



# DBS60E-S4EC01024

DBS60

INCREMENTAL ENCODERS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

Type	part no.
DBS60E-S4EC01024	1073093

Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)

### Detailed technical data

#### Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	500 years (EN ISO 13849-1) <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>Pulses per revolution</b>	1,024
<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>	HTL / Push pull
<b>Number of signal channels</b>	6-channel
<b>Initialization time</b>	< 5 ms <sup>1)</sup>
<b>Output frequency</b>	+ 300 kHz <sup>2)</sup>
<b>Load current</b>	≤ 30 mA, per channel
<b>Power consumption</b>	≤ 1 W (without load)

<sup>1)</sup> Valid signals can be read once this time has elapsed.

<sup>2)</sup> Up to 450 kHz on request.

#### Electronics

<b>Connection type</b>	Male connector, M12, 8-pin, radial
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<sup>1)</sup> Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

<b>Supply voltage</b>	10 ... 27 V
<b>Reference signal, number</b>	1
<b>Reference signal, position</b>	90°, electric, logically gated with A and B
<b>Reverse polarity protection</b>	✓
<b>Short-circuit protection of the outputs</b>	✓ <sup>1)</sup>

<sup>1)</sup> Short-circuit opposite to another channel, US or GND permissible for maximum 30 s.

## Mechanics

<b>Mechanical design</b>	Solid shaft, face mount flange
<b>Shaft diameter</b>	10 mm With flat
<b>Shaft length</b>	19 mm
<b>Flange type / stator coupling</b>	Flange with 3 x M3 and 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>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) <sup>2)</sup> 50 N (axial) <sup>2)</sup>
<b>Operating speed</b>	6,000 min <sup>-1</sup> <sup>3)</sup>
<b>Maximum operating speed</b>	9,000 min <sup>-1</sup> <sup>4)</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 or cable with male connector.

<sup>2)</sup> Higher values are possible using limited bearing life.

<sup>3)</sup> Allow for self-heating of 3.2 K per 1,000 rpm when designing the operating temperature range.

<sup>4)</sup> Maximum speed which does not cause mechanical damage to the encoder. Impact on the service life and signal quality is possible. Please note the maximum output frequency.

## Ambient data

<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3
<b>Enclosure rating</b>	IP67, housing side (IEC 60529) <sup>1)</sup> IP65, shaft side (IEC 60529)
<b>Permissible relative humidity</b>	90 % (Condensation not permitted)
<b>Operating temperature range</b>	-20 °C ... +85 °C <sup>2)</sup>
<b>Storage temperature range</b>	-40 °C ... +100 °C, without package
<b>Resistance to shocks</b>	250 g, 3 ms (EN 60068-2-27)
<b>Resistance to vibration</b>	30 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)

<sup>1)</sup> With mating connector fitted.

<sup>2)</sup> These values relate to all mechanical versions including recommended accessories unless otherwise noted.

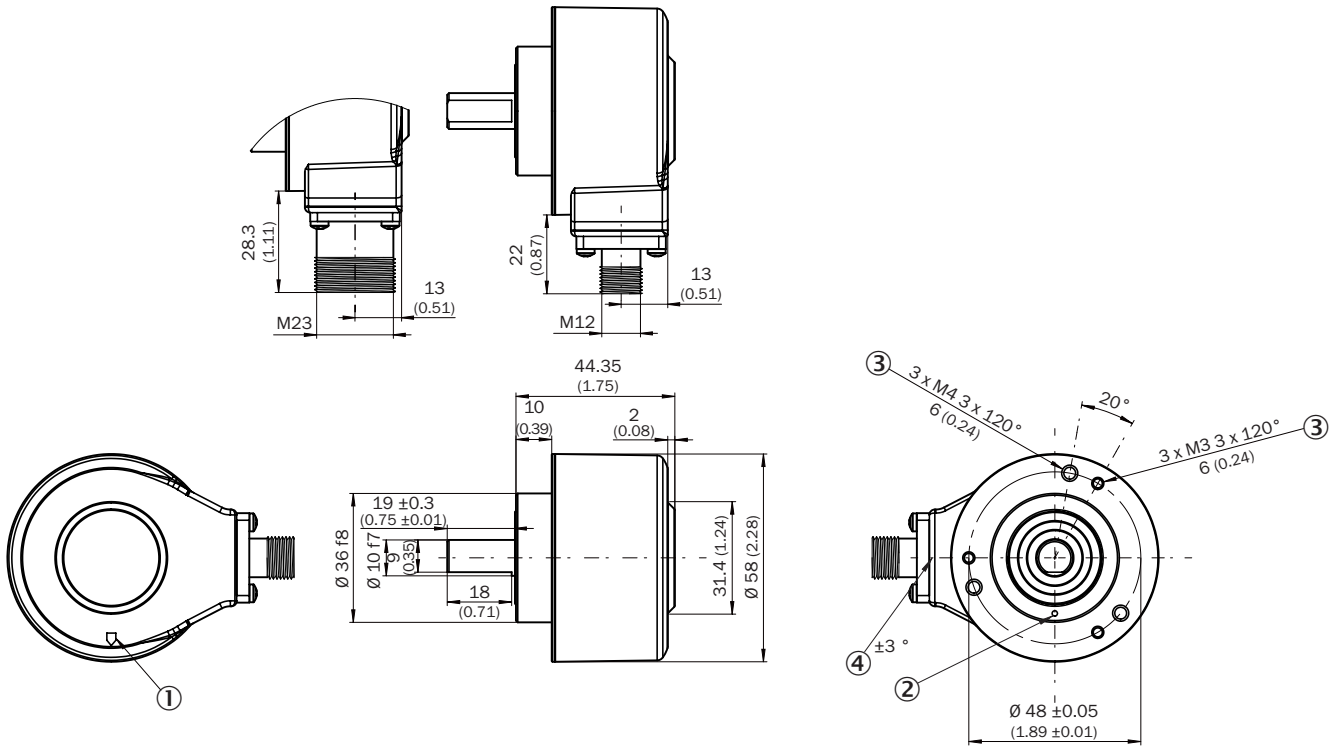
## Certificates

<b>EU declaration of conformity</b>	✓
<b>UK declaration of conformity</b>	✓
<b>ACMA declaration of conformity</b>	✓
<b>China RoHS</b>	✓
<b>cULus certificate</b>	✓
<b>Information according to Art. 3 of Data Act (Regulation EU 2023/2854)</b>	✓

## 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

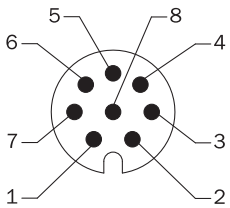
Dimensional drawing



Dimensions in mm (inch)

- ① Zero pulse mark on housing
- ② Zero pulse mark on flange
- ③ depth
- ④ male connector tolerance in relation to hole pattern

PIN assignment



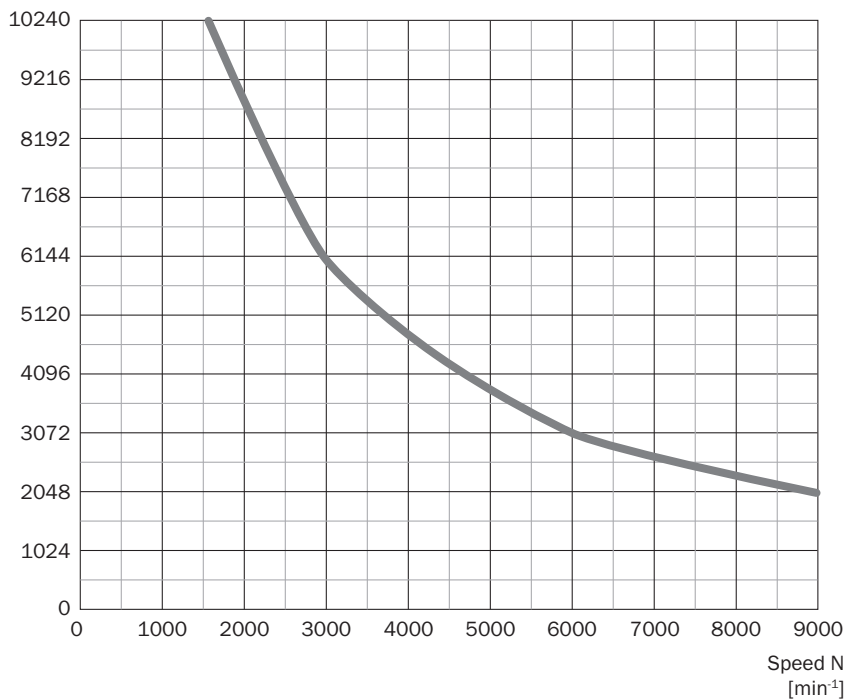
view of M12 male device connector on cable / housing

Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
Brown	1	6	A-	Signal wire
White	2	5	A	Signal wire
Black	3	1	B-	Signal wire
Pink	4	8	B	Signal wire
Yellow	5	4	Z-	Signal wire
Purple	6	3	Z	Signal wire
Blue	7	10	GND	Ground connection
Red	8	12	+U <sub>s</sub>	Supply voltage

Wire colors (cable connection)	Male connector M12, 8-pin	Male connector M23, 12-pin	TTL/HTL 6-channel signal	Explanation
-	-	9	Not assigned	Not assigned
-	-	2	Not assigned	Not assigned
-	-	11	Not assigned	Not assigned
-	-	7	Not assigned	Not assigned
Screen	Screen	Screen	Screen	Screen connected to encoder housing

**Diagrams**

Pulses per revolution



Diagrams Signal outputs for electrical interfaces TTL and HTL













Cw with view on the encoder shaft in direction "A", compare dimensional drawing.





Supply voltage	Output
4,5 V ... 5,5 V	TTL
10 V ... 30 V	TTL
10 V ... 27 V	HTL
4,5 V ... 30 V	TTL/HTL universal
4,5 V ... 30 V	TTL

### Recommended accessories


Other models and accessories → [www.sick.com/DBS60](http://www.sick.com/DBS60)




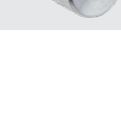
	Brief description	Type	part no.
connectors and cables			
	<ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded, Incremental, HIPERFACE®</li> <li><b>Connection type head A:</b> Flying leads</li> <li><b>Connection type head B:</b> Flying leads</li> <li><b>Signal type:</b> SSI, Incremental, HIPERFACE®</li> <li><b>Items supplied:</b> By the meter</li> <li><b>Cable:</b> 8-wire, PUR, halogen-free</li> </ul>	LTG-2308-MWENC	6027529
	<ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded, Incremental</li> <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> </ul>	LTG-2411-MW	6027530
	<ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded, Incremental</li> <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> </ul>	LTG-2512-MW	6027531
	<ul style="list-style-type: none"> <li><b>Description:</b> SSI, shielded, TTL, HTL, Incremental</li> <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> </ul>	LTG-2612-MW	6028516
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <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>Connection systems:</b> Flying leads</li> <li><b>Application:</b> Drag chain operation, Zones with oils and lubricants</li> </ul>	DOL-1208-G02MAC1	6032866
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <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>Connection systems:</b> Flying leads</li> <li><b>Application:</b> Drag chain operation, Zones with oils and lubricants</li> </ul>	DOL-1208-G05MAC1	6032867
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <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>Connection systems:</b> Flying leads</li> <li><b>Application:</b> Drag chain operation, Zones with oils and lubricants</li> </ul>	DOL-1208-G10MAC1	6032868
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <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>Connection systems:</b> Flying leads</li> <li><b>Application:</b> Drag chain operation, Zones with oils and lubricants</li> </ul>	DOL-1208-G20MAC1	6032869
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <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> 25 m, 8-wire, PUR, halogen-free</li> <li><b>Connection systems:</b> Flying leads</li> <li><b>Application:</b> Drag chain operation, Zones with oils and lubricants</li> </ul>	DOL-1208-G25MAC1	6067859
	<ul style="list-style-type: none"> <li><b>Description:</b> Incremental, shielded, SSI</li> <li><b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li><b>Signal type:</b> Incremental, SSI</li> <li><b>Cable:</b> CAT5, CAT5e</li> <li><b>Connection systems:</b> IDC quick connection</li> </ul>	DOS-1208-GA01	6045001





	Brief description	Type	part no.
	<ul style="list-style-type: none"> <li>• <b>Permitted cross-section:</b> 0.14 mm<sup>2</sup> ... 0.34 mm<sup>2</sup></li> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Cable:</b> 20 m, 8-wire, PUR, halogen-free</li> <li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li> <li>• <b>Note:</b> Drag chain use</li> <li>• <b>Application:</b> Drag chain operation</li> </ul>	YF2AA8-200S01M-KA18	2099208
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> <li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li> <li>• <b>Note:</b> Drag chain use</li> <li>• <b>Application:</b> Drag chain operation</li> </ul>	YF2AA8-020S01M-KA18	2099207
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li> <li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li> <li>• <b>Note:</b> Drag chain use</li> <li>• <b>Application:</b> Drag chain operation</li> </ul>	YF2AA8-050S01M-KA18	2099209
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Connection type head B:</b> Male connector, M12, 8-pin, straight, A-coded</li> <li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li> <li>• <b>Permitted cross-section:</b> ≤ 0.25 mm<sup>2</sup></li> <li>• <b>Note:</b> Drag chain use</li> <li>• <b>Application:</b> Drag chain operation</li> </ul>	YF2AA8-100S01M-KA18	2099210
	<ul style="list-style-type: none"> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Incremental</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> HIPERFACE<sup>®</sup>, Incremental</li> <li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-1208-W02MAC1	6037724
	<ul style="list-style-type: none"> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Incremental</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> HIPERFACE<sup>®</sup>, Incremental</li> <li>• <b>Cable:</b> 5 m, 8-wire, PUR, halogen-free</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-1208-W05MAC1	6037725
	<ul style="list-style-type: none"> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Incremental</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> HIPERFACE<sup>®</sup>, Incremental</li> <li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-1208-W10MAC1	6037726
	<ul style="list-style-type: none"> <li>• <b>Description:</b> HIPERFACE<sup>®</sup>, shielded, Incremental</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> HIPERFACE<sup>®</sup>, Incremental</li> <li>• <b>Cable:</b> 20 m, 8-wire, PUR</li> <li>• <b>Application:</b> Zones with oils and lubricants</li> </ul>	DOL-1208-W20MAC1	6037727
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Cable:</b> 2 m, 8-wire, PVC</li> <li>• <b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-W02MA	6020992
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Sensor/actuator cable, shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> Sensor/actuator cable</li> <li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> </ul>	DOL-1208-W02MAS01	6029224








	Brief description	Type	part no.
	<ul style="list-style-type: none"> <li>• <b>Connection systems:</b> Flying leads</li> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Cable:</b> 2 m, 8-wire, PUR, halogen-free</li> </ul>	DOL-1208-W02MC	6035623
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Shielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Cable:</b> 5 m, 8-wire, PVC</li> <li>• <b>Connection systems:</b> Flying leads</li> </ul>	DOL-1208-W05MA	6021033
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Cable:</b> 5 m, 8-wire, PUR</li> </ul>	DOL-1208-W05MC	6035624
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Unshielded</li> <li>• <b>Connection type head A:</b> Female connector, M12, 8-pin, angled</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Cable:</b> 10 m, 8-wire, PUR, halogen-free</li> </ul>	DOL-1208-W10MC	6035625

	Brief description	Type	part no.
Mounting systems			
	<ul style="list-style-type: none"> <li>• <b>Description:</b> Bearing block for servo and face mount flange encoder. The heavy-duty bearing block is used to absorb very large radial and axial shaft loads. Particularly when using belt pulleys, chain sprockets, friction wheels. Operating speed max. 4,000 rpm<sup>-1</sup>, axial shaft load 150 N, radial shaft load 250 N, bearing service life 3.6 x 10<sup>9</sup> revolutions</li> <li>• <b>Description:</b> Mounting kit for servo flange encoder on the bearing block, 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912,1 hexagon socket wrench SW3 DIN 911</li> </ul>	BEF-FA-LB1210	2044591
		BEF-MK-LB	5320872

	Brief description	Type	part no.
	<ul style="list-style-type: none"> <li><b>Items supplied:</b> 1 bar coupling SKPS 1520 06/06 1 hexagon socket wrench SW1.5 DIN 911, 3 mounting eccentric BEMN 1242 49 3 screws M4 x 10 DIN 912, 1 hexagon socket wrench SW3 DIN 911</li> <li><b>Description:</b> Mounting bracket for encoder with spigot 36 mm for face mount flange</li> <li><b>Items supplied:</b> Mounting kit included</li> </ul>	BEF-WF-36	2029164
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 58 mm square mounting plate with shock absorbers, aluminum</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>	BEF-FA-036-060RSA	2029163
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 60 mm square mounting plate, aluminum, including 3 flat head screws M4 x 8</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M4 x 8</li> </ul>	BEF-FA-036-060REC	2029162
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 100 mm servo flange with 60 mm centering hub, aluminum</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>	BEF-FA-036-100	2029161
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 50 mm servo flange, aluminum, including 3 flat head screws M4 x 10</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M3 x 10</li> </ul>	BEF-FA-036-050	2029160
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter, adaptation of face mount flange with 36 mm centering hub to 63 mm square mounting plate, aluminum, including 3 flat head screws M4 x 8</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> <li><b>Items supplied:</b> Including 3 countersunk screws M4 x 8</li> </ul>	BEF-FA-036-063REC	2034225
	<ul style="list-style-type: none"> <li><b>Description:</b> Flange adapter (adapts size 60 face mount flange encoder to bearing block with part. no. 2044591)</li> </ul>	BEF-FA-036-050-019	2063378
	<ul style="list-style-type: none"> <li><b>Description:</b> Mounting angle spring-loaded, for flange with centerring collar 36 mm, working temperature range -40° ... +120°C</li> <li><b>Material:</b> Aluminum</li> <li><b>Details:</b> Aluminum</li> </ul>	BEF-WF36F	4084775

	Brief description	Type	part no.
shaft adaptation			
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bellows coupling, shaft diameter 6 mm / 10 mm, maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. speed 10,000 rpm, <math>-30^\circ\text{C}</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum hub</li> </ul>	KUP-0610-B	5312982
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Spring washer coupling, shaft diameter 6 mm / 10 mm, Maximum shaft offset: radial <math>\pm 0.3</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 2.5^\circ</math>; max. speed 12,000 rpm, <math>-10^\circ</math> to <math>+80^\circ\text{C}</math>, max. torque 60 Ncm; material: aluminum flange, glass fiber-reinforced polyamide membrane and hardened steel coupling pin</li> </ul>	KUP-0610-F	5312985
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Double loop coupling, shaft diameter 6 mm / 10 mm, max. shaft offset: radially <math>\pm 2.5</math> mm, axially <math>\pm 3</math> mm, angle <math>\pm 10</math> degrees; max. speed 3,000 rpm, <math>-30</math> to <math>+80</math> degrees Celsius, torsional spring stiffness of 25 Nm/rad</li> </ul>	KUP-0610-D	5326697
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bar coupling, shaft diameter 6 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\text{C}</math>, max. torque: 80 Ncm, material: fiber-glass reinforced polyamide, aluminum hub</li> </ul>	KUP-0610-S	2056407
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Claw coupling, shaft diameter 6 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\text{C}</math> to <math>+80^\circ\text{C}</math>, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane</li> </ul>	KUP-0610-J	2127056
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bar coupling, shaft diameter 10 mm / 10 mm; maximum shaft offset: radial <math>\pm 0.3</math> mm, axial <math>\pm 0.2</math> mm, angular <math>\pm 3^\circ</math>; speed 10,000 rpm, <math>-10^\circ</math> to <math>+80^\circ</math> Celsius, max. torque 80 Ncm; material: glass fiber-reinforced polyamide, aluminum hub</li> </ul>	KUP-1010-S	2056408
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Bellows coupling, shaft diameter 10 mm/10 mm; maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. revolutions 10,000 rpm, <math>-30^\circ</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs</li> </ul>	KUP-1010-B	5312983
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> 10 mm / 12 mm; maximum shaft offset: radial <math>\pm 0.25</math> mm, axial <math>\pm 0.4</math> mm, angular <math>\pm 4^\circ</math>; max. revolutions 10,000 rpm, <math>-30^\circ</math> to <math>+120^\circ\text{C}</math>, max. torque 120 Ncm; material: stainless steel bellows, aluminum clamping hubs</li> </ul>	KUP-1012-B	5312984
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Spring washer coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset, radial <math>\pm 0.3</math> mm, axial <math>\pm 0.4</math> mm, angle <math>\pm 2.5^\circ</math>, torsion spring stiffness 30 Nm/rad; material: aluminum flange, glass-fiber reinforced polyamide membrane and hardened steel coupling pin</li> </ul>	KUP-1010-F	5312986
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</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\text{C}</math>, max. torque: 80 Ncm, material: fiber-glass 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:</b> Shaft couplings</li> <li><b>Description:</b> Spring coupling, shaft diameter 10 mm / 10 mm, maximum shaft offset: radial <math>\pm 1.5</math> mm, axial <math>\pm 1.0</math> mm, angular <math>\pm 5^\circ</math>, max. speed 3,000 rpm, <math>-30^\circ</math> to <math>+120^\circ</math> Celsius, nominal torque 150 Ncm, rotational angle at half nominal torque, direction of rotation right viewed on</li> </ul>	KUP-1010-W	5319914

	Brief description	Type	part no.
	driving shaft 40°, left viewed on driving shaft 60°, material: spring steel 1.0600 nickel plated, zinc die cast hubs		
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Double loop coupling, shaft diameter 10 mm / 10 mm, Maximum shaft offset: radial +/- 2.5 mm, axial +/- 3 mm, angular +/- 10°; max. speed 3,000 rpm, -30° to +80 °C, max. torque 1.5 Nm; material: polyurethane, galvanized steel flange</li> </ul>	KUP-1010-D	5326703
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Double loop coupling, shaft diameter 8 mm / 10 mm, max. shaft offset: radially +/- 0,25 mm, axially +/-0,4 mm, angle +/- 4 degrees;max. speed 10.000 rpm, -30 to +120 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:</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 ± 0.22 mm, axial ± 1 mm angular ± 1.3°, max. speed 19,000 rpm, angle of twist max. 10°, -30 °C to +80 °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
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Shaft adaptation</li> <li><b>Product:</b> Shaft couplings</li> <li><b>Description:</b> Claw coupling, shaft diameter 10 mm / 10 mm, damping element 80 shore blue, maximum shaft offset: radial ± 0.22 mm, axial ± 1 mm angular ± 1.3°, max. speed 19,000 rpm, angle of twist max. 10°, -30 °C to +80 °C, max. torque 800 Ncm, tightening torque of screws: ISO 4029 150 Ncm, material: aluminum flange, damping element: polyurethane</li> </ul>	KUP-1010-J	2127054

	Brief description	Type	part no.
measuring wheels and measuring wheel mechanics			
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheel mechanics</li> <li><b>Description:</b> O-ring for measuring wheels (circumference 200 mm)</li> </ul>	BEF-OR-053-040	2064061
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheel mechanics</li> <li><b>Description:</b> O-ring for measuring wheels (circumference 300 mm)</li> <li><b>Items supplied:</b> 2x O-ring</li> </ul>	BEF-OR-083-050	2064076
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheel mechanics</li> <li><b>Description:</b> O-ring for measuring wheels (circumference 500 mm)</li> </ul>	BEF-OR-145-050	2064074
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 300 mm</li> </ul>	BEF-MR010030R	2049278
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminium measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR010020R	2055224
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Measuring wheel with O-ring (NBR70) for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR010050R	2055227
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheel mechanics</li> <li><b>Description:</b> SICK modular measuring wheel system for face mount flange encoder with S4 mechanical design (10 mm x 19 mm solid shaft), e.g., DFS60-S4: with O-ring measuring wheel, circumference 200 mm</li> </ul>	BEF-MRS-10-U	2085714

	Brief description	Type	part no.
	<ul style="list-style-type: none"> <li><b>Suitable for:</b> Face mount flange encoder DFS60, DBS60, AFM60, AFS60, mechanical design S4 (solid shaft 10 mm x 19 mm)</li> </ul>		
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR10500AK	4084733
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR10500AP	4084734
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200APG	4084740
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200APN	4084739
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with smooth polyurethane surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200AP	4084738
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with cross-knurled surface for 10 mm solid shaft, circumference 200 mm</li> </ul>	BEF-MR10200AK	4084737
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with ridged polyurethane surface for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR10500APG	4084736
	<ul style="list-style-type: none"> <li><b>Product segment:</b> Measuring wheels and measuring wheel mechanics</li> <li><b>Product:</b> Measuring wheels</li> <li><b>Description:</b> Aluminum measuring wheel with studded polyurethane surface for 10 mm solid shaft, circumference 500 mm</li> </ul>	BEF-MR10500APN	4084735

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