

# Linear measuring technology

<b>Draw wire mechanics with redundant sensors</b>	<b>Draw wire encoder D125</b>	<b>Measuring length up to 10 m integrated inclinometer</b>
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Thanks to its robust design and its high IP67 protection level, the draw wire encoder D125 reliably provides accurate length measurement. Its simple and optimal integration in the application is a particular highlight of this product. Many additional options, ranging from the integrated inclinometer up to the relay output, are available.

To increase plant availability, this draw wire encoder allows combining a redundant system in a very compact housing.



Analog output



 -40... +85°C	 IP67	 Shock / vibration resistant	 Redundancy
Wide temperature range	High protection level	Shock / vibration resistant	Redundancy

### Characteristics

- Measuring length 6 ... 10 m.
- Integrated inclinometer.
- Redundant sensors.
- Different types of sensors (analog, CANopen).
- Linearity up to  $\pm 0.5\%$  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 . D125 . XXXX . XXX 1 . X 000

- |                           |   |                               |
|---------------------------|---|-------------------------------|
| <b>a</b> Measuring length | <b>b</b> Sensor type                      | <b>c</b> Type of connection   |
| 0600 = 6 m                | A22 = 0 ... 10 V <sup>1)</sup>            | 1 = M12 male connector, 5-pin |
| 0700 = 7 m                | A44 = 0,5 ... 4,5 V                       |                               |
| 0800 = 8 m                | R22 = 0 ... 10 V, redundant <sup>1)</sup> | <b>d</b> Power supply         |
| 0900 = 9 m                | R44 = 0,5 ... 4,5 V, redundant            | 1 = 9 ... 30 V DC             |
| 1000 = 10 m               |   | 2 = 5 V DC <sup>2)</sup>      |

### Order code with CANopen and inclinometer

D8 . D125 . XXXX . RC1 1 . 1 X 00

- |                           |                         |                               |                        |
|---------------------------|-------------------------|-------------------------------|------------------------|
| <b>a</b> Measuring length | <b>b</b> Sensor type    | <b>c</b> Type of connection   | <b>e</b> Inclinometers |
| 0600 = 6 m                | RC1 = CANopen redundant | 1 = M12 male connector, 5-pin | 0 = none               |
| 0700 = 7 m                |                         |                               | 1 = 1 inclinometer     |
| 0800 = 8 m                |                         | <b>d</b> Power supply         | 2 = 2 inclinometers    |
| 0900 = 9 m                |                         | 1 = 9 ... 30 V DC             |                        |
| 1000 = 10 m               |                         |                               |                        |

1) Available from 09/2017.  
2) Only in conjunction with type of sensor A44 and R44.

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<b>Connection technology for analog sensor</b>			Order no.
<b>Cordset, pre-assembled</b>	M12 female connector with coupling nut, 5-pin 2 m [6.56'] PVC cable		<b>05.00.6081.2211.002M</b>
<b>Connector, self-assembly (straight)</b>	M12 female connector with coupling nut, 5-pin		<b>8.0000.5116.0000</b>

## Technical data

Mechanical characteristics (draw wire mechanics)	
<b>Measuring range</b>	6.0 ... 10.0 m
<b>Measuring wire</b>	material AISI304 steel wire Nylon coated diameter $\varnothing$ 0.9 mm
<b>Wire fastening</b>	eyelet internal diameter $\varnothing$ 8 mm outer diameter $\varnothing$ 15 mm height 2 mm
<b>Wire pull-out speed max.</b>	max. 1 m/s
<b>Acceleration</b>	max. 10 m/s <sup>2</sup>
<b>Linearity (whole measuring range)</b>	analog $\pm$ 0.8 % CANopen $\pm$ 0.5 %
<b>Repetition accuracy (whole measuring range)</b>	analog $\pm$ 0.1 % CANopen $\pm$ 0.2 %
<b>Pull-back force</b>	typ. 4.5 N <sup>1)</sup>
<b>Pull-out force</b>	typ. 9 N
<b>Type of connection</b>	M12 connector, 5-pin
<b>Housing</b>	polycarbonate reinforced with glass fibers
<b>Protection</b>	IP67
<b>Temperature range</b>	-40°C ... +85°C [-40°F ... +185°F]
<b>Weight</b>	approx. 0.97 kg [34.2 oz]
<b>Shock resistance acc. to EN 60068-2-27</b>	300 m/s <sup>2</sup> , 11 ms
<b>Vibration resistance acc. to EN 60068-2-6</b>	100 m/s <sup>2</sup> , 10 ... 500 Hz

Analog sensor	
<b>Output signal</b>	analog
<b>Resolution</b>	12 bit

CANopen	
<b>Output signal</b>	CANopen (DS301)
<b>Resolution</b>	14 bit
<b>Resolution inclinometer</b>	0.1°
<b>Accuracy inclinometer</b>	$\pm$ 0.6°
<b>Temperature drift inclinometer</b>	$\pm$ 0.01 % / °C

Electrical characteristics	
<b>Power supply</b>	9 ... 30 V DC 5 V DC $\pm$ 10 % <sup>2)</sup>
<b>Electromagnetic compatibility</b>	acc. to EN 61326-1, EN 61326-3-1
<b>CE compliant acc. to</b>	EMC guideline 2014/30/EU RoHS guideline 2011/65/EU

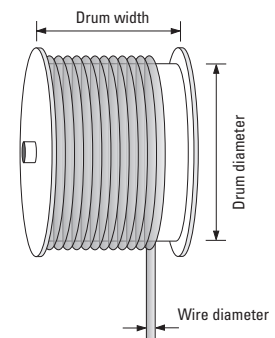
### Operating principle

#### 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) May be lower at low temperatures.  
2) Only in conjunction with type of sensor A44 and R44.

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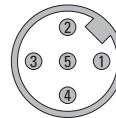
## Terminal assignment

Sensor type	Type of connection	M12 connector, 5-pin					
A22, A44, R22, R44 (analog sensor)	1	Signal:	+V	n.c.	0 V	U <sub>out 1</sub>	U <sub>out 2</sub>
		Pin:	1	2	3	4	5

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

+V : Power supply +V DC  
 0 V : Power supply GND (0V)  
 U<sub>out 1</sub> : Voltage output 1  
 U<sub>out 2</sub> : Voltage output 2

Top view of mating side, male contact base



M12 connector, 5-pin

## Technology in detail

### 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.

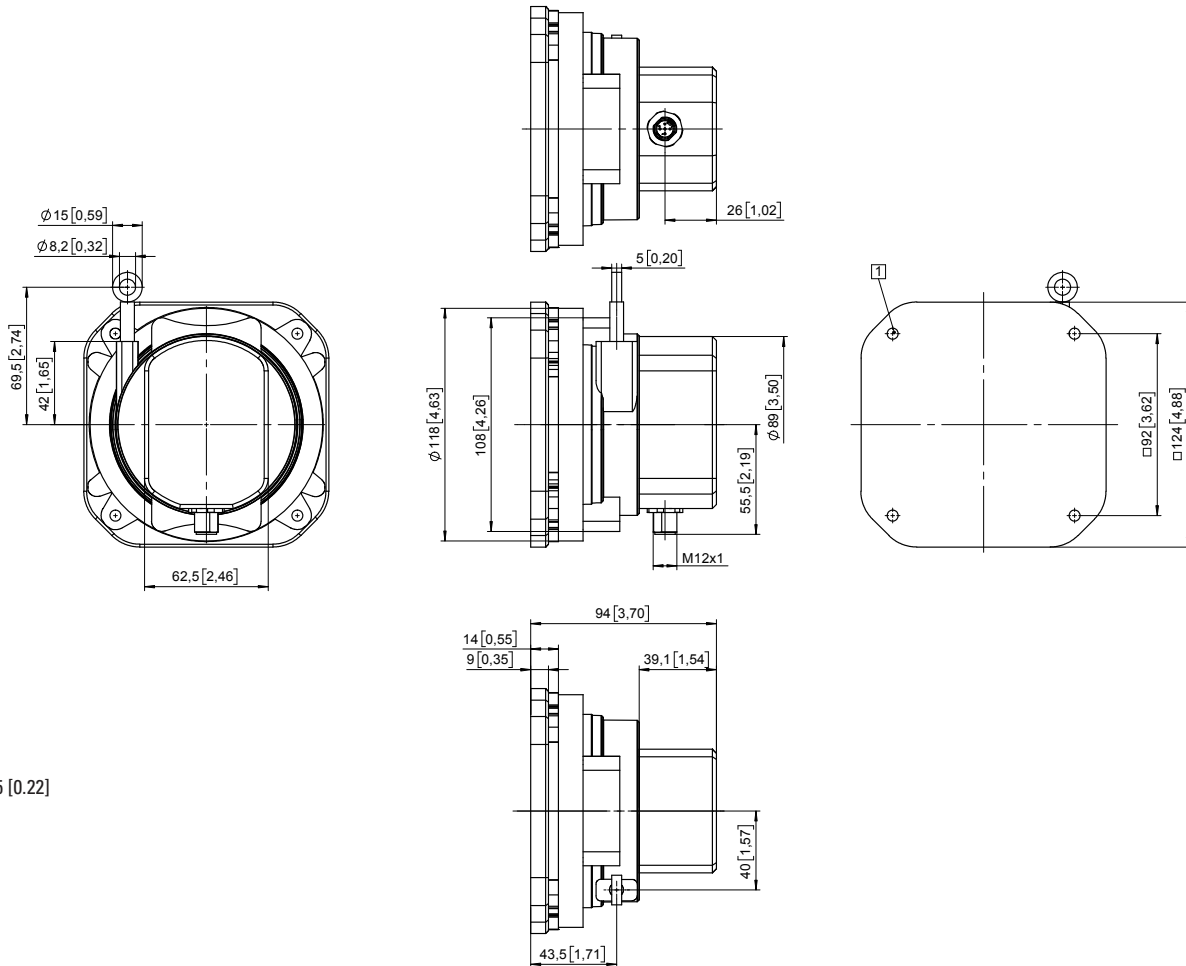
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with redundant sensors**

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## Dimensions

Dimensions in mm [inch]



1 4 x  $\phi 5.5 [0.22]$