

EAM360R-K - Analog

Encoder kit

Magnetic single- or multiturn encoders

Overview

- Encoder kit 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 mm²
- 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 (see info working distance) |
| 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 _d (ISO 13849) | High (>100 years) Use in safety functions exclusively based on Application Note and MTTF _d reliability prediction (request separately). |
| Programmable parameters | Measuring range teachable |
| Diagnostic function | DATAVALID |
| Factory setting | 360° and 10 revolutions (other on request) |
| Approval | UL approval / E217823 |

Technical data - mechanical design

| | |
|-----------------------|--|
| Size (flange) | ø36 mm |
| Shaft type | ø6 mm (magnet bore) ø8 mm (magnet bore) ø12 mm (magnet bore) |
| Protection EN 60529 | IP 67 |
| Operating speed | ≤6000 rpm |
| Working distance | 1,1 ±0.9 mm axial / ≤0.3 mm eccentricity |
| Material | Housing: steel, powder-coated Flange: aluminium |
| 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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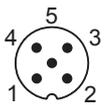
General information

Self-heating correlated to installation and ambient conditions as well as to electronics and supply voltage must be considered for precise thermal dimensioning. 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 mm²

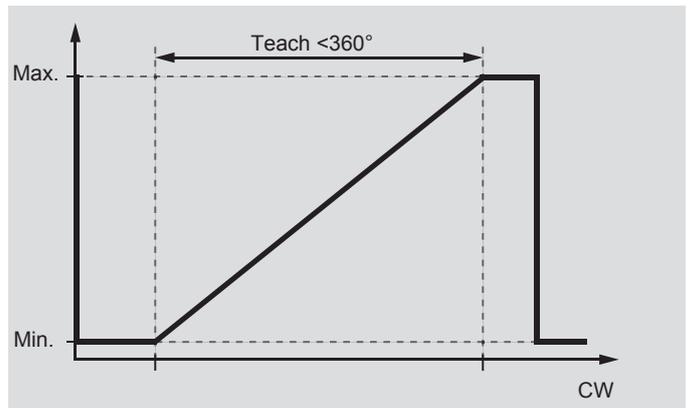
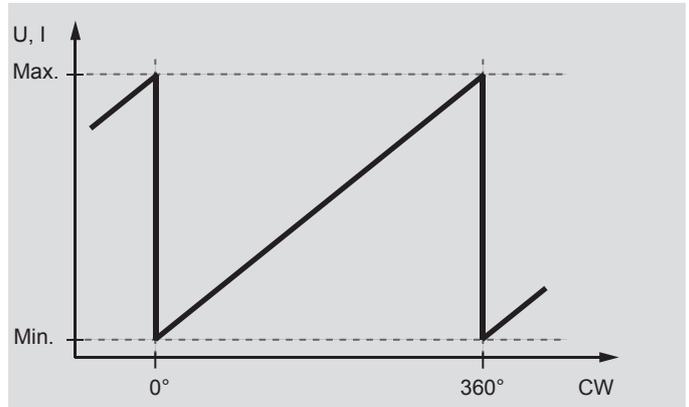
Terminal significance

| | |
|-------|--|
| 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 |

Output signals

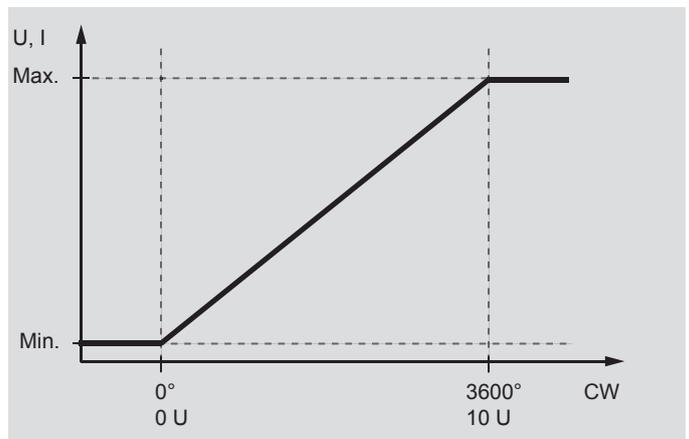
Singleturn

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.

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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

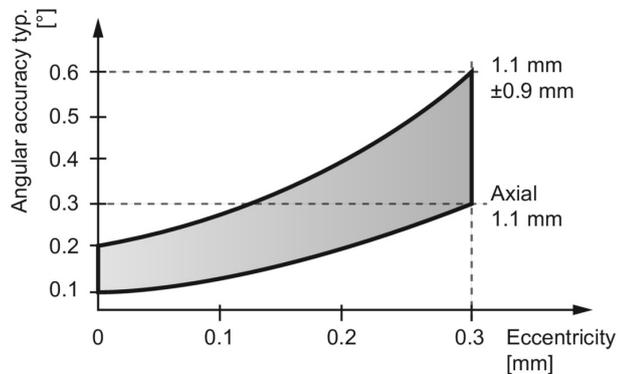
Get encoder on position intended for max. voltage output / current output.
Set teach input for >0.1 seconds on HIGH.
DV/Status output: Switches to HIGH level for 3 seconds and flashes shortly. If measuring range is exceeded or the limits are too close to each other, the teaching process was not successful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

Default

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

Working distance

The ideal working distance of the magnet related to the encoder is at an eccentricity of 0 mm and an axial distance of 1.1 mm. Deviation affects the accuracy as shown in following diagram.



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Ordering reference

| | EAM360R | - | K | W | ## | . | 7 | # | ## | . | #### | 1 | . | A |
|--------------------------------------|--|---|---|---|----|---|---|---|----|----|------|---|------|---|
| Product | EAM360R | | | | | | | | | | | | | |
| Shaft type | Kit | | K | | | | | | | | | | | |
| Flange (kit) | Synchro flange, ø33 mm, M3 | | | W | | | | | | | | | | |
| Magnet holder / bore diameter | ø6 mm | | | | 6 | | | | | | | | | |
| | ø8 mm | | | | 8 | | | | | | | | | |
| | ø12 mm | | | | C | | | | | | | | | |
| Protection class | IP 67 | | | | | | 7 | | | | | | | |
| Connection | Cable radial, 2 m | | | | | | | | L | | | | | |
| | Flange socket radial, M12, 5-pin, male contacts, A-coded | | | | | | | | N | | | | | |
| Voltage supply / interface | 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 | | | | |
| Measuring range | 0...360° | | | | | | | | | | | | A360 | |
| | 0...3600° | | | | | | | | | | | | A36A | |
| Output characteristics | One-channel, rising CW | | | | | | | | | | | | | 1 |
| Operating temperature | -40...+85 °C | | | | | | | | | | | | | |

Accessories

Connectors and cables

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