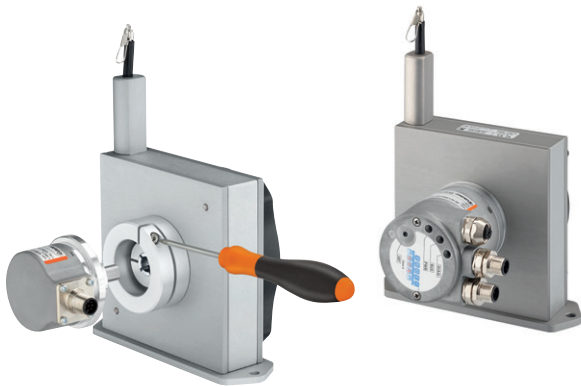


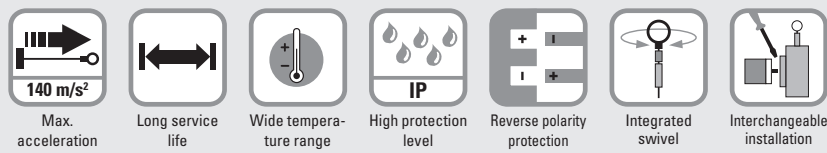
Linear measuring technology

Draw-wire encoder C120 **Performance-Line** **Measuring length max. 6 m**



These draw-wire mechanics C120 can be used up to a measuring length of 6 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.



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, up to max. 10 m/s.
- High acceleration, up to max. 140 m/s².
- Quick fastening by means of 2 screws.
- Various connection possibilities available.
- Interchangeable encoders (interchangeable installation).

Order code with encoder (incremental, absolute)

D8.XC1.XXXX.XXXX.XXXX

a
b
c
d
e
f

a *Mechanics*
 2 = interchangeable installation ¹⁾
 4 = fixed installation ²⁾

b *Measuring range*
 0400 = 4000 mm
 0500 = 5000 mm
 0600 = 6000 mm

c *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

d *Output circuit*
 depends on the encoder used

e *Type of connection*
 depends on the encoder used

f *Resolution / Protocol / Options*
 depends on the encoder used

Optional on request

- Other measuring ranges
- Cable diameter 1 mm
- Other wire fastening (wire clip = standard): eyelet, M4 thread 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

Drum circumference [mm]	317.68	317.68	317.68
Pulses / revolution [ppr]	1000	2000	4000
Pulses / mm	3.1	6.3	12.6
Resolution [mm]	0.32	0.16	0.08

Standard resolutions for draw-wire with absolute encoder Sendix M5863 (12 bit ST) or M5868 (12 bit ST, programmable via bus)

Drum circumference [mm]	317.68
Pulses / revolution [ppr]	4096
Pulses / mm	12.9
Resolution [mm]	0.08

1) Draw-wire mechanics with standard flange. The encoder can be replaced by the customer. (Order option available for measuring ranges 4000 mm and 5000 mm).

2) The encoder can only be replaced at the factory.

Linear measuring technology

Draw-wire encoder C120

Performance-Line

Measuring length max. 6 m

Recommended standard variants (with incremental, absolute encoder)

Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.xC1.xxxx.0054.2000	Sendix 5000 (8.5000.8354.2000)	Push-pull with inverted signal	10 ... 30 V DC	1 x radial M12 connector	2000 ppr	-
D8.xC1.xxxx.M324.G222	Sendix M5863 (8.M5863.3524.G222)	SSI	10 ... 30 V DC	1 x radial M12 connector	4096 ppr / SSI-Gray-Code	-
D8.xC1.xxxx.M824.2122	Sendix M5868 (8.M5868.3524.2122)	CANopen	10 ... 30 V DC	1 x radial M12 connector	CANopen encoderprofil DS406 V4.0	-

Other variants (with absolute encoder)

Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.xC1.xxxx.F326.G223	Sendix F5863 (8.F5863.1226.G223)	SSI	10 ... 30 V DC	1 x radial M12 connector	4096 ppr / SSI-Gray-Code	SET button + status LED
D8.xC1.xxxx.6326.G223	Sendix 5863 (8.5863.1226.G223)	SSI	10 ... 30 V DC	1 x radial M12 connector	4096 ppr / SSI-Gray-Code	SET button + status LED
D8.xC1.xxxx.F82E.2123	Sendix F5868 (8.F5868.122E.2123)	CANopen	10 ... 30 V DC	1 x radial M12 connector	CANopen encoder profile DS406 V3.2	SET button
D8.xC1.xxxx.6822.2123	Sendix 5868 (8.5868.1222.2123)	CANopen	10 ... 30 V DC	2 x radial M12 connector	CANopen encoder profile DS406 V3.2	SET button
D8.xC1.xxxx.M834.3222	Sendix M5868 (8.M5868.3534.3222)	SAE J1939	10 ... 30 V DC	1 x radial M12 connector	SAE J1939	-
D8.xC1.xxxx.M844.4122	Sendix M5868 (8.M5868.3544.4122)	IO-Link	18 ... 30 V DC	1 x radial M12 connector	IO-Link	-
D8.xC1.xxxx.6832.3113	Sendix 5868 (8.5868.1232.3113)	PROFIBUS	10 ... 30 V DC	3 x radial M12 connector	Profibus-DP V0 encoder profile Class 2	SET button
D8.xC1.xxxx.68B2.B212	Sendix 5868 (8.5868.12B2.B212)	EtherCAT	10 ... 30 V DC	3 x radial M12 connector	EtherCAT with CoE 3.2.10	-
D8.xC1.xxxx.F8CN.C122	Sendix F5868 (8.F5868.12CN.C122)	PROFINET IO	10 ... 30 V DC	3 x axial M12 connector	PROFINET encoder profile version 4.2	-
D8.xC1.xxxx.F8AN.A222	Sendix F5868 (8.F5868.12AN.A222)	EtherNet/IP	10 ... 30 V DC	3 x axial M12 connector	EtherNet/IP	-

Order code with encoder (analog, scalable with limit switch function)

D8.XC1.XXXX.M1XX.XXXX

a b c d e f

a Mechanics

- 2 = interchangeable installation ¹⁾
- 4 = fixed installation ²⁾

b Measuring range

- 0400 = 4000 mm
- 0500 = 5000 mm
- 0600 = 6000 mm

c Encoder used

- M1 = Sendix M5861, absolute ³⁾

d Output circuit

- depends on the encoder used

e Type of connection

- depends on the encoder used

f Resolution / Protocol / Options

- depends on the encoder used

Optional on request

- Other measuring ranges
- Cable diameter 1 mm
- Other wire fastening (wire clip = standard): M4 thread, eyelet or carabiner ring
- Modified cable and/or connector orientation
- Modified cable outlet direction
- Sensor protection level IP67

Recommended standard variants (with encoder analog, scalable with limit switch function)

Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.xC1.xxxx.M134.3612	Sendix M5861 (8.M5861.3534.3612)	Analog, 4 ... 20 mA	10 ... 30 V DC	radial M12 connector	12 Bit / 4 ... 20 mA	scalable without limit switch function ⁴⁾
D8.xC1.xxxx.M144.4612	Sendix M5861 (8.M5861.3544.4612)	Analog, 0 ... 10 V	15 ... 30 V DC	radial M12 connector	12 Bit / 0 ... 10 V	scalable without limit switch function ⁴⁾
D8.xC1.xxxx.M134.3512	Sendix M5861 (8.M5861.3534.3512)	Analog, 4 ... 20 mA	10 ... 30 V DC	radial M12 connector	12 Bit / 4 ... 20 mA	scalable with limit switch function ⁵⁾
D8.xC1.xxxx.M144.4512	Sendix M5861 (8.M5861.3544.4512)	Analog, 0 ... 10 V	15 ... 30 V DC	radial M12 connector	12 Bit / 0 ... 10 V	scalable with limit switch function ⁵⁾

1) Draw-wire mechanics with standard flange. The encoder can be replaced by the customer. (Order option available for measuring ranges 4000 m and 5000 m).

2) The encoder can only be replaced at the factory.


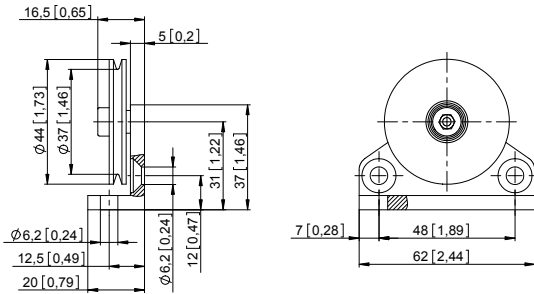

3) With ccw option.

4) Delivery condition: scaled to measuring range. Description for scaling and limit switch function see data sheet M5861.

5) Delivery condition: unscaled. Description for scaling and limit switch function see data sheet M5861.

Linear measuring technology

Draw-wire encoder C120	Performance-Line	Measuring length max. 6 m
Order code with analog sensor (scaled to measuring range)		
D8.3C1 . XXXX . XXX X . 0000		
a <i>Measuring range</i> 0400 = 4000 mm 0500 = 5000 mm 0600 = 6000 mm	b <i>Analog sensor output / supply voltage</i> A11 = 4 ... 20 mA / 12 ... 30 V DC A22 = 0 ... 10 V / 12 ... 30 V DC A33 = potentiometer 1 kΩ / max. 30 V DC	<i>Optional on request</i> - Other measuring ranges - Cable diameter 1 mm - Other wire fastening (wire clip = standard): 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 <i>Type of connection</i> 1 = axial cable, 2 m 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
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
Cables and connectors		
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

Linear measuring technology

Draw-wire encoder C120	Performance-Line	Measuring length max. 6 m
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Technical data

Mechanical characteristics (draw-wire mechanics)	
Measuring range	6000 mm
Extension force	F_{min} 8.8 N F_{max} 12.3 N
Speed max.	10 m/s
Acceleration max.	140 m/s ²
Linearity (of the measuring range)	with analog sensor ±0.10 % with encoder ±0.05 % ±0.02 % ¹⁾
Weight	approx. 1600 g [56.44 oz] (depending on 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 3000 mm (other wire types on request)
Protection acc. to EN 60529	IP65 (sensor)

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

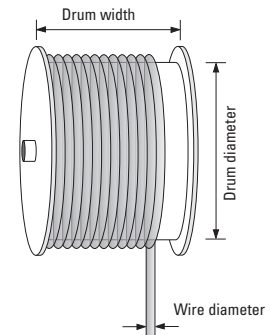
Operating principle

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.



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] -40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾	-20 °C ... +85 °C [-4 °F ... +185 °F] -40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾	-20 °C ... +85 °C [-4 °F ... +185 °F] -40 °C ... +85 °C [-40 °F ... +185 °F] ²⁾ -20 °C ... +120 °C [-4 °F ... +248 °F] ²⁾
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU		

1) On request for encoder version (see order code **ⓐ**):
00 in combination with interchangeable installation (order code **ⓐ** = 2) or fixed installation (order code **ⓐ** = 4)
F3, F3, F8, F8 in combination with interchangeable installation (order code **ⓐ** = 2)
 2) Optional on request.

Linear measuring technology

Draw-wire encoder C120	Performance-Line	Measuring length max. 6 m
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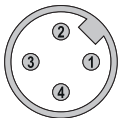
Terminal assignment (analog sensor)

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 10 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.

Linear measuring technology

Draw-wire encoder C120	Performance-Line	Measuring length max. 6 m
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Technology in detail

Wire fastenings

Clip	M4 thread	Eyelet	Carabiner ring
D8.xx 1 .xxxx.xxxx	D8.xx A .xxxx.xxxx	D8.xx J .xxxx.xxxx	D8.xx M .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

guide pulley

Individual wire outlet

wire outlet at the top 0°
D8.xx**1**.xxxx.xxxx.xxxx

wire outlet left 270°
D8.xx**D**.xxxx.xxxx.xxxx

wire outlet right 90°
D8.xx**C**.xxxx.xxxx.xxxx

wire outlet below 180°
D8.xx**E**.xxxx.xxxx.xxxx

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

Individual cable / connector orientation on request

Linear measuring technology

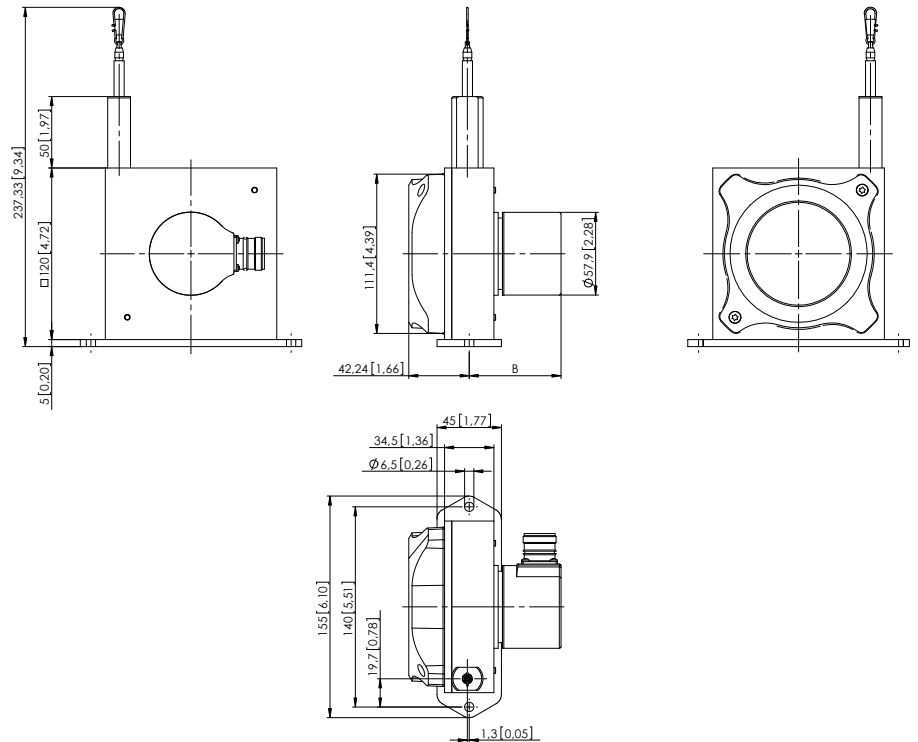
Draw-wire encoder C120 Performance-Line Measuring length max. 6 m

Dimensions

Dimensions in mm [inch]

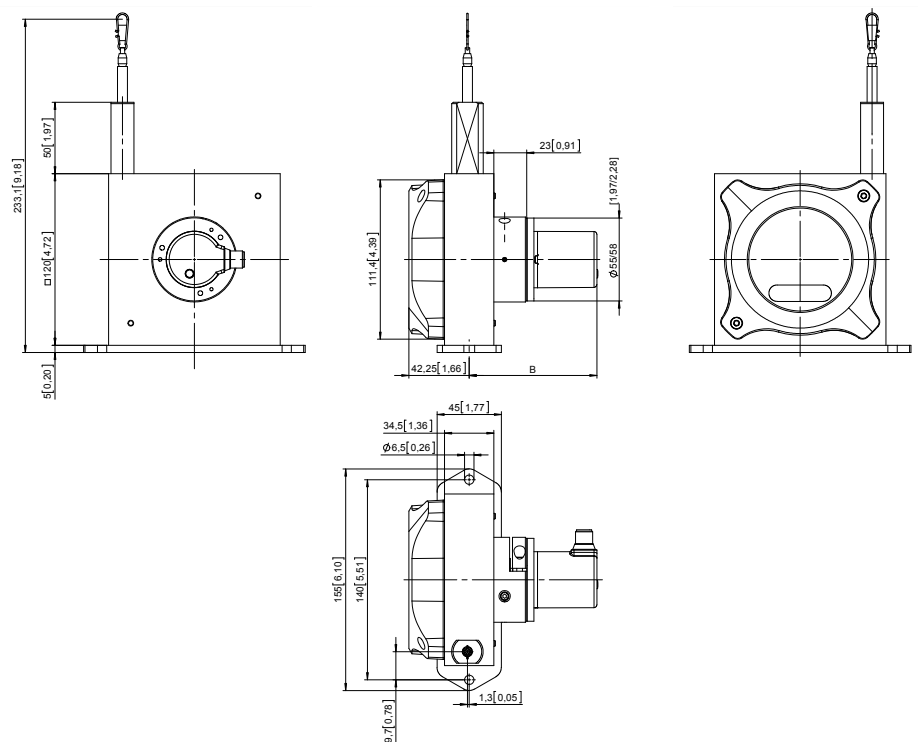
Draw-wire mechanics with encoder Fixed installation

Dimension B depends on the encoder used	
Encoder	B
Sendix incremental (5000) D8.4C1.xxxx.00xx.xxxx	54.25 [2.14]
Sendix absolute (F5863) D8.4C1.xxxx.F3xx.xxxx	66.75 [2.63]
Sendix absolute (5863) D8.4C1.xxxx.63xx.xxxx	66.75 [2.63]
Sendix absolute (F5868, CANopen) D8.4C1.xxxx.F8xx.21xx	88.25 [3.47]
Sendix absolute (F5868, EtherNet/IP) D8.4C1.xxxx.F8xx.A2xx	76.75 [3.02]
Sendix absolute (5868) D8.4C1.xxxx.68xx.xxxx	67.35 [2.65]
Sendix absolute (M586x) D8.4C1.xxxx.Mxxx.xxxx	67.05 [2.64]



Draw-wire mechanics with encoder Interchangeable installation, clamping flange

Dimension B depends on the encoder used	
Encoder	B
Sendix incremental (5000) D8.2C1.xxxx.00xx.xxxx	77.25 3.04]
Sendix absolute (F5863) D8.2C1.xxxx.F3xx.xxxx	89.75 [3.53]
Sendix absolute (5863) D8.2C1.xxxx.63xx.xxxx	89.75 [3.53]
Sendix absolute (F5868, CANopen) D8.2C1.xxxx.F8xx.21xx	111.25 [4.38]
Sendix absolute (F5868, EtherNet/IP) D8.2C1.xxxx.F8xx.A2xx	99.75 [1.69]
Sendix absolute (5868) D8.2C1.xxxx.68xx.xxxx	90.35 [3.93]
Sendix absolute (M586x) D8.2C1.xxxx.Mxxx.xxxx	90.05 [3.54]



Linear measuring technology

Draw-wire encoder C120

Performance-Line

Measuring length max. 6 m

Dimensions

Dimensions in mm [inch]

**Draw-wire mechanics with analog sensor
(scaled on measuring range)**

