Model Number

ECA10TL - Analog

Cable pull rotary encoder with analog interface and push buttons

Features

- **Solid yet lightweight plastic construction**
- **Compact, slim design (the shaft of the mounted rotary encoder is used to provide the function of the drum bearing)**
- **Coupling-free adaptation**
- **Wide range of mounting options**
- **Rust and acid-resistant measuring cable**
- **Very high level of linearity and repeatability**
- **Adjustable measuring range via push buttons**
- **Analog current and voltage output**

Description

Lighter and more solid cable pull rotary encoder with flat housing design.

Technical data

General specifications	
Detection type	magnetic sampling
Device type	Target line with analog interface
Measuring range	3000 ... 10000 mm
Construction type	80 mm, 130 mm, 190 mm
Resolution	Cable pull:
	80 mm design: 0,028 mm
	130 mm design: 0,047 mm
	190 mm design: 0,068 mm
	Encoder:
	17 bit (13 bit/revolution)

Electrical specifications	
Operating voltage U_B	8 ... 32 V DC
Current consumption	typ. 15 mA (with voltage output)
	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 voltage output or analog current output
Default setting	rising ramp at ccw rotation
Linearity error	≤ 0.15 %

Connection	
Connector	M12 connector, 5 pin
Cable	Ø6 mm, 4 x 2 x 0.14 mm^2, 1 m

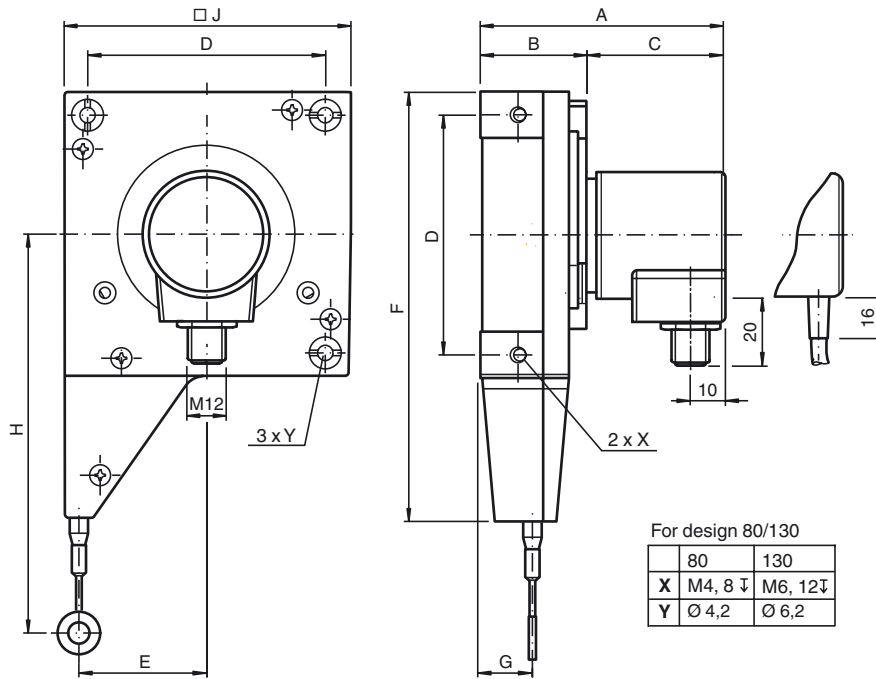| Standard conformity	
Degree of protection	acc. DIN EN 60529
Connection side	cable models: IP54
	connector models: IP65
	Cable pull: IP50
Climatic testing	DIN EN 60068-2-3, no moisture condensation
Emitted interference	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005

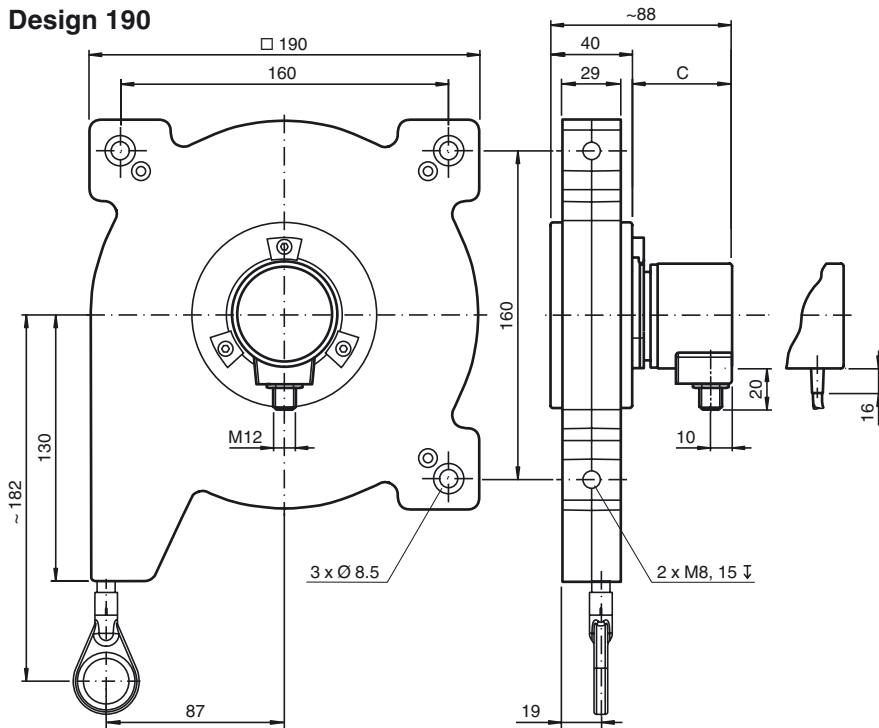| Ambient conditions	
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Operating temperature	cable, flexing: -5 ... 70 °C (23 ... 158 °F)
	cable, fixed: -30 ... 70 °C (-22 ... 158 °F)
	connector models: -30 ... 70 °C (-22 ... 158 °F)
Storage temperature	-30 ... 70 °C (-22 ... 158 °F)
Relative humidity	98 % , no moisture condensation

Mechanical specifications	
Rope diameter	0.55 mm
Material	
Housing	nickel-plated steel
Cable pull	design 80/130 : Luranyl® or Lexan 920
	design 190 : ABS-GF17
Flange	Aluminum
Rope	Stainless steel 1.4401/316
Life span	up to 10^6 Cycles

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

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Dimensions

For design 80/130

For design 80/130

	80	130
X	M4, 8 ↧	M6, 12 ↧
Y	Ø 4,2	Ø 6,2

Design 190

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

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Cable mounts

A Brass ring PE

ø 29
ø 20 H11
6
~50

B Ring

2
ø 6
ø 12
~29

C Ball joint

ø 29
ø 20
ø 12
~50

10
ø 20
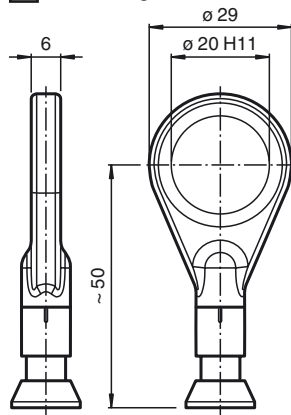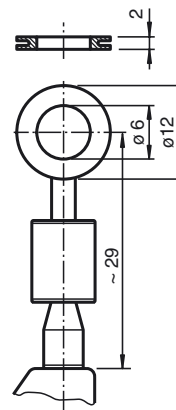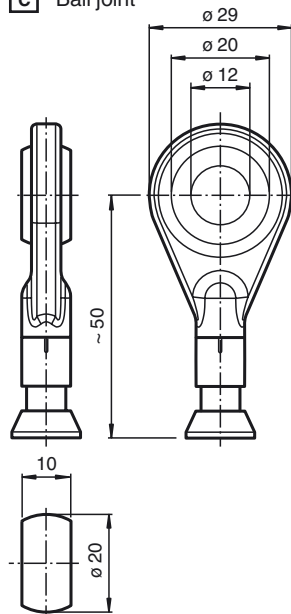
Electrical connection

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	-	(1, 5, 2, 4, 3)

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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 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.
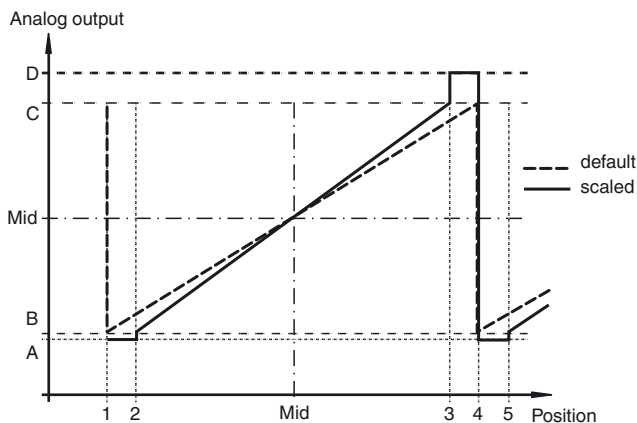
Status LEDs

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
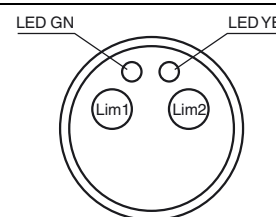
Analog Output Properties

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°	-	2^4 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

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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	-

Variable Data and Dimensions

Technical data	Design 80	Design 130	Design 190
Measuring length (in m)	03	05	10
Drum size (incl. cable) (in mm)	230	385	555
Retraction speed (in m/s)	6	3	4
Spring retraction force (in N)	5–6.3	4.5–7	9–12
Weight (in kg)	0.4	0.95	2.05
Rotary encoder Ø (in mm)	36		
Dimensions (in mm)			
A	71	73	88
B	30	32	40
C	41	41	48
D	67	110	-
E	36	61	-
F	120	186	-
G	14.5	17	-
H	106	150	-
J	80	130	

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Model Number

| E | C | A | 1 | 0 | T | L | - | | | | N | P | - | | | | | | : | X | 3 |

Electrical connection

BD	M12 device plug, 5-pin
C1	Cable, 1 m
C2	Cable, 2 m
C5	Cable, 5 m
CA	Cable, 10 m

Electrical interface

I42	UB = 12 V ... 30 V, 4 mA ... 20 mA
I02	UB = 12 V ... 30 V, 0 mA ... 20 mA
U05	UB = 12 V ... 30 V, 0 V ... 5 V
U01	UB = 12 V ... 30 V, 0 V ... 10 V
U04	UB = 12 V ... 30 V, 0.5 V ... 4.5 V
U09	UB = 12 V ... 30 V, 0.5 V ... 9.5 V

Cable mounts

A	Ring PE carrier (with 10 m only)
B	Eyelet
C	Ball joint (with 10 m only)

Length of measuring cable

03	3 m
05	5 m
10	10 m

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