



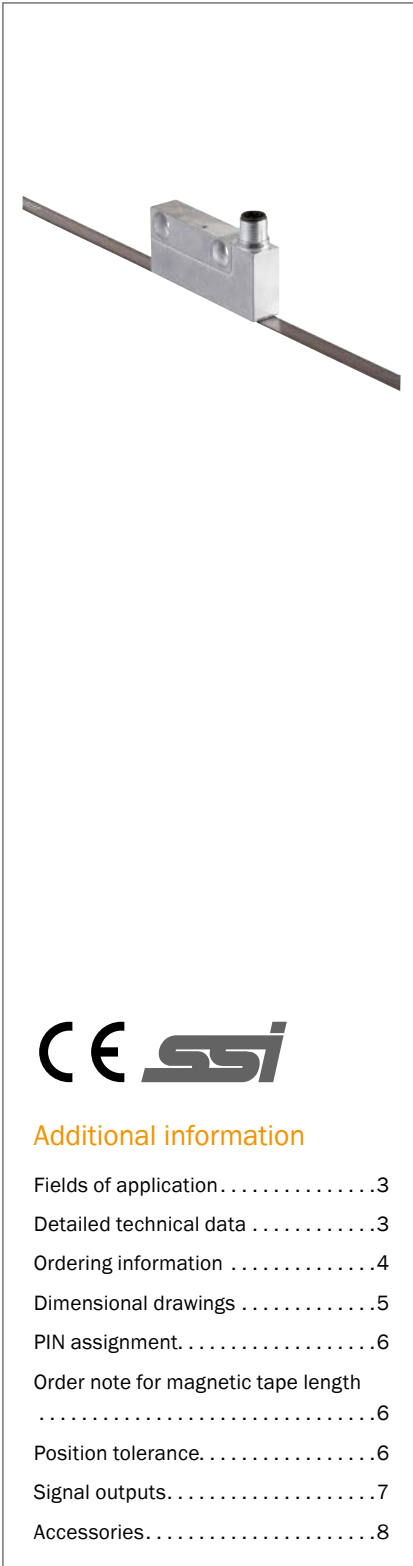
TTK70

COMPACT LINEAR ENCODER WITH HIGH RESOLUTION

Linear encoders

SICK
Sensor Intelligence.

MEASUREMENT OF POSITION AND SPEED WITH MAXIMUM PRECISION



Product description

Precision, speed and dynamics play a particularly important role in the measurement of linear movements. The compact linear measurement system TTK70 with HIPERFACE® or SSI interface fulfills all these properties. The magnetic principle of operation, the long measuring lengths, and the extremely high resolution open up all kinds of applica-

tion possibilities for absolute position and speed recording. The non-contact measuring system consists of a compact read head and magnetic tape. The read head is responsible for recording position values. The magnetic tape is the measuring element and features a magnetic division into an incremental and an absolute track.

At a glance

- Non-contact absolute position and speed recording
- With HIPERFACE® or SSI interface
- Measurement lengths of up to 4 m
- For high traversing speeds of up to 10 m/s
- Reliable measurements, even in the event of contamination and condensation on the magnetic tape
- Small, compact read head
- Certified according to SIL2 and PL d (HIPERFACE® interface)

Your benefits

- Available with the HIPERFACE® and SSI interfaces
- Measurement lengths of up to 4 m
- Maintenance and wear-free thanks to non-contact measurement principle
- Compact design, low weight, and high traversing speed
- Immune to ambient conditions such as contamination and condensation
- No need for a reference run due to the absolute position recording
- Certification allows for easy integration into a safe drive system



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→ www.sick.com/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.



Fields of application

- Linear motors
- Pick & Place applications

Detailed technical data

Performance

Measuring length	≤ 3,920 mm
Resolution	1 µm
Length of period	1 mm
Traversing speed	< 10 m/s, dynamic operation (Sin/Cos) < 2 m/s, static operation (SSI)
Repeatability	≤ ± 2 µm
System accuracy	± 10 µm

Interfaces

SSI

Communication interface	SSI
Interface, digital serial	SSI, 24 Bit, gray Sin/Cos 1.0 V _{PP}

Mechanical data

Dimensions	See dimensional drawing
Weight	
Read head	0.08 kg
Magnetic tape	0.18 kg/m
Magnetic strip length	See ordering information
Read head material	Zinc diecast
Material, magnetic tape	17410 Hard ferrite 9/28 P
Material mounting tape	Stainless steel

Electrical data

SSI

Supply voltage	4.5 V ... 30 V
Operating current	55 mA (without load)
Power consumption	≤ 1.2 W
Connection type	Male connector, M12, 12-pin
MTTFd: mean time to dangerous failure	65 years (EN ISO 13849) ¹⁾

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

EMC	According to EN 61000-6-2 and EN 61000-6-3
Enclosure rating	IP67, with mating connector inserted (according to IEC 60529)
Operating 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
Permissible relative humidity	100 %, condensation permitted
Resistance to shocks	30 g, 6 ms (EN 60068-2-27)
Resistance to vibration	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)
Temperature coefficient magnetic tape	(11 ± 1) µm/K/m
Maximum permitted ambient field strength	< 3 kA/m ... 4 kA/m (3.8 mT ... 5 mT), to guarantee compliance with the quoted accuracy values ¹⁾
Maximum permitted field strength	< 150 kA/m (< 190 mT), to ensure that the magnetic tape is not permanently damaged

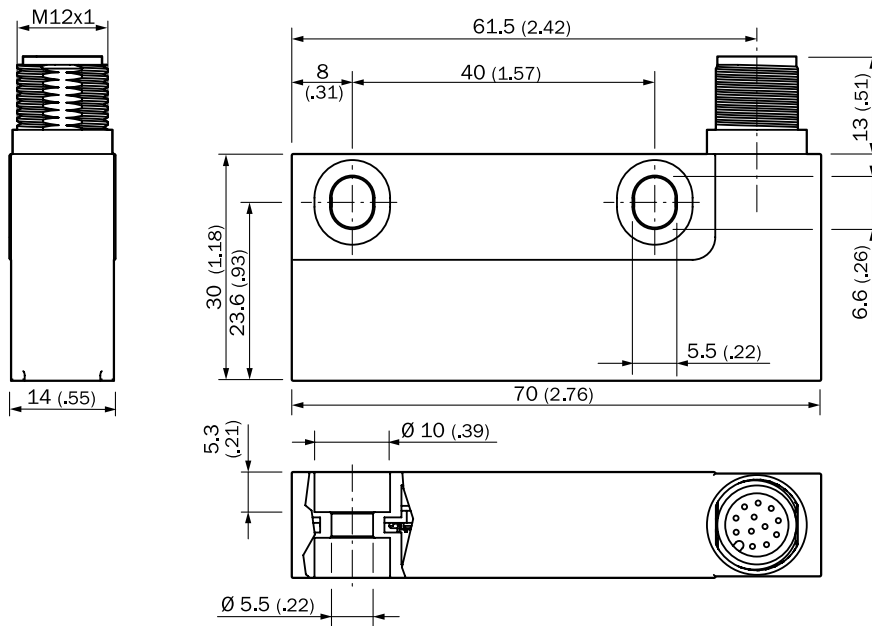
¹⁾ The maximum permitted external field influence is reached when the position value deviates from the original value (without external field influence) by more than 5 µm. This value is reached when, at the sensor location, a field strength of 3 kA/m to 4 kA/m (3.8 mT to 5 mT) occurs in addition to the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

Ordering information

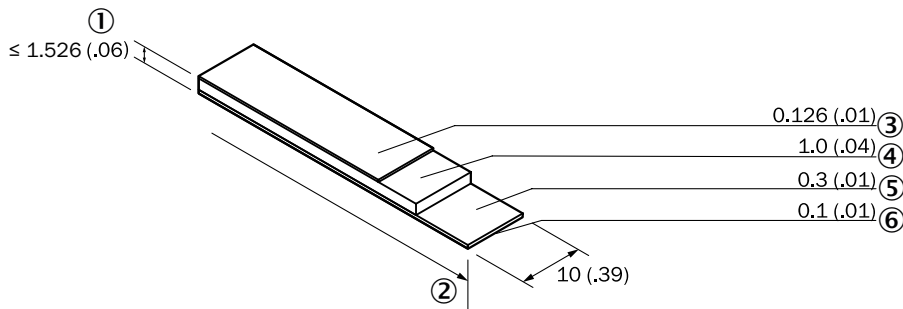
System part	Magnetic strip length	Connection type	Type	Part no.
Magnetic tape	0.5 m	-	MVM-0M5-2MC-MKLB	6037415
	1 m	-	MVM-01M-2MC-MKLB	6037417
	1.5 m	-	MVM-1M5-2MC-MKLB	6037418
	2 m	-	MVM-02M-2MC-MKLB	6037419
	2.5 m	-	MVM-2M5-2MC-MKLB	6037420
	3 m	-	MVM-03M-2MC-MKLB	6037421
	3.5 m	-	MVM-3M5-2MC-MKLB	6037422
	4 m	-	MVM-04M-2MC-MKLB	6037423
Read head	-	Male connector, M12, 12-pin	TTK70-AXA0-K02	1038033

Dimensional drawings (Dimensions in mm (inch))

Read head, male connector connection



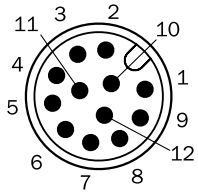
Magnetic tape



- ① Thickness
- ② Length
- ③ Conveying tape
- ④ Magnetic tape
- ⑤ Substrate tape
- ⑥ Adhesive tape

PIN assignment

View of the M12 male connector plug-in face

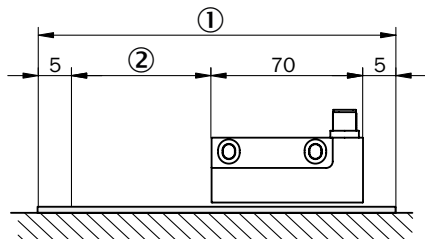


PIN	Color	Signal	Explanation
1	Orange-black	Balancing	For internal purposes only / connect to GND
2	White	SSI data +	Signal
3	Brown	SSI data -	Signal
4	Violet	SSI clock -	Signal
5	Red	U _s	Supply voltage
6	Gray	/SIN	Signal
7	Green	SIN	Signal
8	Pink	/COS	Signal
9	Black	COS	Signal
10	Orange	SET ₁	Electronic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

¹⁾ This input activates the electronic zero set. If the SET wire is connected to US 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

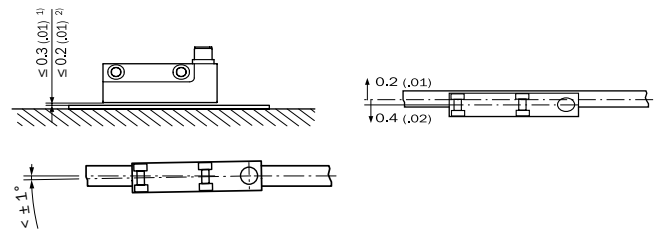
Screen connected to encoder housing.
Connected to ground on control side.

Order note for magnetic tape length



- ① Required band length = measurement path + 80 mm
- ② Measurement path

Position tolerance

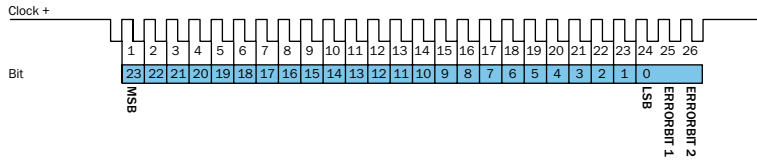


General tolerances according to DIN ISO 2768-mk

- ① Without cover strip
- ② With cover strip

Signal outputs

SSI-Interface



Bit 1–24: Position bits

- LSB: Least significant Bit
- MSB: Most significant Bit

Bit 25–26: Errorbits

- 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.

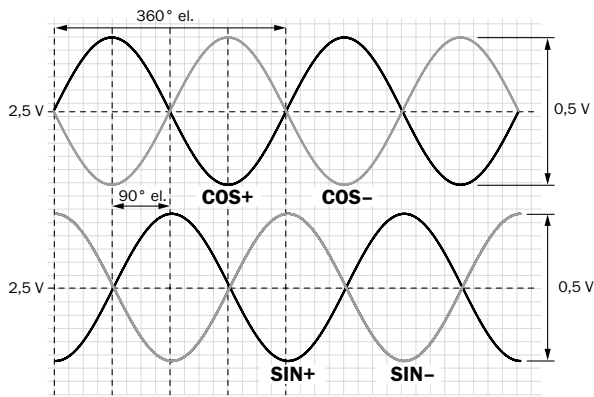
- ERRORBIT 2: Error message concerning working temperature. This bit is set in the SSI data stream if the sensor is operating above its maximum permitted working temperature.

Errorbits must be evaluated in the PLC.

The errorbits do not have to be used by the PLC. To be able to evaluate the errorbits, 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".

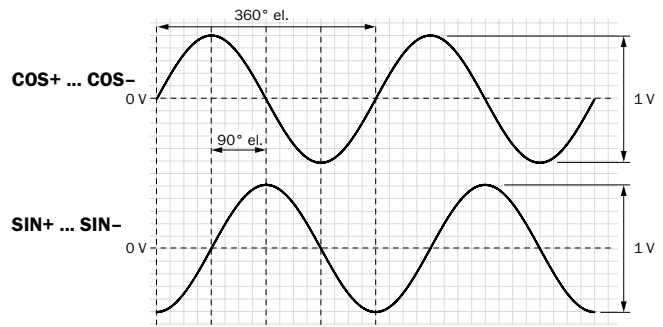
If the errorbits cannot be evaluated in the PLC, the control unit must be set to an encoder resolution of 24 bits.

Signal before differential generation



Signal diagram with read head moving in direction of arrow at 120 Ω load with US = 5 V

Signal SIN/COS after differential generation



Signal diagram with read head moving in direction of arrow at 120 Ω load with US = 5 V


Signal	Interface signals	Signal before differential generation At load 120 Ω	Signal offset	Supply voltage	Output
+ SIN - SIN + COS - COS	Analog, differential	0,5 V _{SS} ± 10 %	2,5 V ± 5 %	4,5 V ... 30 V	Sinus 0,5 V _{PP}

Accessories

Mounting systems

Other mounting accessories



Others

Figure	Brief description	Type	Part no.
	Protective strip for linear encoder magnetic tape, length 1 m, width 10 mm	BEF-MSB-01M-10MM	5338145

Connection systems

Plug connectors and cables

Connecting cables

Figure	Brief description	Length of cable	Type	Part no.
	Head A: female connector, M12, 12-pin, straight, A-coded Head B: Flying leads Cable: SSI, PUR, halogen-free, shielded, 12 x 0.14 mm ² , 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
	Head A: female connector, M12, 12-pin, angled, A-coded Head B: Flying leads Cable: SSI, PUR, halogen-free, shielded, 12 x 0.14 mm ² , 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

Dimensional drawings → [page 9](#)

Further accessories

Magnets

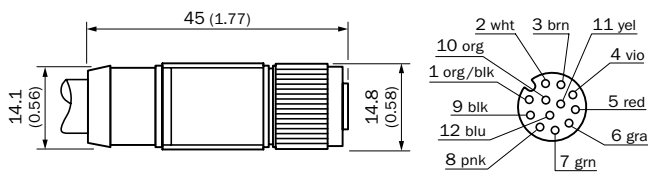
Figure	Brief description	Type	Part no.
	Magnetic tape length: 1 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-01M-2MC-MKLB	6037417
	Magnetic tape length: 2 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-02M-2MC-MKLB	6037419
	Magnetic tape length: 3 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-03M-2MC-MKLB	6037421
	Magnetic tape length: 4 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-04M-2MC-MKLB	6037423
	Magnetic tape length: 0.5 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-0M5-2MC-MKLB	6037415
	Magnetic tape length: 1.5 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-1M5-2MC-MKLB	6037418
	Magnetic tape length: 2.5 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-2M5-2MC-MKLB	6037420
	Magnetic tape length: 3.5 m, magnetic tape width: 10 mm, weight: 0.18 kg/m, magnetic tape material: 17410 hard ferrite 9/28 P, substrate tape material: stainless steel, period length 1 mm, operating temperature range: -20 °C ... 100 °C, storage temperature range: -30 °C ... 100 °C, temperature coefficient: (11 ± 1) µm/K/m	MVM-3M5-2MC-MKLB	6037422

Dimensional drawings → [page 10](#)

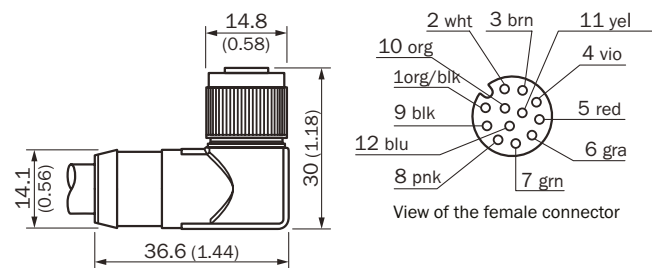
Dimensional drawings for accessories (Dimensions in mm (inch))

Plug connectors and cables

DOL-1212-GxxMAC1

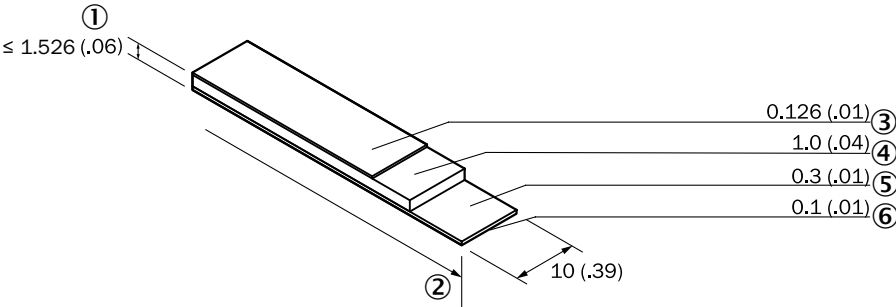


DOL-1212-WxxMAC1



Magnets

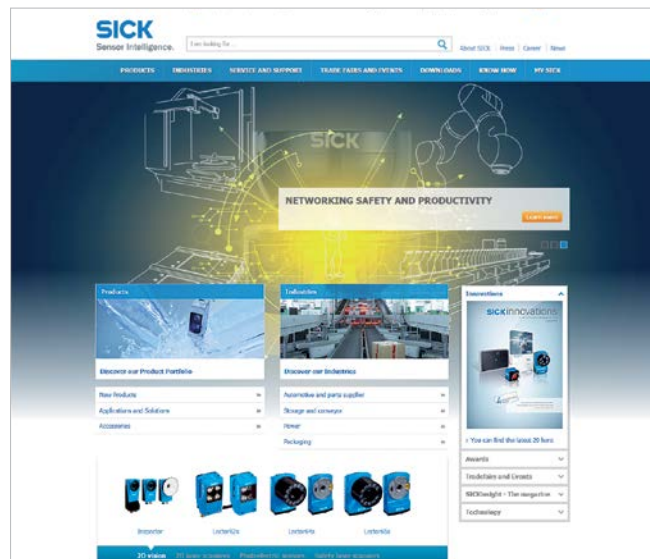
Magnetic tape



- ① Thickness
- ② Length
- ③ Conveying tape
- ④ Magnetic tape
- ⑤ Substrate tape
- ⑥ Adhesive tape

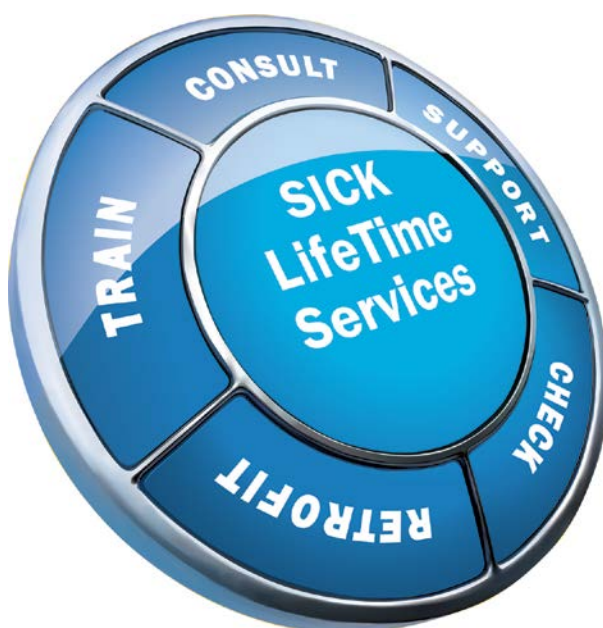
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