Data sheet




# KHK53-AXT00054

## KH53

MAGNETIC LINEAR ENCODERS

SICK
Sensor Intelligence.




Illustration may differ

## Ordering information

| Type | part no. |
|---|---|
| KHK53-AXT00054 | 1035442 |

Other models and accessories ➜ www.sick.com/KH53

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 34 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.

### Performance

| | |
|---|---|
| **Measuring range** | 0 m ... 54 m |
| **Resolution** | 0.1 mm |
| **Traversing speed** | 6.6 m/s [1] |
| **Repeatability** | 1 mm |
| **Measurement accuracy** | ± 2000 + ME (Tu-25 ° C) Tk µm [2] |

[1] 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).
[2] 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 (28 µm/ °C/m).

### Interfaces

| | |
|---|---|
| **Communication interface** | SSI |
| **Position forming time** | + 0.8 ms |
| **Interface, digital serial** | SSI, 24 Bit, gray |
| **Interface for parametrization** | RS-422<br>Default OFF<br>Four wire transmission, asynchrony, full duplex<br>Data format: 1 start bit, 8 data bits, 1 stop bit, no parity<br>Data protocol: ASCII, Baud rate 9600 RS-422 |

### Electronics

| | |
|---|---|
| **Initialization time** | 2 s |
| **Supply voltage** | 10 V ... 32 V |
| **Current consumption** | 250 mA |
| **Connection type** | Cable, 12-wire, 5 m |

### Mechanics

| | |
|---|---|
| **Weight** | 4.4 kg |
| **Length of measuring element** | See calculation example |

| | |
|---|---|
| **Position tolerance** | ± 20 mm, see positional tolerances diagram |
| **Read head material** | AlMgSiPbF28 |

## Ambient data

| | |
|---|---|
| **EMC** | According to EN 61000-6-2 and EN 61000-6-4 [1] |
| **Enclosure rating** | IP66 (IEC 60529) |
| **Operating temperature range** | –30 °C ... +70 °C |
| **Storage temperature range** | –40 °C ... +85 °C |
| **Resistance to shocks** | 30 g, 10 ms (DIN EN 60 068-2-27) |
| **Resistance to vibration** | 10 g, 20 Hz ... 250 Hz (EN 60068-2-6) |

[1] EMC according to the standards quoted is achieved if shielded cables are used.

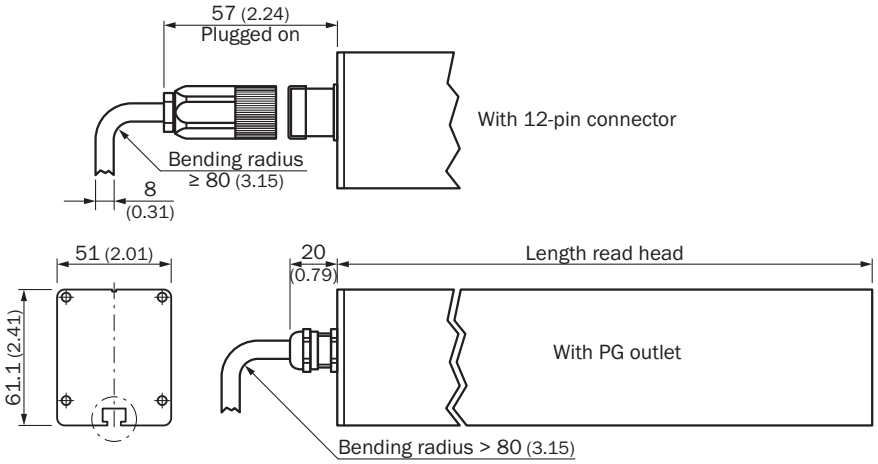
## Classifications

| | |
|---|---|
| **ECLASS 5.0** | 27270705 |
| **ECLASS 5.1.4** | 27270705 |
| **ECLASS 6.0** | 27270705 |
| **ECLASS 6.2** | 27270705 |
| **ECLASS 7.0** | 27270705 |
| **ECLASS 8.0** | 27270705 |
| **ECLASS 8.1** | 27270705 |
| **ECLASS 9.0** | 27270705 |
| **ECLASS 10.0** | 27270705 |
| **ECLASS 11.0** | 27270705 |
| **ECLASS 12.0** | 27274304 |
| **ETIM 5.0** | EC002544 |
| **ETIM 6.0** | EC002544 |
| **ETIM 7.0** | EC002544 |
| **ETIM 8.0** | EC002544 |
| **UNSPSC 16.0901** | 41111613 |

## Certificates

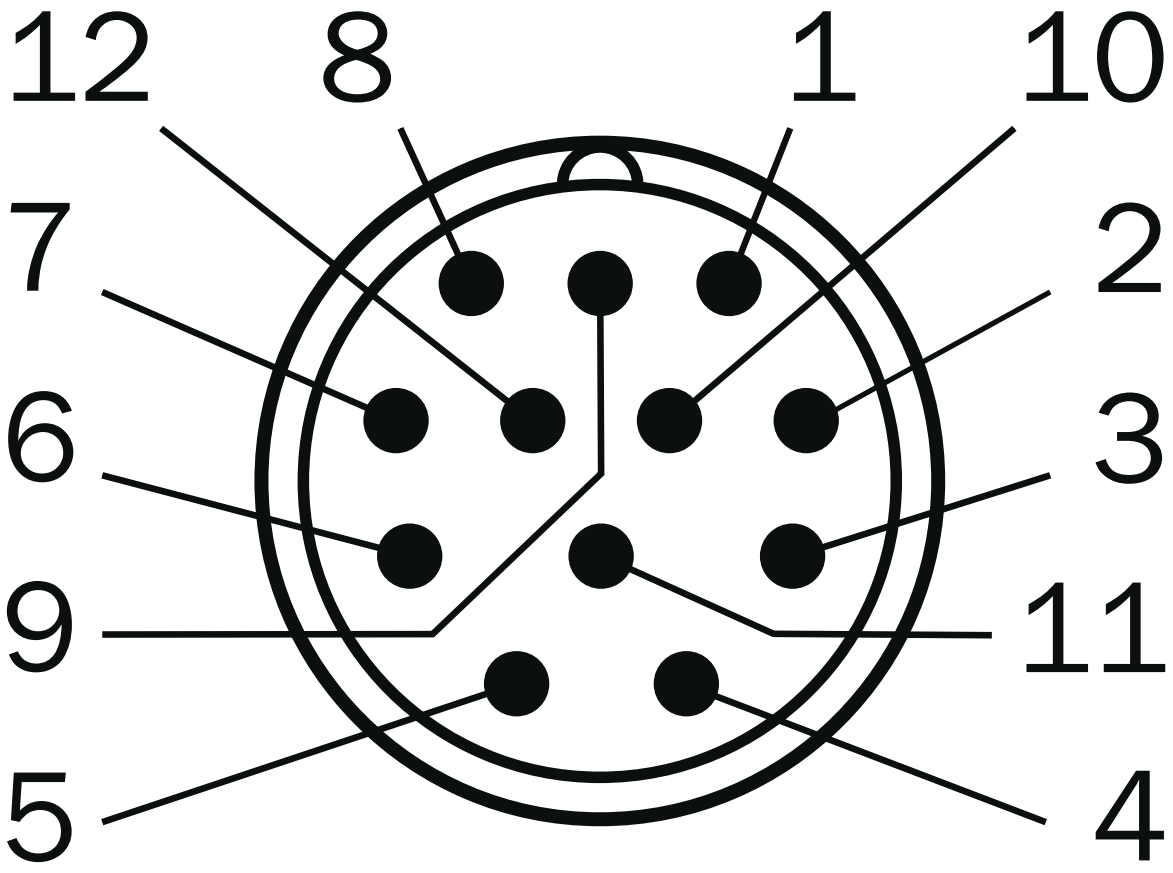
| | |
|---|---|
| **EU declaration of conformity** | ✓ |
| **UK declaration of conformity** | ✓ |
| **ACMA declaration of conformity** | ✓ |
| **Moroccan declaration of conformity** | ✓ |
| **China-RoHS** | ✓ |
| **Information according to Art. 3 of Data Act (Regulation EU 2023/2854)** | ✓ |

## Dimensional drawing SSI read head



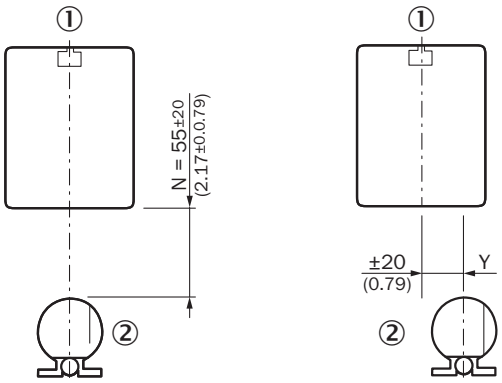

Dimensions in mm (inch)

## PIN assignment SSI interface, view of M23 male device connector




| PIN | Signal | Wire colors (cable connection) | Explanation |
|---|---|---|---|
| 1 | GND | Blue | Ground connection |
| 2 | Data + | White | Interface signals |
| 3 | Clock + | Yellow | Interface signals |
| 4 | R x D + | Gray | RS-422 programming lines |
| 5 | R x D - | Green | RS-422 programming lines |
| 6 | T x D + | Pink | RS-422 programming lines |
| 7 | T x D - | Black | RS-422 programming lines |
| 8 | $U_S$ | Red | Supply voltage |
| 9 | N.C. | Orange | Not assigned |
| 10 | Data - | Brown | Interface signals |
| 11 | Clock - | Violet | Interface signals |
| 12 | N.C. | – | Not assigned |

## 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

## Recommended accessories

Other models and accessories ➜ www.sick.com/KH53

| | Brief description | Type | part no. |
|---|---|---|---|
| Mounting systems | | | |
|  | • **Description:** Mounting bracket for KH53 measuring elements<br>• **Items supplied:** Without mounting hardware for the background | BEF-WK-KHT53 | 2029159 |
|  | • **Description:** Spacer for KHT53<br>• **Items supplied:** Without mounting hardware for the background | BEF-KHA-KHT53 | 2042468 |

| | Brief description | Type | part no. |
|---|---|---|---|
| connectors and cables | | | |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422, TTL, HTL<br>• **Cable:** 1.5 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422TTLHTL | DOL-2312-G1M5MA1 | 2029200 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422, TTL, HTL<br>• **Cable:** 3 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422TTLHTL | DOL-2312-G03MMA1 | 2029201 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422, TTL, HTL<br>• **Cable:** 5 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422TTLHTL | DOL-2312-G05MMA1 | 2029202 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422<br>• **Cable:** 20 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422 | DOL-2312-G20MMA1 | 2029204 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422<br>• **Cable:** 30 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422 | DOL-2312-G30MMA1 | 2029205 |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, Incremental<br>• **Items supplied:** By the meter<br>• **Cable:** 12-wire, PUR, halogen-free<br>• **Description:** SSI, shielded, Incremental | LTG-2512-MW | 6027531 |
|  | • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, TTL, HTL, Incremental<br>• **Items supplied:** By the meter<br>• **Cable:** 12-wire, UV and saltwater-resistant, PUR, halogen-free<br>• **Description:** SSI, shielded, TTL, HTL, Incremental | LTG-2612-MW | 6028516 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental<br>• **Description:** HIPERFACE®, shieldedSSIIncremental<br>• **Connection systems:** Solder connection | DOS-2312-G | 6027538 |
|  | • **Connection type head A:** Male connector, M23, 12-pin, straight, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental, RS-422<br>• **Description:** HIPERFACE®, shieldedSSIIncrementalRS-422<br>• **Connection systems:** Solder connection | STE-2312-G | 6027537 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, angled, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental<br>• **Description:** HIPERFACE®, shieldedSSIIncremental<br>• **Connection systems:** Solder connection | DOS-2312-W01 | 2072580 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422, TTL, HTL<br>• **Cable:** 10 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shieldedRS-422TTLHTL | DOL-2312-G10MMA1 | 2029203 |
|  | • **Connection type head A:** Female connector, M23, 9-pin, straight, A-coded<br>• **Signal type:** HIPERFACE®, SSI, Incremental<br>• **Description:** HIPERFACE®, shieldedSSIIncremental<br>• **Connection systems:** Solder connection | DOS-2309-G | 6028533 |
|  | • **Connection type head A:** Female connector, M23, 12-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** SSI, RS-422, TTL, HTL<br>• **Cable:** 5 m, 12-wire, PUR, halogen-free<br>• **Description:** SSI, shielded, RS-422, TTL, HTL | DOL-2312-G05MHA1 | 2059786 |

| | Brief description | Type | part no. |
|---|---|---|---|
| programming devices | | | |
|  | • **Product segment:** Programming devices<br>• **Product family:** PGT-01-S<br>• **Description:** Programming tool for ATM60, ATM90, and KH53<br>• **Items supplied:** Power supply, interface, link cable, encoder cable, and software | PGT-01-S | 1030111 |
| Linear encoders | | | |
|  | • **System part:** Mounting gauge<br>• **Measuring range:** 0 m ... 54 m | KHM53-XXX00054 | 1035447 |
|  | • **System part:** Measuring element<br>• **Measuring range:** 0 m ... 54 m<br>• **Code type:** Coded | KHT53-XXX00054 | 1035445 |
|  | • **System part:** Measuring element<br>• **Measuring range:** 0 m ... 54 m<br>• **Code type:** Universal configurable | KHU53-XXX00054 | 1035446 |

# 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.”**

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