Тросовые механизмы (энкодеры с кабельной катушкой)

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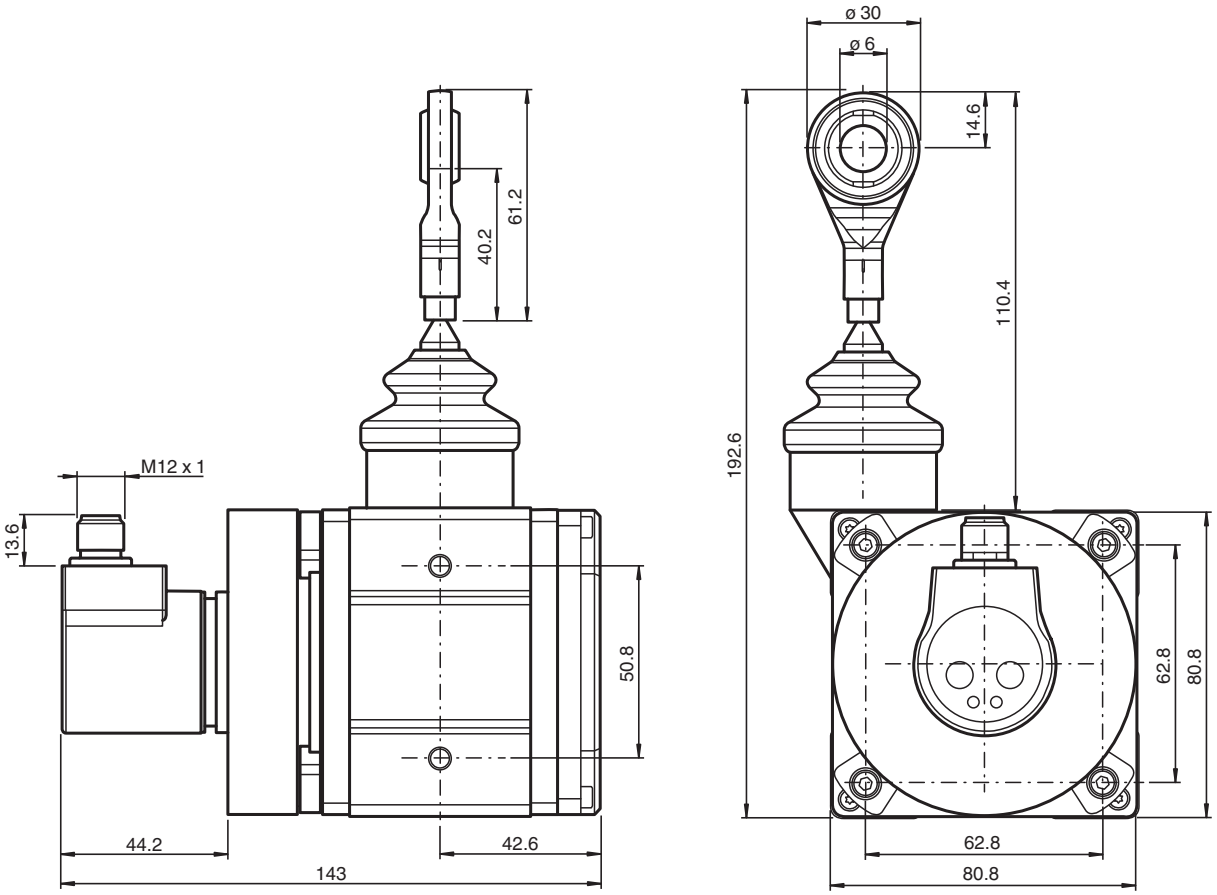
Cable pull rotary encoder
ECA30PL-02C1A-I42BD:X3

- 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

CE

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

Release date: 2024-07-11 Date of issue: 2024-07-11 Filename: 270910-100073_eng.pdf

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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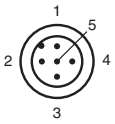
Connection

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 progamming 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 ($+U_{B\,min}$ ≤ high potential ≤ $+U_{B\,max}$) 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 ($+U_{B\,min}$ ≤ high potential ≤ $+U_{B\,max}$) 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 ($+U_{B\,min}$ ≤ high potential ≤ $+U_{B\,max}$) 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.

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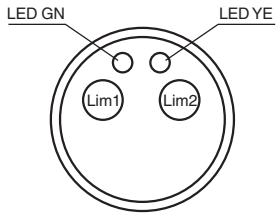
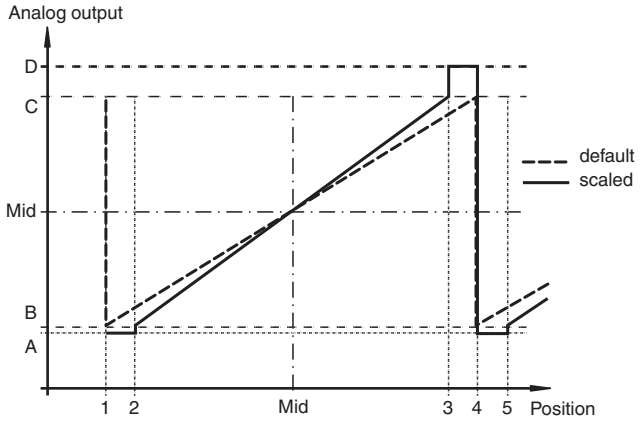
Yellow LED	Green LED	Description
On	**Off**	Rotary encoder operation using default settings
Off	**On**	Rotary encoder operation using scaled measuring range (customer-specific setting)
On	**On**	Programming mode initiated (temporary state)
Flashes	**Flashes**	Rotary encoder in programming mode
On	**Flashes**	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

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**	**-**

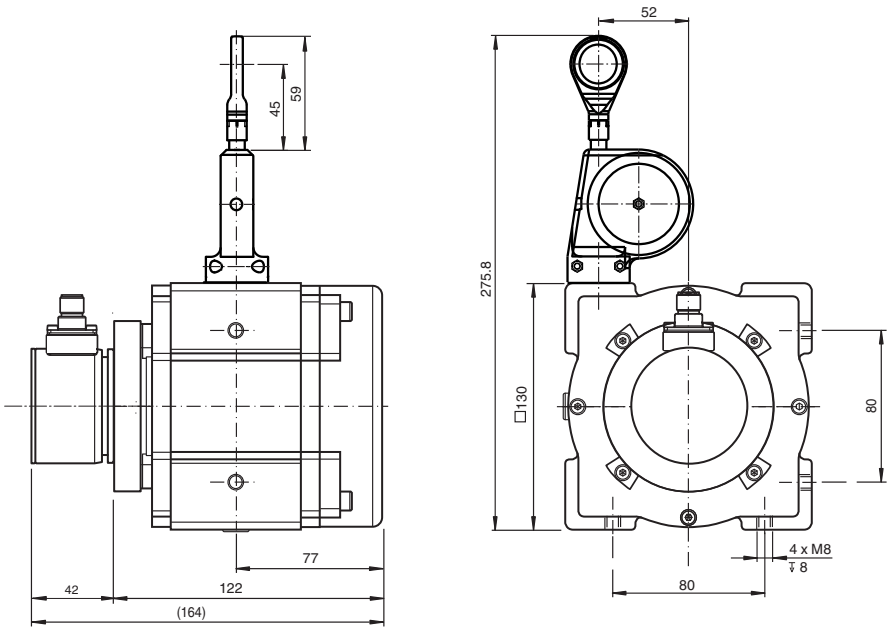
Cable pull rotary encoder
ECI30PL-05A4A-UD1BE:02

- Robust aluminum drum housing
- Guide pulley for guide
- Rust and acid-resistant measuring cable
- 1024 pulses, incremental

Cable pull rotary encoder with incremental output signals (1024 pulses)

CE

Dimensions



Technical Data

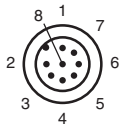
General specifications		
Detection type		photoelectric sampling
Device type		Performance Line
Measuring range		5000 mm
Construction type		130 mm
Resolution		Cable pull: Design 130 mm: 0.32 mm Encoder: 1024 pulses per revolution
Electrical specifications		
Operating voltage	U_B	4.75 ... 30 V DC
No-load supply current	I_0	max. 50 mA
Output		
Output type		push-pull or RS422 (universal output driver, output level depending on input voltage)
Output frequency		max. 400 kHz

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100122_eng.pdf

Technical Data

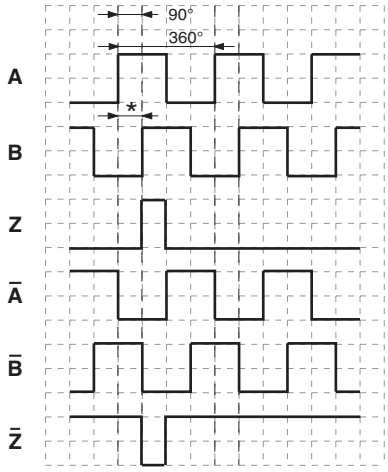
Rise time		300 ns
Phase position A to B		
Pulse counts < 3600		90 ° ± 9 ° electrical
Pulse counts ≥ 3600		90 ° ± 15 ° electrical
Duty cycle		1/2 ± 10 %
Connection		
Connector		M12 connector, 8-pin
Standard conformity		
Degree of protection		acc. DIN EN 60529
Connection side		Encoder: IP65 Cable pull: 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

Connection

Signal	Connector M12 x 1, 8-pin
GND	1
U_b	2
A	3
B	5
$\overline{A}$	4
$\overline{B}$	6
Z	7
$\overline{Z}$	8
NC	-
NC	-
NC	-
NC	-
Shielding	Housing
	

Operation

Signal outputs



↻ cw - with view onto the shaft
phase relationsships electrical
* 1 Measuring step is 90° electrical

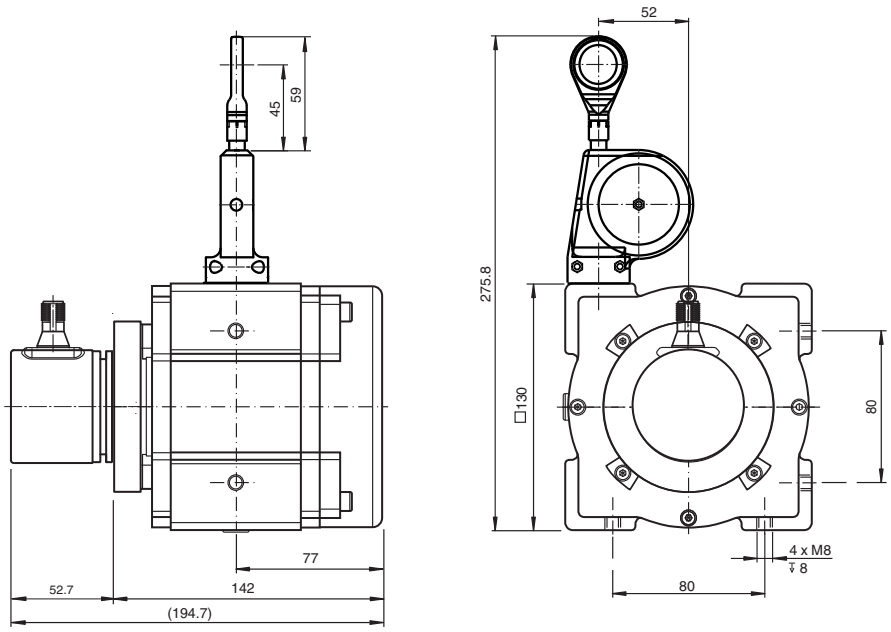
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100122_eng.pdf

Cable pull rotary encoder
ECA30PL-05A4A-B16BD:NN

- Rust and acid-resistant measuring cable
- Robust aluminum drum housing
- Resolution: 13 singleturn, 12 bit multiturn

Cable pull rotary encoder with CANopen interface

Dimensions



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Performance Line
Measuring range		5000 mm
Construction type		130 mm
Resolution		Cable pull: Design 130 mm: 0.04 mm Encoder: 25 Bit (13 Bit/revolution)
Electrical specifications		
Operating voltage	U_B	9 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Interface		
Interface type		CANopen
Resolution		
Single turn		13 Bit

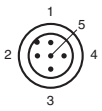
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100123_eng.pdf

Technical Data

Multiturn		12 Bit
Overall resolution		25 Bit
Transfer rate		max. 1 MBit/s
Standard conformity		communication profile: DS 301 Device profiles: DS 406 and DS 417 , programmable according to class 2
Connection		
Connector		M12 connector, 5 pin , A-coded
Standard conformity		
Degree of protection		acc. 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

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100123_eng.pdf

Connection

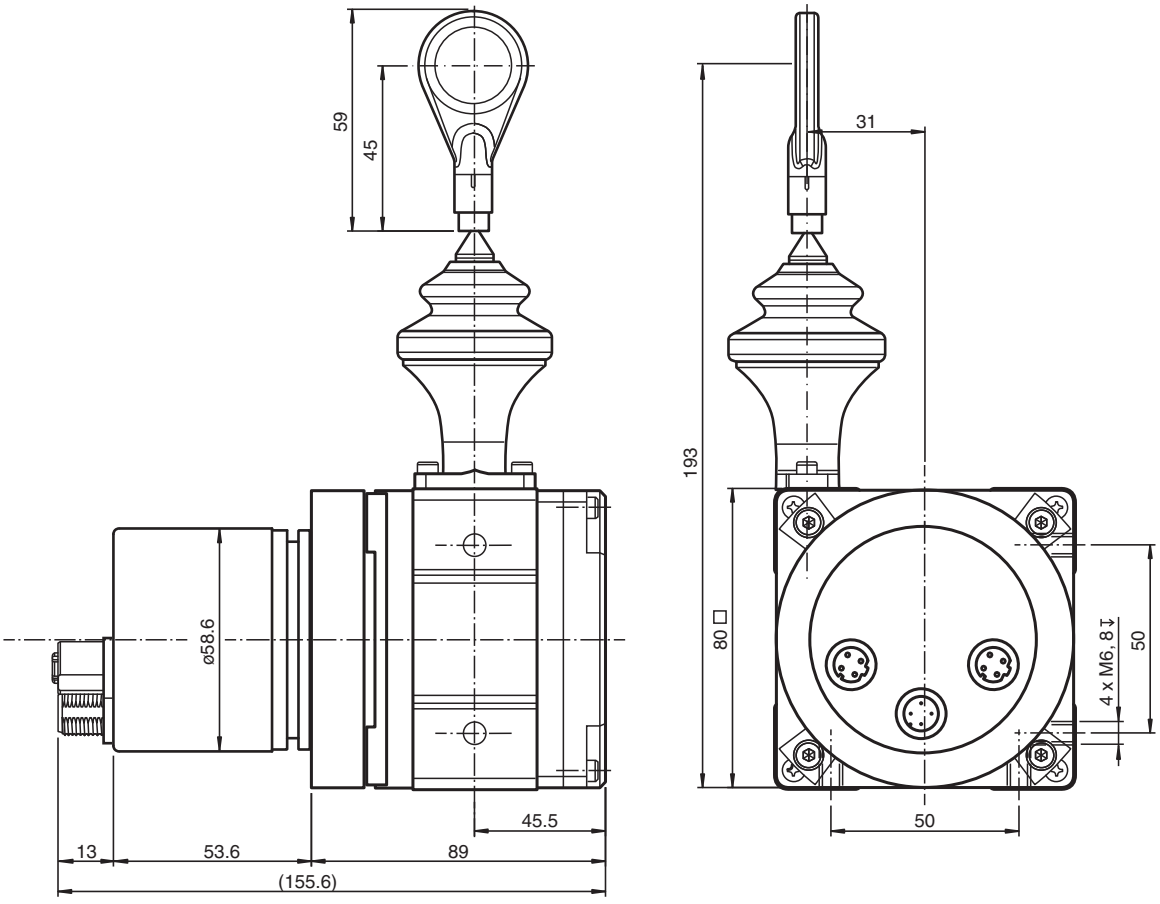
Signal	5-pin, M12 x 1 connector
CAN GND	1
$+V_S$	2
GND	3
CAN-High	4
CAN-Low	5
Shielding	Housing
Pinout	

Cable pull rotary encoder
ECA21IL-03A1A-B17BP:NN

- Robust aluminum drum housing
- Bellows with steel tip
- Rust and acid-resistant measuring cable
- Resolution: 13 singleturn, 12 bit multiturn

Cable pull rotary encoder with PROFINET IO interface

Dimensions



Technical Data

General specifications	
Detection type	magnetic sampling
Device type	Cable pull rotary encoder with PROFINET IO interface
Measuring range	3000 mm
Construction type	80 mm
Resolution	Cable pull: Design 80 mm: 0.024 mm Encoder: 25 Bit (13 Bit/revolution)

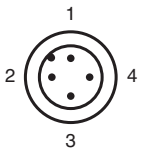
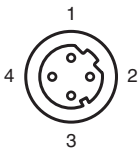
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100196_eng.pdf

Technical Data

Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Power consumption	P_0	approx. 4 W
Time delay before availability	t_v	< 250 ms
Output code		binary code
Code course (counting direction)		programmable, cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)
Interface		
Interface type		PROFINET IO
Resolution		
Single turn		13 Bit
Multiturn		12 Bit
Overall resolution		25 Bit
Transfer rate		max. 100 MBit/s
Cycle time		≥ 1 ms
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
Standard conformity		
Degree of protection		acc. 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		0.55 mm
Drum perimeter		230 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		1400 g
Life span		up to 10^6 Cycles

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100196_eng.pdf

Connection

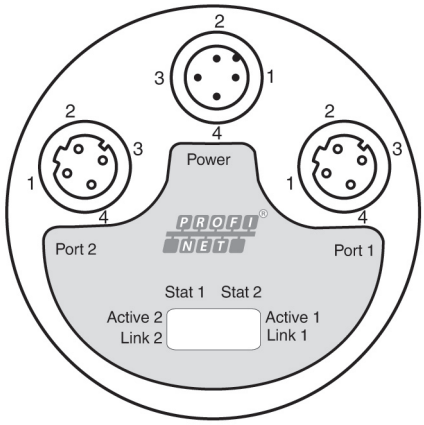
Pin	Male connector M12 x 1, 4-pin, A-coded	Female connector M12 x 1, 4-pin, D-coded
1	Supply voltage +U_B	Tx +
2	-	Rx +
3	0 V	Tx -
4	-	Rx -
		

Indication

Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available



Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another device Criteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

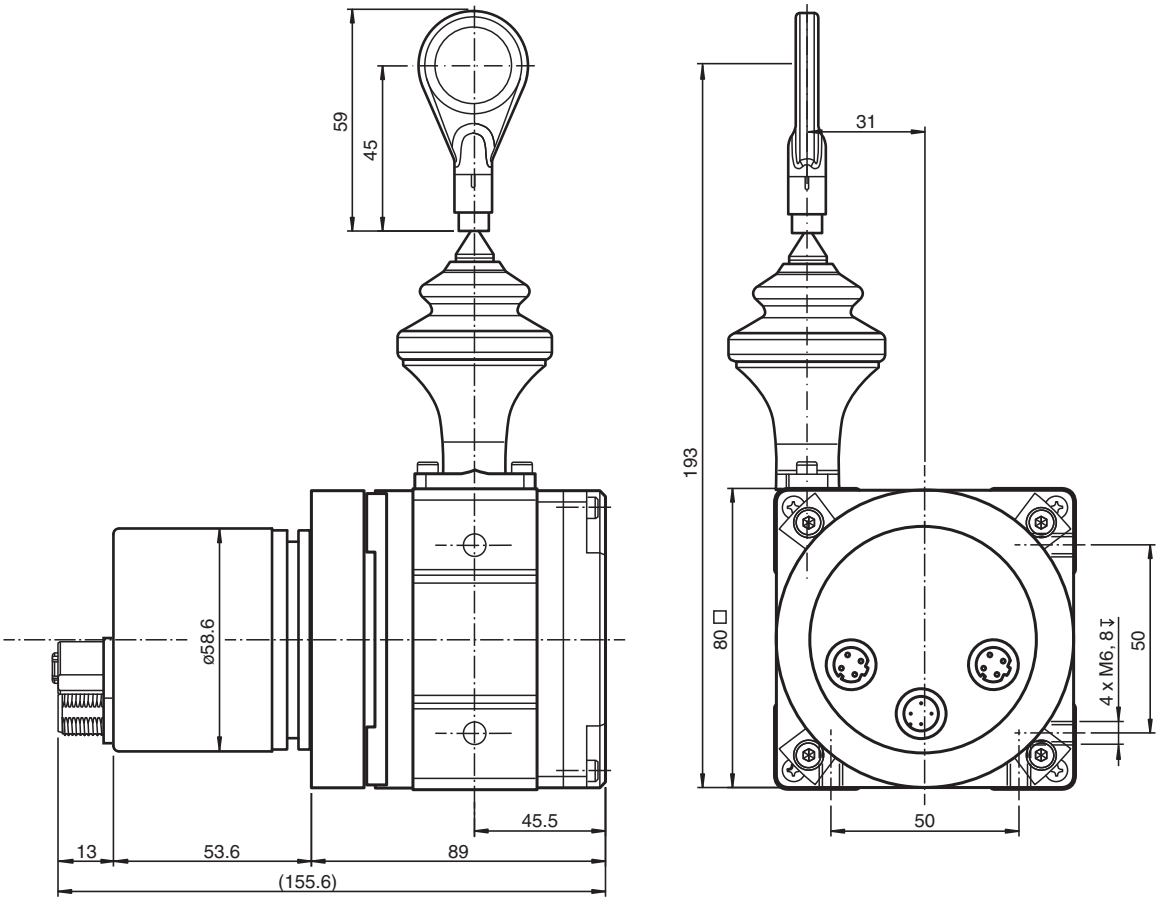
1) flashing frequency 0.5 Hz for at least 3 seconds

Cable pull rotary encoder
ECA21IL-02A1A-B17BP:NN

- Robust aluminum drum housing
- Bellows with steel tip
- Rust and acid-resistant measuring cable
- Resolution: 13 singleturn, 12 bit multiturn

Cable pull rotary encoder with PROFINET IO interface

Dimensions



Technical Data

General specifications	
Detection type	magnetic sampling
Device type	Cable pull rotary encoder with PROFINET IO interface
Measuring range	2000 mm
Construction type	80 mm
Resolution	Cable pull: Design 80 mm: 0.024 mm Encoder: 25 Bit (13 Bit/revolution)

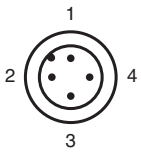
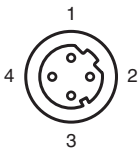
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100214_eng.pdf

Technical Data

Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Power consumption	P_0	approx. 4 W
Time delay before availability	t_v	< 250 ms
Output code		binary code
Code course (counting direction)		programmable, cw ascending (clockwise rotation, code course ascending) cw descending (clockwise rotation, code course descending)
Interface		
Interface type		PROFINET IO
Resolution		
Single turn		13 Bit
Multiturn		12 Bit
Overall resolution		25 Bit
Transfer rate		max. 100 MBit/s
Cycle time		≥ 1 ms
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
Standard conformity		
Degree of protection		acc. 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		0.55 mm
Drum perimeter		230 mm
Retraction speed		4 m/s
Spring retraction force		8 ... 14 N
Material		
Housing		aluminum, coated
Cable pull		anodized aluminum
Flange		anodized aluminum
Rope		Stainless steel 1.4401/316
Mass		1400 g
Life span		up to 10^6 Cycles

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100214_eng.pdf

Connection

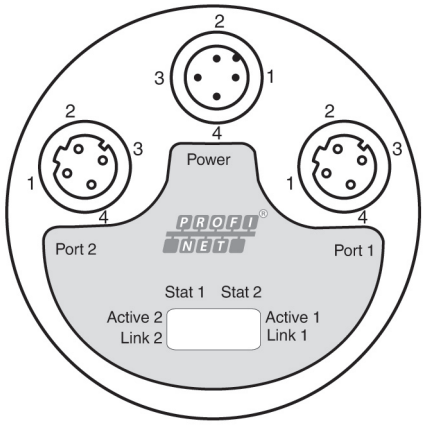
Pin	Male connector M12 x 1, 4-pin, A-coded	Female connector M12 x 1, 4-pin, D-coded
1	Supply voltage +U_B	Tx +
2	-	Rx +
3	0 V	Tx -
4	-	Rx -
		

Indication

Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available



Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another device Criteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

1) flashing frequency 0.5 Hz for at least 3 seconds

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 270910-100214_eng.pdf

Cable pull rotary encoder

ECA10TL-05BNP-B25AZ:OE

- 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
- EtherNet/IP
- Status LEDs
- Compatible with Rockwell/ Allen Bradley/ Schneider control

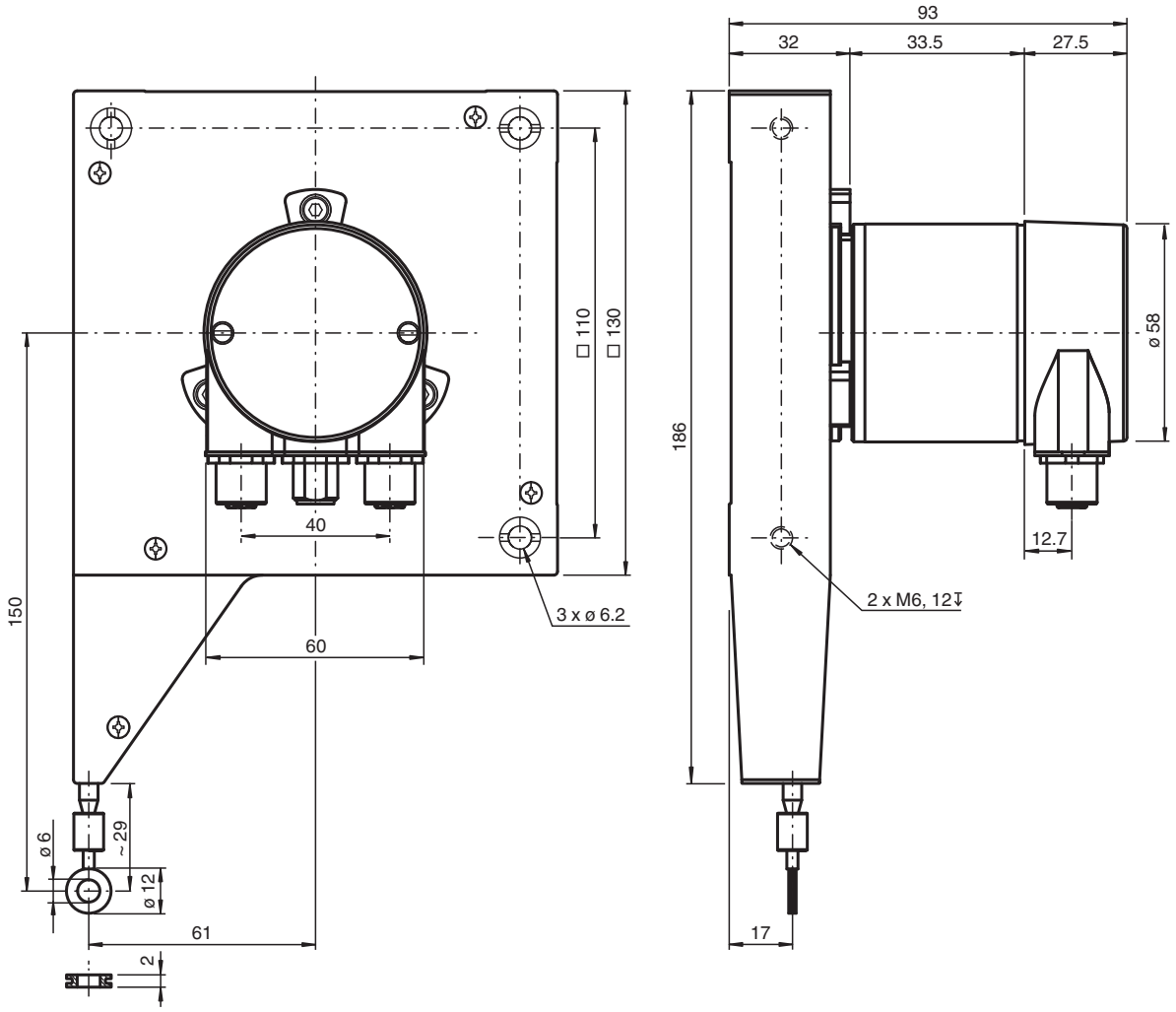
Cable pull rotary encoder with EtherNet/IP interface

CE

Function

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

Dimensions



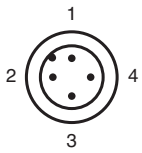
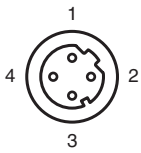
Release date: 2024-07-29 Date of issue: 2024-07-29 Filename: 270910-100300_eng.pdf

Technical Data

General specifications		
Detection type		photoelectric sampling
Device type		Target Line with EtherNet/IP interface
Measuring range		5000 mm
Construction type		130 mm
Resolution		Cable pull: Design 130 mm: 0.047 mm Encoder: 25 Bit (13 Bit/revolution)
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
Power consumption	P_0	approx. 4 W
Output code		binary code
Code course (counting direction)		adjustable
Interface		
Interface type		EtherNet/IP
Resolution		
Single turn		13 Bit
Multiturn		12 Bit
Overall resolution		25 Bit
Physical		Ethernet
Transfer rate		100 MBit/s
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
Standard conformity		
Degree of protection		according DIN EN 60529 shaft side: IP64 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		-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		Luranyl® or Lexan 920
Flange		Aluminum
Rope		Stainless steel 1.4401/316
Mass		approx. 1200 g
Life span		up to 10^6 Cycles

Release date: 2024-07-29 Date of issue: 2024-07-29 Filename: 270910-100300_eng.pdf

Connection

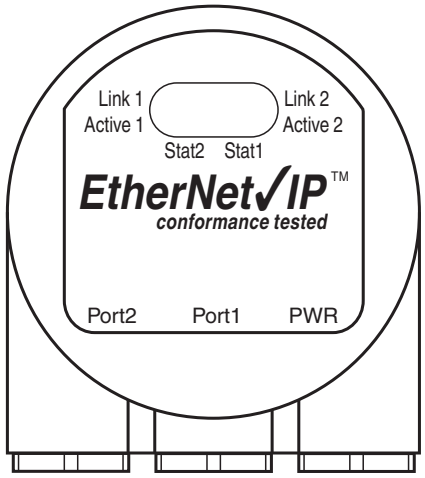
Pin	Male connector M12 x 1, 4-pin, A-coded	Female connector M12 x 1, 4-pin, D-coded
1	Supply voltage +U_B	Tx +
2	-	Rx +
3	0 V	Tx -
4	-	Rx -
		

Indication

Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available



Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another device Criteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

1) flashing frequency 0.5 Hz for at least 3 seconds

Release date: 2024-07-29 Date of issue: 2024-07-29 Filename: 270910-100300_eng.pdf

Cable pull rotary encoder
ECA10TL-03BNY-B20BD:01

- Cable drum anodized
- Plastic sheathed measuring cable
- Solid yet lightweight plastic construction
- Compact and very sleek design
- Coupling-free adaptation
- Very high level of linearity and repeatability
- CAN bus with SAE J1939 protocol

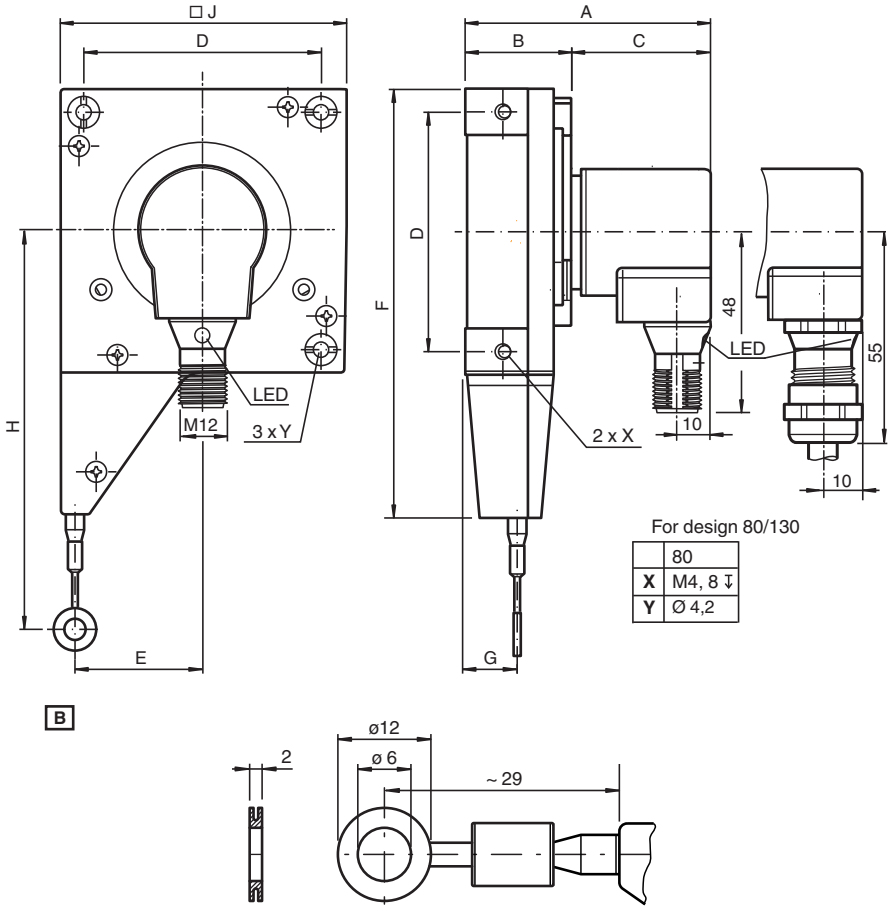
Cable pull rotary encoder with J1939 interface

Function

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

Dimensions

For design 80



For design 80/130

	80
X	M4, 8 ↧
Y	Ø 4,2

Technical Data

General specifications	
Detection type	magnetic sampling

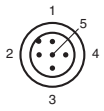
Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: 324247_eng.pdf

Technical Data

Device type		Target line with J1939 interface
Measuring range		3000 mm
Construction type		80 mm
Resolution		Cable pull: Design 80 mm: 0.056 mm Encoder: 24 bit (12 bit/revolution)
Indicators/operating means		
LED green		Operating mode
LED red		wrong baud rate
Electrical specifications		
Operating voltage	U_B	9 ... 30 V DC (with galvanic isolation)
Power consumption	P_0	≤ 1.2 W
Time delay before availability	t_v	< 250 ms
Output code		binary code
Code course (counting direction)		adjustable
Interface		
Interface type		J1939
Resolution		
Single turn		12 Bit
Multiturn		12 Bit
Overall resolution		24 Bit
Transfer rate		min. 20 kBit/s , max. 1 MBit/s
Cycle time		≥ 1 ms
Standard conformity		ISO 11898
Connection		
Connector		M12 connector, 5 pin
Standard conformity		
Degree of protection		acc. DIN EN 60529
Connection side		Encoder: 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		-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		Luranyl® or Lexan 920
Flange		Aluminum
Rope		Stainless steel 1.4401/316, PA sheathing
Life span		up to 10^6 Cycles

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: 324247_eng.pdf

Connection

Signal	5-pin, M12 x 1 connector
CAN GND	1
$+V_S$	2
GND	3
CAN-High	4
CAN-Low	5
Shielding	Housing
Pinout	

Dimensions

Variable Data and Dimensions

Technical data	Design 80
Measuring length (in m)	03
Drum size (incl. cable) (in mm)	230
Retraction speed (in m/s)	6
Spring retraction force (in N)	5–6.3
Weight (in kg)	0.4
Rotary encoder Ø (in mm)	36
Dimensions (in mm)	
A	67
B	30
C	37
D	67
E	36
F	120
G	14.5
H	106
J	80

Interface

Example of the transmit commands

Command	Identifier	Data	Comments
Read request Direction	18EA2000	01 EF 00 00 00 00 00 00	
Read request Node	18EA2000	08 EF 00 00 00 00 00 00	
Write Direction	00EF2000	01 01 00 00 00 FF FF FF (CCW increase position)	When you change direction it will give you a different positional value. You will then need to set your preset value.
Write PRESET	00EF2000	04 A8 61 00 00 FF FF FF (value 25.000)	The preset value should be received at positional value 18FFAA20.
Write Save	00EF2000	FA 73 61 76 65 FF FF FF	The settings saved in non-volatile memory

If you change the node number, you will need to cycle power (after you save your settings) for the node number to change. Once you cycle power, you will need to enter the new node number in your identifier. You can confirm everything is saved in non-volatile memory by cycling power.

Receive:

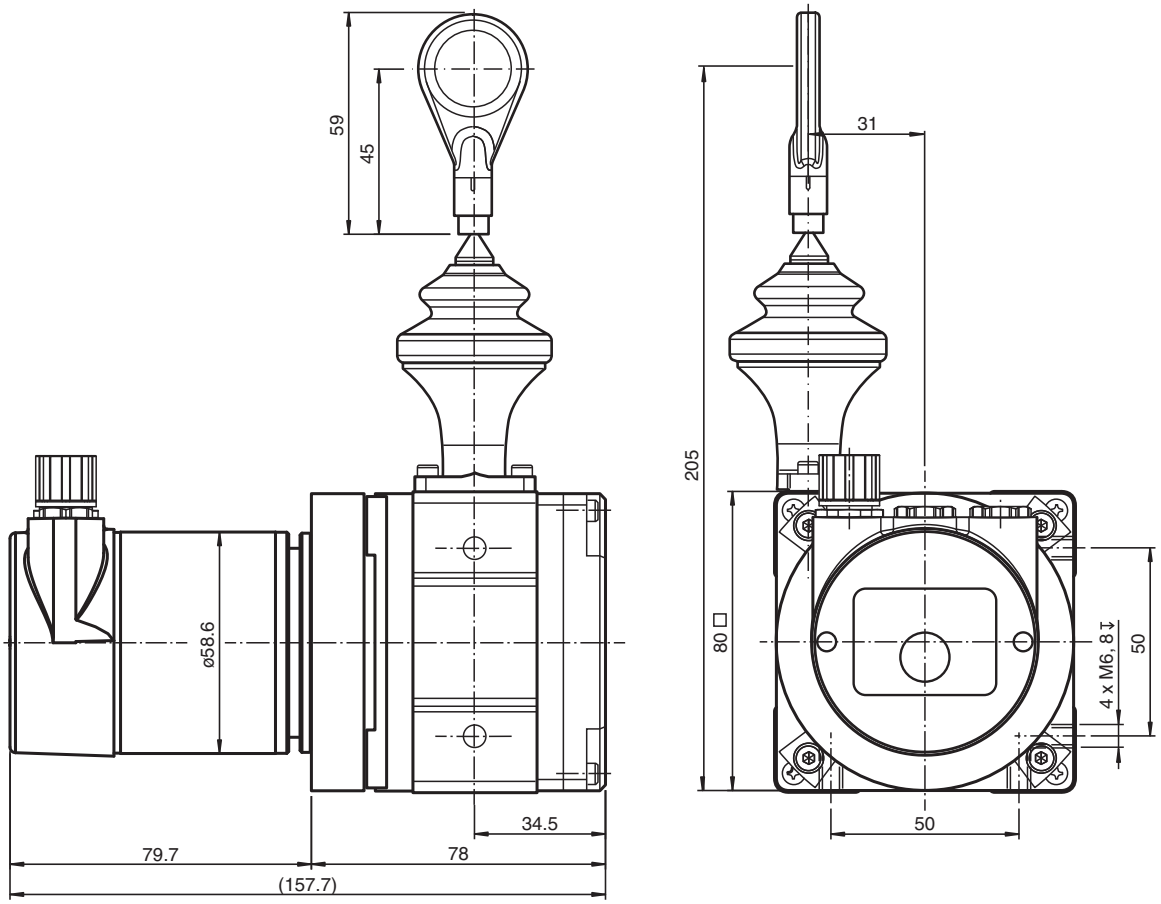
Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: 324247_eng.pdf

Cable pull rotary encoder
ECA21IL-02A1A-B16AN:OE1212

- Robust aluminum drum housing
- Bellows with steel tip
- Rust and acid-resistant measuring cable
- Resolution: 12 singleturn, 12 bit multiturn

Cable pull rotary encoder with CANopen interface

Dimensions



Technical Data

General specifications	
Detection type	photoelectric sampling
Device type	Industrial Line with CANopen interface
Measuring range	2000 mm
Construction type	80 mm
Resolution	Cable pull: Design 80 mm: 0.049 mm Encoder: 24 bit (12 bit/revolution)

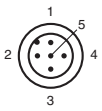
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 70115513_eng.pdf

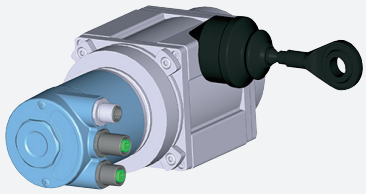
Technical Data

Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Interface		
Interface type		CANopen
Resolution		
Single turn		12 Bit
Multiturn		12 Bit
Overall resolution		24 Bit
Transfer rate		max. 1 MBit/s
Standard conformity		communication profile: DS 301 Device profiles: DS 406 and DS 417 , programmable according to class 2
Connection		
Connector		M12 connector, 5 pin , A-coded
Standard conformity		
Degree of protection		acc. 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		0.54 mm
Drum perimeter		200 mm
Retraction speed		4 m/s
Spring retraction force		8 ... 14 N
Material		
Housing		aluminum, coated
Cable pull		anodized aluminum
Flange		anodized aluminum
Rope		Stainless steel 1.4401/316
Mass		1900 g
Life span		up to 10^6 Cycles

Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 70115513_eng.pdf

Connection

Signal	5-pin, M12 x 1 connector
CAN GND	1
$+V_S$	2
GND	3
CAN-High	4
CAN-Low	5
Shielding	Housing
Pinout	



Cable pull rotary encoder

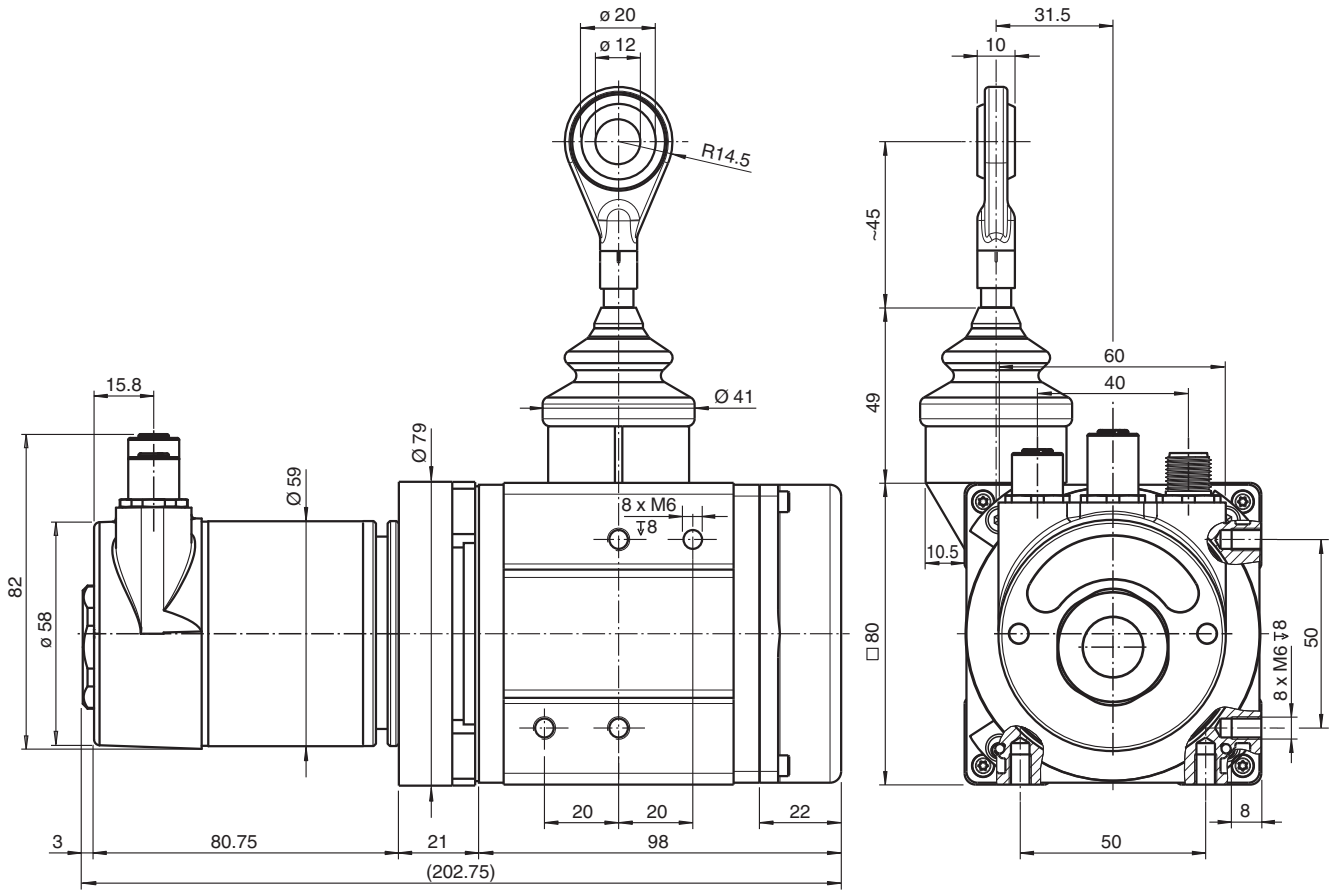
ECA30PL-03C1A-B25AY:OE:01

- Rust and acid-resistant measuring cable
- Robust aluminum drum housing
- Resolution: 13 singleturn, 12 bit multiturn

Cable pull rotary encoder with EtherNet/IP interface

CE EtherNet/IP™

Dimensions



Technical Data

General specifications		
Detection type		photoelectric sampling
Device type		Performance Line

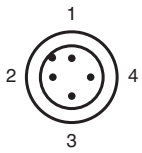
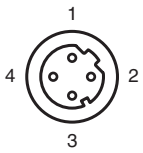
Release date: 2023-01-13 Date of issue: 2023-01-13 Filename: 70124506_eng.pdf

Technical Data

Measuring range		3000 mm
Construction type		80 mm
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Interface		
Interface type		EtherNet/IP
Resolution		
Single turn		13 Bit
Multiturn		12 Bit
Overall resolution		25 Bit
Transfer rate		100 MBit/s
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
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		200 mm
Retraction speed		8 m/s
Spring retraction force		7 ... 11 N
Material		
Housing		aluminum, coated
Cable pull		anodized aluminum
Flange		anodized aluminum
Rope		Stainless steel 1.4401/316
Mass		1870 g
Life span		up to 10^6 Cycles

Release date: 2023-01-13 Date of issue: 2023-01-13 Filename: 70124506_eng.pdf

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

Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available

Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another deviceCriteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

1) flashing frequency 0.5 Hz for at least 3 seconds

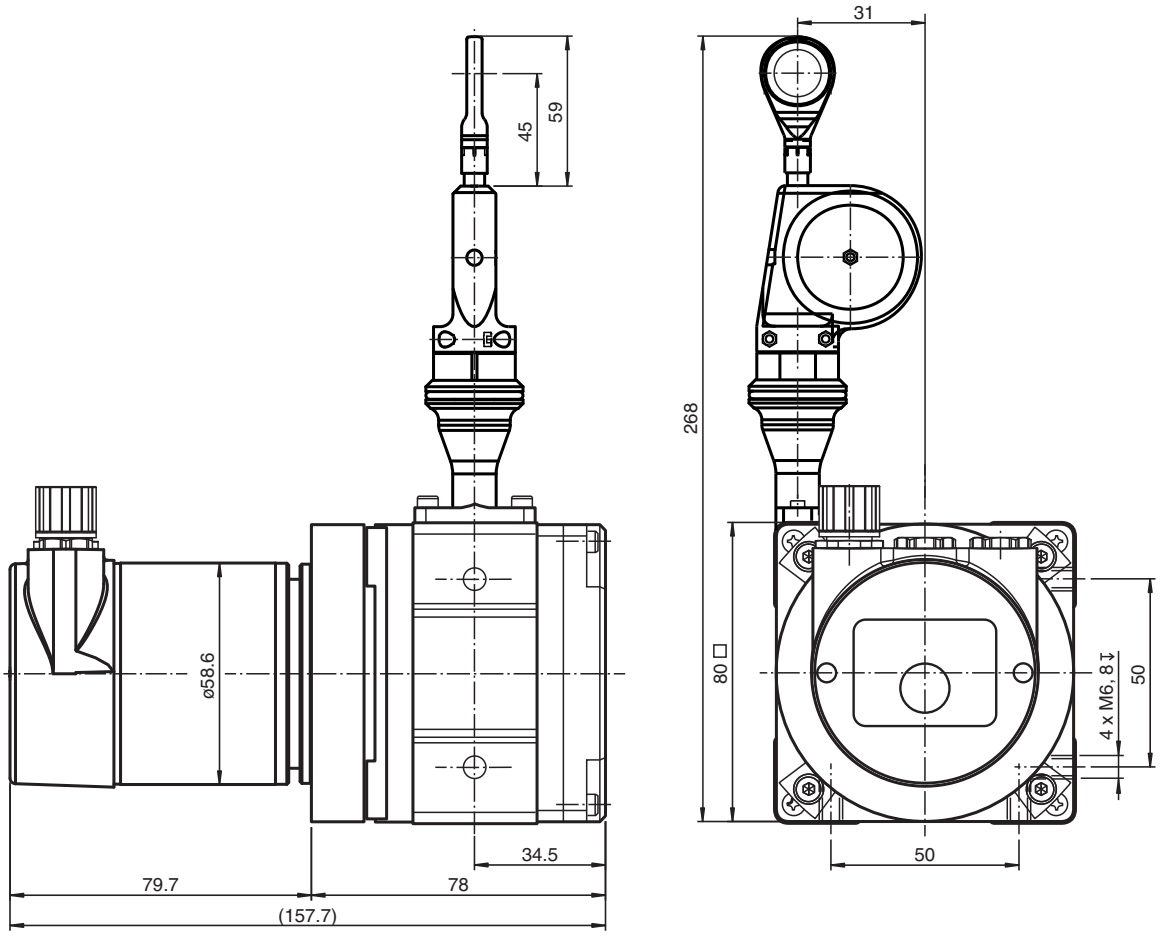
Release date: 2023-01-13 Date of issue: 2023-01-13 Filename: 70124506_eng.pdf

Cable pull rotary encoder
ECA21IL-02A4A-B16AN:OE1212

- Robust aluminum drum housing
- Guide pulley for guide
- Rust and acid-resistant measuring cable
- Resolution: 12 singleturn, 12 bit multiturn

Cable pull rotary encoder with CANopen interface

Dimensions



Technical Data

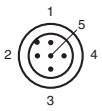
General specifications	
Detection type	photoelectric sampling
Device type	Industrial Line with CANopen interface
Measuring range	2000 mm
Construction type	80 mm
Resolution	Cable pull: Design 80 mm: 0.049 mm Encoder: 24 bit (12 bit/revolution)

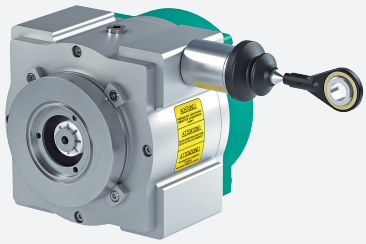
Release date: 2022-04-08 Date of issue: 2022-12-12 Filename: 70124733_eng.pdf

Technical Data

Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	≥ 350 mA
Interface		
Interface type		CANopen
Resolution		
Single turn		12 Bit
Multiturn		12 Bit
Overall resolution		24 Bit
Transfer rate		max. 1 MBit/s
Standard conformity		communication profile: DS 301 Device profiles: DS 406 and DS 417 , programmable according to class 2
Connection		
Connector		M12 connector, 5 pin , A-coded
Standard conformity		
Degree of protection		acc. 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		0.54 mm
Drum perimeter		200 mm
Retraction speed		4 m/s
Spring retraction force		8 ... 14 N
Material		
Housing		aluminum, coated
Cable pull		anodized aluminum
Flange		anodized aluminum
Rope		Stainless steel 1.4401/316
Mass		1900 g
Life span		up to 10^6 Cycles

Connection

Signal	5-pin, M12 x 1 connector
CAN GND	1
$+V_S$	2
GND	3
CAN-High	4
CAN-Low	5
Shielding	Housing
Pinout	



Cable pull

ECN30PL-*

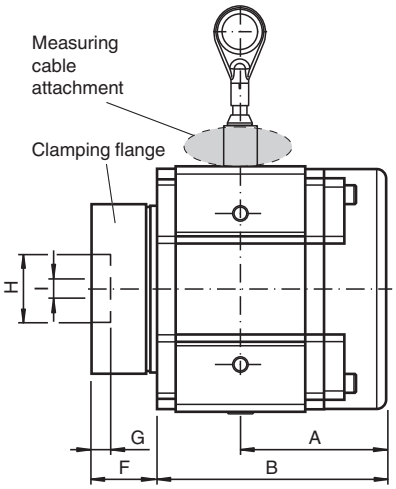
- Robust aluminum drum housing
- Drum travel when cable retracted using threaded spindle
- Bellows with steel tip
- Wide range of mounting options
- Comprehensive accessories
- Up to 60 m of measuring cable
- Housing can be coated as an option (Hart Coat)
- Rust and acid-resistant measuring cable
- Very low hysteresis

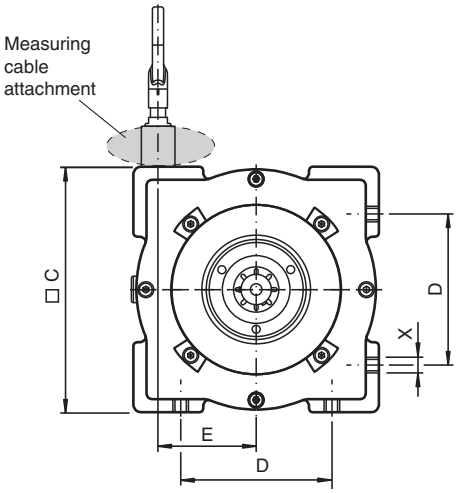
Cable pull

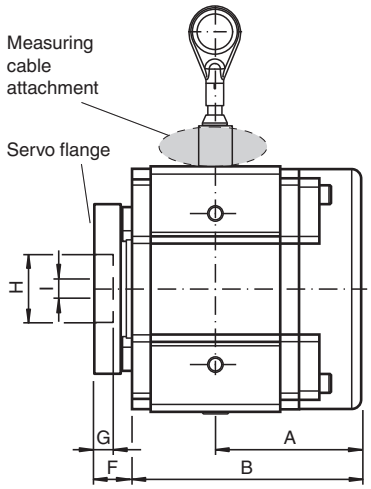
Function

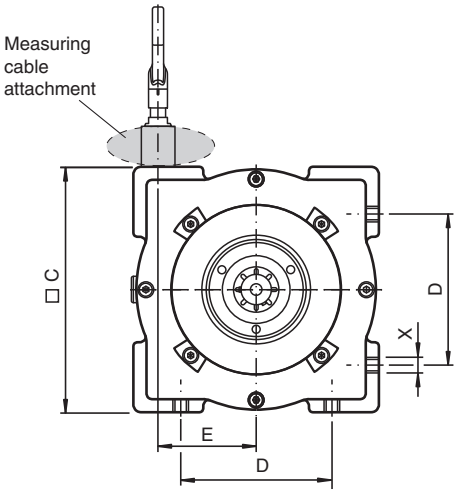
Flexible cable pull designed to meet tough requirements in all fields of application.

Dimensions









Measuring length	X
01 - 02	4 x M6 ↓8
03	8 x M6 ↓8
05 - 10	4 x M8 ↓8
15 - 30	12 x M8 ↓8
35 - 60	12 x M10 ↓11

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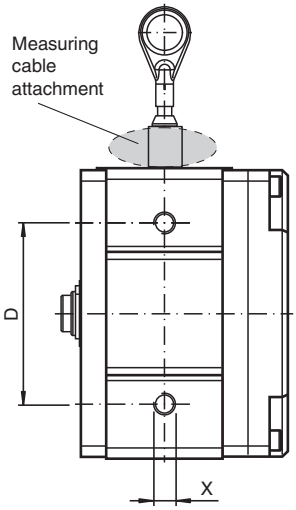
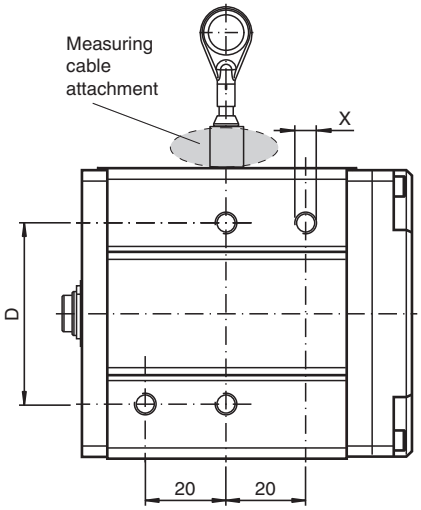
Dimensions

Threaded holes for mounting

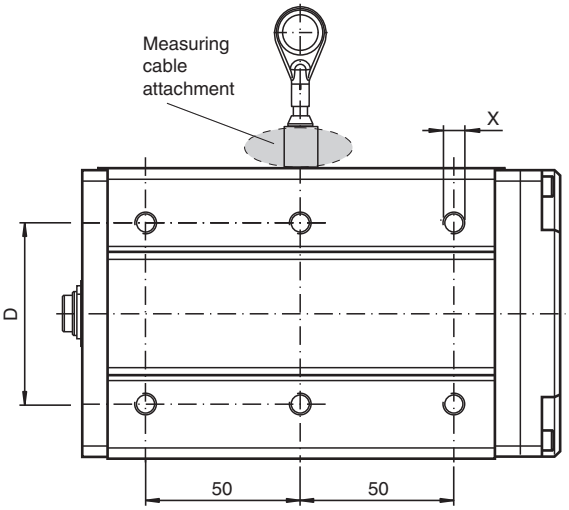
For measuring length
01 m, 02 m, 05 m, 10 m



For measuring length
03 m



For measuring length
≥ 15 m

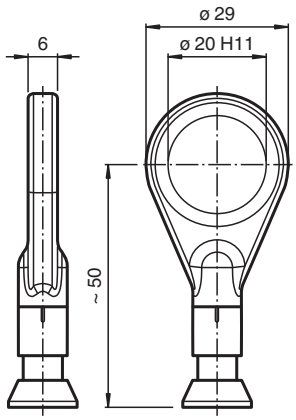


Measuring length	X
01 - 02	4 x M6 ↓8
03	8 x M6 ↓8
05 - 10	4 x M8 ↓8
15 - 30	12 x M8 ↓8
35 - 60	12 x M10 ↓11

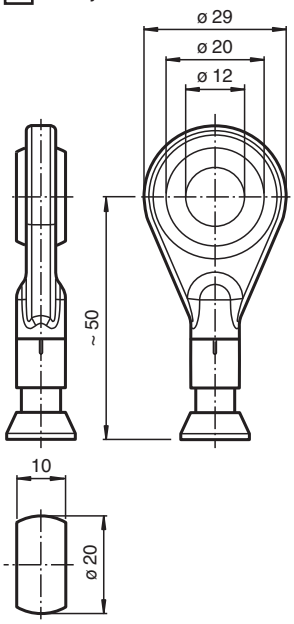
Dimensions

Cable mounts

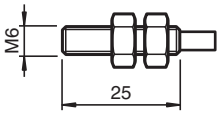
A Brass ring PE



C Ball joint

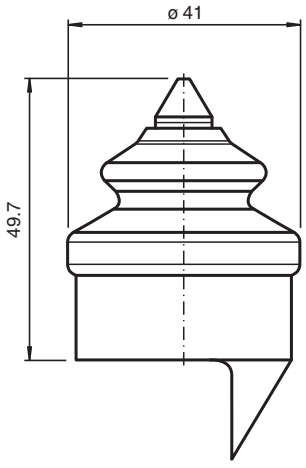


D Headless screw

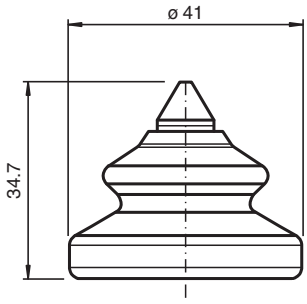


1 Attachement bellows

For design 80



For design 130/190



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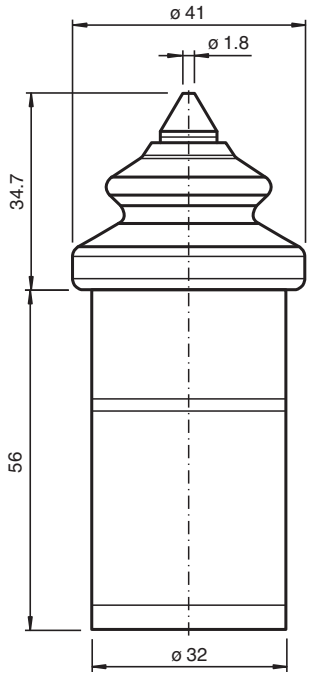
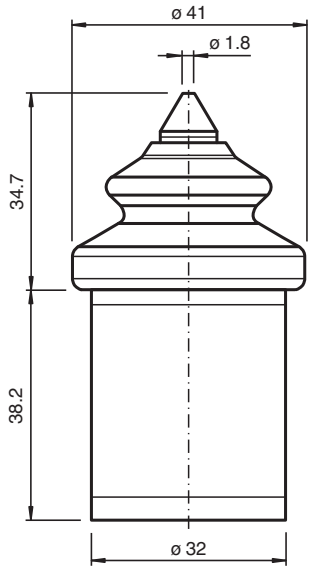
Dimensions

2 Brush attachment with bellows and steel

For design 80



For design 130/190



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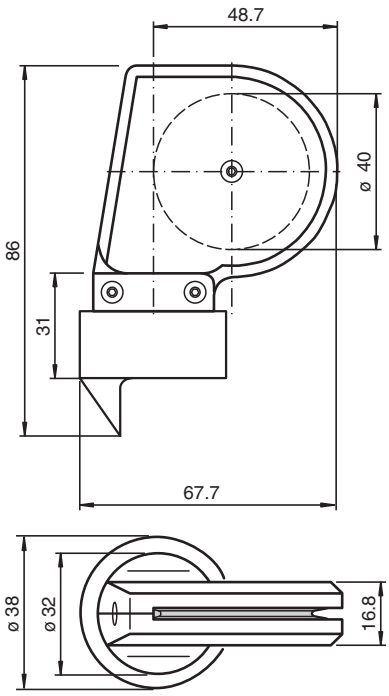
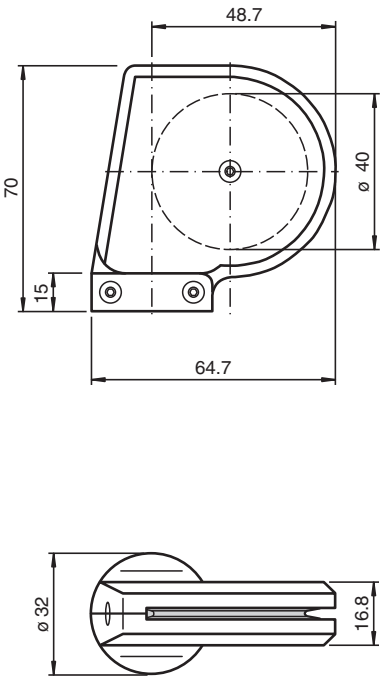
Dimensions

4 Guide pulley

For design 80



For design 130/190



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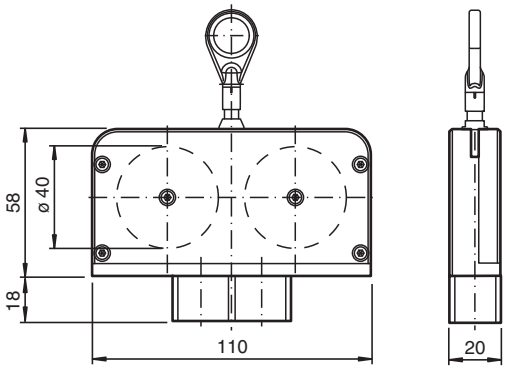
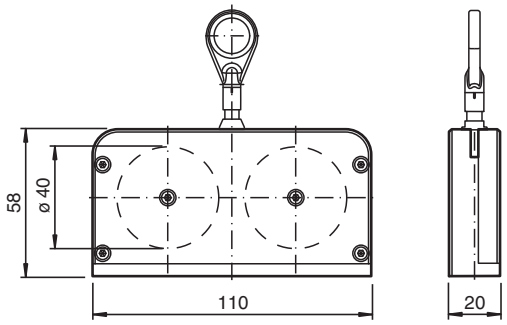
Dimensions

5 Double guide pulley

For design 80



For design 130/190

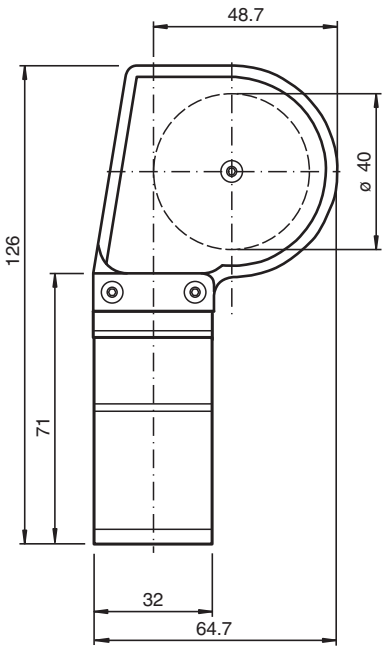


Release date: 2024-07-08 Date of issue: 2024-07-08 Filename: t172461_eng.pdf

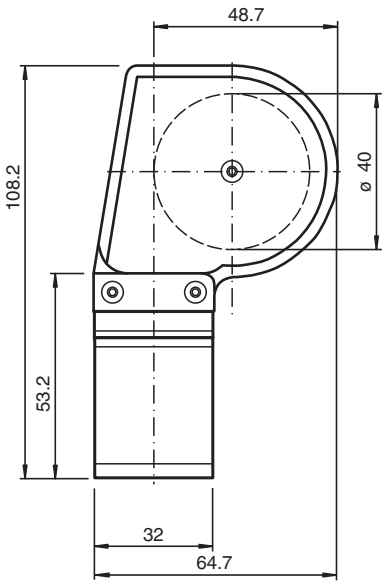
Dimensions

8 Brush attachment with guide pulley

For design 80



For design 130/190



Technical Data

General specifications		
Device type		Premium Line
Measuring range		1000 ... 60000 mm
Construction type		80 mm, 130 mm, 190 mm
Ambient conditions		
Ambient temperature		-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications		
Rope diameter		1.35 mm 0.81 mm (at measuring length 50000 mm)
Degree of protection		IP64
Material		
Housing		anodized aluminum or Aluminum with Hart Coat coating
Rope		Stainless steel 1.4401/316
Life span		up to 10^6 Cycles
General information		
Scope of delivery		Shaft coupling for mounting a rotary encoder depending on the flange type , Mounting clips , bolts for mounting the adapter and a rotary encoder , Sealing elements (various seals for mounting a rotary encoder) , Hexagon socket wrench, 1.3 AF
Accessories		

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Technical Data

Optional accessories	#203843 SL-RP/GS80 Guide pulley, design 80 #203844 SL-RP/GS130/GS190 Guide pulley, design 130/190 #251600 SL-TRP/GS80 Double guide pulley, design 80 #251602 SL-TRP/GS130 Double guide pulley, design 130/190 #271371 SL-BA/GS80 Brush attachment, design 80 #271373 SL-BA/GS130/GS190 Brush attachment, design 130/190 #272502 SL-BCA Ball for ball joint

Dimensions

Variable Data and Dimensions

Technical Data	Design 80			Desgin 130						Design 190			
Max. measuring length (in mm)	01	02	03	05	10	15	20	25	30	35	40	50	60
Drum size (incl. cable) (in mm)	200			334.1						491.5		489.8	491.5
Repeatability (max. in mm)	0.2	0.2	0.3	0.5	1	1.5	2	2.5	3	6	6	6	7
Hysteresis (max. in mm)	1	1	1.5	2	4	5	6	7	8	10	10	10	15
Linearity	±0.1 %			±0.1 %						±0.1 %			
Retraction speed (in m/s)	4			4						4			
Spring retraction force (in N)	11 ... 14	8 ... 4	7 ... 11	15 ... 21	8 ... 13	15 ... 21	8 ... 13	15 ... 21	8 ... 13	20 ... 37	18 ... 37	20 ... 37	18 ... 37
Weight (in kg)	0.9	1.1	1.4	2.5	3.5	5	6	7.5	8.5	16	20	16	15.5

Dimensions (in mm)	Design 80			Design 130						Design 190			
A	34	42	60	77	124	147	193	216	262	188	203	215	210
B	57	72	98	122	190	236	304	350	418	315	346	342	322
C	80			130						190			
D	50			80						140			
E	31.5			52						79			

Dimensions

Flange Dimensions for Adapting Rotary Encoders

Design	80	130/190	80	130/190	80	130/190
Flange type	Servo flange		Clamping flange		Servo flange	
Designation	**X1**		**X2**		**X3**	
H (= flange Ø) (in mm)	50		36		33	
Clamping circuit Ø (in mm)	42		48		26	
l (= shaft Ø) (in mm)	6		10		6	
Shaft length (in mm)	10		20		11.5	

Dimensions (in mm)	80	130/190	80	130/190	80	130/190
F	20	20	36.8	34.8	24	22
G	3.8	3.8	10	10	3.8	3.8

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Type Code

Model Number

Flange type

X1 Servo flange Ø 50 mm/42 mm/3 x M4; shaft Ø 6 mm x 10 mm

X2 Clamping flange Ø 36/48 mm/3 x M4; shaft; Ø 10 mm x 20 mm

X3 Servo flange Ø 33 mm/26 mm/4 x M3; shaft Ø 6 mm x 11.5 mm

Material

A STD anodized aluminum

H Aluminum, Hart Coat coating

Attachment

N No attachment (only for 60 m)

for 1 to 50 m:

1 Bellows with steel tip

2 Brush attachment with bellows and steel tip

4 Guide pulley

5 Double guide pulley

8 Brush attachment with guide pulley

Cable mounts

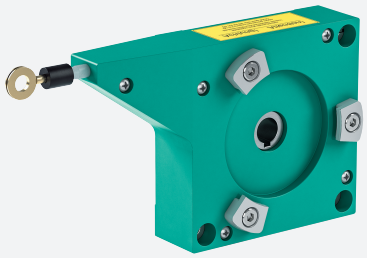
A Ring PE carrier

C Ball joint (only with material A)

D Headless screw

Length of measuring cable

01-60 See table "Variable Data and Dimensions"



Cable pull

ECN10TL-*

- Solid yet lightweight plastic construction
- Compact, slim design (the shaft of the flange-mounted rotary encoder is used to provide the function of the drum bearing)
- Coupling-free adaptation
- Multitude of mounting possibilities
- Rust and acid-resistant measuring cable
- Very high level of linearity and repeatability

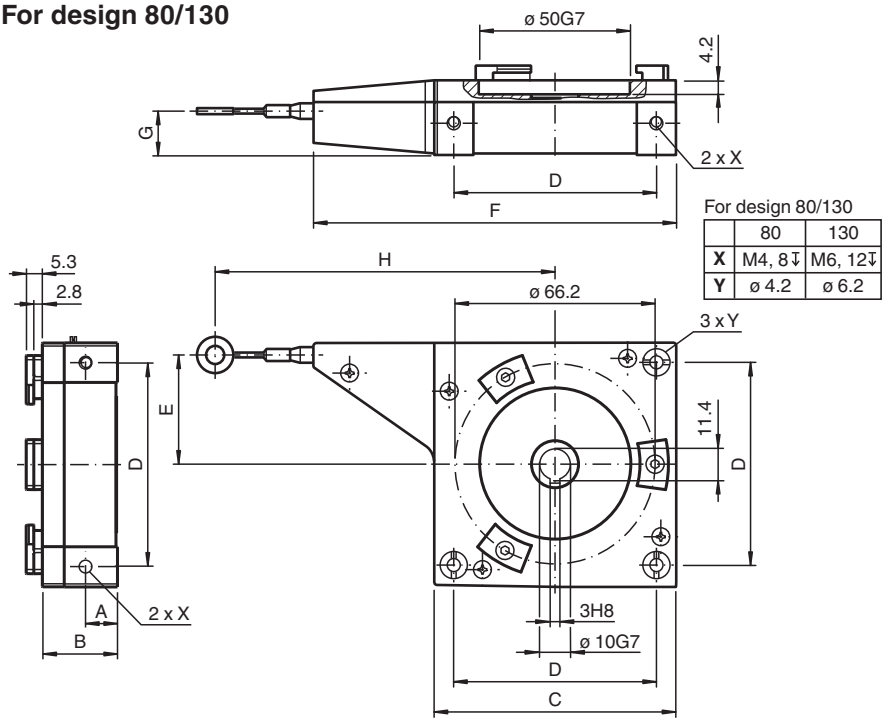
Cable pull

Function

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

Dimensions

For design 80/130



For design 80/130

	80	130
X	M4, 8↧	M6, 12↧
Y	ø 4.2	ø 6.2

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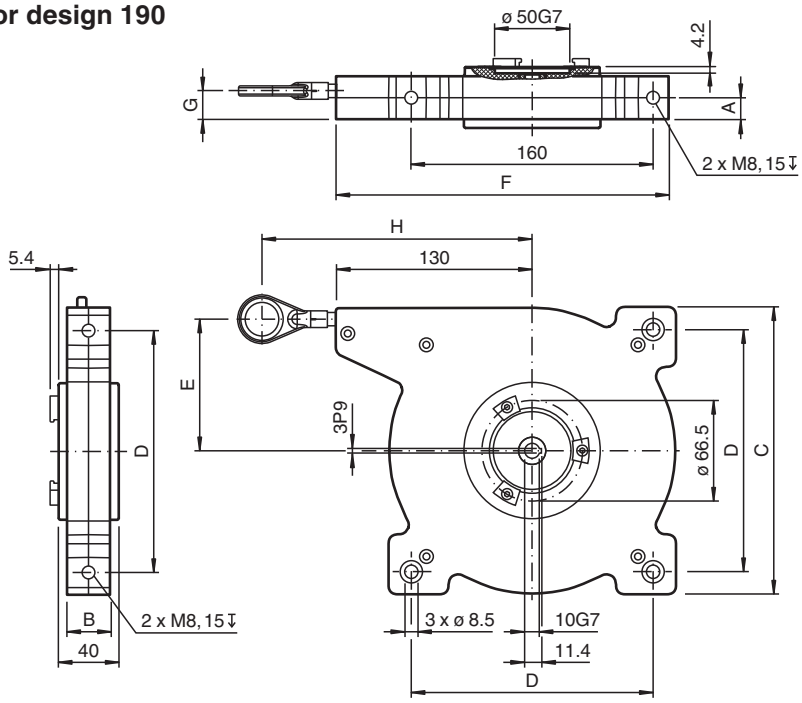
Dimensions

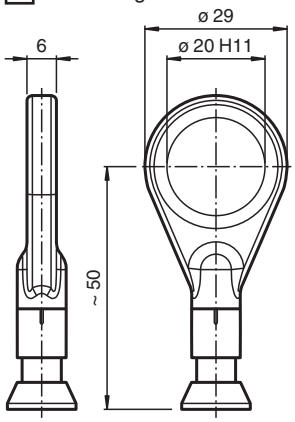
For design 190



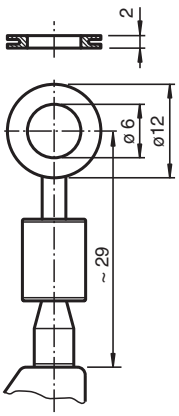
Dimensions

Cable mounts

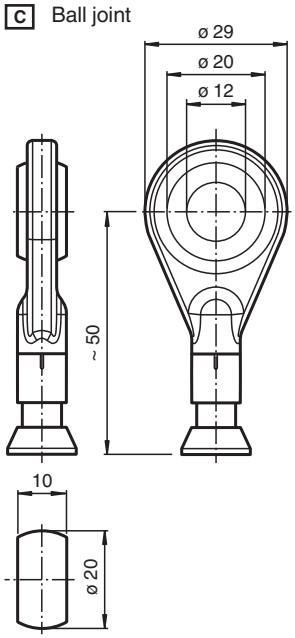
A Brass ring PE



B Ring



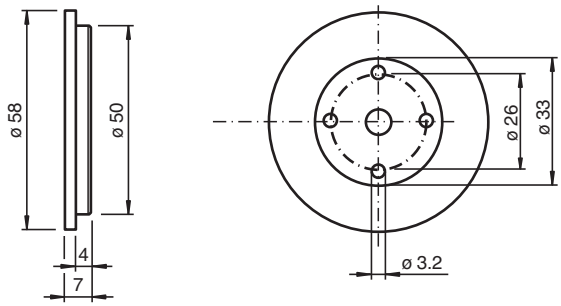
C Ball joint



Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t174181_eng.pdf

Dimensions

X3



Technical Data

General specifications		
Device type		Target Line
Measuring range		3000 ... 10000 mm
Construction type		80 mm, 130 mm, 190 mm
Ambient conditions		
Ambient temperature		-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications		
Rope diameter		0.55 mm
Degree of protection		IP50
Material		
Housing		design 80/130 : Luranyl® or Lexan 920 design 190 : ABS-GF17
Rope		Stainless steel 1.4401/316
Life span		up to 10^6 Cycles
General information		
Scope of delivery		Shaft adapter for rotary encoder with shaft dimension Ø 6 mm x 10 mm up to 20 mm , adapter flange , Mounting clips , 3 x M4 x 8 bolts for mounting the adapter , Cover disk , Hexagon socket wrench, 1.3 AF

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Dimensions

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
Repeatability (max. in mm)	0,3	0,5	1
Hysteresis (max. in mm)	1,2	1,5	3
Linearity	± 0.01%	± 0.01%	± 0.01%
Retraction speed (in m/s)	6	3	4
Spring retraction force (in N)	5–6.3	4.5–7	9–12
Weight (in kg)	0.25	0.8	1.9
Dimensions (in mm)			
A	10.5	13	14.5
B	24.7	27.2	29
C	80	130	190
D	67	110	160
E	36	61	87
F	120.2	186	225
G	14.5	17	19
H	106	150	182

Type Code

Model Number

E	C	N	1	0	T	L	-				N	P	-			:	N	N

Flange type

X1 Servo flange Ø 50 mm/42 mm/3 x M4; shaft Ø 6 mm x 10 mm

X3 Servo flange Ø 33 mm/26 mm/4 x M3; shaft Ø 6 mm x 11.5 mm

Cable mounts

A Brass Ring PE (only with 10 m)

B Ring

C Ball Joint (only with 10 m)

Length of measuring cable

03 3 m

05 5 m

10 10 m

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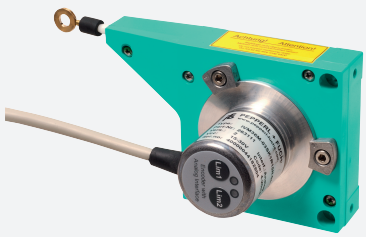


Cable pull rotary encoder
ECA10TL - Analog

- 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

Cable pull rotary encoder with analog interface and push buttons

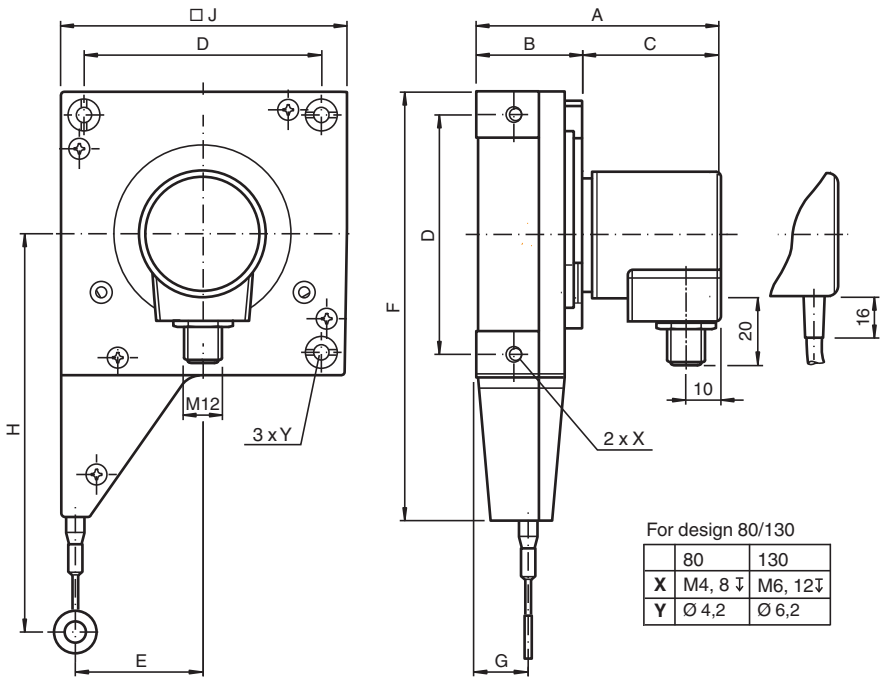
CE

Function

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

Dimensions

For design 80/130



For design 80/130

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

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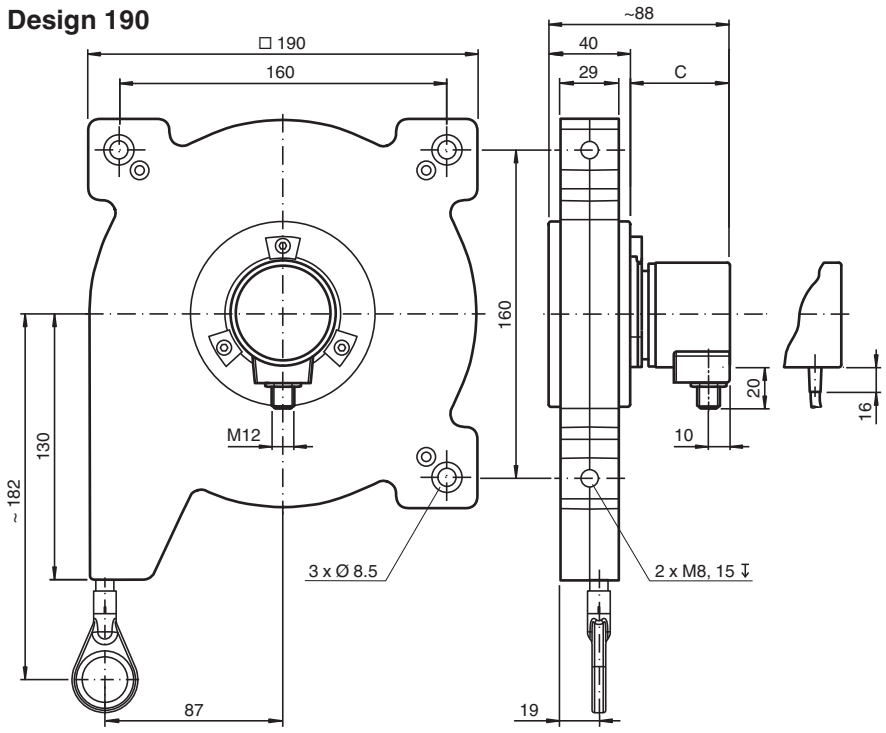
Dimensions

Design 190

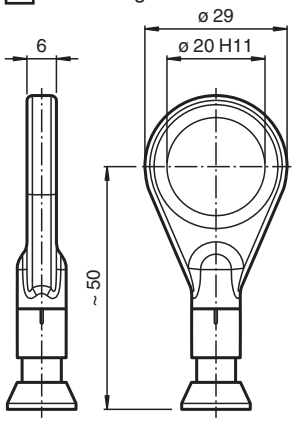


Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t175236_eng.pdf

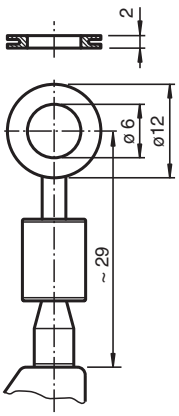
Dimensions

Cable mounts

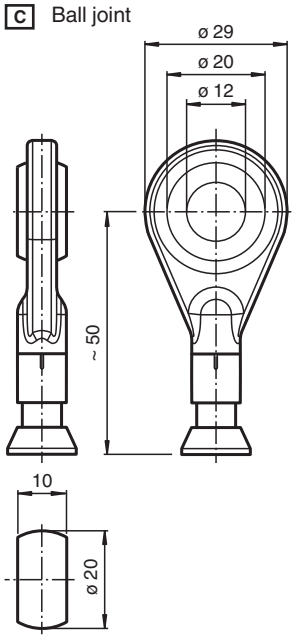
A Brass ring PE



B Ring



C Ball joint



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

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Technical Data

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 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

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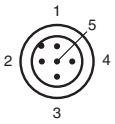
Connection

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 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

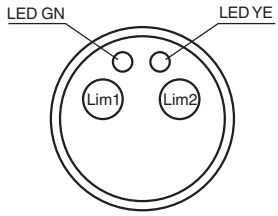
1. Press the two operating buttons ("Lim1" and "Lim2") simultaneously. Both LEDs will light up. Press and hold the operating buttons for 30 seconds. After 15 seconds, the two LEDs will start to flash.

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:

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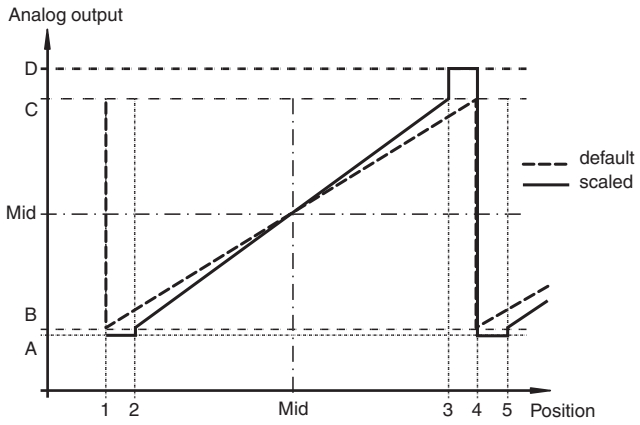

Legend:

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

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	-

Dimensions

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	-

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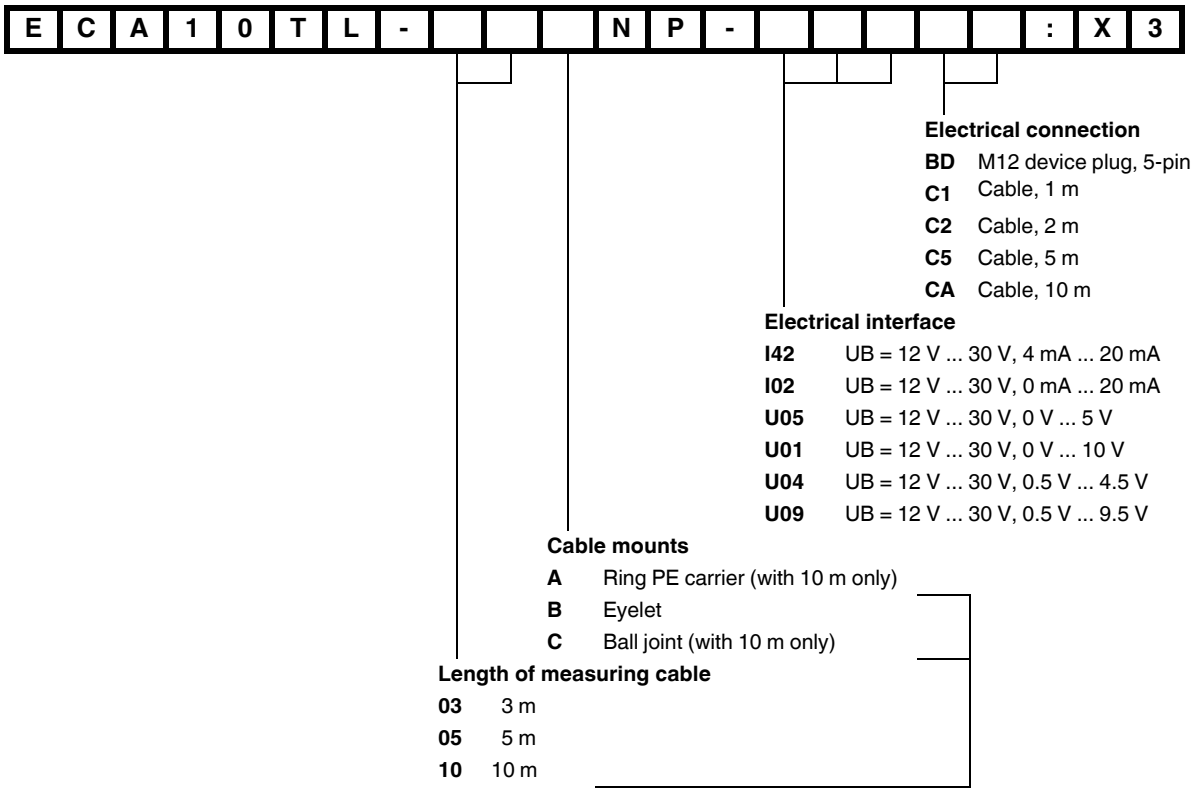
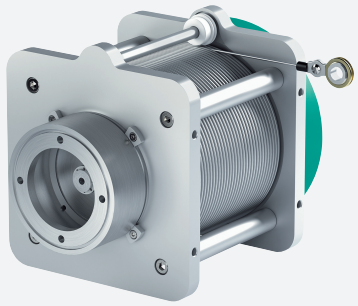
E	36	61	-
F	120	186	-
G	14.5	17	-
H	106	150	-
J	80	130	

Type Code

Model Number





Cable pull

ECN40HD-*

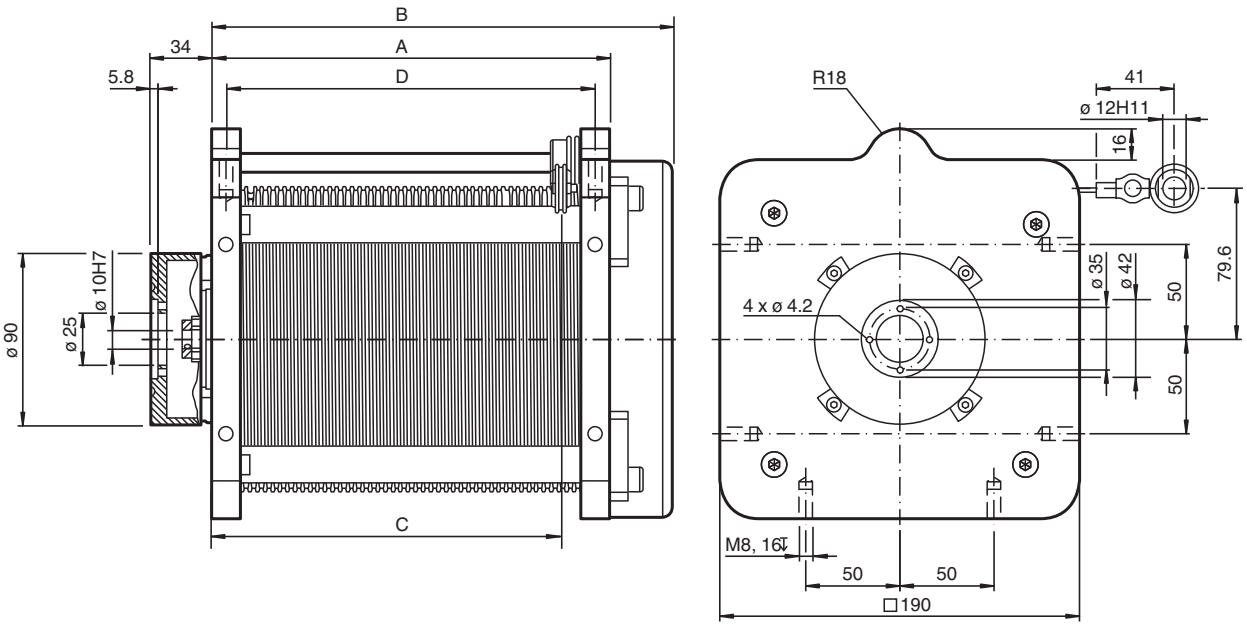
- Open cable pull system
- Up to 20 m of measuring cable
- Measuring cable diameter of 2 mm
- Drum with grooving (Lebus spooling) to increase service life and accuracy
- Ball joint as standard cable attachment point allows the attachment point to move with various degrees of freedom and prevents the measuring cable from kinking

Cable pull

Function

Cable pull for use in harsh ambient conditions.

Dimensions



Technical Data

General specifications		
Device type		Heavy duty
Measuring range		5000 ... 20000 mm
Drum perimeter		500 mm
Construction type		190 mm
Ambient conditions		
Ambient temperature		-30 ... 70 °C (-22 ... 158 °F)

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t175242_eng.pdf

Technical Data

Mechanical specifications		
Rope diameter		2 mm
Tension force at rope		22 ... 37 N
Retraction speed		4 m/s
Degree of protection		IP65
Material		
Housing		anodized aluminum
Spring housing		lacquer-coated aluminum
Rope		Stainless steel 1.4401/316, plastic sheathing
Life span		up to 10^6 Cycles
General information		
Scope of delivery		Shaft coupling for attaching a rotary encoder , Mounting clips , bolts for mounting the adapter and a rotary encoder , Sealing elements (various seals for mounting a rotary encoder) , Hexagon socket wrench, 1.3 AF

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Dimensions

Variable sizes

Technical Data	Design 190			
Measuring length (in m)	05	10	15	20
Repeatability (max. in mm)	0.5	1	1.5	2
Hysteresis (max. in mm)	2	4	5	6
Weight in kg	5	5.5	6	7.5
Dimensions (in mm)				
A	90	130	170	210
B	123	163	203	243
C	64	104	144	184
D	75	115	155	195

Type Code

Model Number

E	C	N	4	0	H	D	-			C	N	A	-	X	4	:	N	N

Length of measuring cable

05 5 m
10 10 m
15 15 m
20 20 m

Cable pull rotary encoder

ECA10TL - SSI

- 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
- SSI interface
- Free of wear magnetic sampling
- Additionally push buttons for preset function (only model characteristic SB2, SG2)

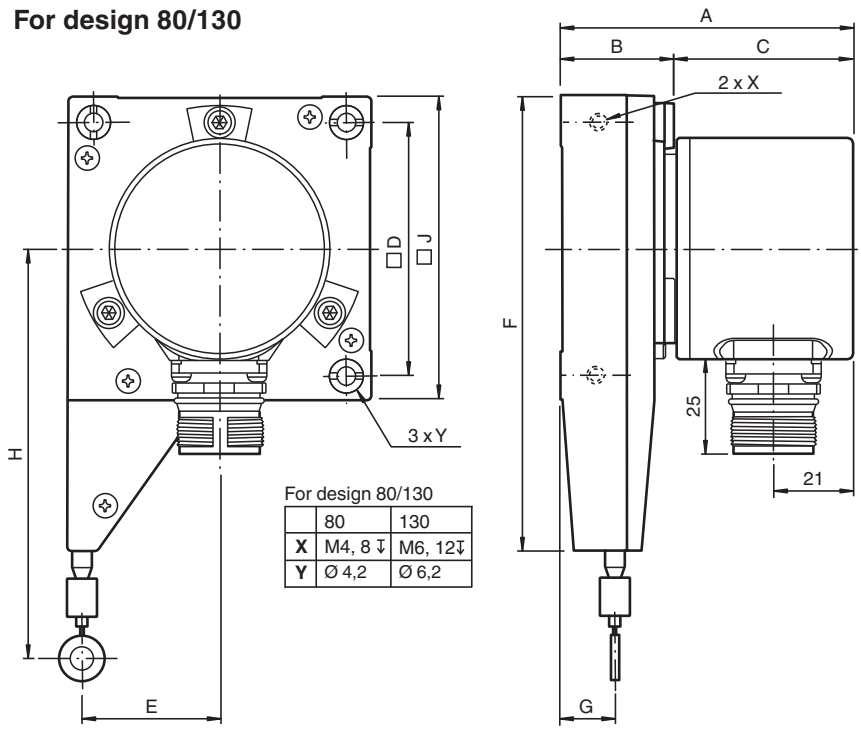
Cable pull rotary encoder with SSI interface

Function

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

Dimensions

For design 80/130



For design 80/130

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

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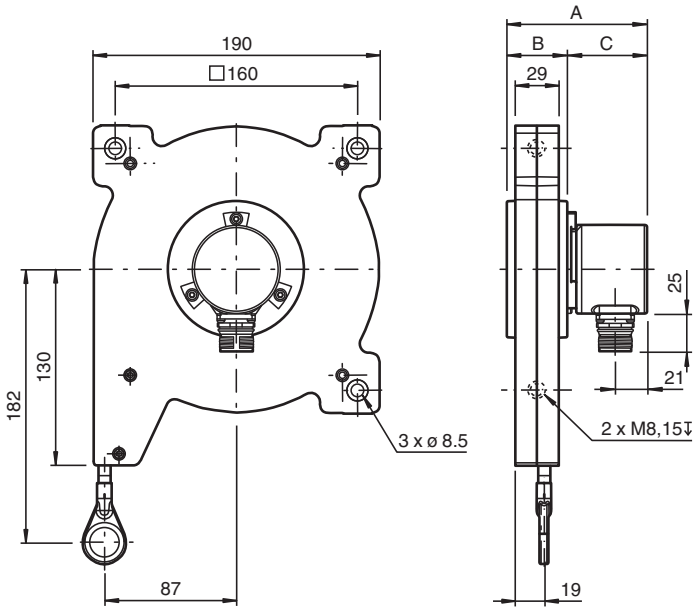
Dimensions

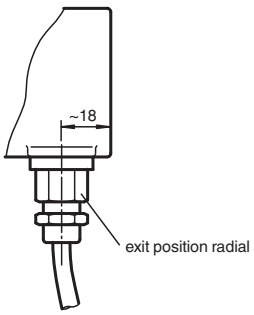
For design 190



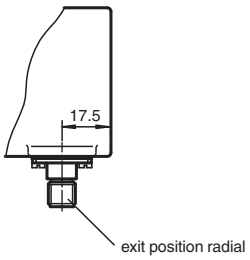
Connections

Dimensions in mm

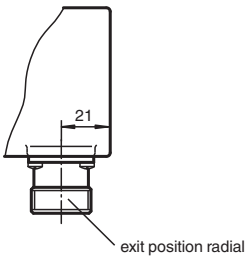
Cable



Connector M12



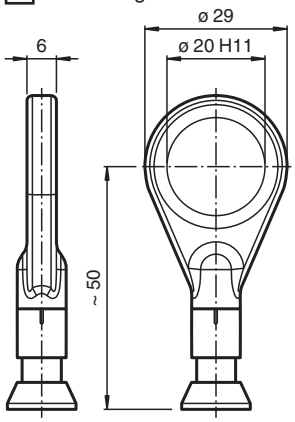
Connector M23



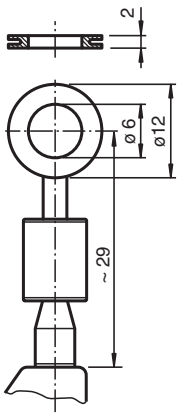
Dimensions

Cable mounts

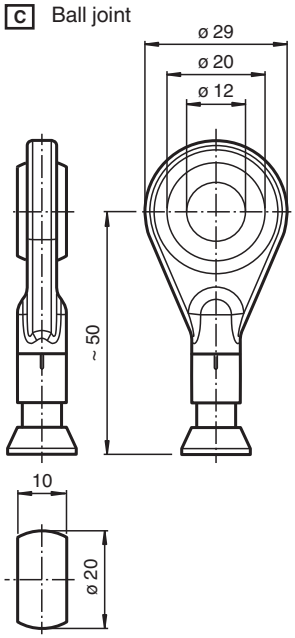
A Brass ring PE



B Ring



C Ball joint



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Target line with SSI interface
Measuring range		3000 ... 10000 mm
Construction type		80 mm, 130 mm, 190 mm
Resolution		Cable pull: design 80 mm: with 13 Bit 0,028 mm; with 12 Bit 0,056 mm design 130 mm: with 13 Bit 0,047 mm; with 12 Bit 0,094 mm design 190 mm: with 13 Bit 0,068 mm; with 12 Bit 0,0135 mm Encoder: standard 25 Bit (13 Bit/revolution) or as an option 24 Bit (12 Bit/revolution)
Electrical specifications		
Operating voltage	U_B	4.75 ... 30 V DC
No-load supply current	I_0	typ. 50 mA
Power consumption	P_0	approx. 1.5 W
Output code		Gray code, binary code
Code course (counting direction)		adjustable

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Technical Data

Interface	
Interface type	SSI
Transfer rate	0.1 ... 2 MBit/s
Cycle time	< 100 µs
Standard conformity	RS 422
Input 1	
Input type	Selection of counting direction (cw/ccw)
Signal voltage	
High	4.75 V ... U_B (cw descending)
Low	0 ... 2 V or unconnected (cw ascending)
Input current	< 6 mA
Input 2	
Input type	zero-set (PRESET 1) with falling edge
Signal voltage	
High	4.75 V ... U_B
Signal duration	min. 1.1 s
Connection	
Connector	M12 connector, 8-pin or M23 connector, 12-pin
Cable	Ø7 mm, 6 x 2 x 0.14 mm²
Standard conformity	
Degree of protection	acc. DIN EN 60529
Connection side	cable models: IP65 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	-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

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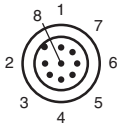
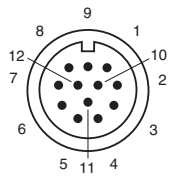
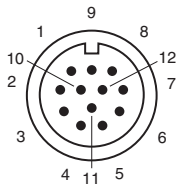
Connection

Signal	Cable, 12-core	Connector M12, 8-pin	Connector M23, 12-pin, cw	Connector M23, 12-pin, ccw	Explanation
GND (encoder)	White	1	1	1	Power supply
U_b (encoder)	Brown	2	2	8	Power supply
Clock (+)	Green	3	3	3	Positive cycle line
Clock (-)	Yellow	4	4	11	Negative cycle line
Data (+)	Grey	5	5	2	Positive transmission data
Data (-)	Pink	6	6	10	Negative transmission data
Reserved	Black		7	12	Not wired, reserved
V/R	Red	8	8	5	Input for selection of counting direction
PRESET 1	Blue	7	9	9	zero-setting input
Reserved	Violet		10	4	Not wired, reserved
Reserved	Grey/Pink		11	6	Not wired, reserved
Reserved	Red/Blue		12	7	Not wired, reserved
					

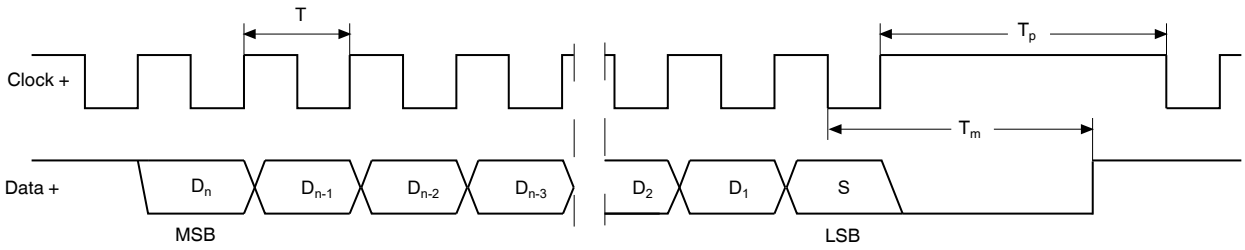
Interface

Description

The Synchronous Serial Interface was specially developed for transferring the output data of an absolute encoder to a control device. The control module sends a clock bundle and the absolute encoder responds with the position value.

Thus only 4 lines are required for the clock and data, no matter what the resolution of the rotary encoder is. The RS 422 interface is optically isolated from the power supply.

SSI signal course Standard



$D_1, ..., D_n$:	Position data	T = 1/f:	Duration of period of clock signal ≤ 1 MHz
S:	Special bit	T_m:	Monoflop time 20 µs ± 1 µs
MSB:	Most significant bit	T_p:	Clock pause ≥ monoflop time ($T_p \geq T_m$)
LSB:	Least significant bit		

SSI output format Standard

- At idle status signal lines "Data +" and "Clock +" are at high level (5 V).
- The first time the clock signal switches from high to low, the data transfer in which the current information (position data (D_n) and special bit (S)) is stored in the encoder is introduced.±
- The highest order bit (MSB) is applied to the serial data output of the encoder with the first rising pulse edge.
- The next successive lower order bit is transferred with each following rising pulse edge.
- After the lowest order bit (LSB) has been transferred the data line switches to low until the monoflop time T_m has expired.
- No subsequent data transfer can be started until the data line switches to high again or the time for the clock pause T_p has expired.
- After the clock sequence is complete, the monoflop time T_m is triggered with the last falling pulse edge.

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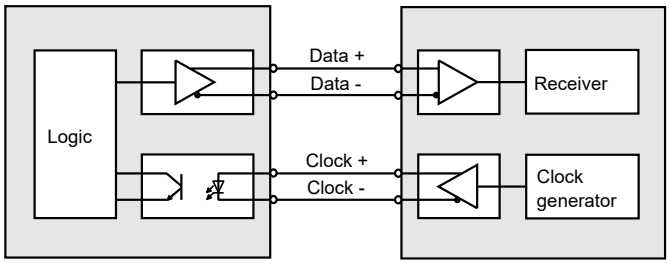
- The monoflop time T_m determines the lowest transmission frequency.

SSI output format ring slide operation (multiple transmission)

- In ring slide operation, multiple transmission of the same data word over the SSI interface makes it possible to offer the possibility of detecting transmission errors.
- In multiple transmission, n bits are transferred per data word in standard format. The value n equals the total resolution of the encoder.
  As an example: a multiturn encoder with a resolution of 8192 steps/revolution (13 bit) and a max. number of 4096 revolutions (12 bit) has a total resolution of n = 25 bit.
- If the clock change is not interrupted after the last falling pulse edge, ring slide operation automatically becomes active. This means that the information that was stored at the time of the first clock change is generated again.
- After the first position transmission, the n+1 pulse controls data repetition. If the n+1 pulse follows after an amount of time greater than the monoflop time T_m, a new current data word will be transmitted with the following pulses.

If the pulse line is exchanged, the data word is generated offset.

Block diagram



Line length

Line length in m	Baudrate in kHz
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Parameterization

Push buttons on encoder with model characteristic SB2, SG2

In addition to the electrical preset function (PRESET 1) these models are equipped with 2 push buttons for manually setting the zero point of the rotary encoder.

Manually zero set

1. Simultaneously press and hold the push buttons A and B for 2 s.

After releasing the push buttons the rotary encoder sets the current position as zero point.

Dimensions

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)	0.55	1.1	2.2
Rotary encoder Ø (in mm)	58		
Dimensions (in mm)			
A	78	80	93
B	30	32	40
C	48	48	53

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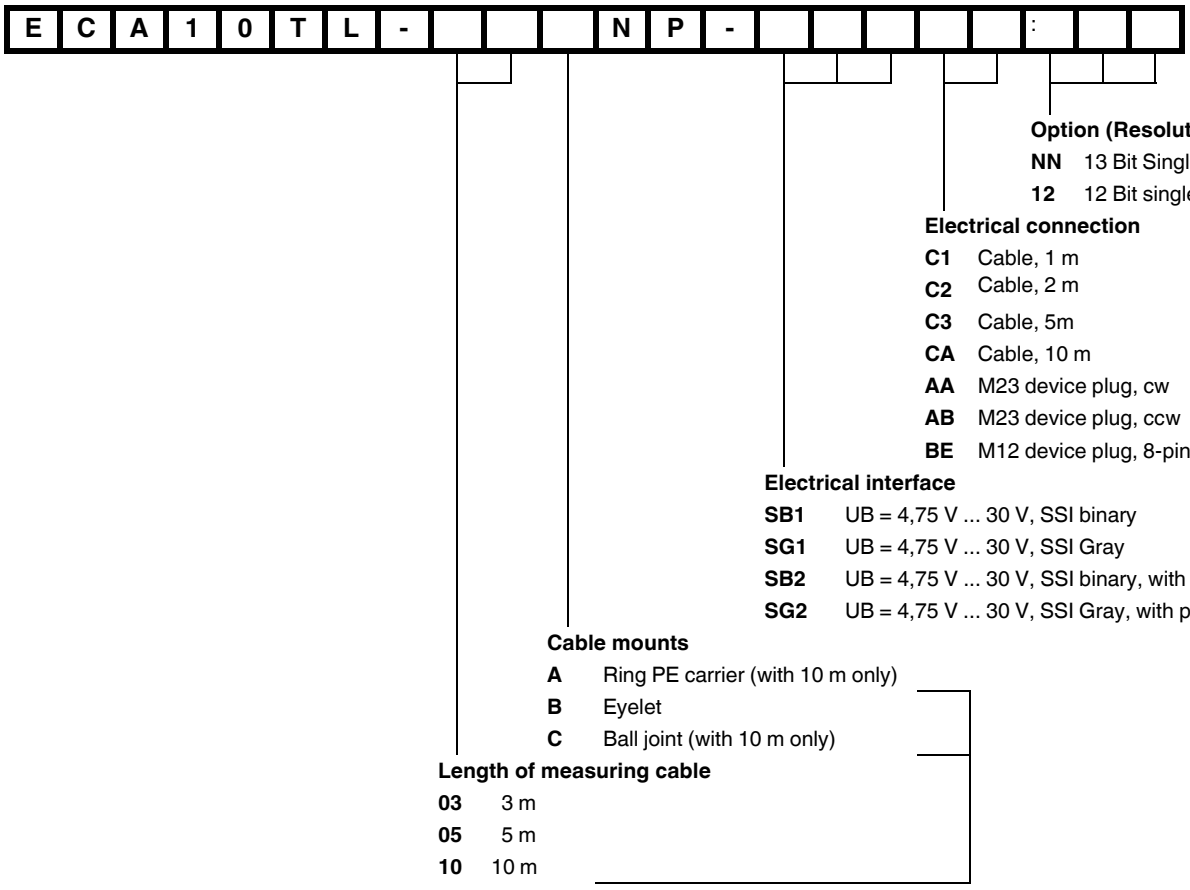
D	67	110	-
E	36	61	-
F	120	186	-
G	14.5	17	-
H	106	150	-
J	80	130	

Type Code

Model Number



Cable pull rotary encoder
ECA10TL - EtherCAT

- 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
- EtherCAT interface
- Free of wear magnetic sampling

Cable pull rotary encoder with EtherCAT interface

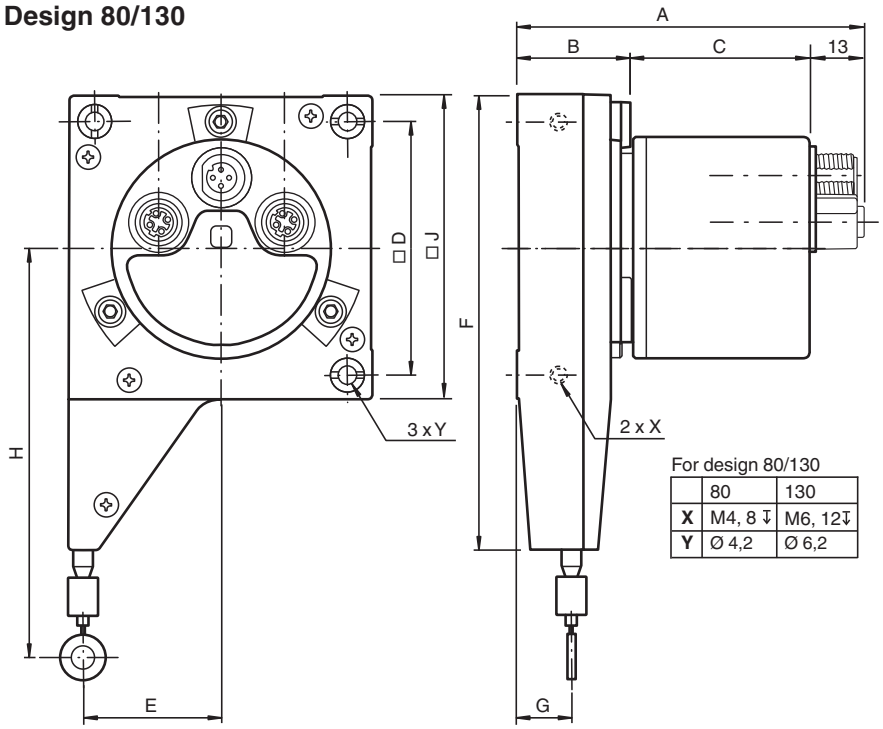
CE

Function

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

Dimensions

Design 80/130



For design 80/130

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

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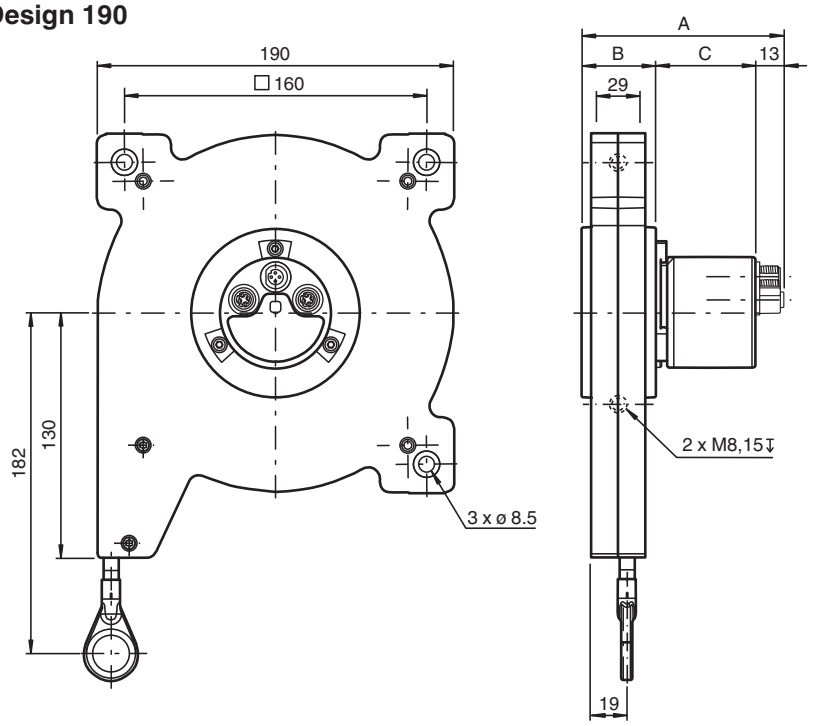
Dimensions

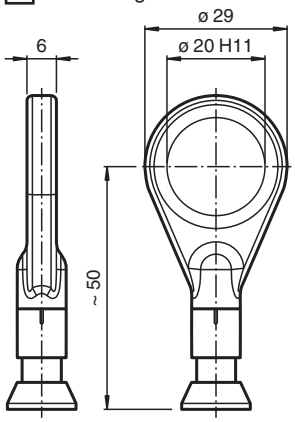
Design 190



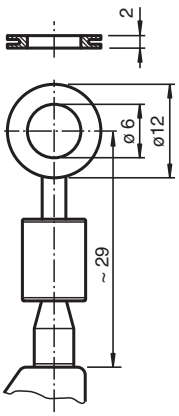
Dimensions

Cable mounts

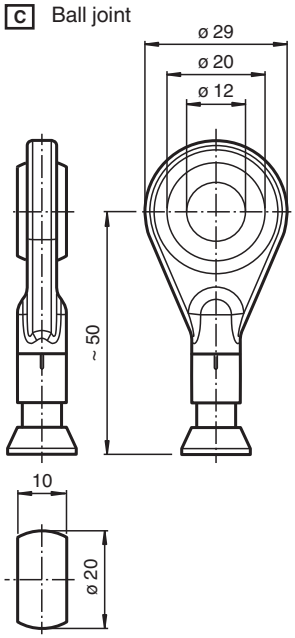
A Brass ring PE



B Ring



C Ball joint



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Target line with EtherCAT 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: 25 Bit (13 Bit/revolution)
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
Power consumption	P_0	approx. 4 W
Output code		binary code
Code course (counting direction)		adjustable
Interface		

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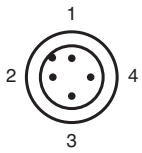
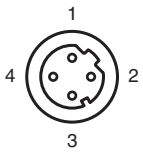
Technical Data

Transfer rate		10 MBit/s / 100 MBit/s
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
Standard conformity		
Degree of protection		acc. DIN EN 60529
Connection side		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		-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

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t176985_eng.pdf

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 -
		

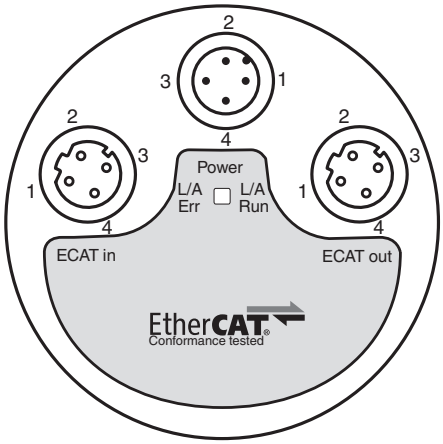
Indication

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



Dimensions

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)	0.55	1.1	2.2
Rotary encoder Ø (in mm)	58		
Dimensions (in mm)			
A	91	93	106
B	30	32	40
C	48	48	53

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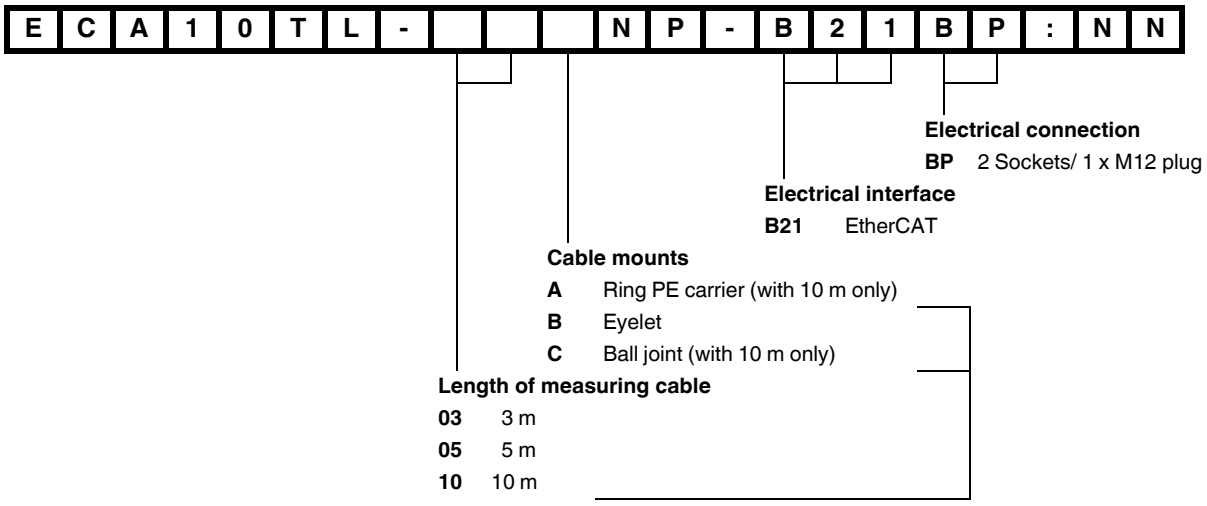
D	67	110	-
E	36	61	-
F	120	186	-
G	14,5	17	-
H	106	150	-
J	80	130	

Type Code

Model Number



Cable pull rotary encoder

ECA10TL - PROFINET

- 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
- PROFINET interface
- Free of wear magnetic sampling

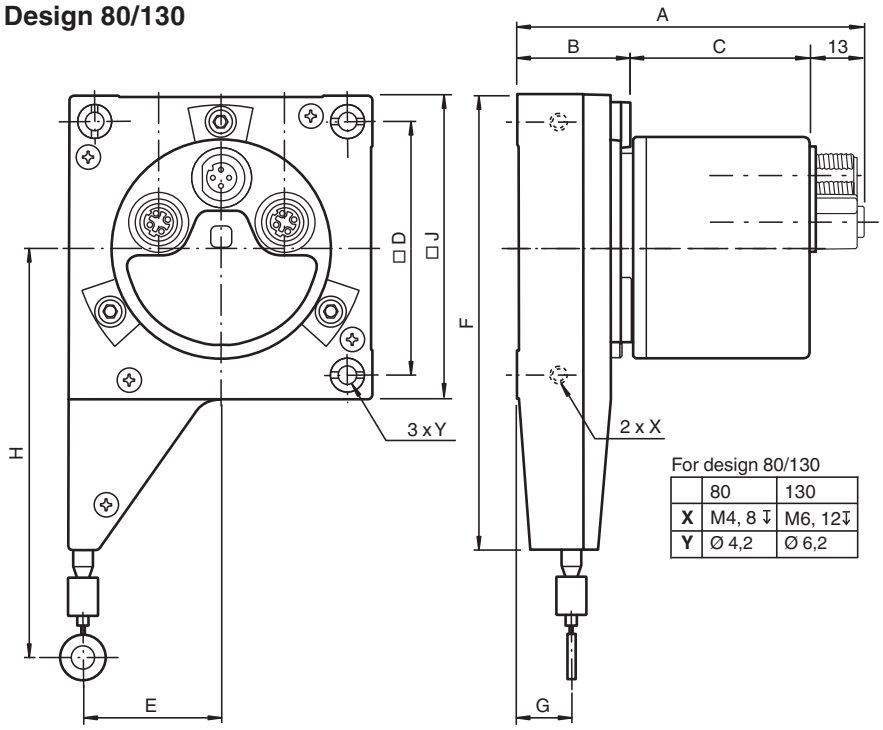
Cable pull rotary encoder with PROFINET interface

Function

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

Dimensions

Design 80/130



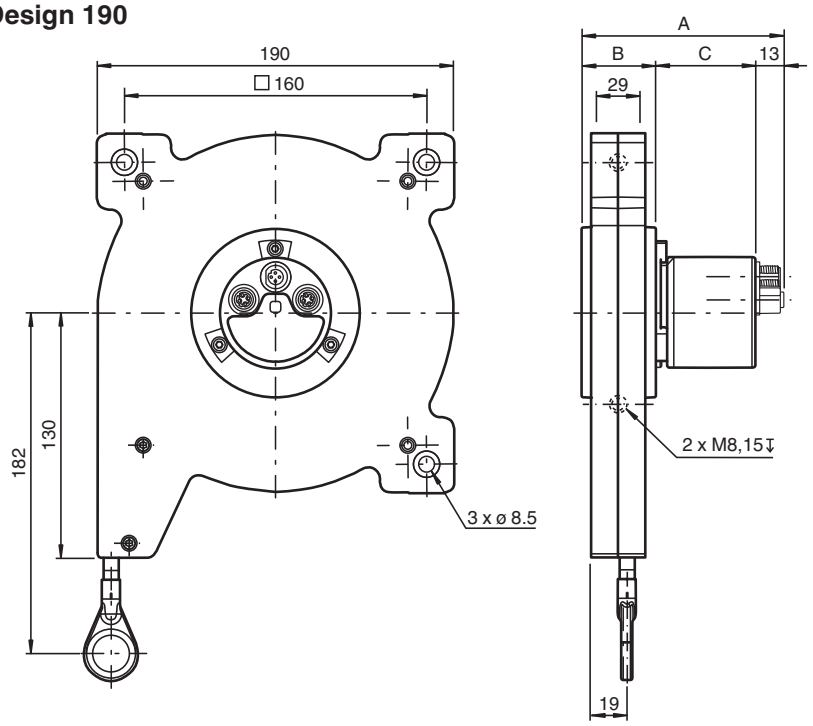
For design 80/130

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

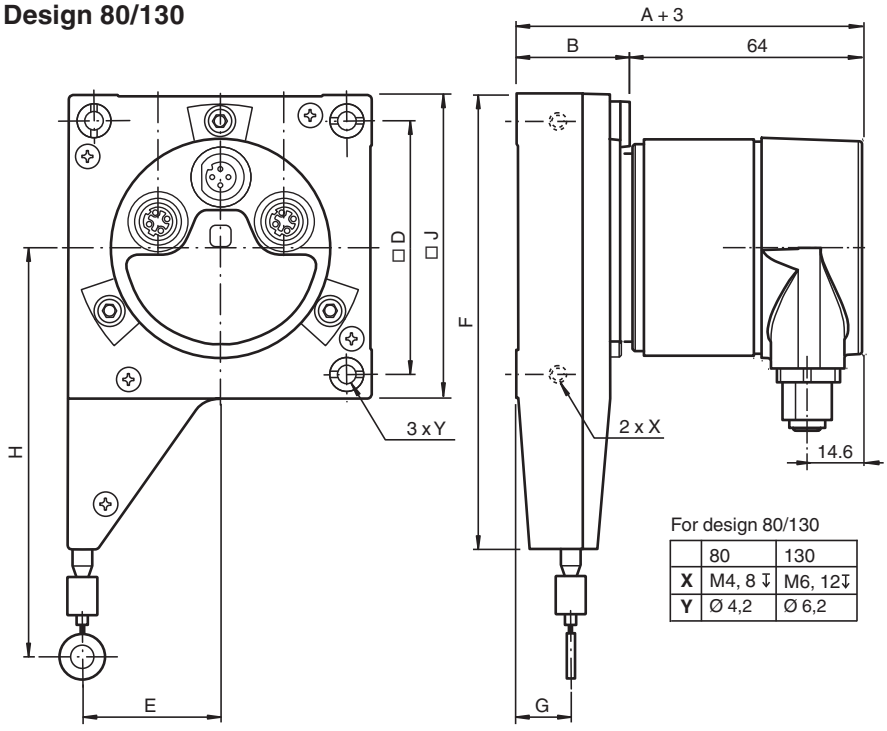
Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

Dimensions

Design 190



Design 80/130



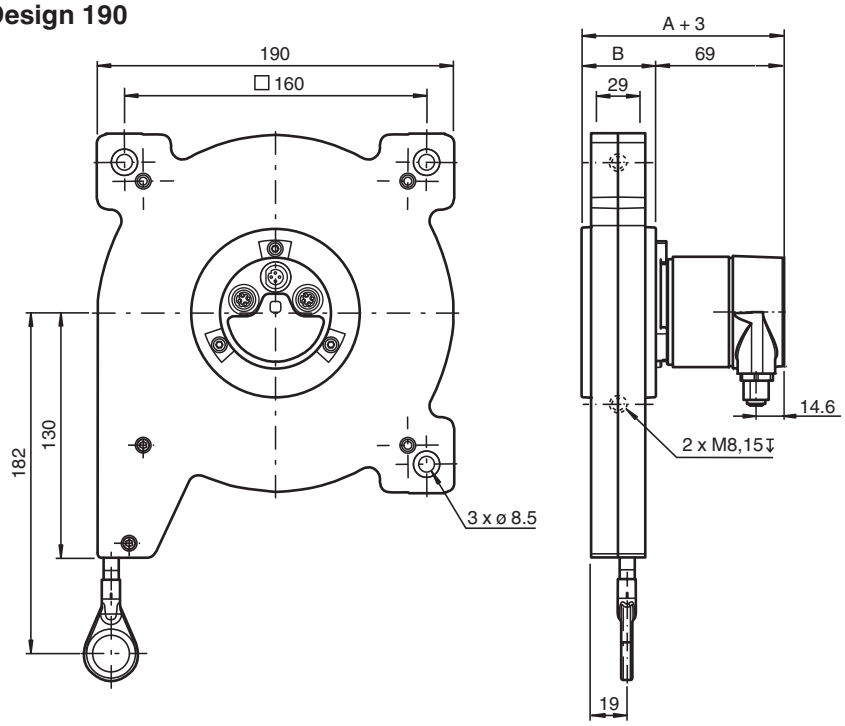
For design 80/130

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

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

Dimensions

Design 190

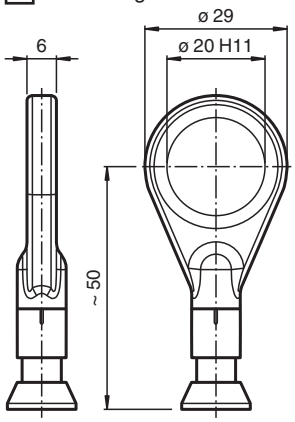


Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

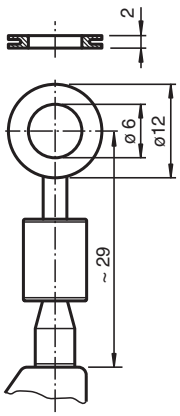
Dimensions

Cable mounts

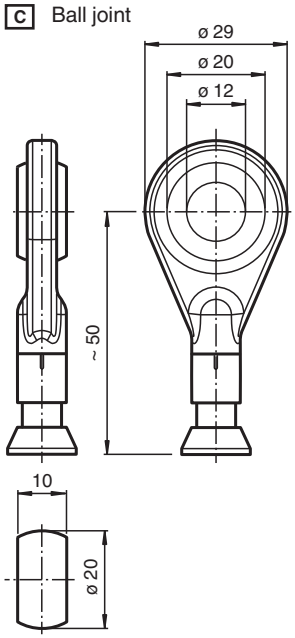
A Brass ring PE



B Ring



C Ball joint



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Target line with PROFINET 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: 25 Bit (13 Bit/revolution)
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
Power consumption	P_0	approx. 4 W
Output code		binary code
Code course (counting direction)		adjustable
Interface		

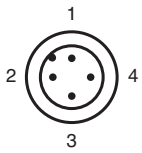
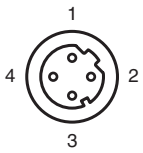
Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

Technical Data

Transfer rate		100 MBit/s
Connection		
Connector		Ethernet: 2 sockets M12 x 1, 4-pin, D-coded Supply: 1 plug M12 x 1, 4-pin, A-coded
Standard conformity		
Degree of protection		acc. DIN EN 60529
Connection side		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		-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 , painted
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

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

Connection

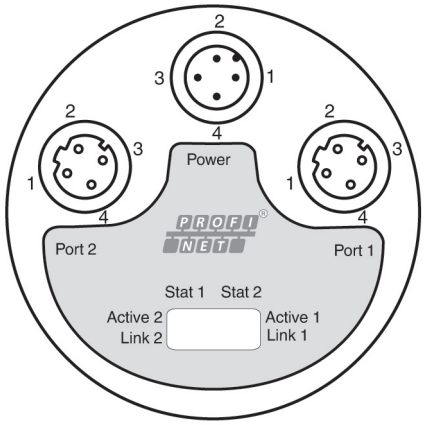
Pin	Male connector M12 x 1, 4-pin, A-coded	Female connector M12 x 1, 4-pin, D-coded
1	Supply voltage +U_B	Tx +
2	-	Rx +
3	0 V	Tx -
4	-	Rx -
		

Indication

Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available



Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another device Criteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

1) flashing frequency 0.5 Hz for at least 3 seconds

Dimensions

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

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t178005_eng.pdf

Retraction speed (in m/s)	6	3	4
Spring retraction force (in N)	5–6.3	4.5–7	9–12
Weight (in kg)	0.55	1.1	2.2
Rotary encoder Ø (in mm)	58		
Dimensions (in mm)			
A	91	93	106
B	30	32	40
C	48	48	53
D	67	110	-
E	36	61	-
F	120	186	-
G	14,5	17	-
H	106	150	-
J	80	130	

Type Code

Model Number

E	C	A	1	0	T	L	-				N	P	-	B	1	7			:	N	N

Electrical connection
BP 2 Sockets/ 1 x M12 plug, axial
AZ 2 Sockets/ 1 x M12 plug, radial

Electrical interface
B17 PROFINET

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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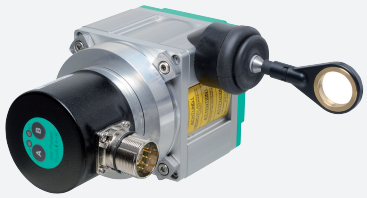


Cable pull rotary encoder

ECA30PL - SSI

- Robust aluminum drum housing
- Drum travel when cable retracted using threaded spindle
- Bellows with steel tip
- Comprehensive accessories
- Housing can be coated as an option (Hart Coat)
- Rust and acid-resistant measuring cable
- SSI interface
- Free of wear magnetic sampling
- Additionally push buttons for preset function (only model characteristic SB2, SG2)

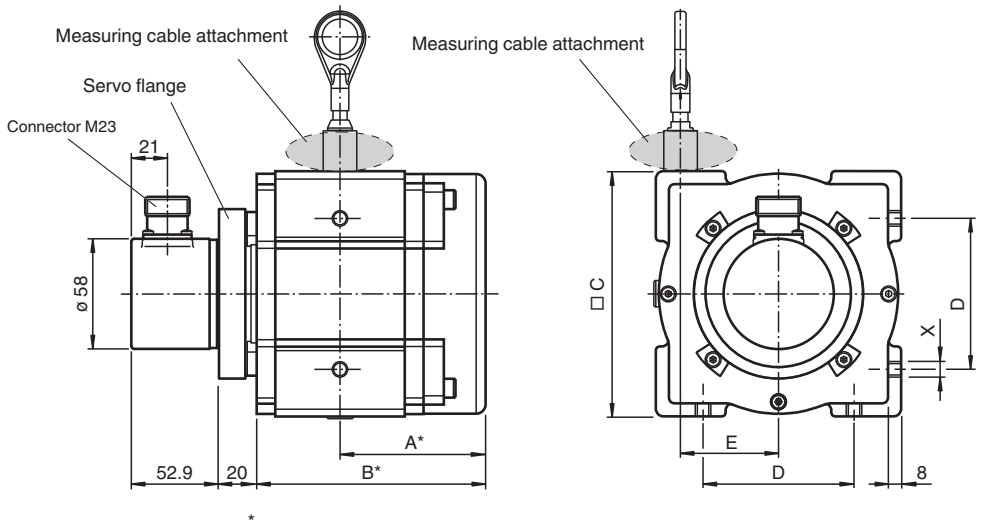
Cable pull rotary encoder with SSI interface

Function

Flexible cable pull rotary encoder designed to meet tough requirements in all fields of application.

Dimensions

Details of variable specifications of desgins and measuring length
see chapter „Variable Data and Dimensions“



Measuring length	X
01 - 02	4 x M6 ↓8
03	8 x M6 ↓8
05 - 10	4 x M8 ↓8
15 - 30	12 x M8 ↓8
35 - 60	12 x M10 ↓11

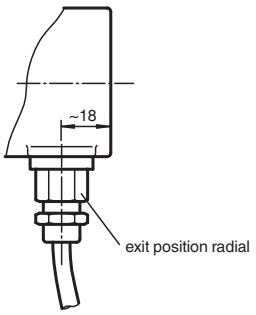
Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t181402_eng.pdf

Dimensions

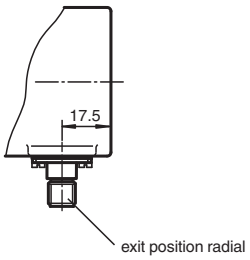
Connections

Dimensions in mm

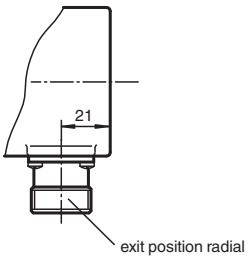
Cable



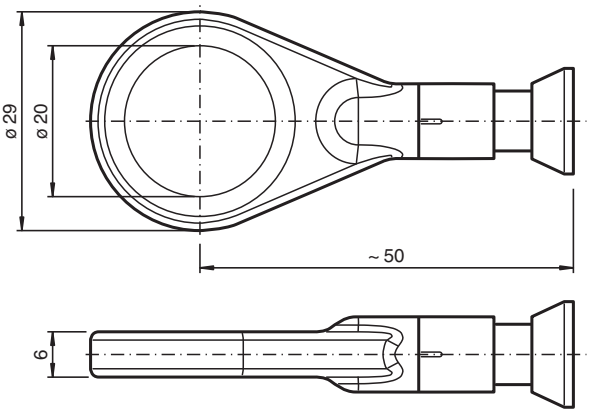
Connector M12



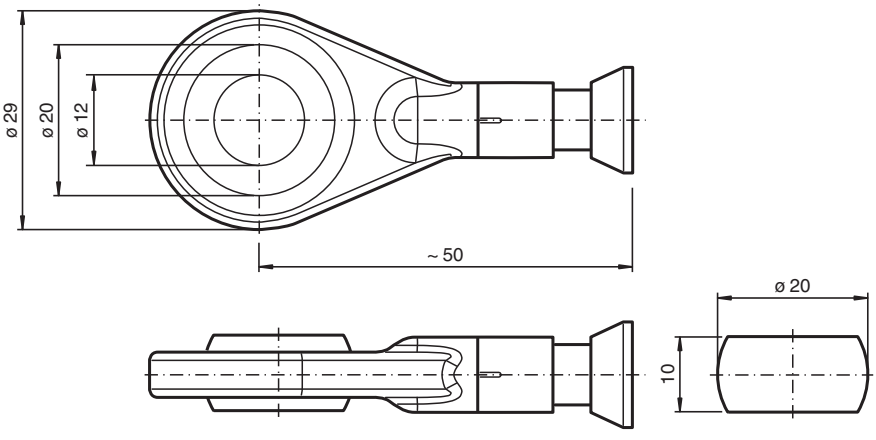
Connector M23



A



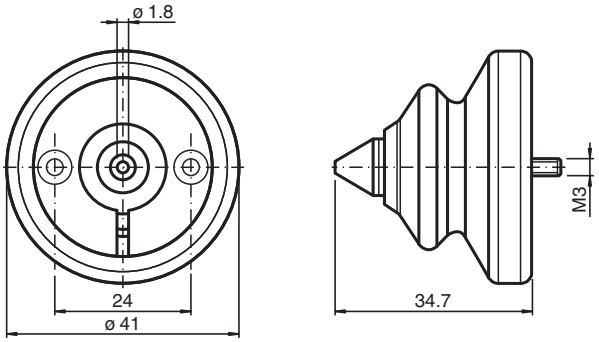
C



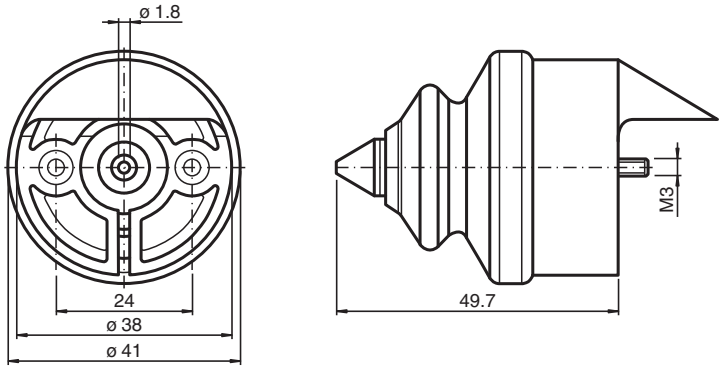
Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t1181402_eng.pdf

Dimensions

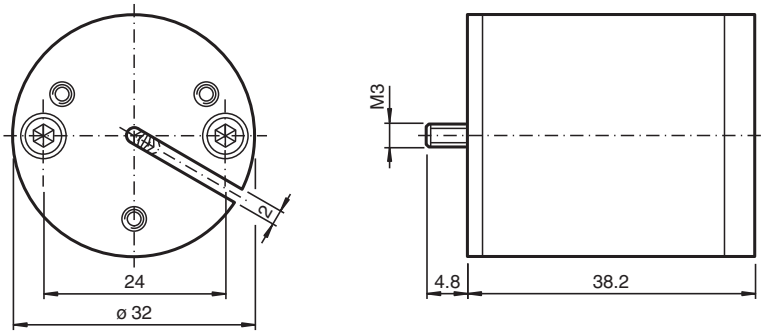
1 For design 130/190



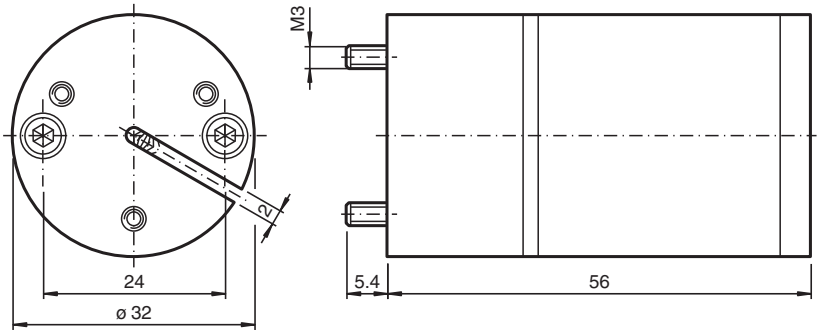
1 For design 80



2 For design 130/190



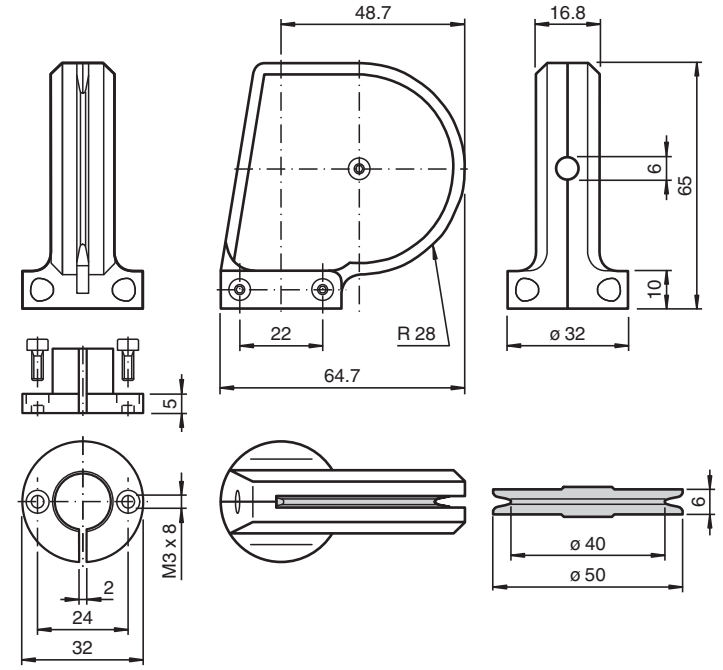
2 For design 80



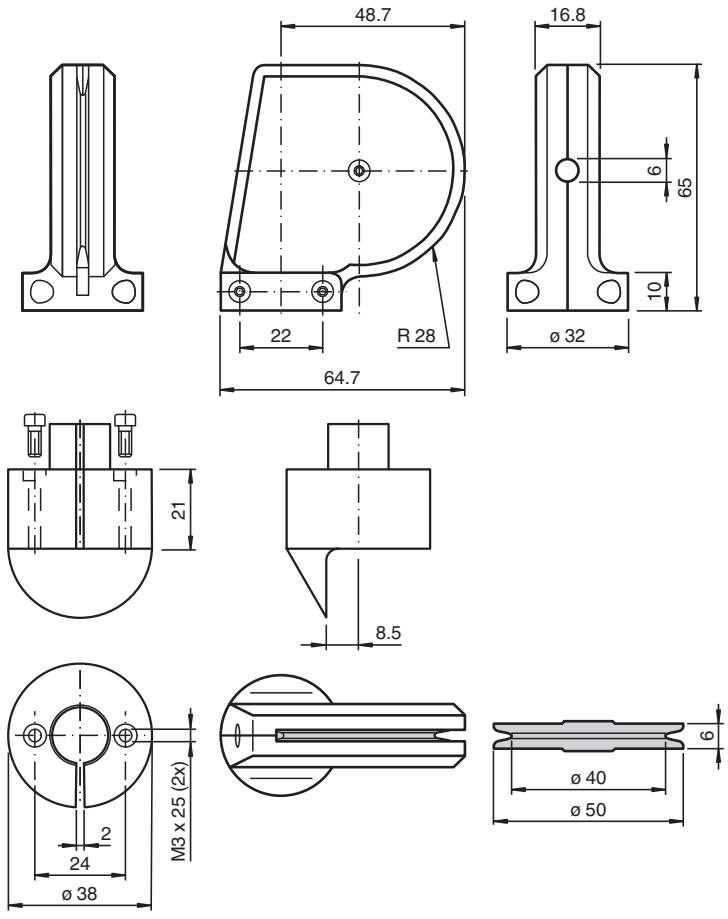
Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t181402_eng.pdf

Dimensions

4 **For design 130/190**

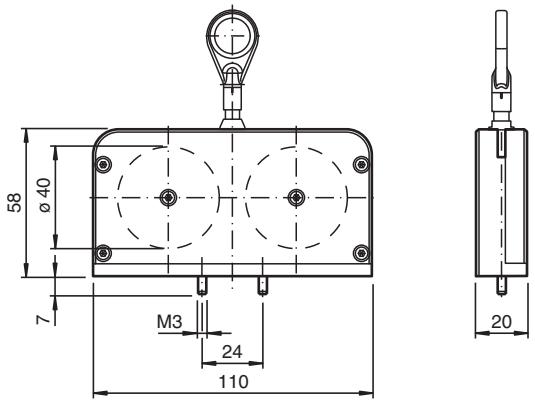


4 **For design 80**

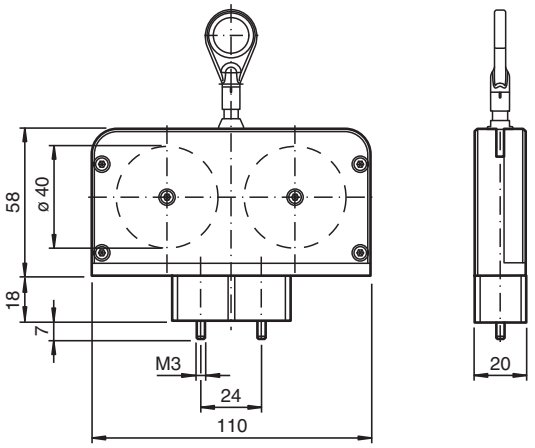


Dimensions

5 **For design 130/190**



5 **For design 80**



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Premium Line with SSI interface
Measuring range		1000 ... 60000 mm
Construction type		80 mm, 130 mm, 190 mm
Resolution		Cable pull: Design 80 mm: 0,024 mm Design 130 mm: 0,041 mm Design 190 mm: 0,059 mm Encoder: 25 Bit (13 Bit/revolution)
Functional safety related parameters		
B_{10d}		300000
Electrical specifications		
Operating voltage	U_B	4.75 ... 30 V DC
No-load supply current	I_0	typ. 50 mA
Power consumption	P_0	approx. 1.5 W
Time delay before availability	t_v	< 450 ms
Output code		Gray code, binary code
Code course (counting direction)		adjustable
Interface		
Interface type		SSI
Cycle time		< 100 µs
Standard conformity		RS 422
Input 1		

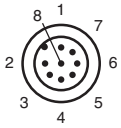
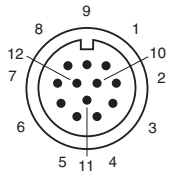
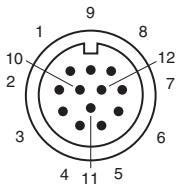
Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t181402_eng.pdf

Technical Data

Input type		Selection of counting direction (cw/ccw)
Signal voltage		
High		4.75 V ... U_B (cw descending)
Low		0 ... 2 V or unconnected (cw ascending)
Input current		< 6 mA
Input 2		
Input type		zero-set (PRESET 1) with falling edge
Signal voltage		
High		4.75 V ... U_B
Low		0 ... 2 V
Input current		< 6 mA
Signal duration		min. 1.1 s
Connection		
Connector		M12 connector, 8-pin or M23 connector, 12-pin
Cable		Ø7 mm, 6 x 2 x 0.14 mm^2, 1 m (cable length, see order code)
Standard conformity		
Degree of protection		DIN EN 60529, IP65
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		-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
Bending radius		min. 17 mm
Breaking force		min. 1227 N
Material		
Cable pull		anodized aluminum or Aluminum with Hart Coat coating
Rotary encoder		housing: nickel-plated steel Flange: aluminum
Flange		Aluminum
Rope		Stainless steel 1.4401/316
Life span		up to 10^6 Cycles

Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t181402_eng.pdf

Connection

Signal	Cable, 12-core	Connector M12, 8-pin	Connector M23, 12-pin, cw	Connector M23, 12-pin, ccw	Explanation
GND (encoder)	White	1	1	1	Power supply
U_b (encoder)	Brown	2	2	8	Power supply
Clock (+)	Green	3	3	3	Positive cycle line
Clock (-)	Yellow	4	4	11	Negative cycle line
Data (+)	Grey	5	5	2	Positive transmission data
Data (-)	Pink	6	6	10	Negative transmission data
Reserved	Black		7	12	Not wired, reserved
V/R	Red	8	8	5	Input for selection of counting direction
PRESET 1	Blue	7	9	9	zero-setting input
Reserved	Violet		10	4	Not wired, reserved
Reserved	Grey/Pink		11	6	Not wired, reserved
Reserved	Red/Blue		12	7	Not wired, reserved
					

Technical Features

Variable Data and Dimensions

Technical Data	Design 80			Design 130						Design 190			
Max. measuring length (in m)	01	02	03	05	10	15	20	25	30	35	40	50	60
Drum size (incl. cable) (in mm)	200			334,1						491,5			
Retraction speed (in m/s)	8			8		6		3		4			
Spring retraction force (in N)	5-15			10-21	15-21	10-21	15-21	10-21	15-21	18-37			
Weight (in kg)	0,9	1,1	1,5	2,5	3,5	5	6	7,5	8,5	16	20	14,5	15,5
Dimensions (in mm)													
A	34	42	60	77	124	147	193	216	262	188	203	195	210
B	57	72	98	122	190	236	304	350	418	315	346	292	322
C	80			130						190			
D	50			80						140			
E	31,5			52						79			

Measuring Cable Attachments

Dimensions (in mm)		Design 80		Design 130/design 190	
Attachment		Length	Width/Ø	Length	Width/Ø
1	Bellows	49.7	41/38	34.7	41
2	Brush attachment with bellows and steel tip	90.7	32	72.9	32
4	Guide pulley	86	32	70	32
5	Double guide pulley	110	58	110	58

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		Design 80/130/190	
		Length	
8	Brush attachment + guide pulley	126	108.2

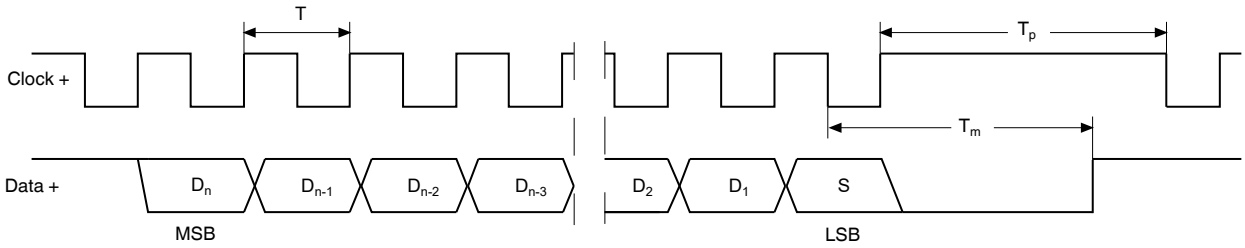
Interface

Description

The Synchronous Serial Interface was specially developed for transferring the output data of an absolute encoder to a control device. The control module sends a clock bundle and the absolute encoder responds with the position value.

Thus only 4 lines are required for the clock and data, no matter what the resolution of the rotary encoder is. The RS 422 interface is optically isolated from the power supply.

SSI signal course Standard



D_1, ..., D_n:	Position data	T = 1/f:	Duration of period of clock signal ≤ 1 MHz
S:	Special bit	T_m:	Monoflop time 20 µs ± 1 µs
MSB:	Most significant bit	T_p:	Clock pause ≥ monoflop time ($T_p \geq T_m$)
LSB:	Least significant bit		

SSI output format Standard

- At idle status signal lines "Data +" and "Clock +" are at high level (5 V).
- The first time the clock signal switches from high to low, the data transfer in which the current information (position data (D_n) and special bit (S)) is stored in the encoder is introduced.±
- The highest order bit (MSB) is applied to the serial data output of the encoder with the first rising pulse edge.
- The next successive lower order bit is transferred with each following rising pulse edge.
- After the lowest order bit (LSB) has been transferred the data line switches to low until the monoflop time T_m has expired.
- No subsequent data transfer can be started until the data line switches to high again or the time for the clock pause T_p has expired.
- After the clock sequence is complete, the monoflop time T_m is triggered with the last falling pulse edge.
- The monoflop time T_m determines the lowest transmission frequency.

SSI output format ring slide operation (multiple transmission)

- In ring slide operation, multiple transmission of the same data word over the SSI interface makes it possible to offer the possibility of detecting transmission errors.
- In multiple transmission, n bits are transferred per data word in standard format. The value n equals the total resolution of the encoder.
  As an example: a multiturn encoder with a resolution of 8192 steps/revolution (13 bit) and a max. number of 4096 revolutions (12 bit) has a total resolution of n = 25 bit.
- If the clock change is not interrupted after the last falling pulse edge, ring slide operation automatically becomes active. This means that the information that was stored at the time of the first clock change is generated again.
- After the first position transmission, the n+1 pulse controls data repetition. If the n+1 pulse follows after an amount of time greater than the monoflop time T_m, a new current data word will be transmitted with the following pulses.

If the pulse line is exchanged, the data word is generated offset.

Block diagram

Line length

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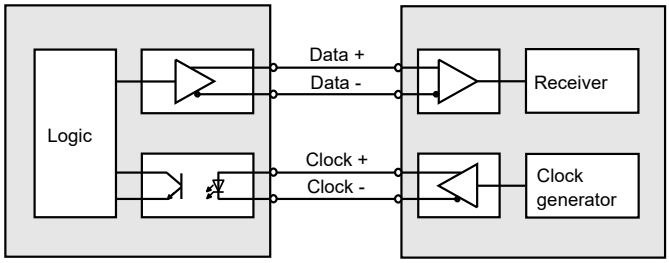

Line length in m	Baudrate in kHz
< 50	< 400
< 100	< 300
< 200	< 200
< 400	< 100

Parameterization

Push buttons on encoder with model characteristic SB2, SG2

In addition to the electrical preset function (PRESET 1) these models are equipped with 2 push buttons for manually setting the zero point of the rotary encoder.

Manually zero set

1. Simultaneously press and hold the push buttons A and B for 2 s.

After releasing the push buttons the rotary encoder sets the current position as zero point.

Type Code

Model Number

E	C	A	3	0	P	L	-						-					

Connection type
- **C1** Cable, 1 m
- **C2** Cable, 2 m
- **C5** Cable, 5 m
- **CA** Cable, 10 m
- **AA** M23 device plug, cw
- **AB** M23 device plug, ccw
- **BE** M12 device plug, 8-pin

Electrical interface
- **SG1** SSI Gray
- **SB1** SSI binary
- **SG2** SSI Gray, with push buttons
- **SB2** SSI binary, with push buttons

Material
- **A** STD anodized aluminum
- **H** Aluminum, Hart Coat coating

Attachment
- **1** Bellows with steel tip
- **2** Brush attachment with bellows and steel tip
- **4** Guide pulley
- **5** Double guide pulley
- **8** 2+4

Cable mounts
- **A** Ring PE carrier
- **C** Ball joint

Length of measuring cable
- **01-60** See table "Variable Data and Dimensions"

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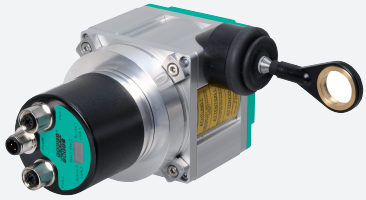


Cable pull rotary encoder
ECA30PL - PROFINET

- Robust aluminum drum housing
- Drum travel when cable retracted using threaded spindle
- Bellows with steel tip
- Comprehensive accessories
- Housing can be coated as an option (Hart Coat)
- Rust and acid-resistant measuring cable
- PROFINET interface
- Free of wear magnetic sampling

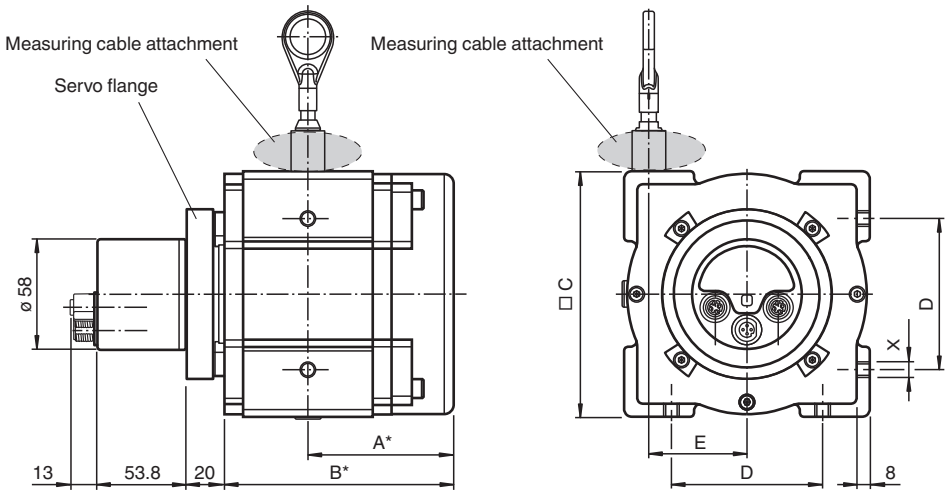
Cable pull rotary encoder with PROFINET interface

Function

Flexible cable pull rotary encoder designed to meet tough requirements in all fields of application.

Dimensions

Details of variable specifications of desgins and measuring length
see chapter „Variable Data and Dimensions“



*

Measuring length	X
01 - 02	4 x M6 ↓8
03	8 x M6 ↓8
05 - 10	4 x M8 ↓8
15 - 30	12 x M8 ↓8
35 - 60	12 x M10 ↓11

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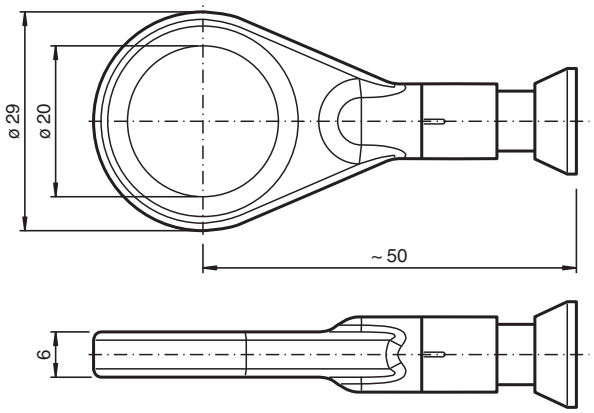
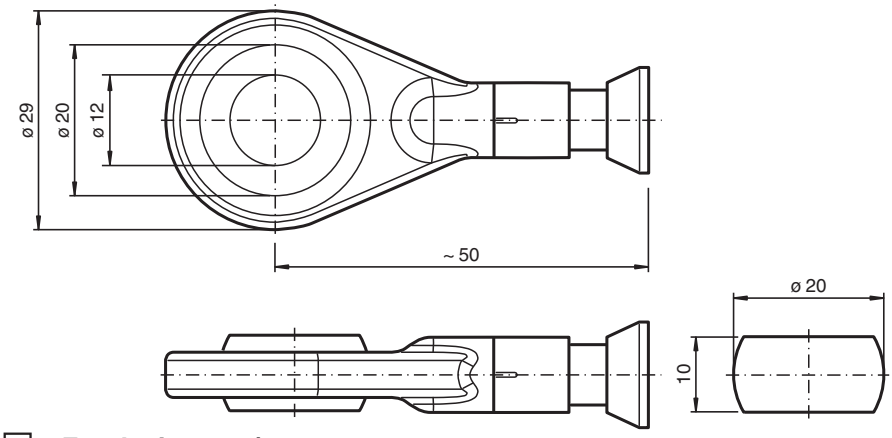
Dimensions

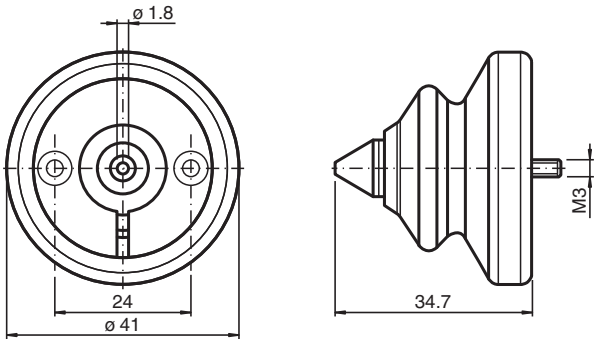
A



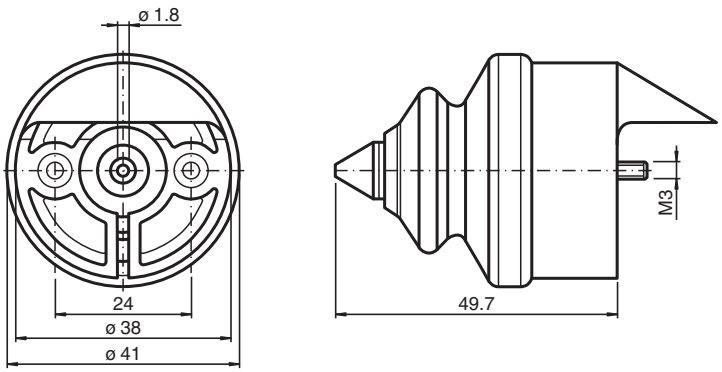
C



1 **For design 130/190**



1 **For design 80**



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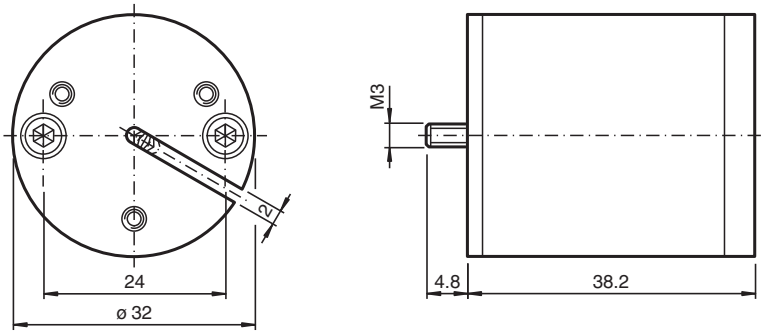
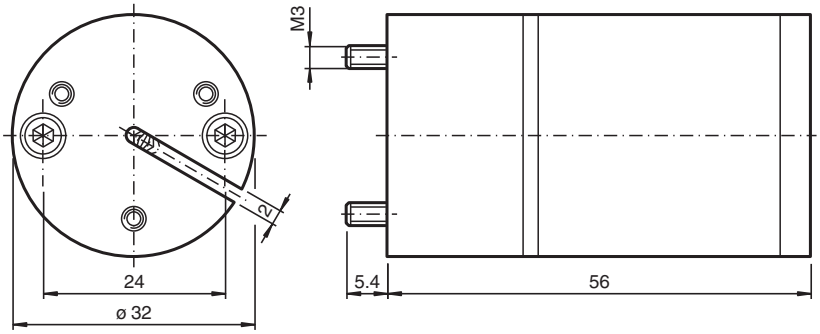
Dimensions

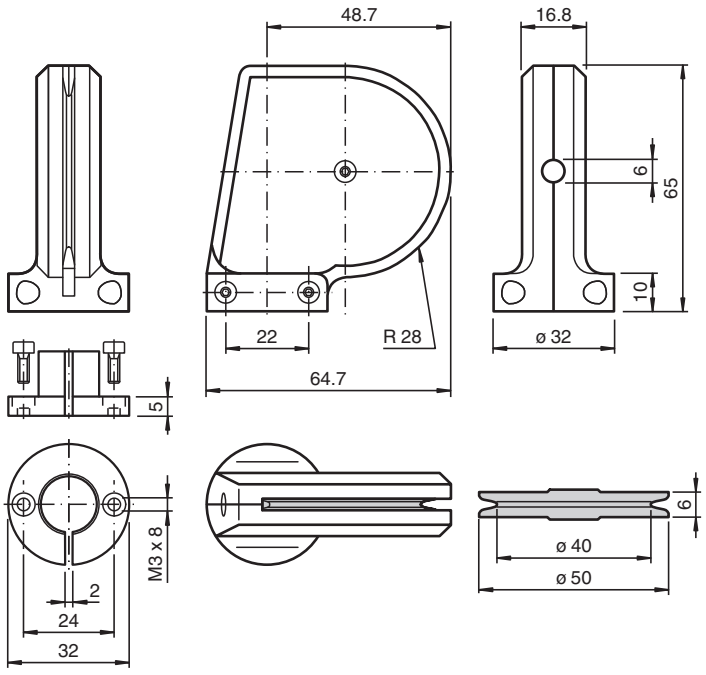
2 For design 130/190



2 For design 80



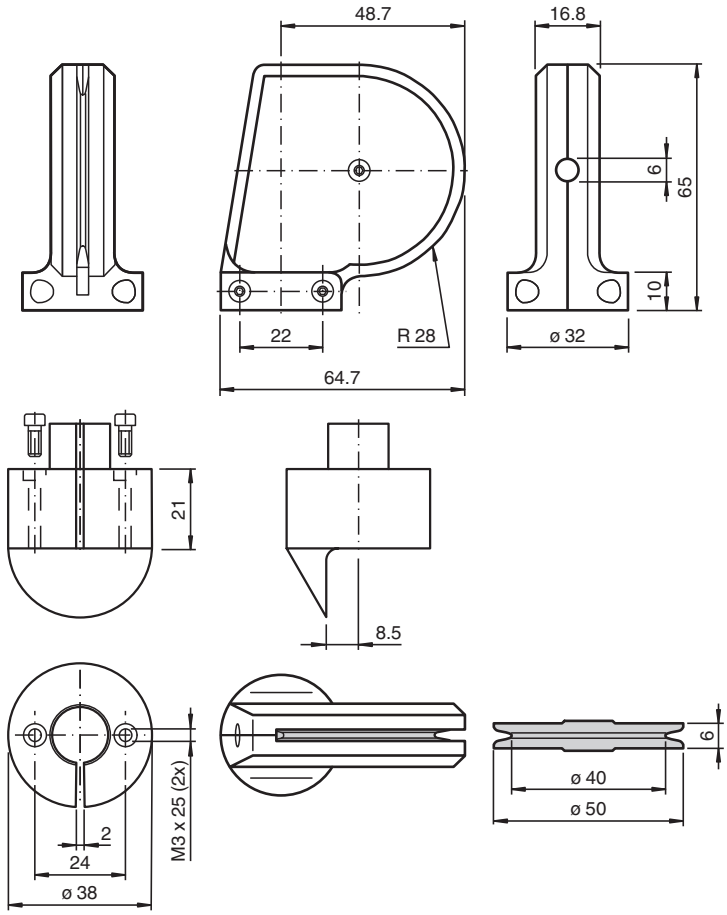
4 For design 130/190



Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t183461_eng.pdf

Dimensions

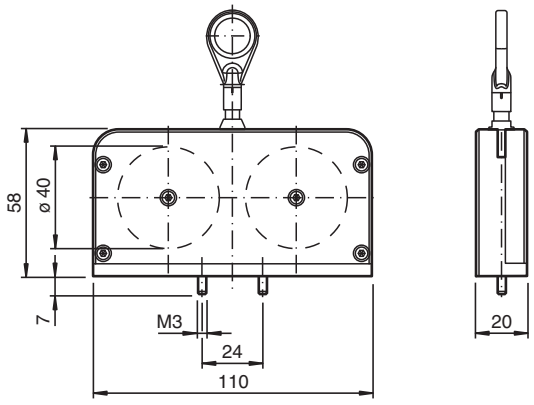
4 **For design 80**



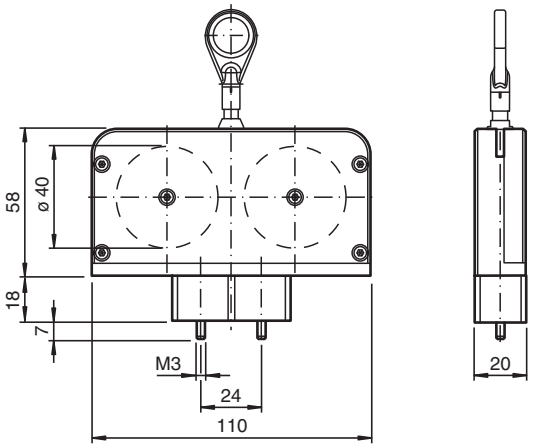
Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t183461_eng.pdf

Dimensions

5 **For design 130/190**



5 **For design 80**



Technical Data

General specifications		
Detection type		magnetic sampling
Device type		Premium Line with PROFINET interface
Measuring range		1000 ... 60000 mm
Construction type		80 mm, 130 mm, 190 mm
Resolution		Cable pull: Design 80 mm: 0,024 mm Design 130 mm: 0,041 mm Design 190 mm: 0,059 mm Encoder: 25 Bit (13 Bit/revolution)
Functional safety related parameters		
B_{10d}		300000
Electrical specifications		
Operating voltage	U_B	10 ... 30 V DC
No-load supply current	I_0	typ. 134 mA
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		PROFINET IO
Transfer rate		100 MBit/s
Connection		

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Technical Data

Connector	Ethernet : 2 x M12 x 1 socket, 4-pin, D-coded ; supply : M12 x 1 connector, 4-pin, A-coded
Standard conformity	
Degree of protection	DIN EN 60529, IP65
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	-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
Bending radius	min. 17 mm
Breaking force	min. 1227 N
Material	
Cable pull	anodized aluminum or Aluminum with Hart Coat coating
Rotary encoder	housing: nickel-plated steel Flange: aluminum
Flange	Aluminum
Rope	Stainless steel 1.4401/316
Life span	up to 10^6 Cycles

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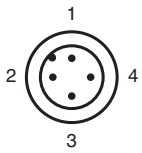
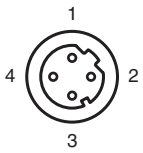
Connection

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 -
		

Technical Features

Variable Data and Dimensions

Technical Data	Design 80			Design 130						Design 190			
Max. measuring length (in m)	01	02	03	05	10	15	20	25	30	35	40	50	60
Drum size (incl. cable) (in mm)	200			334,1						491,5			
Retraction speed (in m/s)	8			8		6		3		4			
Spring retraction force (in N)	5-15			10-21	15-21	10-21	15-21	10-21	15-21	18-37			
Weight (in kg)	0,9	1,1	1,5	2,5	3,5	5	6	7,5	8,5	16	20	14,5	15,5
Dimensions (in mm)													
A	34	42	60	77	124	147	193	216	262	188	203	195	210
B	57	72	98	122	190	236	304	350	418	315	346	292	322
C	80			130						190			
D	50			80						140			
E	31,5			52						79			

Measuring Cable Attachments

Dimensions (in mm)		Design 80		Design 130/design 190	
Attachment		Length	Width/Ø	Length	Width/Ø
1	Bellows	49.7	41/38	34.7	41
2	Brush attachment with bellows and steel tip	90.7	32	72.9	32
4	Guide pulley	86	32	70	32
5	Double guide pulley	110	58	110	58
		Design 80/130/190			
		Length			
8	Brush attachment + guide pulley	126		108.2	

Indication

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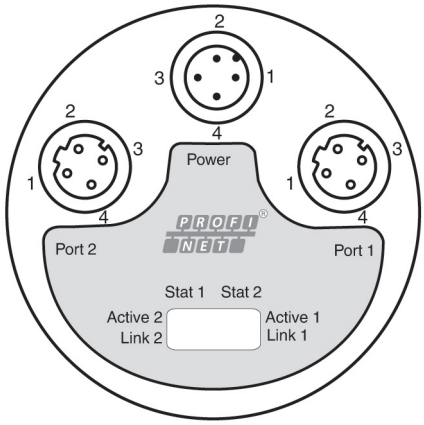
Diagnostic LEDs

LED	Color	Description for LED = ON
Active1	Yellow	Incoming and outgoing data traffic for port 1
Link1*	Green	Connection to other Ethernet devices on port 1
Active2	Yellow	Incoming and outgoing data traffic for port 2
Link2*	Green	Connection to other Ethernet devices on port 2
Stat1	Green	Status 1, details see table below
Stat2	Red	Status 2, details see table below

* flashes with 2 Hz if engineering identification call is activated and link connection is available



Stat1 (green)	Stat2 (red) bus failure	Meaning	Cause
off	off	No power	
on	on	No connection to another device Criteria: no data exchange	• bus disconnected • Master not available / switched off
on	flashes [1)]	Parameterization fault, no data exchange Criteria: data exchange correct. However, the slave did not switch to the data exchange mode.	• Slave not configured yet or wrong configuration • Wrong station address assigned (but not outside the permitted range) • Actual configuration of the slave differs from the nominal configuration
on	off	Data exchange. Slave and operation ok.	

1) flashing frequency 0.5 Hz for at least 3 seconds

Type Code

Model Number

E	C	A	3	0	P	L	-						-	B	1	7	B	P

Connection type
BP 2 Sockets/ 1 plug M12 x 1

Electrical interface
B17 ProfiNet

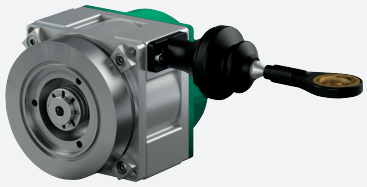
Material
A STD anodized aluminum
H Aluminum, Hart Coat coating

Attachment
1 Bellows with steel tip
2 Brush attachment with bellows and steel tip
4 Guide pulley
5 Double guide pulley
8 2+4

Cable mounts
A Ring PE carrier
C Ball joint

Length of measuring cable
01-60 See table "Variable Data and Dimensions"

Release date: 2024-02-29 Date of issue: 2024-02-29 Filename: t183461_eng.pdf



Cable pull

ECN21IL-*

- Robust aluminum drum housing
- Compact design
- Bellows with steel tip
- Wide range of mounting options
- Up to 5 m of measuring cable
- Rust and acid-resistant measuring cable
- Optionally with guide pulley

Cable pull

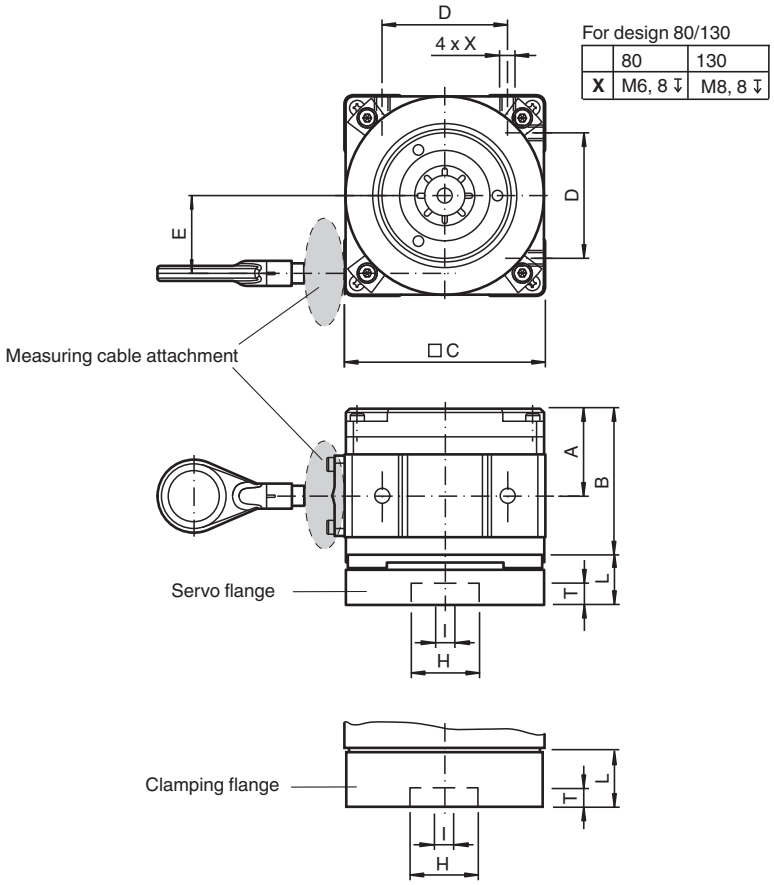
Function

Cable pull with a robust design to suit a wide range of requirements.

Dimensions

.

For design 80/130

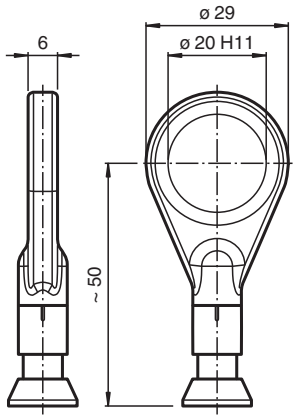


Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t192302_eng.pdf

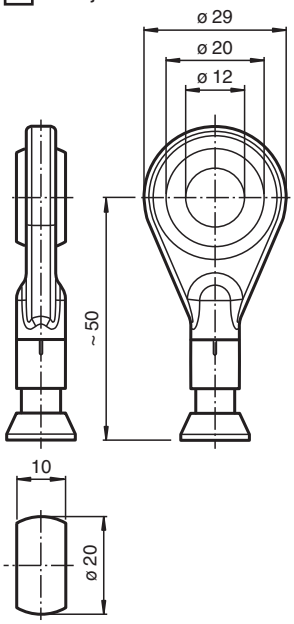
Dimensions

Cable mounts

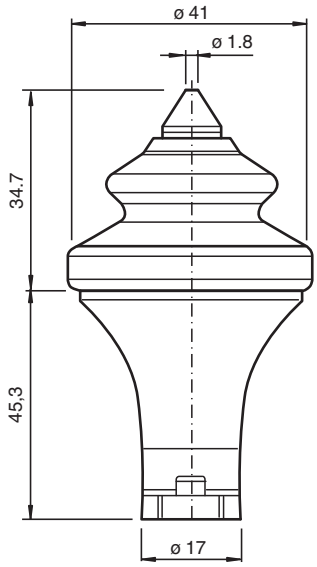
A Brass ring PE



C Ball joint



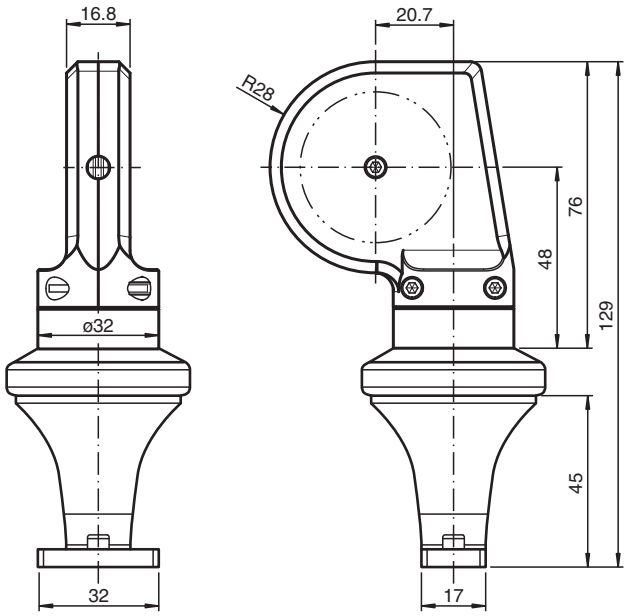
1 Bellows with steel tip



Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t192302_eng.pdf

Dimensions

4 Guide pulley



Technical Data

General specifications	
Device type	Industrial Line
Measuring range	2000 ... 5000 mm
Construction type	80 mm, 130 mm
Functional safety related parameters	
B_{10d}	300000
Ambient conditions	
Ambient temperature	-30 ... 70 °C (-22 ... 158 °F)
Mechanical specifications	
Rope diameter	0.55 mm
Retraction speed	4 m/s
Degree of protection	IP64
Material	
Housing	anodized aluminum
Rope	Stainless steel 1.4401/316
Life span	up to 10^6 Cycles
General information	
Scope of delivery	Shaft coupling for mounting a rotary encoder depending on the flange type , Mounting clips , bolts for mounting the adapter and a rotary encoder , Sealing elements (various seals for mounting a rotary encoder) , Hexagon socket wrench, 1.3 AF

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t192302_eng.pdf

Dimensions

Variable Data and Dimensions

Technical Data	Design 80		Design 130
Measuring length (in m)	02	03	05
Drum size (incl. cable) (in mm)	200		333.3
Repeatability (max. in mm)	0.2	0.3	0.5
Hysteresis (max. in mm)	1	1.5	1.5
Spring retraction force (in N)	8-14	7-11	15-21
Weight (in kg)	1.3	1.4	2.6
Dimensions (in mm)			
A	34.5	45.5	59.5
B	58	69	85.8
C	80		130
D	50		80
E	31		52

Flange dimensions for adapting rotary encoders

Design	80	130	80	130	80	130
Flange type	Servo flange				Clamping flange	
Designation	X1		X3		X2	
H (= flange Ø) (in mm)	50		33		36	
Clamping circuit Ø (in mm)	42		26		48	
l (= shaft Ø) (in mm)	6		6		10	
Wavelength (in mm)	10		11.5		20	
Dimensions (in mm)						
Length L	20		24	22	36.8	34.8
Depth D	3.8		3	3	10	10

Type Code

Model Number

E	C	N	2	1	I	L	-					A	-		

Flange type

X1 Servo flange Ø 50 mm/42 mm/3 x M4; shaft Ø 6 mm x 10 mm

X2 Clamping flange Ø 36/48 mm/3 x M4; shaft; Ø 10 mm x 20 mm

Release date: 2022-12-12 Date of issue: 2022-12-12 Filename: t192302_eng.pdf

Model Number

X3 Servo flange Ø 33 mm/26 mm/4 x M3; shaft Ø 6 mm x 11.5 mm

Material

A STD anodized aluminum

Attachment

1 Bellow tiht steel tip

4 Guide pulley

Cable mounts

A Ring PE carrier

C Ball joint

Length of measuring cable

02 2 m

03 3 m

05 5 m

По вопросам продаж и поддержки обращайтесь:

Алматы (727)345-47-04
Ангарск (3955)60-70-56
Архангельск (8182)63-90-72
Астрахань (8512)99-46-04
Барнаул (3852)73-04-60
Белгород (4722)40-23-64
Благовещенск (4162)22-76-07
Брянск (4832)59-03-52
Владивосток (423)249-28-31
Владикавказ (8672)28-90-48
Владимир (4922)49-43-18
Волгоград (844)278-03-48
Вологда (8172)26-41-59
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Ижевск (3412)26-03-58
Иркутск (395)279-98-46
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