

Linear measuring technology

Draw-wire mechanics with encoder or analog sensor

Draw-wire encoder A50

**Measuring length max. 1.25 m
Traverse speed max. 10 m/s**



The draw-wire mechanics A50 boast both a compact design and high dynamics.

The draw-wire mechanics may be equipped with encoders with an analog, incremental or absolute output. The maximum measuring length is 1.25 m.



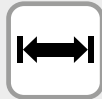
Analog output



SAE J1939



Max. acceleration



Long service life



Wide temperature range



High protection level



Reverse polarity protection

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 300 m/s².
- Quick fastening by means of 2 screws.
- Various connection possibilities available.
- Scalable analog output with limit switch function.

Order code with encoder (incremental, absolute)

D8.6A1 . XXXX . XXXX . XXXX
Type a b c d e

a Measuring range
0025 = 250 mm
0050 = 500 mm
0125 = 1250 mm

b Encoder used
36 = Sendix 3610, incremental
M3 = Sendix M3663, absolute, SSI
F3 = Sendix F3663, absolute, SSI
M8 = Sendix M3668, absolute, CANopen or Sendix M3668, absolute, SAE J1939
F8 = Sendix F3668, absolute, CANopen

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
- 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 3610

Drum circumference [mm]	125	125	125
Pulses / revolution [ppr]	125	1250	2500
Pulses / mm	1	10	20
Resolution [mm]	1	0.1	0.05

Standard resolutions for draw-wire with absolute encoder Sendix F3663/M3663 (12 bit ST) or F3668/M3668 (12 bit ST, programmable via bus)

Drum circumference [mm]	125
Pulses / revolution [ppr]	4096
Pulses / mm	32.8
Resolution [mm]	0.03

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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
D8.6A1.xxxx.3642.1250	3610 (8.3610.2342.1250)	Push-pull with inverted signal	8 ... 30 V DC	radial cable, 2 m	1250 ppr	-
D8.6A1.xxxx.M324.G222	Sendix M3663 (8.M3663.4124.G222)	SSI	10 ... 30 V DC	radial M12 connector	4096 ppr / SSI-Gray-Code	-
D8.6A1.xxxx.M824.2122	Sendix M3668 (8.M3668.4124.2122)	CANopen	10 ... 30 V DC	radial M12 connector	CANopen encoder profile DS406 V4.0	-
D8.6A1.xxxx.M834.3222	Sendix M3668 (8.M3668.4134.3222)	SAE J1939	10 ... 30 V DC	radial M12 connector	SAE J1939	-

Other variants (with absolute encoder)

Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.6A1.xxxx.F321.G222	Sendix F3663 (8.F3663.4121.G222)	SSI	10 ... 30 V DC	tangential cable, 1 m	4096 ppr / SSI-Gray-Code	-
D8.6A1.xxxx.F821.2122	Sendix F3668 (8.F3668.4121.2122)	CANopen	10 ... 30 V DC	tangential cable, 1 m	CANopen encoder profile DS406 V3.2	-

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

D8.6A1	.	XXXX	.	M1	XX	.	XXXX
Type		a		b	c	d	e

- | | | | |
|---|---|--|---|
| <p>a <i>Measuring range</i>
0025 = 250 mm
0050 = 500 mm
0125 = 1250 mm</p> | <p>b <i>Encoder used</i>
M1 = Sendix M3661, absolute ¹⁾</p> | <p>c <i>Output circuit</i>
depends on the encoder used</p> <p>d <i>Type of connection</i>
depends on the encoder used</p> <p>e <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 - 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 %) |
|---|---|--|---|

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

Order no. draw-wire encoder	Mounted encoder	Interface	Power supply	Type of connection	Resolution / Protocol	Option
D8.6A1.xxxx.M134.3612	Sendix M3661 (8.M3661.4134.3612)	Analog, 4 ... 20 mA	10 ... 30 V DC	M12-Stecker radial	12 Bit / 4 ... 20 mA	scalable without limit switch function ²⁾
D8.6A1.xxxx.M144.4612	Sendix M3661 (8.M3661.4144.4612)	Analog, 0 ... 10 V	15 ... 30 V DC	M12-Stecker radial	12 Bit / 0 ... 10 V	scalable without limit switch function ²⁾
D8.6A1.xxxx.M134.3512	Sendix M3661 (8.M3661.4134.3512)	Analog, 4 ... 20 mA	10 ... 30 V DC	M12-Stecker radial	12 Bit / 4 ... 20 mA	scalable with limit switch function ³⁾
D8.6A1.xxxx.M144.4512	Sendix M3661 (8.M3661.4144.4512)	Analog, 0 ... 10 V	15 ... 30 V DC	M12-Stecker radial	12 Bit / 0 ... 10 V	scalable with limit switch function ³⁾

Order code with analog sensor (scaled to measuring range)

D8.3A1	.	XXXX	.	XX	X	.	0000
Type		a		b	c		

- | | | | |
|---|---|---|--|
| <p>a <i>Measuring range</i>
0025 = 250 mm
0050 = 500 mm
0125 = 1250 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 - 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) With ccw option.
 2) Delivery condition: scaled to measuring range.
 Description for scaling and limit switch function see data sheet M3661.
 3) Delivery condition: unscaled.
 Description for scaling and limit switch function see data sheet M3661.

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Draw-wire mechanics with encoder or analog sensor

Draw-wire encoder A50

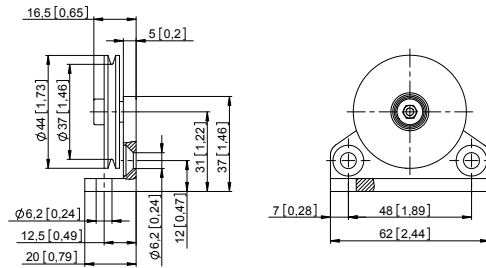
**Measuring length max. 1.25 m
Traverse speed max. 10 m/s**

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

Connector, self-assembly (straight)

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

8.0000.5116.0000

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	250 mm	500 mm	1250 mm	
Extension force	F_{min}	6.8 N	3.4 N	4.1 N
	F_{max}	7.9 N	4.0 N	5.4 N
Max. speed	8 m/s	8 m/s	10 m/s	
Max. acceleration	200 m/s ²	200 m/s ²	300 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. 330 g [11.64 oz] (depending on the sensor / encoder used)			
Material	housing	titanium-anodized aluminum		
	wire	stainless steel \varnothing 0.5 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.

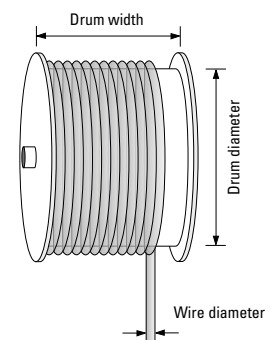
Operating principle

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: **36** (see order code **b**).

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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 [-4°F ... +185°F] -40°C ... +85°C [-40°F ... +185°F] ¹⁾	-20°C ... +85°C [-4°F ... +185°F] -40°C ... +85°C [-40°F ... +185°F] ¹⁾	-20°C ... +85°C [-4°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		

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



Technology in detail

Various wire types and wire fastenings

Wire types:
 - 0.5 mm (V2A) ²⁾
 - 0.51 mm (V4A)
 - 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.

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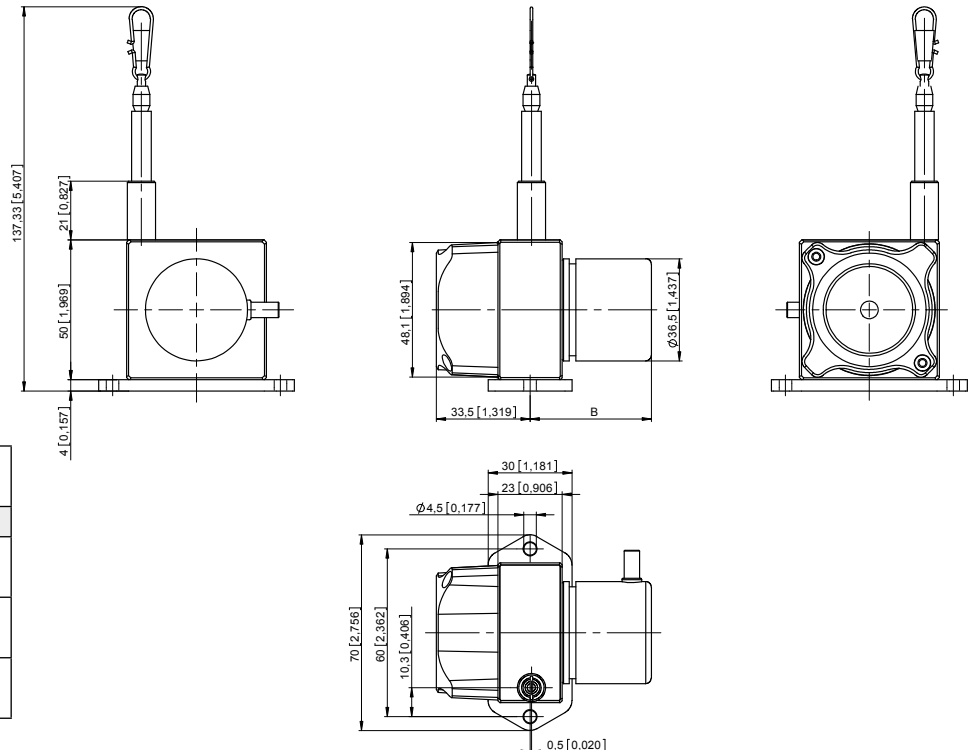
Draw-wire encoder A50

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Dimensions

Dimensions in mm [inch]

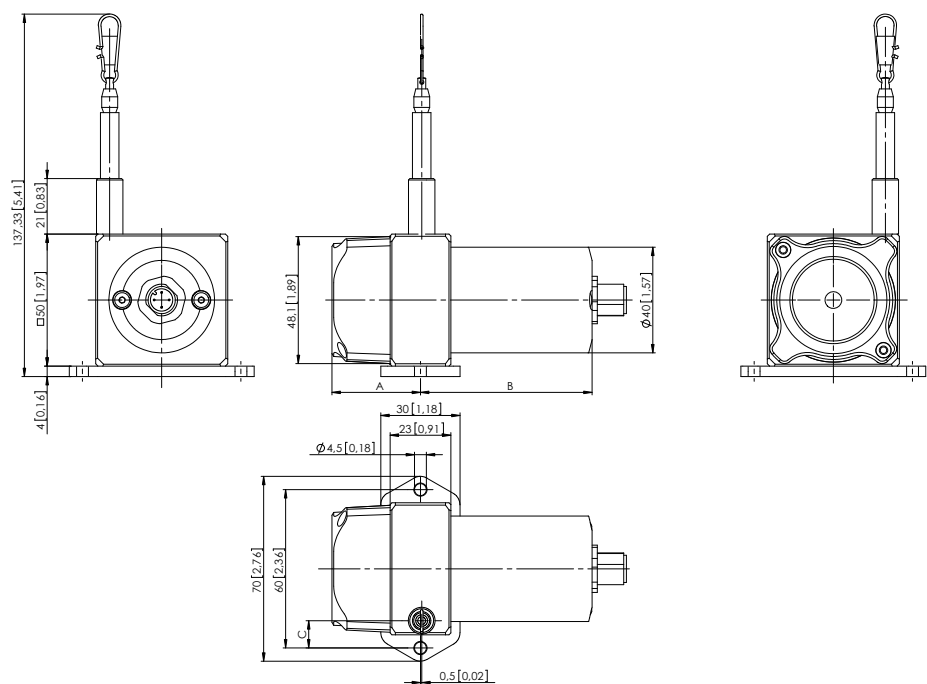
Draw-wire mechanics with encoder



Dimension B depends on the encoder used

Encoder	B
Sendix incremental 3610 D8.6A1.xxxx.36xx.xxxx	43.00 [1.69]
Sendix absolute M366x D8.6A1.xxxx.Mxxx.xxxx	62.45 [2.46]
Sendix absolute F366x D8.6A1.xxxx.Fxxx.xxxx	51.20 [2.02]

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



Sensor type	Measuring length	A	B	C
Potentiometer	250 mm	26.5 [1.04]	65 [2.56]	21.30 [0.84]
	500 mm	26.5 [1.04]	65 [2.56]	12.75 [0.50]
	1250 mm	33.5 [1.32]	65 [2.56]	10.30 [0.41]