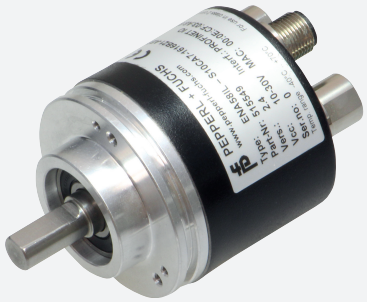
# Absolute rotary encoder

# ENA58IL-S***-EtherCAT

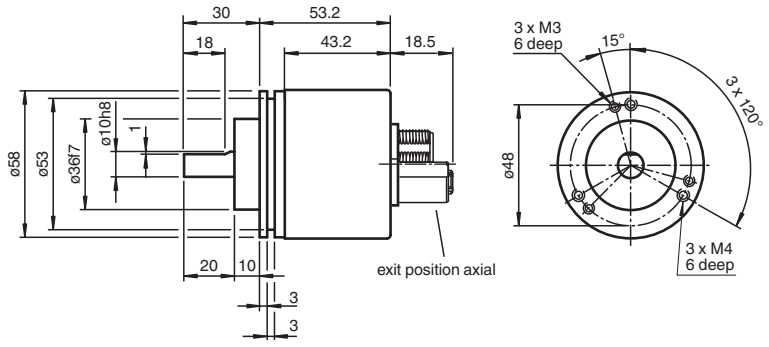


- Solid shaft
- 30 Bit multiturn
- Free of wear magnetic sampling
- High resolution and accuracy
- Mechanical compatibility with all major encoders with fieldbus interface
- Status LEDs

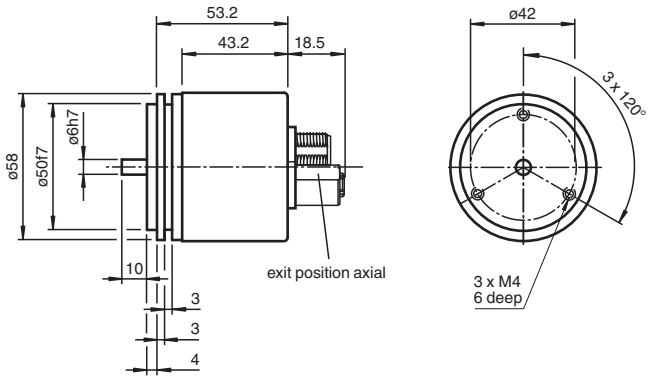
## Function

The ENA58IL series are high precision encoders with internal magnetic sampling.

## Dimensions




Clamping flange




Servo flange

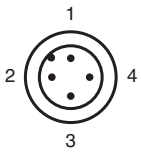
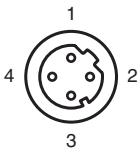
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## Technical Data

| | | |
|---|---|---|
| **General specifications** | | |
| Detection type | | magnetic sampling |
| Device type | | Absolute rotary encoder |
| Linearity error | | ≤ ± 0.1 ° |
| UL File Number | | E223176 "For use in NFPA 79 Applications only" , if UL marking is marked on the product. |
| **Electrical specifications** | | |
| Operating voltage | $U_B$ | 10 ... 30 V DC |
| Power consumption | $P_0$ | approx. 4 W |
| Time delay before availability | $t_v$ | < 250 ms |
| Output code | | binary code |
| Code course (counting direction) | | adjustable |
| **Interface** | | |
| Interface type | | EtherCAT®<br>CoE (CANopen over EtherCAT, according to CiA DS-301 and DS-406 device profile CiA) |
| Resolution | | |
| Single turn | | up to 16 Bit |
| Multiturn | | up to 14 Bit |
| Overall resolution | | up to 30 Bit |
| Transfer rate | | 10 MBit/s / 100 MBit/s |
| **Connection** | | |
| Connector | | Ethernet: 2 sockets M12 x 1, 4-pin, D-coded<br>Supply: 1 plug M12 x 1, 4-pin, A-coded |
| **Standard conformity** | | |
| Degree of protection | | DIN EN 60529, IP65, IP67 |
| 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, 100 *g*, 6 ms |
| Vibration resistance | | DIN EN 60068-2-6, 10 *g*, 10 ... 1000 Hz |
| **Approvals and certificates** | | |
| UL approval | | cULus Listed, General Purpose, Class 2 Power Source , if UL marking is marked on the product. |
| **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 | | Zinc plated steel, painted |
| Flange | | Aluminum |
| Shaft | | Stainless steel |
| Mass | | approx. 300 g |
| Rotational speed | | max. 12000 $min^{-1}$ |
| Moment of inertia | | 50 $gcm^2$ |
| Starting torque | | < 5 Ncm |
| Shaft load | | |
| Axial | | 40 N |
| Radial | | 110 N |

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## Connection

| Pin | Male connector M12 x 1, 4-pin, A-coded | Female connector M12 x 1, 4-pin, D-coded |
|---|---|---|
| 1 | Supply voltage +$U_B$ | Tx + |
| 2 | - | Rx + |
| 3 | 0 V | Tx - |
| 4 | - | Rx - |
| |  |  |





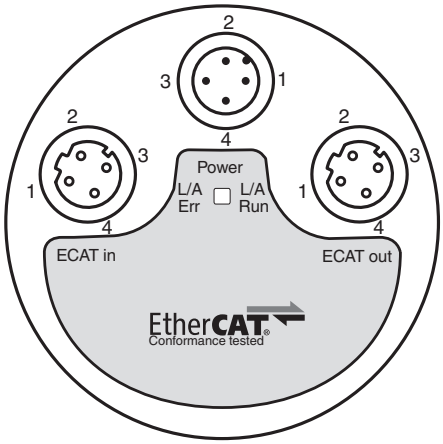
## Indication

**Port LEDs**

| LED | Color | Status | Description |
|---|---|---|---|
| Link/Act IN | green | on | LINK active for HUB port 1 |
| | | blinking | Activity on HUB port 1 |
| Link/Act OUT | green | on | LINK active for HUB port 2 |
| | | blinking | Activity on HUB port 2 |

**EtherCAT LEDs**

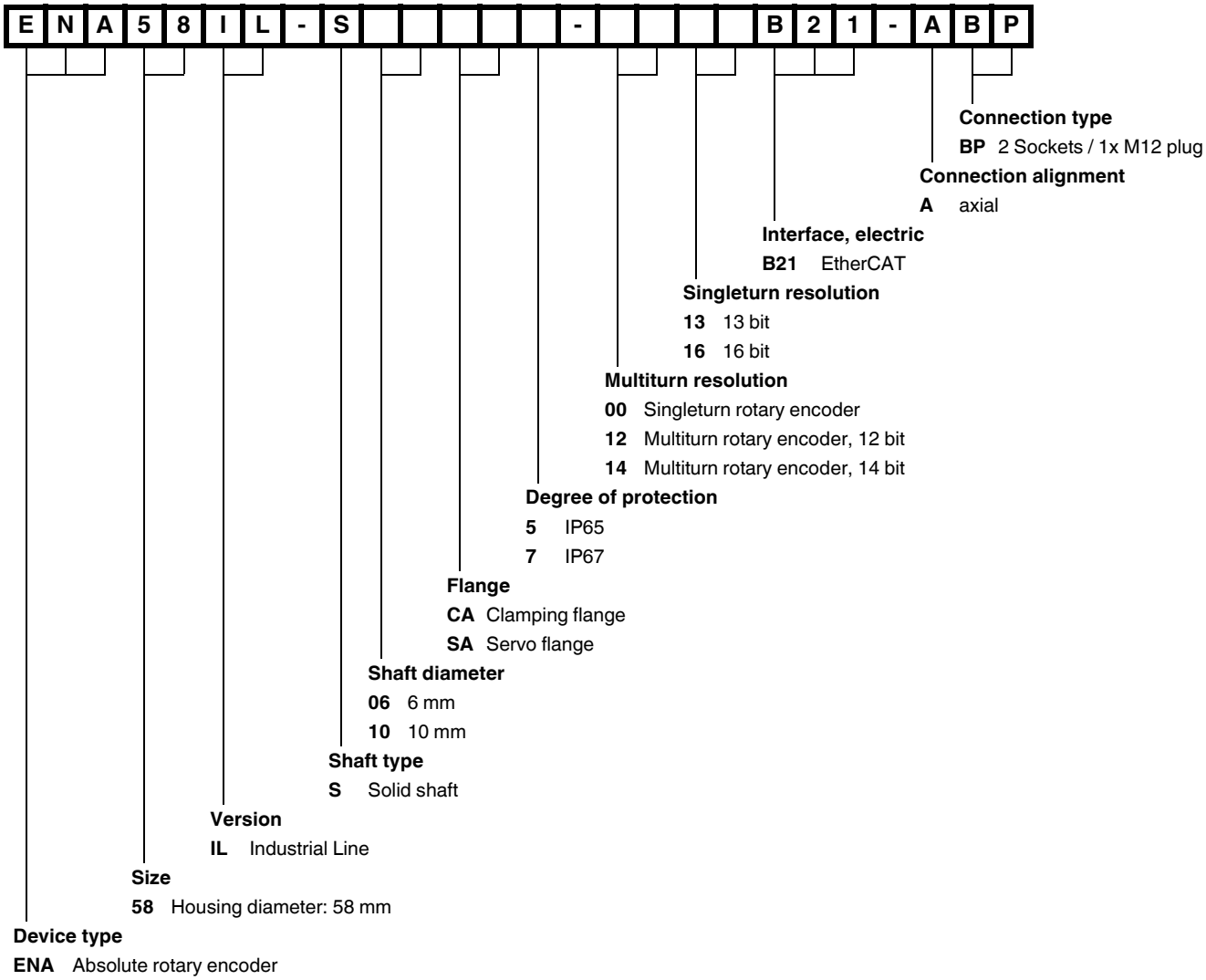
| LED | Color | Status | Description |
|---|---|---|---|
| Error | red | off | no error |
| | | blinking | invalid configuration |
| | | single flash | local error |
| | | double flash | process data watchdog timeout/ EtherCAT watchdog timeout |
| | | flickering | booting error |
| | | on | application failure |
| Run | green | off | initialization |
| | | blinking | Pre-Operational |
| | | single flash | Safe-Operational |
| | | flickering | initialization or bootstrap |
| | | on | Operational |





## Type Code

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## Installation

### Anti-interference measures

The use of highly sophisticated microelectronics requires a consistently implemented anti-interference and wiring concept. This becomes all the more important the more compact the constructions are and the higher the demands are on the performance of modern machines.

The following installation instructions and proposals apply for "normal industrial environments". There is no ideal solution for all interfering environments.

When the following measures are applied, the encoder should be in perfect working order:

- Termination of the serial line with a 120 Ω resistor (between Receive/Transmit and Receive/Transmit) at the beginning and end of the serial line (e. g. the control and the last encoder).
- The wiring of the encoder should be laid at a large distance to energy lines which could cause interferences.
- Cable cross-section of the screen at least 4 $mm^2$.
- Cable cross-section at least 0,14 $mm^2$.
- The wiring of the screen and 0 V should be arranged radially, if and when possible.
- Do not kink or jam the cables.
- Adhere to the minimum bending radius as given in the data sheet and avoid tensile as well as shearing load.

### Operating instructions

Every encoder manufactured by Pepperl+Fuchs leaves the factory in a perfect condition. In order to ensure this quality as well as a faultless operation, the following specifications have to be taken into consideration:

- Avoid any impact on the housing and in particular on the encoder shaft as well as the axial and radial overload of the encoder shaft.
- The accuracy and service life of the encoder is guaranteed only, if a suitable coupling is used.
- The operating voltage for the encoder and the follow-up device (e. g. control) has to be switched on and off simultaneously.
- Any wiring work has to be carried out with the system in a dead condition.
- The maximum operating voltages must not be exceeded. The devices have to be operated at extra-low safety voltage.

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### Notes on connecting the electric screening

The immunity to interference of a plant depends on the correct screening. In this field installation faults occur frequently. Often the screen is applied to one side only, and is then soldered to the earthing terminal with a wire, which is a valid procedure in LF engineering. However, in case of EMC the rules of HF engineering apply.

One basic goal in HF engineering is to pass the HF energy to earth at an impedance as low as possible as otherwise energy would discharge into the cable. A low impedance is achieved by a large-surface connection to metal surfaces.

The following instructions have to be observed:

- Apply the screen on both sides to a "common earth" in a large surface, if there is no risk of equipotential currents.
- The screen has to be passed behind the insulation and has to be clamped on a large surface below the tension relief.
- In case of cable connections to screw-type terminals, the tension relief has to be connected to an earthed surface.
- If plugs are used, metallised plugs only should be fitted (such as sub D plugs with metallised housing). Please observe the direct connection of the tension relief to the housing.

| | |
|---|---|
| Advantage: | metalised connector, shield clamped with the strain relief clamp |
| Disadvantage: | soldering shield on |



## Safety instructions

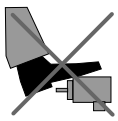
Please observe the national safety and accident prevention regulations as well as the subsequent safety instructions in these operating instructions when working on encoders.

If failures cannot be remedied, the device has to be shut down and has to be secured against accidental operation.

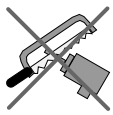
Repairs may be carried out only by the manufacturer. Entry into and modifications of the device are not permissible.

Tighten the clamping ring only, if a shaft has been fitted in the area of the clamping ring (hollow shaft encoders).

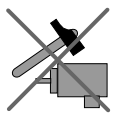
Tighten all screws and plug connectors prior to operating the encoder.



Do not stand on the encoder!



Do not remachine the drive shaft!



Avoid impact!



Do not remachine the housing!

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