

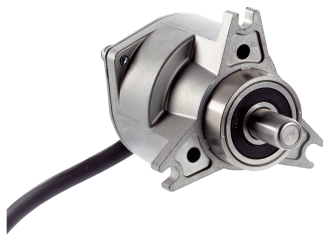


# DKS40-E5M01510

DKS40

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



### Ordering information

| Type           | part no. |
|----------------|----------|
| DKS40-E5M01510 | 1069868  |

Other models and accessories → [www.sick.com/DKS40](http://www.sick.com/DKS40)

Illustration may differ



### Detailed technical data

#### Performance

|                                                               |                                    |
|---------------------------------------------------------------|------------------------------------|
| <b>Pulses per revolution</b>                                  | 1,510                              |
| <b>Measuring step</b>                                         | 90° electric/pulses per revolution |
| <b>Measuring step deviation at non binary number of lines</b> | 0.07°                              |
| <b>Error limits</b>                                           | 0.13° <sup>1)</sup>                |

<sup>1)</sup> "Non-binary" number of lines: 2n, where n is not a whole number.

#### Interfaces

|                                       |                        |
|---------------------------------------|------------------------|
| <b>Communication interface</b>        | Incremental            |
| <b>Communication Interface detail</b> | HTL / Push pull        |
| <b>Number of signal channels</b>      | 6-channel              |
| <b>Initialization time</b>            | 40 ms                  |
| <b>Output frequency</b>               | ≤ 200 kHz              |
| <b>Load current</b>                   | 30 mA                  |
| <b>Operating current</b>              | ≤ 40 mA (without load) |

#### Electrical data

|                                              |                                                |
|----------------------------------------------|------------------------------------------------|
| <b>Connection type</b>                       | Cable, 8-wire, universal, 5 m <sup>1) 2)</sup> |
| <b>Supply voltage</b>                        | 10 ... 30 V                                    |
| <b>Reference signal, number</b>              | 1                                              |
| <b>Reference signal, position</b>            | 90°, electric, logically gated with A and B    |
| <b>MTTFd: mean time to dangerous failure</b> | 600 years (EN ISO 13849-1) <sup>3)</sup>       |

<sup>1)</sup> The universal cable connection is positioned so that it is possible to lay it without bends in a radial or axial direction.

<sup>2)</sup> No UL certification.

<sup>3)</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>Mechanical design</b> | Solid shaft, face mount flange |
| <b>Shaft diameter</b>    | 8 mm                           |
| <b>Shaft length</b>      | 13 mm                          |

|                                               |                                 |
|-----------------------------------------------|---------------------------------|
| <b>Weight</b>                                 | + 0.18 kg                       |
| <b>Start up torque</b>                        | 0.6 Ncm (+20 °C)                |
| <b>Operating torque</b>                       | 0.4 Ncm (+20 °C)                |
| <b>Permissible shaft loading radial/axial</b> | 40 N (radial)<br>20 N (axial)   |
| <b>Operating speed</b>                        | 6,000 min <sup>-1</sup>         |
| <b>Moment of inertia of the rotor</b>         | 6 gcm <sup>2</sup>              |
| <b>Bearing lifetime</b>                       | 2 x 10 <sup>9</sup> revolutions |
| <b>Angular acceleration</b>                   | ≤ 500,000 rad/s <sup>2</sup>    |

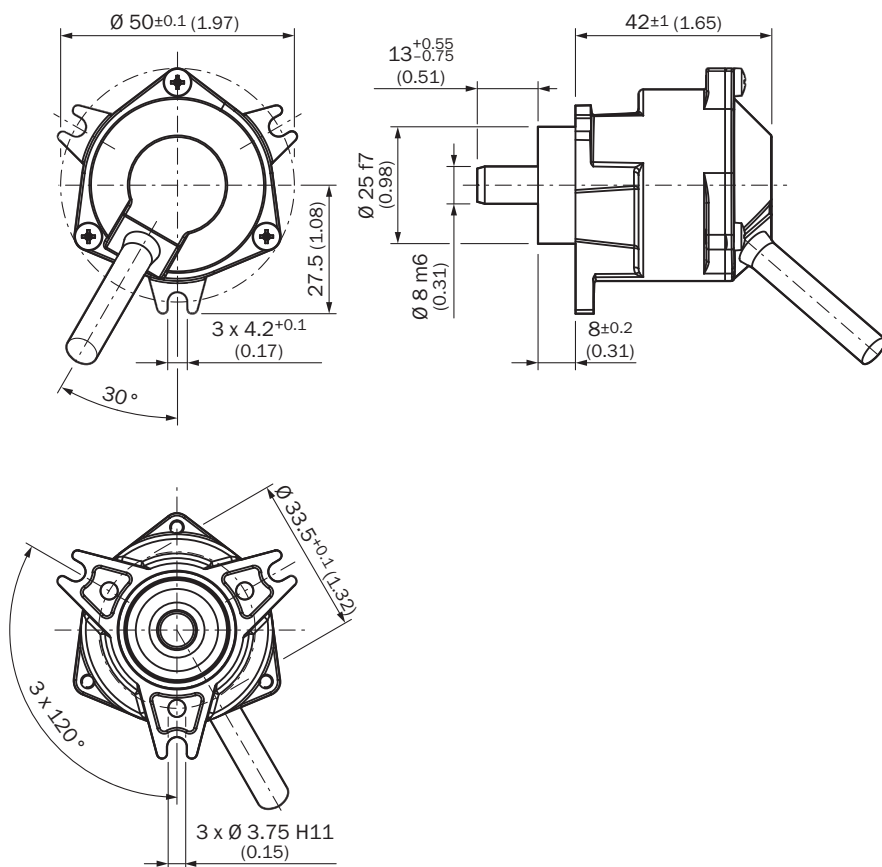
#### Ambient data

|                                      |                                                    |
|--------------------------------------|----------------------------------------------------|
| <b>EMC</b>                           | EN 61000-6-2, EN 61000-6-3                         |
| <b>Enclosure rating</b>              | IP64                                               |
| <b>Permissible relative humidity</b> | Condensation of the optical scanning not permitted |
| <b>Operating temperature range</b>   | 0 °C ... +60 °C                                    |
| <b>Storage temperature range</b>     | -40 °C ... +70 °C, without package                 |
| <b>Resistance to shocks</b>          | 50 g, 7 ms (EN 60068-2-27)                         |
| <b>Resistance to vibration</b>       | 20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)            |

#### Classifications

|                       |          |
|-----------------------|----------|
| <b>ECLASS 5.0</b>     | 27270501 |
| <b>ECLASS 5.1.4</b>   | 27270501 |
| <b>ECLASS 6.0</b>     | 27270590 |
| <b>ECLASS 6.2</b>     | 27270590 |
| <b>ECLASS 7.0</b>     | 27270501 |
| <b>ECLASS 8.0</b>     | 27270501 |
| <b>ECLASS 8.1</b>     | 27270501 |
| <b>ECLASS 9.0</b>     | 27270501 |
| <b>ECLASS 10.0</b>    | 27270501 |
| <b>ECLASS 11.0</b>    | 27270501 |
| <b>ECLASS 12.0</b>    | 27270501 |
| <b>ETIM 5.0</b>       | EC001486 |
| <b>ETIM 6.0</b>       | EC001486 |
| <b>ETIM 7.0</b>       | EC001486 |
| <b>ETIM 8.0</b>       | EC001486 |
| <b>UNSPSC 16.0901</b> | 41112113 |

## Dimensional drawing Face mount flange, cable

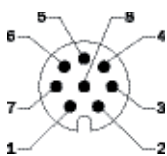


Dimensions in mm (inch)  
General tolerances according to DIN ISO 2768-mk

## PIN assignment

### 8-core cable

View of the connector side of housing



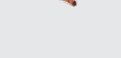
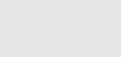
| PIN, 8-pole in M12 | Color of wires | Signal OC       | Signal TTL, HTL | Explanation                                                          |
|--------------------|----------------|-----------------|-----------------|----------------------------------------------------------------------|
| 1                  | Brown          | Not connected   | $\bar{A}$       | Signal line                                                          |
| 2                  | White          | A               | A               | Signal line                                                          |
| 3                  | Black          | Not connected   | $\bar{B}$       | Signal line                                                          |
| 4                  | Pink           | B               | B               | Signal line                                                          |
| 5                  | Yellow         | Not connected   | $\bar{Z}$       | Signal line                                                          |
| 6                  | Lilac          | Z               | Z               | Signal line                                                          |
| 7                  | Blue           | GND             | GND             | Ground connection of the encoder                                     |
| 8                  | Red            | +U <sub>s</sub> | +U <sub>s</sub> | Supply voltage                                                       |
| Screen             | Screen         | Screen          | Screen          | Screen connected to encoder housing. Connect screen on control side. |

## Recommended accessories

Other models and accessories → [www.sick.com/DKS40](http://www.sick.com/DKS40)

|                                                                                   | Brief description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Type       | part no. |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|
| shaft adaptation                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |          |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product family:</b> Shaft couplings</li> <li><b>Description:</b> Bar coupling, shaft diameter 6 mm / 8 mm, maximum shaft offset radial <math>\pm 0.3</math> mm, axial <math>\pm 0.2</math> mm, angle <math>\pm 3^\circ</math>, max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub</li> </ul>                                                                                                                                                                     | KUP-0608-S | 5314179  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product family:</b> Shaft couplings</li> <li><b>Description:</b> Bar coupling, shaft diameter 8 mm / 8 mm, maximum shaft offset radial <math>\pm 0.3</math> mm, axial <math>\pm 0.2</math> mm, angle <math>\pm 3^\circ</math>; max. speed 10,000 rpm, torsion spring rigidity 38 Nm/wheel; material: fiber-glass reinforced polyamide, aluminum hub</li> </ul>                                                                                                                                                                     | KUP-0808-S | 5314177  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product family:</b> Shaft couplings</li> <li><b>Description:</b> Bar coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radial <math>\pm 0.3</math> mm, axial <math>\pm 0.3</math> mm, angular <math>\pm 3^\circ</math>; max. speed 10,000 rpm, <math>-10^\circ</math> to <math>+80^\circ</math> C, max. torque: 80 Ncm, material: fiberglass reinforced polyamide, aluminum hub</li> </ul>                                                                                                                                 | KUP-0810-S | 5314178  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product family:</b> Shaft couplings</li> <li><b>Description:</b> Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially <math>\pm 0.25</math> mm, axially <math>\pm 0.4</math> mm, angle <math>\pm 4</math> degrees; max. speed 10,000 rpm, <math>-30</math> to <math>+120</math> degrees Celsius, torsional spring stiffness of 150 Nm/rad</li> </ul>                                                                                                                                                     | KUP-0810-D | 5326704  |
|  | <ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product family:</b> Shaft couplings</li> <li><b>Description:</b> Claw coupling, shaft diameter 8 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial <math>\pm 0.22</math> mm, axial <math>\pm 1</math> mm angular <math>\pm 1.3^\circ</math>, max. speed 19,000 rpm, angle of twist max. <math>10^\circ</math>, <math>-30^\circ</math> C to <math>+80^\circ</math> C, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane</li> </ul> | KUP-0810-J | 2128267  |

|                                                                                     | Brief description                                                                                                                                                                                                                                            | Type               | part no. |
|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------|
| Mounting systems                                                                    |                                                                                                                                                                                                                                                              |                    |          |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaption of 25 mm spigot face mount flange to 50 mm servo flange</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>                                  | BEF-FA-025-050     | 2032622  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaption of 25 mm spigot face mount flange to 60s face mount flange with 36 mm centering collar</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>   | BEF-FA-025-036     | 2034226  |
|    | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaption of 25 mm spigot face mount flange to 60 mm square installation plate</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>                     | BEF-FA-025-060RCA  | 2032623  |
|   | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaption of 25 mm spigot face mount flange to 60 mm square installation plate with shock-absorber</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul> | BEF-FA-025-060RSA  | 2032624  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adapts face mount flange with 25 mm centering collar to 63 mm square mounting plate</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>               | BEF-FA-025-063-REC | 2033631  |
|  | <ul style="list-style-type: none"> <li><b>Description:</b> Mounting brackets for encoders with a centering spigot 25 mm</li> <li><b>Items supplied:</b> Mounting kit for face mount flange included</li> </ul>                                               | BEF-WF-25          | 2032621  |

|                                                                                     | Brief description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Type             | part no. |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------|
| connectors and cables                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |          |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable</li> <li>Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm<sup>2</sup>, Ø 7.0 mmSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>  | DOL-1208-G02MAC1 | 6032866  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable</li> <li>Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm<sup>2</sup>, Ø 7.0 mmSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul>  | DOL-1208-G05MAC1 | 6032867  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable</li> <li>Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm<sup>2</sup>, Ø 7.0 mmSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul> | DOL-1208-G10MAC1 | 6032868  |
|    | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li> <li><b>Description:</b> Incremental, shielded, Head A: female connector, M12, 8-pin, straight Head B: cable</li> <li>Cable: suitable for drag chain, PVC, shielded, 4 x 2 x 0.25 mm<sup>2</sup>, Ø 7.0 mmSSI</li> <li><b>Connection systems:</b> Flying leads</li> </ul> | DOL-1208-G20MAC1 | 6032869  |
|   | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Flying leads</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, Incremental, HIPERFACE®</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 8-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shieldedIncrementalHIPERFACE®</li> </ul>                                                                                                                                                                           | LTG-2308-MWENC   | 6027529  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Flying leads</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, Incremental</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 11-wire, PUR</li> <li><b>Description:</b> SSI, shieldedIncremental</li> </ul>                                                                                                                                                                                                              | LTG-2411-MW      | 6027530  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Flying leads</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, Incremental</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 12-wire, PUR, halogen-free</li> <li><b>Description:</b> SSI, shieldedIncremental</li> </ul>                                                                                                                                                                                                | LTG-2512-MW      | 6027531  |
|  | <ul style="list-style-type: none"> <li><b>Connection type head A:</b> Flying leads</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, TTL, HTL, Incremental</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 12-wire, UV and saltwater-resistant, PUR, halogen-free</li> <li><b>Description:</b> SSI, shieldedTTLHTLIncremental</li> </ul>                                                                                                                                                    | LTG-2612-MW      | 6028516  |

## 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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