

Cable pull rotary encoder

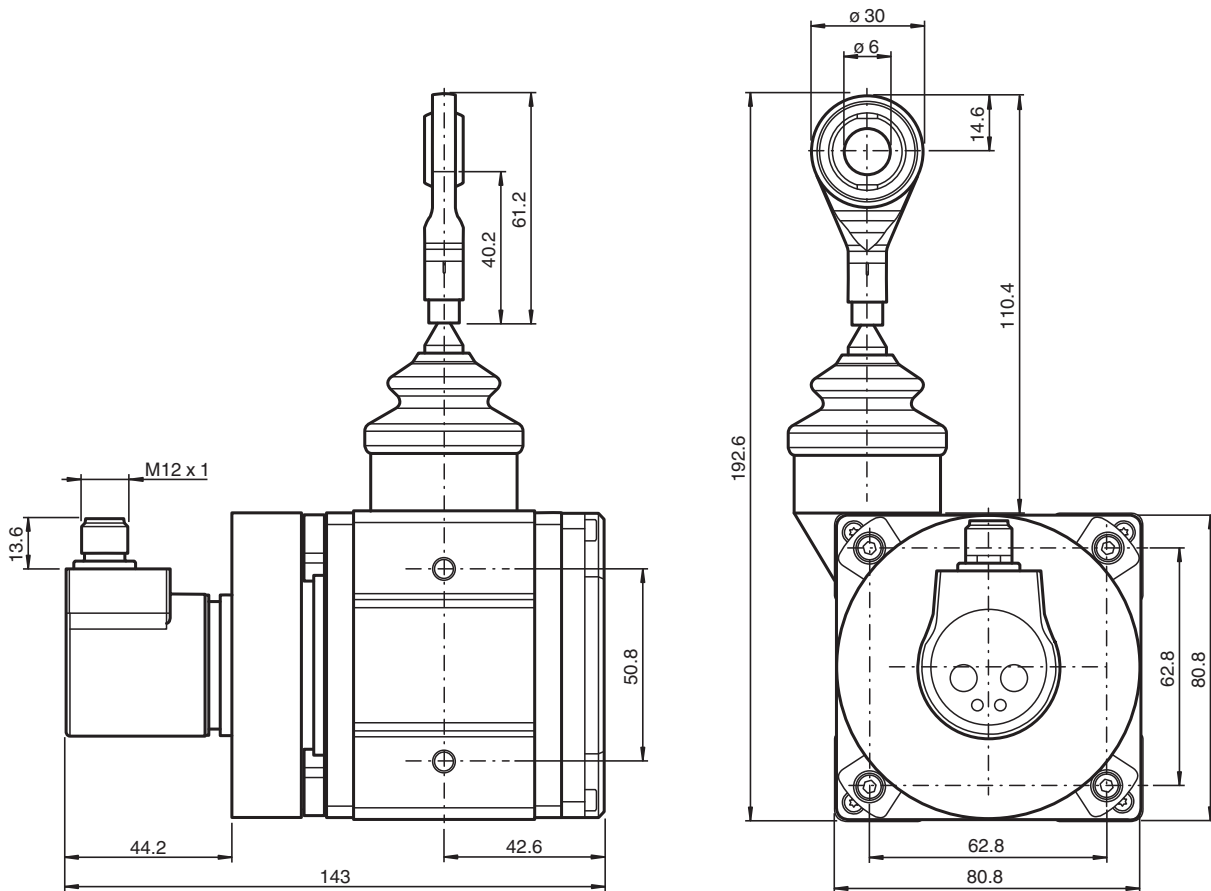
ECA30PL-02C1A-I42BD:X3

- Robust aluminum drum housing
- Resolution: 13 singleturn, 4 bit multiturn
- Adjustable measuring range via push buttons
- Rust and acid-resistant measuring cable

Cable pull rotary encoder with analog interface and push buttons



Dimensions



Technical Data

General specifications

Detection type	magnetic sampling
Device type	Performance Line
Measuring range	2000 mm
Construction type	130 mm
Resolution	Cable pull: Design 130 mm: 0.04 mm Encoder: 17 bit (13 bit/revolution)

Electrical specifications

Operating voltage	U_B	8 ... 32 V DC
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Refer to "General Notes Relating to Pepperl+Fuchs Product Information".

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Technical Data

No-load supply current	I_0	typ. 20 mA
Input 1		
Input type		lower limit of measurement range
Signal voltage		
High		8 ... 32 V DC
Signal duration		min. 1 s
Input 2		
Input type		upper limit of measurement range
Signal voltage		
High		8 ... 32 V DC
Signal duration		min. 1 s
Analog output		
Output type		analog current output 4 ... 20 mA
Default setting		rising ramp at ccw rotation
Linearity error		≤ 0.15 %
Load resistor		min. 500 Ω Max. value for supply voltage 8 V. For higher supply voltage lower load resistance can be used.
Connection		
Connector		M12 connector, 5 pin
Standard conformity		
Degree of protection		according DIN EN 60529
Connection side		Encoder: IP65 Cable pull: IP64
Climatic testing		DIN EN 60068-2-3, no moisture condensation
Emitted interference		EN 61000-6-4:2007
Noise immunity		EN 61000-6-2:2005
Ambient conditions		
Ambient temperature		-30 ... 70 °C (-22 ... 158 °F)
Storage temperature		-30 ... 70 °C (-22 ... 158 °F)
Relative humidity		98 % , no moisture condensation
Mechanical specifications		
Rope diameter		1.35 mm
Drum perimeter		334.1 mm
Retraction speed		4 m/s
Spring retraction force		15 ... 21 N
Material		
Housing		aluminum, coated
Cable pull		anodized aluminum
Flange		anodized aluminum
Rope		Stainless steel 1.4401/316
Mass		2888 g
Life span		up to 10 ⁶ Cycles

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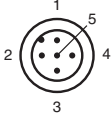
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Connection

Signal	Wire end	M12 connector
Analog output	Green	1
+V _s (encoder)	Red	2
GND (encoder)	Yellow	3
Set 2	White	4
Set 1	Brown	5
Shielding	Screen	Housing
Pinout	-	

Additional Information

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 ($+U_{B \min} \leq \text{high potential} \leq +U_{B \max}$) 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 ($+U_{B \min} \leq \text{high potential} \leq +U_{B \max}$) 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 ($+U_{B \min} \leq \text{high potential} \leq +U_{B \max}$) for 1 second. The measuring range is then reset to the default setting.

Programming Encoders with Operating Buttons

Scaling the measuring range

Use operating buttons "Lim1" and "Lim2" to scale the measuring range (minimum measuring range: 22.5°).

1. Press the two operating buttons ("Lim1" and "Lim2") simultaneously. Both LEDs will light up. Press and hold the operating buttons for 15 seconds until the two LEDs start to flash. The rotary encoder is now in programming mode.
2. Turn the rotary encoder shaft to position 1 (lower measuring range limit).
3. Press and hold operating button "Lim1" for 1 second. The green LED will now light up permanently.
4. Turn the rotary encoder shaft to position 2 (upper measuring range limit).
5. Press and hold operating button "Lim2" for 1 second.

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

Resetting to the Default Setting

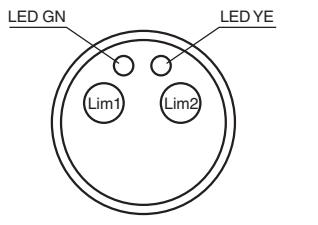
1. Press the two operating buttons ("Lim1" and "Lim2") simultaneously. Both LEDs will light up. Press and hold the operating buttons for 30 seconds. After 15 seconds, the two LEDs will start to flash.

When the green LED goes out and the yellow LED lights up permanently, the measuring range is reset to the default setting.

Status LEDs

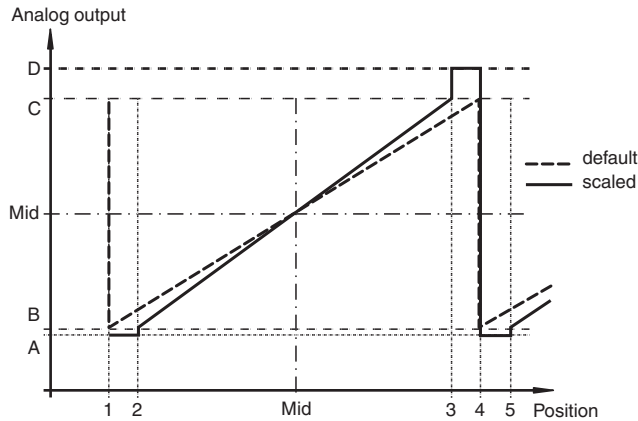
The rotary encoder is equipped with two status LEDs. These LEDs have three possible states: off, flashing, or on. The LEDs use different combinations of these states to indicate the status of the rotary encoder.

Yellow LED	Green LED	Description
On	Off	Rotary encoder operation using default settings
Off	On	Rotary encoder operation using scaled measuring range (customer-specific setting)
On	On	Programming mode initiated (temporary state)
Flashes	Flashes	Rotary encoder in programming mode
On	Flashes	Position 2 set, waiting for position 1
Flashes	On	Position 1 set, waiting for position 2



Analog Output Properties

Depending on its design, the rotary encoder projects the current angular position of the rotary encoder shaft in an analog current or voltage value. The following graphic shows the values the output accepts at the various angular positions:



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 ⁿ x 180°	-	2 ⁿ 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
0 V ... 5 V	-	0 V	2.5 V	5 V	-
0.5 V ... 4.5 V	0.25 V	0.5 V	2.5 V	4.5 V	4.75 V
0 V ... 10 V	-	0 V	5 V	10 V	-
0.5 V ... 9.5 V	0.25 V	0.5 V	5 V	9.5 V	9.75 V
4 mA ... 20 mA	3.6 mA	4 mA	12 mA	20 mA	22 mA
0 mA ... 20 mA	-	0 mA	10 mA	20 mA	-

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