

## EAM360R-B - Analog

Blind hollow shaft

Magnetic single- or multiturn encoders

### Overview

- Encoder single- or multiturn / Analog
- E1 compliant design
- High protection up to IP 67
- High resistance to shock and vibrations
- Protection against corrosion CX (C5-M)
- Wire cross section 0.5 mm<sup>2</sup>
- Teach input for adjustment of measuring range
- Applicable up to PLd (ISO 13849)



### Technical data

#### Technical data - electrical ratings

Voltage supply	8...30 VDC 14...30 VDC
Reverse polarity protection	Yes
Consumption typ.	20 mA (24 VDC, w/o load)
Initializing time	≤ 170 ms after power on
Response time	< 1 ms
Interface	Analog 0...10 V / 0.5...4.5 V / 4...20 mA / Resolution: 12 bit
Function	Multiturn Singleturn
Teach range	5°...359.9° (singleturn) 5°...32767 turns (multiturn)
Absolute accuracy	±0.15 ° (+20 ±15 °C) ±0.25 ° (-40...+85 °C) sensor
Accuracy analog output	±0.5 % of whole measuring range (- 40...+85 °C)
Sensing method	Magnetic
Interference immunity	EN 61000-6-2 ISO 11452-2:2004* / -5:2002* ISO 7637-2:2004* ISO 10605:2008 + Amd 1:2014 (CD ±8 kV / AD ±15 kV) * Severity level according to ECE R10 (Rev. 4)
Emitted interference	EN 61000-6-4 CISPR 25:2008 (30...1000 MHz) ISO 7637-2:2004* * Severity level according to ECE R10 (Rev. 4)

#### Technical data - electrical ratings

MTTF <sub>d</sub> (ISO 13849)	High (>100 years) Use in safety functions exclusively based on Application Note and MTTFd reliability prediction (request separately).
Programmable parameters	Measuring range teachable
Diagnostic function	DATAVALID
Factory setting	360° and 10 revolutions (other on request)

#### Technical data - mechanical design

Size (flange)	ø36 mm
Shaft type	ø10...15 mm (blind hollow shaft)
Protection EN 60529	IP 67 (with shaft seal)
Operating speed	≤6000 rpm
Starting torque	≤2.5 Ncm (+20 °C, IP 67)
Moment of inertia	46.75 gcm <sup>2</sup>
Material	Housing: steel, powder-coated Flange: aluminium Hollow shaft: stainless steel
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions CX (C5-M) accord- ing to ISO 12944-2
Operating temperature	-40...+85 °C (see general information)
Relative humidity	95 %
Resistance	EN 60068-2-6 Vibration 30 g, 10...2000 Hz EN 60068-2-27 Shock 500 g, 1 ms
Weight approx.	170 g
Connection	Flange connector M12, 5-pin Cable 2 m

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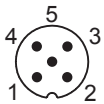
### General information

Self-heating interrelated to speed, protection, attachment method and ambient conditions as well electronics and supply voltage must be considered for precise thermal dimensioning. Self-heating is supposed to approximate 12 K (IP 67 protection) per 1000 rpm. Operating the encoder close to the maximum limits requires measuring the real prevailing temperature at the encoder flange. For the current output (version C4), a load  $>470 \text{ Ohm}$  must be selected when supplied with 24 VDC in order to minimize the self-heating of the encoder and not to exceed the maximum operating temperature. For cable lengths  $>2 \text{ m}$ , a current output (version C4) is to be preferred due to the voltage drop in order to avoid effects on the accuracy.

### Terminal assignment

#### Flange connector M12, 5-pin

Pin	Signals	Description
1	0 V	Supply voltage
2	+Vs	Supply voltage
3	Uout/Iout	Analog output
4	DV	DATAVALID output
5	Teach	Teach input



#### Cable

Core color	Signals	Description
white	0 V	Supply voltage
brown	+Vs	Supply voltage
green	Uout/Iout	Analog output
yellow	DV	DATAVALID output
grey	Teach	Teach input

Cable data:  $5 \times 0.5 \text{ mm}^2$

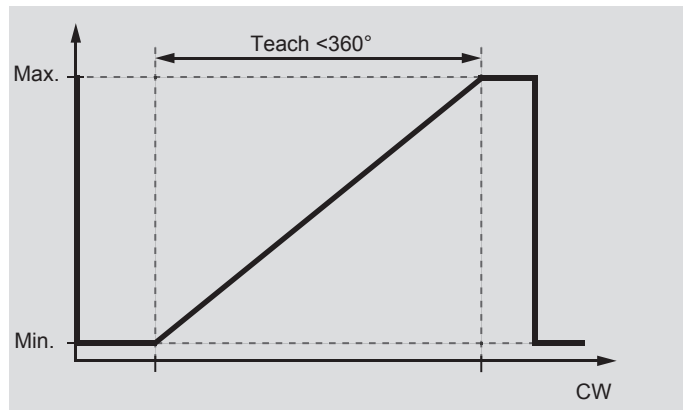
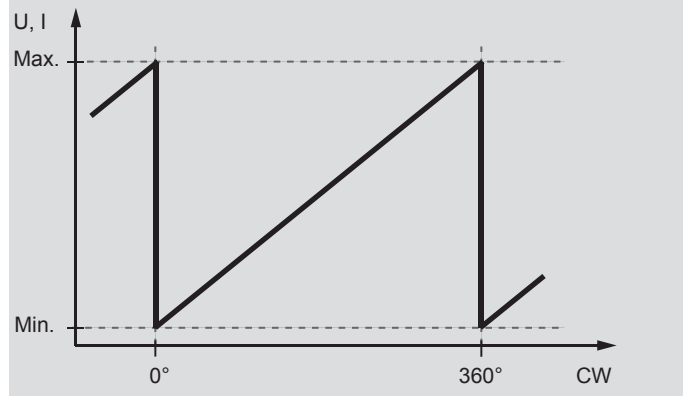
### Terminal significance

Iout	Current output Load: $<500 \text{ }\Omega$
Uout	Voltage output Current output: max. 10 mA Load resistor: $>1 \text{ k}\Omega$ between Uout / 0 V (version 0...10 V) $>2 \text{ k}\Omega$ (version 0.5...4.5 V)
Teach	Teach in Maximum 0...+Vs Level LOW: $<1 \text{ V}$ Level HIGH: $>2.1 \text{ V}$
DV	Diagnostic output/Teach output Function normal operation: DATAVALID (Diagnostic output) Type NPN output, Pull-Up $10 \text{ k}\Omega$ integrated - No error: HIGH - Error: LOW Function teach process: Teach status

### Output signals

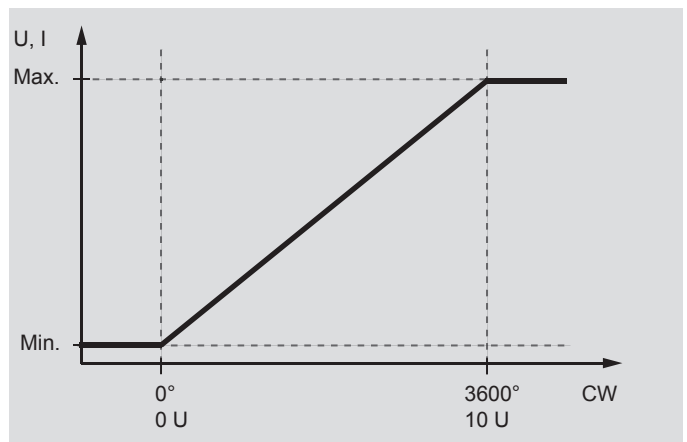
#### Singleturn

Default: CW,  $360^\circ$ , rotating direction and measuring range teachable.



#### Multiturn

Default: CW, 10 turns, rotating direction and measuring range teachable (max. 32767 turns).



Note: The encoder can be mounted at a specific position and set to position 1 by means of factory preset.

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### Teach process

**Activate teach process**

Start teach process within 5 minutes after power on. Set teach input for >5 seconds on HIGH and afterwards on LOW level.  
DV/Status output: Oscillates after 5 seconds.

**Position 1**

Get encoder on position intended for min. voltage output / current output.  
Set teach input for >0.1 seconds on HIGH.  
DV/Status output: Switches to HIGH level for 3 seconds and flashes shortly.

**Position 2**

Get encoder on position intended for max. voltage output / current output.  
Set teach input for >0.1 seconds on HIGH.  
DV/Status output: Switches to HIGH level for 3 seconds and flashes shortly. If measuring range is exceeded or the limits are too close to each other, the teaching process was not successful and has to be repeated.

**Default**

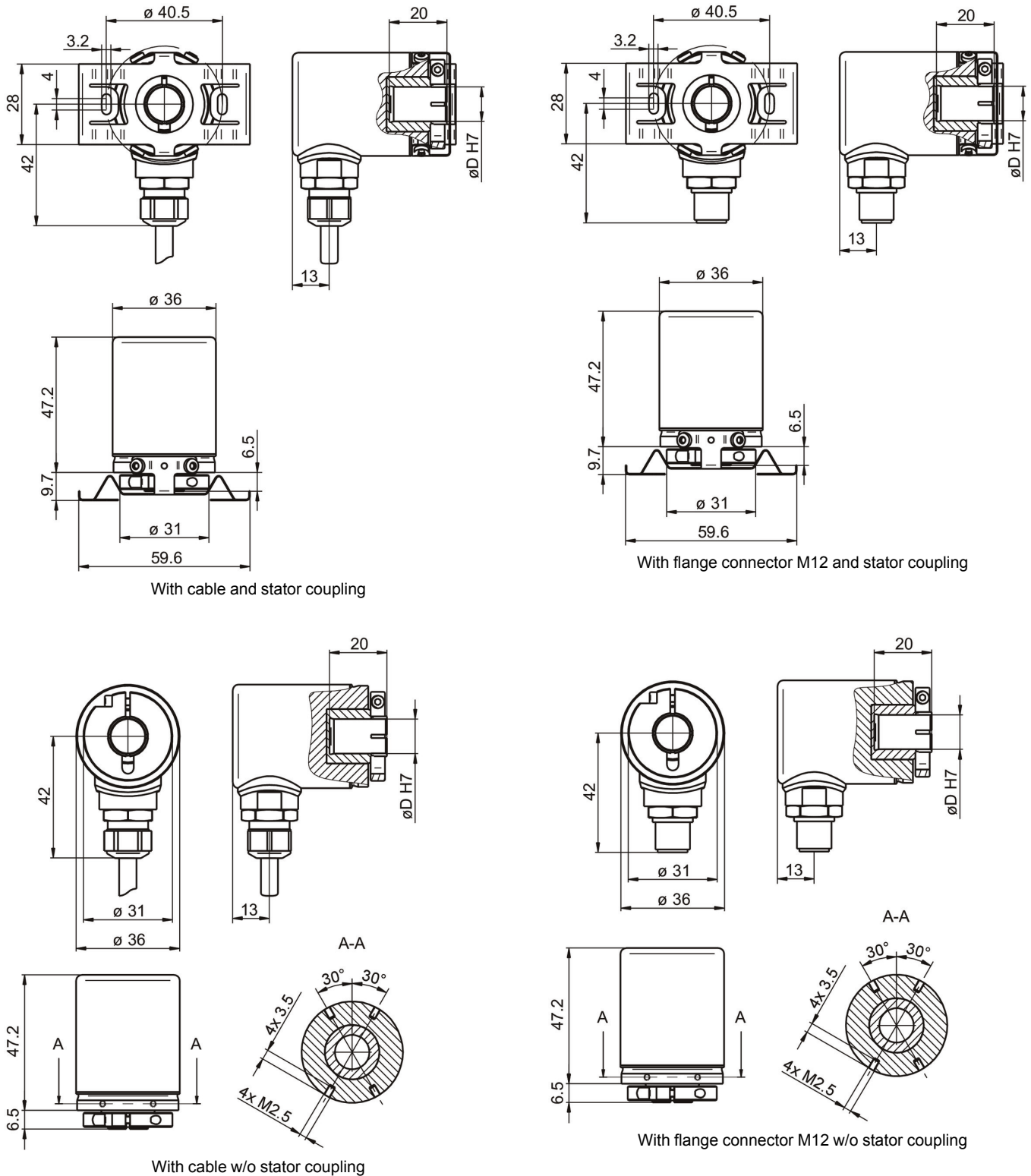
Set teach input for >15 seconds on HIGH.  
DV/Status output: Oscillates after 5 seconds.

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### Dimensions

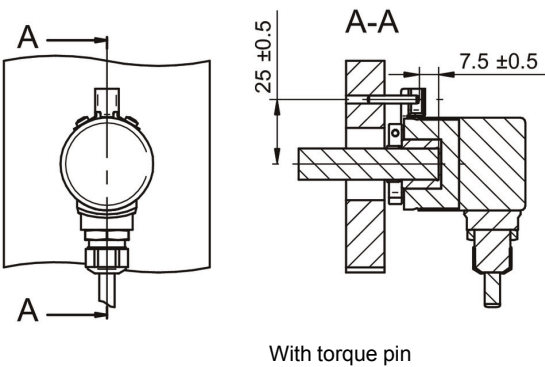
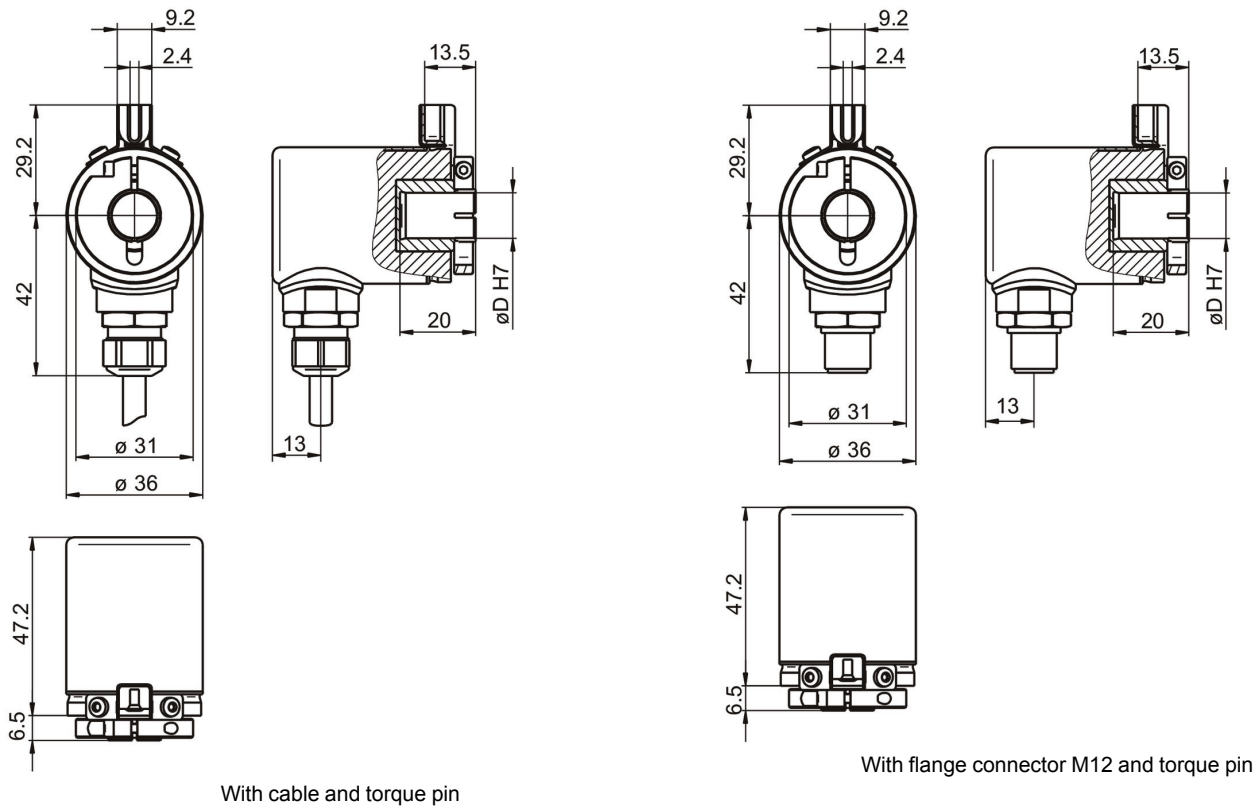


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### Dimensions



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## Ordering reference

	EAM360R	-	B	#	##	.	7	##	##	.	####	1	.	A
<b>Product</b>	EAM360R													
<b>Shaft type</b>														
Blind hollow shaft				B										
<b>Flange (Hollow shaft)</b>														
Without stator coupling				N										
Pin torque support 3 mm, axial/radial				P										
With stator coupling 41 mm				D										
<b>Blind hollow shaft</b>														
ø10 mm, clamping ring, A-side				A										
ø12 mm, clamping ring, A-side				C										
ø14 mm, clamping ring, A-side				E										
ø15 mm, clamping ring, A-side				F										
<b>Protection class</b>														
IP 67							7							
<b>Connection</b>														
Cable radial, 2 m								L						
Flange socket radial, M12, 5-pin, male contacts, A-coded								N						
<b>Voltage supply / interface</b>														
14...30 VDC, current output 4...20 mA									C4					
14...30 VDC, voltage output 0...+10 V									V1					
8...30 VDC, voltage output 0.5...+4.5 V									V3					
<b>Measuring range</b>														
0...360° max												A360		
0...3600°												A36A		
<b>Output characteristics</b>														
One-channel, rising CW													1	
<b>Operating temperature</b>														
-40...+85 °C														

## Accessories

### Connectors and cables

10153968	Female connector M12, 5-pin, straight, without cable
11046266	Female connector M12, 5-pin, straight, shielded, 5 m cable
11144306	Cable with male/female M12, 5-pin, straight, A-coded, 5 m