## Technical Data

### General specifications
- **Detection type**: magnetic sampling
- **Device type**: Absolute encoders
- **Linearity error**: $\leq 0.1^\circ$
- **UL File Number**: E223176 "For use in NFPA 79 Applications only", if UL marking is marked on the product.

### Functional safety related parameters
- **MTTFd**: 480 h at 40 °C
- **Mission Time (TM)**: 20 a
- **t10**: 40 E-8 revolutions at 20/40 N axial/radial shaft load
- **Diagnostic Coverage (DC)**: 0 %

### Electrical specifications
- **Operating voltage $U_{B}$**: 9 ... 30 V DC (with galvanic isolation)
- **Power consumption $P_{0}$**: $\leq 1.2$ W
- **Time delay before availability $t_{v}$**: $< 250$ ms
- **Output code**: binary code
- **Code course (counting direction)**: adjustable

### Interface
- **Interface type**: CANopen
- **Resolution**
  - Single turn: up to 16 Bit
  - Multiturn: up to 15 Bit
  - Overall resolution: up to 31 Bit
- **Cycle time**: $\geq 1$ ms
- **Standard conformity**: DSP 406

### Connection
- **Connector**: M12 connector, 5 pin
- **Cable**: Ø6 mm, 4 x 2 x 0.14 mm²
- **Degree of protection**: DIN EN 60529, IP65 or IP54
- **Climatic testing**: DIN EN 60068-2-3, no moisture condensation
- **Noise immunity**: EN 61000-6-2:2005
- **Shock resistance**: DIN EN 60068-2-27, 200 g, 6 ms
- **Vibration resistance**: DIN EN 60068-2-6, 20 g, 10 ... 1000 Hz

### Ambient conditions
- **Operating temperature**
  - Cable, flexing: $-5 ... 70^\circ$ C (23 ... 158 °F)
  - Cable, fixed: $-30 ... 70^\circ$ C (-22 ... 158 °F)
- **Climatic testing**
  - Connector models: $-40 ... 85^\circ$ C (-40 ... 185 °F)
- **Storage temperature**: $-40 ... 85^\circ$ C (-40 ... 185 °F)
- **Relative humidity**: 98 %, no moisture condensation

### Mechanical specifications
- **Material**
  - **Housing**: nickel-plated steel
  - **Flange**: Aluminum
  - **Shaft**: Stainless steel
  - **Mass**: approx. 150 g
  - **Rotational speed**: max. 12000 min$^{-1}$
  - **Moment of inertia**: 30 g cm²
  - **Starting torque**: < 3 Ncm
- **Shaft load**
  - **Axial**: 20 N
  - **Radial**: 40 N

### Approvals and certificates
- **UL approval**: cULus Listed, General Purpose, Class 2 Power Source, if UL marking is marked on the product.

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### Model Number
ENA36IL-S***-CANopen

### Features
- Very small housing
- Up to 31 bit overall resolution
- CANopen interface
- Free of wear magnetic sampling
- High resolution and accuracy

### Description
This absolute rotary encoder provides a position value corresponding to the shaft position on its integrated CAN bus interface. The integrated CAN-bus interface supports all CANopen functions. Thus the following modes can be programmed to either enabled or disabled:
- Polled Mode
- Cyclic Mode
- Sync Mode
### Dimensions

<table>
<thead>
<tr>
<th>Degree of Protection</th>
<th>Axial Output</th>
<th>Radial Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP54</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>IP65</td>
<td>43</td>
<td>39</td>
</tr>
</tbody>
</table>

Output, axial, IP65

Output, radial, IP65
Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

Absolute encoders ENA36IL-S***-CANopen

Output, axial, IP65

Output, radial, IP65

Output, axial, IP54
**Electrical connection**

<table>
<thead>
<tr>
<th>Signal</th>
<th>Wire end</th>
<th>5-pin, M12 x 1 connector</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN GND</td>
<td>green</td>
<td>1</td>
</tr>
<tr>
<td>+V2</td>
<td>red</td>
<td>2</td>
</tr>
<tr>
<td>GND</td>
<td>yellow</td>
<td>3</td>
</tr>
<tr>
<td>CAN-High</td>
<td>white</td>
<td>4</td>
</tr>
<tr>
<td>CAN-Low</td>
<td>brown</td>
<td>5</td>
</tr>
<tr>
<td>Shielding</td>
<td>Shielding</td>
<td>Housing</td>
</tr>
</tbody>
</table>

**Pinout**

```
2
3
4
5
34.5
10
```
### LED-indicator with dual color LED

<table>
<thead>
<tr>
<th>CAN Run (green)</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blinking</td>
<td>Pre-Operational</td>
<td>Boot up message is sent, device configuration is possible, device is in CAN state „Pre-Operational“</td>
</tr>
<tr>
<td>Single flash</td>
<td>Stopped</td>
<td>The Encoder is in CAN state „Stopped“</td>
</tr>
<tr>
<td>On</td>
<td>Operational</td>
<td>The encoder is in CAN state „Operational“</td>
</tr>
<tr>
<td>Off</td>
<td></td>
<td>No power supply</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Err (red)</th>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No error</td>
<td>The Encoder is in operating mode</td>
</tr>
<tr>
<td>Flickering</td>
<td>AutoBitrate</td>
<td>Auto baud mode is active and the encoder tries to find within the time out period a valid CAN message for baud rate measurement</td>
</tr>
<tr>
<td>Single flash</td>
<td>Warning limit reached</td>
<td>At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames)</td>
</tr>
<tr>
<td>Double flash</td>
<td>Error control event</td>
<td>A guard event (NTM slave or NTM master) or a heartbeat event has occured</td>
</tr>
<tr>
<td>On</td>
<td>Bus off</td>
<td>The CAN controller is in state bus off. No communication possible anymore. Too many error frames in the network.</td>
</tr>
</tbody>
</table>
### Programmable CAN operating modes

<table>
<thead>
<tr>
<th>Mode</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polled mode</td>
<td>The connected host requests the current actual position value via a remote transmission request telegram. The absolute encoder reads in the current position, calculates all parameters that have been set and sends back the process actual value through the same CAN identifier.</td>
</tr>
<tr>
<td>Cyclic mode</td>
<td>The absolute encoder sends the current actual process value cyclically, without being prompted by the host. The cycle time can be programmed in milliseconds for values between 1 ms and 65536 ms.</td>
</tr>
<tr>
<td>Sync mode</td>
<td>After the sync telegram has been received by the host, the absolute encoder sends the current actual process value. If multiple nodes should respond to the sync telegram, the individual nodes report one after the other according to their CAN identifier. There is no programming of an offset time. The sync counter can be programmed so that the rotary encoder does not transmit until after a defined number of sync telegrams.</td>
</tr>
</tbody>
</table>

### Programmable rotary encoder parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating parameter</td>
<td>The direction of rotation (complement) can be specified by parameter as the operating parameter. This parameter determines the direction of rotation in which the output code will ascend or descend.</td>
</tr>
<tr>
<td>Resolution per revolution</td>
<td>The &quot;Resolution&quot; parameter is used to program the rotary encoder so that a desired number of steps can be implemented in reference to one revolution.</td>
</tr>
<tr>
<td>Preset value</td>
<td>The preset value is the desired position value that must be achieved for a specific physical setting of the axis. The preset value parameter is used to set the actual position value to the desired actual process value.</td>
</tr>
<tr>
<td>Min. and max. limit switch</td>
<td>A total of two positions can be programmed. The absolute encoder sets one bit to high state in the 32 Bit actual process value if a value falls outside the range between these two positions.</td>
</tr>
<tr>
<td>Cam</td>
<td>8 freely programmable cams can be set within the overall resolution. This produces the functionality of a mechanical cam shifting mechanism.</td>
</tr>
</tbody>
</table>
## Model number

<table>
<thead>
<tr>
<th>ENA36IL-S06SA-B16-</th>
<th></th>
</tr>
</thead>
</table>

### Connection type
- **C1**: Cable, 1 m
- **C2**: Cable, 2 m
- **C5**: Cable, 5 m
- **CA**: Cable, 10 m
- **BD**: M12 device plug, 5-pin

### Interface, electric
- **B16**: CANopen, $U_B = 9 \ldots 30$ V

### Singleturn resolution
- 13 bit
- 16 bit

### Multiturn resolution
- 00: Singleturn rotary encoder
- 12: Multiturn rotary encoder, 12 bit
- 13: Multiturn rotary encoder, 13 bit
- 14: Multiturn rotary encoder, 14 bit
- 15: Multiturn rotary encoder, 15 bit

### Degree of protection
- **4**: IP54 (with cable only)
- **5**: IP65

### Flange
- **SA**: Servo flange

### Shaft diameter
- 06: 6 mm

### Shaft type
- **S**: Solid shaft

### Version
- **IL**: Industrial Line

### Size
- 36: Housing diameter: 36 mm

### Device type
- **ENA**: Absolute rotary encoder

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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Revised date: 2019-04-25 11:26:03, eng.xml