Magnetic Measurement Solutions for motion control and positioning
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Headquarter Germany
Sales Office North America
Sales Office Asia
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This brochure contains an overview of the BOGEN product portfolio. Use the figure to identify where to find the information on the products required.
Your Best Partner in Magnetic Measurement Solutions

BOGEN Electronic GmbH

BOGEN is internationally recognized as specialist in high performance magnetic measurement technology for position, rotation and motion control.

BOGEN produces magnetic technology for demanding applications. Its core competencies include the development and implementation of customized magnetic encoder and scale products to allow you to meet the application requirements.

Your Benefits

- Full range of measurement products, either standard or customized to your requirements
- E2E process to accelerate your product development with the best BOGEN solution
- Manufacturing capabilities from prototype to high volume production
- Short delivery times for prototype quantities

Quality. Made in Germany, Berlin.
BOGEN Customization Possibilities

To maximize your design freedom for applications BOGEN offers full customization of rotary and linear scales. With individualization of magnetic patterns, materials, sizes and more BOGEN allows you to configure products that meet 100% of your needs rather than you designing around a standard solution. Whether it’s the largest rotary scale for a medical application or the smallest scale for a piezo stage, BOGEN can work with you to help you to realize the best product.

Your Selection Options

- Rotary scales available from 3 mm to 2.3 m diameter - also as segments
  - The ability to magnetize on face, the outer and inner diameter - axially and radially
- Linear scales from 5 mm to 180 m length
- Pole pitches from 0.1 mm to 25 mm
- Including reference and distance coded references tracks
  - One, two and multiple track options
- Different accuracies available
- Different absolute magnetic patterns available

Incremental and Absolute Position Measurements

At BOGEN we get asked what the differences between incremental or absolute measurements are. The easiest explanation is to imagine an absolute system as a clock while the incremental system should be seen as a stopwatch.

- Absolute system = clock provides the absolute time
- Incremental system = stopwatch measures the elapsed time

Both systems have their benefits for different applications and requirements.
Incremental Position Measurements

Incremental Magnetic Encoders

IKS8 - for unlimited measuring length

- Resolution (linear or rotary scale dependent)
- Pole pitch
- Max. movement speed
- Optimal distance magnetic target → sensing head
- Supply voltage
- Energy consumption (without load)
- Operating temperature
- Protection class
- Size
- Output signals

61 nm to 625 μm, depending on the pole pitch
0.5 mm, 1 mm, 2 mm, 2.54 mm or 5 mm
75 m/sec., depending on the pole pitch, resolution and max. output frequency
0.4 mm, depending on the pole pitch
5 V ± 5%
<65 mA ± 5% (UB = 5.0 V)
-20 to +70°C
IP67
Length 35 mm, width 10 mm, height 25.5 mm
RS422, HNL, TTL, ABZ

IKS9/IKS9.1 - high performance encoders for high speed measuring

- Resolution (linear or rotary scale dependent)
- Pole pitch
- Max. movement speed
- Optimal distance magnetic target → sensing head
- Supply voltage
- Energy consumption (without load)
- Operating temperature
- Protection class
- Size IKS9
- Size IKS9.1
- Output signals

20 nm to 1,250 μm, depending on the pole pitch
0.5 mm, 1 mm, 2 mm, 2.54 mm or 5 mm
100 m/sec., depending on the pole pitch, resolution and max. output frequency
0.4 mm, depending on the pole pitch
5 V ± 5%
<120 mA ± 5% (UB = 5.0 V)
-20 to +70°C
IP67
Length 35 mm, width 9 mm, height 13.6 mm
Length 36 mm, width 11 mm, height 14.1 mm
Order information
RS422, HNL, TTL, ABZ

IKS11 - superb performance in less space

- Resolution
- Pole pitch
- Max. movement speed
- Optimal distance magnetic target → sensing head
- Supply voltage
- Energy consumption (without load)
- Operating temperature
- Protection class
- Size
- Output signals

20 nm to 500 μm, depending on the pole pitch
0.5 mm, 1 mm or 2 mm
75 m/sec., depending on the pole pitch
0.4 mm, depending on the pole pitch
5 V ± 5%
<65 mA ± 5% (UB = 5.0 V)
-20 to +70°C
IP67
Length 12.5 mm, width 5 mm, height 10.1 mm
RS422, HNL, TTL, ABZ

- Accuracy better than 40 μm
- For long travel rotary and linear scales
- High measuring distance tolerance
- Easy adjustable to customer-specific needs (programmable with PC)
- Several connector variants available

- Accuracy better than 10 μm
- For rotary and linear scales
- Easy adaption to application-specific needs (programmable by customer)
- Metal housing for harsh environments
- Several connector variants available
IKS15/IKS15.1 - fast analog signal for multiple controllers

- Resolution (linear or rotary scale dependent)
- Pole pitch
- Max. movement speed
- Optimal distance magnetic target/ sensing head
- Supply voltage
- Energy consumption (without load)
- Operating temperature
- Protection class
- Size
- Output signals

- 20 nm to 1,250 μm, depending on the pole pitch
- 0.5 mm, 1 mm, 2 mm, 2.54 mm or 5 mm
- 100 m/sec., depending on the pole pitch, resolution and max. output frequency
- 0.4 mm, depending on the pole pitch
- 5 V ± 5%
- <120 mA ± 5% [UB = 5.0 V]
- -20 to +70°C
- IP67
- Length 36 mm, width 11 mm, height 14.1 mm
- RS422, HIL, TTL, ABZ

Magnetic Scales for Incremental Measurements

With the product portfolio for incremental encoders and the corresponding magnetic scales BOGEN offers cost-efficient incremental magnetic measurement solutions. They are used wherever positions, positions and motions have to be measured highly accurate and reliable. All incremental encoders can be used in combination with our incremental linear and rotary scales. The magnetic measuring technology is resistant against humidity, contamination, temperature fluctuations and vibrations and therefore is ideal for harsh environment.

With the huge portfolio of magnetic scales it would be impossible to list them all in this brochure. Therefore here is a small selection of the BOGEN Incremental Scales with an accuracy up to 3 microns.

Selection of Linear Magnetic Scales

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Further products and information in the LMSI datasheet

Linear Magnetic Scales for Incremental Measurements

Our Linear Magnetic Scales are customizable in width, length, thickness, pole pitch and mounting positioning. BOGEN offers you the incremental magnetic scale you need.
Rotary Magnetic Scales for Incremental Measurements

Motion control and angle measuring has never been as easy and reliable as it is with the BOGEN Rotary Incremental Magnetic Scales. With different magnetic and hub materials and customizable dimensions our rotary scales are applicable in various tasks.

### Selection of Rotary Magnetic Scales Radial

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Further products and information in the RMSI datasheet.

### Selection of Rotary Magnetic Scales Axial

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Further products and information in the RMSI datasheet.
Absolute Position Measurements

Absolute Magnetic Encoders

AKS16 - for 2-track scales up to 256 mm length or 86 mm diameter

- Max. absolute linear res. 0.15 μm
- For short travel 2-track rotary and linear scales
- Parallel or perpendicular orientation
- Rotary measuring up to 86 mm diameter
- Linear measuring up to 256 mm length
- 12-pin FFC or Molex connector

- Absolute resolution (linear or rotary scale dependent) 18 Bit, 19 Bit, 20 Bit
- Pole pitch 1.28 mm, 1.50 mm or 2.00 mm
- Rotation speed (Resolution) 18 Bit: up to 24,000 rpm, 19 Bit: up to 12,000 rpm
- 20 Bit: up to 6,000 rpm
- Optimal distance magnetic target ↔ sensing head 0.4 mm
- Supply voltage 5 V ± 5%
- Energy consumption (without load) <60 mA ± 5% (UB = 5,0 V)
- Operating temperature -20 to +60°C
- Protection class IP67 (with FFC connector)
- Size Molex Version
- Size FFC version
- Absolute output signals
- Incremental output signals
- BISS-C, SSI
- ABZ, UVW, STEP, CW/CCW

AKS17 - for 3-track scales up to 3,000 mm length or 977 mm diameter

- Max. absolute linear res. 0.15 μm
- For short travel 3-track rotary and linear scales
- Parallel or perpendicular orientation
- Rotary measuring up to 977 mm diameter
- Linear measuring up to 3,000 mm length
- 12-pin FFC or Molex connector

- Absolute resolution (linear or rotary scale dependent) 21 Bit, 22 Bit, 23 Bit, 24 Bit
- Pole pitch 1.28 mm, 1.50 mm or 2.00 mm
- Rotation speed (Resolution) 21 Bit: up to 3,000 rpm, 22 Bit: up to 1,500 rpm
- 23 Bit: up to 750 rpm, 24 Bit: up to 375 rpm
- Optimal distance magnetic target ↔ sensing head 0.4 mm
- Supply voltage 5 V ± 5%
- Energy consumption (without load) <120 mA ± 5% (UB = 5,0 V)
- Operating temperature -20 to +60°C
- Protection class IP67 (with FFC connector)
- Size Molex Version
- Size FFC version
- Absolute output signals
- Incremental output signals
- BISS-C, SSI
- ABZ, UVW, STEP, CW/CCW

AKP18 - for space-saving implementation with 2-track scales

- Max. absolute linear res. 0.15 μm
- For space-saving implementation
- Rotary measuring up to 86 mm diameter
- Linear measuring up to 256 mm length
- 10-pin FFC connector
- Daisy-chainable with wire board connector-option

- Absolute resolution (linear or rotary scale dependent) 18 Bit, 19 Bit, 20 Bit
- Pole pitch 1.28 mm, 1.50 mm or 2.00 mm
- Rotation speed (Resolution) 18 Bit: up to 24,000 rpm, 19 Bit: up to 12,000 rpm
- 20 Bit: up to 6,000 rpm
- Optimal distance magnetic target ↔ sensing head 0.4 mm
- Supply voltage 5 V ± 5%
- Energy consumption (without load) <60 mA ± 5% (UB = 5,0 V)
- Operating temperature -20 to +60°C
- Size
- Absolute output signals
- BISS-C, SSI
AKP20 - the absolute magnetic encoder for linear & rotary applications

- Max. absolute linear res. 0.15 µm
- For space-saving implementation
- Rotary measuring up to 86 mm diameter
- Linear measuring up to 256 mm length
- 12-pin FFC connector or wire to board connector

Absolute resolution [linear or rotary scale dependent]
Pole pitch
Rotation speed [Resolution]
Optimal distance magnetic target ↔ sensing head
Supply voltage
Energy consumption (without load)
Operating temperature
Protection class
Size Molex Version
Size FFC version
Absolute output signals
Incremental output signals
18 Bit, 19 Bit, 20 Bit
1.28 mm, 1.50 mm or 2.00 mm
18 Bit: up to 24,000 rpm, 19 Bit: up to 12,000 rpm
20 Bit: up to 6,000 rpm
0.4 mm
5 V ± 5%
<60 mA ± 5% [UB = 5.0 V]
-20 to +60°C
IP47 (with FFC connector)
Length: 24.2 mm, width: 16 mm, height: 6.6 mm
Length: 24.2 mm, width: 16 mm, height: 3.4 mm
B55-C, SSI
ABZ, UVW, STEP, CW/CCW

Magnetic Scales for Absolute Measurements

All magnetic scales are resistant against hydraulic oil, weak alcali, detergent, water and many other liquids. They are insensitive against temperature fluctuations, vibrations and contamination with solids like dust or production residues.

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Further products and information in the LMSN datasheet.
Characteristics of Magnetic Scales

**Linear Magnetic Scale**
- Magnetized material: Elastomer filled with ferrite
- Temperature range: -20°C to +100°C
- Mounting: Adhesive tape, multiple hole combinations and angle cuts available

**Rotary Magnetic Scale**
- Magnetized material: Elastomer bonded ferrite, hard ferrite, plastoferrite, vulcanized
- Temperature range:
  - -40°C to +100°C (elastomer bonded ferrite)
  - -20°C to +250°C (hard ferrite)
- Mounting: Multiple hub sizes and hub materials available

---

### Selection of Rotary Magnetic Scales Radial

<table>
<thead>
<tr>
<th>Encoder</th>
<th>Order-Number</th>
<th>Master-Nomius Relation</th>
<th>Outer Diameter (mm)</th>
<th>Inner Diameter (mm)</th>
<th>System Resolution (Bit)</th>
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### Selection of Rotary Magnetic Scales Axial

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Further products and information in the RMSN datasheet
Your Contact Options

Please contact BOGEN for any product inquiries, questions or issues. While the headquarter with product development and production is in Germany, you will find your sales offices below. If you are in doubt, please contact BOGEN Germany.

**Headquarter Germany**
BOGEN Electronic GmbH
Potsdamer Straße 12-13
14163 Berlin - Germany

Phone +49 30 81 00 02-0
magnetics@bogen-electronic.com
www.bogen-electronic.com

**Sales Office North America**
BOGEN Magnetics North America LLC
219 Redfield Parkway, Suite 204
Reno, NV 89509 - USA

Phone +1 775 851 2173
magneticsna@bogen-electronic.com
www.bogen-electronic.com

**Sales Office Asia**
BOGEN Magnetics Trading CO., Ltd
2302, Block B, Tian Xia Taurus Plaza,
Nan Shan, Shenzhen - P.R.China

Phone +86 755 8654 9642
magneticsasia@bogen-electronic.com
www.bogen-electronic.com

We are looking forward to your call.