TWK ELEKTRONIK

Product overview

Cable Converter

Design and function

Due to their compact design, cable converters are used to register extensive travel. The measuring cable is wound in a single layer on a drum. The distance to be measured can be precisely determined using the drum‘s circumference and angle of rotation. In this case, each drum revolution corresponds to an identically long distance. The drum is firmly connected to a rotary encoder which measures the drum‘s precise angle of rotation and number of revolutions. A powerful helical spring ensures that the measuring cable always remains tensioned. The measuring cable is extended counter to the spring‘s force and is wound back onto the drum again by the spring on retraction.

Cable winding systems for winding in a single layer

- **Travelling drum**
  The drum is tracked on a threaded spindle. When the measuring cable is being extended and wound up, the drum is moved along a central threaded spindle by the distance of one cable diameter for each revolution. This ensures that the measuring cable is positioned coil by coil on the drum over its entire length. This principle is implemented in the SWK, SWP, SWA, SWH, SWF and SWG product series.

- **Self-positioning**
  If the measuring cable is thin and only a few coils are found on the drum, the measuring cable coil positions itself coil by coil. This principle is implemented in the SWM product series.

- **Travelling cable inlet**
  If the measuring cable is very long, the drum is very heavy. The cable inlet is then moved. The cable inlet is moved by the distance of one cable diameter for each revolution of the drum. This principle is implemented in the SWL product series.

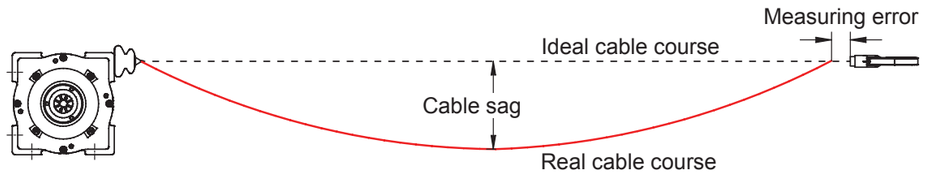
Mobile crane systems
in a dusty environment

Portal crane systems
in a saltwater environment

Note on application

Measuring error compensation in the case of cable sag: if the measuring cable runs horizontally, it will never be possible to prevent sag entirely. As the dead weight of the measuring cable and the tensile load of the helical spring are known, the cable sag can be determined. The cable sag generates a measuring error. The cable sag and measuring error can be looked up in the table and corrected by the user.

Optimal installation situation: in order not to overload the integrated brush chamber, the ingress of dust and moisture should be reduced. To achieve this, it is most sensible to position the cable outlet pointing downwards. A deflection roller can then be used to guide the cable in any desired direction. If it is not possible to angle the cable outlet downwards, it can be positioned at the side. However, angling the cable outlet upwards should be avoided wherever possible.



	Cable sag		Measuring error	
Cable diameter	⌀ = 1,35 mm	⌀ = 0,81 mm	⌀ = 1,35 mm	⌀ = 0,81 mm
SWF				
5 m	20 mm	10 mm	-	-
10 m	65 mm	25 mm	0,5 mm	-
20 m	210 mm	80 mm	3,0 mm	0,5 mm
30 m	400 mm	140 mm	8,0 mm	1,0 mm
SWG/SWL				
20 m	130 mm	50 mm	4,0 mm	0,5 mm
40 m	500 mm	160 mm	18,0 mm	3,0 mm
60 m	1000 mm	360 mm	42,0 mm	6,0 mm

Cable pull linear transducers up to 30 m



Product designation	SWK	SWP	SWA
Mechanical data			
Measuring range	Up to 2 m	Up to 2 m	Up to 2 m
Measuring system	Incremental	Potentiometric	External
Accuracy	0,05 %	0,2 %	0,05 %
Cable outlet	Rotating spherical nozzle	Rotating spherical nozzle	Nozzle
Winding	Travelling drum	Travelling drum	Travelling drum
Maximum cable speed	10 m/s	10 m/s	10 m/s
Maximum cable acceleration	70 m/s²	100 m/s²	100 m/s²
Service life	2 Mio. million strokes	2 Mio. million strokes	0,5 Mio. million strokes
Environmental data			
Protection type	IP54	IP54	IP53
Temperature	-20 ... +50 °C	-20 ... +50 °C	-20 ... +60 °C



Product designation	SWH	SWM	SWF
Mechanical data			
Measuring range	Up to 3 m	Up to 5 m	Up to 30 m
Measuring system	External	External	External
Accuracy	0,1 %	0,1 %	0,1 %
Cable outlet	Rotating spherical nozzle	Metal nozzle + guide	Metal nozzle
Winding	Travelling drum	Self-positioning	Travelling drum
Maximum cable speed	8 m/s	4 m/s	6-12 m/s
Maximum cable acceleration	40 m/s²	10 m/s²	15-70 m/s²
Service life	10 Mio. million strokes	5 Mio. million strokes	10 Mio. million strokes
Environmental data			
Protection type	IP65	IP65	IP65
Temperature	-20 ... +70 °C	0 ... +70 °C	-20 ... +70 °C
Optional	-30 ... +70 °C	-20 ... +70 °C	-30 ... +70 °C
Further options			
	hard anodised housing cable extension deflection roller grease chamber brush attachment folding bellows compressed air attachment	hard anodised housing cable extension	hard anodised housing cable extension deflection roller grease chamber brush attachment folding bellows compressed air attachment

Cable pull linear transducers up to 60 m


Product designation	SWG	SWL
Mechanical data		
Measuring range	Up to 50 m	Up to 60 m
Measuring system	External	External
Accuracy	0,1 %	0,1 %
Cable outlet	Metal nozzle	Slot
Winding	Travelling drum	Travelling cable inlet
Maximum cable speed	2-12 m/s	2 m/s
Maximum cable acceleration	4-20 m/s²	4 m/s²
Service life	10 Mio. million strokes	1 Mio. million strokes
Environmental data		
Protection type	IP65	IP31
Temperature	-20 ... +70 °C	-20 ... +70 °C
Optional	-30 ... +70 °C	-30 ... +70 °C
Further options		
	hard anodised housing cable extension, brush attachment deflection roller, folding bellows grease chamber, compressed air attachment	hard anodised housing cable extension, brush strip

Rotary encoder

The rotary encoder which is used is the link between the cable converter and the control system, which requires an electrical signal to register the position. The rotary encoder supplies this signal in analogue, incremental or digital form (refer to the rotary encoder prospectus for further details). All TWK rotary encoders with standard flange are suitable for attaching to the cable converter. The necessary installation material is already available for the majority of special flanges. Enquire about this if necessary.

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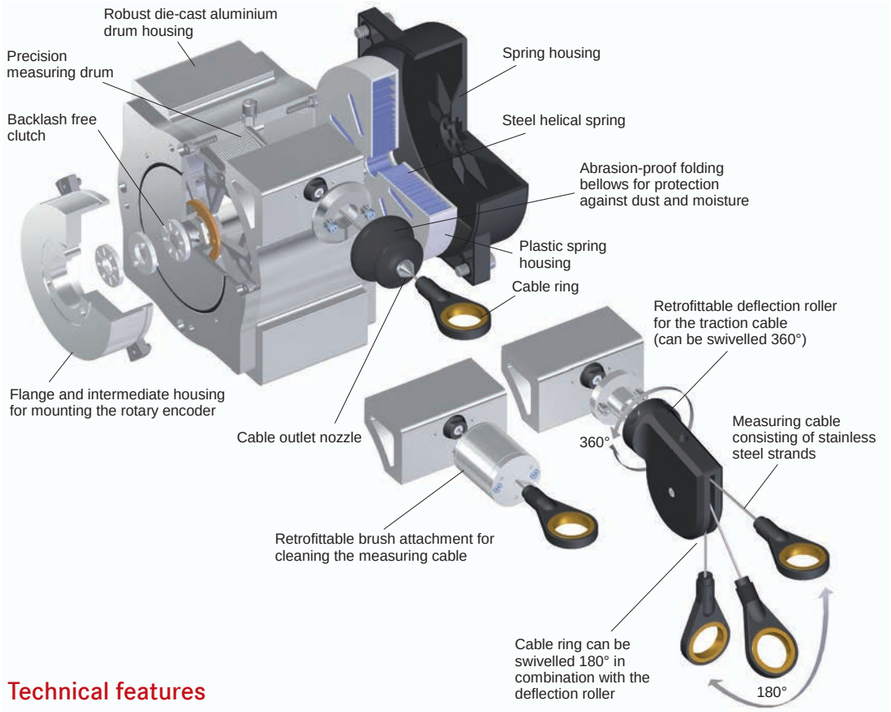
Sectional illustration of a cable converter with travelling drum



Technical features

- Tightly toleranced aluminium cable drum
- Single-layer stainless steel measuring cable winding
- Spring motor with virtually constant force curve
- Precise cable inlet via rollers, slot or spherical nozzle
- External rotary encoder with direct shaft coupling to the cable drum
- Optionally hard anodised - resistant to sea water

Alternative system

Toothed belt system

Toothed belt linear transducers are also available as an alternative to the cable converter. In this principle, a steel-reinforced toothed belt runs around a pinion. The toothed belt is tensioned using a spring element and engages into the teeth of the pinion without backlash. The pinion‘s angle of rotation is registered by a rotary encoder and converted into a measurement signal. The measurement signal is proportionate to the distance travelled.

Accessories for cable converters

Extension cable

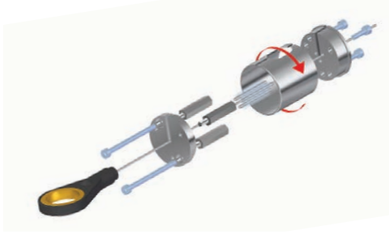
To extend the application range and for installation locations outside of the measuring range

- Stainless design
- Highly-flexible stainless steel 1.4401 strand, ⌀ 1,3 mm (7x19=133 wires)
- Snap hook

Brush attachment

For use in extremely dusty and oxidised environmental conditions

- Cylindrical aluminium housing (rotatable - with outlet for dirt and dust)
- Dust is brushed off from the measuring cable by three brushes
- Can be installed in the factory or by the user without removing the cable ring



Guide pulley

For use in inaccessible areas and to protect against water ingress

- Can be swivelled by 360 °
- Can be subsequently installed without removing the cable ring
- Cable can be deflected by up to 180°

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Further information and data sheets with exhaustive product descriptions incl. application examples can be found under:

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