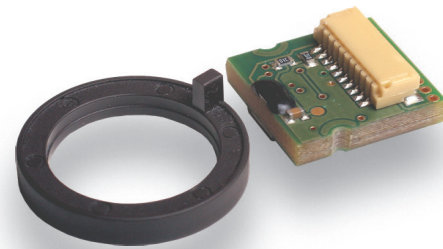


# EBR7912EBI-CA-KA

## Incremental Sensor Module with Reference

The sensor module EBR7912EBI-CA contains an Anisotropic MagnetoResistive (AMR) FixPitch sensor AL796 with 2 mm magnetic pitch and a Giant MagnetoResistive (GMR) sensor GF705 for the reference signal. The sensor module has an JST-connector with all necessary connections and two holes at the edges of the circuit board for mounting. The sensor module is calibrated, so you will get signals with a high performance and low jitter. The used ASIC is fully programmable and changes (for example the resolution) can be done with a programming tool.

When used with the magnetic scale MWR0032KAC-KH with 2 mm pitch, the module delivers two differential rectangular signals (A and B) and a differential reference pulse (Z) per revolution. The flank-to-flank resolution of the incremental signal is 0.088 deg.



### Product Overview

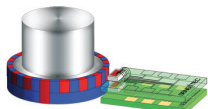
Article description	Article number
EBR7912EBI-CA-KA	5112.3101.0
MWR0032KAC-KH incremental pole ring with reference <sup>1)</sup>	5109.6001.0

<sup>1)</sup> Matching pole ring.

### Quick Reference Guide

Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply voltage	3.0	3.3 / 5.0	5.5	V
$I_C$	Current consumption ( $V_{CC} = 5\text{ V}$ )	-	11	12	mA
A	Resolution (flank to flank)	-	0.088	-	deg
F	Flanks per revolution	-	4096	-	-
$f_{out}$	Output frequency	-	145	-	kHz
$T_{amb}$	Ambient temperature	-40	-	+105	°C

### Measurement Setup

Depiction	Configuration	Application
	Magnetic pole ring with fixed pole pitch; sensor positioned radially; sensor face in the plane of rotation	Incremental angle measurement

### Features

- Resolution 4096 flanks per revolution
- Differential A/B output signal (digital)
- Reference output signal (Z) once per revolution
- Ambient temperature range from -40 to +105 °C
- Supply voltage 5.0 V or 3.3 V

### Advantages

- Easy to mount
- Integrated reference signal
- Very small size

### Applications

Incremental encoder for rotating movements in various applications, for example:

- Motor feedback system
- Motor integrated encoder



## Absolute Maximum Ratings

In accordance with the absolute maximum rating system (IEC60134).

Symbol	Parameter	Min.	Max.	Unit
$V_{CC}$	Supply voltage	-0.3	+6.0	V
$T_{amb}$	Ambient temperature	-40	+105	°C

Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## Electrical Data

$T_{amb} = 25\text{ °C}$ ;  $H_{ext} = 25\text{ kA/m}$ ;  $V_{CC} = 5\text{ V}$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply voltage		3.0	3.3 5.0	5.5	V
$I_c$	Current consumption	5.0 V, no load	-	11	12	mA
$I_c$	Current consumption	3.3 V, no load	-	8	9	mA
A	Resolution (flank to flank)		-	0.088	-	deg
F	Flanks per revolution		-	4096	-	-
$f_{out}$	Output frequency	$N = 8500\text{ min}^{-1}$	-	145	-	kHz
$T_{amb}$	Ambient temperature		-40	-	+105	°C
$I_{out,pin}$	Permissible load current (source and sink)		-10	-	+10	mA
$V_{outH}$	Output high level	$V_{CC} = 5\text{ V}$ , $I_{source} = 6\text{ mA}$	4.6	-	5.0	V
$V_{outL}$	Output low level	$V_{CC} = 5\text{ V}$ , $I_{sink} = 6\text{ mA}$	0.0	-	0.25	V
$V_{outH}$	Output high level	$V_{CC} = 3.3\text{ V}$ , $I_{source} = 6\text{ mA}$	2.8	-	3.3	V
$V_{outL}$	Output low level	$V_{CC} = 3.3\text{ V}$ , $I_{sink} = 6\text{ mA}$	0.0	-	0.3	V
$t_{Lat}$	Latency		-	-	<1	µs

## Accuracy

$T_{amb} = -40\dots+105\text{ °C}$ ;  $H_{ext} = 25\text{ kA/m}$ ;  $V_{CC} = 5\text{ V}$ ; unless otherwise specified.

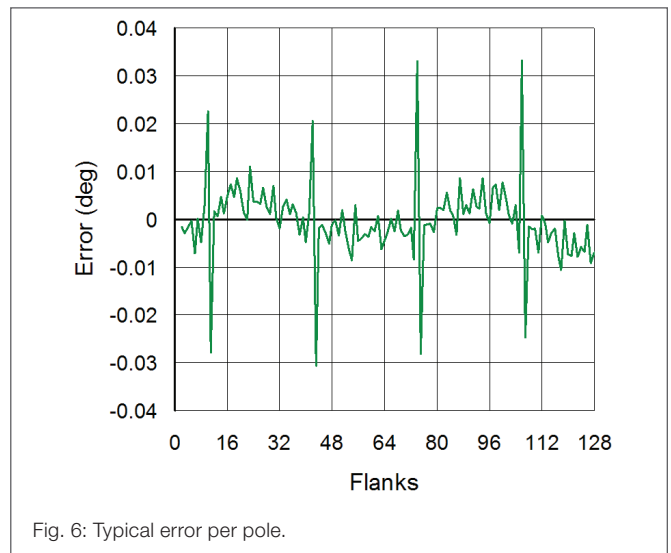
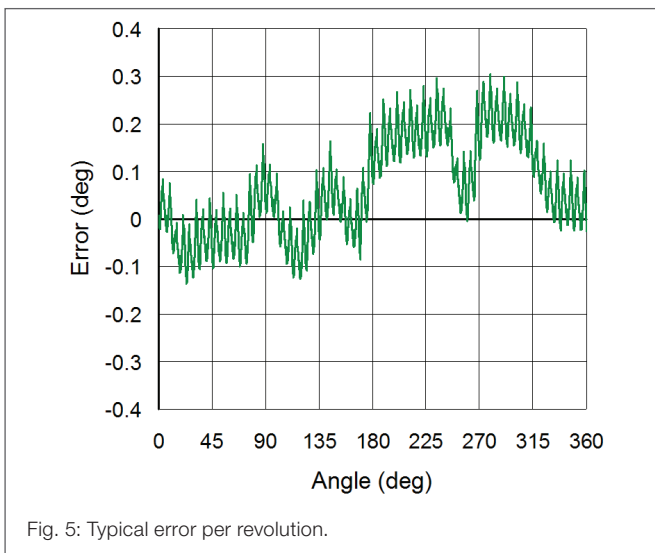
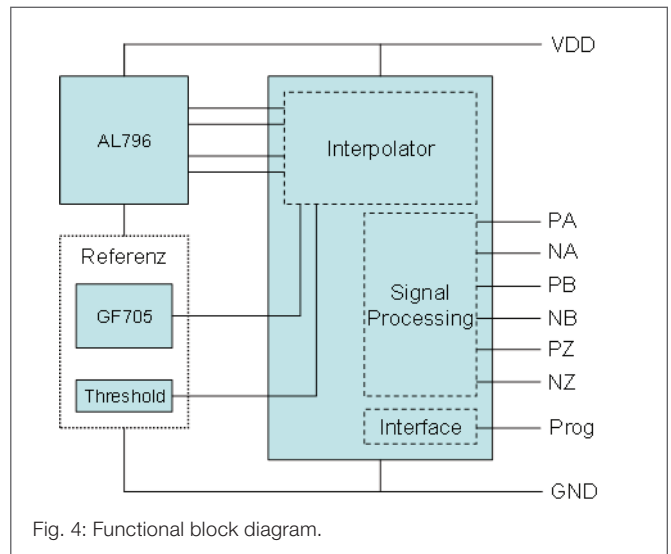
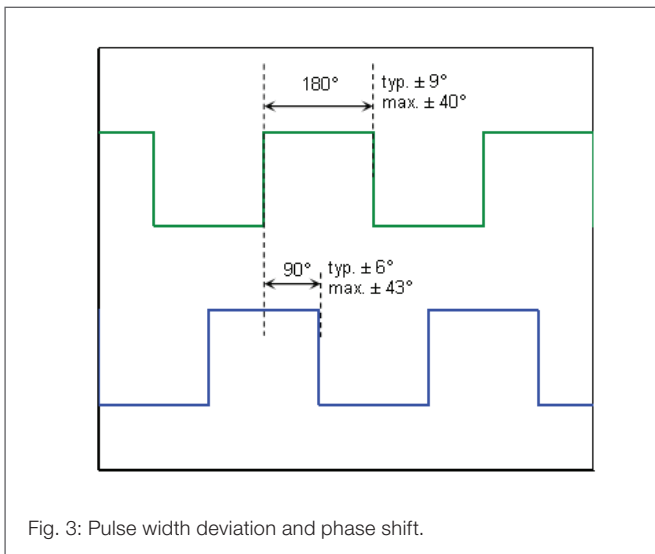
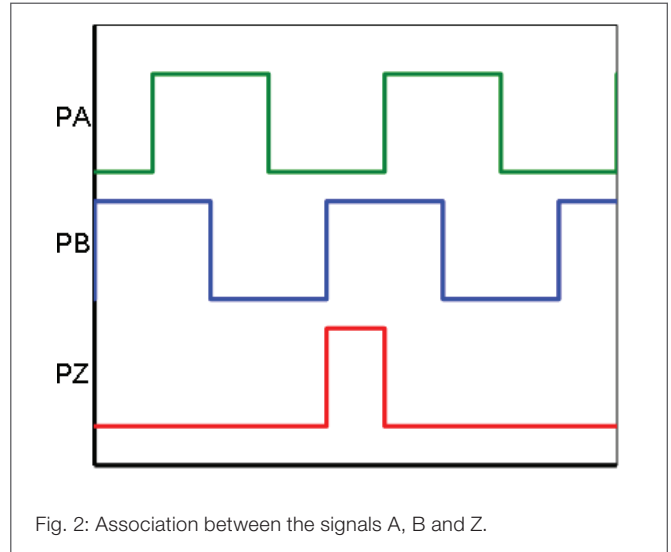
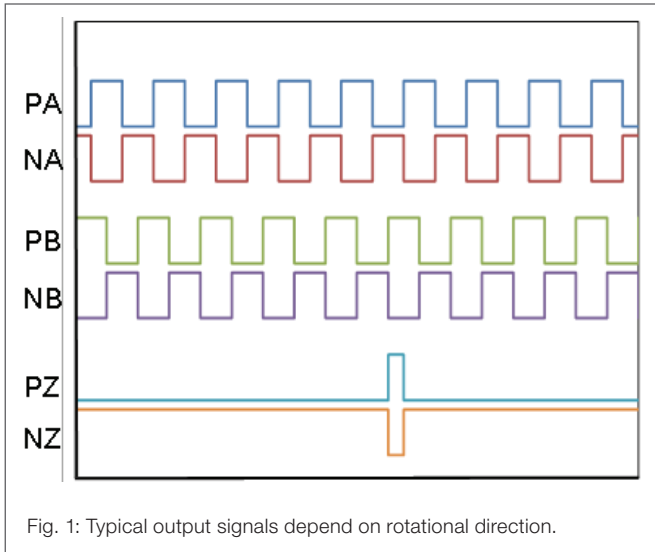
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$\Delta\alpha$	Absolute accuracy <sup>1)</sup>		-	-	±1	deg
R	Repeatability <sup>1)</sup>		-	-	±1	deg
$\Delta\Pi$	Deviation of pulse width <sup>1)</sup>	See Fig. 3	-	±9	±40	deg
$\Delta\phi$	Deviation of phase shift <sup>1)</sup>	See Fig. 3	-	±6	±43	deg

<sup>1)</sup> Matching pole ring.

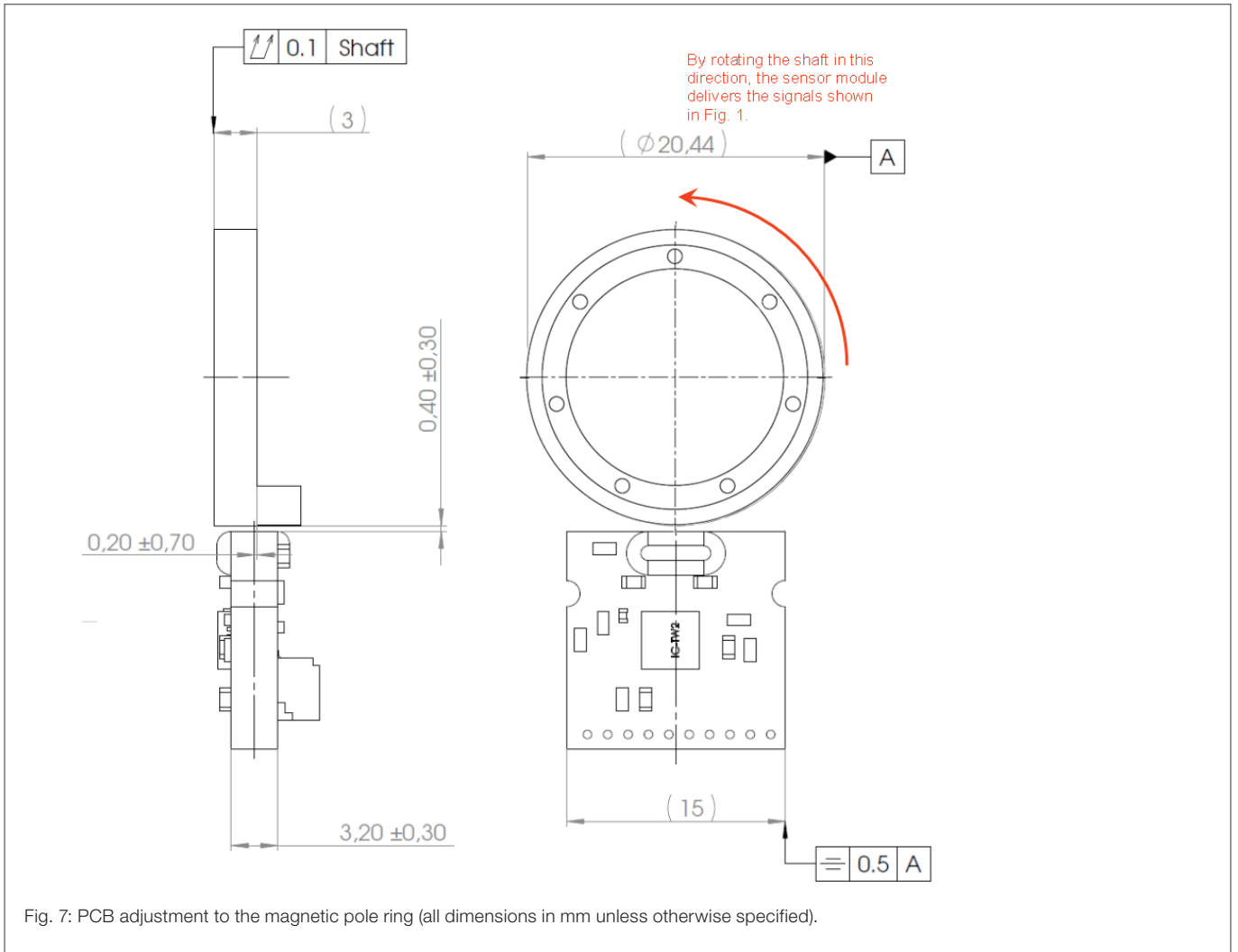
## Mechanical Data

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
N	Rotational speed	$V_{CC} \geq 3.3\text{ V}$	-	-	8500	min <sup>-1</sup>
$\Delta_{radial}$	Working distance (scale surface ↔ sensor)	See Fig. 7	100	400	700	µm
$\Delta_{axial}$	Axial tolerance	See Fig. 7	-500	-	+900	µm

Typical Performance Graphs



**Dimensions of EBR7912 with Pole Ring MWR0032KAC**



## Pinning and Dimensions of the Sensor Module EBR7912EBI-CA-KA

### Pinning

Pad	Symbol	Parameter
1	PZ	Positive output signal Z
2	NZ	Negative output signal Z
3	PA	Positive output signal A
4	NA	Negative output signal A
5	PB	Positive output signal B
6	NB	Negative output signal B
7	GND	Ground
8	V <sub>CC</sub>	Supply voltage
9	SCL	Communication interface: clock <sup>1)</sup>
10	SDA	Communication interface: data <sup>1)</sup>

<sup>1)</sup> Use only with suitable programming adapter.

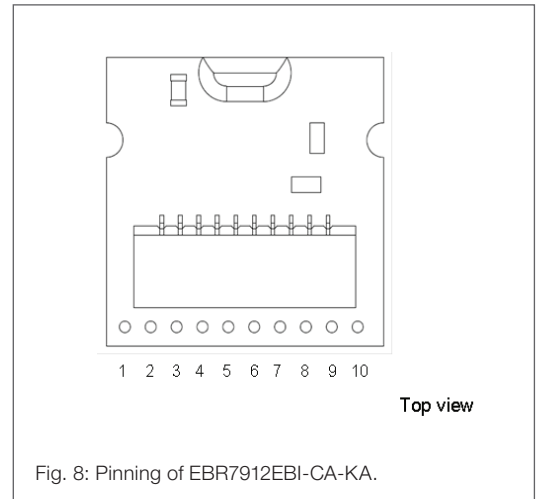


Fig. 8: Pinning of EBR7912EBI-CA-KA.

### Dimensions

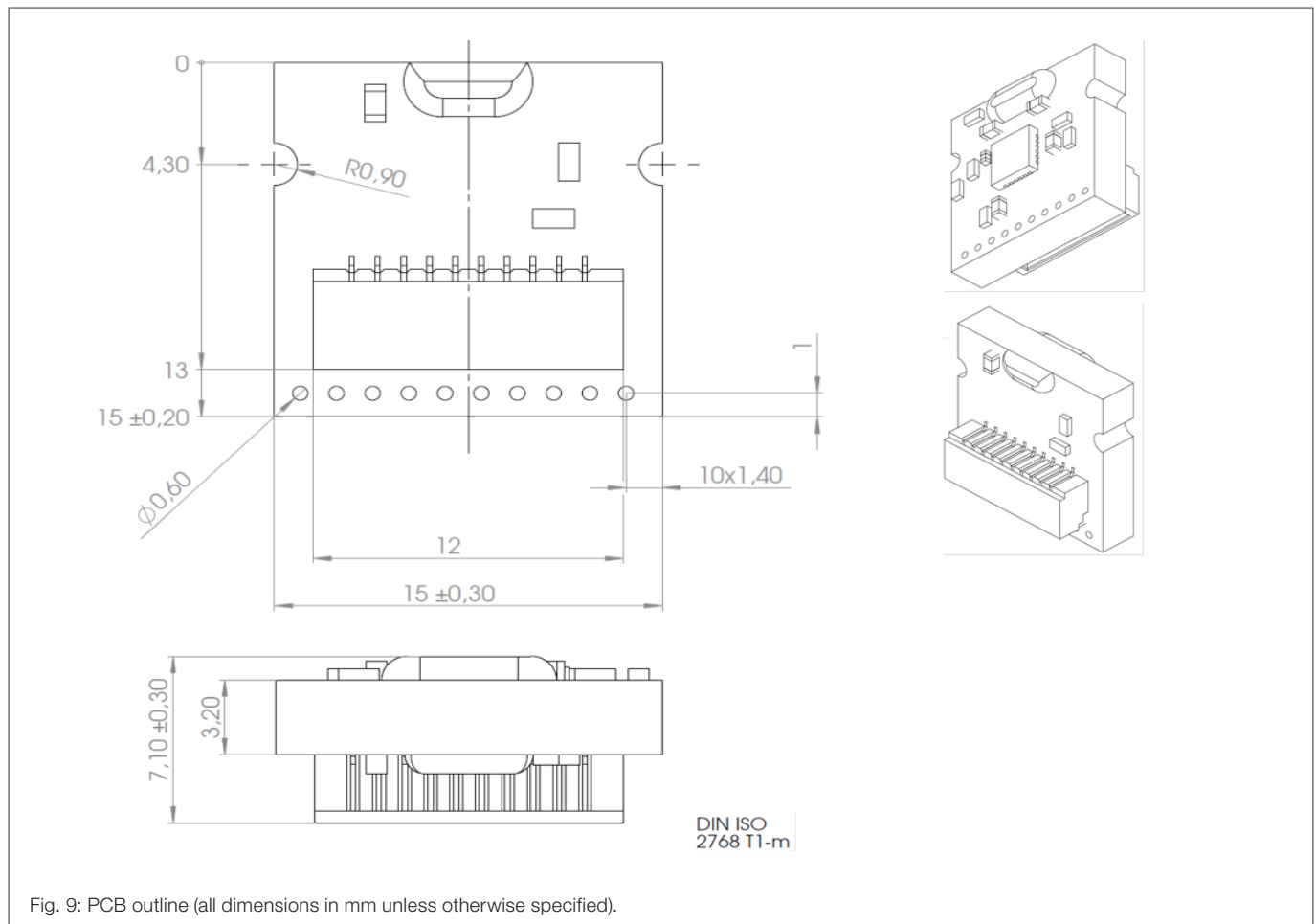


Fig. 9: PCB outline (all dimensions in mm unless otherwise specified).

**Magnetic Data**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$H_{ext}$	Magnetic field strength <sup>1)</sup>		30	35	40	kA/m

<sup>1)</sup> Typical magnetic field strength of the pole ring MWR0032KAC-KH.

**Dimensions**

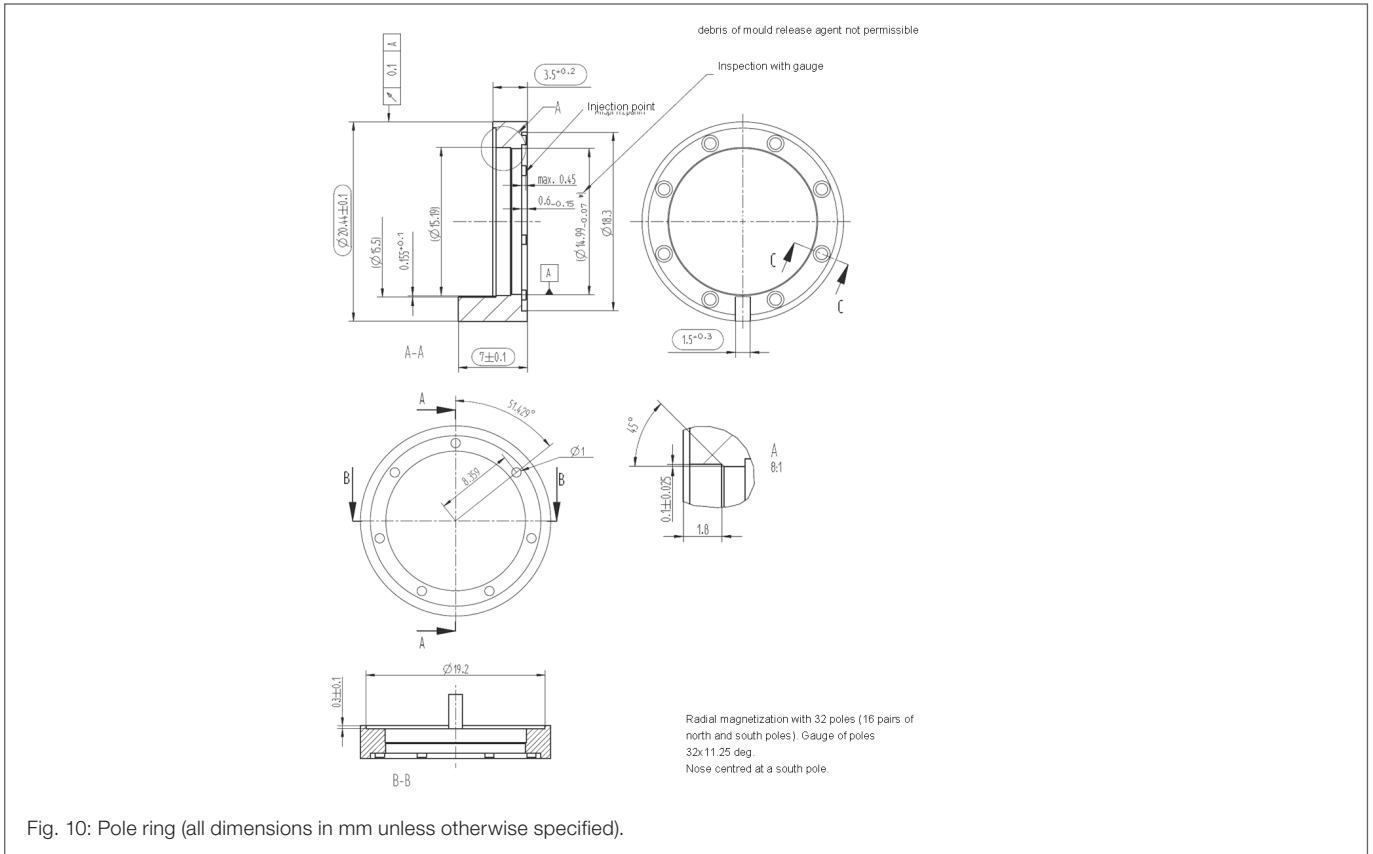


Fig. 10: Pole ring (all dimensions in mm unless otherwise specified).

## General Information

### Product Status

Article	Status
EBR7912EBI-CA-KA Incremental sensor module	The product is in series production.
MWR0032-KAC-KH Incremental pole ring with reference	The product is in series production.
<b>Note</b>	The status of the product may have changed since this data sheet was published. The latest information is available on the internet at <a href="http://www.sensitec.com">www.sensitec.com</a> .

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