Draw-wire encoder C100 | Base-Line | Measuring length max. 5 m



The draw wire system C100 is more than a sensor for determining length-related position data. Variants with integrated inclinometer and redundant interfaces offer versatile application possibilities. The contactless magnetic position scanning, a high IP67 protection level and the wider temperature range round off the product.

RoHS Analog output CANopen



Wide temperature range | High protection level | Shock / vibration resistant | Redundancy | Relay output | Switching outputs

Characteristics

- Measuring length up to 5 m.
- Integrated inclinometer.
- Redundant sensors.
- Different types of sensors (analog, incremental, CANopen, relay output, switch output).
- Linearity up to ±0.1 % of the measuring range.
- High protection level IP67 and wide temperature range from -40 °C ... +85 °C.

Advantages

- The suitable measuring length for every application.
- Cost, space and installation work saving.
- For even higher plant availability.
- Simple selection and fast installation.
- High accuracy at economic prices.
- Reliability and long service life for outdoor applications.

Order code with analog sensor

D8.C100.XXXX.XXX1.1000
(a) (b) (c)

(a) *Measuring length*
0100 = 1 m
0200 = 2 m
0300 = 3 m
0400 = 4 m
0500 = 5 m

(b) *Single sensor*
A11 = 4 ... 20 mA
A22 = 0 ... 10 V
A44 = 0.5 ... 4.5 V

Redundat sensor
R11 = 2 x 4 ... 20 mA
R22 = 2 x 0 ... 10 V
R44 = 2 x 0.5 ... 4.5 V

Crossed signals
R1C = 4 ... 20 mA / 20 ... 4 mA
R2C = 0 ... 10 V / 10 ... 0 V
R4C = 0,5 ... 4,5 V / 4,5 ... 0,5 V

(c) *Type of connection*
1 = M12 connector, 5-pin

Order code with CANopen and inclinometer

D8.C100.XXXX.XXX1.1X00
(a) (b) (c) (d)

(a) *Measuring length*
0100 = 1 m
0200 = 2 m
0300 = 3 m
0400 = 4 m
0500 = 5 m

(b) *Sensor type*
RC1 = CANopen redundant
RCT = CANopen redundant, with termination resistor 120 Ω

(c) *Type of connection*
1 = M12 connector, 5-pin

(d) *Inclinometers*
0 = none
1 = 1 inclinometer
2 = 2 inclinometers

Stock types
D8.C100.0500.RC11.1000

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Order code with incremental output

D8.C100.XXXX.XXXX.1000
(a) (b) (c)

a *Measuring length*
0100 = 1 m
0200 = 2 m
0300 = 3 m
0400 = 4 m
0500 = 5 m

b *Sensor type*
I11 = incremental AB, 512 ppr
I12 = incremental ABZ, 512 ppr
I21 = incremental AB, 1024 ppr
I22 = incremental ABZ, 1024 ppr

c *Type of connection*
1 = M12 connector, 5-pin
3 = radial cable, 2 m [6.56']

Order code with relais output

D8.C100.XXXX.RL11.1000
(a) (b) (c)

a *Measuring length*
0100 = 1 m
0200 = 2 m
0300 = 3 m
0400 = 4 m
0500 = 5 m

b *Sensor type*
RL1 = relay output

c *Type of connection*
1 = M12 connector, 5-pin

Order code with switch output

D8.C100.XXXX.SW34.1000
(a) (b) (c)

a *Measuring length*
0100 = 1 m
0200 = 2 m
0300 = 3 m
0400 = 4 m
0500 = 5 m

b *Sensor type*
SW3 = 3 switch outputs

c *Type of connection*
4 = M12 connector, 12-pin

Accessories relais output		Order no.
Teach adapter (for sensor type RL1)	M12 connector, 5-pin adapter with button	**D8.C100.RL1.TEACH**

Accessories switch output		Order no.
Visualization adapter (for sensor type SW3)	M12 connector, 12-pin	**D8.C100.SW3.VISUAL**

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 female connector with coupling nut, 12-pin, A coded, straight single ended 2 m [6.56'] PVC cable	**05.00.60B1.B211.002M**
Connectors	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**
	M12 female connector with coupling nut, 12-pin, A coded, straight (metal)	**8.0000.5162.0000**

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

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Technical data

Mechanical characteristics (draw-wire mechanics)

Measuring range		1.0 ... 5.0 m
Measuring wire	material	AISI304 steel wire Nylon coated
	diameter	ø 0.9 mm ø 0.61 mm (ABZ Incremental)
Wire fastening		eyelet
	internal diameter	ø 8 mm
	outer diameter	ø 15 mm
	height	2 mm
Speed max.		1 m/s
Acceleration max.		10 m/s²
Linearity (whole measuring range)		
	analog	±0.8 %
	incremental (≤ 2 m)	±0.1 %
	incremental ((> 2 m)	±0.3 %
	CANopen / relay	±0.5 %
Repetition accuracy (whole measuring range)	analog	±0.3 %
	incremental (≤ 2 m)	±0.1 %
	incremental ((> 2 m)	±0.3 %
	CANopen / relay	±0.3 %
Pull-back force		typ. 2 N [1]
Pull-out force		typ. 8 N
Drum circumference		245 mm
Type of connection		M12 connector, 5-pin cable, 2 m [6.56'] (only incremental)
Housing		polycarbonate reinforced with glass fibers
Protection		IP67
Temperature range		-40 °C ... +85 °C [-40 °F ... +185 °F]
Weight		approx. 0.5 kg [17.67 oz]
Shock resistance acc. to EN 60068-2-27		300 m/s², 11 ms
Vibration resistance acc. to EN 60068-2-6		100 m/s², 10 ... 500 Hz

Electrical characteristics

Supply voltage	
Sensor type:	
A11, A22, R11, R22, R1C, R2C	12 ... 30 V DC
A44 , R44, R4C	9 ... 30 V DC
RC1, RCT	9 ... 30 V DC
RL1, SW3	9 ... 30 V DC
I11, I12, I21, I22	9 ... 30 V DC

Analog sensor

Output signal	analog
Resolution	12 bit

Incremental output

Output signal	AB (Z optional)
Resolution	512 / 1024 ppr
Current consumption (non load)	max. 100 mA
Output current	max. 50 mA
Circuit	TTL

CANopen

Output signal	CANopen (DS301)
Resolution	14 bit
Resolution inclinometer	0.1°
Accuracy inclinometer	±0.6°
Temperature drift inclinometer	±0.01 %/ °C

Relay output

Output signal	1x relay (Normaly Open)
Maximum current	50 mA
Hysteresis	20 mm (factory setting)

Switch output

Output signal		switch
Maximum current		0.5 A
Mechanical service live		
	without load	min. 1,000,000 switching operations (60 switching operations/ min.)
	under load	min. 30,000 switching operations (30 switching operations/ min.)

Approvals

Electromagnetic compatibility	acc. to EN 61326-1, EN 61326-3-1
CE compliant in accordance with	
EMC Directive	2014/30/EU
RoHS Directive	2011/65/EU
UKCA compliant in accordance with	
EMC Regulations	S.I. 2016/1091
RoHS Regulations	S.I. 2012/3032

1) May be lower at low temperatures.

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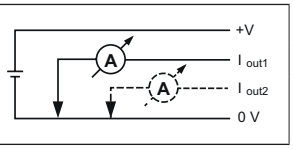
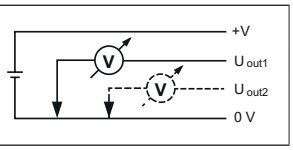
Terminal assignment

Sensor type	Interface	Type of connection	M12 connector, 5-pin					
Analog sensor **A11, R11, R1C**	(2x) 4 ... 20 mA	1	Signal:	+V	0 V	Iout 1	Iout 2 [1]	n.c.
			Pin:	1	2	3	4	5



Sensor type	Interface	Type of connection	M12 connector, 5-pin					
Analog sensor **A22, R22, R2C A44, R44, R4C**	(2x) 0 ... 10 V (2x) 0.5 ... 4.5 V	1	Signal:	+V	0 V	Uout 1	Uout 2 [1]	n.c.
			Pin:	1	2	3	4	5

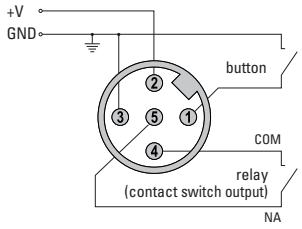


Sensor type	Interface	Type of connection	M12 connector, 5-pin					
I11, I12, I21, I22	incremental output	1	Signal:	+V	0 V	A	B	0
			Pin:	1	2	3	4	5

Sensor type	Interface	Type of connection	M12 connector, 5-pin					
RC1, RCT	CANopen	1	Signal:	+V	0 V	CAN-GND	CAN-H	CAN-L
			Pin:	2	3	1	4	5

Sensor type	Interface	Type of connection	M12 connector, 5-pin					
RL1	relay	1	Signal:	+V	0 V	Teach	CAN-H	NO
			Pin:	2	3	1	4	5

The switching point of the relay can be set by means of a button connected to pin 1 (Teach). To do so, position the draw-wire mechanic at the desired switching point and then press the button once.



Sensor type	Interface	Type of connection	Cable (isolate unused cores individually before initial start-up)					
I11, I12, I21, I22	incremental output	3	Signal:	+V	0 V	A	B	0
			Core color:	WH	YE	BN	GN	GY

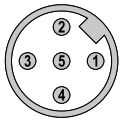
Sensor type	Interface	Type of connection	M12 connector, 12-pin											
SW3	switching output	4	Signal:	NC 1	NO 1	C 1	NC 2	NO 2	C 2	NC 3	NO 3	C 3	n.c.	n.c.	n.c.
			Pin:	1	2	3	4	5	6	7	8	9	10	11	12

+V : Supply voltage +V DC
0 V : Supply voltage GND (0V)
Iout 1 : Current output 1
Iout 2 : Current output 2
Uout 1 : Voltage output 1
Uout 2 : Voltage output 2
A : Incremental output channel A
B : Incremental output channel B
0 : Reference signal

Teach : Teach function input
C : Relay contact C
NO : Relay contact N.O.
n.c. : not connected
AGND : Analog Ground

C 1 : Switching contact C.1
C 2 : Switching contact C.2
C 3 : Switching contact C.3
NO 1 : Switching contact N.O.1
NO 2 : Switching contact N.O.2
NO 3 : Switching contact N.O.3
NC 1 : Switching contact N.C.1
NC 2 : Switching contact N.C.2
NC 3 : Switching contact N.C.3

Top view of mating side, male contact base



M12 connector, 5-pin



M12 connector, 12-pin

1) Only in case of redundant ordering option sensor type R11, R1C, R22, R2C, R44, R4C (otherwise n.c.).

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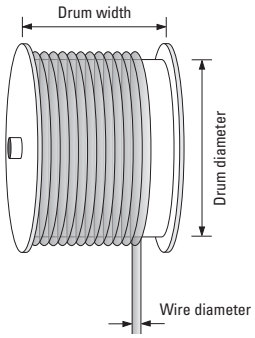
Technology in detail

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.

Inclinometer with option RC1

Setting possibility 360°



Setting possibility ±180°



Redundant signals possible.

Setting possibilities:
- Switching between setting possibilities 180° and 360°.
- Switching between synchronous and asynchronous output.
- Change of direction of rotation (cw/ccw).
- Setting and resetting an offset.

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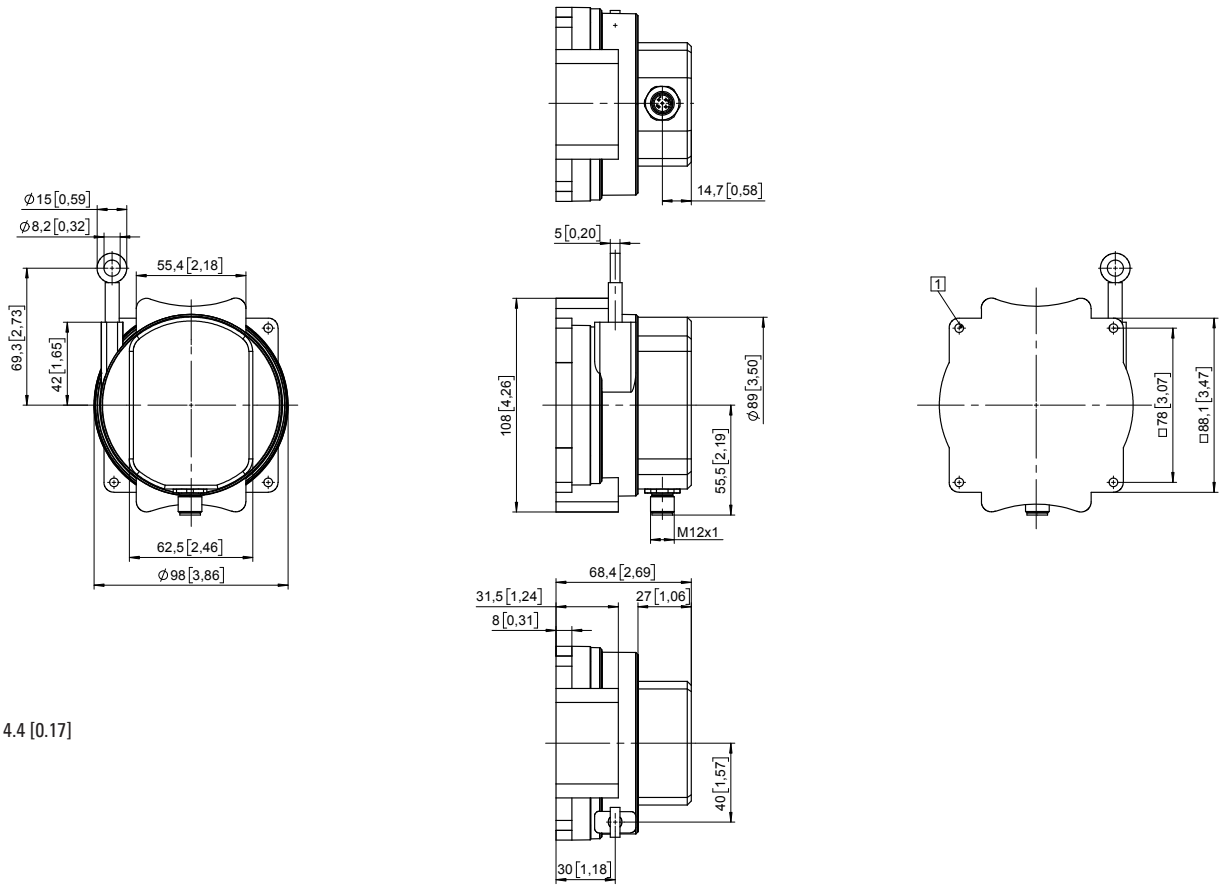
Dimensions

Dimensions in mm [inch]



1 4 x ø 4.4 [0.17]

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