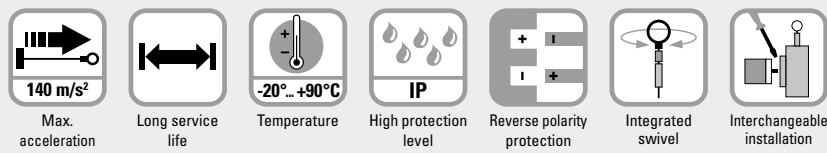


Draw-wire encoder D135 **Performance-Line** **Measuring length max. 42.5 m**



These draw-wire mechanics D135 can be used up to a measuring length of 42.5 meters. This draw-wire mechanics may be combined with the proven Kübler Sendix encoders with incremental or absolute interface, as well as with analog sensors.

With its compact construction, the D135 suits perfectly all measuring tasks from 6 up to 42.5 meters.



Robust

- The titanium-anodized aluminum housing and the stainless steel wires allow for using the mechanics even in harsh conditions.
- Wear-free wire exit thanks to special plain bearing guide.
- Various wire types and wire fastenings.

Versatile

- High traverse speed and high acceleration.
- Flexible mounting thanks to fastening tabs or fastening grooves.
- Various connection possibilities available.
- Interchangeable encoders (interchangeable installation).

Order code with encoder (incremental, absolute)

D8.4D1 . XXXX . XXXX . XXXX
Type a b c d e

a *Measuring range*

- 0600 = 6 000 mm
- 0700 = 7 000 mm
- 0800 = 8 000 mm
- 1000 = 10 000 mm
- 1200 = 12 000 mm
- 1500 = 15 000 mm
- 2000 = 20 000 mm
- 2500 = 25 000 mm
- 3000 = 30 000 mm
- 3500 = 35 000 mm
- 4000 = 40 000 mm
- 4250 = 42 500 mm

b *Encoder used*

- 00 = Sendix 5000, incremental
- M3 = Sendix M5863, absolute
- F3 = Sendix F5863, absolute
- 63 = Sendix 5863, absolute
- M8 = Sendix M5868, absolute
- F8 = Sendix F5868 absolute
- 68 = Sendix 5868, absolute
- S8 = Sendix S5868FS3 absolute ¹⁾

c *Output circuit*

depends on the encoder used

d *Type of connection*

depends on the encoder used

e *Resolution / Protocol / Options*

depends on the encoder used

Optional on request

- Other measuring ranges
- Cable diameter 1 mm
- Other wire fastening
M4 thread, eyelet or carabiner ring
- Modified cable and/or connector orientation
- Modified cable outlet direction
- Sensor protection level IP67
- Improved linearity (0.02 %)

Standard resolutions for draw-wire with incremental encoder Sendix 5000				Standard resolutions for draw-wire with absolute encoder Sendix M5863 (12 bit ST) or M5868 (12 bit ST, programmable via bus)	
Pulses / revolution [ppr]	1000	2000	4000	Pulses / revolution [ppr]	4096
For measuring range 6 ... 8 m, drum circumference 357.14 mm				For measuring range 6 ... 8 m, drum circumference 357.14 mm	
Pulses / mm	2.8	5.6	11.2	Pulses / mm	11.5
Resolution [mm]	0.36	0.18	0.09	Resolution [mm]	0.09
For measuring range 10 ... 42,5 m, drum circumference 333.33 mm				For measuring range 10 ... 42,5 m, drum circumference 333.33 mm	
Pulses / mm	3	6	12	Pulses / mm	12.3
Resolution [mm]	0.33	0.17	0.08	Resolution [mm]	0.08


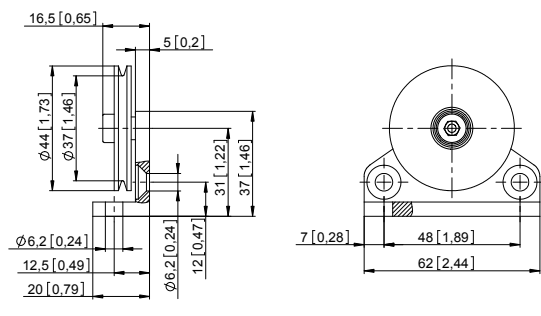
1) The complete system of draw-wire mechanism + encoder is not SIL3 certified.

Linear measuring technology

Draw-wire encoder D135	Performance-Line	Measuring length max. 42.5 m
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Order code with analog sensor (scaled to measuring range)	D8.3D1 . XXXX . XXX X . 0000
	Type a b c

a Measuring range 0600 = 6 000 mm 0700 = 7 000 mm 0800 = 8 000 mm 1000 = 10 000 mm 1200 = 12 000 mm 1500 = 15 000 mm 2000 = 20 000 mm 2500 = 25 000 mm 3000 = 30 000 mm 3500 = 35 000 mm 4000 = 40 000 mm 4250 = 42 500 mm	b Analog sensor output / supply voltage A11 = 4 ... 20 mA / 12 ... 30 V DC A22 = 0 ... 10 V / 12 ... 30 V DC A33 = potentiometer 1 kΩ / max. 30 V DC	Optional on request - Other measuring ranges - Cable diameter 1 mm - Other wire fastening M4 thread, eyelet or carabiner ring - Modified cable and/or connector orientation - Modified cable outlet direction - Sensor protection level IP67 - Increased temperature range -40 °C ... +85 °C and -20 °C ... +120 °C
c Type of connection 1 = axial cable, 2 m [6.56'] PVC 3 = axial M12 connector, 4-pin		

Accessories for draw-wire encoder	Dimensions in mm [inch]	Order no.
Guide pulley 	Technical data: - mounting bracket (anodized alum.) - guide pulley (plastic POM) - ball bearing (type 696-2R5)	Scope of delivery: - 2 x countersunk screws for lateral fixing - 2 x hexagonal screws for fixing on a flat surface
		8.0000.7000.0045 ¹⁾

Extension cable (further on request) 	0.5 m with clip 1.0 m with clip 2.0 m with clip	8.0000.7000.0051 8.0000.7000.0052 8.0000.7000.0054
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Cables and connectors	Order no.
Preassembled cables M12 female connector with coupling nut, 5-pin, A coded, straight single ended 2 m [6.56'] PVC cable	05.00.6081.2211.002M
M12 male connector with external thread, 4-pin, D coded, straight single ended 2 m [6.56'] PUR cable	05.00.6031.4411.002M
Connectors M12 female connector with coupling nut, 5-pin, A coded, straight (metal)	8.0000.5116.0000
M12 female connector with coupling nut, 5-pin, A coded, straight (metal/plastic)	05.B-8151-0/9
M12 female connector with coupling nut, 5-pin, A coded, right-angle (plastic)	05.B-8251-0/9

Further Kübler cables and connectors can be found at: kuebler.com/connection-technology

1) Stock types.

Linear measuring technology

Draw-wire encoder D135	Performance-Line	Measuring length max. 42.5 m
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Technical data

Mechanical characteristics (draw-wire mechanics)						
Measuring range	8000 mm	10000 mm 12000 mm 15000 mm	20000 mm	25000 mm 30000 mm	35000 mm 40000 mm 42500 mm	
Extension force	F_{min}	7.2 N	8.7 N	7.0 N	7.3 N	7.0 N
	F_{max}	16.0 N	16.9 N	12.4 N	15.7 N	14.1 N
Speed max.	10 m/s	6 m/s	5 m/s	5 m/s	5 m/s	
Acceleration max.	140 m/s ²	80 m/s ²	60 m/s ²	60 m/s ²	60 m/s ²	
Linearity	with analog output	±0.1 % (of the measuring range)				
	with encoder	±0.05 % (of the measuring range)				
		±0.02 % (of the measuring range) ¹⁾				
Weight	depending on the measuring and the sensor/encoder used					
Material	housing	titanium-anodized aluminum				
	wire	stainless steel ø 0.5 mm (ø 1 mm can be supplied as a special up to measuring range 20000 mm)				
Protection acc. to EN 60529	IP65 (sensor)					

Electrical characteristics (analog sensor, scaled to measuring range)

Version	A22	A11	A33
Analog output	0 ... 10 V	4 ... 20 mA	potentiometer
Output	0 ... 10 V / galv. isolated, 4 conductors	4 ... 20 mA / 2 conductors	1 kΩ
Supply voltage	12 ... 30 V DC	12 ... 30 V DC	max. 30 V DC
Recommended slider current	–	–	< 1 μA
Max. current consumption	22.5 mA (no load)	50 mA	–
Reverse polarity protection	yes	yes	–
Working temperature	-20 °C ... +85 °C [-4 °F ... +185 °F]	-20 °C ... +85 °C [-4 °F ... +185 °F]	-20 °C ... +85 °C [-4 °F ... +185 °F]
	-40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾	-40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾	-40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾
			-20 °C ... +120 °C [-4 °F ... +248 °F] ²⁾

Electrical characteristics (digital output)

The electrical characteristics of the draw-wire mechanics with digital output can be found in the data sheets of the encoders.

Approvals

CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU

1) On request for encoder version: 00, F3, G3, F8, G8 (see order code ).
2) Optional on request

Linear measuring technology

Draw-wire encoder D135	Performance-Line	Measuring length max. 42.5 m
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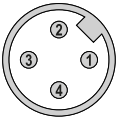
Terminal assignment (analog sensor)

Analog sensor A11 (4 ... 20 mA)			R/I converter					
			Signal:	+V	n.c.	I _{out}		n.c.
			Cable ¹⁾	Core color:	BN	WH		BU
	M12 connector, 4-pin	Pin:	1	2	3	4		

Analog sensor A22 (0 ... 10 V DC)			R/U converter					
			Signal:	+V	U _{out}	0 V		0 V _{out}
			Cable ¹⁾	Core color:	BN	WH		BU
	M12 connector, 4-pin	Pin:	1	2	3	4		

Analog sensor A33 (Potentiometer 1 kΩ)			Potentiometer					
			Signal:	+V	Out	0 V		n.c.
			Cable ¹⁾	Core color:	BN	WH		BU
	M12 connector, 4-pin	Pin:	1	2	3	4		

Top view of mating side, male contact base



M12 connector, 4-pin

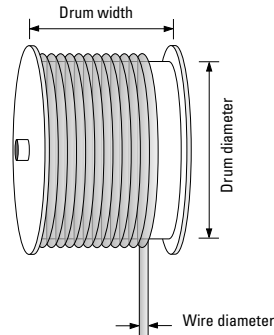
1) Isolate unused cores individually before initial start-up

Technology in detail

Operating principle

Construction

The core of a draw-wire device is a drum mounted on bearings, onto which a wire is wound. Winding takes place via a spring-loaded device.



Note

Exceeding the maximum extension length of the draw-wire will lead to damage to the wire and the mechanics.

Wire fastenings

Clip
D8.xx1.xxxx.xxxx



M4 thread
D8.xxA.xxxx.xxxx



Eyelet
D8.xxJ.xxxx.xxxx



Carabiner ring
D8.xxM.xxxx.xxxx



ball-bearing swivel
(no torsion of the measuring wire during installation)

rubber stopper

measuring wire

Wire types

- V2A, \varnothing 0.5 mm (standard)

Optional on request:

- V4A, \varnothing 0.51 mm

- Coramid, \varnothing 0.6 mm

- V4A plastic coated, 1.0 mm (V4A = \varnothing 0.81 mm)

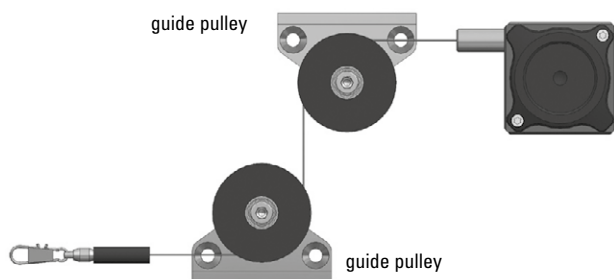


Extension wire

For optimum use of the measuring range by extending the wire length, e. g. to allow realizing a pre-extension in the application. Especially combined with analog interfaces.



Application-specific installation possibilities



Interchangeable installation

Easy adjustment of the connector or cable orientation. Exchange of individual components possible.

Requirements for encoders:

- clamping flange \varnothing 58 mm

- shaft 10 x 20 mm

All versions from measuring range

10 000 mm as interchangeable

installation (D8.4Dx.xxxx.xxxx).

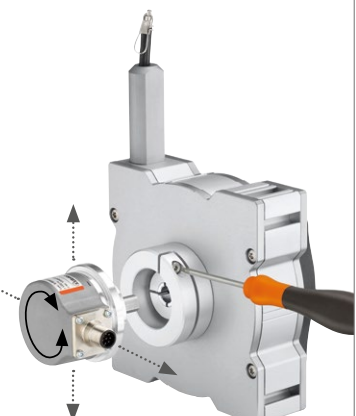
Version with measuring range

up to 8 000 mm as interchangeable

installation (D8.2Dx.0800.xxxx)

and as fixed installation

(D8.4Dx.0800.xxxx).

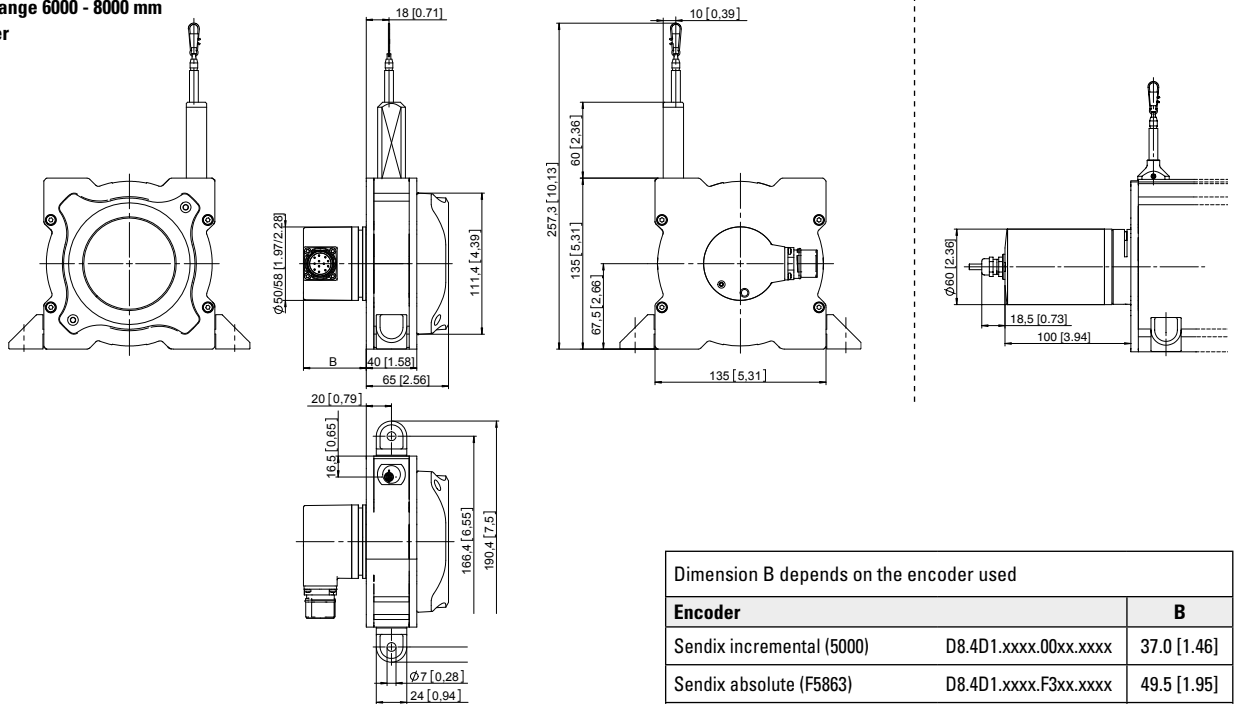


Draw-wire encoder D135 **Performance-Line** **Measuring length max. 42.5 m**

Dimensions

Dimensions in mm [inch]

**Draw-wire mechanics,
measuring range 6000 - 8000 mm
with encoder**



Dimension B depends on the encoder used

Encoder		B
Sendix incremental (5000)	D8.4D1.xxxx.00xx.xxxx	37.0 [1.46]
Sendix absolute (F5863)	D8.4D1.xxxx.F3xx.xxxx	49.5 [1.95]
Sendix absolute (5863)	D8.4D1.xxxx.63xx.xxxx	49.5 [1.95]
Sendix absolute (F5868, CANopen)	D8.4D1.xxxx.F8xx.21xx	70.0 [2.76]
Sendix absolute (F5868, EtherNet/IP)	D8.4D1.xxxx.F8xx.A2xx	59.5 [2.34]
Sendix absolute (5868)	D8.4D1.xxxx.68xx.xxxx	77.2 [3.04]
Sendix absolute (M586x)	D8.4D1.xxxx.Mxxx.xxxx	49.8 [1.96]

Linear measuring technology

Draw-wire encoder D135

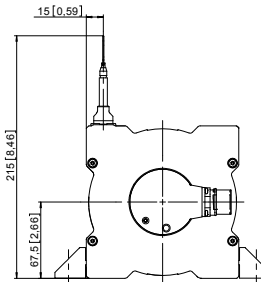
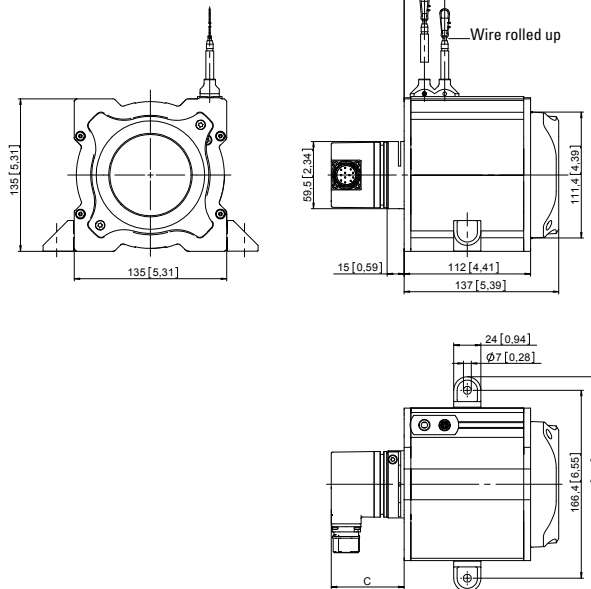
Performance-Line

Measuring length max. 42.5 m

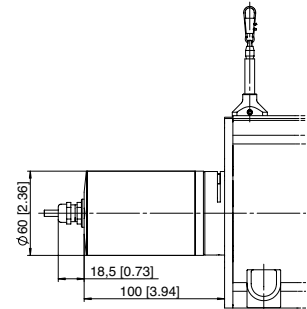
Dimensions

Dimensions in mm [inch]

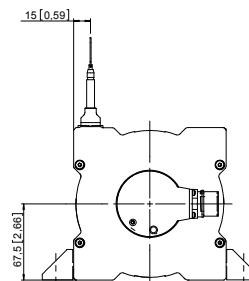
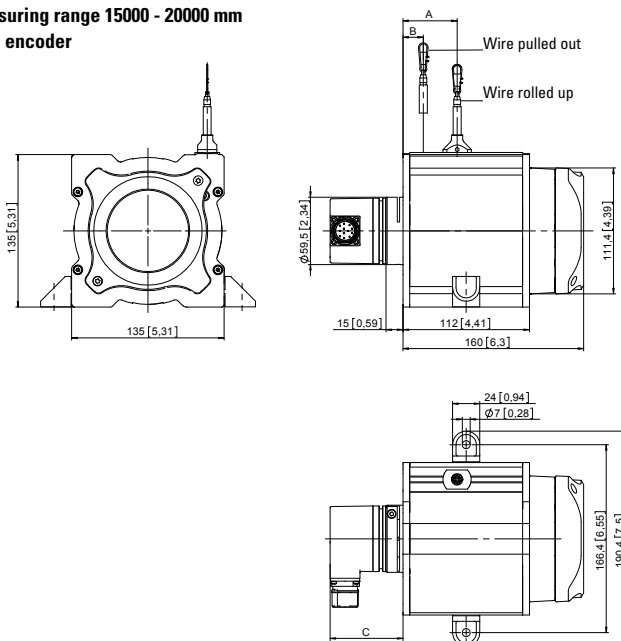
Draw-wire mechanics, measuring range 10000 - 12000 mm with encoder



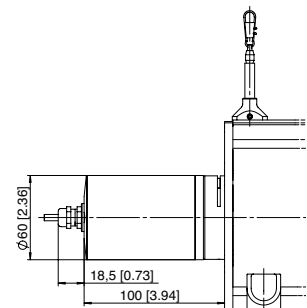
with analog output



Draw-wire mechanics, measuring range 15000 - 20000 mm with encoder



with analog output



Measuring range	A - Wire rolled up	B - Wire pulled out
10000 mm	33 [1.30]	18 [0.71]
12000 mm	36 [1.42]	18 [0.71]
15000 mm	41 [1.61]	18 [0.71]
20000 mm	48 [1.89]	18 [0.71]

Dimension C depends on the encoder used

Encoder		C
Sendix incremental (5000)	D8.4D1.xxxx.00xx.xxxx	60.0 [2.36]
Sendix absolute (F5863)	D8.4D1.xxxx.F3xx.xxxx	72.5 [2.85]
Sendix absolute (5863)	D8.4D1.xxxx.63xx.xxxx	72.5 [2.85]
Sendix absolute (F5868, CANopen)	D8.4D1.xxxx.F8xx.21xx	93.0 [3.66]
Sendix absolute (F5868, EtherNet/IP)	D8.4D1.xxxx.F8xx.A3xx	82.5 [3.25]
Sendix absolute (5868)	D8.4D1.xxxx.68xx.xxxx	100.2 [3.94]
Sendix absolute (M586x)	D8.4D1.xxxx.Mxxx.xxxx	72.8 [2.87]

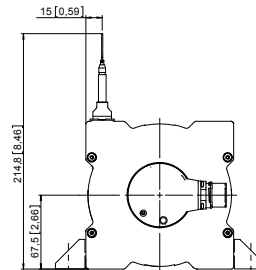
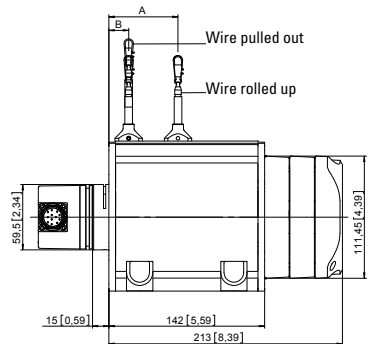
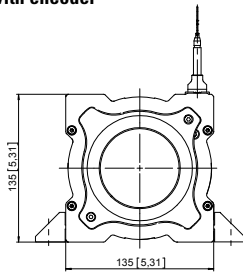
Linear measuring technology

Draw-wire encoder D135 Performance-Line Measuring length max. 42.5 m

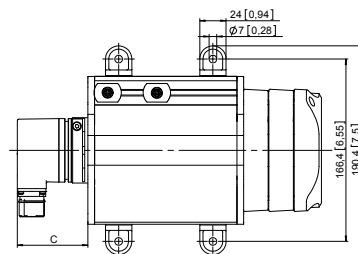
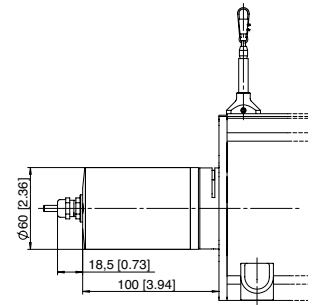
Dimensions

Dimensions in mm [inch]

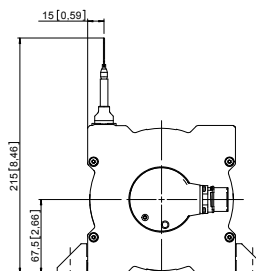
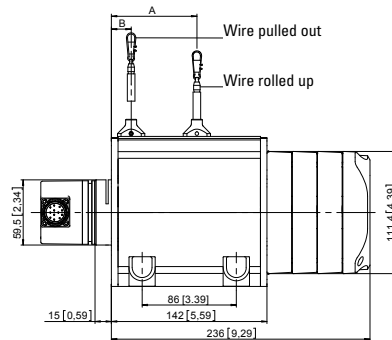
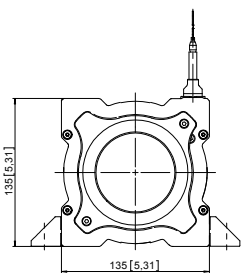
Draw-wire mechanics, measuring range 25000 - 30000 mm with encoder



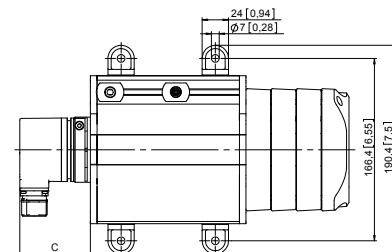
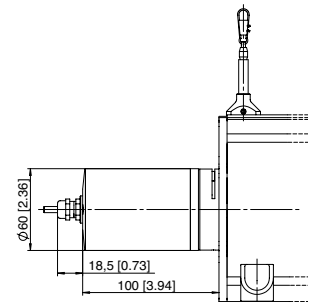
with analog output



Draw-wire mechanics, measuring range 35000 - 42500 mm with encoder



with analog output



Measuring range	A - Wire rolled up	B - Wire pulled out
25000 mm	56 [2.02]	18 [0.71]
30000 mm	63 [2.48]	18 [0.71]
35000 mm	71 [2.80]	18 [0.71]
40000 mm	78 [3.07]	18 [0.71]
42500 mm	82 [3.23]	18 [0.71]

Dimension C depends on the encoder used		
Encoder		C
Sendix incremental (5000)	D8.4D1.xxxx.00xx.xxxx	60.0 [2.36]
Sendix absolute (F5863)	D8.4D1.xxxx.F3xx.xxxx	72.5 [2.85]
Sendix absolute (5863)	D8.4D1.xxxx.63xx.xxxx	72.5 [2.85]
Sendix absolute (F5868, CANopen)	D8.4D1.xxxx.F8xx.21xx	93.0 [3.66]
Sendix absolute (F5868, EtherNet/IP)	D8.4D1.xxxx.F8xx.A3xx	82.5 [3.25]
Sendix absolute (5868)	D8.4D1.xxxx.68xx.xxxx	100.2 [3.94]
Sendix absolute (M586x)	D8.4D1.xxxx.Mxxx.xxxx	72.8 [2.87]

Draw-wire encoder D135 **Performance-Line** **Measuring length max. 42.5 m**

Dimensions

Dimensions in mm [inch]

Wire fastenings

