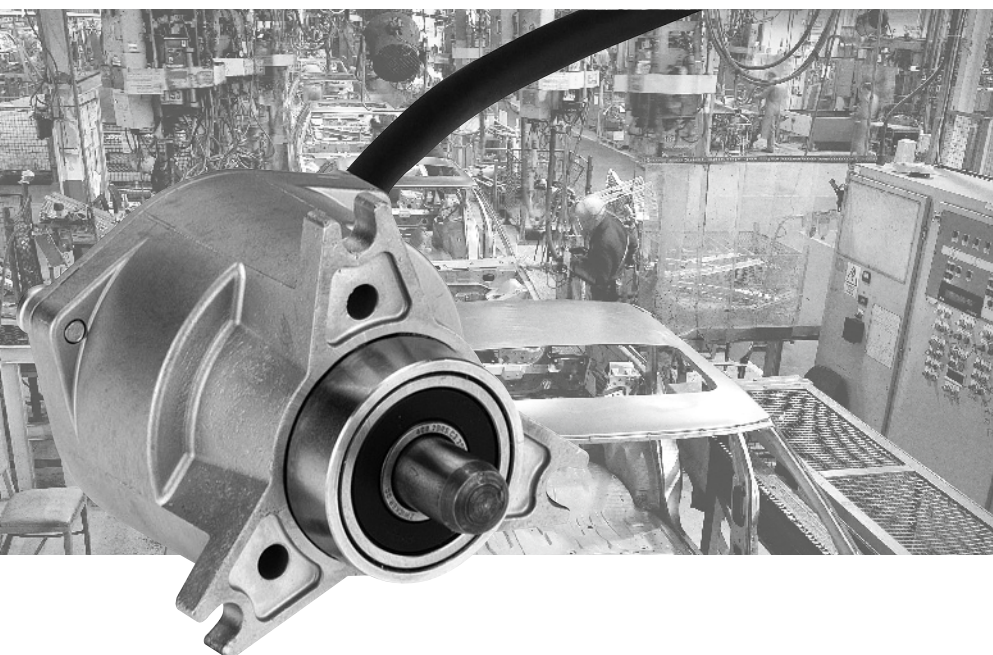


DKS40: Incremental Encoders



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.

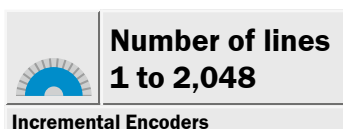
Specify your individual 50 mm dia. Encoder.

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 up to 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



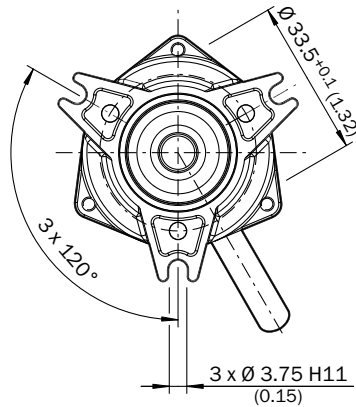
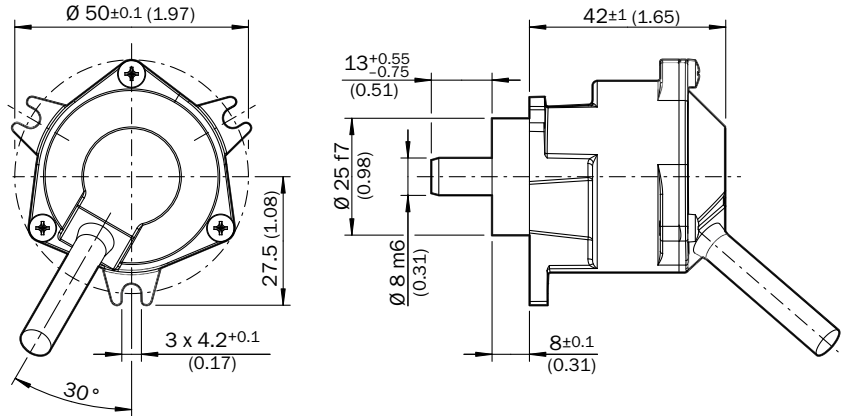
The DKS40 Incremental Encoders offers exceptional quality for its price and its range of application. Its housing is a solid zinc die-casting and is extremely compact in its design, having an external diameter of only 50 mm. As a consequence, valuable space can be spared when installed.

Number of lines
1 to 2,048

Incremental Encoders

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

Dimensional drawing face mount flange



All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

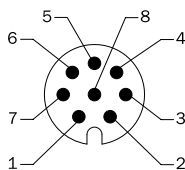
Product may differ from illustration



UL certification not valid for all types. See order information.

Wire allocation/cable 8-core

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



View of the connector fitted to the encoder body

¹⁾ Potential free to housing

²⁾ Screen connected to Encoder housing. Connect screen on control side!

³⁾ N. C. = not connected

Accessories

Connection systems (page 6)

Mounting systems (page 7)

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

¹⁾ „Binary“ number of lines
2ⁿ, n is a whole number

²⁾ „Non binary“ number of lines
2ⁿ, n is not a whole number

³⁾ Condensation of optical scanning
system not permitted

⁴⁾ To DIN EN 61000-6-2 and
DIN EN 61000-6-3

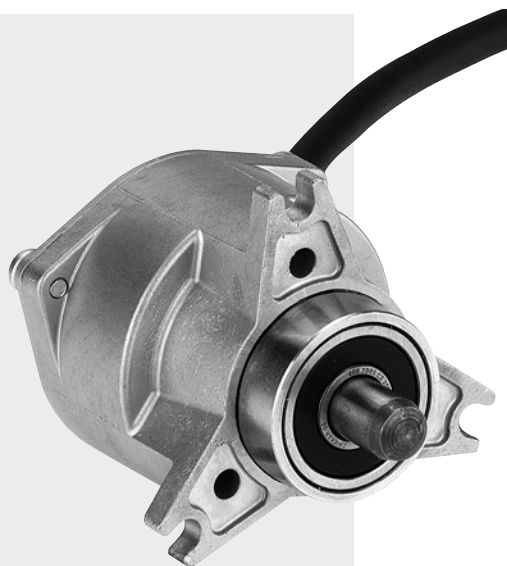
⁵⁾ To DIN EN 60068-2-27

⁶⁾ To DIN EN 60068-2-6

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

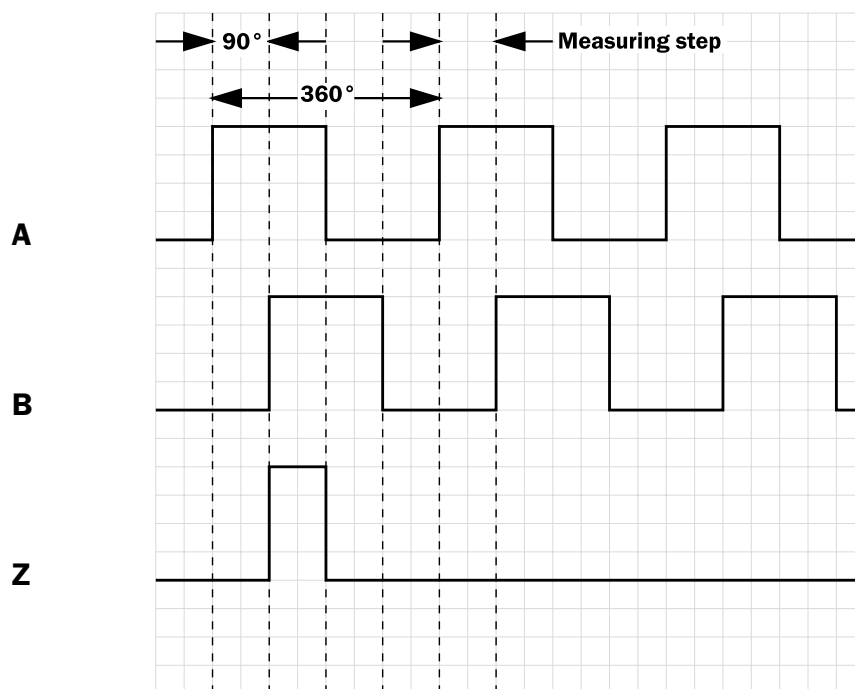
Incremental Encoders

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



Product may differ from illustration

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



UL certification not valid for all types. See order information.

Accessories

Connection systems (page 6)

Mounting systems (page 7)

Order information

Incremental Encoders 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
D	K	S	4	0	-		5						

Electrical interface 4.5 ... 5.5 V, Open Collector NPN, 3-channel = P <hr/> 10 ... 30 V, Open Collector NPN, 3-channel = R <hr/> 4.5 ... 5.5 V, TTL/RS422, 6-channel = A <hr/> 10 ... 30 V, HTL/push-pull, 6-channel = E	Mechanical interface Face mount flange, Solid shaft Ø 8 x 13 mm = 5	Connection type Cable 8-core, universal 0.5 m ¹⁾ = J Cable 8-core, universal 1.5 m ¹⁾²⁾ = K Cable 8-core, universal 3 m ¹⁾²⁾ = L Cable 8-core, universal 5 m ¹⁾²⁾ = M <hr/> Cable, universal 1.5 m ¹⁾ with connector M12, 8-pin = P Preferred types	Number of lines Always 5 characters in clear text ① with leading zeros
---	---	---	---

Preferred types

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

²⁾ No UL certification.

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

Preferred types

Order example: Incremental Encoders 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
D	K	S	4	0	-	A	5	J	0	0	3	6	0

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
D	K	S	4	0	-		5						

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
D	K	S	4	0	-		5						

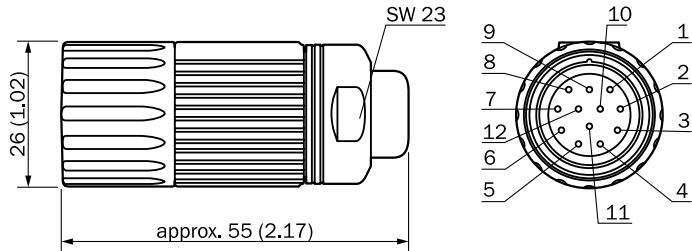
Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Point 7	Point 8	Point 9	Point 10	Point 11	Point 12	Point 13	Point 14
D	K	S	4	0	-		5						

Dimensional drawings and order information

Screw-in system M23, 12-pin

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

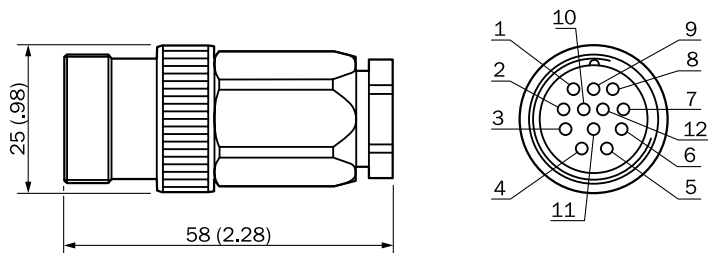
Model name	Part no.	Contacts
DOS-2312-G	6027538	12



All dimensions in mm (inch)

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

Model name	Part no.	Contacts
STE-2312-G	6027537	12



All dimensions in mm (inch)

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 mm² with screening

cable diameter 7.8 mm

Model name	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 mm² with screening, capable of being dragged,

cable diameter 7.8 mm

Model name	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 mm² with screening,
cable diameter 5.6 mm**

Model name	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 mm² with screening,
cable diameter 7.5 mm**

Model name	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 mm² with screening, capable of being dragged,
cable diameter 7.8 mm**

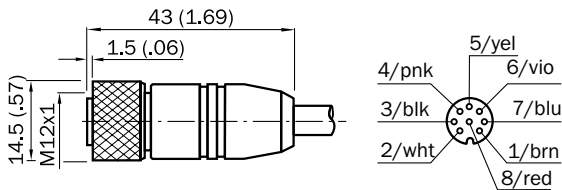
Model name	Part no.	Cores
LTG-2512-MW	6027531	12

**Cable 12 core, per meter, 4 x 2 x 0.25 + 2 x 0.5 + 2 x 0.14 mm² with screening, capable of being dragged, UV + saltwater resistant
cable diameter 7.8 mm**

Model name	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 mm², screened, flexible

Model name	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

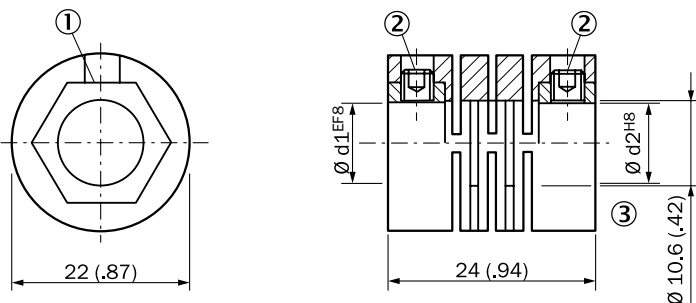


All dimensions in mm (inch)

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 aluminium**

Model name	Part No.	Shaft diameter
KUP-0606-S	2056406	6 mm ... 6 mm
KUP-0610-S	2056407	6 mm ... 10 mm
KUP-0608-S	5314179	8 mm ... 6 mm
KUP-0808-S	5314177	8 mm ... 8 mm
KUP-0810-S	5314178	8 mm ... 10 mm
KUP-1010-S	2056408	10 mm ... 10 mm



- ① Shaft clamped around its circumference
- ② Cheese-head screw 4 x M4 DIN 916
- ③ No contact between beams and shaft

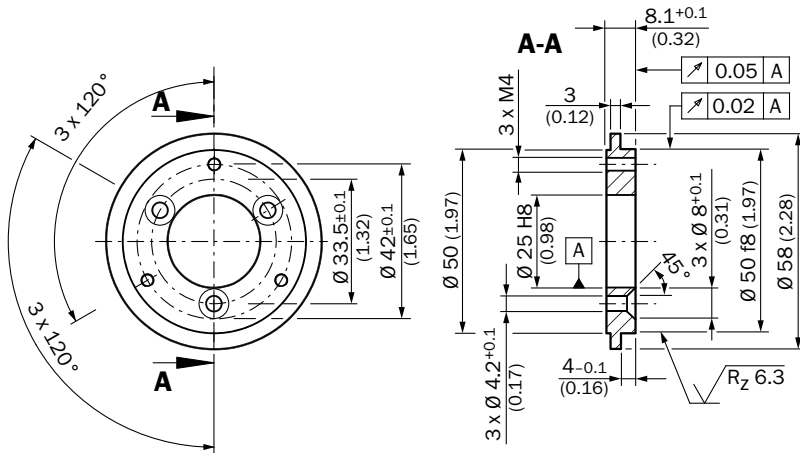
All dimensions in mm (inch)

Dimensional drawings and order information

Mechanical Adapters

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

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

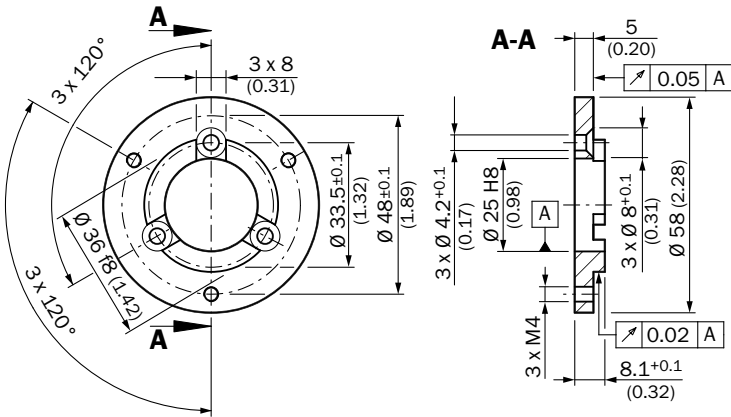


All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

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

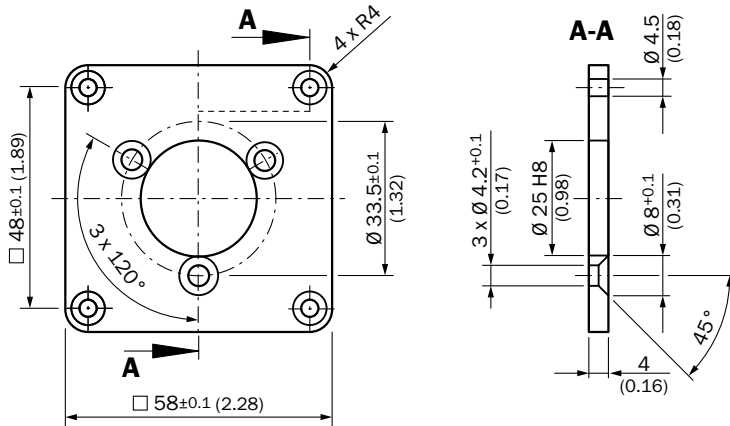
Model name	Part no.	Adaption
BEF-FA-025-036	2034226	To 36 mm face mount flange



All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

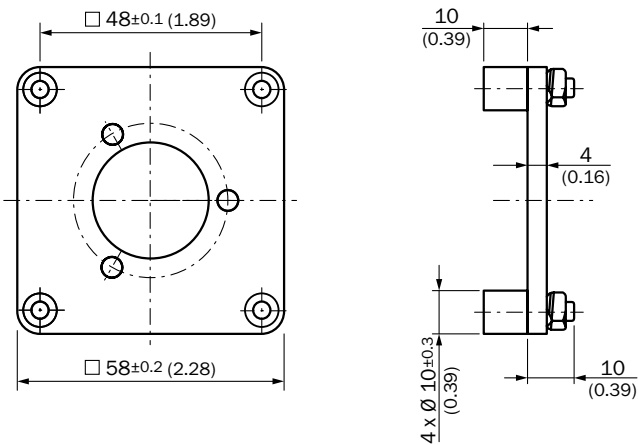
Adapter flange of aluminium for face mount flange, spigot 25 mm		
Model name	Part no.	Adaption
BEF-FA-025-060RCA	2032623	To 60 mm square mounting plate



All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

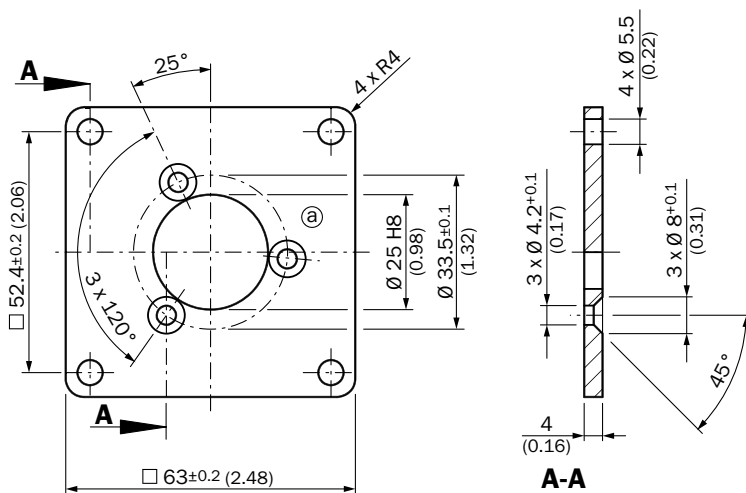
Adapter flange of aluminium for face mount flange, spigot 25 mm		
Model name	Part no.	Adaption
BEF-FA-025-060RSA	2032624	To 60 mm square mounting plate with shock absorbers



All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

Adapter flange of aluminium for face mount flange, spigot 25 mm		
Model name	Part no.	Adaption
BEF-FA-025-063REC	2033631	To 63 mm square mounting plate



All dimensions in mm (inch)

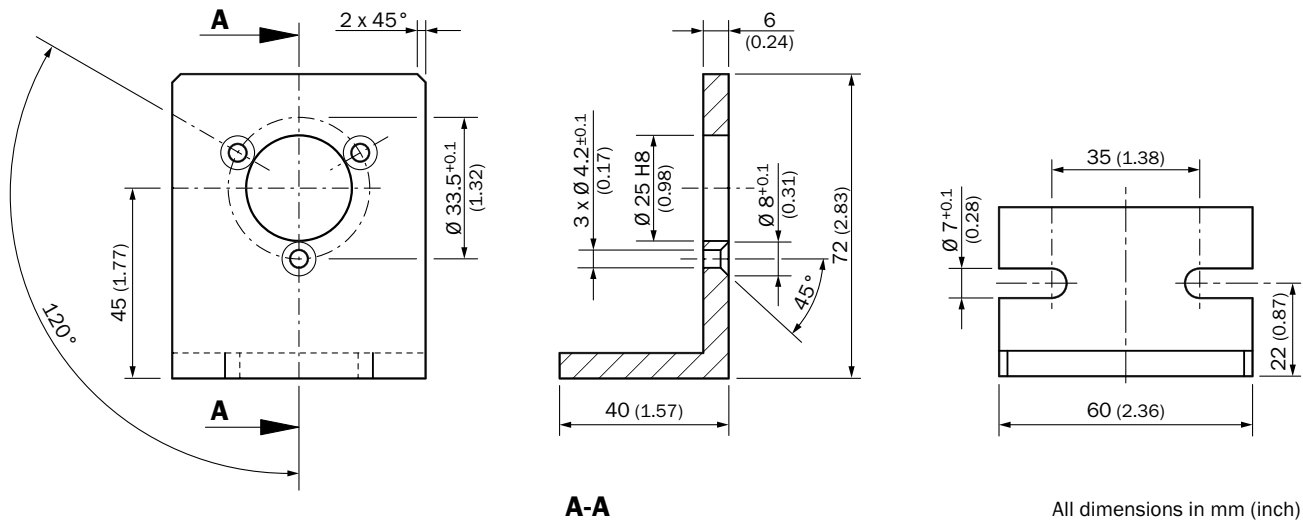
General tolerances according to DIN ISO 2768-mk

Dimensional drawings and order information

Mechanical Adapters

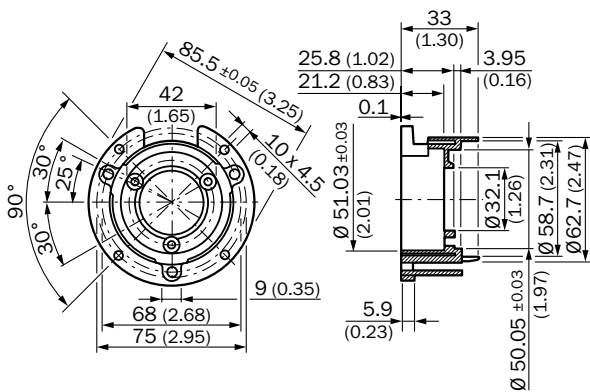
Mounting angle incl. fixing set for encoder with face mount flange

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



Mounting bell incl. fixing set for encoder with servo flange

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

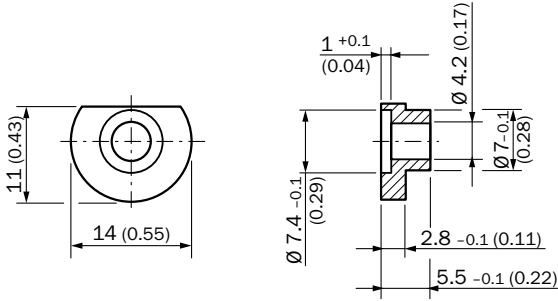


Dimensional drawings and order information

Servo clamps

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

Model name	Part no.
BEF-WK-SF	2029166



All dimensions in mm (inch)

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