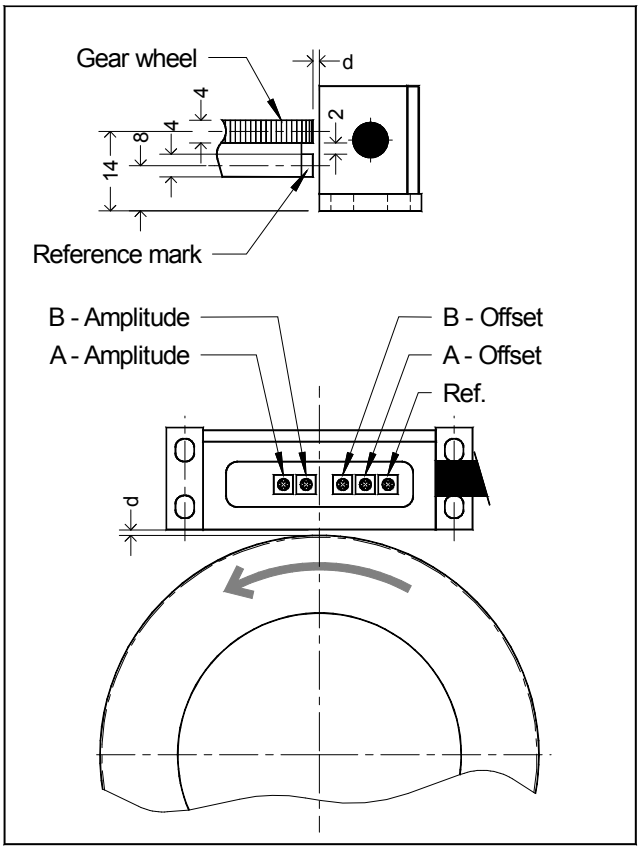
■ Signal type	Analog, differential signals SIN (spur A), COS (spur B) Ref. pulse Inverted signals A, B & Ref.
■ Signal amplitude A & B	1Vpp +/- 20% *
■ Amplitude differential A/B	0.9 ... 1.1 *
■ Phase A to B	90° +/- 1°
■ Offset - static	+/- 20mV
■ Freq. of measurement	0 ... 200kHz

* Conditions: UB = 5VDC; f £ 50 kHz

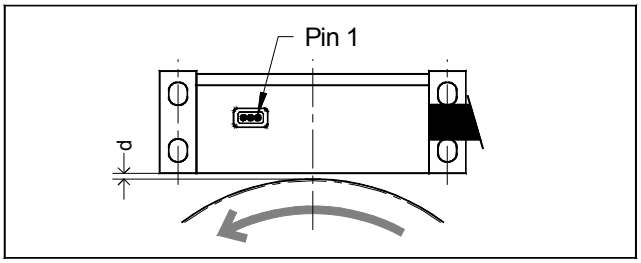
General parameters

■ Supply voltage UB	5VDC +/- 5%
■ Wattage without load	50mA
■ Operating temperature	-20 ... 85°C (up to 100°C on request)
■ Storage temperature	-30 ... 110°C
■ Optimal distance **do** encoder - gear wheel	0.1 +/- 0.02mm for **M = 0.3** 0.4 +/- 0.02mm for **M = 0.5**
■ Vibration resistance	bis 200 m/s²
■ Shock resistance	bis 2000 m/s²
■ Type of protection	IP65

Magnetic gear wheel encoder RGK2G-A
Assembly & Electrical connection



The arrow indicates the direction of movement during counter-clockwise rotation of the gear wheel with a view to the encoder.
Position of the trim potentiometers (RGK2G-A-M3 and RGK2G-A-M5)



RGK2G-A-M3X and RGK2G-A-M5X:Position and configuration of the connection sockets for the I2C interface. The connection sockets can be reached after partially removing the guard tag.

Assembly

The encoder is assembled using the following procedure:

1. Gauge blocks of the corresponding gauges do are located on the front side of the encoder.

2. Fix the encoder using 4 M3 screws. The screws are still not firmly tightened. The encoder should be loose.

3. Push the encoder slightly against the gear wheel. Completely tighten the screws alternately.

4. After screwing the encoder tightly, remove the gauge block (spacer) in the upward direction.

Distance encoder - gear wheel d (air gap)

The optimal distance encoder - gear wheel **do** is:

- 0.1 +/- 0.02mm for Modul **M = 0.3**
- 0.4 +/- 0.02mm for Modul **M = 0.5**

For this distance do the encoders are balanced on optimal signal parameters. If required, the signal parameters can be adjusted via the I2C signal interface or by using the potentiometers provided (see fig.).

Cable assignment

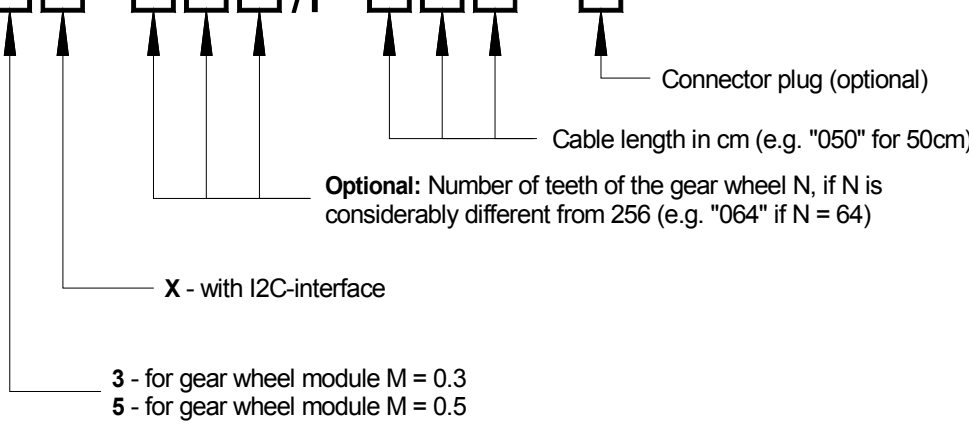
On the output of the encoder is a screened cable with 10 wires AWG26. The cable is assigned as follows:

■ Signal **A +**	brown
■ Signal **A -**	green
■ Signal **B +**	grey
■ Signal **B -**	orange
■ Signal **Ref +**	red
■ Signal **Ref -**	black
■ UB = 5VDC	violet
■ GND (0V)	yellow
■ RS_5V	blue
■ RS_GND (0V)	white

The **shield** is connected to the casing on the encoder side.

Magnetic gear wheel encoder RGK2G-A
Order identifiers & Accessories

RGK2G - A - M □□ - □□□/P □□□ - □



Accessories

Measuring gear wheels: **ZR3-256/Di** or **ZR5-256/Di**
Other types of gear wheels on request.

External interpolation box for the digitalisation and interpolation of the analogue encoder signals

PB-RGMA-USB box with **SPB-RGMA-USB** software for the fine alignment of encoder signals via the I2C-interface

PB-I2C-HH box for the fine alignment of the encoder signals via the I2C-interface in "hand-held" format