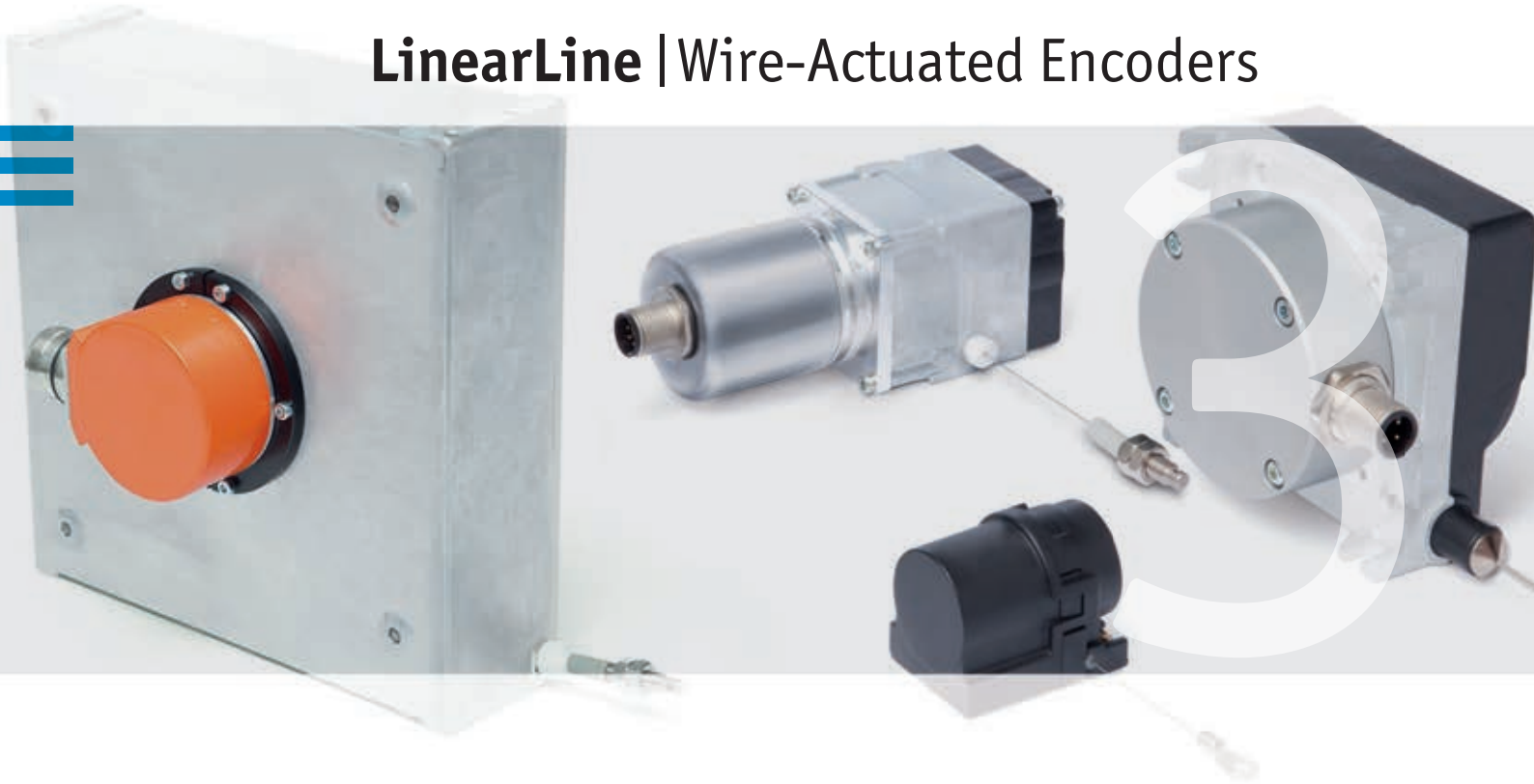


## LinearLine | Wire-Actuated Encoders





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3.1

**With a clear vision for the future!**

Today SIKO can look back over five decades of experience in the production of measuring instruments for length, angle and speed measurement as well as the measurement of tilt angles and speed. With these core competencies as its foundation, SIKO develops and produces measuring instruments and positioning systems for automation and manufacturing processes that are geared to the future.

The highest demands of our customers from the industry and the mechanical engineering sector are more than met by the quality, precision and functionality of our products and services.

SIKO is certified to DIN EN ISO 9001 : 2008. In our company sustainable use of resources is a matter of course.

**Six product ranges - a wide portfolio for very different measuring assignments**

The SIKO product portfolio comprises a total of six ranges, including high-quality measuring instruments and positioning systems for the industry and the mechanical engineering sector.

We develop sensor systems for measured value acquisition either for you or in collaboration with your company. Shorter tooling times and the optimization of manufacturing and production processes are often the centre of focus.

OEM customers, projects and special solutions, retrofits or spare parts supplies directly to end users - all our customers are important!

**6 distinctive product lines**

<b>PositionLine</b>	mechanical and electronic position indicators, handwheels with analog displays, adjustment buttons
<b>RotoLine</b>	magnetic and optical rotary encoders, geared potentiometers
<b>LinearLine</b>	wire-actuated encoders, optical distance sensors
<b>DriveLine</b>	actuators
<b>MagLine</b>	magnetic length and angle measuring systems
<b>OptoLine</b>	high-precision optical sensors





3.1

### Global success is never coincidental

Today the robust and innovative SIKO measuring instruments are in use in industrial and mechanical engineering installations around the world.

Five SIKO subsidiaries are at your disposal in the following countries:

- U.S.A.
- Italy
- Switzerland
- China
- Singapore

In addition, around 60 national and international agencies are on the spot for direct customer contact and technical support. Sales engineers and service technicians support OEM customers as well as users at their own facilities, providing competent advice and services in the respective national languages.



Horst Wandres & Sven Wischnewski | Management of SIKO GmbH





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3.2 | Wire-actuated Encoder

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Rotary encoders made by SIKO are optimally suited to wire-actuated technology. Custom-specific encoders can also be mounted thanks to standardized mechanical "interfaces".

### The most flexible solution when the direct route goes round the corner

SIKO wire-actuated encoders are a perfect measurement solution thanks to their state-of-the-art, fail-safe technology and effortless integration. They are suitable for a wide range of measurement tasks under very varied conditions. Their sturdy design and wire types guarantee an exceptionally long, maintenance-free service life.

### This is how the technology works

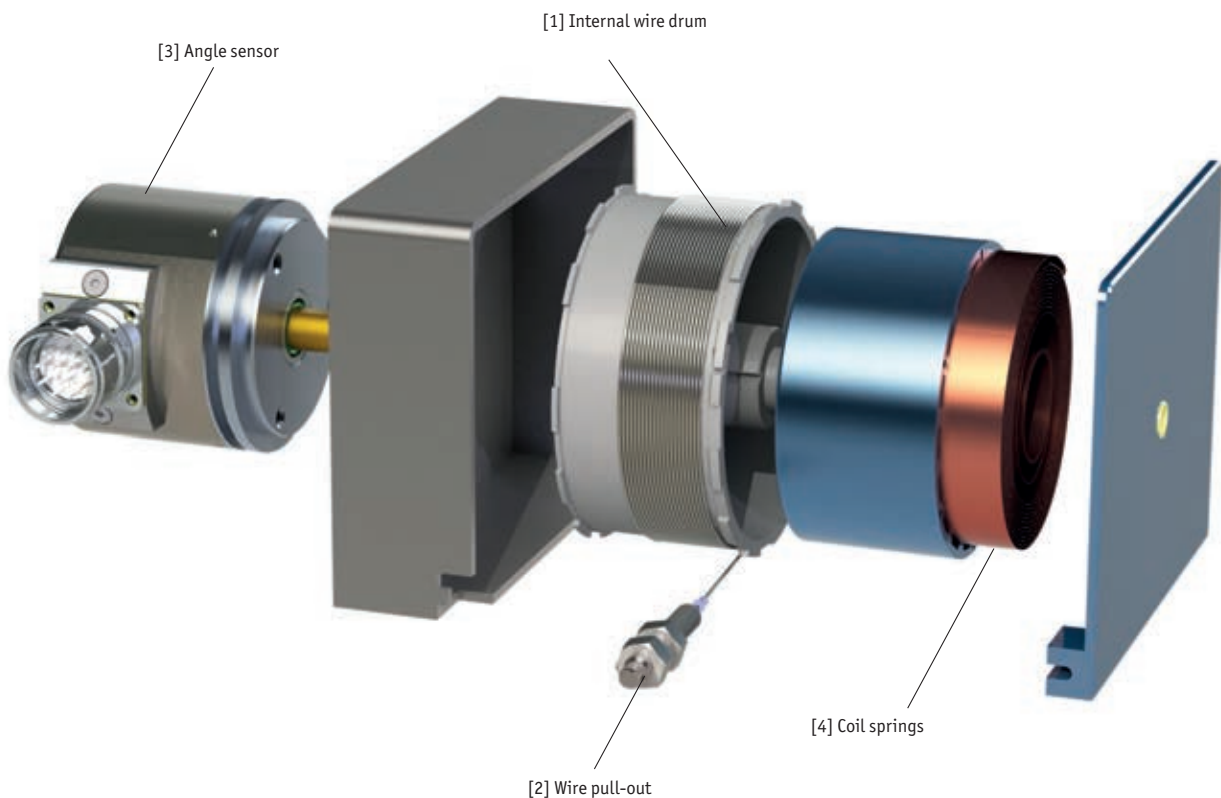
A single layer of measurement wire is wound onto an internal drum [1]. When the wire is pulled out [2], it causes the drum to rotate. The angle sensor [3] connected directly to the drum axle records this rotation and generates an arbitrarily usable measurement signal proportional to the wire movement. An integral coil spring [4] on the drum's rotation axis guarantees a safe wire return movement (see illustration). Mounting effort is low, as the wire is simply attached to the object to be measured. This means there is no need of additional guiding systems or installation of energy supply chains.

Moreover, the flexibility of the wire enables linear adjustments even at sites which are hard to reach. Indirect paths can also be measured by means of guide rollers.

A choice of incremental and absolute measuring principles is generally available. SIKO wire-actuated encoders cover almost the entire range of industrial applications - from compact versions in miniature format with a measurement length of 600 mm to solutions with wire pull-out lengths of 15 m.

### Benefits

- Long service life thanks to consistent technological development and application-oriented choice of materials
- Excellent price-performance ratio
- Variable measurement lengths
- Easy adaptation of measuring transducers
- Standardized interfaces
- Problem-free, fast mounting





### Areas of application

Measurement systems based on the “draw-wire” principle are easy to handle, since attaching the wire to the adjustment unit is quick and inexpensive.

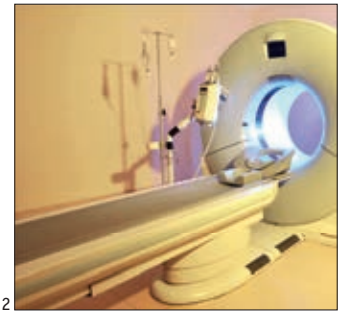
They also run reliably without additional mechanical protection, for example on elevating work platforms or forklift trucks. While during metal processing the dimension of the workpiece is measured with a wire cable when adjusting the end stop of mitre saws, wire cables are used for all measuring tasks in the illustrated material handling example.

SIKO’s miniature encoders are the logical answer to ongoing integration in industrial products and processes. The tiny encoders have a wide range of application: They are reliable monitors of positioning tasks for patient tables (medical technology), adjustment of seats (vehicle technology) or controlled deflection of chassis (aircraft technology).

With the SG120 and the SG150 for measuring distances of up to 15 metres, solutions in the work platform, warehouse and crane sectors have been implemented.



1



2

iStockphoto. Levent Komuk



3



4



6



5

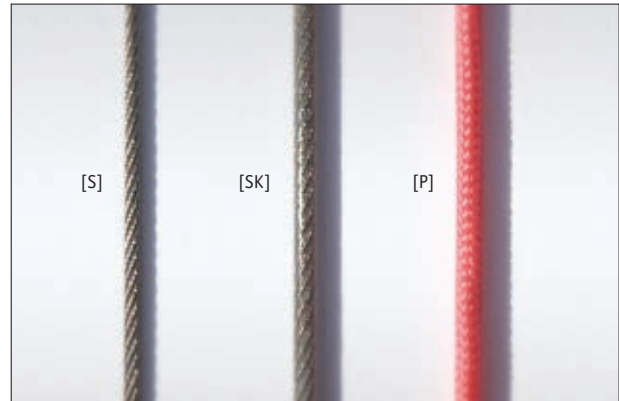
[1] Retrofitting with a wire-actuated encoder permits direct control of a set value for height and stroke. [2] Positioning of patient tables, for example on tomography systems, operating tables and X-ray equipment. [3, 4] Finding the correct placement area is decisive for a smooth workflow: Wire-actuated encoders are reliable measuring elements for the assignment of pre-defined storage areas. [5] For height adjustment and side positioning of the lifting fork of unmanned transport systems. [6] Reliable recording of the support and the telescopic cylinder for monitoring the maximum range with wire-actuated encoders, optionally of redundant design.

## 3.2

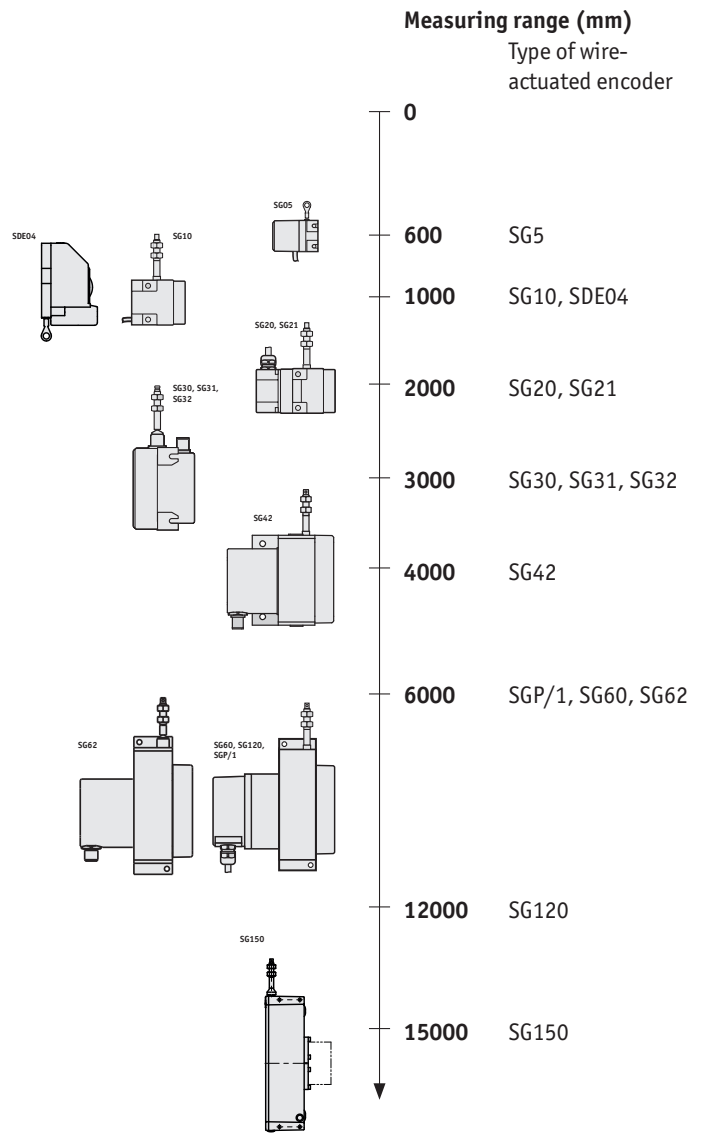
### Measurement range and wire versions

Various measurement lengths and wire types are available depending on the measurement range requirements and the ambient conditions. The following table is a guide to selecting the right components (wire) when planning a linear wire measurement system..

Wire versions		Properties compared		
Type	Material	Tensile strength	Sliding properties	Measuring accuracy
S	stainless steel	•	•	•••
SK	plastic-coated steel	••	••	••
P	electric paraline non-conducting, signal color	•••	•••	•



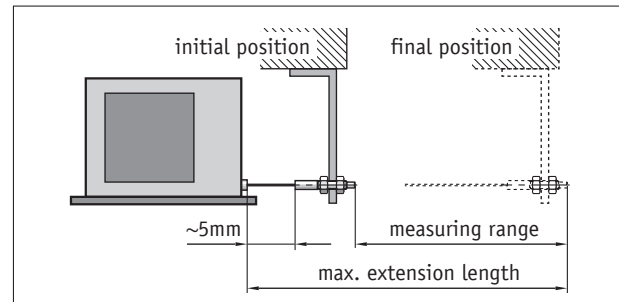
### 3.2



## Mounting note

When attaching the wire it should be pulled out straight in line with the wire outlet.

**Recommendation:** A 5 mm wire extension is recommended before the measurement starting point. This prevents the wire snapping back to the stop on rewinding.



Symbolic representation

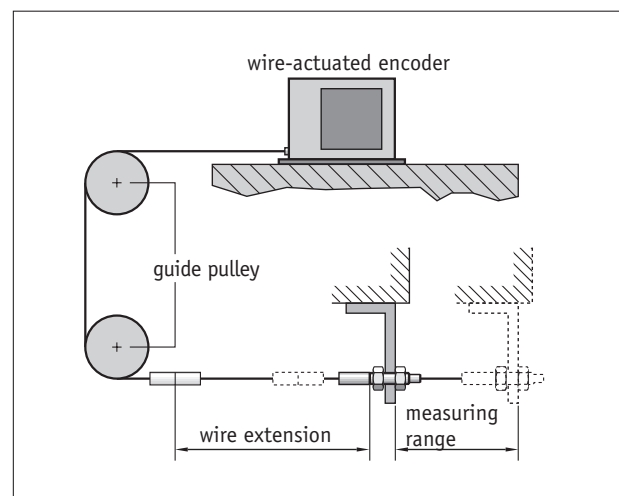
## Mounting example

Guide rollers are used wherever the wire-actuated encoder cannot be installed in line with the extension direction of the wire. Several rollers can be used to redirect the wire without influencing the measurement result.

An opening slightly larger than the diameter of the wire is sufficient as a point of access at measurement sites which are hard to reach. A protective cover is recommended for use in soiled environments. Note: Mechanical stress shortens the lifespan of the wire.

A wire extension piece can be used for applications where the distance between the wire-actuated encoder and the measurement range is greater than the wire's maximum extension length. This does not extend the actual measurement range, however (see above: mounting note). This simple method is useful for measurements in areas where a sufficiently large distance is required between the wire-actuated encoder and the measured object due to high temperatures, harsh environments, measurement in liquid media, areas which are difficult to access, etc.

Detailed information on guide rollers or wire extension pieces can be found on the product page in the accessories section.

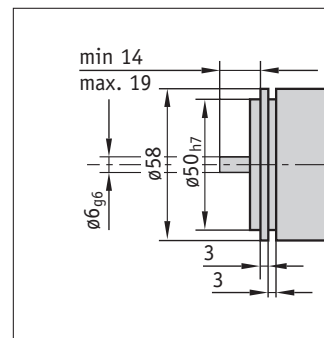


3.2

## Customer-specific encoders

All rotary encoders with the following specifications can be installed on the SG31, SG60, SG120 und SG150 wire-actuators (see diagram):

- 58 mm servo/synchro flange
- 6, 8 and 10 mm solid shaft\*
- Maximum starting and operating torques 3 Ncm\*  
\*depends on device: see product pages!

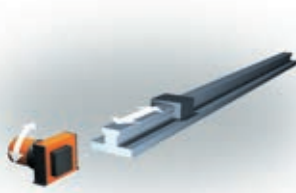


### Application

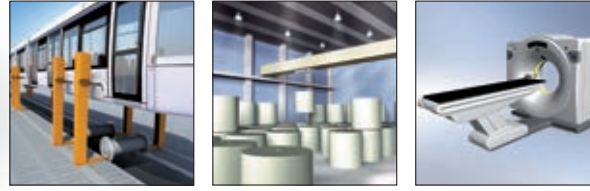
### Examples of use

### Benefits

#### Rail-guided systems



Direct measurement of the guided element.



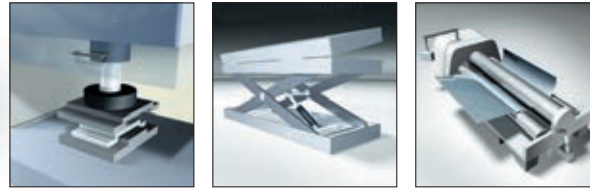
e.g., heavy duty column lifts, gantry cranes, CT patient tables ...

- Little space required
- Little assembly effort

#### Hydraulic cylinders



In combination with piston-guided systems or hydraulic cylinders, wire-actuated encoders use the deflection of these systems to gather length information.



e.g., presses, lifter tables, bending machines ...

- Little space required
- Mechanical tolerances do not influence measuring accuracy

#### Telescope-like systems



In combination with telescope-like systems, wire-actuated encoders can be ideally integrated and are also protected from environmental impact.



e.g., mobile cranes, vehicle hoists ...

- Do not require guiding
- Mechanical tolerances do not influence measuring accuracy

#### Chain, crane and cable winch adjustment



Direct position feedback after winch adjustment. The wire-actuated encoder can be positioned outside danger or humidity areas by means of wire extension.











e.g., forklifts, stage control systems, elevators ...

- Chain/wire tears are detectable
- Mechanical tolerances do not influence measuring accuracy



Or crane technology ...







## Wire-Actuated Encoders

								
<b>Page</b>	14	18	22	26	29	33	36	39
<b>Measuring length</b>								
0 to ... [mm]	600	1000/2000*	2000	2000	3000	3000	3000	4000
<b>Encoder type</b>								
Power output (MWI) 4 ... 20 mA	•	•	•		•	•	•	•
Voltage output (MWU) 0 ... 10 V	•	•	•		•	•		
Potentiometer output	•	•	•		•		•	•
Incremental output		•		•		•		
SSI				•		•		
CAN-Bus				•		•		
Profibus						•		
Manufacturer of independent rotary encoder mounting				•		•		
<b>Housing material</b>								
Plastic	•	•						
Zinc die-cast/plastic			•	•	•	•	•	
Aluminum/plastic								•
Aluminum								

\* only with incremental output

3.2

## Wire-Actuated Encoders

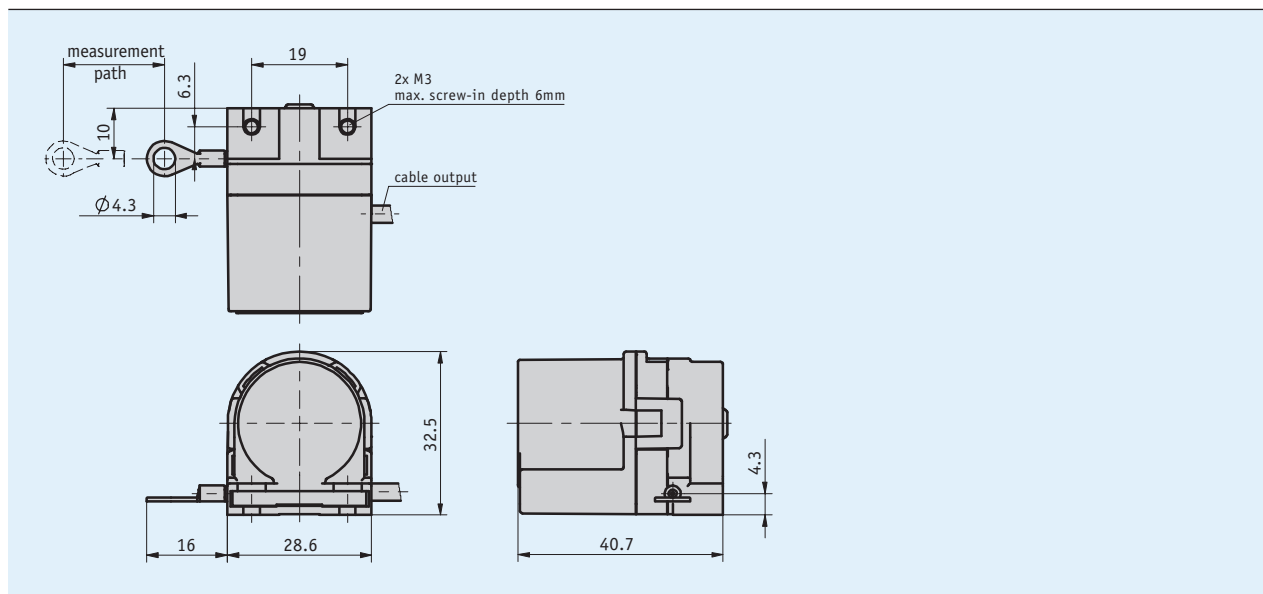
						
<b>Page</b>	42	46	49	52	55	57
<b>Measuring length</b>						
0 to ... [mm]	6000	6000	6000	12000	15000	1000
<b>Encoder type</b>						
Power output (MWI) 4 ... 20 mA	•	•	•	•		
Voltage output (MWU) 0 ... 10 V	•	•		•		
Potentiometer output	•		•			
Incremental output		•		•		
SSI		•		•		
CAN-Bus		•		•		
Profibus		•		•		
Manufacturer of independent rotary encoder mounting		•	•	•	•	
<b>Housing material</b>						
Plastic						•
Zinc die-cast/plastic						
Aluminum/plastic	•	•	•	•		
Aluminum					•	

### Profile

- Very small design
- Universally applicable thanks to standardized interfaces
- Easy mounting
- Measurement lengths up to max. 600 mm
- Potentiometer, voltage or power output
- Housing made of reinforced plastic



3.2



### Mechanical data

Feature	Technical data	Additional information
Housing	reinforced plastic	
Wire design	steel wire (stainless steel) $\varnothing 0.36$ mm	plastic coated
Extension force	$\geq 3$ N	
Absolute accuracy	$\pm 0.35$ % (potentiometer)	relating to measuring length (mm)
Cable length	$\leq 15$ m	P10 encoder type
	$\leq 30$ m	MWI encoder type
	$\leq 20$ m	MWU encoder type
Weight	$\sim 0.06$ kg	

### Electrical data

#### Encoder potentiometer

Feature	Technical data	Additional information
Power rating	2 W at 70 °C	
Resistance	10 k $\Omega$	
Resistance tolerance	$\pm 5$ %	
Linearity tolerance	$\pm 0.25$ %	

#### ■ Transducer, power output

Feature	Technical data	Additional information
Operating voltage	24 V DC $\pm 20\%$	at $\leq 500\ \Omega$ load
Output current	4 ... 20 mA	

#### ■ Transducer, voltage output

Feature	Technical data	Additional information
Operating voltage	15 ... 28 V DC	at 3 mA, no load
Output voltage	0 ... 10 V DC	$I_{\text{Load}} \leq 10\ \text{mA}$
Load	$\leq 10\ \text{mA}$	

\*Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA (MWI) or 0 ... 10 V DC (MWU) is available.

### System data

Feature	Technical data	Additional information
Repeat accuracy	$\pm 0.15\ \text{mm}$	
Travel speed	$\leq 800\ \text{mm/s}$	

3.2

### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 80 °C	
Relative humidity		condensation inadmissible
Protection category	IP50 (encoder part)	EN 600529; with cable connected in the factory

### Pin assignment

#### ■ Potentiometric outputs P10

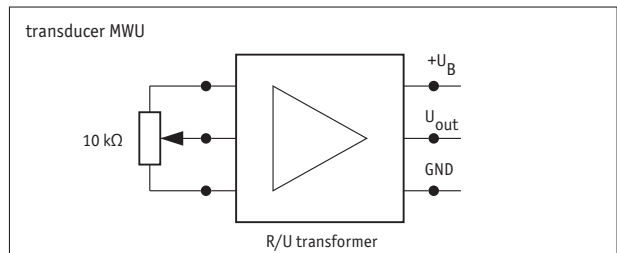
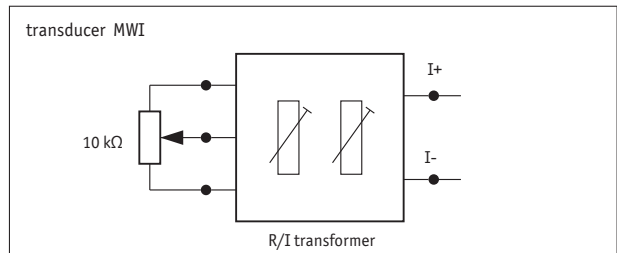
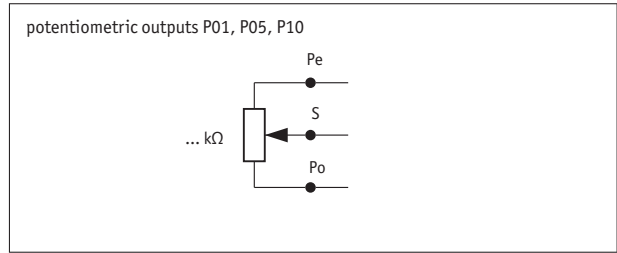
Signal	E1 (terminal)
Po	brown
Pe	white
S	green

#### ■ MWI transducer

Signal	Cable color
I+	brown
I-	white

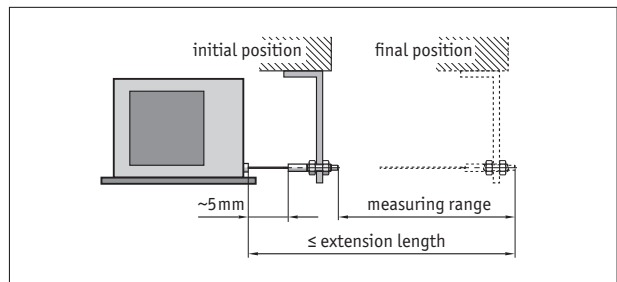
#### ■ MWU transducer

Signal	Cable color
+24 V DC	brown
GND	white
U <sub>out</sub>	green



### Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction



### Order

#### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	300M	300 mm	Transducer setting, only with MWI or MWU encoder types
	600	600 mm	
Encoder type	P10	potentiometer with 10 kΩ	
	MWI	transducer 4 ... 20 mA	
	MWU	transducer 0 ... 10 V	
		others on request	
Cable length	OK	without cable	
	0.5	0.5 m	
	...	1 ... 15 m, in steps of 1 m	

#### Order key

SG5 -  -  -

Scope of delivery: SG5

Accessories:  
Guide roller UR

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Additional information:

General information and areas of application

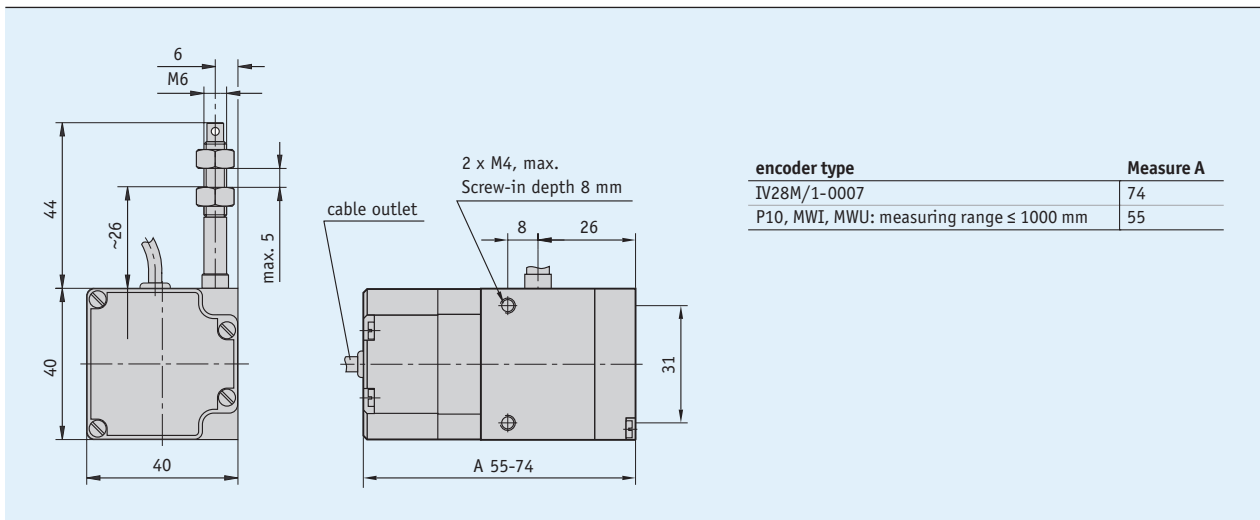
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### Profile

- Compact design
- Universally applicable thanks to standardized interfaces
- Easy mounting
- Measurement lengths up to max. 2000 mm
- Potentiometer, voltage, power output or incremental encoder
- Housing made of reinforced plastic



3.2



### Mechanical data

Feature	Technical data	Additional information
Housing	reinforced plastic	
Wire design	steel wire (stainless steel) $\varnothing 0.45$ mm	plastic coated
Extension force	$\geq 2$ N	
Measured distance/ rope drum revolution	100 mm	
Cable length	$\leq 30$ m	P10 + MWI encoder type
	$\leq 20$ m	MWU encoder type
	1 m	IV28M/1-0007 encoder type
Weight	$\sim 0.2$ kg	

### Electrical data

#### ■ Encoder potentiometer

Feature	Technical data	Additional information
Power rating	1 W at 20 °C	300 measuring range
	2 W at 70 °C	500, 100 measuring ranges
Resistance	10 k $\Omega$	
Resistance tolerance	$\pm 5$ %	
Linearity tolerance	$\pm 0.5$ %	300 measuring range
	$\pm 0.1$ %	measuring range 500
	$\pm 0.25$ %	1000 measuring range

### ■ Transducer, power output

Feature	Technical data	Additional information
Operating voltage	24 V DC $\pm 20\%$	at $\leq 500\ \Omega$ load
Output current	4 ... 20 mA	

### ■ Transducer, voltage output

Feature	Technical data	Additional information
Operating voltage	15 ... 28 V DC	at 3 mA, no load
Output voltage	0 ... 10 V DC	
Load	$\leq 15$ mA	

### ■ IV28M/1-0007 encoder incremental

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	at 25 mA, no load
Output circuit	PP	
Output signals	AB0	

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA (MWI) or 0 ... 10 V DC (MWU) is available.

3.2

## System data

Feature	Technical data	Additional information
Resolution	0.1 mm (10 Impulse/mm)	IV28M/1-0007 encoder type
	1000 steps/revolution	IV28M/1-0007 encoder type
Repeat accuracy	$\pm 0.15$ mm	
Travel speed	$\leq 800$ mm/s	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 80 °C	without transducer
	0 ... 50 °C	with transducer
Protection category	IP50 (encoder part potentiometer)	EN 600529
	IP54 incremental	EN 600529

## Pin assignment

### ■ Potentiometric outputs P10

Signal	E1 (terminal)
Po	brown
Pe	white
S	green

### ■ MWI transducer

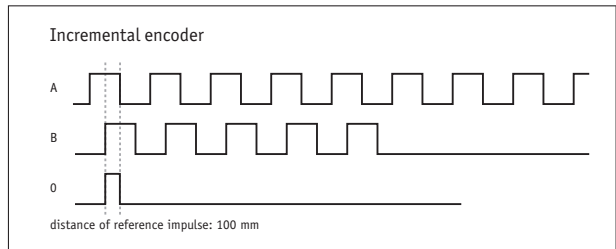
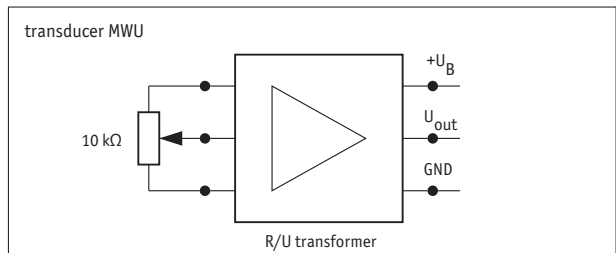
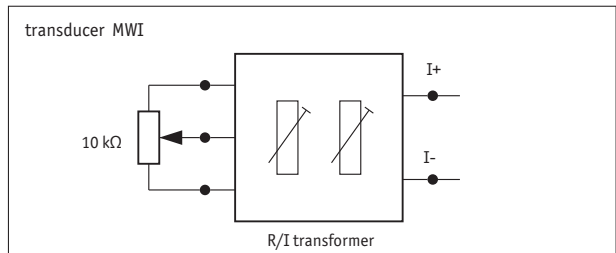
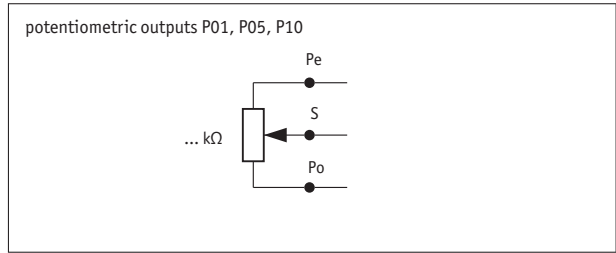
Signal	Cable color
I+	brown
I-	white

### ■ MWU transducer

Signal	Cable color
+24 V DC	brown
GND	white
U <sub>out</sub>	green

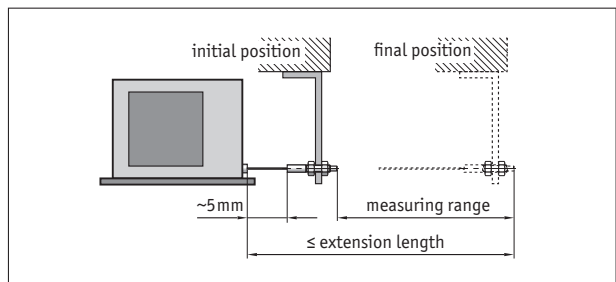
### ■ IV58M/1-0007 encoder type, incremental

Signal	E1 (terminal)
B	white
+24 V DC	brown
O/I	green
A	yellow
GND	gray



## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet. Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information	
Measuring range	...	300, 500, 1000 in mm	Encoder types $\Omega$ , I, U (potentiometer and transducer) Incremental output IV28M/1	
	2000I			A
Encoder type	P10	potentiometer with 10k $\Omega$ transducer 4 ... 20 mA transducer 0 ... 10 V incremental encoder others on request	only with measuring range 2000	
	MWI			B
	MWU			
	IV28M/1-0007			
Cable length	0.5	0.5 m 1 ... 20 m, in steps of 1 m specified with encoder type "IV28M/1-0007"	with encoder type P10 or MWI/MWU with encoder type P10 or MWI/MWU	
	...			C
	IG			

### Order key

SG10 -  -  -   
A      B      C

Scope of delivery: SG10

Accessories:  
Guide roller UR

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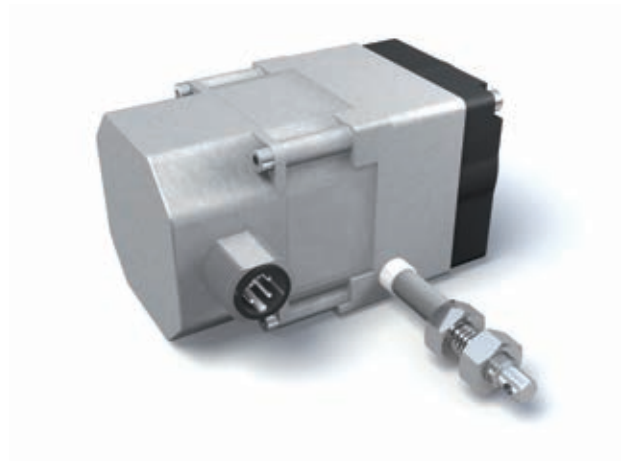
Additional information:

General information and areas of application

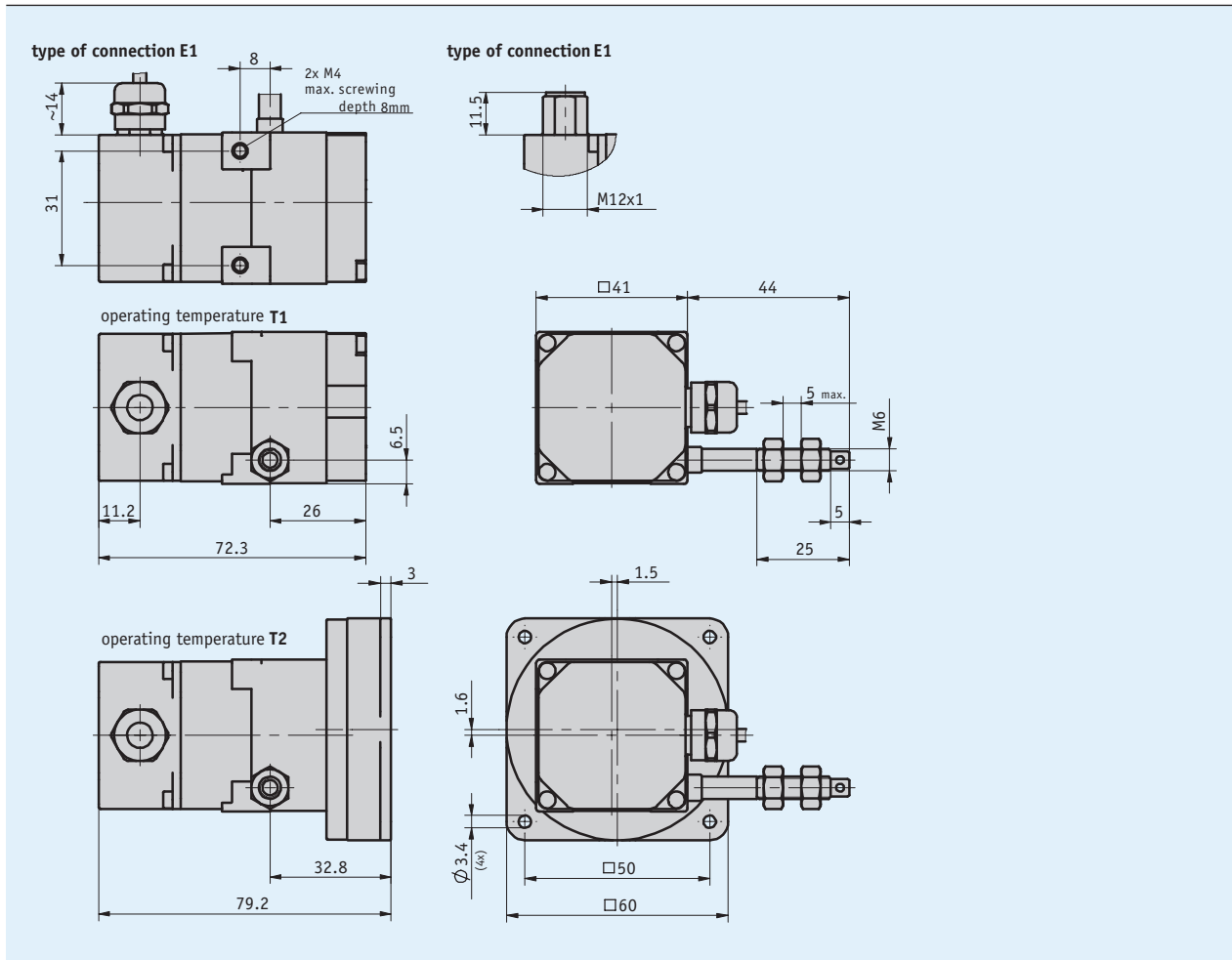
page 8

## Profile

- Compact design
- Universally applicable thanks to standardized interfaces
- Easy mounting
- Measurement lengths up to max. 2000 mm
- Potentiometer, voltage or power output
- Robust zinc die-cast housing



3.2



## Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast	
Wire design	steel wire (stainless steel) $\varnothing 0.45$ mm	plastic coated
Extension force	$\geq 2$ N	T1 operating temperature
	$\geq 11$ N	T2 working temperature
Measured distance/ rope drum revolution	100 mm	
Absolute accuracy	$\pm 0.35$ %	relating to measuring length (mm)
Cable length	$\leq 30$ m	4/20mA, MWIHP, MWIHP/R encoder type
	$\leq 20$ m	P10; 0/10V; 0,5/4,5V encoder type
Weight	$\sim 0.32$ kg	

## Electrical data

### Encoder potentiometer

Feature	Technical data	Additional information
Power rating	2 W at 70 °C	
Resistance	10 k $\Omega$	
Resistance tolerance	$\pm 5$ %	
Linearity tolerance	$\pm 0.25$ %	

### Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	between I+ and I-, at $\leq 500 \Omega$ load
Output current	4 ... 20 mA	(4/20mA; MWIHP)

### Transducer, voltage output

Feature	Technical data	Additional information
Operating voltage	15 ... 28 V DC	at 3 mA without load (0/10V)
	8 ... 28 V DC	at 3 mA without load (0,5/4,5V)
Output voltage	0 ... 10 V DC	$I_{Load} \leq 10$ mA
	0.5 ... 4.5 V DC	$I_{Last} \leq 10$ mA (0,5/4,5V)
Resistance	2 ... 10 k $\Omega$	against GND
Load	$\leq 15$ mA	

## System data

Feature	Technical data	Additional information
Repeat accuracy	$\pm 0.15$ mm	
Travel speed	$\leq 1$ m/s	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 80 °C	T1
	-40 ... 80 °C	T2
Protection category	IP65 (encoder part)	EN 600529

## Pin assignment

### ■ Potentiometric outputs P10

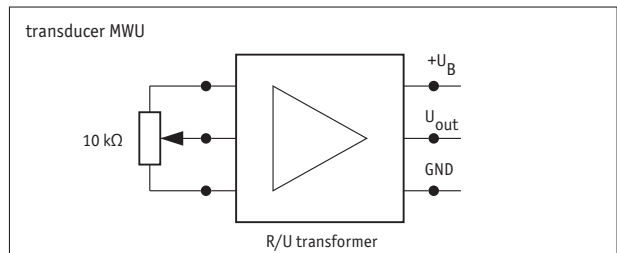
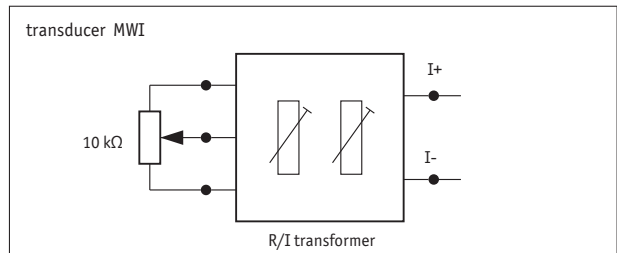
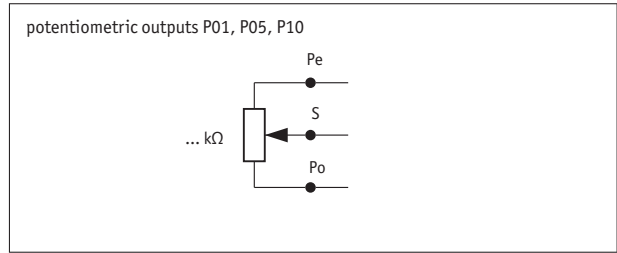
Signal	E1	E12
Po	brown	1
Pe	white	2
S	green	3
nc		4

### ■ MWI transducer

Signal	E1	E12
I+	brown	1
I-	white	2
nc		3
nc		4

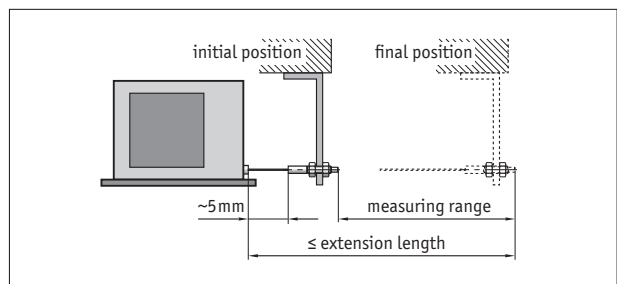
### ■ MWU transducer

Signal	E1	E12
+24 V DC	brown	1
GND	white	2
U <sub>out</sub>	green	3
nc		4



## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction



## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	1250, 1500, 1750, 2000 in mm	
Encoder type	<b>P10</b>	potentiometer with 10 kΩ	
	<b>0.5/4.5V</b>	measuring transducer 0.5 ... 4.5 V	
	<b>0/10V</b>	measuring transducer 0 ... 10 V	
	<b>4/20mA</b>	measuring transducer 4 ... 20 mA others on request	
Type of connection	<b>E1</b>	open cable ends	
	<b>E12</b>	connector	
Cable length	... <b>D</b>	1 ... 20.0 m, in steps of 1 m	with P10 or MWU encoder types
	... <b>D</b>	1 ... 30.0 m, in steps of 1 m	with MWI encoder type
Operating temperature	<b>T1</b>	-10 ... +80 °C	
	<b>T2</b>	-4 ... +80 °C	

### Order key

SG20 -  -  -  -  -   
A   B   C   D   E

**Scope of delivery:** SG20, Mounting instructions

**Accessories:**

- Guide roller UR page 62
- Wire extension piece SV page 63
- Mating Connector Overview page 66
- Mating connector, E12, 4-pole, socket Order key 83419

**Additional information:**

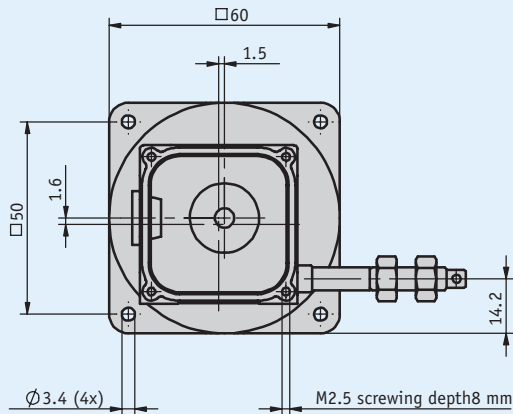
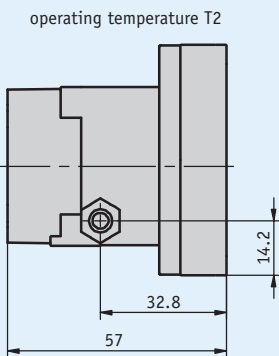
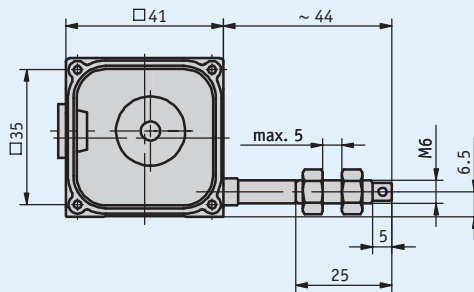
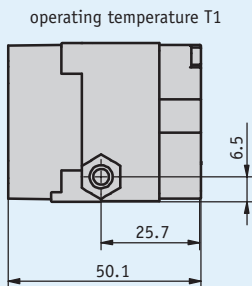
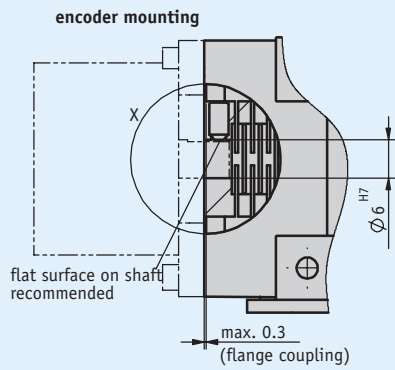
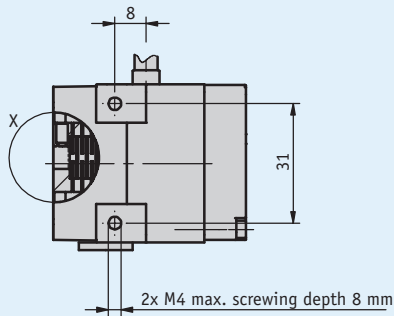
General information and areas of application page 8

### Profile

- Wire-actuated encoder for rotary encoder with max.  $\varnothing 40$  mm flange
- Measurement lengths up to 2000 mm
- Sturdy zinc die-cast housing, robust design, stable measuring rope (stainless steel)
- Very compact design



### 3.2



### Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast	
Wire design	∅0.45 mm	steel wire (stainless), plastic coated
Extension force	≥2 N	T1 operating temperature
	≥11 N	T2 operating temperature
Measured distance/ rope drum revolution	100 mm	
Weight	~0.2 kg	

### Electric data

Rotary encoders suitable for the SG21 are featured in RotoLine catalogue 2. Depending on the output signals the following are suitable for...

- Incremental outputs: IV28M/1
- Absolute outputs: WV36M/SSI, WV36M/CAN

The technical specifications for these devices are given in the respective data sheet. A number of transmitter versions of various manufacturers can also be used.

3.2

### System data

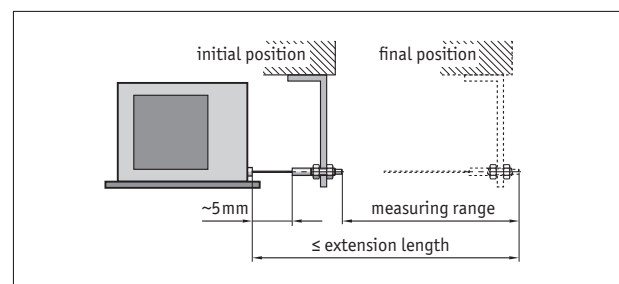
Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	per direction of approach
Travel speed	≤1 m/s	

### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 80 °C	T1
	-40 ... 80 °C	T2

### Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

## Order

### Ordering information

one or more system components are required:

Mounting Flange ZB4002

page 64

### Ordering table

Feature	Ordering data	Specification	Additional information
Encoder type	OG6	without encoder	
	S6	a wide range of encoders can be used	see accessories
Operating temperature	T1	-10 ... +80 °C	
	T2	-40 ... +80 °C	

### Order key

SG21 -  -

## 3.2

**Scope of delivery:** SG21, Mounting instructions

#### Accessories:

Guide roller UR

page 62

Wire extension piece SV

page 63

Incremental encoder IV28M/1

[www.siko-global.com](http://www.siko-global.com)

Absolute encoder WV36M/SSI

[www.siko-global.com](http://www.siko-global.com)

Absolute encoder WV36M/CAN

[www.siko-global.com](http://www.siko-global.com)

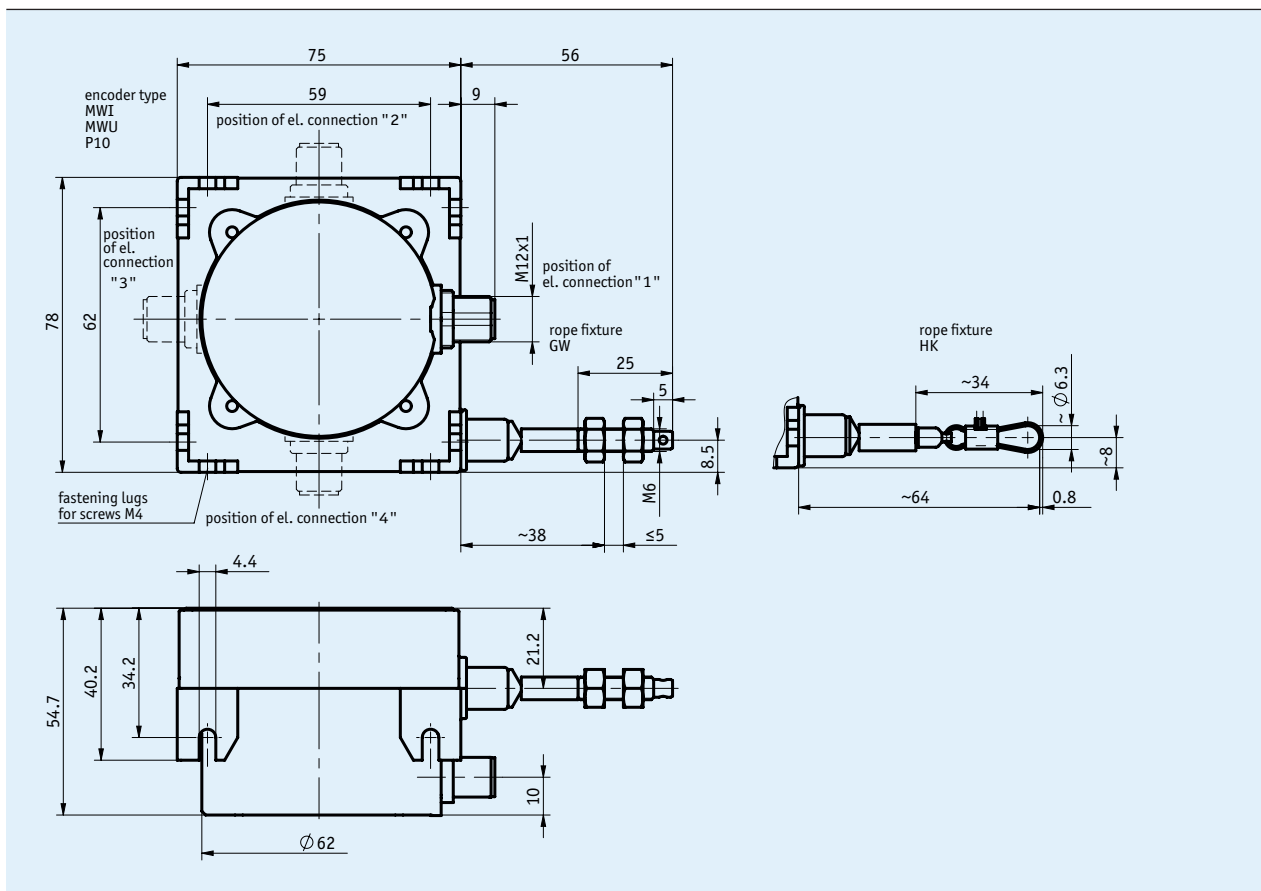
#### Additional information:

General information and areas of application

page 8

### Profile

- Compact, robust design
- Variable mounting options
- Measuring lengths up to 3000 mm
- Potentiometer, voltage or power output
- Housing made of zinc die-cast and plastic
- Lockable ventilation holes against condensation
- High tightness at the rope outlet
- M12 connection



3.2

### Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast, plastic	
Wire design	steel wire (stainless steel) $\varnothing 0.87$ mm	plastic coated
Extension force	$\geq 3$ N	
Cable length	$\leq 30$ m	P10, MWI encoder types
	$\leq 20$ m	MWU encoder type
Weight	$\sim 0.5$ kg	

## Electrical data

### Encoder potentiometer

Feature	Technical data	Additional information
Power rating	2 W at 70 °C	
Resistance	10 kΩ	
Resistance tolerance	±5 %	
Linearity tolerance	±0.25 %	
Type of connection	M12 plug connector (A-coded)	4-pole, 1x pin

### Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	between I+ and I-, at ≤500 Ω load
Output current	4 ... 20 mA	
Type of connection	M12 plug connector (A-coded)	4-pole, 1x pin

### Transducer, voltage output

Feature	Technical data	Additional information
Operating voltage	15 ... 28 V DC	at 3 mA without load
Output voltage	0 ... 10 V DC	I <sub>load</sub> ≤10 mA
Resistance	2 ... 10 kΩ	against GND
Load	≤15 mA	
Type of connection	M12 plug connector (A-coded)	4-pole, 1x pin

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA (MWI) or 0 ... 10 V DC (MWU) is available.

## System data

Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	per direction of approach
Measuring range	≤3000 mm	
Travel speed	≤800 mm/s	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Relative humidity		condensation inadmissible
Protection category	IP65 (encoder part)	EN 600529

### Pin assignment

#### ■ Potentiometric outputs P10

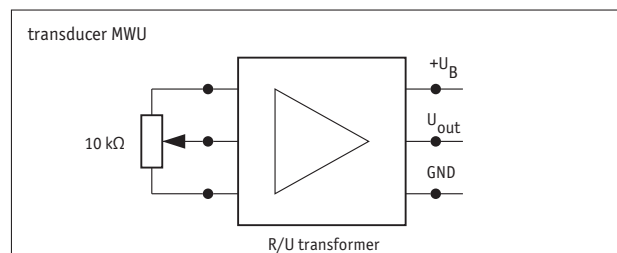
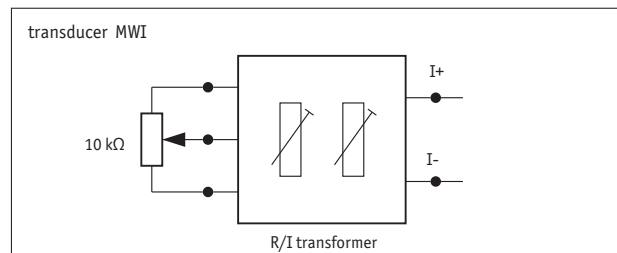
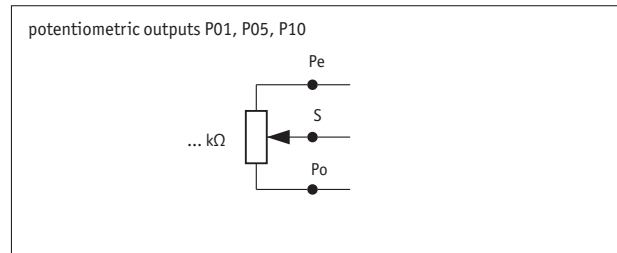
Signal	PIN
Po	1
Pe	2
S	3
	4

#### ■ MWI transducer

Signal	PIN
I+	1
I-	2
nc	3
nc	4

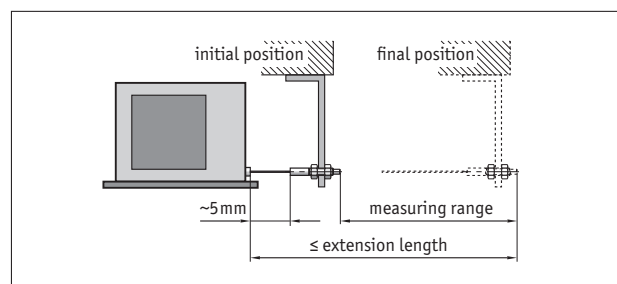
#### ■ MWU transducer

Signal	PIN
+24 V DC	1
GND	2
U <sub>out</sub>	3
nc	4



### Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



Symbolic representation

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	2000, 2500, 3000 in mm	
Rope fixture	<b>GW</b>	wire suspension with thread	
	<b>HK</b>	wire suspension hook	
Encoder type	<b>MWI</b>	transducer, current	
	<b>MWU</b>	transducer, voltage	
	<b>P10</b>	potentiometer	
Position of electrical connection	<b>1</b>	0 °	
	<b>2</b>	90 °	
	<b>3</b>	180 °	
	<b>4</b>	270 °	

### Order key



#### Scope of delivery: SG30

#### Accessories:

Guide roller UR	page 62
Wire extension piece SV	page 63
Mating Connector Overview	page 66
Mating connector, P10, MWI, MWU, 4-pole, socket	Order key 83419
Mating connector, P10, MWI, MWU, 4-pole, socket	Order key 83526

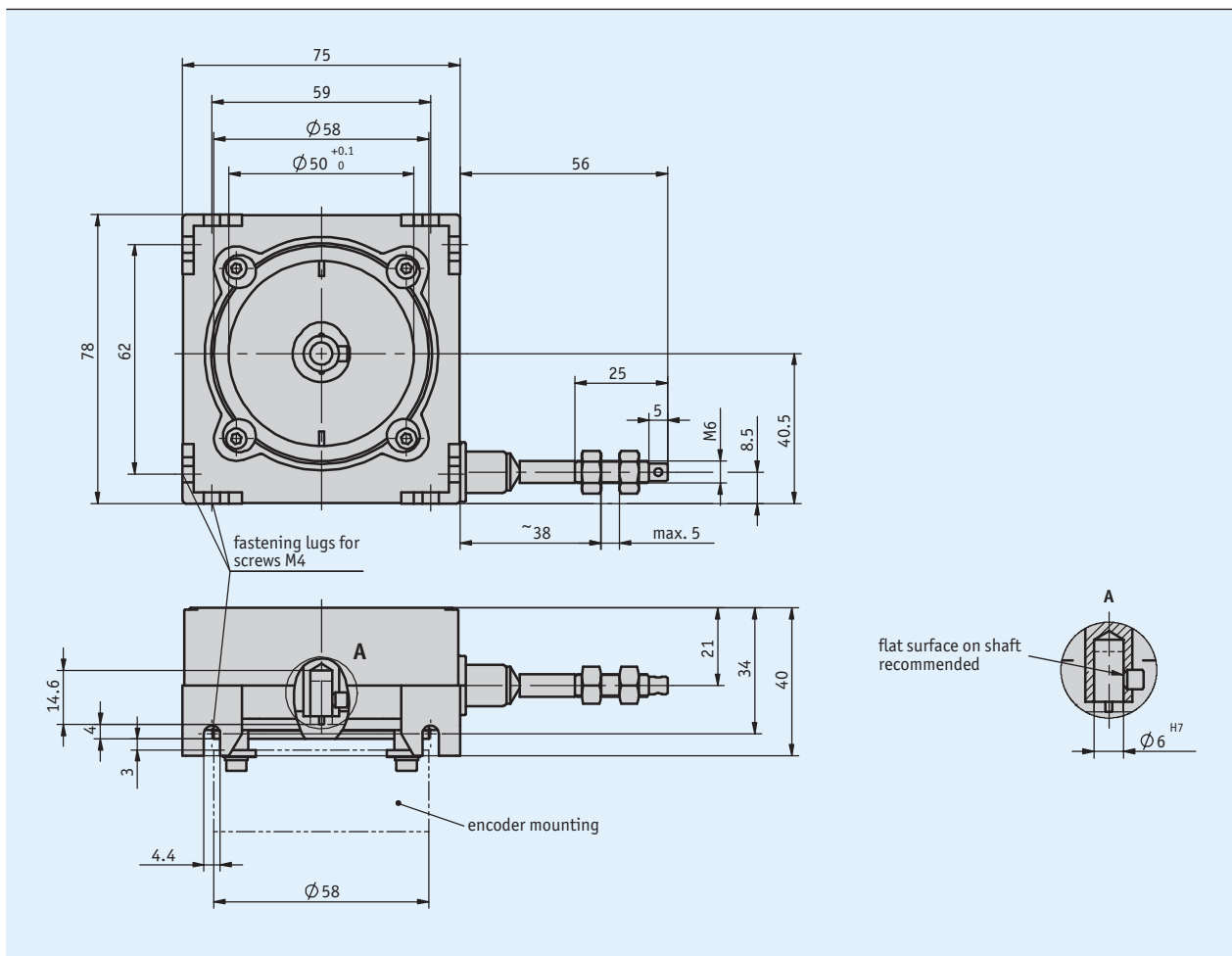
#### Additional information:

General information and areas of application	page 8
----------------------------------------------	--------



### Profile

- Robust design
- Measuring lengths up to 3000 mm
- Wire-actuated encoder for rotary encoder with 58 mm servo-flange
- Variable mounting options
- Lockable ventilation holes against condensation
- Very robust measuring rope (stainless steel)
- High tightness at the rope outlet



### Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast, plastic	
Wire design	$\varnothing 0.87$ mm	steel wire (stainless), plastic coated
Extension force	$\geq 3$ N	
Measured distance/ rope drum revolution	200 mm	
Weight	$\sim 0.35$ kg	

### Electric data

Rotary encoders suitable for the SG31 are featured in RotoLine catalogue 2. Depending on the output signals the following are suitable for...

- Analog outputs such as current or voltage: AV58M
- Incremental outputs: IV58M
- Absolute outputs: WV36M/SSI, WV36M/CAN

The technical specifications for these devices are given in the respective data sheet. A number of transmitter versions of various manufacturers can also be used.

### System data

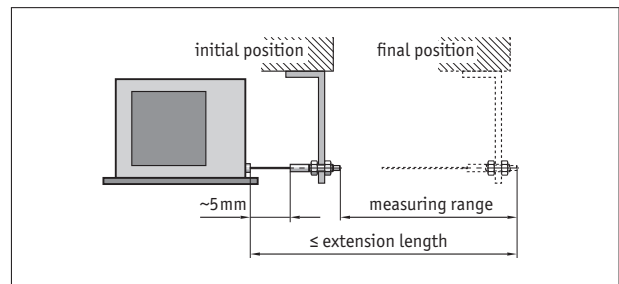
Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	per direction of approach
Travel speed	≤800 mm/s	

### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	

### Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet. Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

## Order

### Ordering information

one or more system components are required:

Absolute encoder AV58M	www.siko-global.com
Incremental encoder IV58M	www.siko-global.com
Absolute encoder WV36M/SSI	www.siko-global.com
Absolute encoder WV36M/CAN	www.siko-global.com

### Ordering table

Feature	Ordering data	Specification	Additional information
Encoder type	OG6	without encoder	see accessories
	S6	a wide range of encoders can be used	

### Order key

SG31 -  A

**Scope of delivery:** SG31, Mounting instructions

**Accessories:**

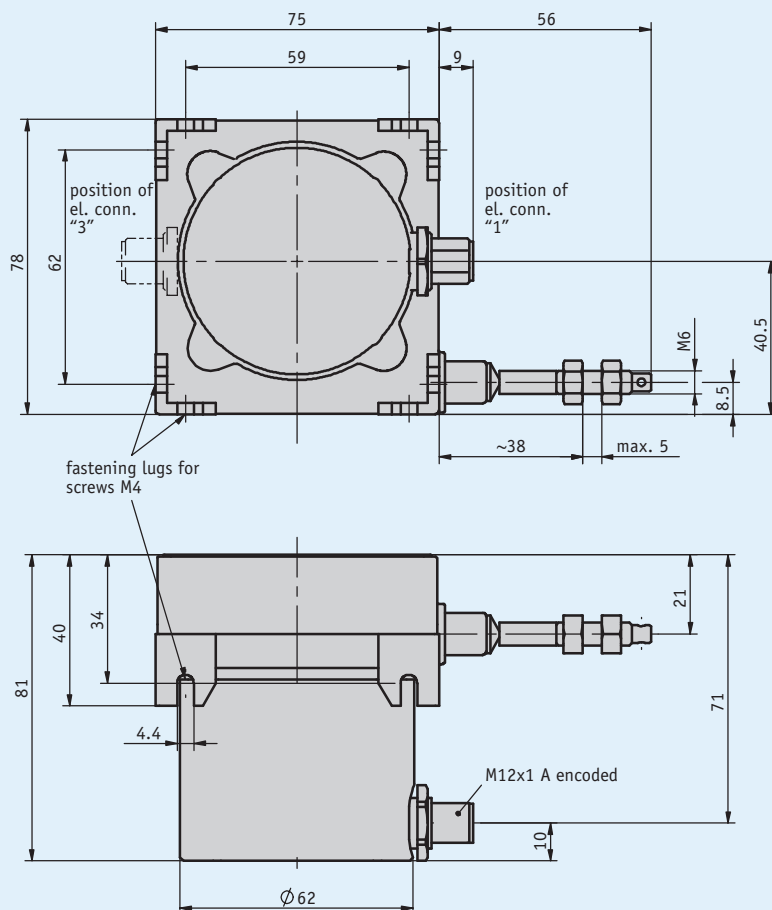
Guide roller UR page 62  
 Wire extension piece SV page 63

**Additional information:**

General information and areas of application page 8

### Profile

- Robust design
- Measuring lengths up to 3000 mm
- Analogue signal output in redundant design (2x 4...20 mA or potentiometer)
- Variable mounting options
- Lockable vent and water drain holes
- Very robust measuring rope (stainless steel)
- IP65 protection category
- M12 plug connection



### Mechanical data

Feature	Technical data	Additional information
Housing	zinc die-cast, plastic	
Wire design	ø0.87 mm	steel wire (stainless), plastic coated
Extension force	≥3 N	
Absolute accuracy	±0.35 %	relating to measuring ranges (mm)
Weight	~0.5 kg	

## Electrical data

### Encoder potentiometer

Feature	Technical data	Additional information
Operating voltage	≤30 V	power loss on the potentiometer <1 W
Power rating	1 W at 70 °C	
Resistance	10 kΩ	
Resistance tolerance	±5 %	
Standard terminal resistance	0.5 % or 1 Ω	(the higher value applies in each case)
Linearity tolerance	±0.25 %	
Type of connection	M12 plug connector (A-coded)	8-pole, 1x pin

### Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	with load impedance ≤500 Ω voltage between I+ and I-
Output current	4 ... 20 mA	(2x)
Failure rate	166.7 year(s)	at 60°C (MTBF)
Type of connection	M12 plug connector (A-coded)	8-pole, 1x pin

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA or 20 ... 4 mA is available.

3.2

## System data

Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	same direction of approach
Travel speed	≤800 mm/s	

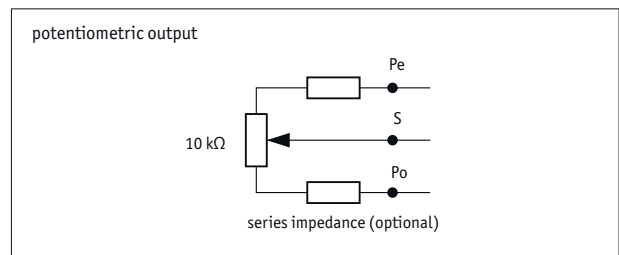
## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Protection category	IP65 (for electronic unit)	EN 60529, Certonal-coated electronic unit

## Pin assignment

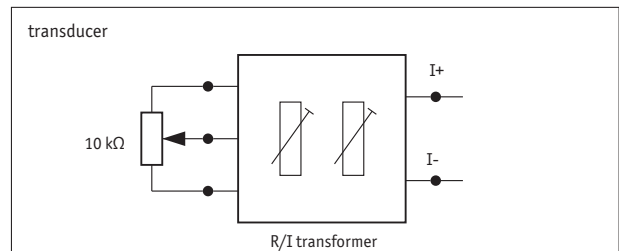
### Potentiometer pin assignment

Signal	PIN	Additional information
Po	1	Potentiometer 1
Po	2	Potentiometer 2
S	3	Potentiometer 2
Pe	4	Potentiometer 2
nc	5	
Pe	6	Potentiometer 1
S	7	Potentiometer 1
nc	8	



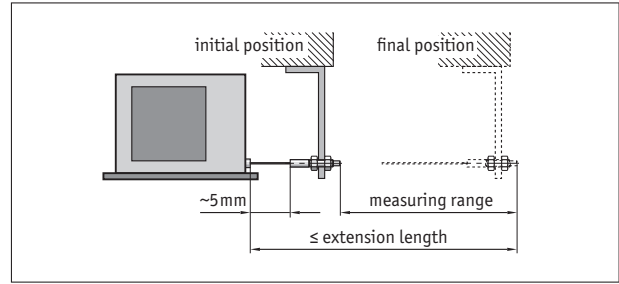
### Transducer pin assignment

Signal	Pin	Additional information
I+	1	Transducer 1
I+	2	Transducer 2
nc	3	
I-	4	Transducer 2
nc	5	
I-	6	Transducer 1
nc	7	
nc	8	



**Hint for mounting**

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

**Order**

■ **Ordering table**

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	2000, 2500, 3000 in mm	
Encoder type	<b>P10_P10</b> <b>B</b>	2x potentiometer 10 kΩ	
	<b>20/4mA_20/4mA</b>	2x transducers 20...4 mA	
	<b>4/20mA_20/4mA</b>	2x transducers 4...20 mA counter-rotating	
	<b>4/20mA_4/20mA</b>	2x transducers 4...20 mA	
Position of electrical connection	<b>1</b> <b>C</b>	0 °	
	<b>3</b>	180 °	
Series impedance	<b>0</b> <b>D</b>	0 Ω	only for P10_10 encoder type
	<b>1k2</b>	1.2 kΩ	only for P10_10 encoder type

■ **Order key**



**Scope of delivery:** SG32, Mounting instructions

**Accessories:**

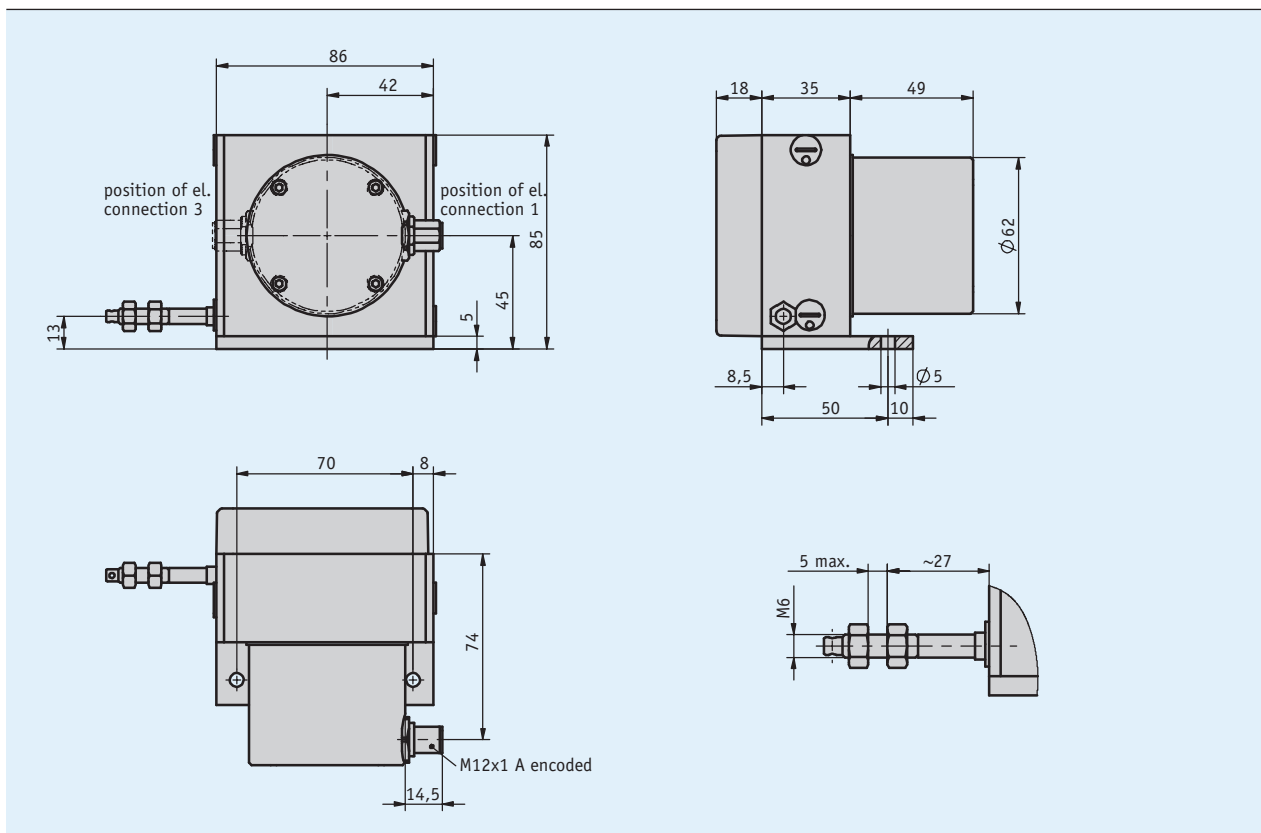
- Guide roller UR page 62
- Wire extension piece SV page 63
- Mating Connector Overview page 66
- Mating connector, 8-pole, socket Order key 83525

**Additional information:**

General information and areas of application page 8

### Profile

- Robust design
- Measuring lengths up to 4000 mm
- Analogue signal output in redundant design (2x 4...20 mA or potentiometer)
- Variable mounting options
- Lockable vent and water drain holes
- Very robust measuring rope (stainless steel)
- IP65 protection category
- M12 plug connection



### Mechanical data

Feature	Technical data	Additional information
Housing	aluminum/plastic	
Wire design	$\phi 0.87$ mm	steel rope (stainless), plastic-coated
Extension force	$\geq 8$ N	
Absolute accuracy	$\pm 0.35$ %	relating to measuring length (mm)
Weight	$\sim 0.79$ kg	

### Electrical data

#### Encoder potentiometer

Feature	Technical data	Additional information
Operating voltage	≤30 V	power loss on the potentiometer <1 W
Power rating	1 W at 70 °C	
Resistance	10 kΩ	
Resistance tolerance	±5 %	
Standard terminal resistance	0.5 % or 1 Ω	the higher value applies in each case
Linearity tolerance	±0.25 %	
Type of connection	M12 plug connector (A-coded)	8-pole, 1x pin

#### Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	with load impedance ≤500 Ω voltage between I+ and I-
Output current	4 ... 20 mA	(2x)
Failure rate	166.7 year(s)	at 60°C (MTBF)
Type of connection	M12 plug connector (A-coded)	8-pole, 1x pin

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA or 20 ... 4 MA is available.

### System data

Feature	Technical data	Additional information
Repeat accuracy	±0.25 mm	same direction of approach
Travel speed	≤800 mm/s	

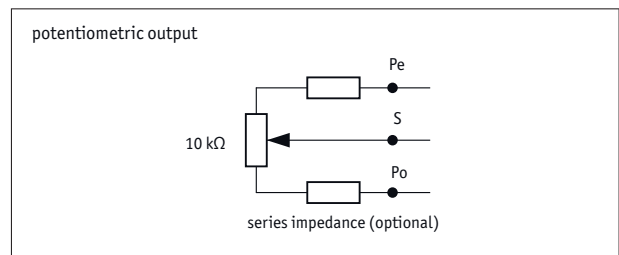
### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Protection category	IP65 (for electronic unit)	EN 60529, Certonal-coated electronic unit

### Pin assignment

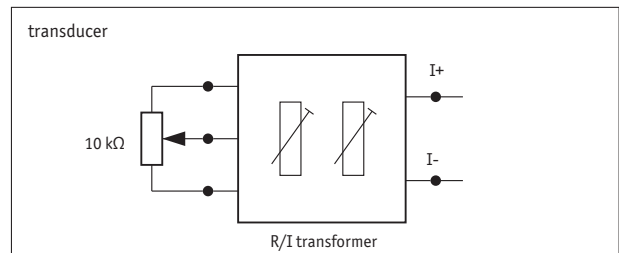
#### Potentiometer pin assignment

Signal	PIN	Additional information
Po	1	Potentiometer 1
Po	2	Potentiometer 2
S	3	Potentiometer 2
Pe	4	Potentiometer 2
nc	5	
Pe	6	Potentiometer 1
S	7	Potentiometer 1
nc	8	



#### Transducer pin assignment

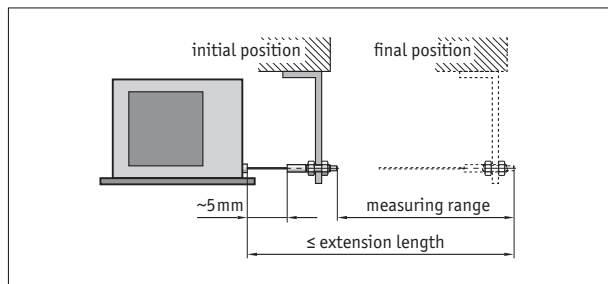
Signal	Pin	Additional information
I+	1	Transducer 1
I+	2	Transducer 2
nc	3	
I-	4	Transducer 2
nc	5	
I-	6	Transducer 1
nc	7	
nc	8	





## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



Symbolic representation

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... A	3300, 3700, 4000 in mm	
Encoder type	P10_P10 B	2x potentiometers 10 kΩ	
	20/4mA_20/4mA	2x transducers 20...4 mA	
	4/20mA_20/4mA	2x transducers 4...20 mA counter-rotating	
	4/20mA_4/20mA	2x transducers 4...20 mA	
Position of electrical connection	1 C	0 °	
	3	180 °	
Series impedance	0 D	0 Ω	only for P10_10 encoder type
	1k2	1.2 kΩ	only for P10_10 encoder type

### Order key



**Scope of delivery:** SG42, Mounting instructions

#### Accessories:

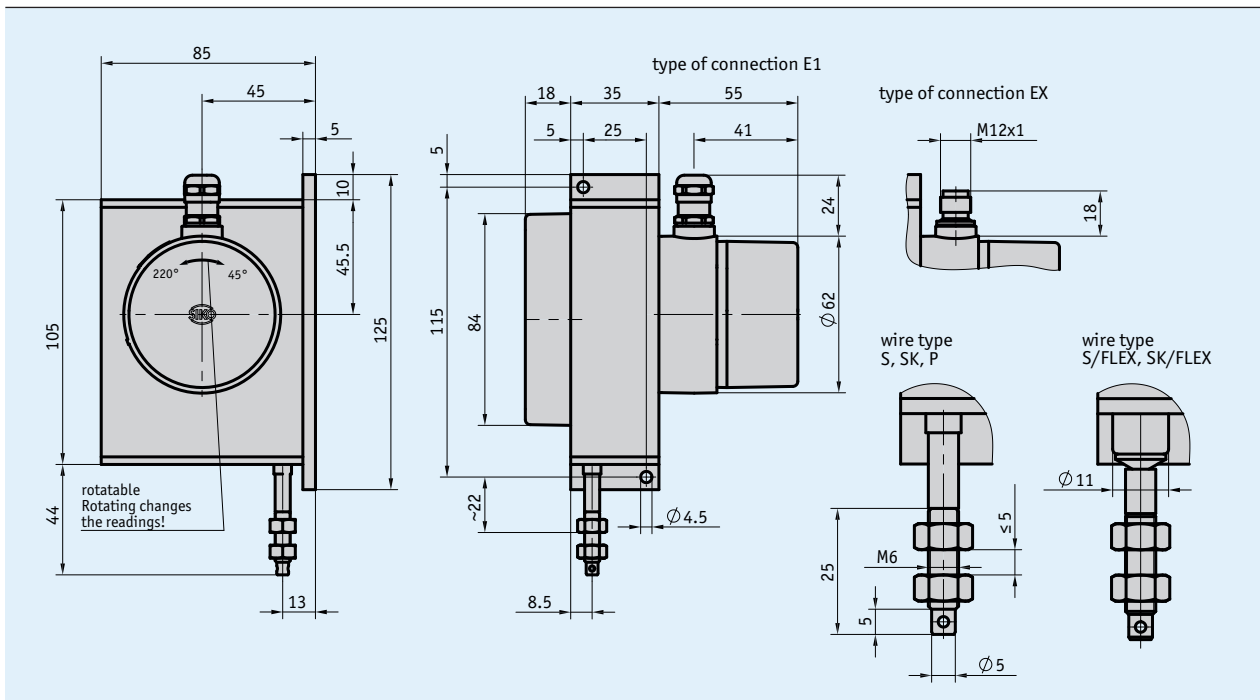
- Guide roller UR page 62
- Wire extension piece SV page 63
- Mating Connector Overview page 66
- Mating connector, 8-pole, socket Order key 83525

#### Additional information:

- General information and areas of application page 8

### Profile

- Robust design
- Measurement lengths up to max. 6000 mm
- Potentiometer, voltage or power output
- Housing made of aluminum and plastic
- Potentiometer/resistance range adapted to actual measurement length via an integrated gear
- Various wire types



### Mechanical data

Feature	Technical data	Additional information
Housing	aluminum/plastic	
Wire design	steel wire $\varnothing 0.54$ mm steel wire (stainless steel) $\varnothing 0.87$ mm para-line synthetic rope $\varnothing 1.05$ mm	plastic coated
Extension force	$\geq 8$ N	
Measured distance/ rope drum revolution	200 mm	
Weight	$\sim 0.7$ kg	

### max. travel speed

Measuring range [mm]	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	6000
Travel speed [mm/s]	$\leq 200$	$\leq 300$	$\leq 300$	$\leq 400$	$\leq 490$	$\leq 500$	$\leq 600$	$\leq 700$	$\leq 800$	$\leq 800$	$\leq 900$	$\leq 1000$	$\leq 1000$

## Electrical data

### Encoder potentiometer

Feature	Technical data	Additional information
Power rating	2 W at 70 °C	
Resistance	1 kΩ	P01
	2 kΩ	P02
	5 kΩ	P05
	10 kΩ	P10
Resistance tolerance	±5 %	
Linearity tolerance	±0.25 %	

### Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	between I+ and I-, load ≤500 Ω
Output current	4 ... 20 mA	

### Transducer, voltage output

Feature	Technical data	Additional information
Operating voltage	15 ... 28 V DC	at 3 mA without load
Output voltage	0 ... 10 V DC	
Resistance	2 ... 10 kΩ	against GND
Load	≤15 mA	

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA (MWI) or 0 ... 10 V DC (MWU) is available.

## System data

Feature	Technical data	Additional information
Repeat accuracy	~0.5 mm	per direction of approach
Travel speed	see table	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-20 ... 80 °C	T1
	-40 ... 80 °C	T2 (draw-in speed ≤800 mm/s)
Protection category	IP65 (potentiometer part)	EN 600529

3.2

## Pin assignment

### ■ Potentiometric outputs P10

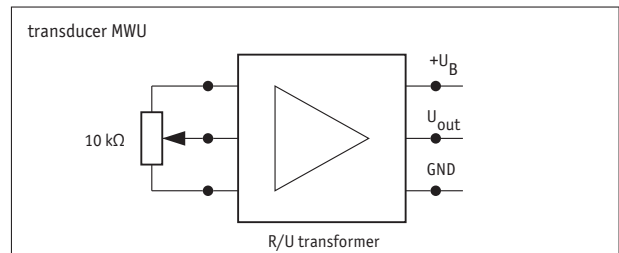
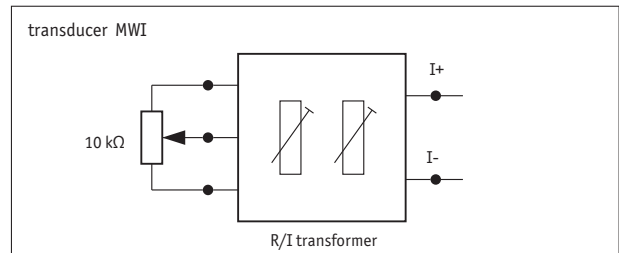
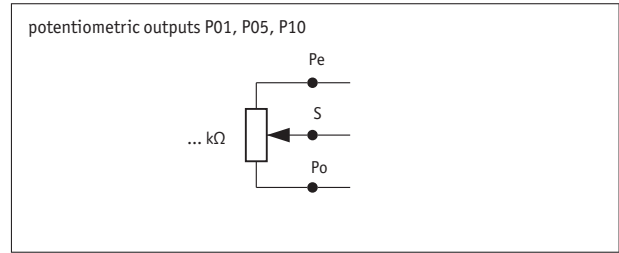
Signal	E1 (terminal)	E12 (connector pin)
Po	brown	1
Pe	white	2
S	green	3
nc		4

### ■ MWI transducer

Signal	E1 (terminal)	E12 (connector pin)
I+	1	1
I-	2	2
nc	3	3
nc		4

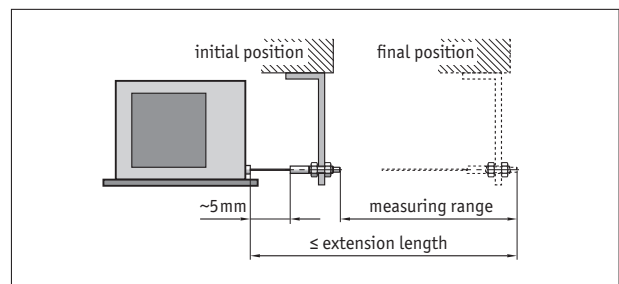
### ■ MWU transducer

Signal	E1 (terminal)	E12 (connector pin)
+24 V DC	1	1
GND	2	2
U <sub>out</sub>	3	3
nc		4



## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet. Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	750 ... 6000 mm, in steps of 250 mm	
Wire design	<b>S</b>	stainless steel rope	measuring range ≤ 6000 mm
	<b>SK</b>	stainless steel rope, plastic-coated	measuring range ≤ 4000 mm
	<b>P</b>	para-line, non-conducting, signal color	measuring range ≤ 2800 mm
	<b>S/FLEX</b>	stainless steel rope, flexible rope outlet	measuring range ≤ 6000 mm
	<b>SK/FLEX</b>	stainless steel rope, plastic-coated, flexible rope outlet	measuring range ≤ 4000 mm
Type of connection	<b>E1</b>	cable gland PG7	cable ø 3-6.5 mm
	<b>EX</b>	for M12 connector	
Potentiometer type	<b>02</b>	10 helices/wire	(P01, P05, P10)
	<b>03</b>	10 helices/hybrid	(P01, P05, P10)
Analog output	<b>MWI</b>	4 ... 20 mA transducer	
	<b>MWU</b>	0 ... 10 V transducer	
	<b>P01</b>	potentiometer 1 kΩ	
	<b>P05</b>	potentiometer 5 kΩ	
	<b>P10</b>	potentiometer 10 kΩ	
Operating temperature	<b>T1</b>	-20 ... +80 °C	
	<b>T2</b>	-40 ... +80 °C	≤ feed speed 800 mm/s

### Order key

SGP/1 -  -  -  -  -  -

A      B      C      D      E      F

**Scope of delivery:** SGP/1, Mounting instructions

**Accessories:**

- Guide roller UR page 62
- Wire extension piece SV page 63
- Mating Connector Overview page 66
- Mating connector, EX, 4-pole, socket Order key 83419

**Additional information:**

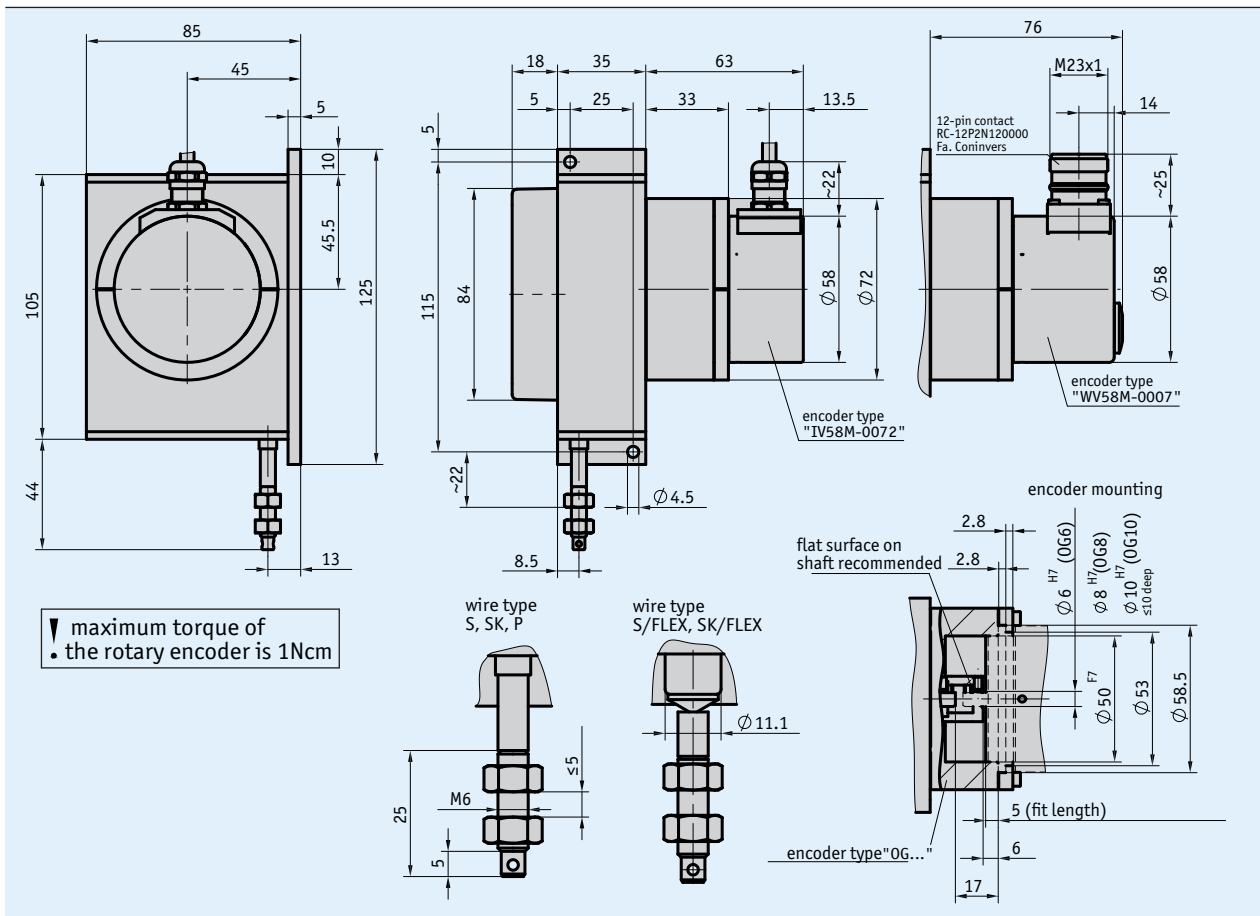
- General information and areas of application page 8

# Wire-actuated encoder SG60

## robust design with 6000 mm measurement length

### Profile

- Robust design
- Easy mounting
- Measurement lengths up to max. 6000 mm
- Incremental or absolute encoder
- Housing made of aluminum and plastic
- High flexibility thanks to free choice of rotary encoders with 58 mm standard flange
- Various wire types



### Mechanical data

Feature	Technical data	Additional information
Housing	aluminum/plastic	
Wire design	<ul style="list-style-type: none"> <li>Ø0.54 mm</li> <li>Ø0.87 mm</li> <li>Ø1.05 mm</li> </ul>	<ul style="list-style-type: none"> <li>steel wire</li> <li>steel wire, plastic coated</li> <li>para-line plastic rope</li> </ul>
Extension force	≥8 N	on the wire
Measured distance/ rope drum revolution	200 mm	
Weight	~0.6 kg	

## Electric data

Rotary encoders suitable for the SG60 are featured in RotoLine catalogue 2. Depending on the output signals the following are suitable for:

- Analog outputs such as current or voltage: AV58M
- Incremental outputs: IV58M
- Absolute outputs: WV36M/SSI, WV36M/CAN

The technical specifications for these devices are given in the respective data sheets. A great number of transmitter versions of various manufacturers can also be used.

## System data

Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	depending on the direction of approach (1st layer)
Measuring range	≤6000 mm	
Travel speed	≤3000 mm/s	

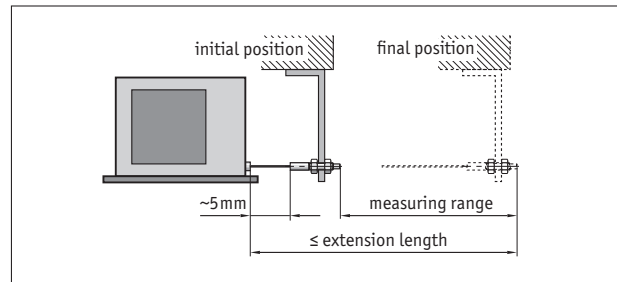
3.2

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-20 ... 80 °C	T1
	-40 ... 80 °C	T2 (drawing-in speed ≤800 mm/s)
Protection category	IP54 (standard encoder)	EN 60529

## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet. Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



symbolic depiction

## Order

### Ordering information

one or more system components are required:

Incremental encoder IV58M  
 Absolute encoder WV36M/SSI  
 Absolute encoder WV36M/CAN

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 www.siko-global.com  
 www.siko-global.com

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	1000 ... 6000 mm, in steps of 100 mm	
Wire design	<b>S</b>	stainless steel rope	measuring range ≤ 6000 mm
	<b>SK</b>	stainless steel rope, plastic-coated	measuring range ≤ 4000 mm
	<b>P</b>	para-line, non-conducting, signal color	measuring range ≤ 2800 mm
	<b>S/FLEX</b>	stainless steel rope, flexible rope outlet	measuring range ≤ 6000 mm
	<b>SK/FLEX</b>	stainless steel rope, plastic-coated, flexible rope outlet	measuring range ≤ 4000 mm
Encoder type	<b>OG6</b>	without encoder, 6 mm diameter of coupling	see accessories
	<b>OG8</b>	without encoder, with 8 mm diameter of coupling	see accessories
	<b>OG10</b>	without encoder, 10 mm diameter of coupling	see accessories
Operating temperature	<b>T1</b>	-20 ... +80 °C	
	<b>T2</b>	-40 ... +80 °C	≤ feed speed 800 mm/s
Color	<b>N</b>	natural, anodized	
	<b>E</b>	others on request	

### Order key



**Scope of delivery:** SG60

**Accessories:**

Guide roller UR

page 62

Wire extension piece SV

page 63

**Additional information:**

General information and areas of application

page 8





### ■ Transducer, power output

Feature	Technical data	Additional information
Operating voltage	10 ... 30 V DC	with load impedance $\leq 500 \Omega$ voltage between I+ and I-
Output current	4 ... 20 mA	(2x)
Failure rate	166.7 year(s)	at 60°C (MTBF)
Type of connection	M12 plug connector (A-coded)	8-pole, 1x pin

\* Measurement transducers permit optimum adjustment of the output current and output voltage to the measuring range. The measurement transducer is pre-set at the works so that an output signal of 4 ... 20 mA or 20 ... 4 mA is available.

### System data

Feature	Technical data	Additional information
Repeat accuracy	$\pm 0.25$ mm	per starting direction
Travel speed	$\leq 800$ mm/s	

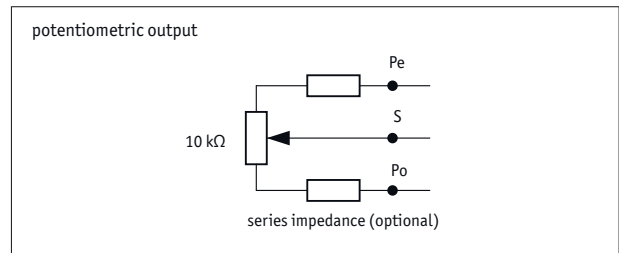
### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Relative humidity	condensation inadmissible	
Protection category	IP65 (for electronic unit)	EN 60529, certonal-coated electronic unit

### Pin assignment

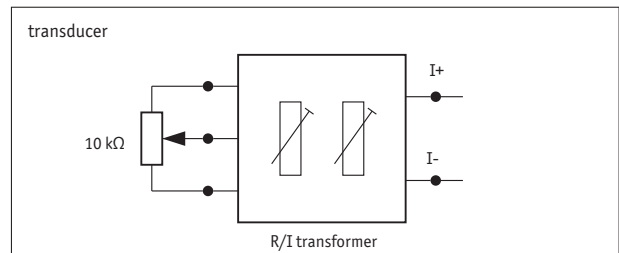
#### ■ Potentiometer pin assignment

Signal	PIN	Additional information
Po	1	Potentiometer 1
Po	2	Potentiometer 2
S	3	Potentiometer 2
Pe	4	Potentiometer 2
nc	5	
Pe	6	Potentiometer 1
S	7	Potentiometer 1
nc	8	



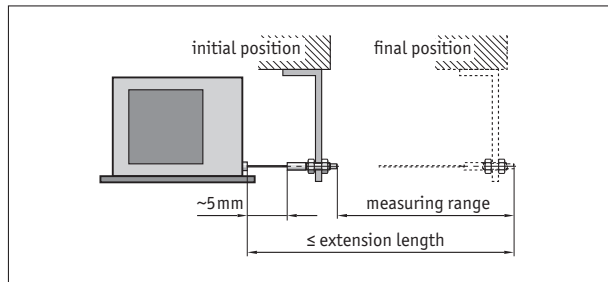
#### ■ Transducer pin assignment

Signal	Pin	Additional information
I+	1	Transducer 1
I+	2	Transducer 2
nc	3	
I-	4	Transducer 2
nc	5	
I-	6	Transducer 1
nc	7	
nc	8	



## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



Symbolic representation

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	5000, 6000 in mm	
Encoder type	<b>P10 P10</b> <b>B</b>	2x potentiometer 10 kΩ	
	<b>20/4mA_20/4mA</b>	2x transducer 4...20 mA	
	<b>4/20mA_20/4mA</b>	2x transducer 4...20 mA, counter-rotating	
	<b>4/20mA_4/20mA</b>	2x transducer 4...20 mA	
Position of electrical connection	<b>1</b> <b>C</b>	0 °	
	<b>3</b>	180 °	
Series impedance	<b>0</b> <b>D</b>	0 Ω	
	<b>1k2</b>	1.2 kΩ	

### Order key



**Scope of delivery:** SG62, Mounting instructions

#### Accessories:

Guide roller UR

page 62

Wire extension piece SV

page 63

#### Additional information:

General information and areas of application

page 8

# Wire-actuated encoder SG120

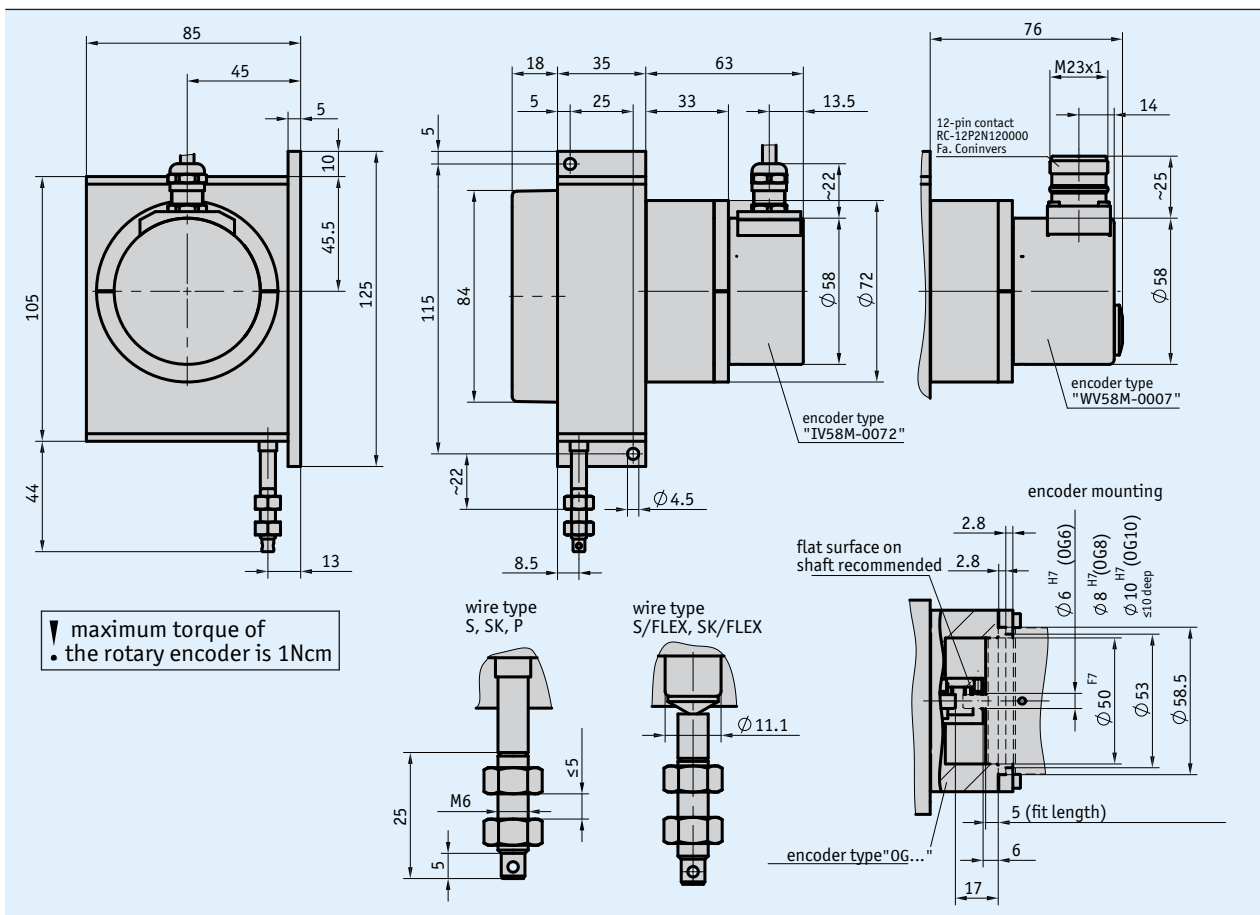
## robust design with 12 m measurement length

### Profile

- Robust design
- Easy mounting
- Measurement lengths up to max. 12000 mm
- Incremental or absolute encoder
- Housing made of aluminum and plastic
- High flexibility thanks to free choice of rotary encoders with 58 mm standard flange
- Various wire types



3.2



### Mechanical data

Feature	Technical data	Additional information
Housing	aluminum/plastic	
Wire design	$\phi 0.54$ mm $\phi 0.87$ mm $\phi 1.05$ mm	steel wire steel wire, plastic coated para-line plastic rope
Extension force	$\geq 8$ N	on the wire
Measured distance/ rope drum revolution	200 mm	
Weight	$\sim 0.7$ kg	

## System data

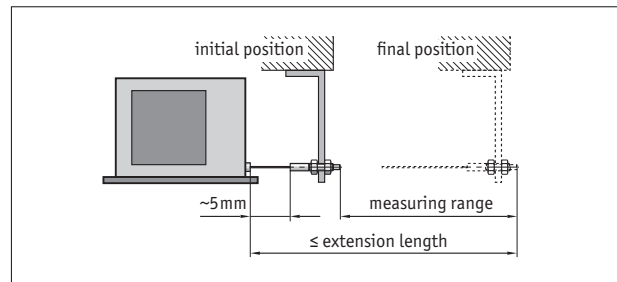
Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	depending on the direction of approach (1st layer)
Measuring range	≤12000 mm	
Travel speed	≤3000 mm/s	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-20 ... 80 °C	
Protection category	IP54 (standard encoder)	EN 60529

## Hint for mounting

When securing the wire it must be ensured that the wire is straight and vertical in relation to the wire outlet.  
 Recommendation: Only select the starting position after an unwound length of approx. 5 mm. This prevents the wire hitting the end stop when it is rewound.



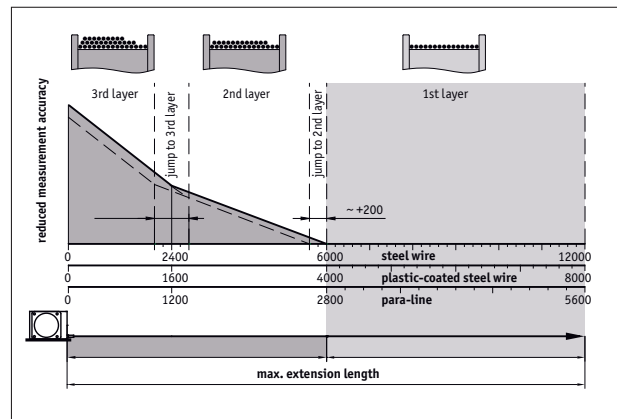
symbolic depiction

3.2

## Extension length/measuring range

SIKO wire-actuated encoders achieve the maximum measuring accuracy when the entire wire length (measuring range) is only wound onto the drum in one layer. On the SG120 the wire diameter is selected so that when the first drum layer is used, a maximum measuring range of 6000 mm is possible. The larger diameter of the plastic sheathed steel wire and the Paraline require more space. The result is a correspondingly shorter measuring range. If a lower measuring accuracy is acceptable, two to three layer winding is also possible, and the possible measuring lengths change accordingly.

Extension lengths SG120	1st layer	2nd and 3rd layers
Steel wire	6000 mm	12000 mm
Steel wire, plastic-coated	4000 mm	8000 mm
Paraline	2800 mm	5600 mm



dimensions refer to millimeters

## Order

### Ordering information

one or more system components are required:

Absolute encoder AV58M	www.siko-global.com
Incremental encoder IV58M	www.siko-global.com
Absolute encoder WV36M/SSI	www.siko-global.com
Absolute encoder WV36M/CAN	www.siko-global.com

### Ordering table

Feature	Ordering data	Specification	Additional information
Measuring range	... <b>A</b>	2900 ... 12000 mm, in steps of 100 mm	
Wire design	<b>S</b>	stainless steel rope	measuring range ≤ 6100 ... 12000 mm
	<b>SK</b>	stainless steel rope, plastic-coated	measuring range ≤ 4100 ... 8000 mm
	<b>P</b>	para-line, non-conducting, signal color	measuring range ≤ 2900 ... 5600 mm
	<b>S/FLEX</b>	stainless steel rope, flexible rope outlet	
	<b>SK/FLEX</b>	stainless steel rope, plastic-coated, flexible rope outlet	
Encoder type	<b>OG6</b>	without encoder, with 6 mm diameter of coupling	see accessories
	<b>OG8</b>	without encoder, with 8 mm diameter of coupling	see accessories
	<b>OG10</b>	without encoder, with 10 mm diameter of coupling	see accessories
Color	<b>N</b>	natural, anodized	
	<b>D</b>	others on request	

### Order key



*Scope of delivery: SG120*

**Accessories:**

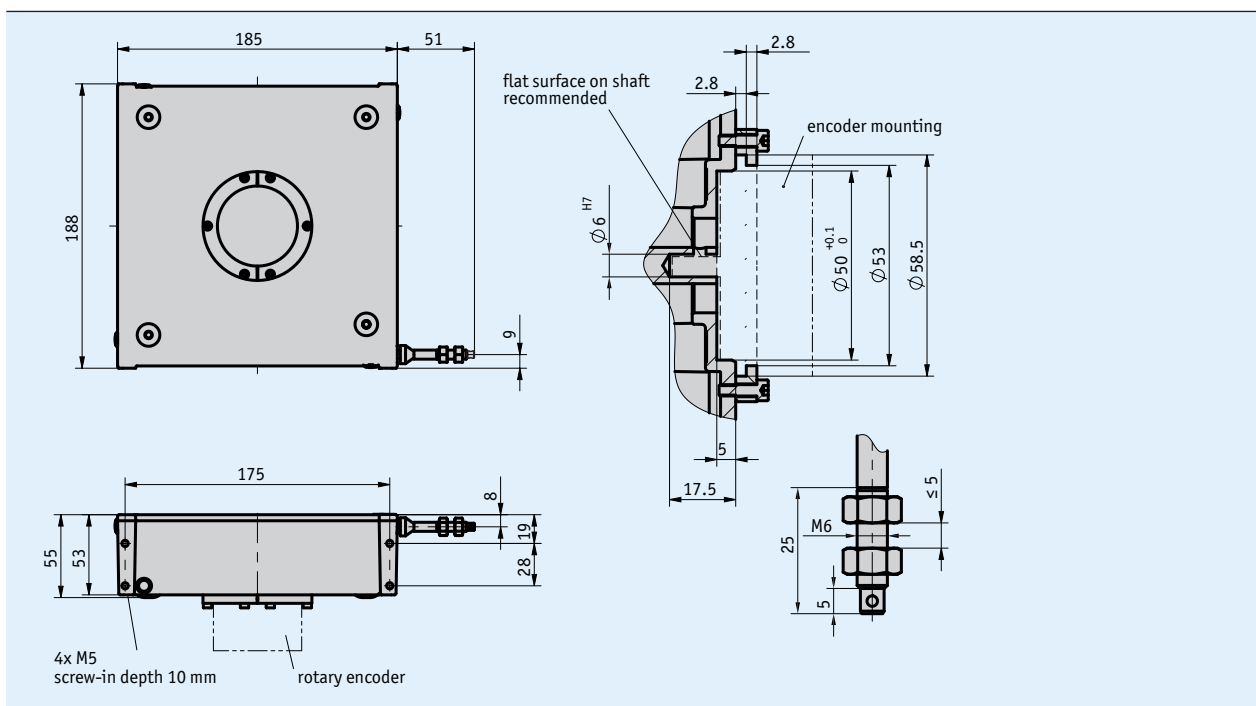
Guide roller UR page 62  
 Wire extension piece SV page 63

**Additional information:**

General information and areas of application page 8

### Profile

- Very compact design
- Measurement lengths up to max. 15000 mm
- Flexible wire outlet
- Wire-actuated encoder for rotary encoder with 58 mm servo-flange
- Robust design
- Very robust measuring rope (stainless steel)



3.2

### Mechanical data

Feature	Technical data	Additional information
Housing	aluminum die-cast	
Wire design	$\phi 0.87$ mm	steel wire, plastic-coated
Extension force	$\geq 15.5$ N	
Measured distance/ rope drum revolution	500 mm	
Weight	$\sim 2.5$ kg	without rotary encoder

### System data

Feature	Technical data	Additional information
System accuracy	$\pm 0.1$ %	relating to measuring length (mm)
Repeat accuracy	$\pm 0.2$ mm	per direction of approach
Travel speed	$\leq 2.4$ m/s	

### Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-40 ... 80 °C	
Protection category	see rotary encoder	

### Order

#### Ordering information

one or more system components are required:

Incremental encoder IV58M

[www.siko-global.com](http://www.siko-global.com)

Absolute encoder WV36M/SSI

[www.siko-global.com](http://www.siko-global.com)

Absolute encoder WV36M/CAN

[www.siko-global.com](http://www.siko-global.com)

Absolute encoder AV58M

[www.siko-global.com](http://www.siko-global.com)

#### Ordering table

Feature	Ordering data	Specification	Additional information
Encoder type	0G6	without encoder	
	S6	a great variety of rotary connectors can be connected	

#### Order key

SG150 - 15000 - SK -

**Scope of delivery:** SG150, User information

#### Accessories:

Guide roller UR

page 62

Wire extension piece SV

page 63

#### Additional information:

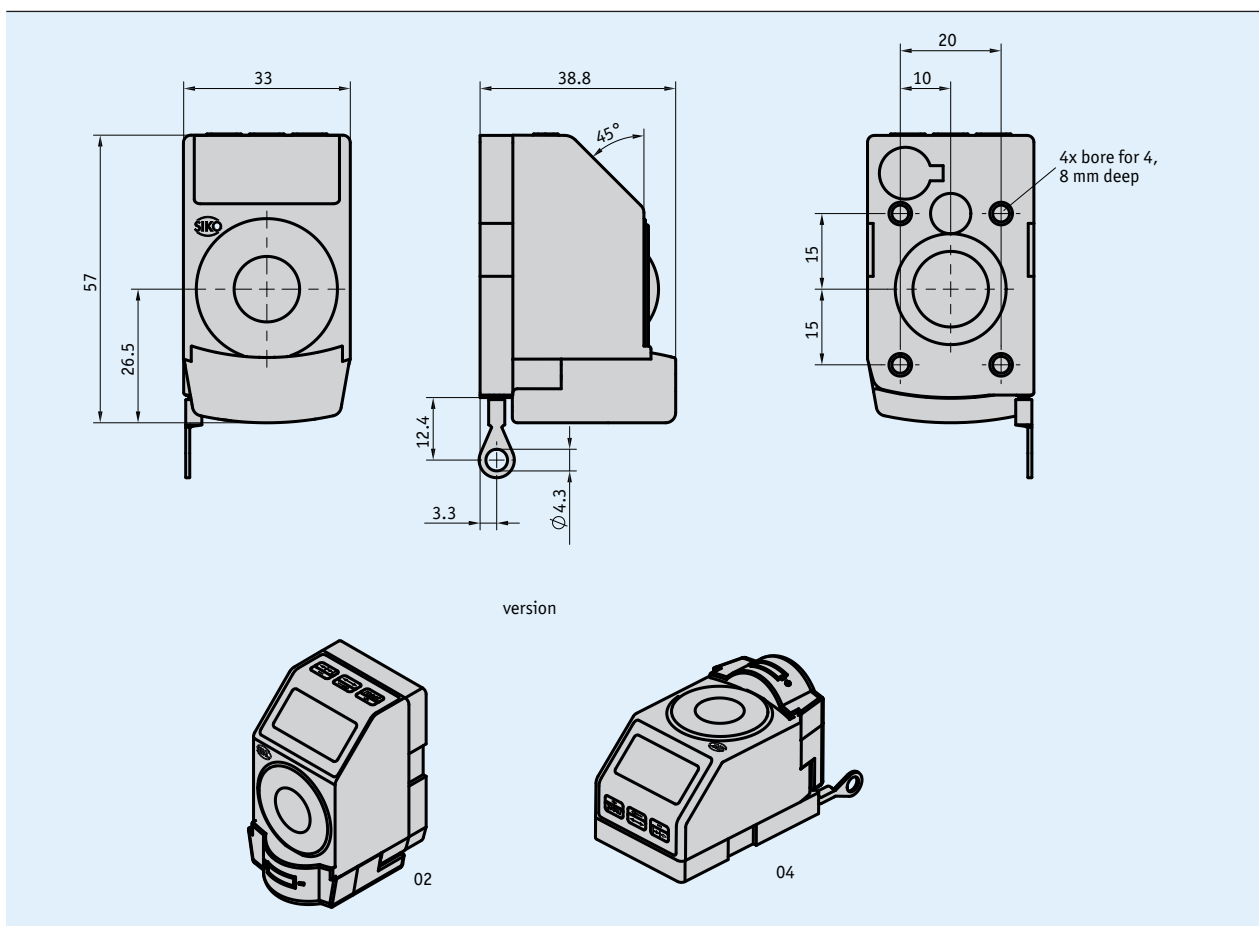
General information and areas of application

page 8



## Profile

- Wire-actuated encoder with a freely programmable electronic digital display
- Linear distance measurement up to 1000 mm
- Long battery life
- Easy battery change without dismantling of the device
- LCD display with 5 digits and special characters
- Digit height approx. 8 mm
- Flexible mounting position
- Easy mounting



3.2

## Mechanical data

Feature	Technical data	Additional information
Housing	plastic	
Wire design	steel wire (stainless steel) $\varnothing 0.36$ mm	plastic coated
Extension force	$\geq 3$ N	
Weight	$\sim 0.06$	

## Electrical data

Feature	Technical data	Additional information
Battery	lithium coin cell, 3 V, CR2477 type	~8 years service life
Display/display range	5-digit LCD 7-segment, ~8 mm height	-19999 ... 99999

## System data

Feature	Technical data	Additional information
Repeat accuracy	±0.15 mm	
Travel speed	≤800 mm/s	

## Ambient conditions

Feature	Technical data	Additional information
Ambient temperature	-10 ... 60 °C	
Storage temperature	-30 ... 80 °C	
EMC	EN 61000-6-2 EN 61000-6-4	interference resistance / immission electromagnetic emission
Protection category	IP50	EN 60529

## 3.2

## Order

### Ordering table

Feature	Ordering data	Specification	Additional information
Version	02	downward wire extension	
	04	horizontal wire extension	
Measuring range	1000	1000 mm, resolution 1 mm	
	1000.0	1000 mm, resolution 0.1 mm	
	40.0	40 inch, resolution 0.1 inch	
	40.00	40 inch, resolution 0.01 inch	
Counting direction	e	ascending with wire extension	
	i	descending with wire extension	
Key pad operation	D	direct zeroing	
	V	zeroing delayed by 5 s	

### Order key

SDE04 -  -  -  -  -  -

*Scope of delivery: SDE04, User information*

**Additional information:**  
General information and areas of application

page 8

3.2

# 3.3



3.1 | Overview 3

3.2 | Wire-actuated Encoder 7

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**3.3 | Accessories**

<b>Products</b>	UR	62
	SV	63
	ZB4002	64
	Mating Connector Overview	66

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3.4 | Appendix 69

3.5 | Product index, contact information 73

3.1

3.2

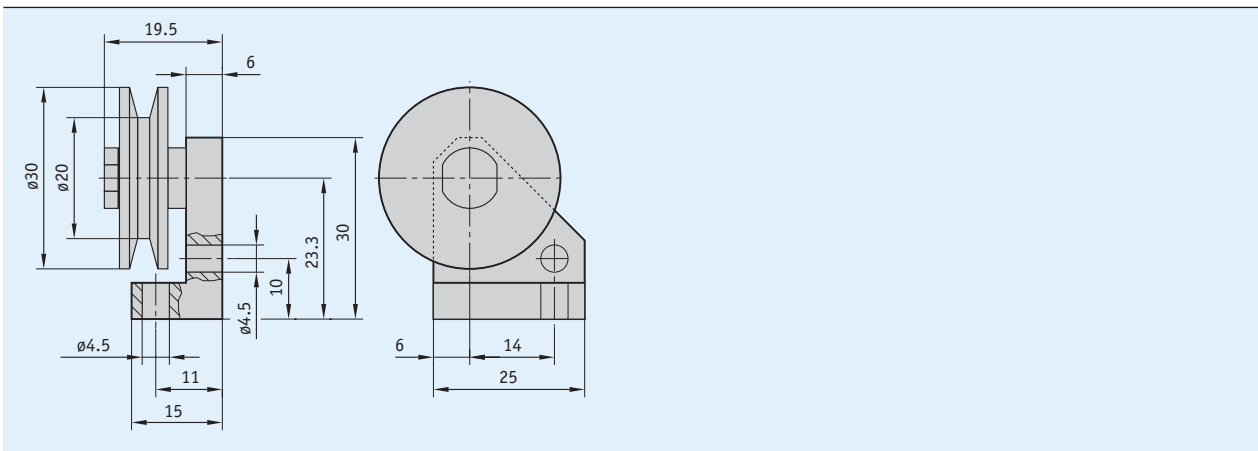
3.3

3.4

3.5

## Profile

- For changing the measurement direction. Guide rollers are used when the wire-actuated encoder cannot be installed inline with the extension direction of the wire
- Several guide rollers can be combined



## Mechanical data

Feature	Technical data	Additional information
Material	plastic aluminum	roller accommodation
Weight	0.025 kg	

## Order

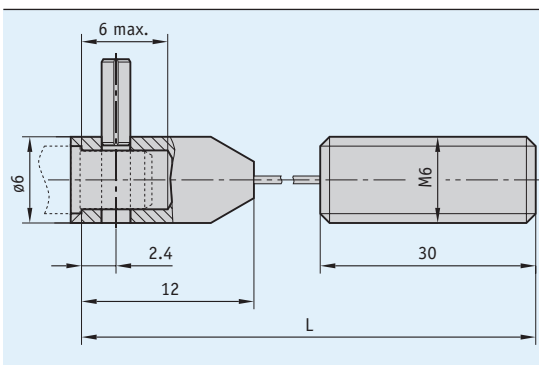
- **Mounting example**  
(See page 11)
- **Order key**

**UR**

Scope of delivery: UR

### Profile

- For extending the measurement wire or bridging the gap to the object to be measured. This does not extend the actual measurement range of the encoder, however
- Easy mounting



3.3

### Order

#### Ordering table

Feature	Ordering data	Specification	Additional information
Wire length	...	<b>A</b> 0.1 ... 20 m, in steps of 0.1 m	
Wire design	SK P	<b>B</b> steel rope, plastic-coated Para-line	

#### Order key



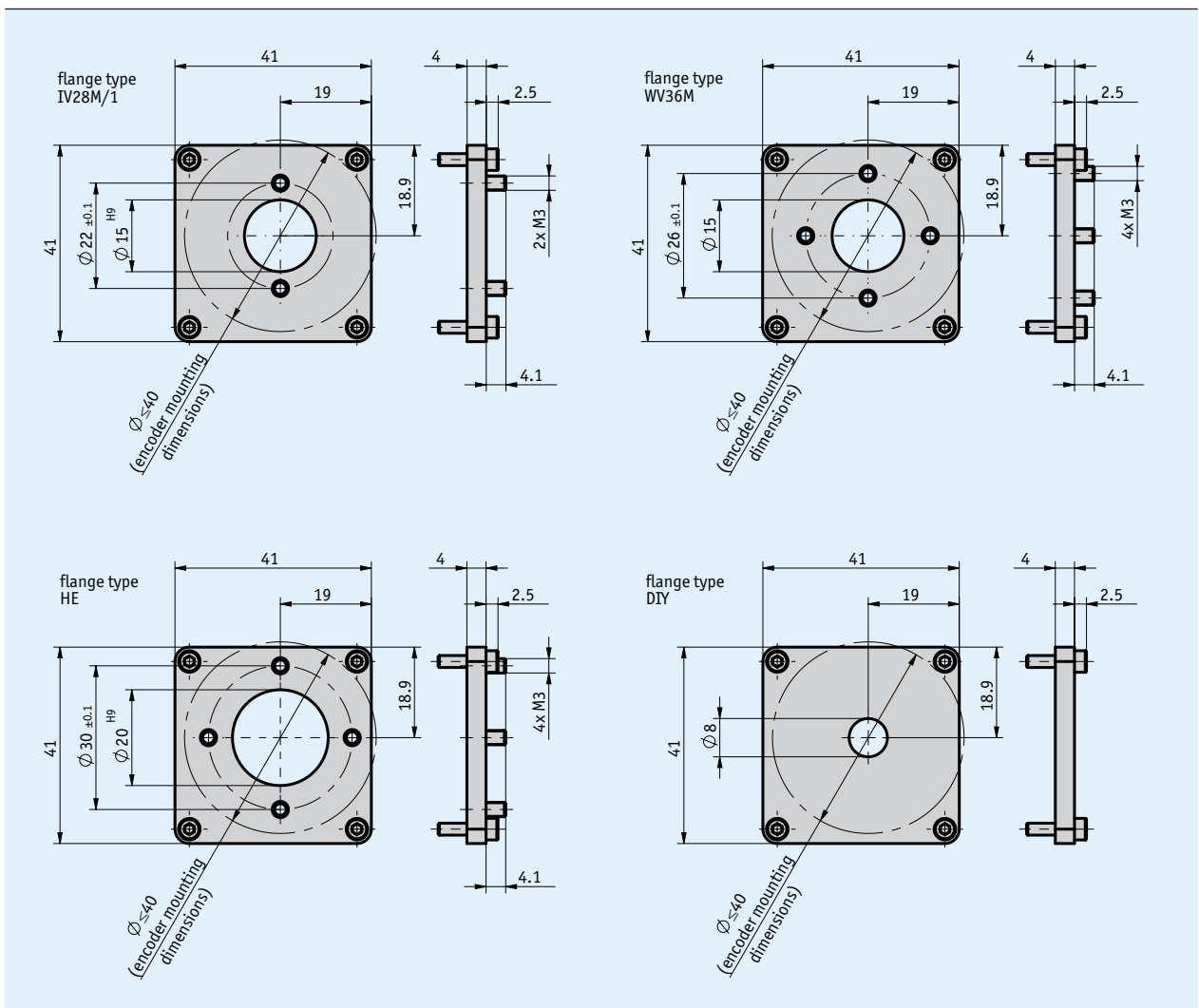
Scope of delivery: SV, User information

### Profile

- For easy mounting of rotary encoders to SG21
- For rotary encoders with max.  $\varnothing 40$  mm
- Diverse variants available
- Basic version (DIY) for own adjustments



3.3



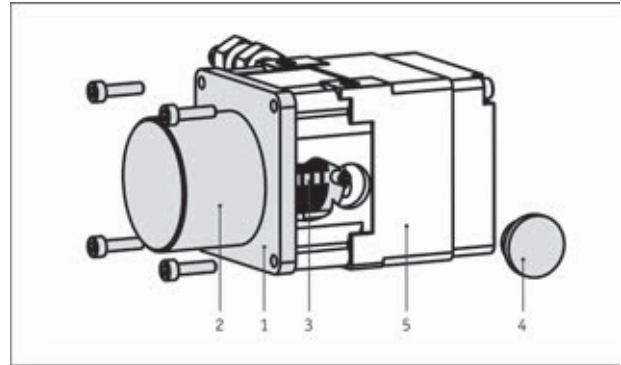
### Mechanical data

Feature	Technical data	Additional information
Material	aluminum	



## Hint for mounting

Mount the mounting flange [1] directly on the encoder flange [2]. After mounting the self-aligning coupling [3] on the encoder shaft, place the rotary encoder with flange and coupling on the cable housing [5]. Screw the flange to the housing and fasten the coupling through the lateral hole on the drum shaft of the cable. The plastic cover [4] prevents foreign bodies from entering the cable housing. For detailed instructions regarding encoder mounting refer to the user information of the SG21 wire-actuated encoder



## Order

### Ordering information

one or more system components are required:

Absolute encoder WV36M/CAN  
 Absolute encoder WV36M/SSI  
 Incremental encoder IV28M/1  
 Wire-actuated encoder SG21

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 page 26

### Ordering table

Feature	Ordering data	Specification	Additional information
Flange type	IV28M/1	for IV28M/1 rotary encoder	
	WV36M/SSI <b>A</b>	for WV36M/CAN and WV36M/SSI rotary encoders	
	HE	for rotary encoder with bolt circle ø30 mm	
	DIY	processing of the flange for the encoder by the customer	


### Order key

ZB4002 -

*Scope of delivery: ZB4002, fastening screws for flange and encoder*

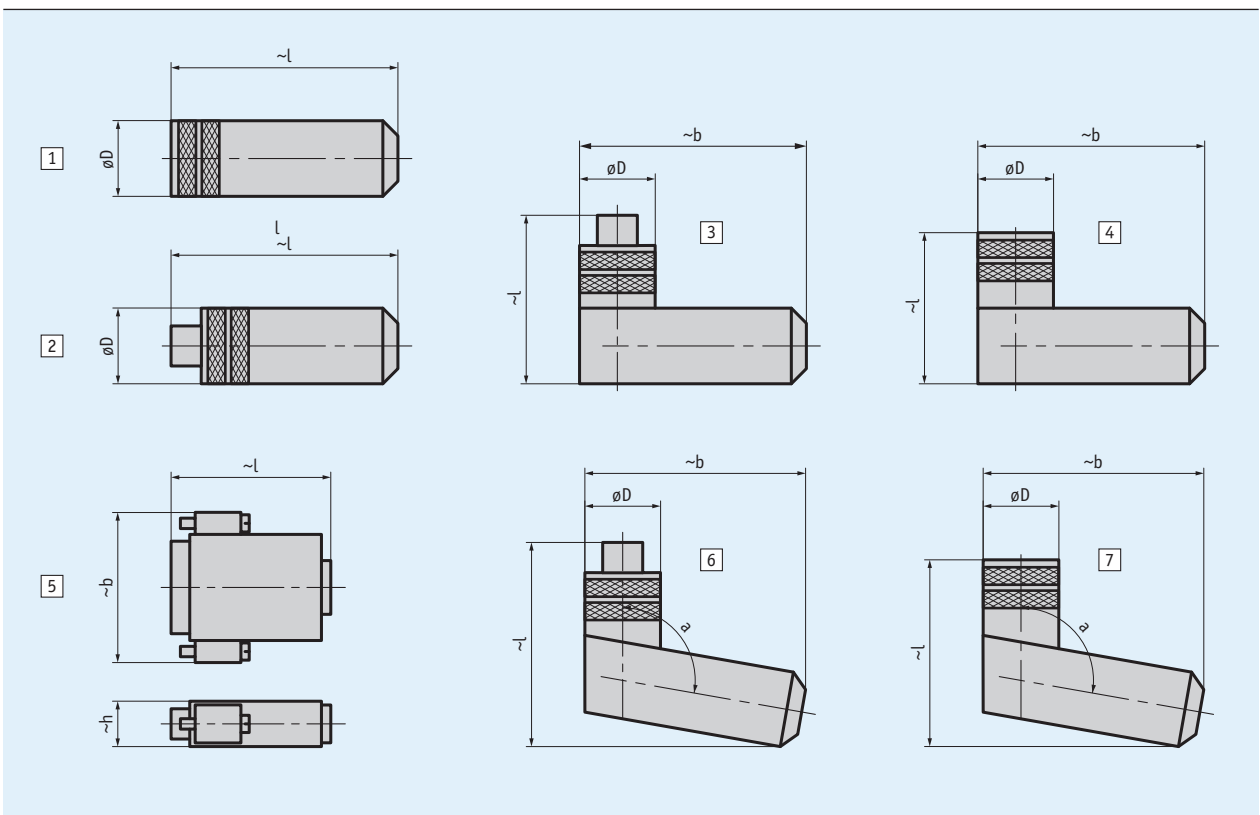
### Profile

- Mating connector, straight
- Mating connector, offset
- D-SUB connector
- Bus terminator, straight

 When screwed, the distance to the device will increase by approx. 3 mm.



### 3.3



### Order

#### ■ Overview of orders

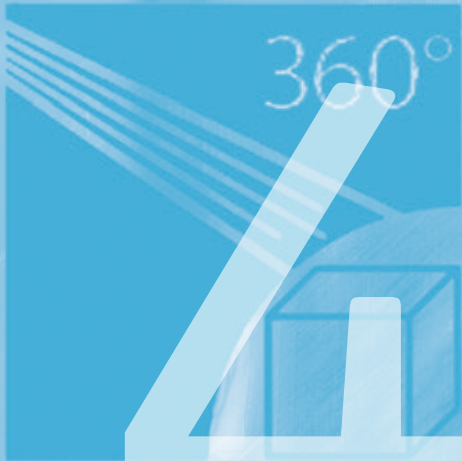
Order key	Picture	Type	PIN	Name	ø Cable	øD	l	b	h	a
71364+71365	5	D-SUB	9	pin+shell	≤8.5		35	31	15.5	
71366+71365	5	D-SUB	9	socket+shell	≤8.5		35	31	15.5	
73947+73946	5	D-SUB	15	socket+shel	≤8.5		42	40	15.2	
76141	1	M16	7	socket	4 ... 6	18.5	61			
76572	1	M16	12	socket	6 ... 8	18.5	62			
77087	1	M16	7	socket	6 ... 8	18.5	62			
78088	4	M16	7	angle socket	4 ... 6	20	38	54		
79665	4	M16	7	angle socket	6 ... 8	20	38	54		
79666	4	M16	12	angle socket	6 ... 8	20	38	54		
81351	1	M9	8	socket	3.5 ... 5	14	38			
81363	4	M16	3	angle socket	4 ... 6	20	38	54		
81487	1	M9	3	socket	3.5 ... 5	14	38			
81935	1	M23	12	socket	≤8.5	26	51.1			
82182	1	M16	3	socket	4 ... 6	18.5	61			
82247	4	M9	4	angle socket	3.5 ... 5	14	30	30.5		
82366	4	M9	3	angle socket	3.5 ... 5	14	30	30.5		
82804	7	M12 B-Cod.	5	angle socket	4 ... 8	19	48	41		100°
82805	6	M12 B-Cod.	5	angular pin	4 ... 8	19	50	41		100°
82815	2	M12 A-Cod.	5	bus terminating plug (CAN)		14.5	55			
82816	2	M12 B-Cod.	5	bus terminating plug (PB)		14.2	44			
83006	7	M12 A-Cod.	5	angle socket	4 ... 8	19	48	41		100°
83007	6	M12 A-Cod.	5	angular pin	4 ... 8	19	50	41		100°
83091	7	M12 A-Cod.	4	angle socket	4 ... 8	19	48	41		100°
83419	1	M12 A-Cod.	4	socket	4 ... 6	20	54			
83447	1	M9	4	socket	3.5 ... 5	14	38			
83525	1	M12 A-Cod.	8	socket	6 ... 8	20	57			
83526	1	M12 A-Cod.	4	socket	6 ... 8	20	57			
83527	2	M12 A-Cod.	8	pin	6 ... 8	20	62			
83991	1	M12 B-Cod.	5	socket	6 ... 8	20	57			
83992	2	M12 B-Cod.	5	pin	6 ... 8	20	62			
84109	1	M12 A-Cod.	5	socket	6 ... 8	20	57			
84209	1	M8	4	socket	3.5 ... 5	12	43			
84210	2	M8	4	pin	3.5 ... 5	12	50			
84732	2	M12 A-Cod.	5	pin	6 ... 8	20	62			
85057	1	M16	3	socket	6 ... 8	18.5	62			
85058	4	M16	3	angle socket	6 ... 8	20	38	54		
85277	1	M12 A-Cod.	12	socket	6 ... 8	20	57			
85278	4	M12 A-Cod.	12	angle socket	6 ... 8	20	38	54		
87599	7	M12 A-Cod.	8	angle socket	4 ... 8	19	48	41		100°
87600	3	M12 D-Cod.	4	angular pin	6 ... 8	20	42	54		
87601	2	M12 D-Cod.	4	pin	6 ... 8	20	63			
BAS-0005	2	M8	4	bus terminating plug		12	45			

#### ■ Order key

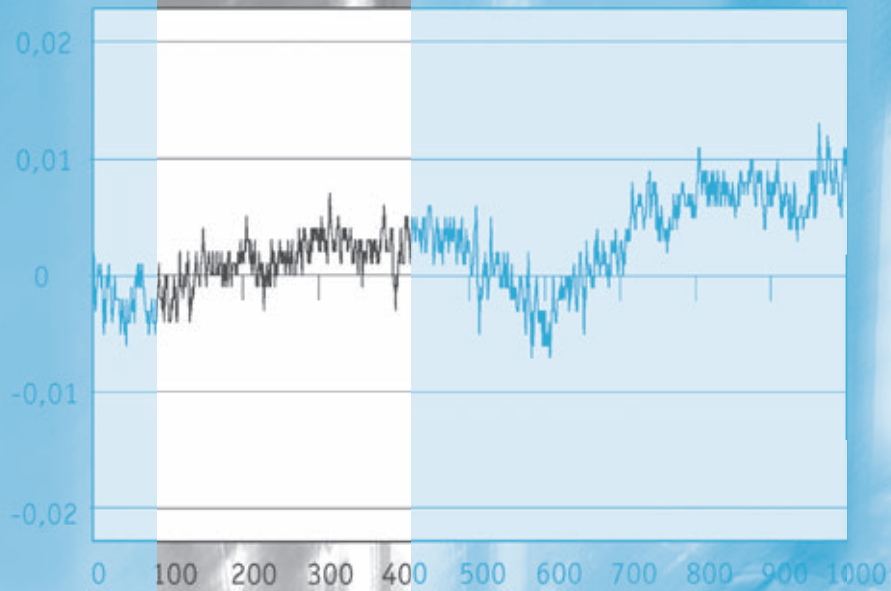


Scope of delivery: mating connector

# 3.4



[mm]  
tolérance



longueur L [mm]



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3.5


Protection classes according to DIN EN 60529


IP ..

Touch and foreign bodies protection

Water protection

Touch and foreign bodies protection		Water protection	
	<b>0</b> No protection.		<b>0</b> No protection.
	<b>1</b> Protected against access with the back of the hand. Protection against solid foreign bodies with $\varnothing > 50$ mm.		<b>1</b> Protection against vertical water drips.
	<b>2</b> Protected against contact with a finger. Protected against solid foreign bodies with diameters $> 12.5$ mm.		<b>2</b> Protection against vertical water drips if the housing is tilted up to $\pm 15^\circ$ .
	<b>3</b> Protected against access with a tool. Protected against solid foreign bodies with diameters $> 2.5$ mm.		<b>3</b> Protection against spray up to $\pm 60^\circ$ towards verticality.
	<b>4</b> Protected against access with a wire. Protected against solid foreign bodies with diameters $> 1.0$ mm.		<b>4</b> Protection against splash water coming from any angle.
	<b>5</b> Full protection against contact. Protection against harmful quantities of dust.		<b>5</b> Protection against hose water (nozzle) coming from any angle.
	<b>6</b> Full protection against contact. Dust-proof.		<b>6</b> Protection against strong hose water coming from any angle.
			<b>7</b> Protection against temporary immersion.
			<b>8</b> Protection against continuous immersion.
			<b>9k*</b> Protection against ingress of water during high pressure or steam-jet cleaning, specific for road vehicles.

 The standards deal with the protection of electric equipment by means of housings, covers and so forth. For purely mechanical devices, the information is used figuratively.

 The two numbers are not indicative of the protection against ingress of oils or similar liquids. The second figure indicates the protection class exclusively for water.

\* IPx9k is not part of DIN EN 60 529, rather it is contained in DIN 40 050



# 3.5





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**3.5**

SDE04

SGP/1

SG20

UR

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SG42	Wire-actuated encoder	39
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