



Model Number

ENA36HD-S10SA9-0413I42-RBD

Features

- Very small housing
- Analog interface
- 13 bit overall resolution
- Free of wear magnetic sampling
- High climatic resistance

Description

This absolute encoder with internal magnetic sampling is available with an analog voltage output or an analog current output. Depending on the model, the analog output provides a voltage value or a current value corresponding to the shaft setting.

Technical Data

General specifications

| | |
|-------------------|---|
| Detection type | magnetic sampling |
| Device type | Absolute encoders |
| Measurement range | min. 0 ... 22.5 ° max. 65536 x 360 ° factory setting: 16 x 360° |
| Resolution | 13 Bit |
| UL File Number | E223176 "For use in NFPA 79 Applications only", if UL marking is marked on the product. |

Functional safety related parameters

| | |
|--------------------------------|--------------------|
| MTTF _d | 480 a at 40 °C |
| Mission Time (T _M) | 20 a |
| L ₁₀ | 10 E+8 revolutions |
| Diagnostic Coverage (DC) | 0 % |

Electrical specifications

| | |
|----------------------------------|----------------------------------|
| Operating voltage U _B | 8 ... 32 V DC |
| Current consumption | typ. 20 mA (with current output) |

Input 1

| | |
|-----------------|----------------------------------|
| Input type | lower limit of measurement range |
| Signal voltage | |
| High | 8 ... 32 V DC |
| Signal duration | ≥ 1 s |

Input 2

| | |
|-----------------|----------------------------------|
| Input type | upper limit of measurement range |
| Signal voltage | |
| High | 8 ... 32 V DC |
| Signal duration | ≥ 1 s |

Analog output

| | |
|-----------------|-----------------------------|
| Output type | analog current output |
| Default setting | rising ramp at ccw rotation |
| Linearity error | ≤ 0.15 % |
| Load resistor | max. 500 Ω |

Connection

| | |
|-----------|----------------------|
| Connector | M12 connector, 5 pin |
|-----------|----------------------|

Standard conformity

| | |
|----------------------|--|
| Degree of protection | DIN EN 60529 , IP68 / IP69K |
| Climatic testing | DIN EN 60068-2-3, no moisture condensation |
| Emitted interference | EN 61000-6-4:2007 |
| Noise immunity | EN 61000-6-2:2005 |
| Shock resistance | DIN EN 60068-2-27, 200 g, 11 ms |
| Vibration resistance | DIN EN 60068-2-6, 30 g, 10 ... 1000 Hz |

Ambient conditions

| | |
|-----------------------|---------------------------------|
| Operating temperature | -40 ... 85 °C (-40 ... 185 °F) |
| Storage temperature | -40 ... 85 °C (-40 ... 185 °F) |
| Relative humidity | 98 % , no moisture condensation |

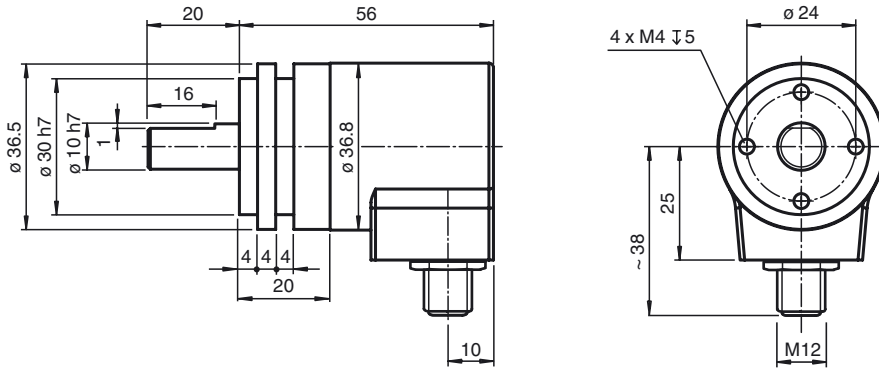
Mechanical specifications

| | |
|-------------------|-----------------------------|
| Material | |
| Housing | Steel , corrosion-resistant |
| Flange | Aluminum |
| Shaft | Stainless steel |
| Mass | approx. 150 g |
| Rotational speed | max. 6000 min ⁻¹ |
| Moment of inertia | 30 gcm ² |
| Starting torque | < 5 Ncm |
| Shaft load | |
| Axial | 180 N |
| Radial | 180 N |

Approvals and certificates

| | |
|-------------|---|
| UL approval | cULus Listed, General Purpose, Class 2 Power Source , if UL marking is marked on the product. |
|-------------|---|

Dimensions



Electrical connection

| Signal | M12 connector |
|---------------------------|---------------|
| Analog output | 1 |
| +V _s (encoder) | 2 |
| GND (encoder) | 3 |
| Set 2 | 4 |
| Set 1 | 5 |
| Shielding | Housing |
| Pinout | |

Description of rotary encoder functions

Default Settings

| | Lower measuring range limit | Mid measuring range | Upper measuring range limit |
|------------------------------------|-----------------------------|---------------------|-----------------------------|
| Singleturn absolute rotary encoder | 0 | 180° | 360° |
| Multiturn absolute rotary encoder | 0 | 8 x 360° | 16 x 360° |

Programming Encoders with No Operating Buttons

Scaling the measuring range

Use signal inputs "Set 1" and "Set 2" to scale the measuring range (minimum measuring range: 22.5°).

1. Connect signal inputs "Set 1" and "Set 2" simultaneously to +U_B for 15 seconds. The programming mode is activated now.
2. Turn the rotary encoder shaft to position 1 (lower measuring range limit).
3. Connect signal input "Set 1" to a high-potential source (+U_{B min} ≤ high potential ≤ +U_{B max}) for 1 second.
4. Connect signal input "Set 1" to ground
5. Turn the rotary encoder shaft to position 2 (upper measuring range limit).
6. Connect signal input "Set 2" to a high-potential source (+U_{B min} ≤ high potential ≤ +U_{B max}) for 1 second.
7. Connect signal input "Set 2" to ground

The analog output is now scaled to the programmed measuring range and the rotary encoder will operate in normal mode.

Resetting to the Default Setting

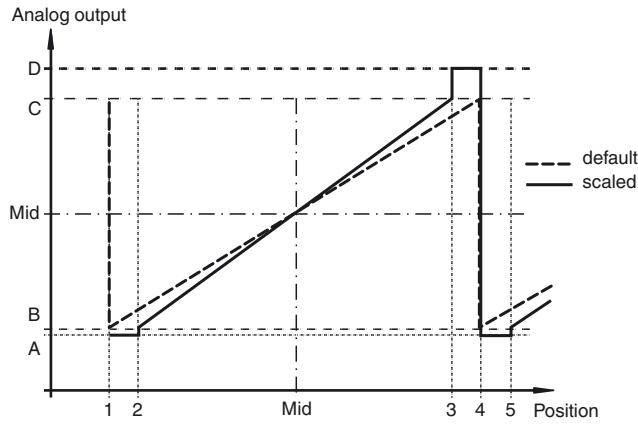
1. Connect the two signal inputs ("Set 1" and "Set 2") to a high-potential source (+U_{B min} ≤ high potential ≤ +U_{B max}) for 1 second.

The measuring range is then reset to the default setting.

Analog Output Properties

The rotary encoder projects the current angular position of the rotary encoder shaft in an analog current value. The following graphic shows the values the output accepts at the various angular positions:

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Legend:

| Encoder type ¹⁾ | | Angular position | | | | | |
|----------------------------|-------------------------|------------------|-----------------------------|-----------------------|-----------------------------|-----------------------|-----------------------------|
| | | 1 | 2 | Mid | 3 | 4 | 5 |
| Singleturn | Factory default setting | 0° | - | 180° | - | 360° | - |
| | Scaled | 0° | Lower measuring range limit | - | Upper measuring range limit | 360° | Lower measuring range limit |
| Multiturn | Factory default setting | 0° | - | 2 ⁴ x 180° | - | 2 ⁴ x 360° | - |
| | Scaled ²⁾ | 0° | Lower measuring range limit | - | Upper measuring range limit | 2 ⁿ x 360° | Lower measuring range limit |

n = whole number from 1 to 16

1) See model number

2) Overflow at 360°, 720°, 1440°, 2880°, 5760°, etc. depending on the scale set.

| Encoder output type | Analog output value | | | | |
|---------------------|---------------------|------|-------|-------|-------|
| | A | B | Mid | C | D |
| 4 mA ... 20 mA | 3.6 mA | 4 mA | 12 mA | 20 mA | 22 mA |