

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor

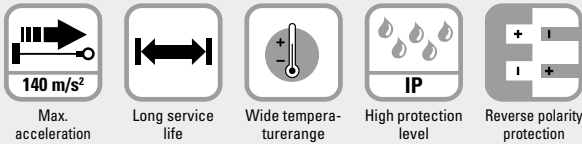
Draw-wire encoder B80

**Measuring length max. 3 m
Traverse speed max. 10 m/s**



The draw-wire mechanics B80 can be used up to a measuring length of 3 meters.

These 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.XB1.XXXX.XXXX.XXXX

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

b *Measuring range*
0100 = 1000 mm
0200 = 2000 mm
0300 = 3000 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]	200	200	200
Pulses / revolution [ppr]	200	2000	4000
Pulses / mm	1	10	20
Resolution [mm]	1	0.1	0.05

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

Drum circumference [mm]	200
Pulses / revolution [ppr]	4096
Pulses / mm	20.5
Resolution [mm]	0.05

1) Draw-wire mechanics with standard flange. The encoder can be replaced by the customer.
2) The encoder can only be replaced at the factory.

Draw-wire mechanics with encoder or analog sensor	Draw-wire encoder B80	Measuring length max. 3 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.xB1.xxxx.0054.2000	Sendix 5000 (8.5000.8354.2000)	Push-pull with inverted signal	10 ... 30 V DC	radial M12 connector	2000 ppr	-
D8.xB1.xxxx.M324.G222	Sendix M5863 (8.M5863.3524.G222)	SSI	10 ... 30 V DC	radial M12 connector	4096 ppr / SSI-Gray-Code	-
D8.xB1.xxxx.M824.2122	Sendix M5868 (8.M5868.3524.2122)	CANopen	10 ... 30 V DC	radial M12 connector	CANopen encoder profile 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.xB1.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.xB1.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.xB1.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.xB1.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.xB1.xxxx.M834.3222	Sendix M5868 (8.M5868.3534.3222)	SAE J1939	10 ... 30 V DC	1 x radial M12 connector	SAE J1939	-
D8.xB1.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.xB1.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.xB1.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.xB1.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 . XB1 . XXXX . M1XX . XXXX

a b c d e f

- | | | |
|--|--|---|
| <p>a <i>Mechanics</i>
2 = interchangeable installation ¹⁾
4 = fixed installation ²⁾</p> <p>b <i>Measuring range</i>
0100 = 1000 mm
0200 = 2000 mm
0300 = 3000 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 |
|--|--|---|

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.xB1.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.xB1.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.xB1.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.xB1.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⁾

Order code with analog sensor (scaled to measuring range)

D8.3B1 . XXXX . XXX X . 0000

Type a b c

- | | | |
|---|---|---|
| <p>a <i>Measuring range</i>
0100 = 1000 mm
0200 = 2000 mm
0300 = 3000 mm</p> | <p>b <i>Analog sensor output / power supply</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</p> <p>c <i>Type of connection</i>
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 - Increased temperature range -40°C ... +85°C and -20°C ... +120°C |
|---|---|---|

1) Draw-wire mechanics with standard flange. The encoder can be replaced by the customer.
 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 B80

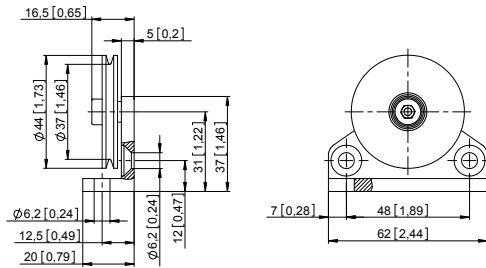
**Measuring length max. 3 m
Traverse speed max. 10 m/s**

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

Connection technology for analog sensor

Order no.

Cordset, pre-assembled

M12 female connector with coupling nut, 5-pin
2 m [6.56'] PVC cable

05.00.6081.2211.002M

M12 male connector with external thread, 4-pin
2 m [6.56'] PVC cable

05.00.6031.4411.002M

Connector, self-assembly (straight)

M12 female connector with coupling nut, housing metal, 5-pin

8.0000.5116.0000

M12 female connector with coupling nut, housing metal/plastic, 5-pin

05.B-8151-0/9

Connector, self-assembly (right-angle)

M12 female connector with coupling nut, housing plastic, 5-pin

05.B-8251-0/9

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.

Technical data

Mechanical characteristics (draw-wire mechanics)

Measuring range		1000 mm	2000 mm	3000 mm
Extension force	F_{min}	6.9 N	6.4 N	6.9 N
	F_{max}	8.3 N	7.8 N	9.8 N
Max. speed		10 m/s	10 m/s	10 m/s
Max. acceleration		140 m/s ²	140 m/s ²	140 m/s ²
Linearity (of the measuring range)				
	with analog sensor	±0.15 %	±0.1 %	±0.1 %
	with encoder	±0.05 %	±0.05 %	±0.05 %
		±0.02 % ¹⁾	±0.02 % ¹⁾	±0.02 % ¹⁾
Weight		approx. 750 g [26.45 oz] (dep. on the sensor/encoder used)		
Material	housing	titanium-anodized aluminum		
	wire	stainless steel ϕ 0.5 mm ϕ 1 mm can be supplied as a special up to measuring range 1500 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.

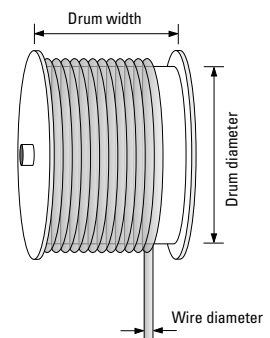
Operating principle

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.



1) On request for encoder version (see order code **0**):

00 in combination with interchangeable installation (order code **3** = 2) or fixed installation (order code **3** = 4)

F3, F3, F8, F8 in combination with interchangeable installation (order code **3** = 2)

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor	Draw-wire encoder B80	Measuring length max. 3 m Traverse speed max. 10 m/s
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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 [-40°F ... +185°F] -40°C ... +85°C [-40°F ... +185°F] ¹⁾	-20°C ... +85°C [-40°F ... +185°F] -40°C ... +85°C [-40°F ... +185°F] ¹⁾	-20°C ... +85°C [-40°F ... +185°F] -40°C ... +85°C [-40°F ... +185°F] ¹⁾ -20°C ... +120°C [-4°F ... +248°F] ¹⁾
Connection diagrams			
CE compliant acc. to	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU		

Technology in detail

Various wire types and wire fastenings

Wire types:

- 0.5 mm (V2A) ²⁾
- 0.51 mm (V4A)
- 1.0 mm plastic-coated (V4A = 0.81 mm, plastic 0.19 mm)
- 0.6 mm (Coramid)

Wire fastenings:

- Clip ²⁾
- M4 thread
- Eyelet

Individual wire outlet and cable / connector orientation

Extension wire

Application-specific installation possibilities

1) Optional on request.
2) Standard.

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor

Draw-wire encoder B80

**Measuring length max. 3 m
Traverse speed max. 10 m/s**

Dimensions

Dimensions in mm [inch]

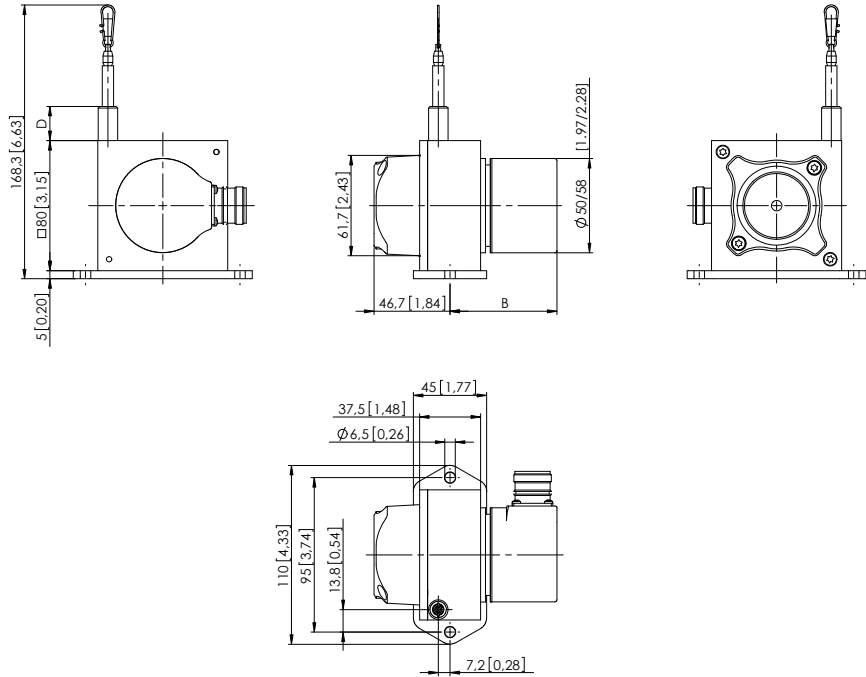
Draw-wire mechanics with encoder Fixed installation

Dimension D depends on the measuring range of the draw-wire

Measuring range	D
1000 mm	21 [0.83]
2000 mm	21 [0.83]
3000 mm	35 [1.38]

Dimension B depends on the encoder used

Encoder	B
Sendix incremental (5000) D8.4B1.xxxx.00xx.xxxx	55.75 [2.19]
Sendix absolute (F5863) D8.4B1.xxxx.F3xx.xxxx	68.25 [2.69]
Sendix absolute (5863) D8.4B1.xxxx.63xx.xxxx	68.25 [2.69]
Sendix absolute (F5868, CANopen) D8.4B1.xxxx.F8xx.21xx	88.25 [3.47]
Sendix absolute (F5868, EtherNet/IP) D8.4B1.xxxx.F8xx.A2xx	76.75 [3.02]
Sendix absolute (5868) D8.4B1.xxxx.68xx.xxxx	95.35 [3.75]
Sendix absolute (M586x) D8.4B1.xxxx.Mxxx.xxxx	68.45 [2.69]



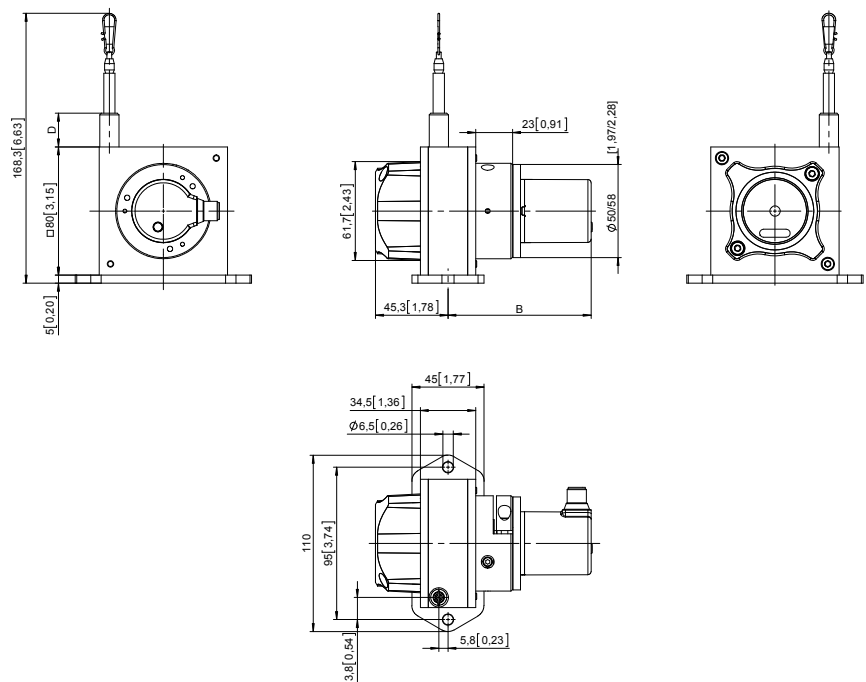
Draw-wire mechanics with encoder Interchangeable installation, clamping flange

Dimension D depends on the measuring range of the draw-wire

Measuring range	D
1000 mm	21 [0.83]
2000 mm	21 [0.83]
3000 mm	35 [1.38]

Dimension B depends on the encoder used

Encoder	B
Sendix incremental (5000) D8.2B1.xxxx.00xx.xxxx	78.75 [3.10]
Sendix absolute (F5863) D8.2B1.xxxx.F3xx.xxxx	91.25 [3.59]
Sendix absolute (5863) D8.2B1.xxxx.63xx.xxxx	91.25 [3.59]
Sendix absolute (F5868, CANopen) D8.2B1.xxxx.F8xx.21xx	111.25 [4.40]
Sendix absolute (F5868, EtherNet/IP) D8.2B1.xxxx.F8xx.A2xx	99.75 [3.93]
Sendix absolute (5868) D8.2B1.xxxx.68xx.xxxx	118.35 [4.66]
Sendix absolute (M586x) D8.2B1.xxxx.Mxxx.xxxx	91.45 [3.60]



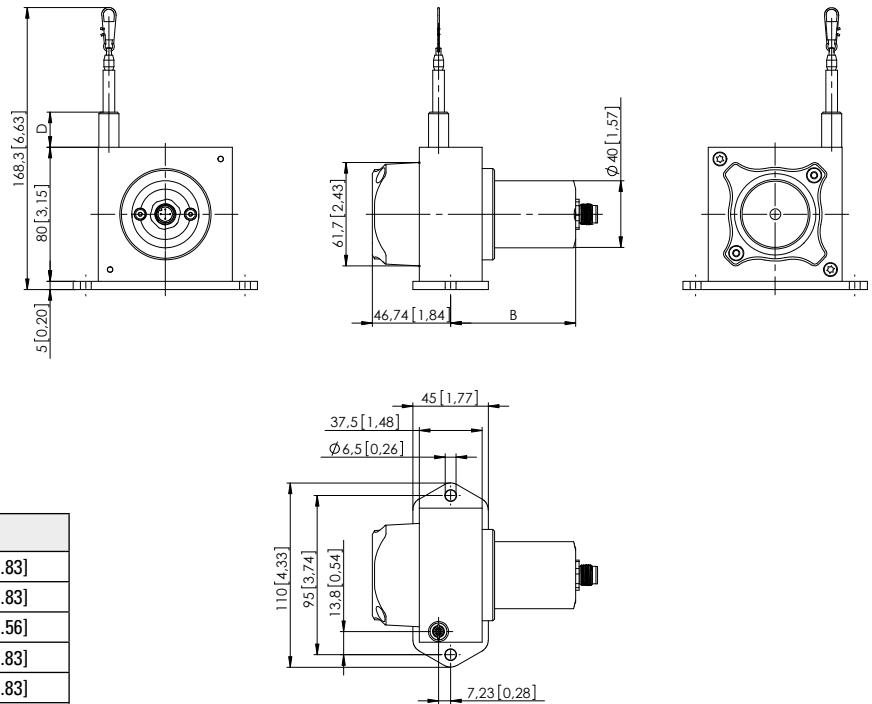
Linear measuring technology

Draw-wire mechanics with encoder or analog sensor	Draw-wire encoder B80	Measuring length max. 3 m Traverse speed max. 10 m/s
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Dimensions

Dimensions in mm [inch]

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

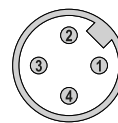


Sensor type	Measuring length	B	D
Potentiometer	1000 mm	74 [2.91]	21 [0.83]
	2000 mm	74 [2.91]	21 [0.83]
	3000 mm	102.5 [4.04]	65 [2.56]
4 ... 20 mA	1000 mm	87.5 [3.44]	21 [0.83]
	2000 mm	87.5 [3.44]	21 [0.83]
0 ... 10 V	1000 mm	87.5 [3.44]	21 [0.83]
	2000 mm	102.3 [4.03]	78.5 [3.09]

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