



# 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>	A and B 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	✓
<b>Configuration switches</b>	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>
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<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 Load capacity of shaft</b>	100 N (radial) 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.

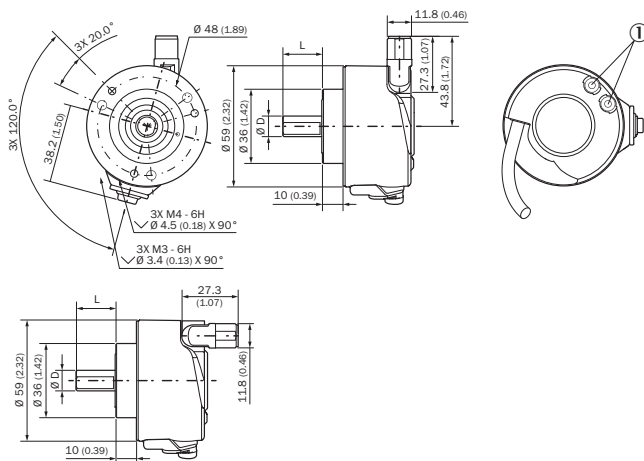
## Classifications

<b>ECl@ss 5.0</b>	27270501
<b>ECl@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>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))

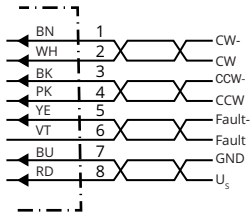
Solid shaft



① Status indicators

Type 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

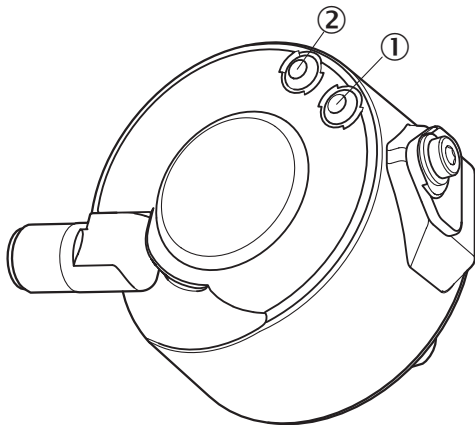
## PIN assignment



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) 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 Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 2 m	DOL-1208-G02MAC1	6032866
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 5 m	DOL-1208-G05MAC1	6032867
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 10 m	DOL-1208-G10MAC1	6032868
	Head A: female connector, M12, 8-pin, straight Head B: Flying leads Cable: Incremental, SSI, PUR, halogen-free, shielded, 20 m	DOL-1208-G20MAC1	6032869
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 2 m	YF2A24-020UB4XLEAX	2105499
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 5 m	YF2A24-050UB4XLEAX	2095729
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 10 m	YF2A24-100UB4XLEAX	2095730
	Head A: female connector, M12, 4-pin, straight, A-coded Head B: Flying leads Cable: Sensor/actuator cable, PUR, halogen-free, shielded, 20 m	YF2A24-200UB4XLEAX	2105497
	Head A: female connector, M12, 5-pin, straight Cable: CANopen, DeviceNet™, shielded	DOS-1205-GA	6027534
	Head A: female connector, M12, 8-pin, straight, A-coded 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.”

## WORLDWIDE PRESENCE:

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