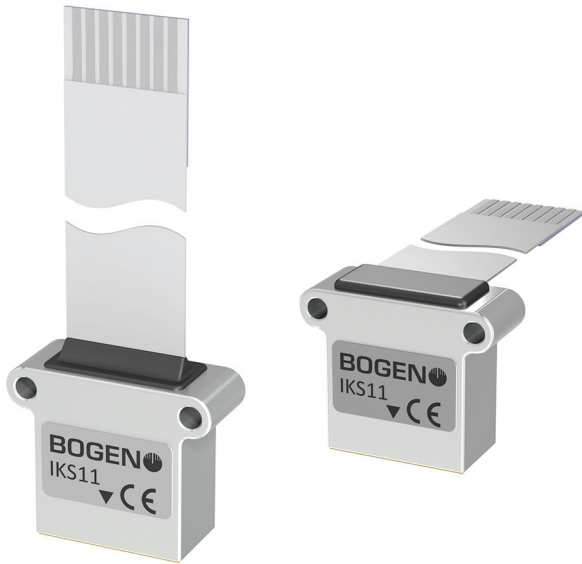




Measuring



Positioning



IKS11 Incremental Magnetic Sensing Head

- Linear Applications
- Rotational Applications
- Non contact, quick position measurement

Features

- High accuracy
- Resolution options available
- Single piece unit
- Customizable max output frequencies
- Software programmable interface
- Connector options with multiple cable lengths
- No wear from usage
- Resistant to dust, cooling lubricant emulsion, oil, etc.
- High fly height tolerance (Up to half of pole pitch)
- Unlimited measuring length

Superb performance in less space – the IKS11

With the compact incremental magnetic sensing head IKS11 BOGEN offers superb performance in a small form factor. If space is decisive the IKS11 allows easy usage. The IKS11 impresses customers in automation, instrumentation and motion control applications. In combination with BOGEN precision scales, measurement solutions for almost every application can be custom-tailored.

Features

| | |
|-----------------------------------|--|
| Resolution | 0.020 to 500µm, depending on the pole pitch |
| Energy Consumption (without Load) | <65 mA (UB = 5 V) |
| Operating Temperature | -20 to +70 °C |
| Storage Temperature | -20 to +80 °C |
| Protection Class | IP67 |
| Adjustable Parameters | Resolution, maximum output frequency and interface |

Resolution and Max. Speed

Output Frequency F = 1000 kHz

| Pole Pitch P [mm] | Resolution R [µm] | Speed [m/s] |
|-------------------|-------------------|-------------|
| 0.5 | 0.25 | 1 |
| 1 | 0.5 | 2 |
| 2 | 1 | 4 |

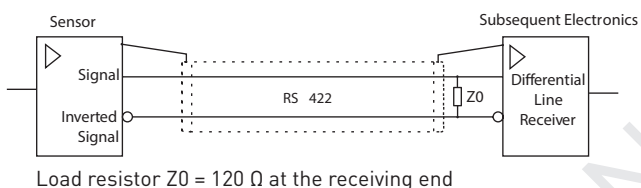
See chart below for other selectable output frequencies

Sensing Head Variants

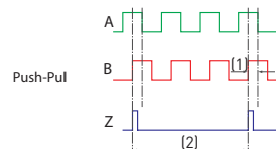
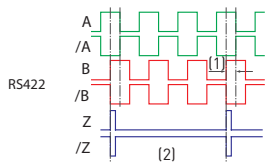
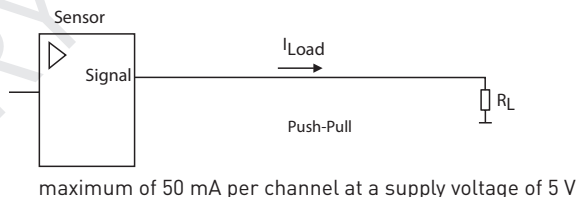
| | |
|------------------------------|---|
| Pole pitch | 0.5 mm; 1 mm; 2 mm |
| Reference | Reference chip for 2nd track not for 0.5 mm or periodically from the pole pitch |
| Supply Voltage | 5 V ± 5 % |
| Interface (without load) | D1 = RS422 (0 to 5 V) D3 = Push-Pull TTL (0 to 5 V) |
| Cable Length of Sensing Head | Standard length X m |

Output Circuit

RS422



Push-Pull (HTL, TTL)

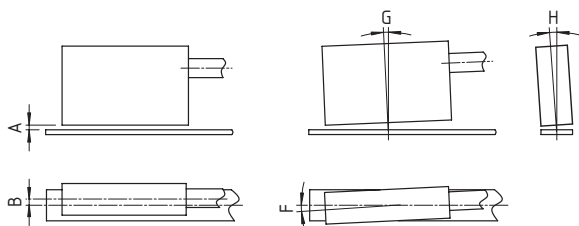


Output Signals

| | |
|------------------------|--|
| Signals | A, /A, B, /B, Z, /Z |
| Signal Error Indicator | High impedance on all output signals (A, /A, B, /B, Z, /Z) |

- (1) Phase shift A and B 90° ±10° electrical
- (2) Signal period depending on the reference track pattern or as a periodic reference depending on the pole pitch
- Z Length default is 50 counts

Installation Tolerances



| | Pole Pitch 0.5 mm | Pole Pitch 1 mm | Pole Pitch 2 mm |
|-----------------------|-------------------|-----------------|-----------------|
| A [mm] | 0.1 to 0.25 | 0.1 to 0.5 | 0.1 to 1.0 |
| B ⁽³⁾ [mm] | 2.5 | 2.5 | 2.5 |
| B ⁽⁴⁾ [mm] | 0.5 | 0.5 | 0.5 |
| G | 0.5° | 1° | 1° |
| H | 3° | 3° | 3° |
| F | 3° | 3° | 3° |

⁽³⁾ relative to 10 mm scale width (1-track)

⁽⁴⁾ relative to 10 mm scale width (2-track)

Further Selection (Ordering Parameters)

| Pole Pitch P [mm] | | | Resolution R [μm] | Resolution R_{dpi} [dpi] | Maximum Output Frequency per channel F [kHz] | | | | | |
|------------------------|---|---|-------------------------------------|-------------------------------|--|-------|------|------|-------|--------|
| 0.5 | 1 | 2 | | | 3500 | 1750 | 1000 | 500 | 100 | 60 |
| | | | Max. Movement Speed V_{max} [m/s] | | | | | | | |
| | | x | 500 | 50.8 | >100 | >100 | >100 | >100 | >100 | >100 |
| | x | x | 200 | 127 | >100 | >100 | >100 | >100 | 80 | 48 |
| x | x | x | 100 | 254 | >100 | >100 | >100 | >100 | 40 | 24 |
| | | x | 80 | 317.5 | >100 | >100 | >100 | >100 | 32 | 19.2 |
| x | x | x | 62.5 | 406.4 | >100 | >100 | >100 | >100 | 25 | 15 |
| x | x | x | 50 | 508 | >100 | >100 | >100 | >100 | 20 | 12 |
| x | x | x | 25 | 1016 | >100 | >100 | >100 | 50 | 10 | 6 |
| x | x | x | 20 | 1270 | >100 | >100 | 80 | 40 | 8 | 4.8 |
| x | x | x | 12.5 | 2032 | >100 | 87.5 | 50 | 25 | 5 | 3 |
| x | x | x | 10 | 2540 | >100 | 70 | 40 | 20 | 4 | 2.4 |
| x | x | x | 5 | 5080 | 70 | 35 | 20 | 10 | 2 | 1.2 |
| x | x | x | 4 | 6350 | 56 | 28 | 16 | 8 | 1.6 | 0.96 |
| x | x | x | 2.5 | 10160 | 35 | 17.5 | 10 | 5 | 1 | 0.6 |
| x | x | x | 2 | 12700 | 28 | 14 | 8 | 4 | 0.8 | 0.48 |
| x | x | x | 1 | 25400 | 14 | 7 | 4 | 2 | 0.4 | 0.24 |
| x | x | x | 0.5 | 50800 | 7 | 3.5 | 2 | 1 | 0.2 | 0.12 |
| x | x | x | 0.25 | 101600 | 3.5 | 1.75 | 1 | 0.5 | 0.1 | 0.06 |
| x | x | x | 0.125 | 203200 | 1.75 | 0.875 | 0.5 | 0.25 | 0.05 | 0.03 |
| x | x | x | 0.05 | 508000 | 0.7 | 0.35 | 0.2 | 0.1 | 0.02 | 0.012 |
| x | x | | 0.02 | 1270000 | 0.28 | 0.14 | 0.08 | 0.04 | 0.008 | 0.0048 |

Table 1: Maximum output frequency and speed as a function of pole pitch and resolution

Definition:

Resolution R (Resolution is post quadrature)Pole pitch P (available 0.5; 1; 2 mm)Resolution factor R_f (Resolution factor available from 4 to 65536 in integer increments of one)Maximum Output Frequency per channel F (from 60 kHz to 3500 kHz)Max-Movement-Speed V_{max} Interpolation = $R_f / 4$

$$R = P / R_f$$

Resolution [dpi] R_{dpi}

$$R_{dpi} = 25400 / R$$

 V_{max} is limited by following formulars:

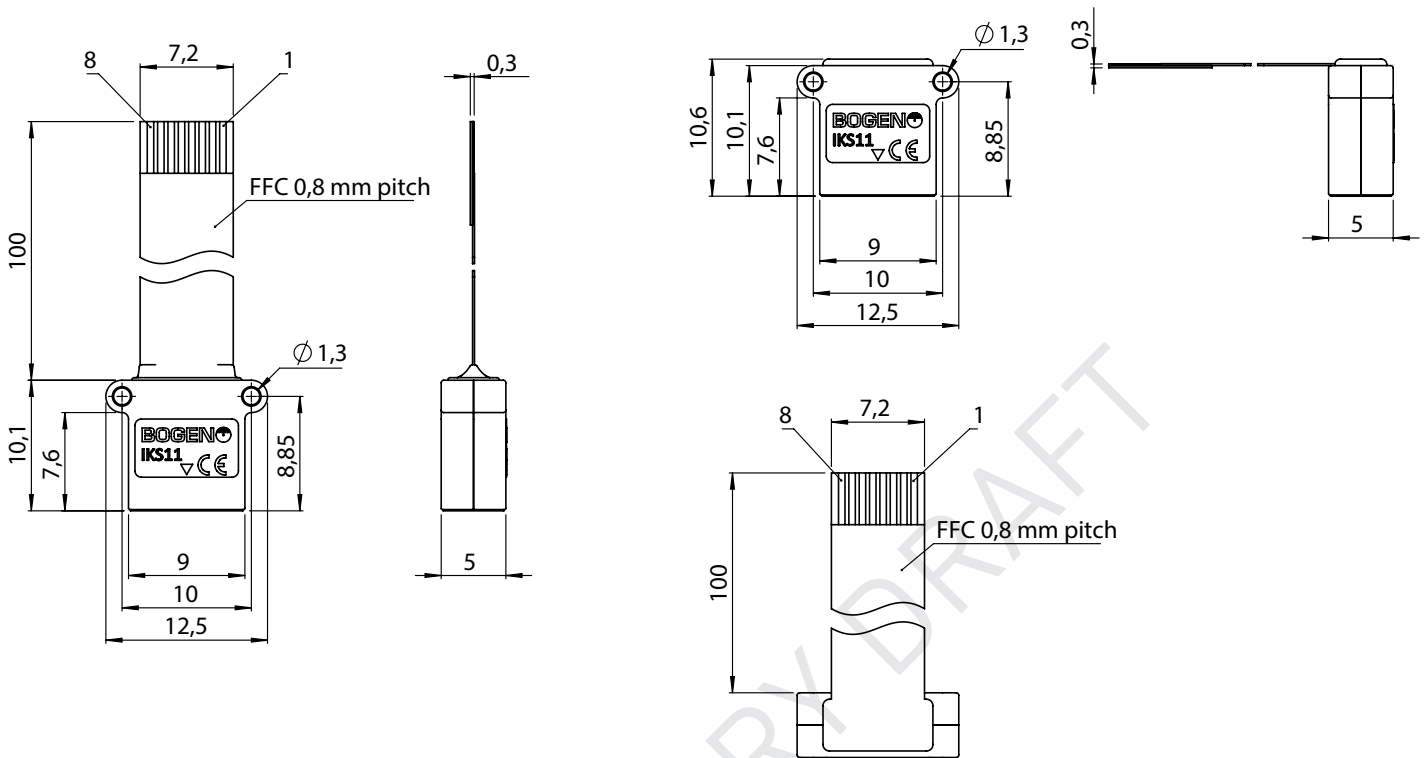
$$1. V_{max} = 4 * F * R$$

$$2. V_{max} = P * 50 \text{ MHz}$$

Pin Assignment

| Signal | Pin No. | |
|--------|---------------|--------------|
| | C1 (FFC 180°) | C2 (FFC 90°) |
| A | 1 | 1 |
| /A | 2 | 2 |
| B | 3 | 3 |
| /B | 4 | 4 |
| Z | 5 | 5 |
| /Z | 6 | 6 |
| V - | 7 | 7 |
| V + | 8 | 8 |

Dimensions



Optional Accessory – Order Codes for Linear Scales, 10 mm Width ^[5]

| Pole Pitch | Accuracy A3 | Accuracy A10 | Accuracy A20 | Accuracy A40 (standard) |
|------------|----------------|-----------------|-----------------|-------------------------|
| 0.5 | KBEE10-0.5-A3K | KBEE10-0.5-A10K | KBEE10-0.5-A20K | KBEE10-0.5-K |
| 1 | KBEE10-1-A3K | KBEE10-1-A10K | KBEE10-1-A20K | KBEE10-1-K |
| 2 | KBEE10-2-A3K | KBEE10-2-A10K | KBEE10-2-A20K | KBEE10-2-K |

^[5] Scale dimensions: 10 mm x 1.3 mm (w/o cover tape), length up to 50 m. Other accuracies, other pole pitches, other scale widths and scales with reference track on request. See separate data sheet for linear scales for further possibilities.

Optional Accessory – Scales

Scales with different dimensions and number of poles are available. Please contact us.

Order Code

Parameters

IKS11 -

| | | | | | |
|---|---|---|---|---|---|
| Z | P | D | R | F | C |
|---|---|---|---|---|---|

| | | Code ⁽⁷⁾ | Explanation ⁽⁶⁾ |
|----------|--|---------------------|--|
| Z | Reference Signal ^(7,8) | Z1. ... | Periodic index signal, from the pole pitch, length of index signal ... counts ⁽¹⁰⁾ |
| | | Z2. ... | From reference marks (requires 2-track magnetic tape with incremental track and reference track), length of index signal ... counts ⁽⁹⁾ |
| | | Z2.50 | Periodic index signal, from the pole pitch with length of index signal 50 counts |
| P | Pole Pitch [mm] | P0.5 | 0.5 mm |
| | | P1 | 1 mm |
| | | P2 | 2 mm |
| D | Interface ⁽⁷⁾ | D1 | RS422 |
| | | D3 | Push-Pull TTL |
| R | Resolution ⁽⁷⁾ [µm] | R0.25 | Standard for pole pitch 0.5 mm |
| | | R0.5 | Standard for pole pitch 1 mm |
| | | R1 | Standard for pole pitch 2 mm |
| F | Maximum Output Frequency per channel ⁽⁷⁾ [kHz] | F1000 | 1000 kHz |
| | | F ... | Other non-standard output frequencies, see section "Resolution and Speed" in table 1 on page 2. |
| C | Connector | C1 | FFC 180° |
| | | C2 | FFC 90° |
| | | C3 | on request |

⁽⁶⁾ standard parameters are bold⁽⁷⁾ user programmable parameters (optional IKS-Programming device necessary)⁽⁸⁾ if no index signal is needed, please do not connect pin "Z" an "/Z" on delivered connector⁽⁹⁾ length of index signal available from 1 to 256