



# DUS60E-S4KM0BAA

DUS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

| Type            | Part no. |
|-----------------|----------|
| DUS60E-S4KM0BAA | 1085620  |

Other models and accessories → [www.sick.com/DUS60](http://www.sick.com/DUS60)

### Detailed technical data

#### Performance

|                                 |                                     |
|---------------------------------|-------------------------------------|
| <b>Measuring step</b>           | 90°, electric/pulses per revolution |
| <b>Measuring step deviation</b> | ± 18° / pulses per revolution       |
| <b>Error limits</b>             | Measuring step deviation x 3        |
| <b>Duty cycle</b>               | ≤ 0.5 ± 5 %                         |

#### Interfaces

|                                       |  |
|---------------------------------------|--|
| <b>Communication interface</b>        | Incremental  |
| <b>Communication Interface detail</b> | TTL / HTL <sup>1)</sup>                                  |
| <b>Parameterising data</b>            | DIP switch, selectable output                            |
| <b>Output function</b>                | CW and CCW output  |
| <b>Initialization time</b>            | < 5 ms <sup>2)</sup>                                     |
| <b>Output frequency</b>               | + 60 kHz   |
| <b>Load current</b>                   | ≤ 30 mA, per channel                                     |
| <b>Operating current</b>              | ≤ 120 mA (without load)                                  |
| <b>Power consumption</b>              | ≤ 1.25 W (without load)                                  |
| <b>DIP switch parameters</b>          |  |
| Pulses per revolution                 | ✓  |
| Output voltage                        | ✓  |
| Direction of rotation                 | ✓  |
| Configuration switches                | 2400 PPR values, direction selection, TTL/HTL selectable |

<sup>1)</sup> The output is not selectable for DIP switch configurations E, F, and G. The output voltage value is dependent on the supply voltage.

<sup>2)</sup> Valid positional data can be read once this time has elapsed.

#### Electrical data

|                        |   |
|------------------------|---|
| <b>Connection type</b> | Cable, 8-wire, universal, 5 m <sup>1)</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> 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.

|  |  |
|--|--|
| <b>Supply voltage</b>                          | 4.75 ... 30 V                            |
| <b>Reference signal, number</b>                | 1  |
| <b>Reference signal, position</b>              | 180°, electric, gated with A             |
| <b>Reverse polarity protection</b>             | ✓  |
| <b>Short-circuit protection of the outputs</b> | ✓  |
| <b>MTTFd: mean time to dangerous failure</b>   | 275 years (EN ISO 13849-1) <sup>2)</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> 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>                 | 10 mm                                |
| <b>Shaft length</b>                   | 19 mm                                |
| <b>Flange type / stator coupling</b>  | Face mount flange with 3 x M3 3 x M4 |
| <b>Weight</b>                         | 0.3 kg <sup>1)</sup>                 |
| <b>Shaft material</b>                 | Stainless steel                      |
| <b>Flange material</b>                | Aluminum                             |
| <b>Housing material</b>               | Aluminum                             |
| <b>Material, cable</b>                | PVC                                  |
| <b>Start up torque</b>                | 1.2 Ncm (+20 °C)                     |
| <b>Operating torque</b>               | 1.1 Ncm (+20 °C)                     |
| <b>Permissible shaft loading</b>      | 100 N (radial)<br>50 N (axial)       |
| <b>Operating speed</b>                | 1,500 min <sup>-1</sup>              |
| <b>Moment of inertia of the rotor</b> | 33 gcm <sup>2</sup>                  |
| <b>Bearing lifetime</b>               | 3.6 x 10 <sup>9</sup> revolutions    |
| <b>Angular acceleration</b>           | ≤ 500,000 rad/s <sup>2</sup>         |

<sup>1)</sup> Based on encoder with male connector.

## Ambient data

|                                      |  |
|--------------------------------------|--|
| <b>EMC</b>                           | According to EN 61000-6-2 and EN 61000-6-3 |
| <b>Enclosure rating</b>              | IP65 <sup>1)</sup>                         |
| <b>Permissible relative humidity</b> | 90 % (Condensation not permitted)          |
| <b>Operating temperature range</b>   | -30 °C ... +90 °C                          |
| <b>Storage temperature range</b>     | -40 °C ... +75 °C                          |
| <b>Resistance to shocks</b>          | 100 g (EN 60068-2-27)                      |
| <b>Resistance to vibration</b>       | 30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)    |

<sup>1)</sup> When the mating connector is installed and the DIP switch door is sealed with the encoder housing.

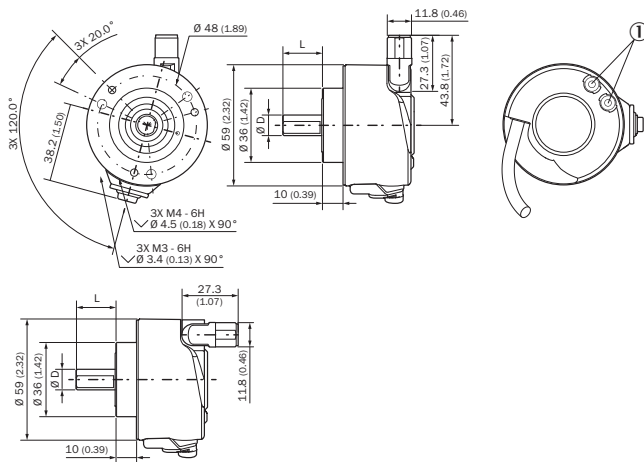
## Classifications

|                     |          |
|---------------------|----------|
| <b>eCI@ss 5.0</b>   | 27270501 |
| <b>eCI@ss 5.1.4</b> | 27270501 |

|                       |          |
|-----------------------|----------|
| <b>eCl@ss 6.0</b>     | 27270590 |
| <b>eCl@ss 6.2</b>     | 27270590 |
| <b>eCl@ss 7.0</b>     | 27270501 |
| <b>eCl@ss 8.0</b>     | 27270501 |
| <b>eCl@ss 8.1</b>     | 27270501 |
| <b>eCl@ss 9.0</b>     | 27270501 |
| <b>eCl@ss 10.0</b>    | 27270501 |
| <b>eCl@ss 11.0</b>    | 27270501 |
| <b>eCl@ss 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 (Dimensions in mm (inch))

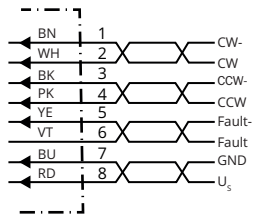
Solid shaft



① Status indicators

| Type<br>Solid shaft | Shaft Diameter D | Shaft length L |
|---------------------|------------------|----------------|
| DUS60x-S3xxxxxxx    | 6 mm             | 10 mm          |
| DUS60x-S4xxxxxxx    | 10 mm            | 19 mm          |
| DUS60x-S7xxxxxxx    | 3/8"             | 19 mm          |
| DUS60x-S8xxxxxxx    | 1/4"             | 10 mm          |

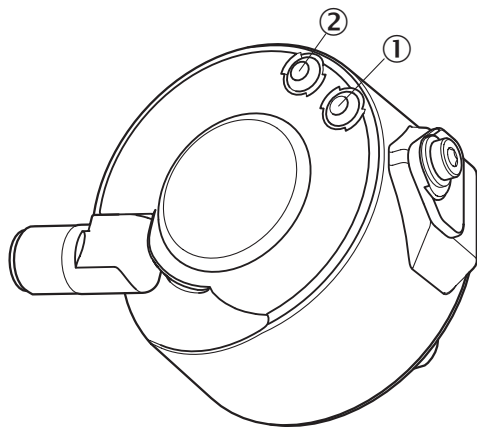
## PIN assignment



| Wire colors (cable connection) | Male connector M12, 4-pin | Male connector M12, 8-pin | Output function |                |                |   | Explanation            |
|--------------------------------|---------------------------|---------------------------|-----------------|----------------|----------------|---|------------------------|
|                                |                           |                           | A               | B              | C              | D   |                        |
| Brown                          | -                         | 1                         | A-              | CW-            | A-             | A-  | Signal                 |
| White                          | 4                         | 2                         | A               | CW             | A              | A   | Signal                 |
| Black                          | -                         | 3                         | B-              | CCW-           | Direction-     | B-  | Signal                 |
| Pink                           | 2                         | 4                         | B               | CCW            | Direction      | Fault (M12, 4-pin)<br>B (M12, 8-pin and cable connection) | Signal                 |
| Yellow                         | -                         | 5                         | Z-              | Fault-         | Fault-         | Fault-  | Signal                 |
| Violet                         | -                         | 6                         | Z               | Fault          | Fault          | Fault   | Signal                 |
| Blue                           | 3                         | 7                         | GND             | GND            | GND            | GND   | Ground connection      |
| Red                            | 1                         | 8                         | U <sub>S</sub>  | U <sub>S</sub> | U <sub>S</sub> | U <sub>S</sub>  | Supply voltage         |
| -                              | -                         | -                         | Case            | Case           | Case           | Case  | Earth fault protection |
| Shielding                      | -                         | -                         | Shielding       | Shielding      | Shielding      | Shielding   | Shielding              |

## Adjustments





Status indicator LED







- ① Signal
- ② Fault/Power

### Recommended accessories

Other models and accessories → [www.sick.com/DUS60](http://www.sick.com/DUS60)

|   | Brief description   | Type               | Part no. |
|---|---|--------------------|----------|
| <b>Plug connectors and cables</b>   |   |                    |          |
|    | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, SSI, PUR, halogen-free, shielded, 2 m   | DOL-1208-G02MAC1   | 6032866  |
|   | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, SSI, PUR, halogen-free, shielded, 5 m   | DOL-1208-G05MAC1   | 6032867  |
|   | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, SSI, PUR, halogen-free, shielded, 10 m  | DOL-1208-G10MAC1   | 6032868  |
|   | Head A: female connector, M12, 8-pin, straight<br>Head B: Flying leads<br>Cable: Incremental, SSI, PUR, halogen-free, shielded, 20 m  | DOL-1208-G20MAC1   | 6032869  |
|    | Head A: female connector, M12, 4-pin, straight, A-coded<br>Head B: Flying leads<br>Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 2 m   | YF2A24-020UB4XLEAX | 2105499  |
|   | Head A: female connector, M12, 4-pin, straight, A-coded<br>Head B: Flying leads<br>Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 5 m   | YF2A24-050UB4XLEAX | 2095729  |
|   | Head A: female connector, M12, 4-pin, straight, A-coded<br>Head B: Flying leads<br>Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 10 m  | YF2A24-100UB4XLEAX | 2095730  |
|   | Head A: female connector, M12, 4-pin, straight, A-coded<br>Head B: Flying leads<br>Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 20 m  | YF2A24-200UB4XLEAX | 2105497  |
|  | Head A: female connector, M12, 5-pin, straight<br>Cable: CANopen, DeviceNet™, shielded  | DOS-1205-GA        | 6027534  |
|  | Head A: female connector, M12, 8-pin, straight, A-coded<br>Cable: Incremental, SSI, shielded  | DOS-1208-GA01      | 6045001  |
| <b>Shaft adaptation</b>   |   |                    |          |
|  | Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial ± 0.25 mm, axial ± 0.4 mm, angular +/- 4°; max. speed 10,000 rpm, -30 °C to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub   | KUP-0610-B         | 5312982  |
|  | Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial +/- 0.3 mm, axial +/- 0.4 mm, angular +/- 2.5°; max. speed 12,000 rpm, -10° to +80 °C, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin | KUP-0610-F         | 5312985  |
|  | Bar coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub   | KUP-0610-S         | 2056407  |
|   | Bar coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radial ± 0,3 mm, axial ± 0,3 mm, angular ± 3°; max. speed 10.000 rpm, -10° to +80 °C, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub   | KUP-0810-S         | 5314178  |
|  | Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial +/- 0.25 mm, axial +/- 0.4 mm, angular +/- 4°; max. revolutions 10,000 rpm, -30° to +120 °C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs  | KUP-1010-B         | 5312983  |

|   | Brief description   | Type       | Part no. |
|---|---|------------|----------|
|  | Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angle $\pm 2.5^\circ$ , torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin | KUP-1010-F | 5312986  |
|  | Bar coupling, shaft diameter 10 mm / 10 mm; maximum shaft offset: radial $\pm 0.3$ mm, axial $\pm 0.2$ mm, angular $\pm 3^\circ$ ; speed 10,000 rpm, $-10^\circ$ to $+80^\circ$ Celsius, max. torque 80 Ncm; material: glass fiber-reinforced polyamide, aluminum hub                 | KUP-1010-S | 2056408  |
|  | Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial $\pm 0.3$ mm, axial $\pm 0.4$ mm, angle $\pm 2.5^\circ$ , torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin | KUP-1010-W | 5319914  |
|  | 10 mm / 12 mm; maximum shaft offset: radial $\pm 0.25$ mm, axial $\pm 0.4$ mm, angular $\pm 4^\circ$ ; max. revolutions 10,000 rpm, $-30^\circ$ to $+120^\circ$ C, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs                                     | KUP-1012-B | 5312984  |

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