



# KHK53-PXF00054

KH53

LINEAR ENCODERS

**SICK**  
Sensor Intelligence.



### Ordering information

Type	Part no.
KHK53-PXF00054	1036167

Other models and accessories → [www.sick.com/KH53](http://www.sick.com/KH53)

Illustration may differ



### Detailed technical data

#### Safety-related parameters

<b>MTTFd: mean time to dangerous failure</b>	30 years (EN ISO 13849) <sup>1)</sup>
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<sup>1)</sup> 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.

#### Performance

<b>Measuring length</b>	0 m ... 54 m
<b>Measuring range</b>	54 m
<b>Resolution</b>	0.1 mm
<b>Traversing speed</b>	6.6 m/s <sup>1)</sup>
<b>Repeatability</b>	1 mm
<b>Measurement accuracy</b>	± 2000 + ME (Tu-25° C) Tk μm <sup>2)</sup>

<sup>1)</sup> If the max. traversing speed is exceeded or if the measuring elements are left, the corresponding error message is triggered (with SSI: FF FF FE hex).

<sup>2)</sup> If a positional tolerance of ± 1 mm is observed relative to the nominal distance in the N and Y directions within a measuring element relative to the starting point of this element ME = length of measuring element Tu = ambient temperature in °C. Tk = coefficient of thermal expansion (see "Mechanical data" table).

#### Interfaces

<b>Communication interface</b>	PROFIBUS DP <sup>1)</sup>
<b>Bus interface</b>	RS-485, according to EN 50 170-2 (DIN 19245 Parts 1–3) electrically isolated by optocoupler
<b>Position forming time</b>	+ 1.1 ms
<b>Address setting</b>	0 ... 127, Hex switches or Protocol
<b>Data protocol</b>	PROFIBUS DP basic functions (DP-V0)
<b>Bus termination</b>	Via external switches
<b>Set (electronic adjustment)</b>	Via protocol
<b>Encoder profile</b>	Profile for encoders (07hex) – Class 2
<b>Data transmission rate (baud rate)</b>	9.6 kBaud ... 12 MBaud, Automatic detection
<b>Status information</b>	Operation (green LED) Bus activity (red LED)

<sup>1)</sup> According to EN 50 170-2 (DIN 19245 Parts 1–3) electrically isolated by optocoupler.

## Electrical data

<b>Initialization time</b>	2 s
<b>Supply voltage</b>	10 V ... 32 V
<b>Power consumption</b>	2.5 W
<b>Connection type</b>	Male connector, 3 x M12
<b>MTTFd: mean time to dangerous failure</b>	30 years (EN ISO 13849) <sup>1)</sup>

<sup>1)</sup> 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.

## Mechanical data

<b>Weight</b>	4.4 kg
<b>Length of measuring element</b>	See calculation example
<b>Position tolerance</b>	± 20 mm, see positional tolerances diagram
<b>Read head material</b>	AlMgSiPbF28

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-4 <sup>1)</sup>
<b>Enclosure rating</b>	IP67, with mating connector inserted (IEC 60529)
<b>Operating temperature range</b>	-30 °C ... +70 °C
<b>Storage temperature range</b>	-40 °C ... +85 °C
<b>Resistance to shocks</b>	30 g, 10 ms (DIN EN 60 068-2-27)
<b>Resistance to vibration</b>	10 g, 20 Hz ... 250 Hz (EN 60068-2-6)

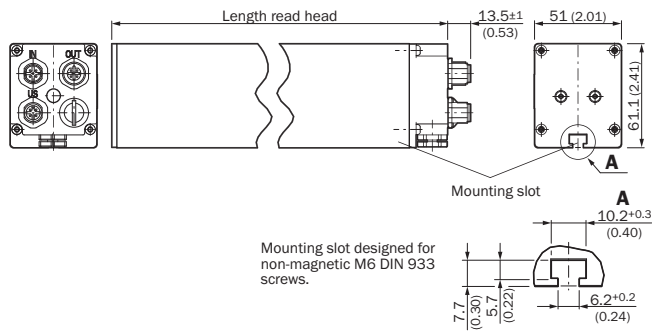
<sup>1)</sup> EMC according to the standards quoted is achieved if shielded cables are used.

## Classifications

<b>ECI@ss 5.0</b>	27270705
<b>ECI@ss 5.1.4</b>	27270705
<b>ECI@ss 6.0</b>	27270705
<b>ECI@ss 6.2</b>	27270705
<b>ECI@ss 7.0</b>	27270705
<b>ECI@ss 8.0</b>	27270705
<b>ECI@ss 8.1</b>	27270705
<b>ECI@ss 9.0</b>	27270705
<b>ETIM 5.0</b>	EC002544
<b>ETIM 6.0</b>	EC002544
<b>UNSPSC 16.0901</b>	41111613

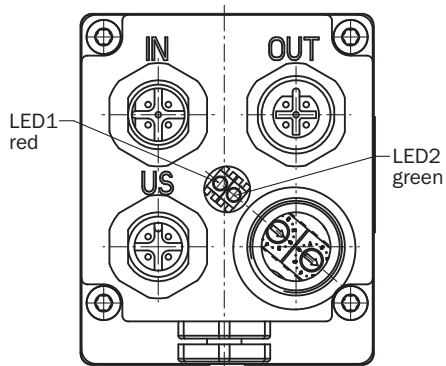
### Dimensional drawing (Dimensions in mm (inch))

#### Read head PROFIBUS



### PIN assignment

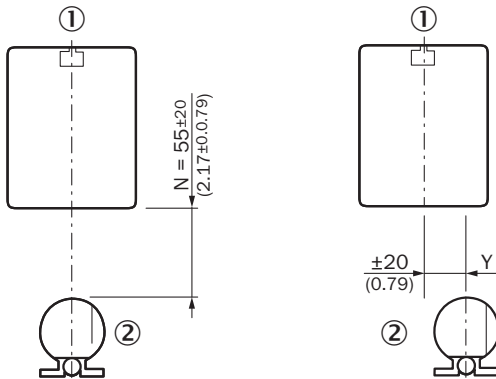
#### PROFIBUS interface



Male connector M12, 4-pin	Male connector M12, 5-pin	Female connector M12, 5-pin	Signal	Explanation
1	-	-	U <sub>S</sub>	Supply voltage
3	-	-	GND	Ground connection
-	-	4	B	B-cable PROFIBUS DP (out)
-	-	2	A	A-cable PROFIBUS DP (out)
-	4	-	B	B-cable PROFIBUS DP (in)
-	2	-	A	A-cable PROFIBUS DP (in)
-	-	1	2P5 <sup>1)</sup>	+ 5 V (potential free)
-	-	3	2M <sup>1)</sup>	0 V (potential free)
4	1	-	Not connected	-
2	3	-	Not connected	-
-	5	5	Screen	Housing potential
1) Use for external bus termination				

## Position tolerance

KH53 Advanced

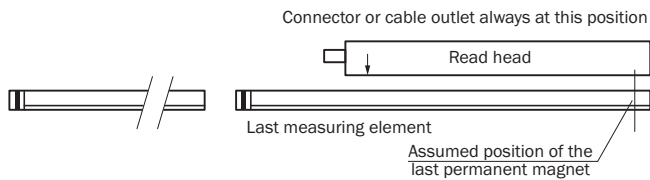


All dimensions in mm (inch)

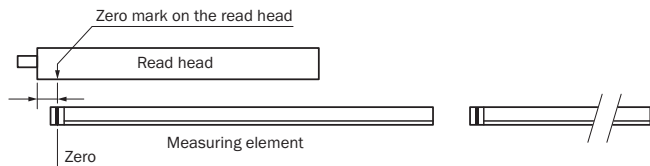
The operating reliability and accuracy of the measuring system depends on (amongst other things) compliance with the position tolerances. Magnetic or magnetizable materials are not permitted within 80 mm of the encoder or the measuring element.

- ① Read head
- ② Measuring element

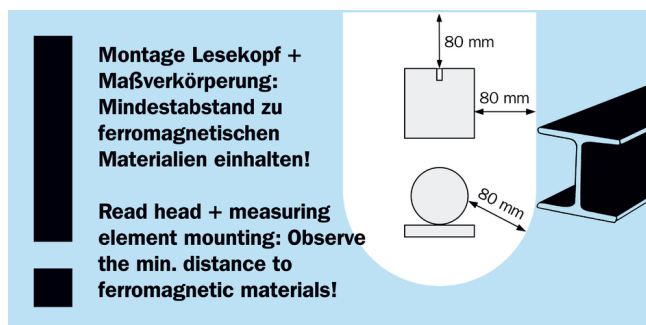
End of measurement path



Start of measuring path



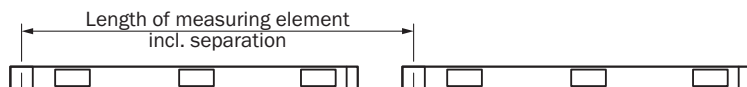
## Assembly note



Only use non ferro-magnetic materials for the assembly base of the read head. A separation distance of 80 mm must be observed for ferro-magnetic materials (e.g., iron).

### Dimensions and calculation table

KH53 PROFIBUS Advanced










Measuring range up to	Read head length	Length of measuring element including distance	Mounting systems per measuring element (suggestion)
53.50 m	1.599 m	1.408 m Identification letters F1 ... ≤ F39	3 clamp holders or 6 mounting brackets
546.40 m	2.525 m	2.3552 m Identification letters G1 ... ≤ G233	4 clamp holders or 8 mounting brackets
The dimensions given are slightly rounded.			

### Recommended accessories

Other models and accessories → [www.sick.com/KH53](http://www.sick.com/KH53)

	Brief description	Type	Part no.
Mounting brackets and plates			
	Mounting bracket for KH53 measuring elements, without mounting hardware for the background	BEF-WK-KHT53	2029159
Terminal and alignment brackets			
	Spacer for KHT53, without mounting hardware for the background	BEF-KHA-KHT53	2042468
Plug connectors and cables			
	Head A: Flying leads Head B: Flying leads Cable: PROFIBUS DP, PUR, shielded	LTG-2102-MW	6021355
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 5 m	DOL-1205-G05MQ	6026006
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 10 m	DOL-1205-G10MQ	6026008
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 15 m	DOL-1205-G15MQ	6032637
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 20 m	DOL-1205-G20MQ	6032638
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 30 m	DOL-1205-G30MQ	6032639
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 50 m	DOL-1205-G50MQ	6032861

	Brief description	Type	Part no.
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 5 m Wire shield Al-Pt film, overall shield C-screen tin-plated	STL-1205-G05MQ	6026005
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 10 m Wire shield Al-Pt film, overall shield C-screen tin-plated	STL-1205-G10MQ	6026007
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: Flying leads Cable: PROFIBUS DP, twisted pair, PUR, halogen-free, shielded, 12 m Wire shield Al-Pt film, overall shield C-screen tin-plated	STL-1205-G12MQ	6032635
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PVC, unshielded, 5 m	YF2A14-050VB3XLEAX	2096235
	Head A: female connector, M12, 4-pin, straight Head B: - Cable: unshielded	DOS-1204-G	6007302
	Head A: female connector, M12, 5-pin, straight, B-coded Head B: - Cable: PROFIBUS DP, shielded	DOS-1205-GQ	6021353
	Head A: male connector, M12, 5-pin, straight, B-coded Head B: - Cable: PROFIBUS DP, shielded	STE-1205-GQ	6021354
	Head A: male connector, M12, 4-pin, straight, B-coded Cable: PROFIBUS DP, terminal resistor	STE-END-Q	6021156
Programming and configuration tools			
	Programming tool for ATM60, ATM90, and KH53	PGT-01-S	1030111

## SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

**For us, that is “Sensor Intelligence.”**

## WORLDWIDE PRESENCE:

Contacts and other locations –[www.sick.com](http://www.sick.com)