

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor

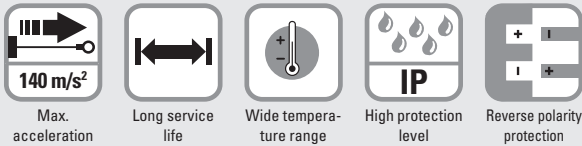
Draw-wire encoder C120

**Measuring length max. 6 m
Traverse speed max. 10 m/s**



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 10 m/s.
- High acceleration, up to 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
- Eyelet or M4 wire fastening instead of wire clip
- 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 m and 5000 m).

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

Draw-wire mechanics with encoder or analog sensor	Draw-wire encoder C120	Measuring length max. 6 m Traverse speed max. 10 m/s
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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	radial M12 connector	4096 ppr / SSI-Gray-Code	-
D8.xC1.xxxx.M824.2122	Sendix M5868 (8.M5868.3524.2122)	CANopen	10 ... 30 V DC	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.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.68C2.C212	Sendix 5868 (8.5868.12C2.C212)	PROFINET IO	10 ... 30 V DC	3 x radial M12 connector	PROFINET encoder profile version 4.1	-
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

<p>a <i>Mechanics</i> 2 = interchangeable installation ¹⁾ 4 = fixed installation ²⁾</p> <p>b <i>Measuring range</i> 0400 = 4000 mm 0500 = 5000 mm 0600 = 6000 mm</p> <p>c <i>Encoder used</i> M1 = Sendix M5861, absolute ³⁾</p>	<p>d <i>Output circuit</i> depends on the encoder used</p> <p>e <i>Type of connection</i> depends on the encoder used</p> <p>f <i>Resolution / Protocol / Options</i> depends on the encoder used</p>	<p><i>Optional on request</i></p> <ul style="list-style-type: none"> - Other measuring ranges - Cable diameter 1 mm - Eyelet or M4 wire fastening instead of wire clip - Modified cable and/or connector orientation - Modified cable outlet direction - Sensor protection level IP67
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Recommended standard variants (with encoder analog, scalable with limit switch function)


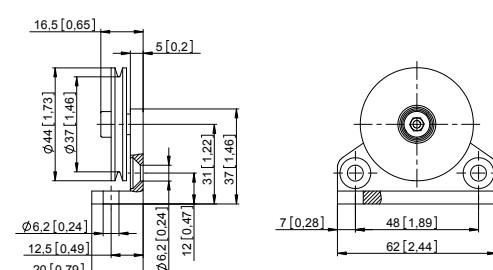
Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.xC1.xxxx.M134.3612	Sendix M5861 (8.M5861.3534.3612)	Analog, 4 ... 20 mA	10 ... 30 V DC	radial M12 connector	12 Bit / 4 ... 20 mA	scalable without limit switch function ⁴⁾
D8.xC1.xxxx.M144.4612	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 M3661.

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor	Draw-wire encoder C120	Measuring length max. 6 m Traverse speed max. 10 m/s
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Order code with analog sensor (scaled to measuring range)	<table border="1" style="margin: auto;"> <tr> <td style="padding: 2px 5px;">D8.3C1</td> <td style="padding: 2px 5px;">. XXXX</td> <td style="padding: 2px 5px;">. XXX X</td> <td style="padding: 2px 5px;">. 0000</td> </tr> <tr> <td style="font-size: 8px;">Type</td> <td style="font-size: 8px; text-align: center;">a</td> <td style="font-size: 8px; text-align: center;">b</td> <td style="font-size: 8px; text-align: center;">c</td> </tr> </table>	D8.3C1	. XXXX	. XXX X	. 0000	Type	a	b	c
D8.3C1	. XXXX	. XXX X	. 0000						
Type	a	b	c						
<p>a <i>Measuring range</i></p> <p>0400 = 4000 mm 0500 = 5000 mm 0600 = 6000 mm</p>	<p>b <i>Analog sensor output / power supply</i></p> <p>A11 = 4 ... 20 mA / 12 ... 30 V DC A22 = 0 ... 10 V / 12 ... 30 V DC A33 = potentiometer 1 kΩ / max. 30 V DC</p> <p>c <i>Type of connection</i></p> <p>1 = axial cable, 2 m PVC 3 = axial M12 connector, 4-pin</p>	<p><i>Optional on request</i></p> <ul style="list-style-type: none"> - Other measuring ranges - Cable diameter 1 mm - Eyelet or M4 wire fastening instead of wire clip - Modified cable and/or connector orientation - Modified cable outlet direction - Sensor protection level IP67 - Improved linearity (0.02 %) - Increased temperature range -40°C ... +85°C and -20°C ... +120°C 							

Accessories for draw-wire encoder	Dimensions in mm [inch]	Order no.
<p>Guide pulley</p> 		<p>8.0000.7000.0045</p> <p>Technical data:</p> <ul style="list-style-type: none"> - mounting bracket (anodized alum.) - guide pulley (plastic POM) - ball bearing (type 696-2R5) <p>Scope of delivery:</p> <ul style="list-style-type: none"> - 2 x countersunk screws for lateral fixing - 2 x hexagonal screws for fixing on a flat surface

Connection technology for analog sensor	Order no.
<p>Cordset, pre-assembled</p> <p>M12 female connector with coupling nut, 5-pin 2 m [6.56'] PVC cable</p> <p>M12 male connector with external thread, 4-pin 2 m PVC-Kabel</p>	<p>05.00.6081.2211.002M</p> <p>05.00.6031.4411.002M</p>
<p>Connector, self-assembly (straight)</p> <p>M12 female connector with coupling nut, housing metal, 5-pin M12 female connector with coupling nut, housing metal/plastic, 5-pin</p>	<p>8.0000.5116.0000</p> <p>05.B-8151-0/9</p>
<p>Connector, self-assembly (right-angle)</p> <p>M12 female connector with coupling nut, housing plastic, 5-pin</p>	<p>05.B-8251-0/9</p>

Additional connectors can be found in the connection technology section or in the connection technology area of our website at: www.kuebler.com/connection_technology.

Linear measuring technology

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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
Max. speed.	10 m/s
Max. acceleration	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

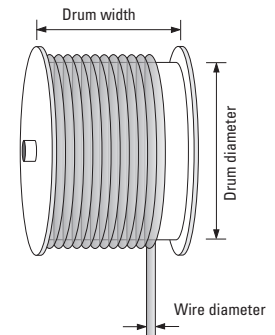
Operating principle

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.

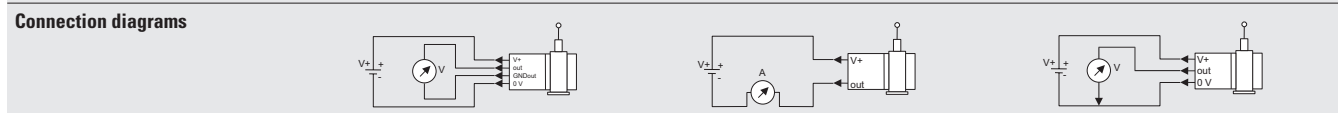
Note

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
Power supply	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⁾

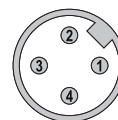


CE compliant acc. to EMC guideline 2014/30/EU
RoHS guideline 2011/65/EU

Terminal assignment (analog sensor A11, A22, A33)

Pin	1	2	3	4
Core color	BN	WH	BU	BK
0 ... 10 V	+V	Signal	0 V	0 V Sig.
4 ... 20 mA	+V	n. c.	Signal	n. c.
1 kΩ	+V	Slider	0 V	n. c.

Top view of mating side, male contact base



M12 connector, 4-pin

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, 63, F8, 68 in combination with interchangeable installation (order code **ⓐ** = 2)
 2) Optional on request.

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor

Draw-wire encoder C120

**Measuring length max. 6 m
Traverse speed max. 10 m/s**

Technology in detail

Various wire types and wire fastenings

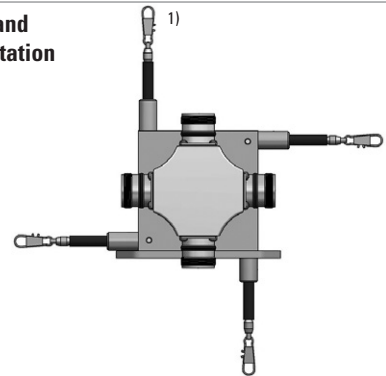
- Wire types:
- 0.5 mm (V2A) ¹⁾
 - 0.51 mm (V4A)
 - 1.0 mm plastic-coated (V4A = 0.81 mm, plastic 0.19 mm)
 - 0.6 mm (Coramid)

Wire fastenings:
Clip ¹⁾ M4 thread

Eyelet



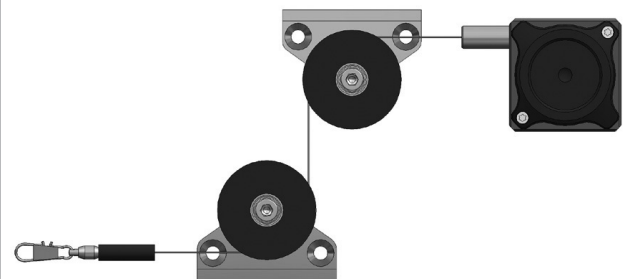
Individual wire outlet and cable / connector orientation



Extension wire



Application-specific installation possibilities

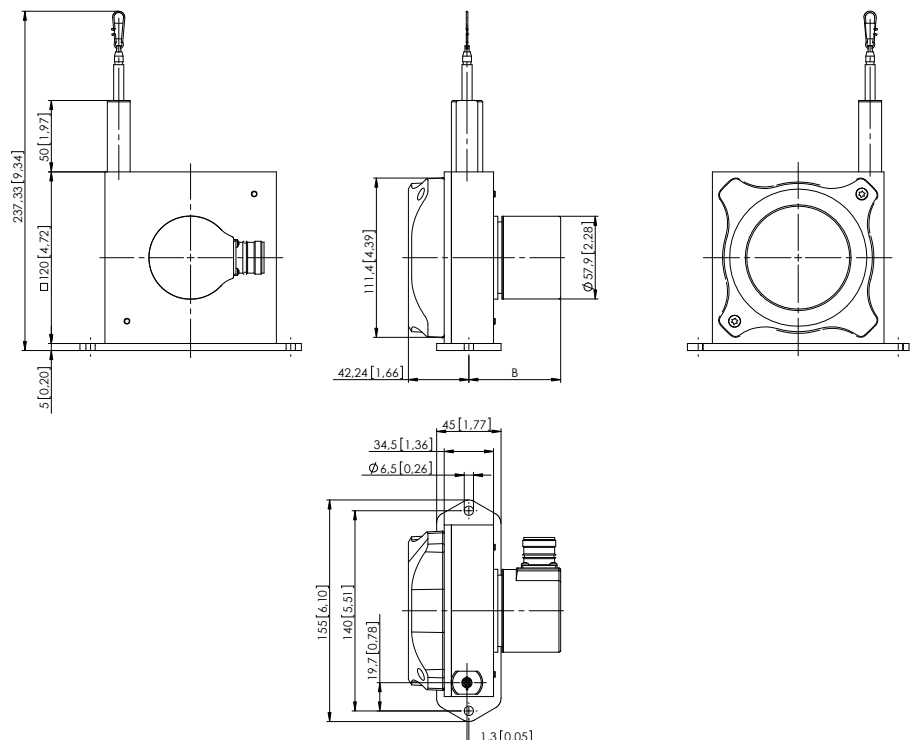


Dimensions

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]



1) Standard.

Linear measuring technology

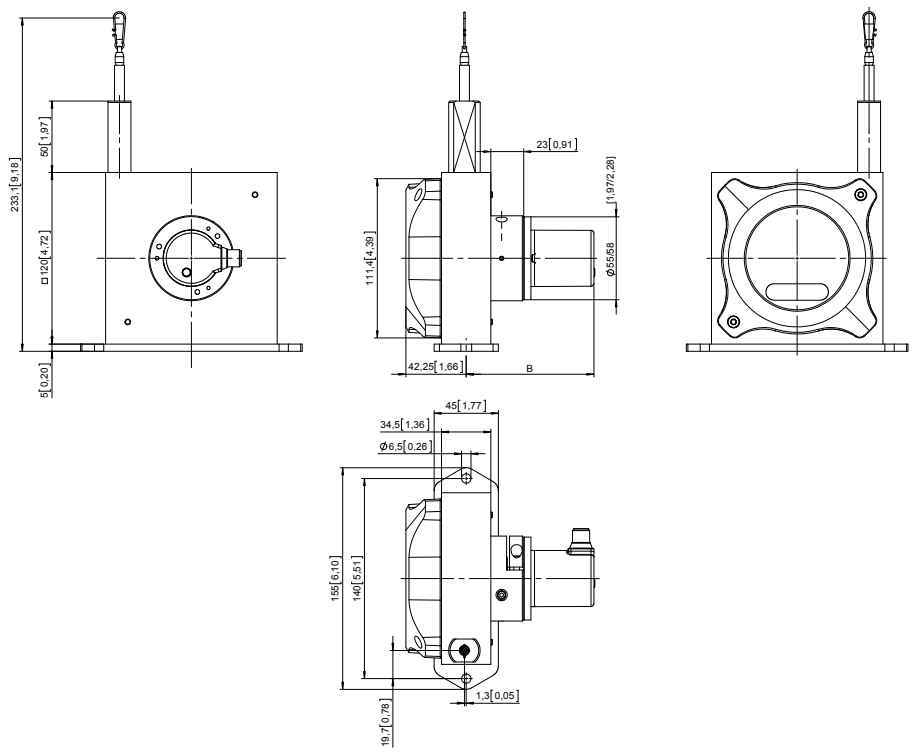
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Dimensions

Dimensions in mm [inch]

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]



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

