

# Absolute encoders - analog

Solid shaft with synchro flange

Magnetic single- or multiturn encoders

## EAM360R-S - analog - MAGRES



EAM360R analog with solid shaft

### Features

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

### 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	DIN 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	DIN EN 61000-6-4 CISPR 25:2008 (30..1000 MHz) ISO 7637-2:2004* * Severity level according to ECE R10 (Rev. 4)
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 x 16 mm, solid shaft with flat
Flange	Synchro flange
Protection DIN EN 60529	IP 67 (with shaft seal)
Operating speed	≤6000 rpm
Starting torque	≤2.5 Ncm (+20 °C, IP 67)
Moment of inertia	15.38 gcm <sup>2</sup>
Admitted shaft load	≤40 N axial ≤80 N radial
Materials	Housing: steel, powder-coated Flange: aluminium Shaft: stainless steel
Corrosion protection	IEC 60068-2-52 Salt mist for ambient conditions C5-M (CX) according to ISO 12944-2
Operating temperature	-40...+85 °C (see general information)
Relative humidity	95 %
Resistance	DIN EN 60068-2-6 Vibration 30 g, 10-2000 Hz DIN EN 60068-2-27 Shock 500 g, 1 ms
Weight approx.	170 g
Connection	Flange connector M12, 5-pin Cable 2 m
Instruction	Use in safety functions exclusively based on Application Note and MTTFd reliability prediction (request separately).

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### Part number

EAM360R-S 

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#### Output characteristics

1 Increasing CW

#### Measuring range

A360 0°...360°

A36A 0°...3600°

#### Voltage supply / signals

V3 8...30 VDC / Output 0.5...+4.5 VDC

V1 14...30 VDC / Output 0...+10 VDC

C4 14...30 VDC / Output 4...20 mA

#### Connection

N Flange connector M12, 5-pin, radial, male contacts, CCW

L Cable 2 m, radial

#### Protection

7 IP 67

#### Specification solid shaft

A  $\varnothing 10 \times 16$  mm, with flat

#### Flange

W Synchro flange, flute  $\varnothing 33$  mm, M3

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##### 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

##### 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 8 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.

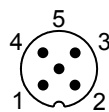
For the current output (version C4), a load >470 Ohm must be selected when supplied with 24 VDC in order to minimize the self-heating of the encoder and not to exceed the maximum operating temperature.

For cable lengths >2 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 x 0.5 mm<sup>2</sup>

##### Terminal significance

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

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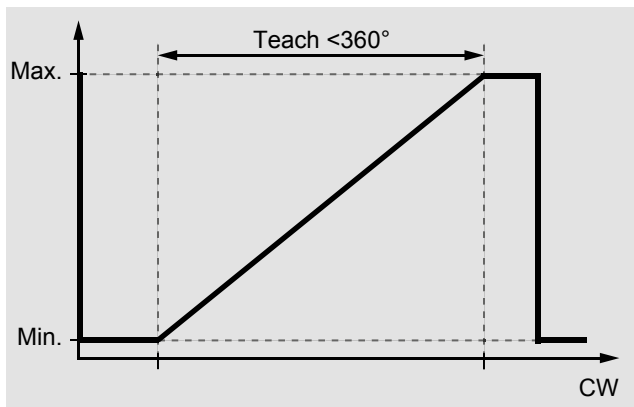
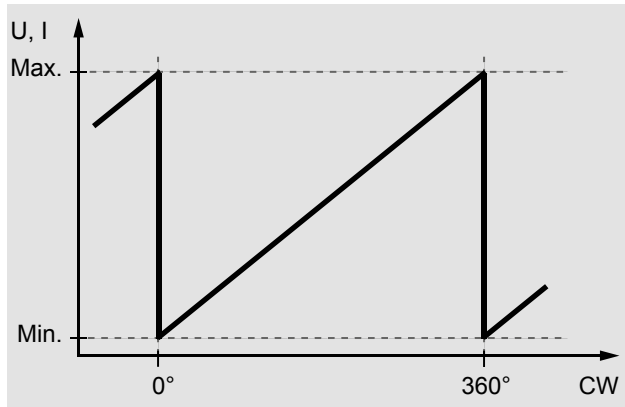
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#### Output signals

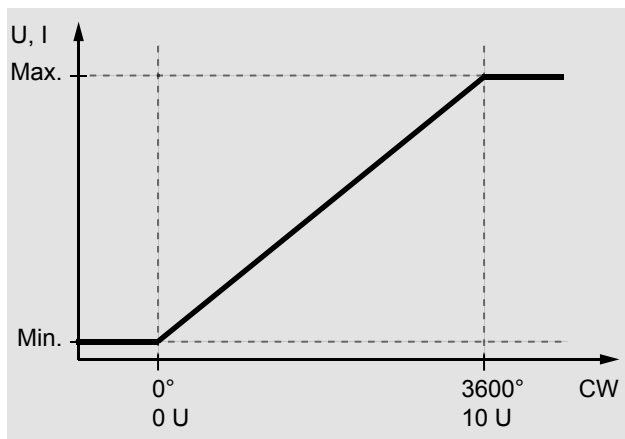
##### Singleturn

Default: CW, 360°, 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.

#### 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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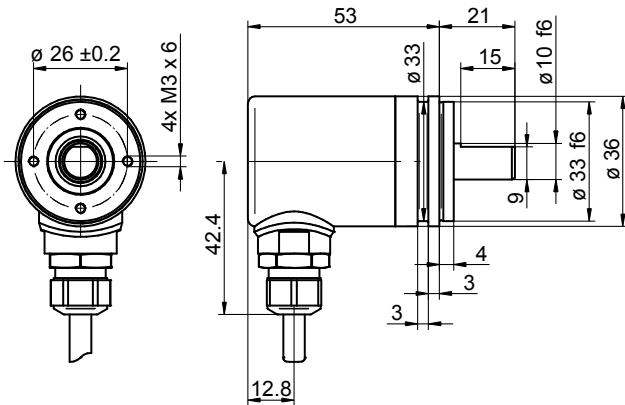
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### Dimensions

EAM360R, cable



EAM360R, M12 radial

