Baumer electric

Hall Sensors
Magneto-resistive Sensors

Gear pick-up devices

Non-contact potentiometers

Magnetic encoders for rotary applications

Magnetic encoders for linear applications

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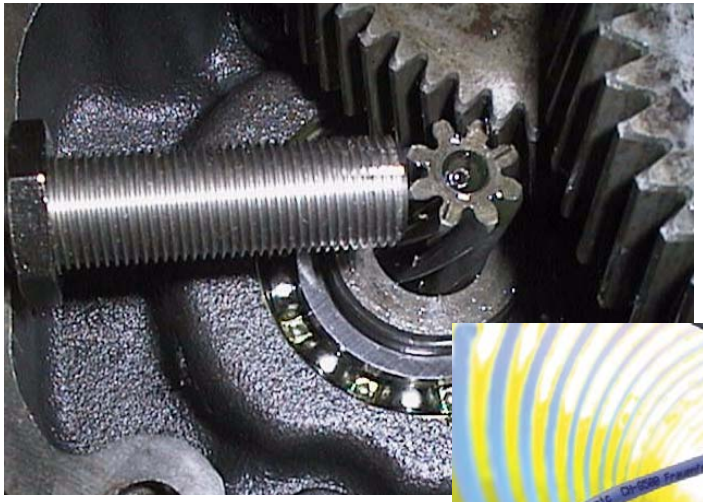
Magnet sensors

Product range overview



- Gear pick-up devices
- Non-contact potentiometers

- Rotary encoders
- Linear encoders

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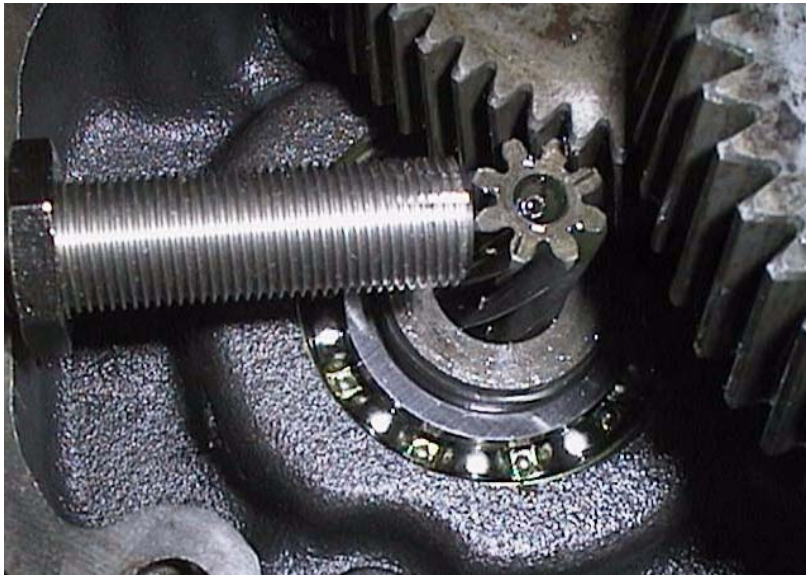
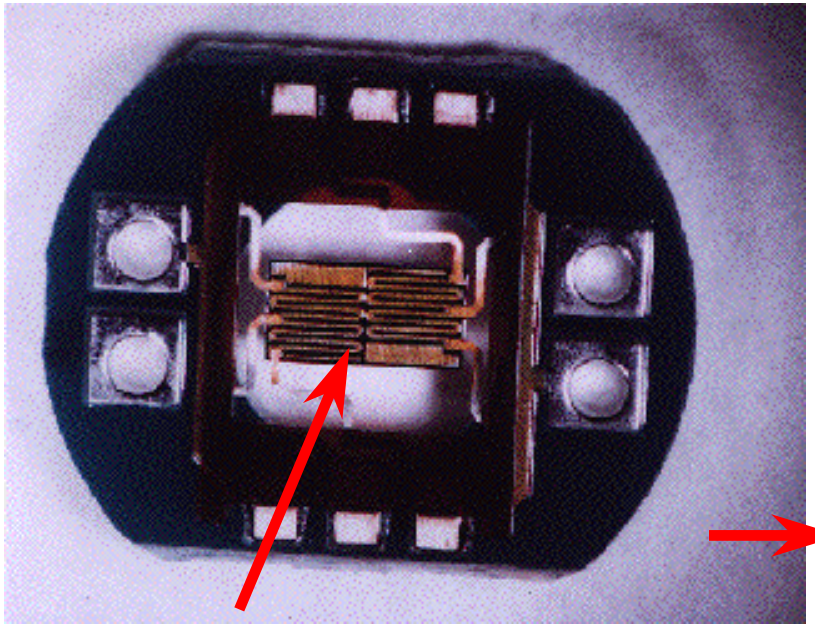
Hall Sensors

Gear pick-up devices

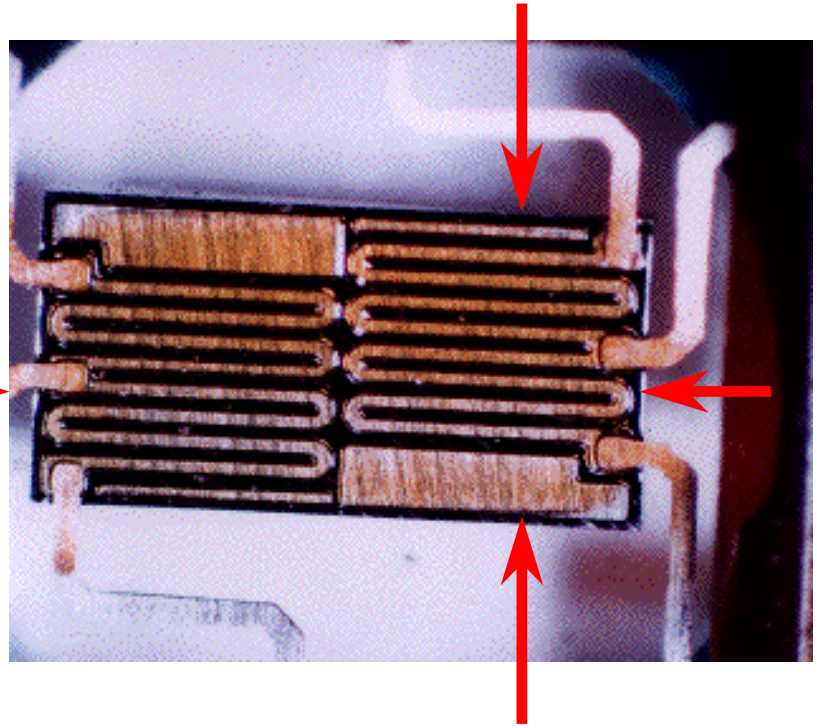


The magnetically biased Hall chip
The “heart” of gear pick-up devices



Position of biasing magnet

Chip size 1.6 x 2.7 mm



Magnet sensors

Hall gear pick-up device (IP 67)

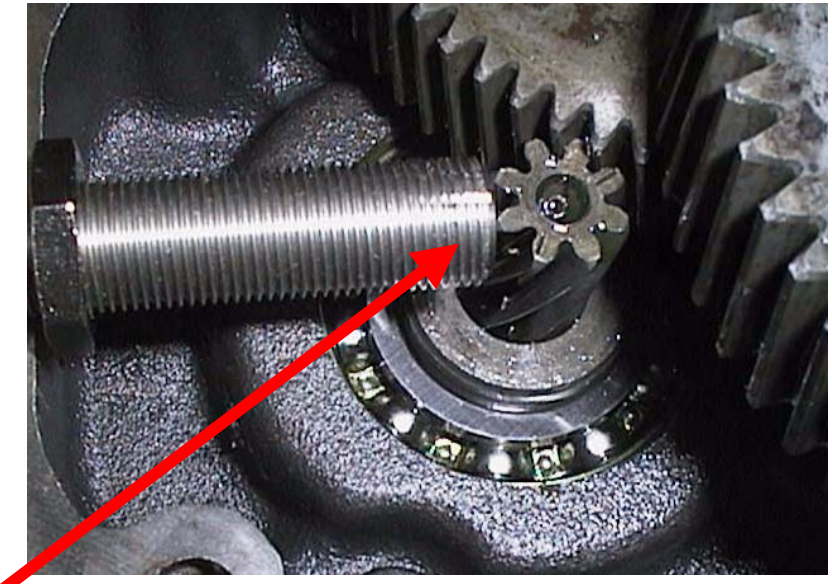
- MHRM 12G5501/S14

- Replacement for field plate sensors (IP 67)
- Single channel device
- Resolution module >/= 1
- Does not have to be aligned with the gear teeth

- Specification sheets: www.baumerelectric.com

Magnet sensors — Hall gear pick-up devices (IP 68)

- IHRM 12P1501
  - Single output
- MHRM 12G2501
  - Dual outputs
- Full metal steel housings including sensing face
- IP 68 / 20 bar rating
- Resolution module >/= 1
- Must be aligned with the gear teeth



Magnet sensors

Hall gear pick-up devices

- Higher switching frequencies than inductive sensors
  - Inductive sensors up to 5 kHz only
  - Hall sensors up to 20 kHz
- Finer resolution than inductive sensors
  - Resolution of inductive sensors > module 2
  - Resolution of Hall sensors > module 1
- Hall sensors are much easier to adjust than proxies

Applications for gear pick-up devices

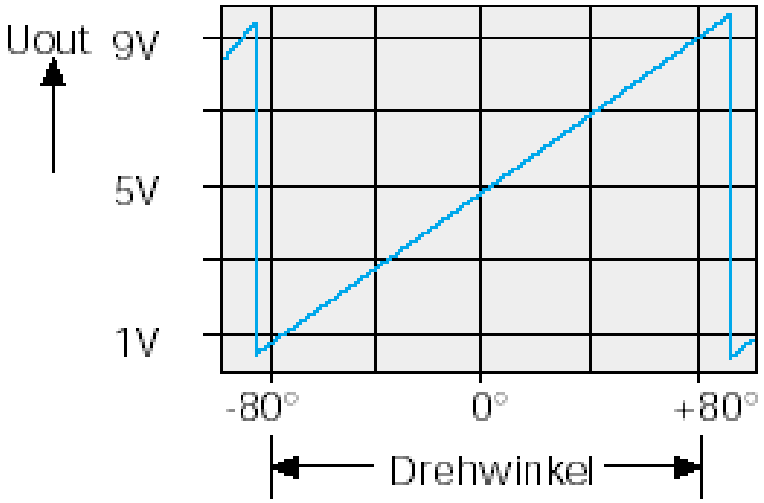
- Primarily used for the reliable detection of ferromagnetic gear wheels and toothed racks
- Hall sensors replace incremental encoders is certain applications
- Gear wheel RPM monitoring
- Tachometer generator
- Determination of sense of rotation of gear wheels
- Direction of movement of toothed racks

USPs Hall gear pick-up devices

- Can be easily retrofitted in existing machinery
- Fast and easy set-up requiring little adjustment
- Insensitive to vibration
- Tolerant against dust and humidity
- Sealed to IP 67 / IP 68 like inductive sensors
- No moving parts, no bearings
- No need for expensive mechanical couplings
- Absolutely no wear
- Wide working temperature range (-40°C to +120°C)
- For long operation cycles

Non-contact potentiometers
based on
Giant Magneto Resistors

- Sinusoidal outputs
- Linear current output signal
- Linear voltage output signal



Giant Magneto Resistors

The “heart” of rotary & linear motion control devices

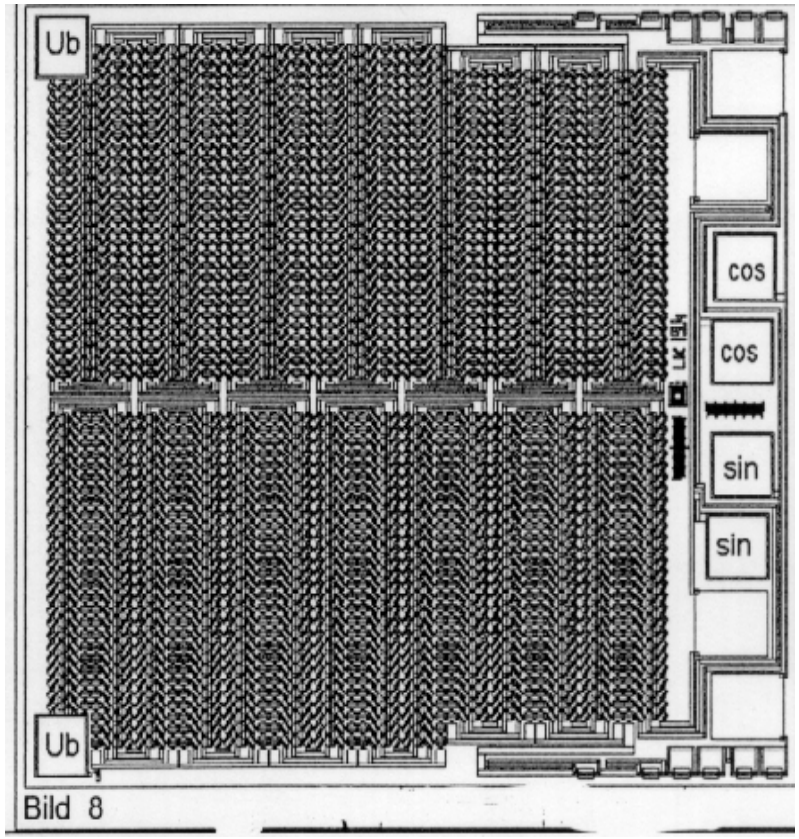
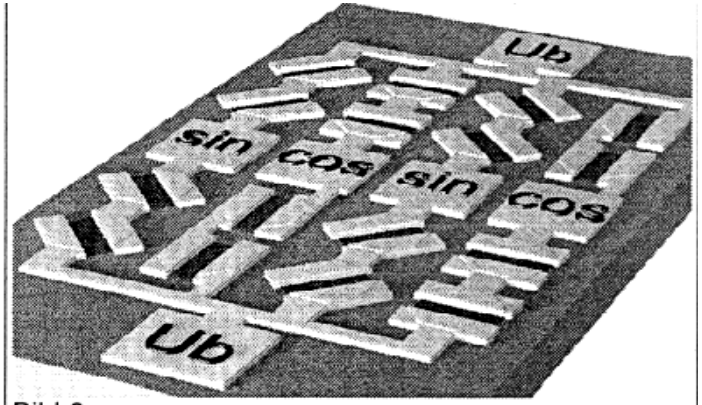


Bild 8



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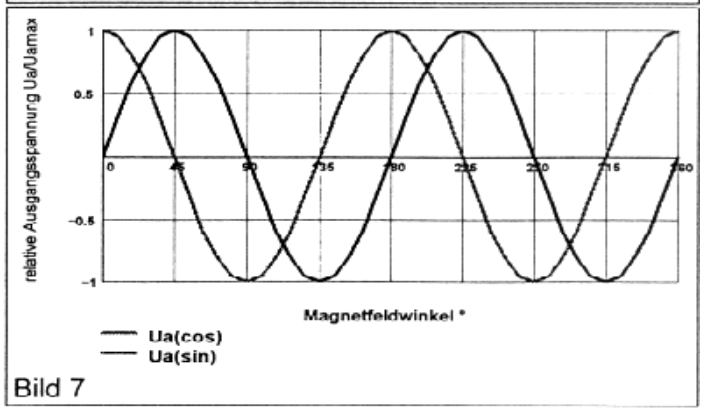

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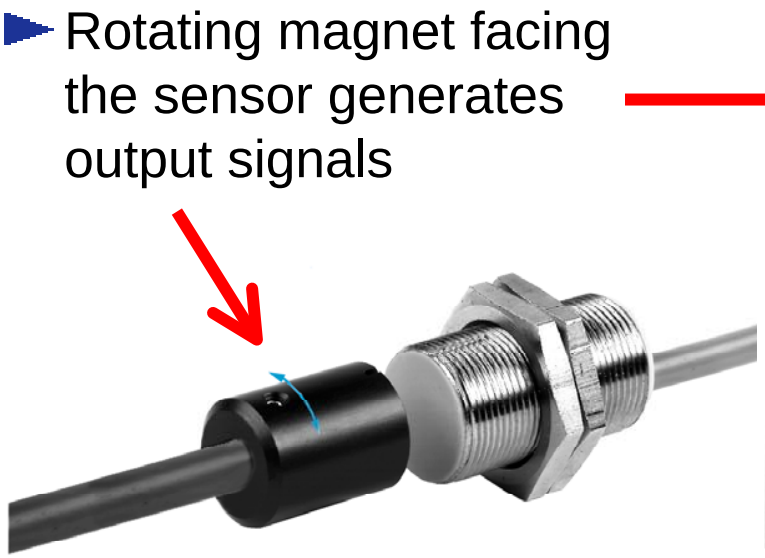
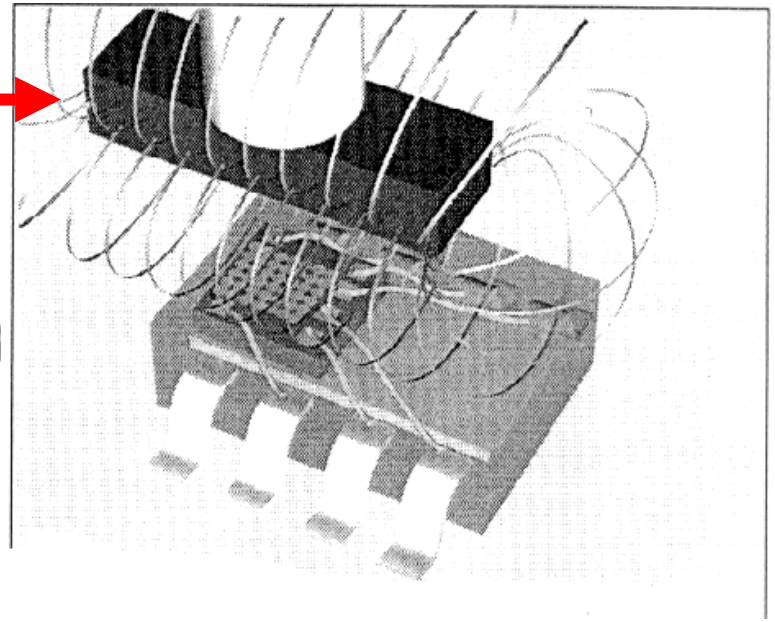
The working principle of non-contact potentiometers

- Rotating magnet facing the sensor generates output signals

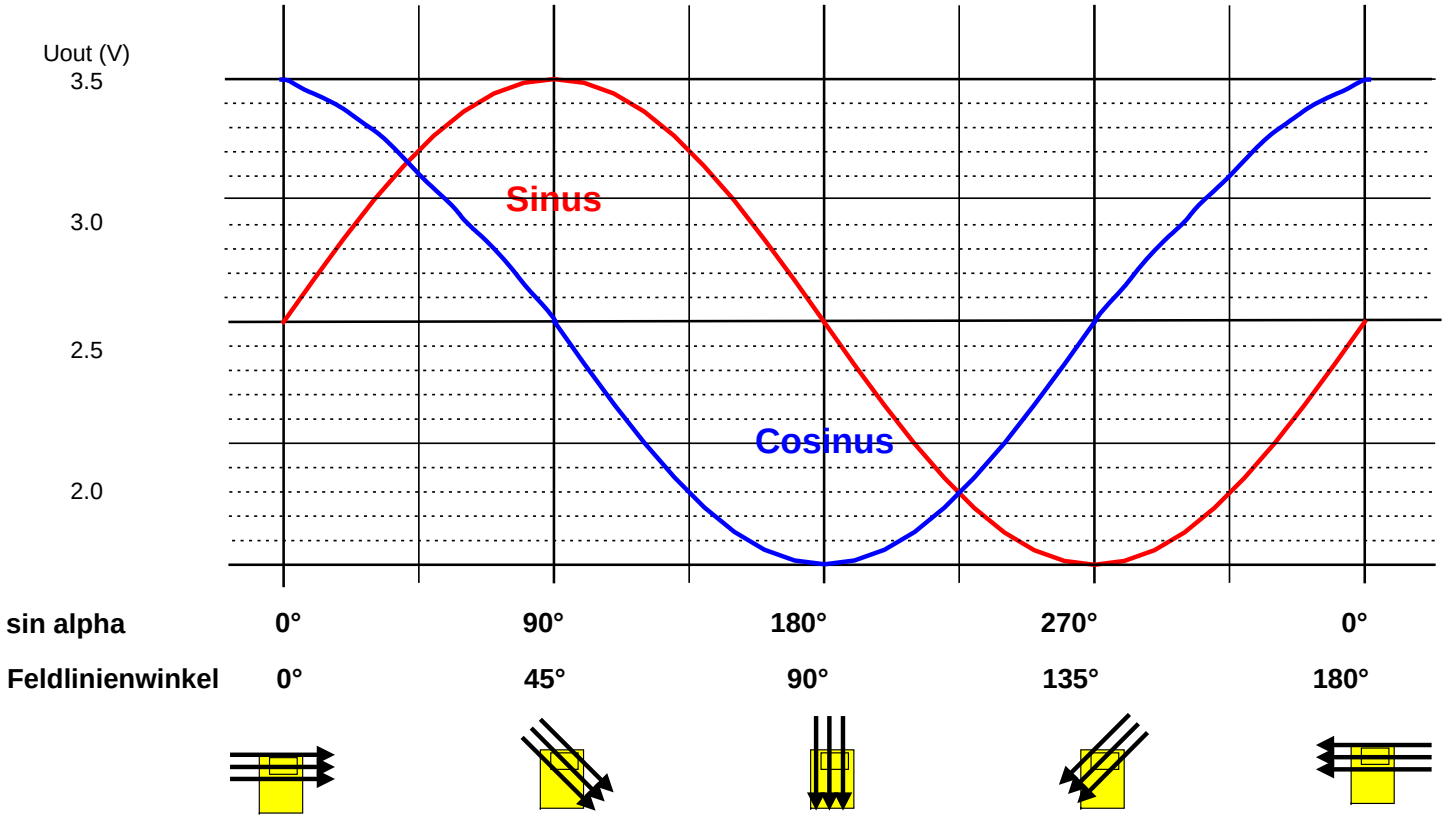




- Two full sine and cosine signals per turn

Chip output signal / half turn of rotor

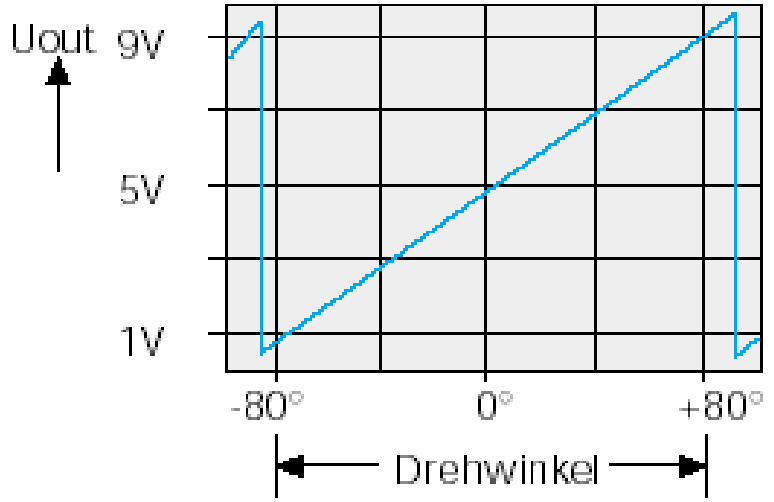
LK15 Winkelsensor (elektrisches Ausg.signal)



Magnet sensors

Non-contact potentiometers

- 160° angle of rotation
- Linear VDC output signals
- MDRM 18U9501
  - 0.3…4.7 VDC
- MDRM 18U9524
  - 1…9 VDC



- 20 kHz frequency response
- absolute voltage output

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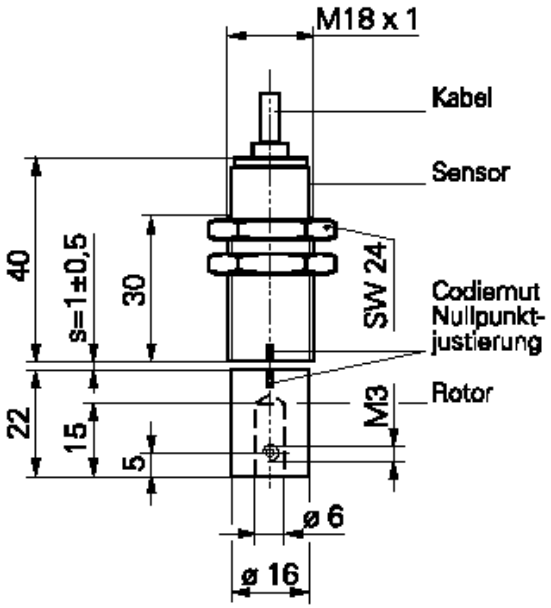
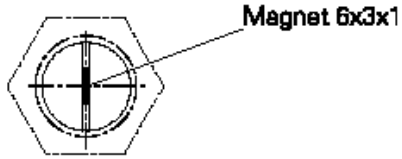
- 120° angle of rotation
- Linear current output signal
- 24 VDC voltage supply range

- MDRM 18I9524
  - 4…20 mA





- 20 kHz frequency response
- absolute 4…20 mA current output

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- Reliable replacement for mechanical potentiometers
- 20 kHz frequency response
- With linear (absolute) voltage & current signals
- Sine output signals
- For long operation cycles
- Absolutely no wear
- No moving parts
- Sealed to IP 67

- Require magnet rotor 123344 for proper operation

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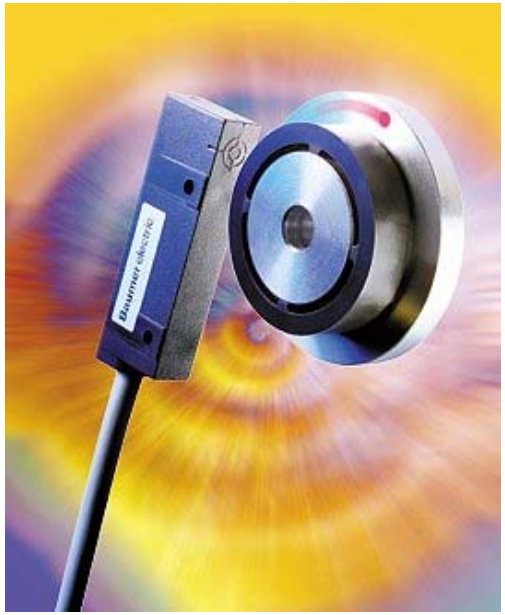
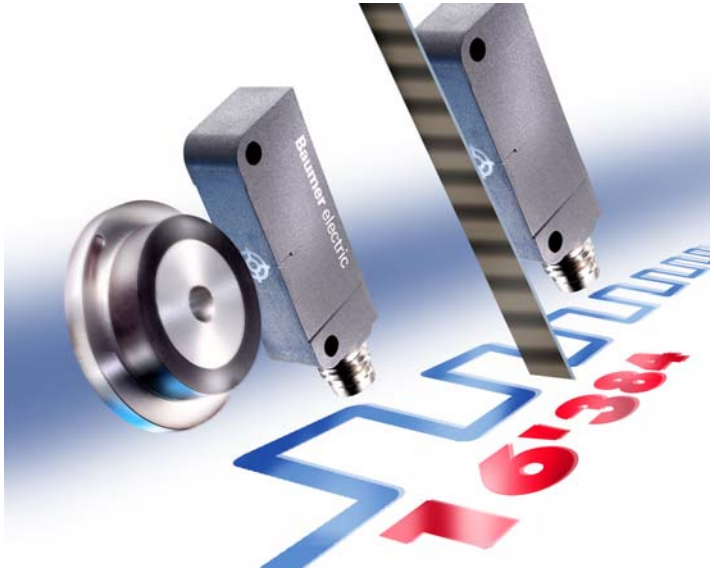
Magneto-resistive Sensors

Magnetic encoders for rotary applications





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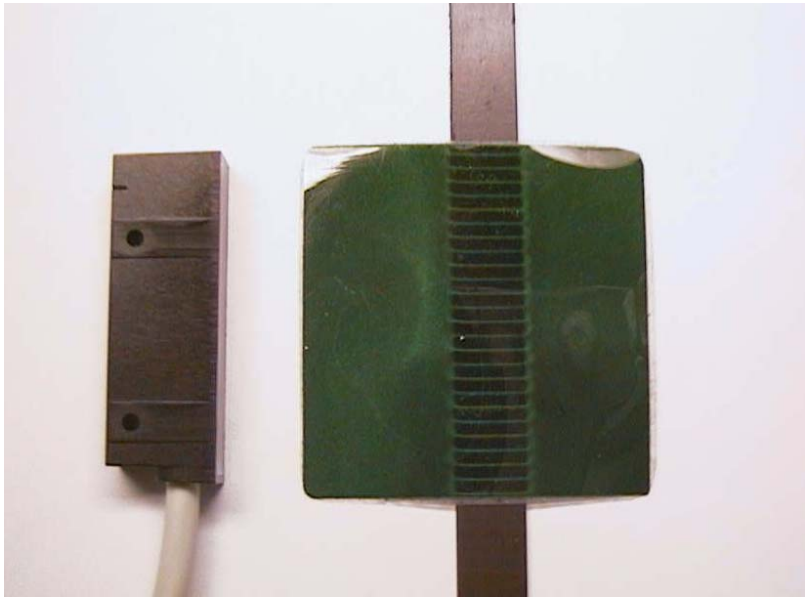
Magnet sensors

Ring magnets & magnetic strips

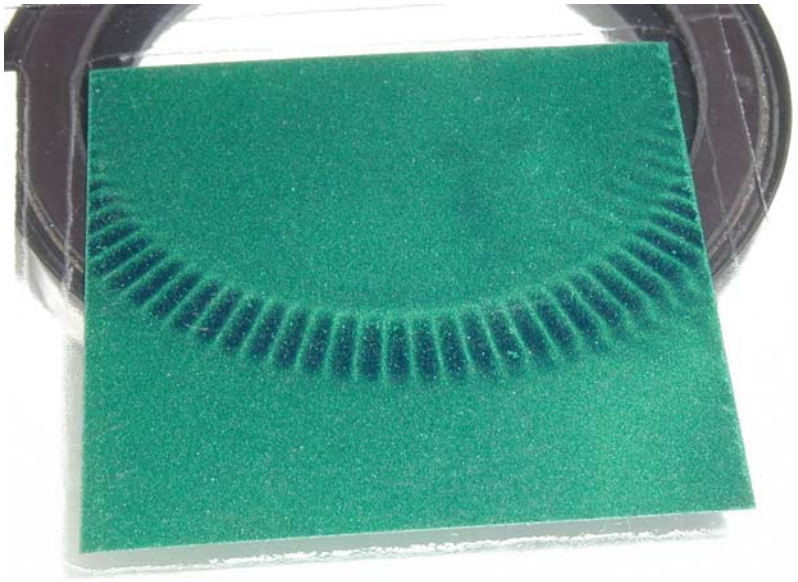


Magnetic strips

- Ferrite
- Plasticized ferrite

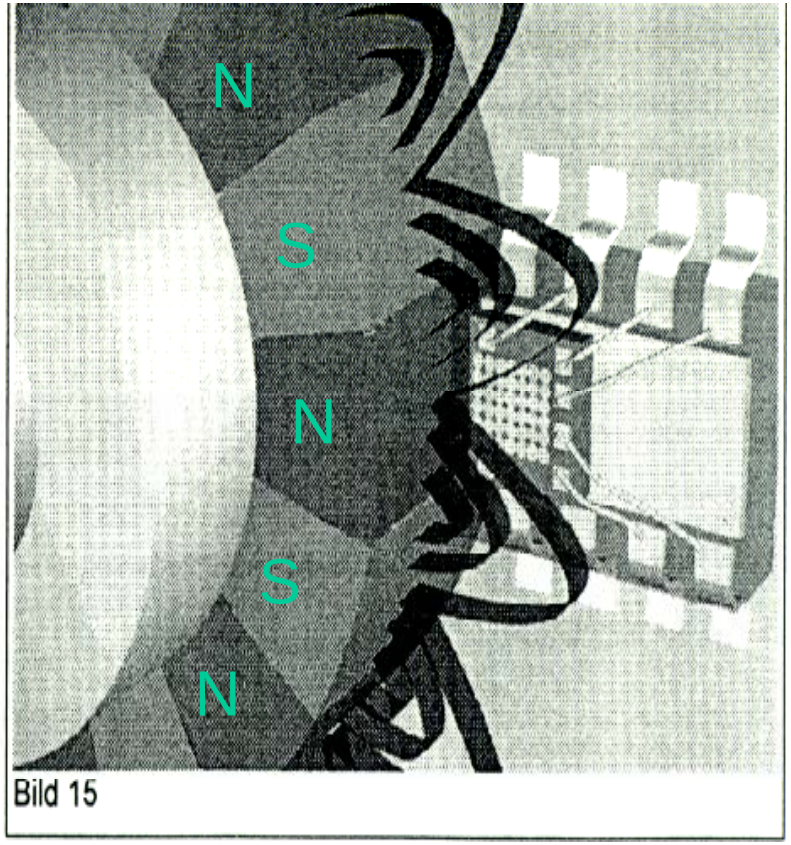
Ring magnets

- Ferrite
- Plasticized ferrite
- Front or side magnetized



The working principle of rotary magnet encoders

- Rotating ring magnet facing the sensor generates output signals
- Provides a full sine and cosine signal per pole



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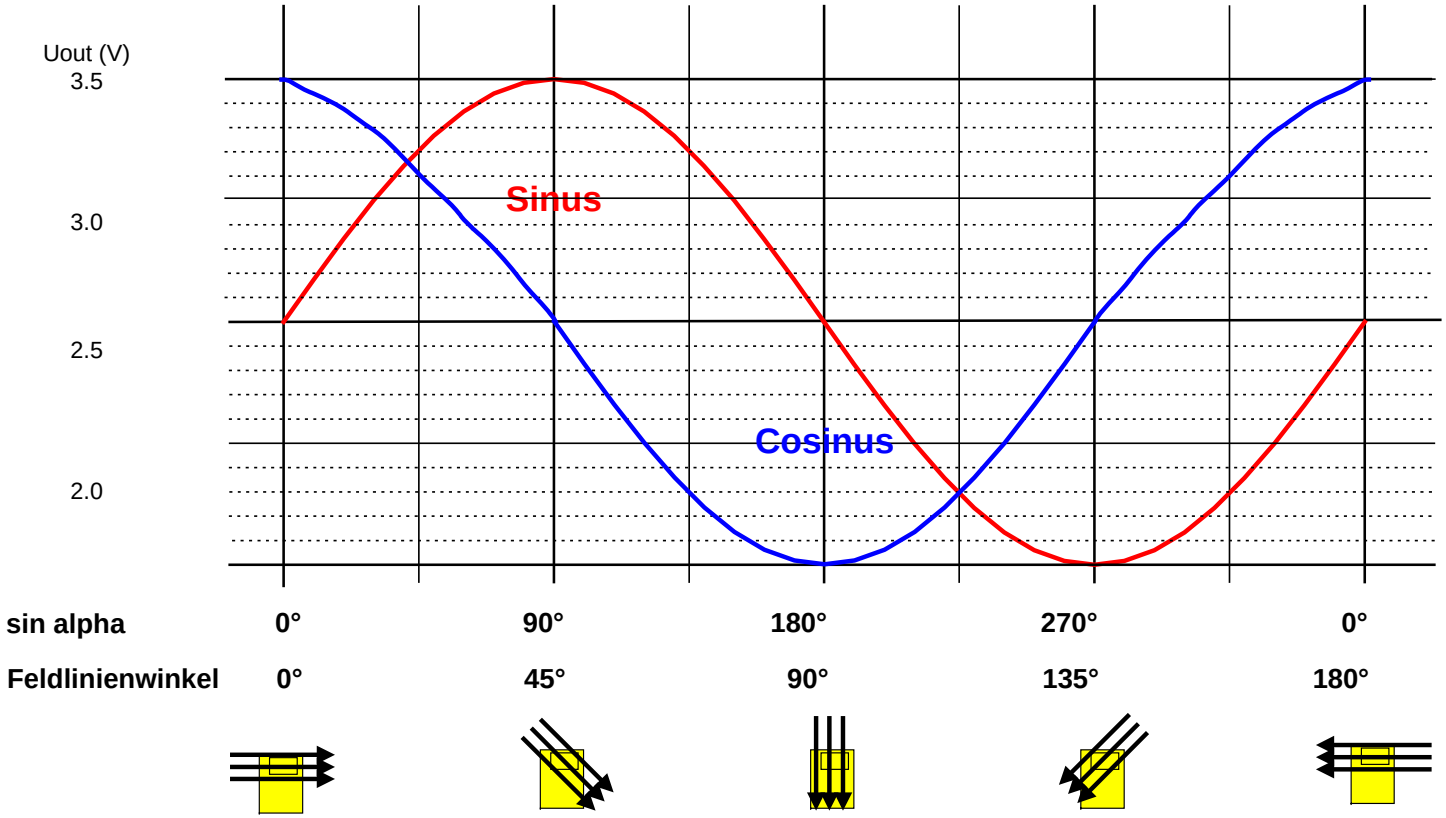
Chip output signal / pole of magnet ring

LK15 Winkelsensor (elektrisches Ausg.signal)



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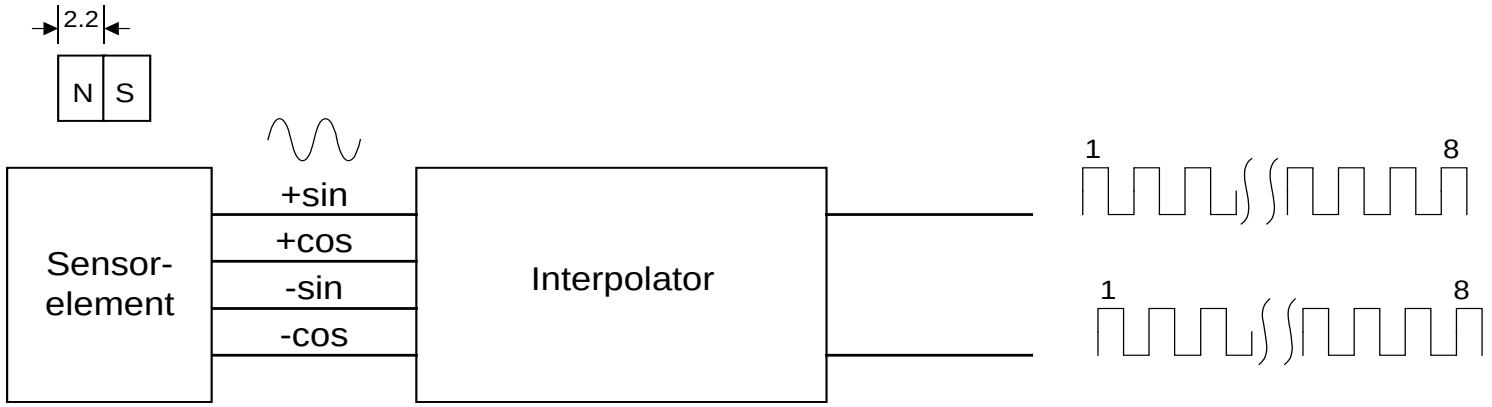
Increasing the number of pulses per pole by applying signal interpolation

- 64-fold signal interpolation generates
- 64 pulses per pole and channel



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How to calculate the max number of steps per revolution based on

- Number of poles of the ring magnet (64)
- Interpolation factor of the sensor (64)

A standard 64 pole ring magnet generates:

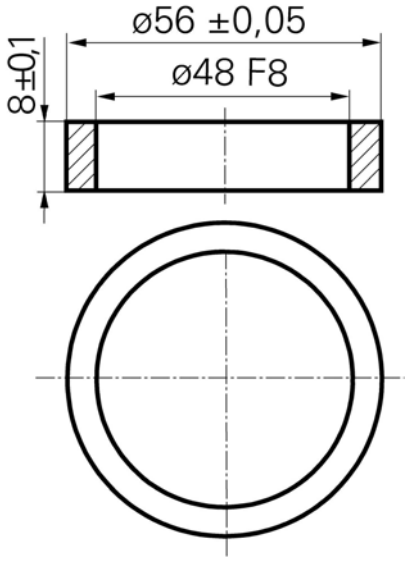
- 64 pulses per pole on channel A
- 64 pulses per pole on channel B

= 4096 pulses on both channels per full turn (360° mechanical)

= 16384 ppr when using quadrature type of external signal processing

Available ring magnets and magnet rotors

- 32 poles dia 30 mm
- 36 poles dia 30 mm
- 40 poles dia 30 mm
- 64 poles dia 56 mm



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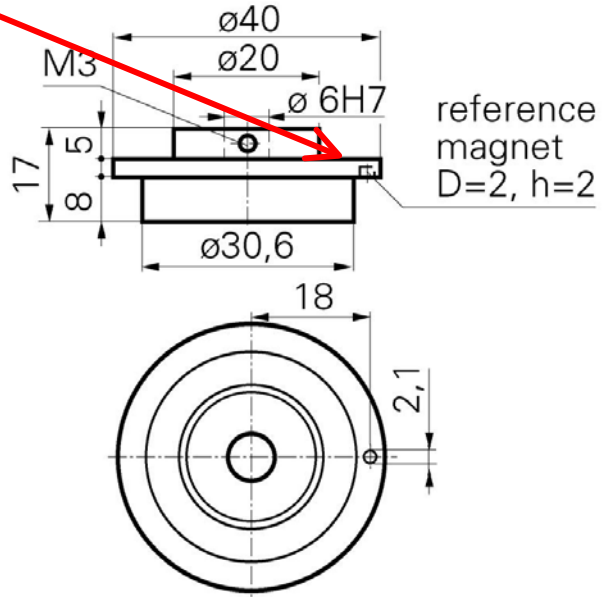
Special magnet rotors for sensors with integrated 0-pulse

- 32 poles dia 40 mm
- 36 poles dia 40 mm
- 64 poles dia 56 mm



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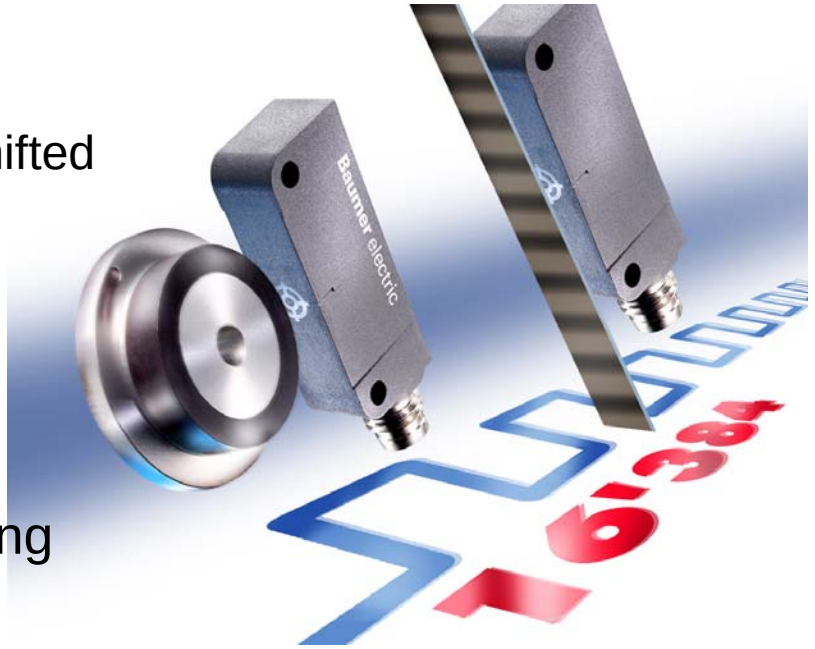
Controlling rotary motion with magnet sensors

MDFK 10G8124/N64

- Two channels 90° phase shifted
- With zero pulse
- 64 fold interpolation
- Push-pull output
- Up to 16384 steps per rev.

- Active face at center of housing



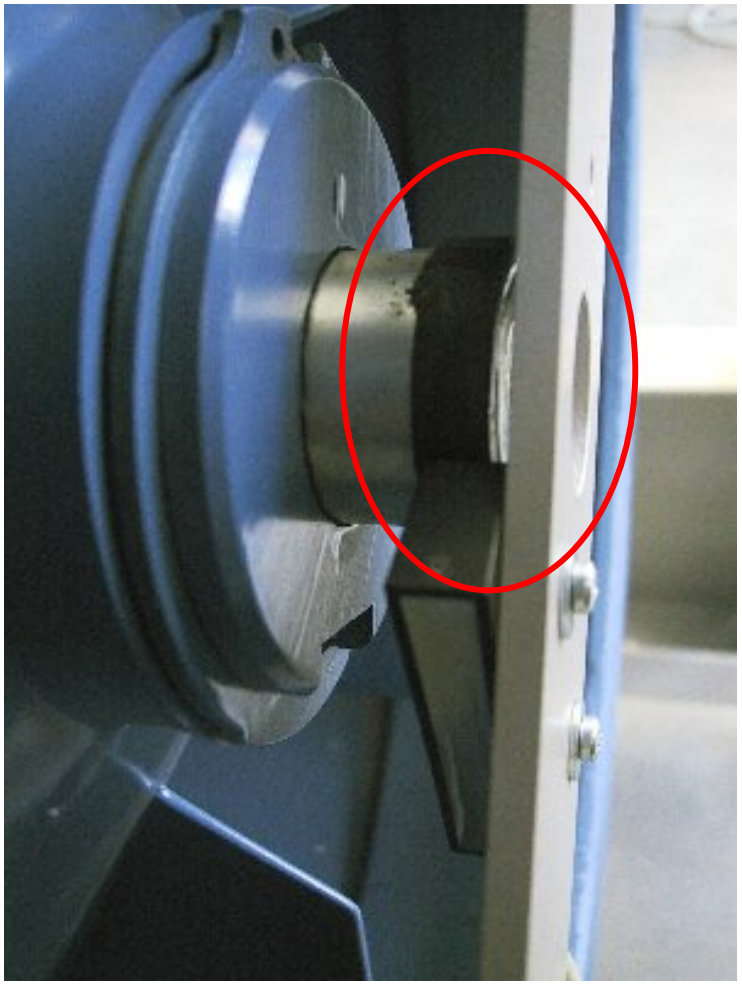
Where to find applications for magnet sensors

- Dusty and dirty environments
- Wood, glass, ceramics, stone, plastics, textile, rubber, cement, paper & cardboard processing industries
- Outdoor applications of all sorts (sealed to IP 67)
- In applications where space is at a premium

Application: textile machine, main drive control

- MDFK 08G2124
- Monitoring of shaft rotation
- Standard 32 pole ring magnet
- Directly mounted on shaft

- Standard interpolation factor
- No marker pulse required
- Replacing optical encoder



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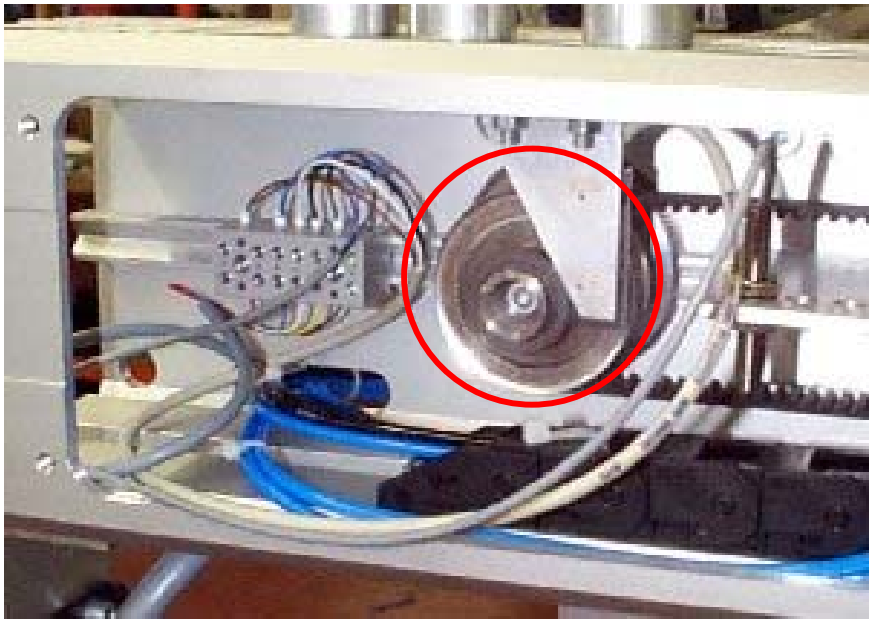
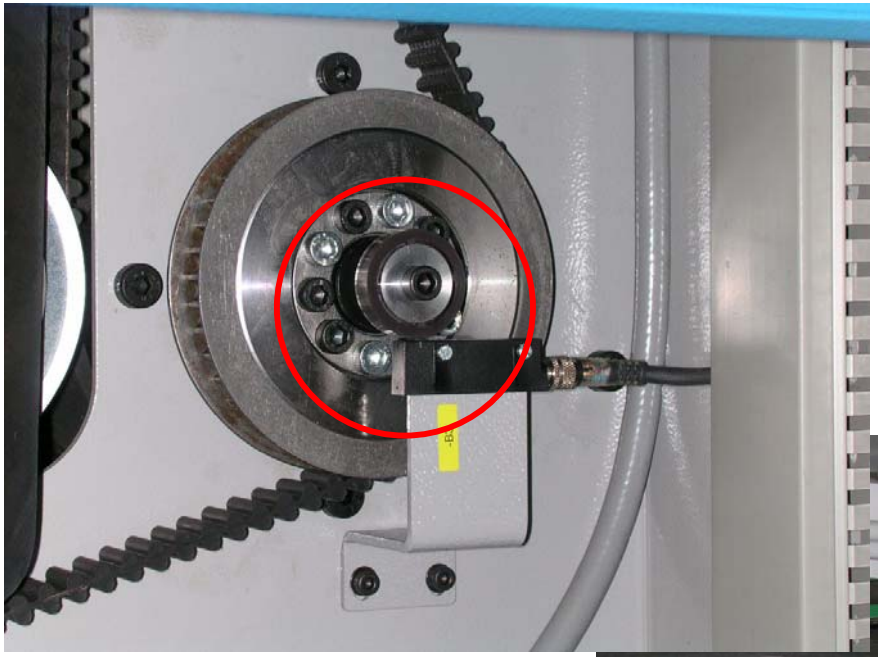
Application: on sieve printing machine

- MDFK 08G2124
- Scraper feed control
- 36-pole ring magnet
- Glued onto steel shaft
- Old solution: gear wheel and inductive sensor
- Advantage of MDFK:
  - Higher resolution
  - U/D recognition

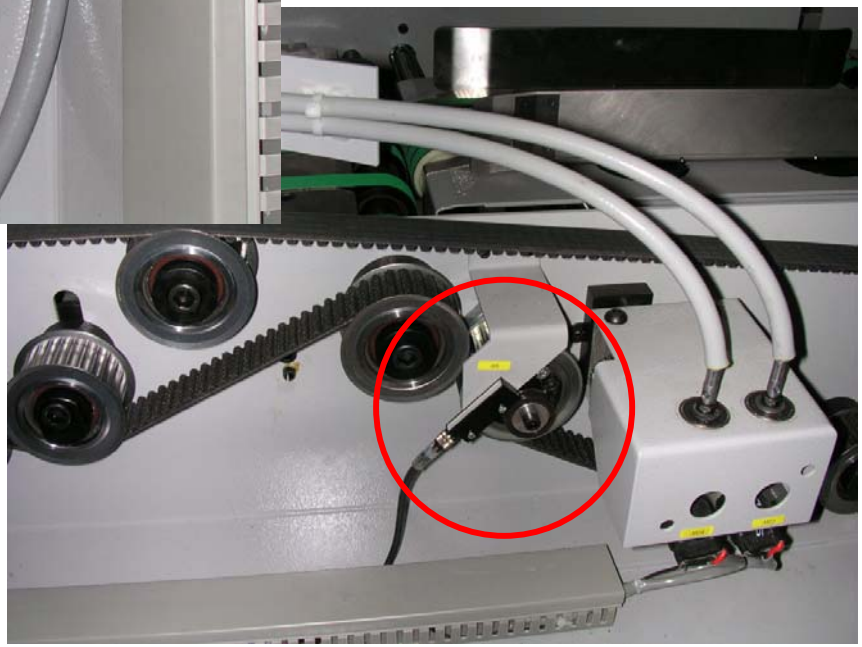


Magnet sensors

MDFK 08 rotary magnet encoders



- MDFK 08G2124/N16
- Connector version
- 32 pole ring magnet
- Attached to drive pulleys



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Magneto-resistive Sensors

Magnetic encoders for linear applications

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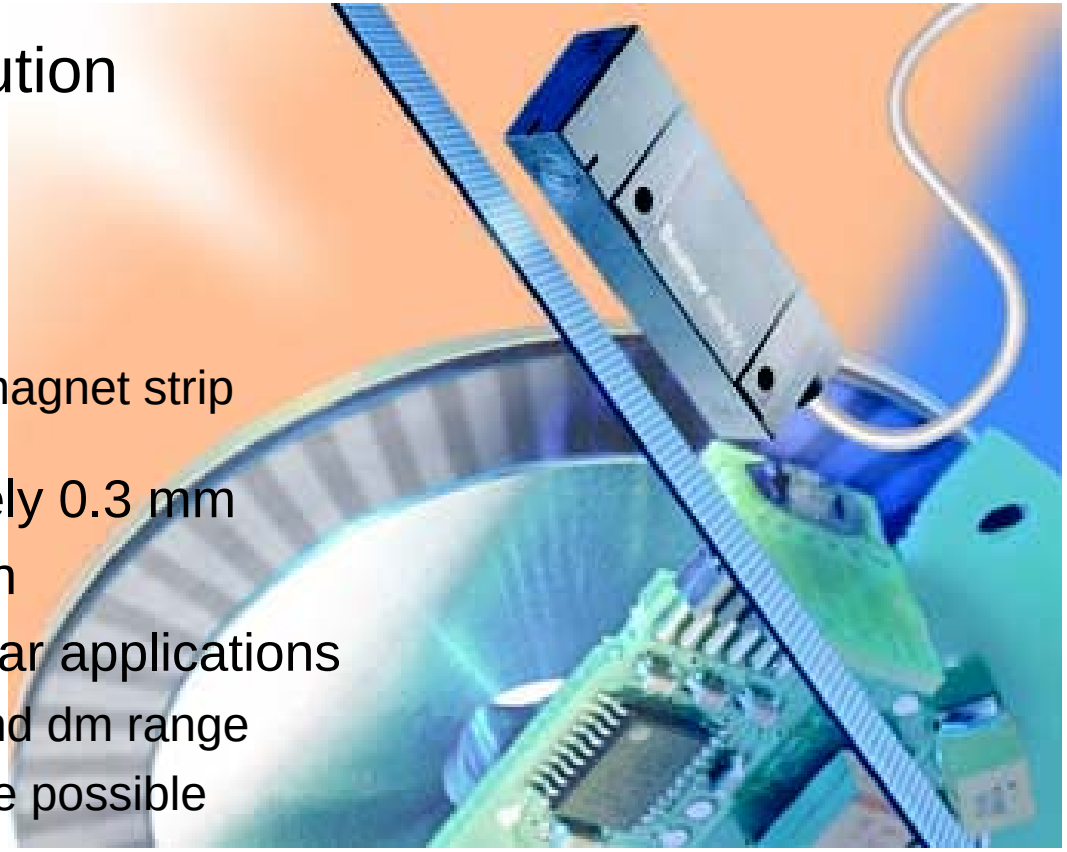
Magnet sensors

MLFK 08 linear magnet encoders

Featuring 10µm resolution

MLFK 08T7105/N25X



- High resolution
  - < 10µm @ 1mm magnet strip
- Air gap approximately 0.3 mm
- very compact design
- For incremental linear applications
  - Preferred in cm and dm range
  - Several meters are possible
- 5VDC with RS 422
- Output signals A+, A-, B+, B-
- 25 pulses / 100 steps per pole

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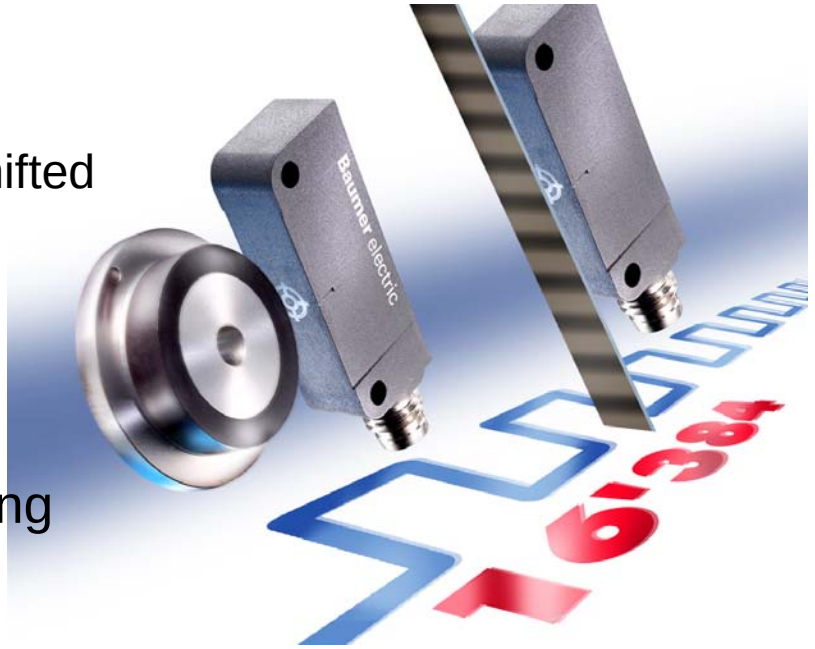
Controlling linear motion with magnet sensors

MLFK 10G2124/N100

- Two channels 90° phase shifted
- 100 fold interpolation
- Push-pull output
- 5 micrometer resolution

- Active face at center of housing



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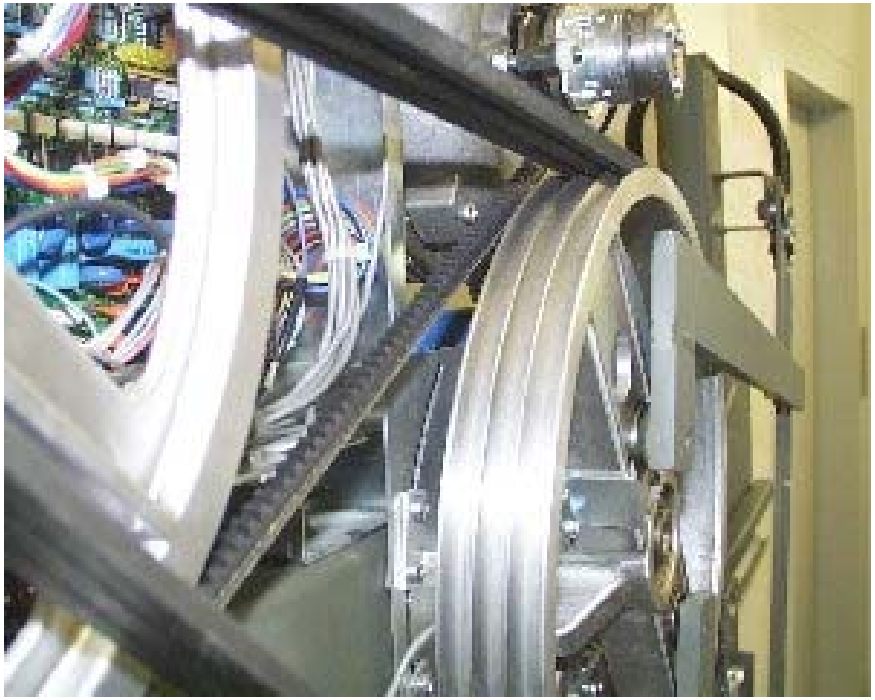
Application: elevator technology, position feedback

- Application of MLFK 08G2101
- Magnetized ribbon attached to the side of the big belt wheel
- MLFK 08 provides feedback for the control electronics
- Control device for locking mechanism of elevator doors



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Customer benefits of magnet sensors

- Magnetic sensors require little mounting space
- No flexible couplings required
- No moving parts (ball bearings, shafts, optical discs etc.)
- Protection class IP 67 (fully potted & sealed)
- Tolerant to dust, dirt and vibration
- Ring magnets & magnetic strips can be glue-fixed
- Magnetic strip even adjusts to contours of carrier