

# Absolute encoders

## ENA58IL-R\*\*\*-EtherCAT



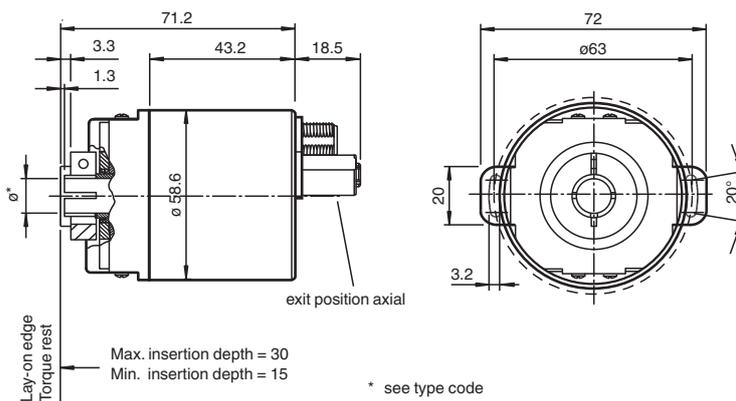
- Recessed hollow shaft
- 30 Bit multiturn
- Free of wear magnetic sampling
- High resolution and accuracy
- Mechanical compatibility with all major encoders with fieldbus interface
- Status LEDs



### Function

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

### Dimensions



Recessed hollow shaft

### Technical Data

#### General specifications

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

#### Functional safety related parameters

MTTF <sub>d</sub>	256 a at 40 °C
Mission Time (T <sub>M</sub> )	12 a
L <sub>10</sub>	5 E+8 revolutions at 24/198 N axial/radial shaft load
Diagnostic Coverage (DC)	0 %

#### Electrical specifications

Operating voltage	U <sub>B</sub>	10 ... 30 V DC
Power consumption	P <sub>0</sub>	approx. 4 W

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

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## Technical Data

Time delay before availability	$t_v$	< 250 ms
Output code		binary code
Code course (counting direction)		adjustable
<b>Interface</b>		
Interface type		EtherCAT 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
<b>Connection</b>		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
<b>Standard conformity</b>		
Degree of protection		DIN EN 60529, IP65, IP66, 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
<b>Approvals and certificates</b>		
UL approval		cULus Listed, General Purpose, Class 2 Power Source , if UL marking is marked on the product.
<b>Ambient conditions</b>		
Operating temperature		-40 ... 85 °C (-40 ... 185 °F)
Storage temperature		-40 ... 85 °C (-40 ... 185 °F)
Relative humidity		98 % , no moisture condensation
<b>Mechanical specifications</b>		
Material		
Housing		Zinc plated steel, painted
Flange		Aluminum
Shaft		Stainless steel
Mass		approx. 300 g
Rotational speed		max. 12000 min <sup>-1</sup>
Moment of inertia		50 gcm <sup>2</sup>
Starting torque		< 5 Ncm
Shaft load		
Axial		24 N
Radial		198 N
Angle offset		± 0.9 °
Axial offset		± 0.3 mm static
Radial offset		± 0.5 mm static

## Accessories

	<b>9108, 6</b>	Measuring wheel
	<b>9109, 6</b>	Measuring wheel for shaft diameter 6 mm
	<b>9110, 6</b>	Measuring wheel for shaft diameter 6 mm

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**Accessories**

	<b>9113, 6</b>	Measuring wheel for shaft diameter 6 mm
	<b>ACC-PACK-ABS-_S_58 ø15</b>	Accessories set for Ø58 absolut rotary encoder with recessed hollow shaft 15 mm
	<b>ACC-PACK-ABS-_S_58 ø14</b>	Accessories set for Ø58 absolut rotary encoder with recessed hollow shaft 14 mm
	<b>ACC-PACK-ABS-_S_58 ø12</b>	Accessories set for Ø58 absolut rotary encoder with recessed hollow shaft 12 mm
	<b>ACC-PACK-ABS-_S_58 ø10</b>	Accessories set for Ø58 absolut rotary encoder with recessed hollow shaft 10 mm

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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 <sub>B</sub>	Tx +
2	-	Rx +
3	0 V	Tx -
4	-	Rx -

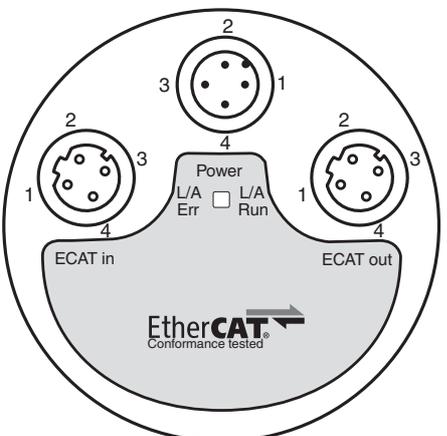
**Indication**

**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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- 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.

**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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