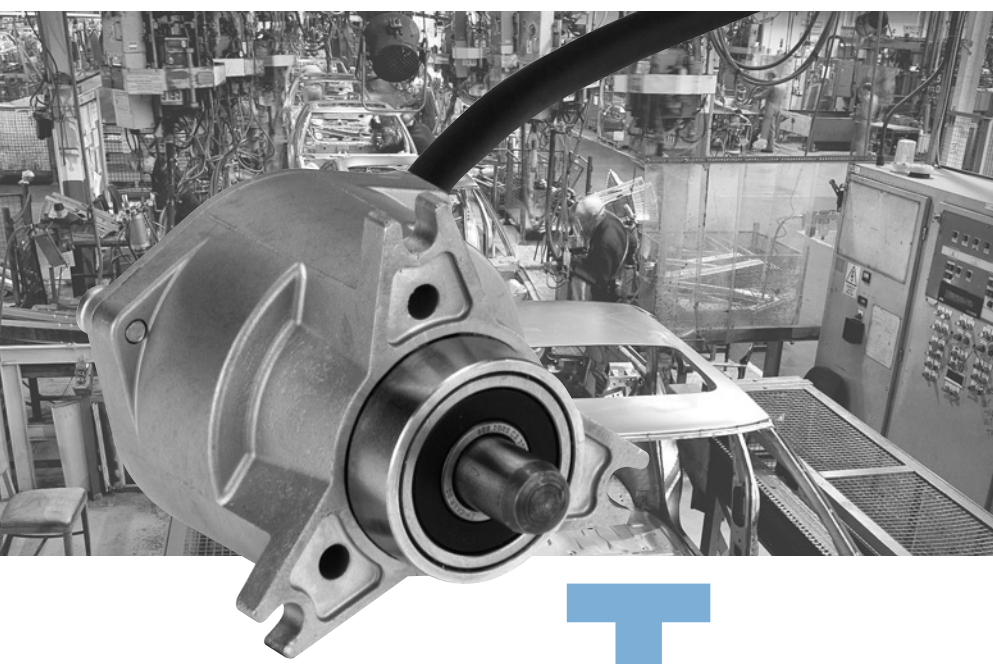


# DKS40: Incremental Encoder



By adopting highly successful Mini-Disc technology, the DKS40 is extremely robust and can resist high levels of shock and vibration. In addition the DKS40 has a very high protection class, IP 64.

Specify your individual 50 mm dia. Encoder.

Options available:


- Interfaces    Open Collector NPN, TTL/RS 422, HTL/push-pull.
- Face mount flange with solid shaft  $\varnothing 8 \times 13$  mm,
- Output cable 0.5 m can be used radially or axially

Thanks to product flexibility there are numerous applications, for example in:

- machine tools
- textile machines
- wood processing machines
- packaging machines



The DKS40 Incremental Encoder offers exceptional quality for its price and its range of application. Its housing is a solid zinc die-casting and is extremely compact in its design, having an external diameter of only 50 mm. As a consequence, valuable space can be spared when installed.

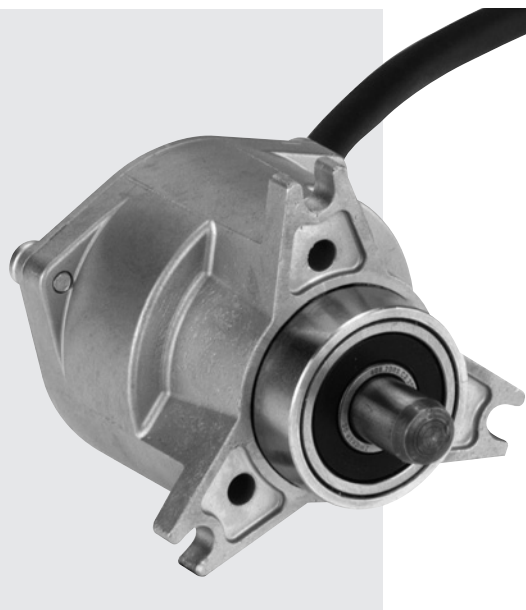
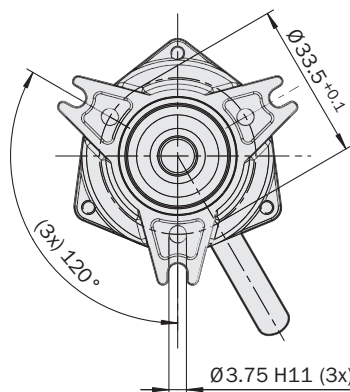
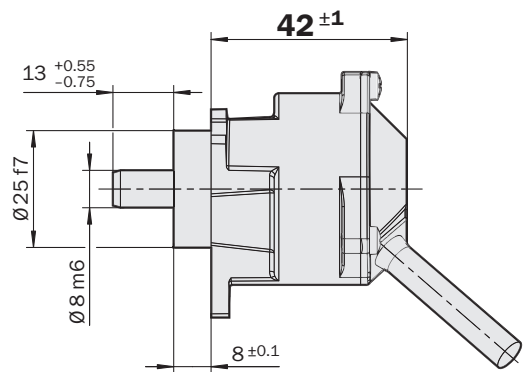
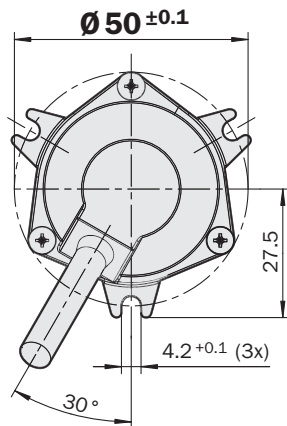
	<b>Number of lines</b>
	<b>1 to 2,048</b>
<b>Incremental Encoder</b>	

**Number of lines**  
1 to 2,048

Incremental Encoder

- Cable outlet
- Enclosure rating IP 64
- Electrical Interfaces  
Open Collector NPN,  
TTL,  
HTL

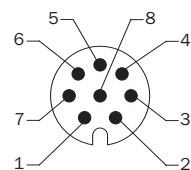
## Dimensional drawing face mount flange



General tolerances according to DIN ISO 2768-mk

## Wire allocation/cable 8-core

8-Pin, M12 connector	Core colour	Signal OC	Signal TTL, HTL	Explanation
1	Brown	N. C. <sup>3)</sup>	$\bar{A}$	Signal line
2	White	A	A	Signal line
3	Black	N. C. <sup>3)</sup>	$\bar{B}$	Signal line
4	Pink	B	B	Signal line
5	Yellow	N. C. <sup>3)</sup>	$\bar{Z}$	Signal line
6	Lilac	Z	Z	Signal line
7	Blue	GND	GND	Ground connection
8	Red	+U <sub>S</sub>	+U <sub>S</sub>	Power supply <sup>1)</sup>
	Screen	Screen	Screen	Screen <sup>2)</sup>



View of the connector fitted to the encoder body

- <sup>1)</sup> Potential free to housing
- <sup>2)</sup> Screen connected to Encoder housing. Connect screen on control side!
- <sup>3)</sup> N. C. = not connected

**Accessories**

Connection systems

Mounting systems



Technical data according to 32878		DKS40	DKS										
<b>Number of lines (Z) per revolution</b>		1 to 2,048											
<b>Electrical Interfaces</b>		4.5 ... 5.5 V, Open Coll. NPN, 3-channel											
		10 ... 30 V, Open Coll. NPN, 3-channel											
		4.5 ... 5.5 V, TTL/RS422, 6-channel											
		10 ... 30 V, HTL, 6-channel											
<b>Mass</b>		0.18 Kg											
<b>Moment of inertia of the rotor</b>		6 gcm <sup>2</sup>											
<b>Measuring step</b>		90° / number of lines											
<b>Reference signal</b>	Number	1											
	Position	90° electr., logic. interlocked with A+B											
<b>Error limits</b>													
		"binary" number of lines <sup>1)</sup>	± 0.09 degree										
		"non-binary" number of lines <sup>2)</sup>	± 0.13 degree										
<b>Measuring step deviation</b>													
		binary number of lines	± 0.035 degree										
		non-binary number of lines	± 0.07 degree										
<b>Max. output frequency</b>	Open Collector	50 KHz											
	TTL/RS422	200 KHz											
	HTL/push-pull	200 KHz											
<b>Operating speed</b>		6,000 min <sup>-1</sup>											
<b>Angular acceleration</b>		3.6 x 10 <sup>9</sup> rad/s <sup>2</sup>											
<b>Operating torque</b>		0.4 Ncm											
<b>Start up torque</b>		0.6 Ncm											
<b>Permissible shaft loading</b>													
		radial	40 N										
		axial	20 N										
<b>Bearing lifetime</b>		2 x 10 <sup>9</sup> revolutions											
<b>Working temperature range</b>		0 ... + 60 °C											
<b>Storage temperature range</b>		- 40 ... + 70 °C											
<b>Permissible relative humidity <sup>3)</sup></b>		90 %											
<b>EMC <sup>4)</sup></b>													
<b>Resistance</b>													
		to shocks <sup>5)</sup>	50/7 g/ms										
		to vibration <sup>6)</sup>	20/10 ... 2000 g/Hz										
<b>Protection class acc. IEC 60529</b>		IP 64											
<b>Load current</b>		30 mA											
<b>Operating current range at no load</b>		40 mA											
<b>Initialisation time after power on</b>		40 ms											

<sup>1)</sup> „Binary“ number of lines  
2<sup>n</sup>, n is a whole number

<sup>2)</sup> „Non binary“ number of lines  
2<sup>n</sup>, n is not a whole number

<sup>3)</sup> Condensation of optical scanning system not permitted

<sup>4)</sup> To DIN EN 61000-6-2 and  
DIN EN 61000-6-3

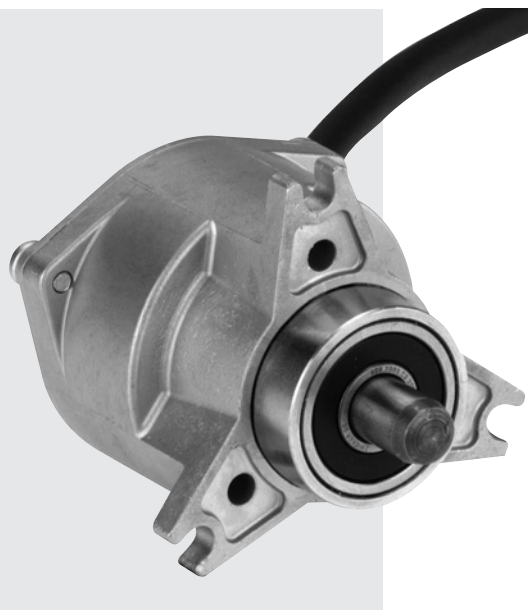
<sup>5)</sup> To DIN EN 60068-2-27

<sup>6)</sup> To DIN EN 60068-2-6

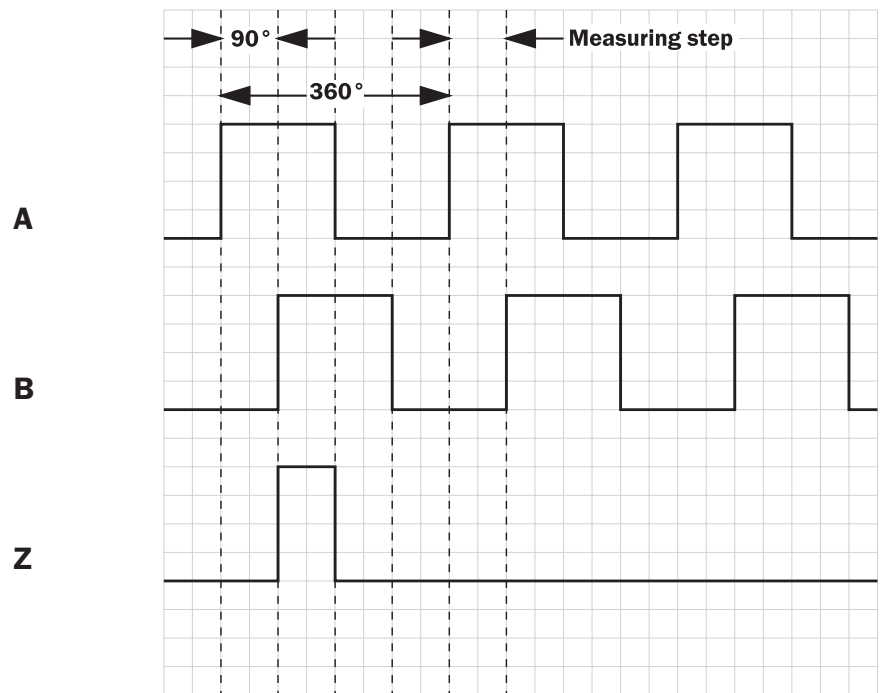
**Number of lines**  
**1 to 2,048**

Incremental Encoder

- Cable outlet
- Enclosure rating IP 64
- Electrical Interfaces  
Open Collector NPN,  
TTL,  
HTL



## Incremental pulse diagram



CW rotation when looking at the encoder shaft

$\bar{A}$ ,  $\bar{B}$ ,  $\bar{Z}$  inverted signals to A, B, Z

## Electrical interfaces

Supply voltage	4.5 ... 5.5 V	10 ... 30 V	4.5 ... 5.5 V	10 ... 30 V
Interfaces/drivers	Open Coll. NPN	Open Coll. NPN	TTL/RS422	HTL/push-pull



## Accessories

- Connection systems
- Mounting systems

**Order information**

**Incremental Encoder DKS40, solid shaft**

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
<b>D</b>	<b>K</b>	<b>S</b>	<b>4</b>	<b>0</b>	-		<b>5</b>						

<b>Electrical interface</b> 4.5 ... 5.5 V, Open Collector NPN, 3-channel = <b>P</b> <hr/> 10 ... 30 V, Open Collector NPN, 3-channel = <b>R</b> <hr/> 4.5 ... 5.5 V, TTL/RS422, 6-channel = <b>A</b> <hr/> 10 ... 30 V, HTL/push-pull, 6-channel = <b>E</b>	<b>Mechanical interface</b> Face mount flange, Solid shaft Ø 8 x 13 mm = <b>5</b>	<b>Connection type</b> Cable 8-core, universal 0.5 m <sup>1)</sup> = <b>J</b> Cable 8-core, universal 1.5 m <sup>1)</sup> = <b>K</b> Cable 8-core, universal 3 m <sup>1)</sup> = <b>L</b> Cable 8-core, universal 5 m <sup>1)</sup> = <b>M</b> <hr/> Cable, universal 1.5 m <sup>1)</sup> with connector M12, 8-pin = <b>P</b>	<b>Number of lines</b> Always 5 characters in clear text <b>1</b> with leading zeros
---	---	--	--

<sup>1)</sup> The universal cable output is positioned so that a kink-free cable run is possible in radial or axial direction.

**1 Number of lines (Z) per revolution**

00010	00050	00200	00256	00500	00720	01024	02048
00020	00100	00250	00360	00512	01000	02000	others on request

**Order example: Incremental Encoder DKS40**

**4.5 ... 5.5 Volt, TTL; face mount flange, cable 8-core, universal 0.5 m, number of lines: 360**

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
<b>D</b>	<b>K</b>	<b>S</b>	<b>4</b>	<b>0</b>	-	<b>A</b>	<b>5</b>	<b>J</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>6</b>	<b>0</b>

**Please enter your individual encoder here**

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
<b>D</b>	<b>K</b>	<b>S</b>	<b>4</b>	<b>0</b>	-		<b>5</b>						

Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
<b>D</b>	<b>K</b>	<b>S</b>	<b>4</b>	<b>0</b>	-		<b>5</b>						

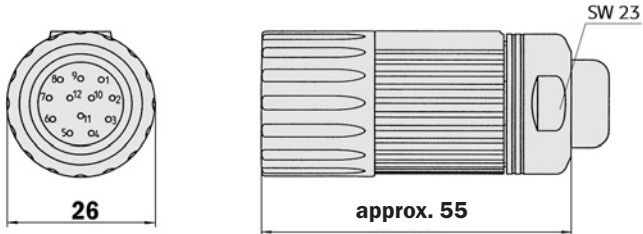
Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
<b>D</b>	<b>K</b>	<b>S</b>	<b>4</b>	<b>0</b>	-		<b>5</b>						

Dimensional drawings and order information

Screw-in system M23, 12-pin

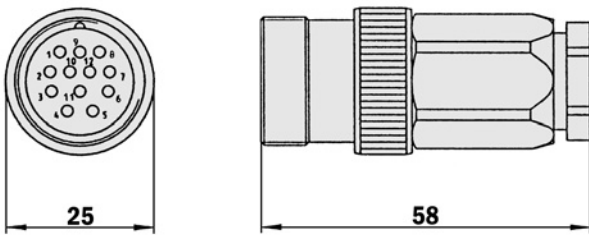
Cable connector M23 female, 12-pin, straight, screened

Type	Part no.	Contacts
DOS-2312-G	6027538	12



Cable connector M23 male, 12-pin, straight, screened

Type	Part no.	Contacts
STE-2312-G	6027537	12



Pre-wired cables

Connector M23 female, 12-pin, straight, cable 11-core, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm<sup>2</sup> with screening

cable diameter 7.8 mm

Type	Part no.	Contacts	Cable length
DOL-2312-G02MLA3	2030682	12	2.0 m
DOL-2312-G07MLA3	2030685	12	7.0 m
DOL-2312-G10MLA3	2030688	12	10.0 m
DOL-2312-G15MLA3	2030692	12	15.0 m
DOL-2312-G20MLA3	2030695	12	20.0 m
DOL-2312-G25MLA3	2030699	12	25.0 m
DOL-2312-G30MLA3	2030702	12	30.0 m

Connector M23 female, 12-pin, straight, cable 12-core, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm<sup>2</sup> with screening, capable of being dragged,

cable diameter 7.8 mm

Type	Part no.	Contacts	Cable length
DOL-2312-G1M5MA3	2029212	12	1.5 m
DOL-2312-G03MMA3	2029213	12	3.0 m
DOL-2312-G05MMA3	2029214	12	5.0 m
DOL-2312-G10MMA3	2029215	12	10.0 m
DOL-2312-G20MMA3	2029216	12	20.0 m
DOL-2312-G30MMA3	2029217	12	30.0 m

**Dimensional drawings and order information**

**Cable 8-core, per meter, 4 x 2 x 0.15 mm<sup>2</sup> with screening,  
cable diameter 5.6 mm**

Type	Part no.	Cores
LTG-2308-MWENC	6027529	8

**Cable 11-core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm<sup>2</sup> with screening,  
cable diameter 7.5 mm**

Type	Part no.	Cores
LTG-2411-MW	6027530	11

**Cable 12-core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm<sup>2</sup> with screening, capable of being dragged,  
cable diameter 7.8 mm**

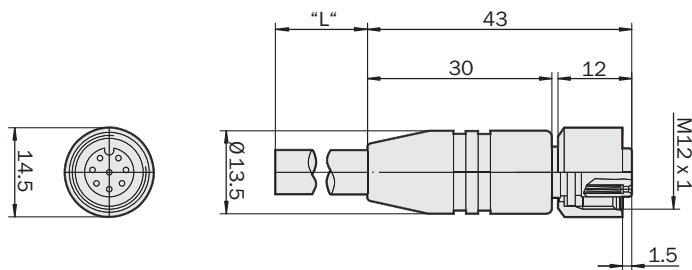
Type	Part no.	Cores
LTG-2512-MW	6027531	12

**Cable 12 core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm<sup>2</sup> with screening, capable of being dragged, UV + saltwater resistant  
cable diameter 7.8 mm**

Type	Part no.	Cores
LTG-2612-MW	6028516	12

**Female connector M12, 8-pin, straight, pre-wired with cable 8-wire, 4 x 2 x 0.25 mm<sup>2</sup>, screened, flexible (adapter side)**

Type	Part no.	Contacts	Cable length
DOL-1208-G02MAC1	6032866	8	2,0 m
DOL-1208-G05MAC1	6032867	8	5,0 m
DOL-1208-G10MAC1	6032868	8	10,0 m
DOL-1208-G20MAC1	6032869	8	20,0 m

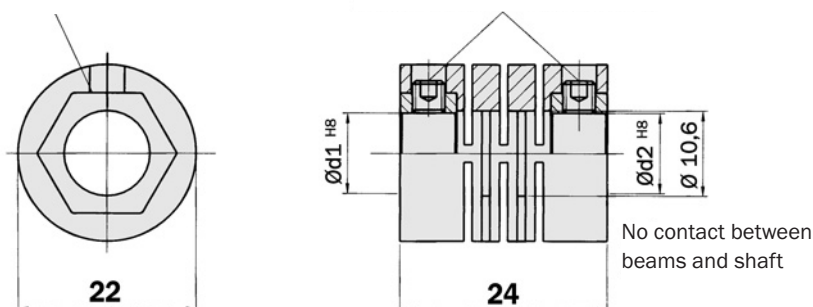


**Shaft couplings**

**Beam coupling max. shaft displacement radially ± 0.3 mm, axially ± 0.2 mm, angular ± 3 degrees, torsional rigidity 38 Nm/rad,  
body: fibre glass reinforced polyamide, hubs made of brass**

Type	Part no.	Type shaft diameter
KUP-0608-S	5314179	6 mm ... 8 mm
KUP-0808-S	5314177	8 mm ... 8 mm
KUP-0810-S	5314178	8 mm ... 10 mm

Shaft clamped around its circumference Cheese-head screw M 4 x 4 DIN916

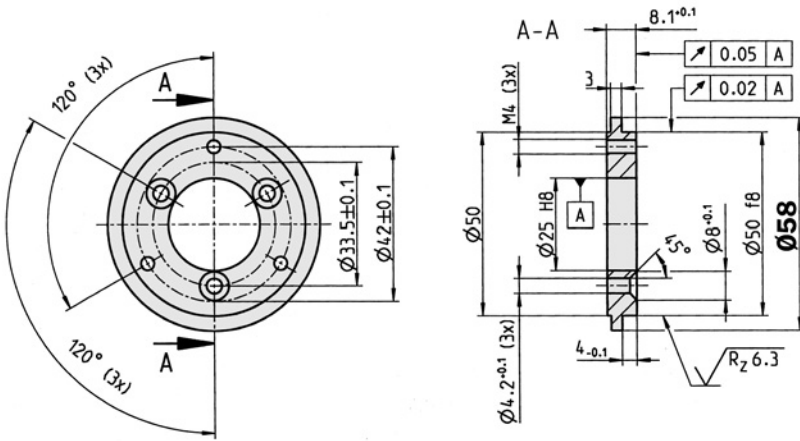


Dimensional drawings and order information

Mechanical Adapters

Adapter flange of aluminium for face mount flange, spigot 25 mm

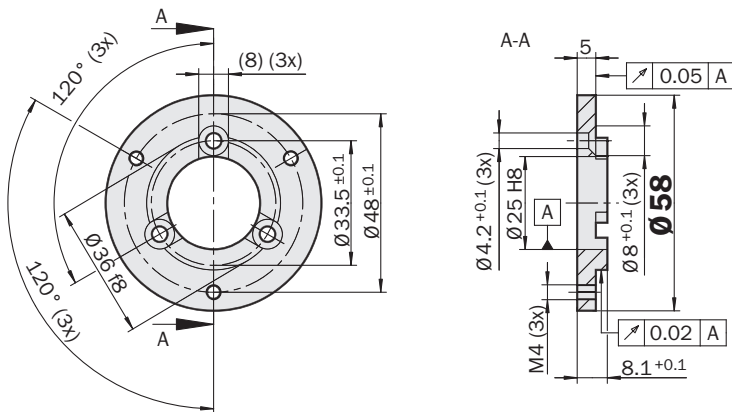
Type	Part no.	Adaption
BEF-FA-025-050	2032622	To 50 mm servo flange



General tolerances according to DIN ISO 2768-mk

Adapter flange of aluminium for face mount flange, spigot 25 mm

Type	Part no.	Adaption
BEF-FA-025-036	2034226	To 36 mm face mount flange

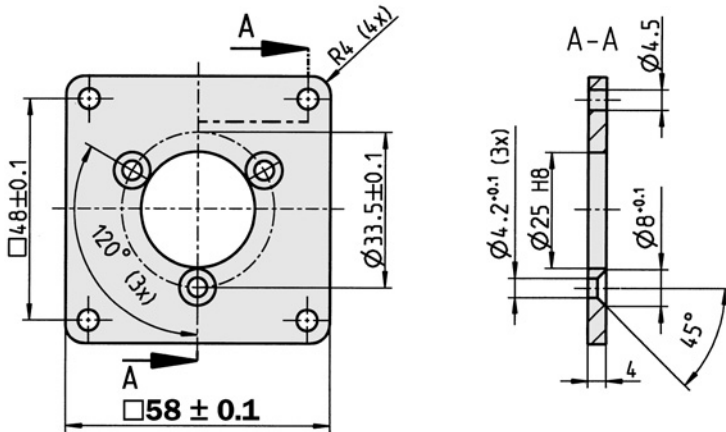


General tolerances according to DIN ISO 2768-mk



**Adapter flange of aluminium for face mount flange, spigot 25 mm**

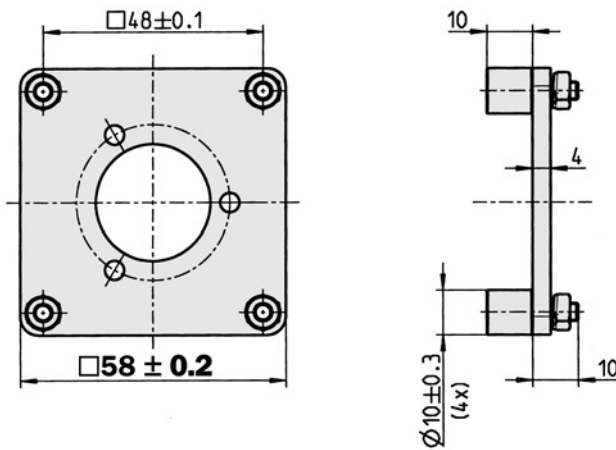
Type	Part no.	Adaption
BEF-FA-025-060RCA	2032623	To 60 mm square mounting plate



General tolerances according to DIN ISO 2768-mk

**Adapter flange of aluminium for face mount flange, spigot 25 mm**

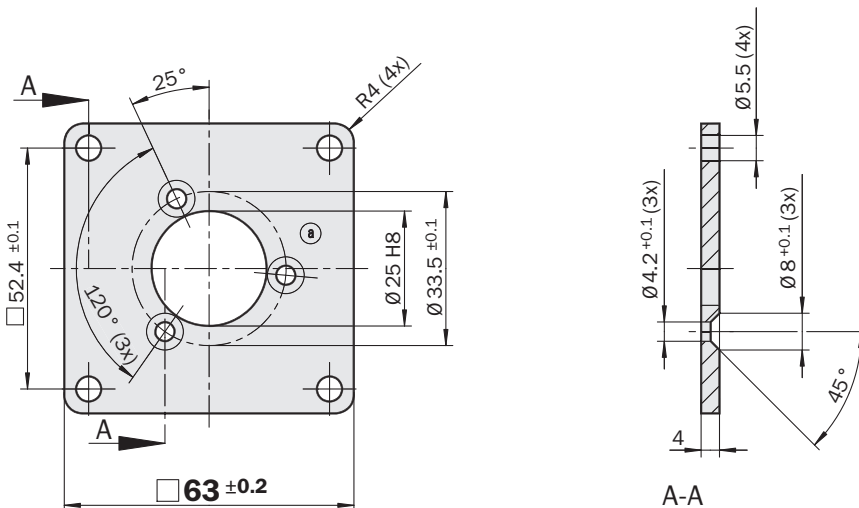
Type	Part no.	Adaption
BEF-FA-025-060RSA	2032624	To 60 mm square mounting plate with shock absorbers



General tolerances according to DIN ISO 2768-mk

**Adapter flange of aluminium for face mount flange, spigot 25 mm**

Type	Part no.	Adaption
BEF-FA-025-063REC	2033631	To 63 mm square mounting plate



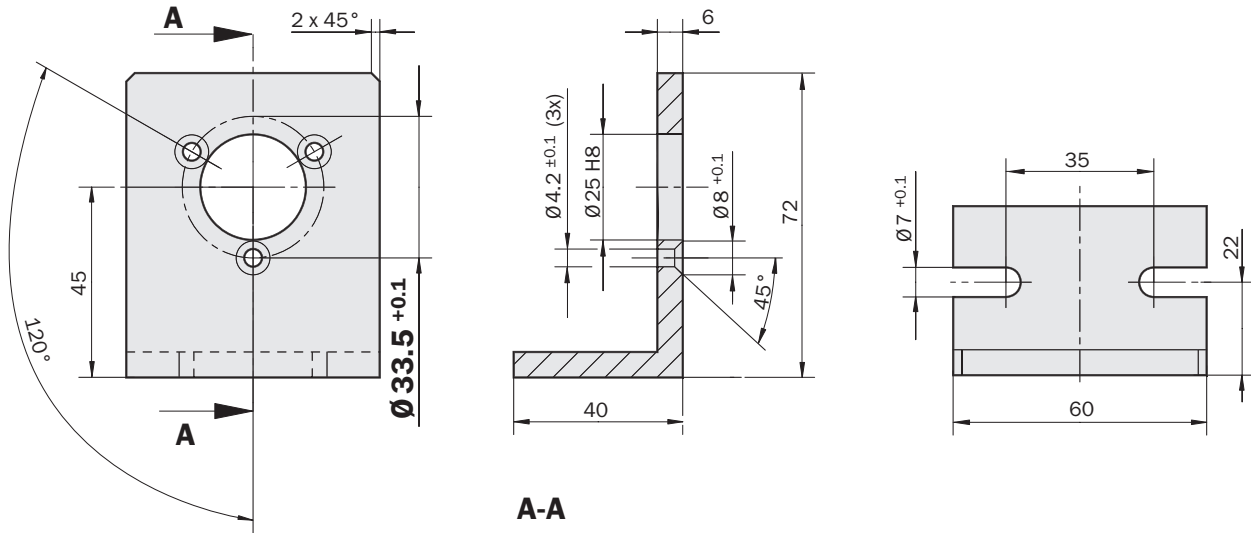
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adapters

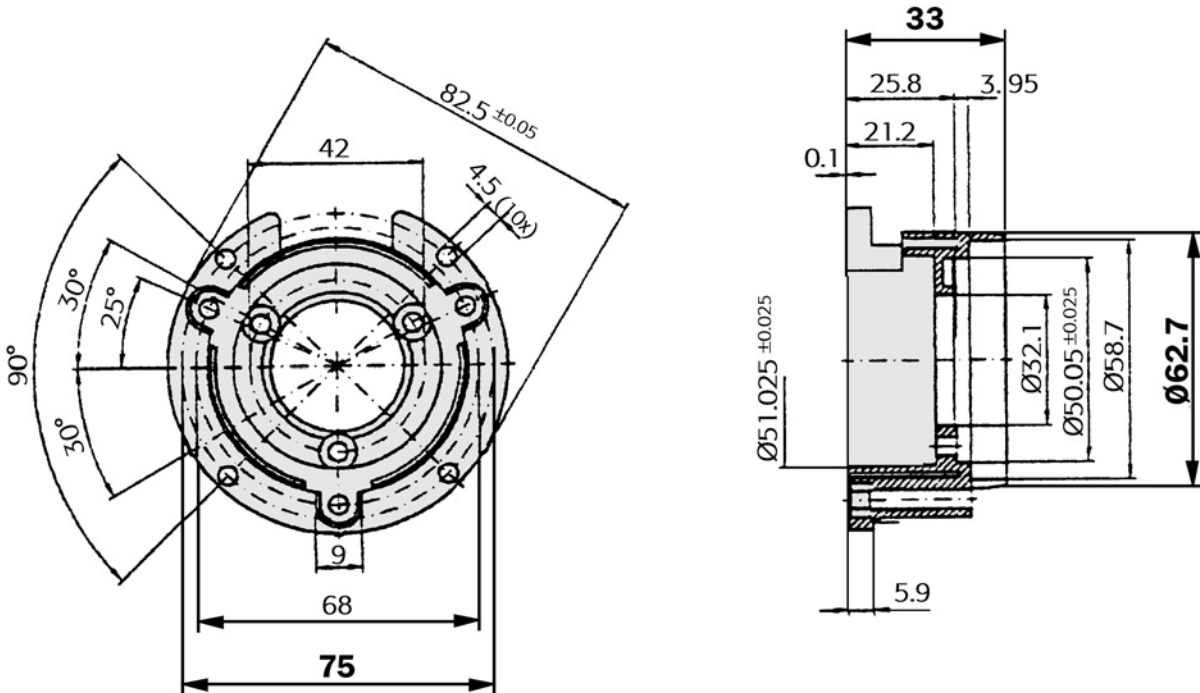
Mounting angle incl. fixing set for encoder with face mount flange

Type	Part no.	Flange spigot
BEF-WF-25	2032621	Diameter 25 mm



Mounting bell incl. fixing set for encoder with servo flange

Type	Part no.	Flange spigot
BEF-MG-50	5312987	Diameter 50 mm

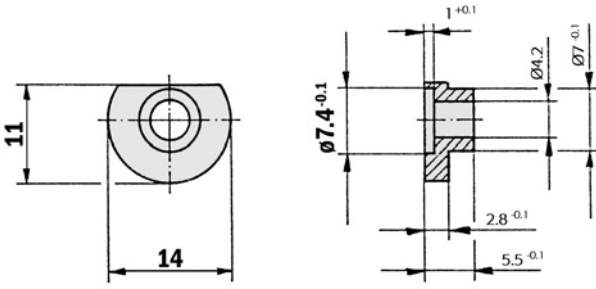


Dimensional drawings and order information

Servo clamps

Servo clamps small, Set (comprises 3 pieces) for servo flanges

Type	Part no.
BEF-WK-SF	2029166



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