

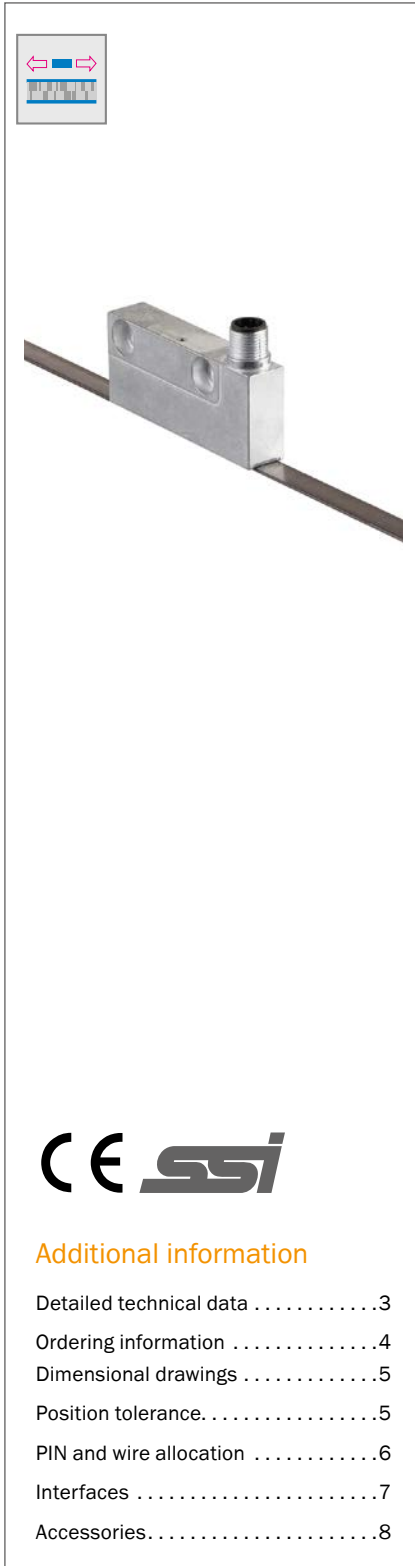
TTK70 SSI

COMPACT LINEAR ENCODER WITH HIGH RESOLUTION

Linear encoders

SICK
Sensor Intelligence.

COMPACT LINEAR ENCODER WITH HIGH RESOLUTION



Product description

The TTK70 non-contact linear encoder consists of a compact read head and a magnetic tape. The magnetic tape is equipped with a magnetic partition and acts as the measuring element. The partition consists of an incremental and an absolute track (two-track tape). To calculate the absolute position value, the read head detects both the absolute

and incremental component. With the SSI version, the position value is directly output for further processing. The TTK70 has an SSI output for absolute positioning and an incremental Sin/Cos output for recording speed in real time.

At a glance

- Non-contact absolute positioning
- Small, compact read head
- Standard SSI interface, combined with Sin/Cos output
- Measurement lengths of up to 4 m possible
- High level of accuracy ($\pm 10 \mu\text{m}$)
- High resolution ($1 \mu\text{m}$)
- High travel speed of up to 10 m/s

Your benefits

- Easy integration into existing systems
- Small size, low weight and high travel speed deliver excellent process dynamics
- After installation, the system is immediately available and completely maintenance-free, which leads to time and cost savings
- Immune to environmental factors such as contamination and condensation, ensuring increased reliability
- Real-time speed determination plus absolute positioning due to Sin/Cos and SSI output



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→ www.mysick.com/en/TTK70

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



Detailed technical data

Performance

Measurement length	Max. 4,000 mm
Magnetic tape length	Measurement length + 80 mm
Resolution	1 μm
Period length	1 mm
Travel speed	
Static operation (SSI)	< 2 m/s
Dynamic operation (Sin/Cos)	< 10 m/s
Repeatability	Max. $\pm 2 \mu\text{m}$
System accuracy	$\pm 10 \mu\text{m}$
Electrical interface	SSI + Sin/Cos
Connection type	Male connector, M12, 12-pin

Mechanical data

Dimensions	See dimensional drawing
Mass	
Read head	0.08 kg
Magnetic tape	0.18 kg/m
Material	
Read head	Zinc die-cast
Magnetic tape	17410 Hard ferrite 9/28 P
Substrate tape	Stainless steel

Electrical data

Electrical interfaces	
SSI	24 bit, gray
Sin/Cos	1 V_{pp}
Supply voltage	4.5 to 30 V
Max. power consumption	Max. 1.2 W
Operating current (no load)	55 mA
MTTFd: Mean time to dangerous failure ¹⁾	65 years (EN ISO 13849)

¹⁾ This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 40 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Ambient data

Working temperature range	
Read head	-30 °C ... +85 °C
Magnetic tape	-20 °C ... +100 °C
Storage temperature range	
Read head	-40 °C ... +85 °C
Magnetic tape	-30 °C ... +100 °C
Relative humidity / condensation	100 %, condensation permitted
Resistance to shocks	30 g / 6 ms (EN 60068-2-27)
Resistance to vibrations	20 g / 10 Hz to 2,000 Hz (EN 60068-2-6)
EMC	EN 61000-6-2, EN 61000-6-3
Enclosure rating	IP 67, with mating connector fitted
Temperature coefficient of magnetic tape	(11 ± 1) µm/K/m
Maximum permitted ambient field strength ¹⁾	< 3 kA/m to 4 kA/m (3.8 mT ... 5 mT); to ensure accuracy values are maintained
Maximum permitted field strength	< 150 kA/m (< 190 mT); to ensure the magnetic tape is not irreparably damaged

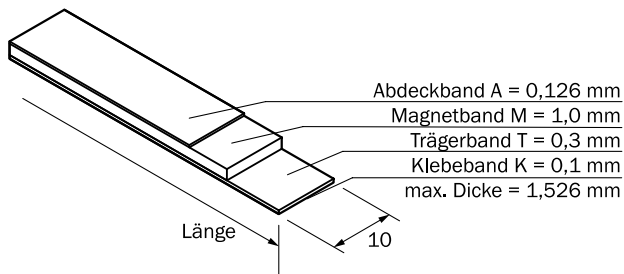
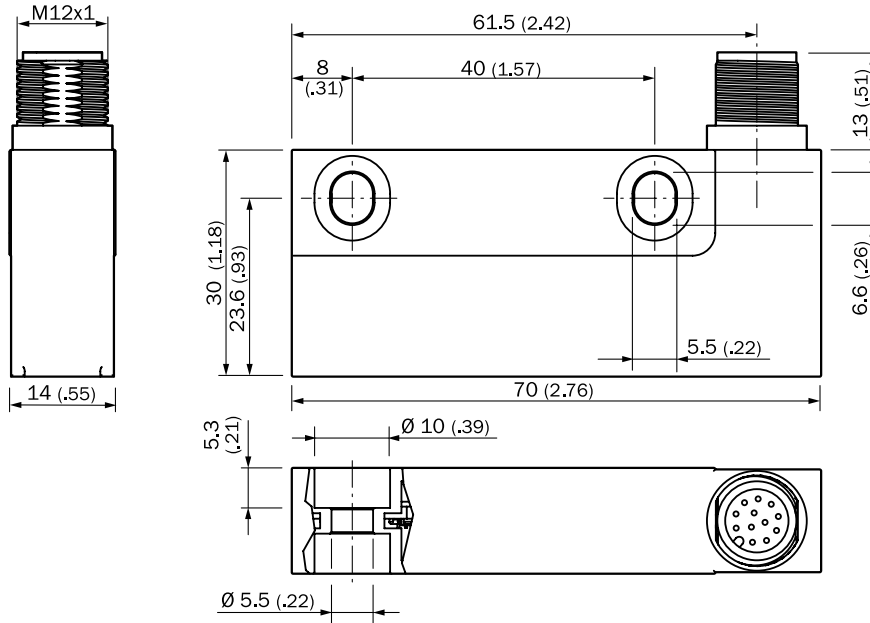
¹⁾ The maximum permitted external field influence is reached when the position value deviates from the original value (without external field influence) by more than 5 µm. This value is reached when, at the sensor location, a field strength of 3 kA/m to 4 kA/m (3.8 mT to 5 mT) occurs in addition to the field strength of the magnetic tape.

Ordering information

System part	Magnetic tape length	Model name	Part no.
Read head	-	TTK70-AXA0-K02	1038033
Magnetic tape with adhesive tape and cover band incl. ¹⁾	0.5 m	MVM-0M5-2MC-MKLB	6037415
	1 m	MVM-01M-2MC-MKLB	6037417
	1.5 m	MVM-1M5-2MC-MKLB	6037418
	2 m	MVM-02M-2MC-MKLB	6037419
	2.5 m	MVM-2M5-2MC-MKLB	6037420
	3 m	MVM-03M-2MC-MKLB	6037421
	3.5 m	MVM-3M5-2MC-MKLB	6037422
	4 m	MVM-04M-2MC-MKLB	6037423

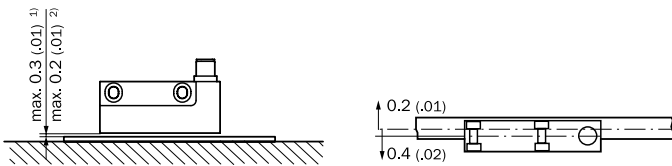
¹⁾ Working temperature range -20 ... +100 °C, storage temperature range -30 ... +100 °C.

Dimensional drawings (dimensions in mm)

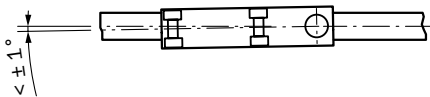


Position tolerance

General tolerances according to ISO 2768-mk

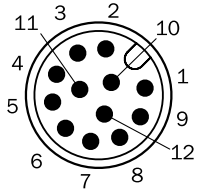


- ① Without covering tape
- ② With covering tape



PIN and wire allocation

M12 male connector, 12-pin
SSI + Sin/Cos



PIN	Color	Signal	Explanation
1	Orange-black	Calibration	For internal purposes only / connect to GND
2	White	SSI data +	Signal wire
3	Brown	SSI data -	Signal wire
4	Violet	SSI clock -	Signal wire
5	Red	+U _s	Operating voltage
6	Gray	/Sin	Signal wire
7	Green	Sin	Signal wire
8	Pink	/Cos	Signal wire
9	Black	Cos	Signal wire
10	Orange	SET ¹⁾	Electronic adjustment
11	Yellow	SSI clock +	Signal wire
12	Blue	GND	Ground connection

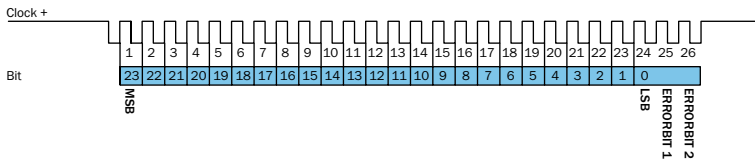
¹⁾ SET This input activates the electronic zero set. If the SET wire is connected to U_s for more than 1.2 seconds after it had previously been unassigned or connected to GND, the position of the encoder above the magnetic tape corresponds to the value 0.
Warning! The SET input must be connected to GND or not be connected when the encoder is switched on. If electronic zeroing is performed using the SET input, the synchronization between the SSI and Sin/Cos signals is lost.

Screen connected to housing on encoder side. Connected to ground on control side.

Interfaces

SSI interface

Data format



Bit 1-24: Position bits

- LSB: Least significant bit
- MSB: Most significant bit

Bit 25-26: Error bits

- ERRORBIT 1: Error message concerning distance between read head and magnetic tape. This bit is set in the SSI data stream if the maximum permitted distance between the read head and the magnetic tape is exceeded. The output position value is invalid.
- ERRORBIT 2: Error message concerning working temperature. This bit is set in the SSI data stream if the sensor is operating above its maximum permitted working temperature.

Evaluation of the error bits must be realized in the PLC.

The error bits output do not have to be used by the PLC. To be able to evaluate the error bits, the PLC must send at least 26 clock pulses per clock pulse train. A maximum of 31 clock pulses must not be exceeded. If more than 26 pulses are sent, the additional bits are output with "0".

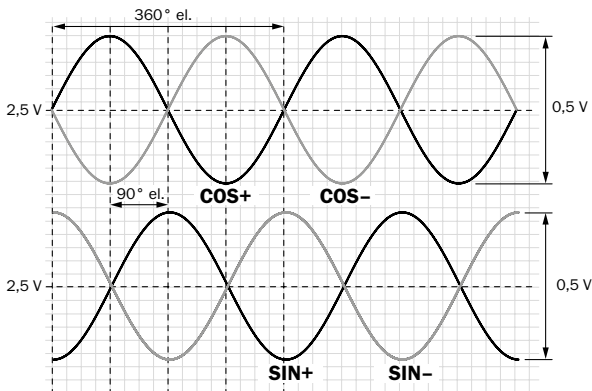
If the error bits cannot be evaluated in the PLC, the control unit must be set to an encoder resolution of 24 bits.

Sin/Cos interface $1 V_{pp}$

Supply voltage	Output
4.5 to 30 V	Sine $0.5 V_{pp}$

Signals **before** difference at 120Ω load at $U_s = 5 V$

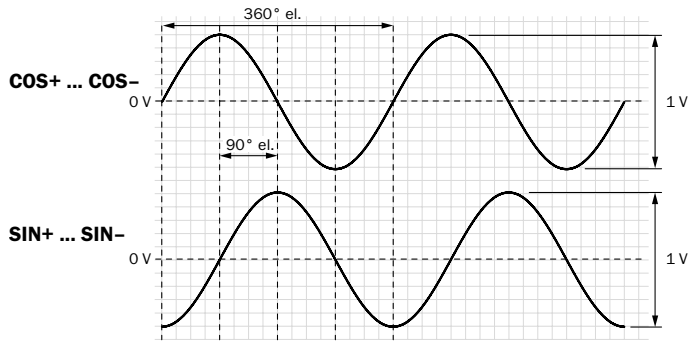
Signal diagram with read head moving in direction of arrow



Interface signals $\sin, \overline{\sin}, \cos, \overline{\cos}$	Signals before difference at 120Ω load	Signal offset
Differential analog	$0.5 V_{pp} \pm 10\%$	$2.5 V \pm 5\%$

Signals **after** difference at 120 Ω load at $U_s = 5\text{ V}$

Signal diagram with read head moving in direction of arrow



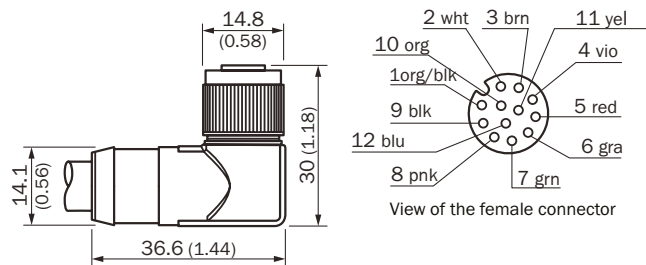
Accessories

Plug connectors and cables

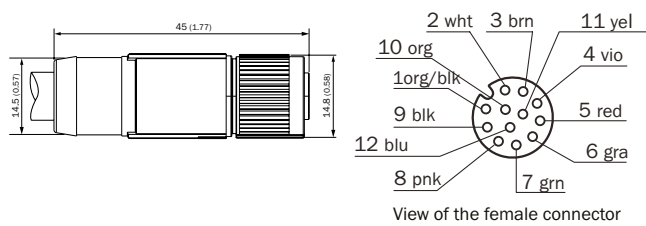
Connecting cable (female connector-open)

Brief description	Length	Model name	Part no.
Female cable connector, M12, 12-pin, angled, pre-wired with SSI cable, 12-wire, 12 x 0.14 mm ² , suitable for drag chains, diam. 8.5 mm	2 m	DOL-1212-W02MAC1	6039824
	5 m	DOL-1212-W05MAC1	6039825
	10 m	DOL-1212-W10MAC1	6039826
	20 m	DOL-1212-W20MAC1	6039827
Female cable connector, M12, 12-pin, straight, pre-wired with SSI cable, 12-wire, 12 x 0.14 mm ² , suitable for drag chains, diam. 8.5 mm	2 m	DOL-1212-G02MAC1	6053273
	5 m	DOL-1212-G05MAC1	6053274
	10 m	DOL-1212-G10MAC1	6053275
	20 m	DOL-1212-G20MAC1	6053276

DOL-1212-WxxMAC1

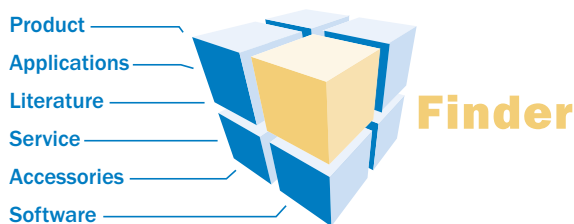


DOL-1212-GxxMAC1



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