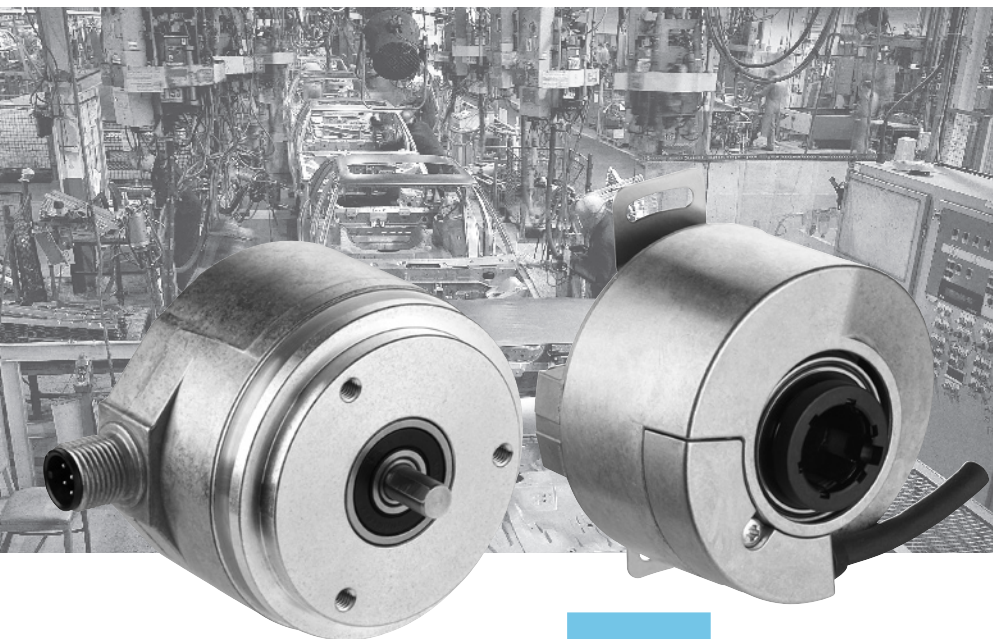


The high-resolution family: DFS60 Incremental Encoders



has a feature which substantially increases interference immunity and reliability. The DFS60 can therefore be used in harsh ambient conditions in any industrial application.

Product options:

- interfaces TTL/RS422,
 HTL/push-pull
- Face mount flange and
 Servo flange
- Blind hollow shaft and
- Through hollow shaft
- Cable outlet 1.5 m;
 3 m and 5 m
- Connector outlet M12 or M23
- 1 to 65,536 lines
 programmable by customer




The DFS60 is a high-resolution incremental hollow shaft Encoder in a 60 mm housing.

With a maximum of 65,536 lines, the DFS60 is unique in its class.

Due to the options available, applications are diverse, in areas such

as:
Excellent concentricity and exceptional robustness are achieved thanks to the large distance between the ball bearings which support the Encoder shaft. With electrical isolation between motor shaft and Encoder, the DFS60 version with through hollow shaft

- printing machines
- textile machines
- woodworking machines
- packaging machines

	Number of lines 1 up to 65,536
Incremental Encoder	



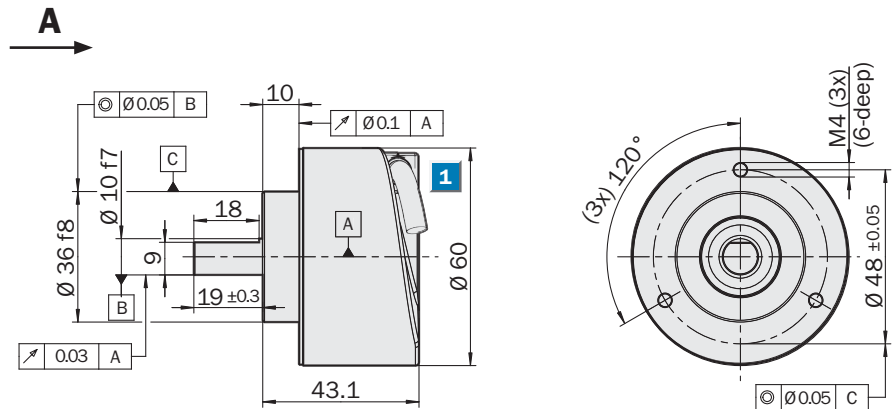
SICK | STEGMANN

Number of lines
1 up to 65,536

Incremental Encoder

- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of output signal and zero pulse width freely programmable

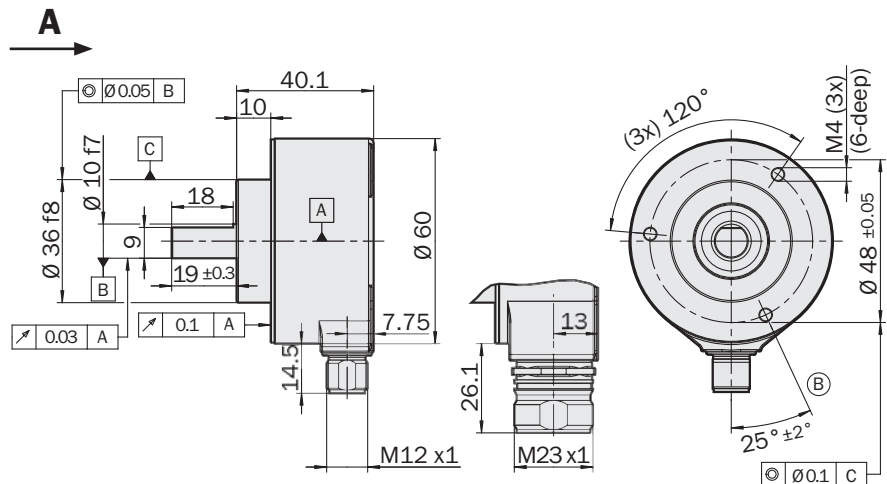
Dimensional drawing face mount flange, cable outlet



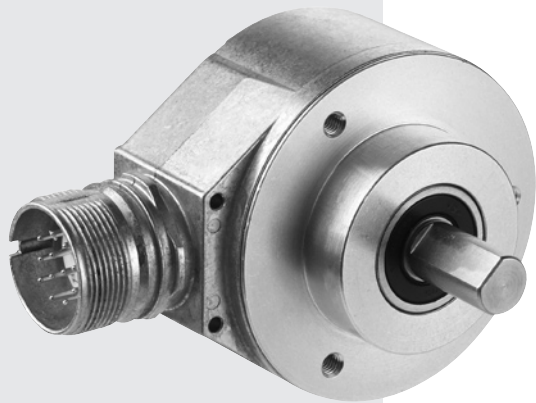
General tolerances according to DIN ISO 2768-mk

- 1** Cable- $\varnothing = 5.6 \pm 0.2$ mm
 Bending radius R = 30 mm

Dimensional drawing face mount flange, connector outlet M12 and M23



General tolerances according to DIN ISO 2768-mk



Accessories
Connection systems (page 24/25)
Mounting systems (page 26/27)
Programming Tool (page 23)

Pin assignment (page 22)

Technical Data to DIN 32878		DFS60 face mount flange		
Type		E	B	A
Shaft diameter	10 x 19 mm			
Electrical interface	4.5 ... 5.5 V, TTL/RS422			
	10 ... 32 V, TTL/RS422			
	10 ... 32 V, HTL/push-pull			
	5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		100 ... 2048	1 ... 10000	1 ... 65536
Mass	0.3 kg			
Moment of inertia to the rotor	6.2 gcm ²			
Measuring step	90° electric/number of lines			
Reference signal	Number	1		
	Position	90° electr., gated with A and B		
Error limits		± 0.3°	± 0.05°	± 0.03°
Measuring step deviation	Number of lines 1 ... 99		± 0.08°	± 0.04°
	Number of lines 100 ... 10,000	± 0.2°	± 0.01°	± 0.008°
	Number of lines > 10,000			± 0.002°
Max. output frequency	TTL/RS422	300 kHz	600 kHz	820 kHz
	HTL/push-pull	300 kHz	600 kHz	820 kHz
	TTL/HTL programmable		600 kHz	820 kHz
Operating speed ¹⁾		10,000 rpm	10,000 rpm	10,000 rpm
Angular acceleration	5 x 10 ⁵ rad/s ²			
Max. Operating torque at 20 °C	0.3 Ncm			
Starting torque at 20 °C	0.5 Ncm			
Permissible shaft loading	radial	80 N	80 N	80 N
	axial	40 N	40 N	40 N
Bearing lifetime	3 x 10 ⁹ revolutions			
Working temperature range		0 ... + 70 °C	-20 ... + 100 °C	-20 ... + 100 °C
Storage temperature range (without package)		-40 ... + 100 °C	-40 ... + 100 °C	-40 ... + 100 °C
Permissible relative humidity ²⁾	90 %			
EMC ³⁾				
Resistance	To shocks ⁴⁾	50 g/6 ms	70 g/6 ms	60 g/6 ms
	To vibration ⁵⁾	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	20 g/10 ... 2000 Hz
Protection class IEC 60529		IP 64	IP 65	IP 65
Load current	4.5 ... 5.5 V, TTL/RS422	30 mA	30 mA	30 mA
	10 ... 32 V, TTL/RS422	30 mA	30 mA	30 mA
	10 ... 32 V, HTL/push-pull	30 mA	30 mA	30 mA
	5 ... 32 V, TTL/HTL programmable		30 mA	30 mA
No-load operating current	4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, HTL/push-pull	40 mA	40 mA	40 mA
	5 ... 32 V, TTL/HTL programmable		60 mA	60 mA
Initialisation time after power on	4.5 ... 5.5 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, HTL/ Push pull	40 ms	40 ms	40 ms
	5 ... 32 V, TTL/HTL programmable		1000 ms	1000 ms

¹⁾ Self-warming 3.3k/1,000 min⁻¹
when applying, note working temperature range

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

DFS60 Incremental Encoder face mount flange

Order information TTL and HTL interface

DFS60 Incremental Encoder, face mount flange

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	Point 15	Point 16
D	F	S	6	0		-	S								

Type (cp. technical data page 3)	Mechanical interface	Electrical interface	Connection type	No. of lines
E	Solid shaft, 10 x 19 mm = 4	4.5 ... 5.5 V, TTL/RS422 = A	Connector M23, 12-pin, radial = A	Always 5 characters in clear text Selection depending on the type, see below.
B		10 ... 32 V, TTL/RS422 = C	Connector M12, 8-pin, radial = C	
A		10 ... 32 V, HTL/push-pull = E	Cable 8-core, universal 1.5 m ¹⁾ = K Cable 8-core, universal 3 m ¹⁾ = L Cable 8-core, universal 5 m ¹⁾ = M	

¹⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Type E – Number of lines per revolution

00100	00314	00500	01000	02000
00200	00360	00512	01024	02048
00250		00720	01250	

Type B – Number of lines per revolution

00050	00300	00500	01000	02000	04000	07200	Others on request
00100	00314	00512	01024	02048	04096	08192	
00200	00360	00720	01250	02500	05000	10000	
00250				03600			

Type A – Number of lines per revolution

00100	00300	00500	01000	02000	04000	07200	16384
00200	00314	00512	01024	02048	04096	08192	32768
00250	00360	00720	01250	02500	05000	10000	65536
				03600			Others on request

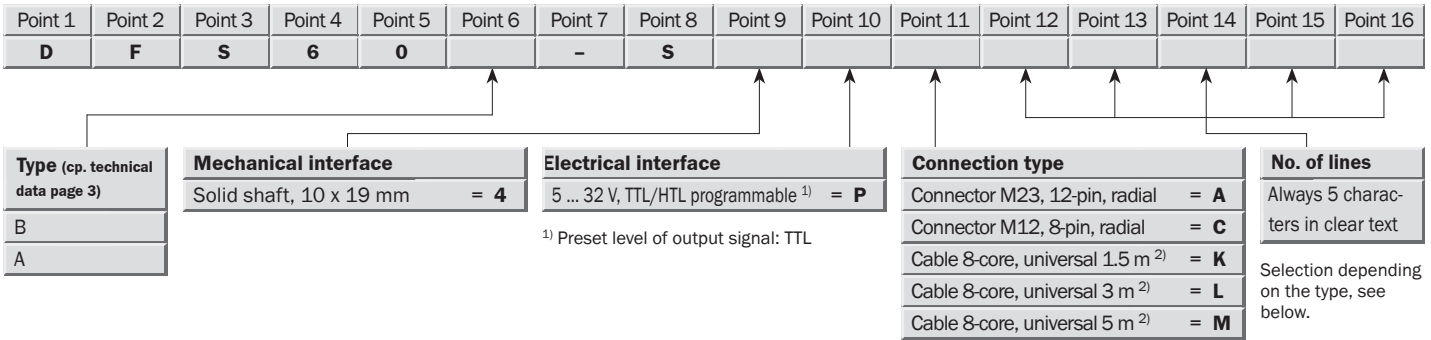
DFS60 Incremental Encoder, type E, solid shaft 10 x 19 mm,

Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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	Point 15	Point 16
D	F	S	6	0	E	-	S	4	E	C	0	1	0	2	4

Order information TTL or HTL programmable

DFS60 Incremental Encoder, face mount flange



²⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

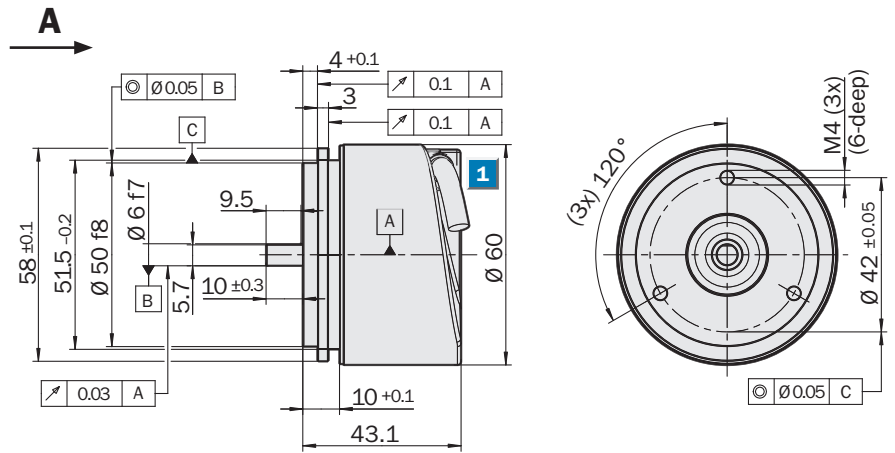
Order information		Order information	
DFS60 Incremental Encoder Type B		DFS60 Incremental Encoder Type A	
Face mount flange		Face mount flange	
Solid shaft 10 x 19 mm		Solid shaft 10 x 19 mm	
Type	Part no.	Type	Part no.
DFS60B-S4PA10000	1036720	DFS60A-S4PA65536	1036725
DFS60B-S4PC10000	1036721	DFS60A-S4PC65536	1036726
DFS60B-S4PK10000	1036722	DFS60A-S4PK65536	1036727
DFS60B-S4PL10000	1036723	DFS60A-S4PL65536	1036728
DFS60B-S4PM10000	1036724	DFS60A-S4PM65536	1036729

Number of lines
1 up to 65,536

Incremental Encoder

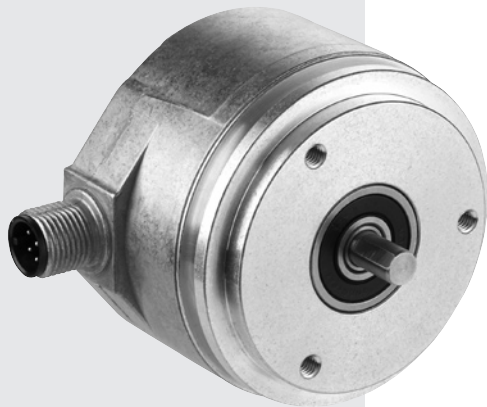
- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of output signal and zero pulse width freely programmable

Dimensional drawing servo flange, cable outlet

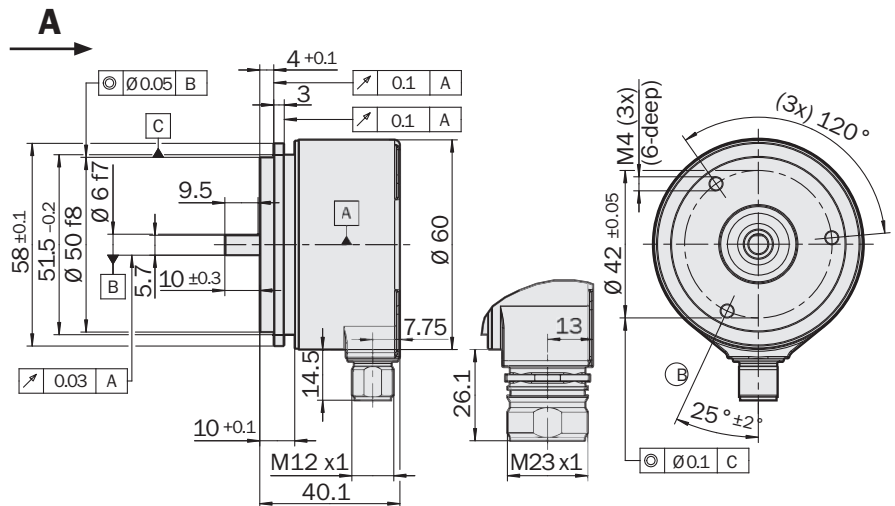


General tolerances according to DIN ISO 2768-mk

1 Cable- $\varnothing = 5.6 \pm 0.2$ mm
 Bending radius R = 30 mm



Dimensional drawing servo flange, connector outlet M12 and M23



General tolerances according to DIN ISO 2768-mk



Accessories
Connection systems (page 24/25)
Mounting systems (page 26/27)
Programming Tool (page 23)

Pin assignment (page 22)

Technical Data to DIN 32878		DFS60 servo flange		
Type		E	B	A
Shaft diameter	6 x 10 mm			
Electrical interface	4.5 ... 5.5 V, TTL/RS422			
	10 ... 32 V, TTL/RS422			
	10 ... 32 V, HTL/push-pull			
	5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		100 ... 2048	1 ... 10000	1 ... 65536
Mass	0.3 kg			
Moment of inertia to the rotor	6.2 gcm ²			
Measuring step	90° electric/number of lines			
Reference signal	Number	1		
	Position	90° electr., gated with A and B		
Error limits		± 0.3°	± 0.05°	± 0.03°
Measuring step deviation	Number of lines 1 ... 99		± 0.08°	± 0.04°
	Number of lines 100 ... 10,000	± 0.2°	± 0.01°	± 0.008°
	Number of lines > 10,000			± 0.002°
Max. output frequency	TTL/RS422	300 kHz	600 kHz	820 kHz
	HTL/push-pull	300 kHz	600 kHz	820 kHz
	TTL/HTL programmable		600 kHz	820 kHz
Operating speed ¹⁾		10,000 rpm	10,000 rpm	10,000 rpm
Angular acceleration	5 x 10 ⁵ rad/s ²			
Max. Operating torque at 20 °C	0.3 Ncm			
Starting torque at 20 °C	0.5 Ncm			
Permissible shaft loading	radial	80 N	80 N	80 N
	axial	40 N	40 N	40 N
Bearing lifetime	3 x 10 ⁹ revolutions			
Working temperature range		0 ... + 70 °C	-20 ... + 100 °C	-20 ... + 100 °C
Storage temperature range (without package)		-40 ... + 100 °C	-40 ... + 100 °C	-40 ... + 100 °C
Permissible relative humidity ²⁾	90 %			
EMC ³⁾				
Resistance	To shocks ⁴⁾	50 g/6 ms	70 g/6 ms	60 g/6 ms
	To vibration ⁵⁾	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	20 g/10 ... 2000 Hz
Protection class IEC 60529		IP 64	IP 65	IP 65
Load current	4.5 ... 5.5 V, TTL/RS422	30 mA	30 mA	30 mA
	10 ... 32 V, TTL/RS422	30 mA	30 mA	30 mA
	10 ... 32 V, HTL/push-pull	30 mA	30 mA	30 mA
	5 ... 32 V, TTL/HTL programmable		30 mA	30 mA
No-load operating current	4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, HTL/push-pull	40 mA	40 mA	40 mA
	5 ... 32 V, TTL/HTL programmable		60 mA	60 mA
Initialisation time after power on	4.5 ... 5.5 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, HTL/ Push pull	40 ms	40 ms	40 ms
	5 ... 32 V, TTL/HTL programmable		1000 ms	1000 ms

¹⁾ Self-warming 3.3k/1,000 min⁻¹
when applying, note working temperature range

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

Order information TTL and HTL interface

DFS60 Incremental Encoder, servo flange

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	Point 15	Point 16
D	F	S	6	0		-	S								

Type (cp. technical data page 7)	Mechanical interface	Electrical interface	Connection type	No. of lines
E	Solid shaft, 6 x 10 mm = 1	4.5 ... 5.5 V, TTL/RS422 = A	Connector M23, 12-pin, radial = A	Always 5 characters in clear text Selection depending on the type, see below.
B		10 ... 32 V, TTL/RS422 = C	Connector M12, 8-pin, radial = C	
A		10 ... 32 V, HTL/push-pull = E	Cable 8-core, universal 1.5 m ¹⁾ = K	
			Cable 8-core, universal 3 m ¹⁾ = L	
			Cable 8-core, universal 5 m ¹⁾ = M	

¹⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Type E – Number of lines per revolution

00100	00314	00500	01000	02000
00200	00360	00512	01024	02048
00250		00720	01250	

Type B – Number of lines per revolution

00050	00300	00500	01000	02000	04000	07200	Others on request
00100	00314	00512	01024	02048	04096	08192	
00200	00360	00720	01250	02500	05000	10000	
00250				03600			

Type A – Number of lines per revolution

00100	00300	00500	01000	02000	04000	07200	16384
00200	00314	00512	01024	02048	04096	08192	32768
00250	00360	00720	01250	02500	05000	10000	65536
				03600			Others on request

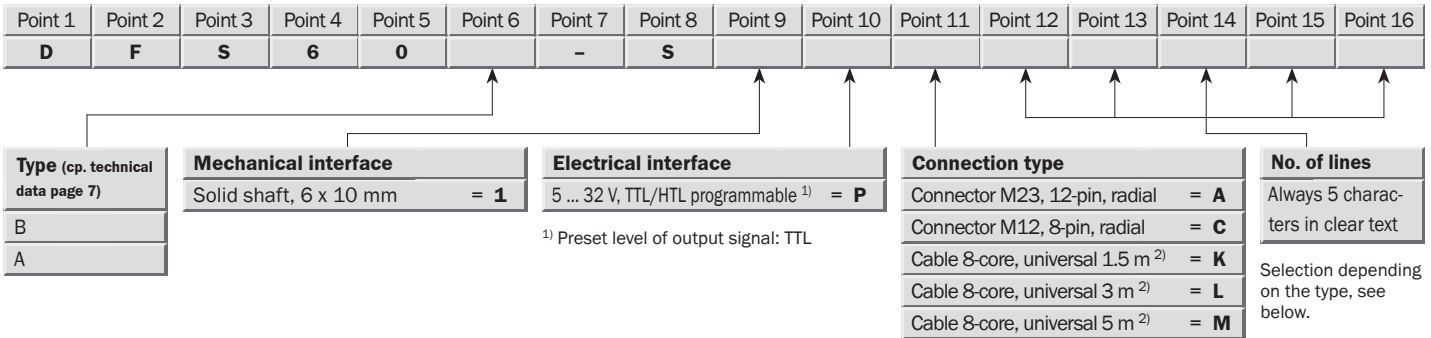
DFS60 Incremental Encoder, type E, solid shaft 6 x 10 mm,

Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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	Point 15	Point 16
D	F	S	6	0	E	-	S	1	E	C	0	1	0	2	4

Order information TTL or HTL programmable

DFS60 Incremental Encoder, servo flange



²⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Order information		Order information	
DFS60 Incremental Encoder Type B		DFS60 Incremental Encoder Type A	
Servo flange		Servo flange	
Solid shaft 6 x 10 mm		Solid shaft 6 x 10 mm	
Type	Part no.	Type	Part no.
DFS60B-S1PA10000	1036755	DFS60A-S1PA65536	1036760
DFS60B-S1PC10000	1036756	DFS60A-S1PC65536	1036761
DFS60B-S1PK10000	1036757	DFS60A-S1PK65536	1036762
DFS60B-S1PL10000	1036758	DFS60A-S1PL65536	1036763
DFS60B-S1PM10000	1036759	DFS60A-S1PM65536	1036764

Number of lines
1 up to 65,536

Incremental Encoder

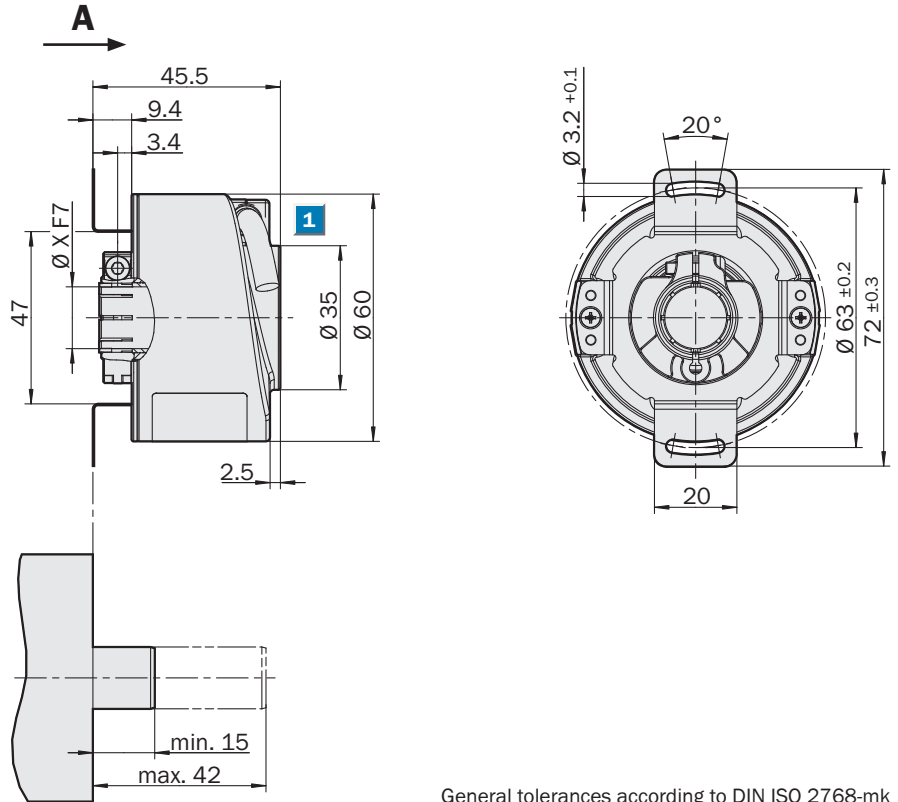
- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of output signal and zero pulse width freely programmable



Accessories
Connection systems (page 24/25)
Mounting systems (page 26/27)
Programming Tool (page 23)

Pin assignment (page 22)

Dimensional drawing blind hollow shaft, cable outlet

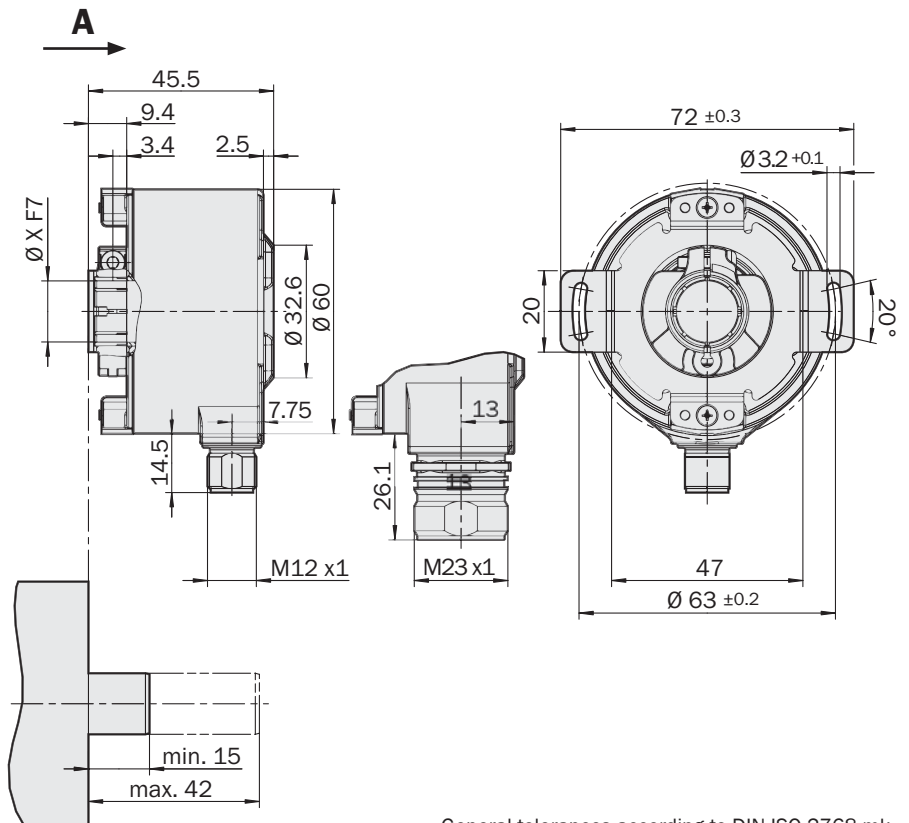


General tolerances according to DIN ISO 2768-mk

Customer-side

- 1** Cable- $\varnothing = 5.6 \pm 0.2$ mm
 Bending radius R = 30 mm

Dimensional drawing Aufsteckhohlwelle, connector outlet M12 and M23



General tolerances according to DIN ISO 2768-mk

Customer-side

Technical Data to DIN 32878		DFS60 blind hollow shaft		
Type		E	B	A
Shaft diameter	8, 10, 12, 14, 15 mm a. 3/8", 1/2", 5/8"			
Electrical interface	4.5 ... 5.5 V, TTL/RS422			
	10 ... 32 V, TTL/RS422			
	10 ... 32 V, HTL/push-pull			
	5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		100 ... 2048	1 ... 10000	1 ... 65536
Mass	0.2 kg			
Moment of inertia to the rotor	40 gcm ²			
Measuring step	90° electric/number of lines			
Reference signal	Number	1		
	Position	90° electr., gated with A and B		
Error limits		± 0.3°	± 0.05°	± 0.03°
Measuring step deviation	Number of lines 1 ... 99		± 0.08°	± 0.04°
	Number of lines 100 ... 10,000	± 0.2°	± 0.01°	± 0.008°
	Number of lines > 10,000			± 0.002°
Max. output frequency	TTL/RS422	300 kHz	600 kHz	820 kHz
	HTL/push-pull	300 kHz	600 kHz	820 kHz
	TTL/HTL programmable		600 kHz	820 kHz
Operating speed ¹⁾		6,000 rpm	6,000 rpm	6,000 rpm
Angular acceleration	5 x 10 ⁵ rad/s ²			
Max. Operating torque at 20 °C	0.6 Ncm			
Starting torque at 20 °C	0.8 Ncm			
Permissible movement of the drive element				
radial	Static/dynamic	± 0.3/± 0.1 mm	± 0.3/± 0.1 mm	± 0.3/± 0.05 mm
axial	Static/dynamic	± 0.5/± 0.2 mm	± 0.5/± 0.2 mm	± 0.5/± 0.01 mm
Bearing lifetime	3 x 10 ⁹ revolutions			
Working temperature range		0 ... + 70 °C	-20 ... + 100 °C	-20 ... + 100 °C
Storage temperature range (without package)		-40 ... + 100 °C	-40 ... + 100 °C	-40 ... + 100 °C
Permissible relative humidity ²⁾	90 %			
EMC ³⁾				
Resistance	To shocks ⁴⁾	50 g/6 ms	70 g/6 ms	60 g/6 ms
	To vibration ⁵⁾	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	20 g/10 ... 2000 Hz
Protection class IEC 60529		IP 64	IP 65	IP 65
Load current	4.5 ... 5.5 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, HTL/push-pull	max. 30 mA	max. 30 mA	max. 30 mA
	5 ... 32 V, TTL/HTL programmable		max. 30 mA	max. 30 mA
No-load operating current	4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, HTL/push-pull	40 mA	40 mA	40 mA
	5 ... 32 V, TTL/HTL programmable		60 mA	60 mA
Initialisation time after power on	4.5 ... 5.5 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, HTL/HTL programmable	40 ms	40 ms	40 ms
	5 ... 32 V, TTL/HTL programmable		1000 ms	1000 ms

¹⁾ Self-warming 3.3k/1,000 min⁻¹
when applying, note working temperature range

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

Order information TTL and HTL interface

DFS60 Incremental Encoder, blind hollow 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	Point 15	Point 16
D	F	S	6	0		-	B								

Type (cp. technical data page 11)	Mechanical interface	Electrical interface	Connection type	No. of lines
E	Blind hollow shaft 8 mm = B	4.5 ... 5.5 V, TTL/RS422 = A	Connector M23, 12-pin, radial = A	Always 5 characters in clear text
B	Blind hollow shaft 3/8" = C	10 ... 32 V, TTL/RS422 = C	Connector M12, 8-pin, radial = C	
A	Blind hollow shaft 10 mm = D	10 ... 32 V, HTL/push-pull = E	Cable 8-core, universal 1.5 m ¹⁾ = K	Selection depending on the type, see below.
	Blind hollow shaft 12 mm = E		Cable 8-core, universal 3 m ¹⁾ = L	
	Blind hollow shaft 1/2" = F		Cable 8-core, universal 5 m ¹⁾ = M	
	Blind hollow shaft 14 mm = G			
	Blind hollow shaft 15 mm = H			
	Blind hollow shaft 5/8" = J			

¹⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Type E – Number of lines per revolution

00100	00314	00500	01000	02000
00200	00360	00512	01024	02048
00250		00720	01250	

Type B – Number of lines per revolution

00050	00300	00500	01000	02000	04000	07200	Others on request
00100	00314	00512	01024	02048	04096	08192	
00200	00360	00720	01250	02500	05000	10000	
00250				03600			

Type A – Number of lines per revolution

00100	00300	00500	01000	02000	04000	07200	16384
00200	00314	00512	01024	02048	04096	08192	32768
00250	00360	00720	01250	02500	05000	10000	65536
				03600			Others on request

DFS60 Incremental Encoder, type E, blind hollow shaft, diameter 10 mm,

Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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	Point 15	Point 16
D	F	S	6	0	E	-	B	D	E	C	0	1	0	2	4

Order information TTL or HTL programmable

DFS60 Incremental Encoder, blind hollow 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	Point 15	Point 16
D	F	S	6	0		-	B								

Type (cp. technical data page 11) B A	Mechanical interface Blind hollow shaft 8 mm = B Blind hollow shaft 3/8" = C Blind hollow shaft 10 mm = D Blind hollow shaft 12 mm = E Blind hollow shaft 1/2" = F Blind hollow shaft 14 mm = G Blind hollow shaft 15 mm = H Blind hollow shaft 5/8" = J	Electrical interface 5 ... 32 V, TTL/HTL programmable ¹⁾ = P ¹⁾ Preset level of output signal: TTL	Connection type Connector M23, 12-pin, radial = A Connector M12, 8-pin, radial = C Cable 8-core, universal 1.5 m ²⁾ = K Cable 8-core, universal 3 m ²⁾ = L Cable 8-core, universal 5 m ²⁾ = M	No. of lines Always 5 characters in clear text Selection depending on the type, see below.
--	---	--	---	---

²⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Order information DFS60 Incremental Encoder Type B Blind hollow shaft Connector M23	Order information DFS60 Incremental Encoder Type B Blind hollow shaft Connector M12	Order information DFS60 Incremental Encoder Type B Blind hollow shaft Cable 1,5 m	Order information DFS60 Incremental Encoder Type B Blind hollow shaft Cable 3 m																																																																								
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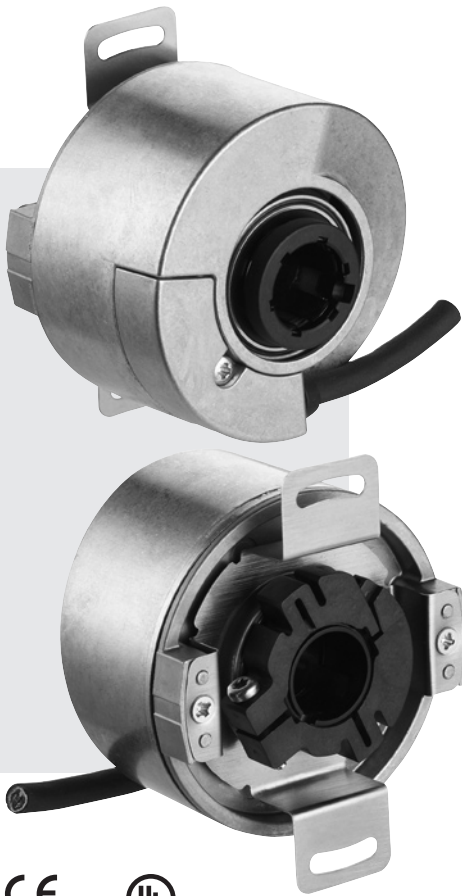
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Programming Tool (page 23)

Number of lines
1 up to 65,536

Incremental Encoder

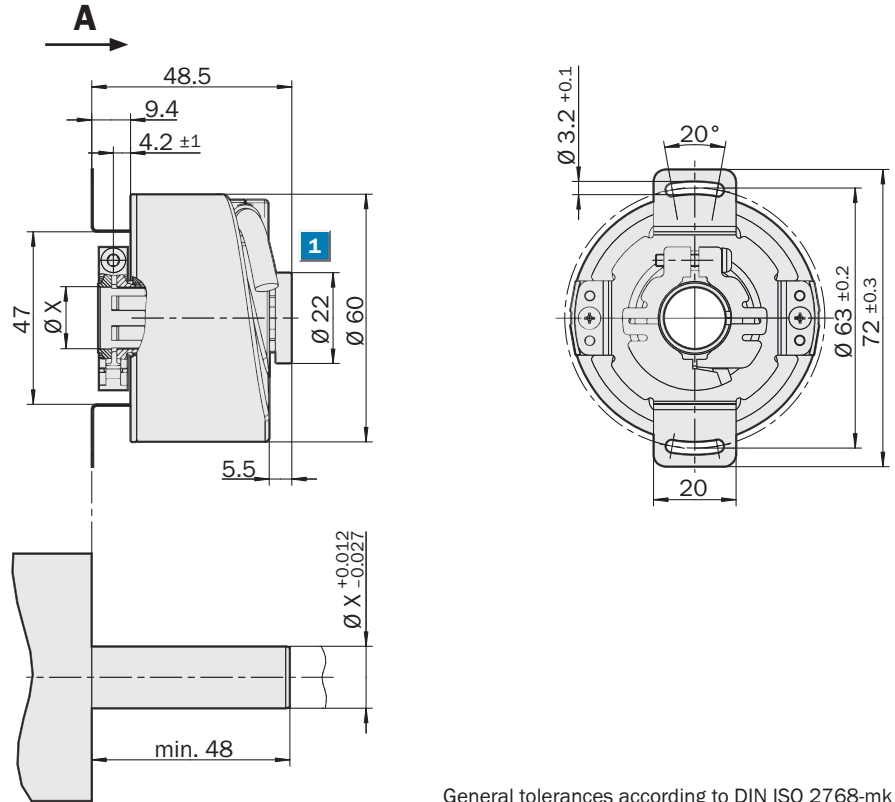
- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of output signal and zero pulse width freely programmable



Accessories
Connection systems (page 24/25)
Mounting systems (page 26/27)
Programming Tool (page 23)

Pin assignment (page 22)

Dimensional drawing through hollow shaft plastic, cable outlet

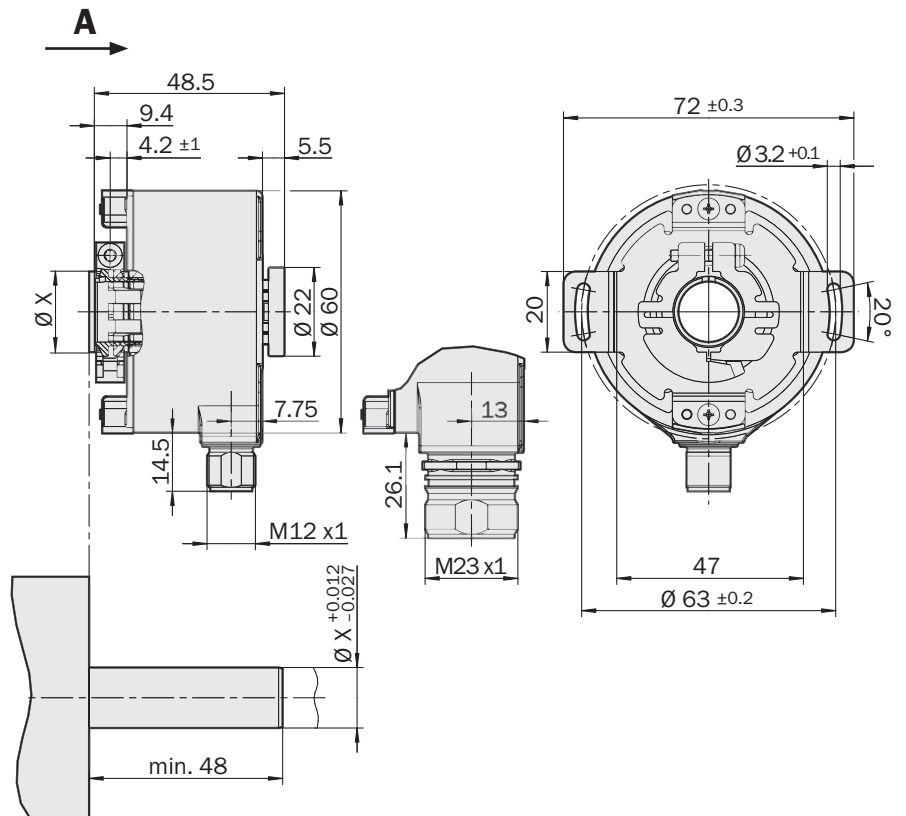


General tolerances according to DIN ISO 2768-mk

Customer-side

- 1** Cable-Ø = 5.6 ± 0.2 mm
Bending radius R = 30 mm

Dimensional drawing through hollow shaft plastic, connector outlet M12 and M23



General tolerances according to DIN ISO 2768-mk

Customer-side

Technical Data to DIN 32878		DFS60 through hollow shaft plastic		
Type		E	B	A
Shaft diameter	10, 12, 14, 15 mm a. 3/8", 1/2"			
Electrical interface	4.5 ... 5.5 V, TTL/RS422			
	10 ... 32 V, TTL/RS422			
	10 ... 32 V, HTL/push-pull			
	5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution	100 ... 2048	1 ... 10000	1 ... 65536	
Mass	0.2 kg			
Moment of inertia to the rotor	40 gcm ²			
Measuring step	90° electric/number of lines			
Reference signal	Number	1		
	Position	90° electr., gated with A and B		
Error limits		± 0.3°	± 0.05°	± 0.03°
Measuring step deviation	Number of lines 1 ... 99		± 0.08°	± 0.04°
	Number of lines 100 ... 10,000	± 0.2°	± 0.01°	± 0.008°
	Number of lines > 10,000			± 0.002°
Max. output frequency	TTL/RS422	300 kHz	600 kHz	820 kHz
	HTL/push-pull	300 kHz	600 kHz	820 kHz
	TTL/HTL programmable		600 kHz	820 kHz
Operating speed ¹⁾		9,000 rpm	12,000 rpm	12,000 rpm
Angular acceleration	5 x 10 ⁵ rad/s ²			
Max. Operating torque at 20 °C	0.6 Ncm			
Starting torque at 20 °C	0.8 Ncm			
Permissible movement of the drive element				
radial	Static/dynamic	± 0.3/± 0.1 mm	± 0.3/± 0.1 mm	± 0.3/± 0.05 mm
axial	Static/dynamic	± 0.5/± 0.2 mm	± 0.5/± 0.2 mm	± 0.5/± 0.01 mm
Bearing lifetime	3 x 10 ⁹ revolutions			
Working temperature range		0 ... + 70 °C	-20 ... + 100 °C	-20 ... + 100 °C
Storage temperature range (without package)		-40 ... + 100 °C	-40 ... + 100 °C	-40 ... + 100 °C
Permissible relative humidity ²⁾	90 %			
EMC ³⁾				
Resistance	To shocks ⁴⁾	50 g/6 ms	70 g/6 ms	60 g/6 ms
	To vibration ⁵⁾	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	20 g/10 ... 2000 Hz
Protection class IEC 60529		IP 64	IP 65	IP 65
Load current	4.5 ... 5.5 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, HTL/push-pull	max. 30 mA	max. 30 mA	max. 30 mA
	5 ... 32 V, TTL/HTL programmable		max. 30 mA	max. 30 mA
No-load operating current	4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, HTL/push-pull	40 mA	40 mA	40 mA
	5 ... 32 V, TTL/HTL programmable		60 mA	60 mA
Initialisation time after power on	4.5 ... 5.5 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, HTL/ Push pull	40 ms	40 ms	40 ms
	5 ... 32 V, TTL/HTL programmable		1000 ms	1000 ms

¹⁾ Self-warming 3.3k/1,000 min⁻¹
when applying, note working temperature range

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

Order information TTL and HTL interface

DFS60 Incremental Encoder, through hollow shaft plastic

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	Point 15	Point 16
D	F	S	6	0		-	T								

Type (cp. technical data page 15)	Mechanical interface Through hollow shaft	Electrical interface	Connection type	No. of lines
E	Plastic 3/8" = 3	4.5 ... 5.5 V, TTL/RS422 = A	Connector M23, 12-pin, radial = A	Always 5 characters in clear text
B	Plastic 10 mm = 4	10 ... 32 V, TTL/RS422 = C	Connector M12, 8-pin, radial = C	
A	Plastic 12 mm = 5	10 ... 32 V, HTL/push-pull = E	Cable 8-core, universal 1.5 m ¹⁾ = K	Selection depending on the type, see below.
	Plastic 1/2" = 6		Cable 8-core, universal 3 m ¹⁾ = L	
	Plastic 14 mm = 7		Cable 8-core, universal 5 m ¹⁾ = M	
	Plastic 15 mm = 8			

¹⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Type E – Number of lines per revolution

00100	00314	00500	01000	02000
00200	00360	00512	01024	02048
00250		00720	01250	

Type B – Number of lines per revolution

00050	00300	00500	01000	02000	04000	07200	Others on request
00100	00314	00512	01024	02048	04096	08192	
00200	00360	00720	01250	02500	05000	10000	
00250				03600			

Type A – Number of lines per revolution

00100	00300	00500	01000	02000	04000	07200	16384
00200	00314	00512	01024	02048	04096	08192	32768
00250	00360	00720	01250	02500	05000	10000	65536
				03600			Others on request

DFS60 Incremental Encoder, type E, through hollow shaft plastic, diameter 10 mm,

Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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	Point 15	Point 16
D	F	S	6	0	E	-	T	4	E	C	0	1	0	2	4

Order information TTL or HTL programmable

DFS60 Incremental Encoder, through hollow shaft plastic

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	Point 15	Point 16
D	F	S	6	0		-	T								

Type (cp. technical data page 15)	Mechanical interface	Electrical interface	Connection type	No. of lines
B	Through hollow shaft	5 ... 32 V, TTL/HTL programmable ¹⁾ = P	Connector M23, 12-pin, radial = A	Always 5 characters in clear text
A	Plastic 3/8" = 3	¹⁾ Preset level of output signal: TTL	Connector M12, 8-pin, radial = C	Selection depending on the type, see below.
	Plastic 10 mm = 4		Cable 8-core, universal 1.5 m ²⁾ = K	
	Plastic 12 mm = 5		Cable 8-core, universal 3 m ²⁾ = L	
	Plastic 1/2" = 6		Cable 8-core, universal 5 m ²⁾ = M	
	Plastic 14 mm = 7			
	Plastic 15 mm = 8			

²⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Order information	Order information	Order information	Order information
DFS60 Incremental Encoder Type B	DFS60 Incremental Encoder Type B	DFS60 Incremental Encoder Type B	DFS60 Incremental Encoder Type B
Through hollow shaft plastic	Through hollow shaft plastic	Through hollow shaft plastic	Through hollow shaft plastic
Connector M23	Connector M12	Cable 1,5 m	Cable 3 m
Type	Type	Type	Type
Part no.	Part no.	Part no.	Part no.
DFS60B-T3PA10000	DFS60B-T3PC10000	DFS60B-T3PK10000	DFS60B-T3PL10000
1036845	1036851	1036857	1036863
DFS60B-T4PA10000	DFS60B-T4PC10000	DFS60B-T4PK10000	DFS60B-T4PL10000
1036846	1036852	1036858	1036864
DFS60B-T5PA10000	DFS60B-T5PC10000	DFS60B-T5PK10000	DFS60B-T5PL10000
1036847	1036853	1036859	1036865
DFS60B-T6PA10000	DFS60B-T6PC10000	DFS60B-T6PK10000	DFS60B-T6PL10000
1036848	1036854	1036860	1036866
DFS60B-T7PA10000	DFS60B-T7PC10000	DFS60B-T7PK10000	DFS60B-T7PL10000
1036849	1036855	1036861	1036867
DFS60B-T8PA10000	DFS60B-T8PC10000	DFS60B-T8PK10000	DFS60B-T8PL10000
1036850	1036856	1036862	1036868

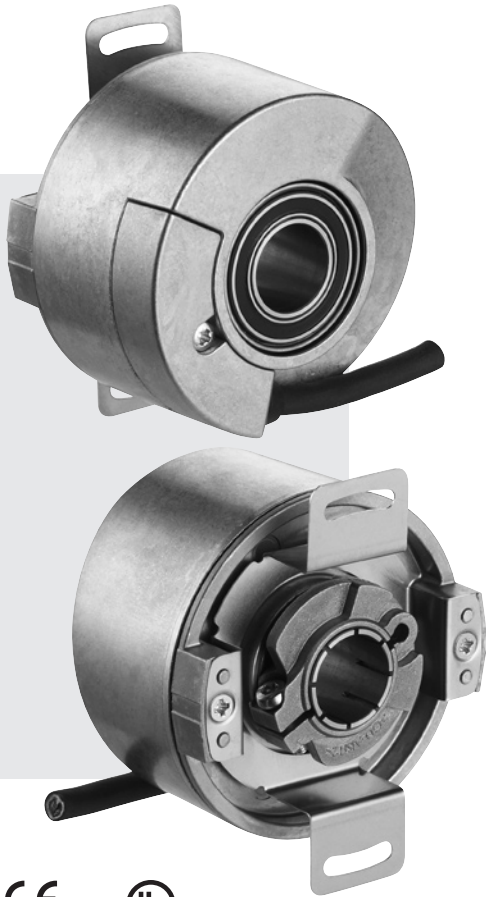
Order information	Order information	Order information	Order information
DFS60 Incremental Encoder Type B	DFS60 Incremental Encoder Type A	DFS60 Incremental Encoder Type A	DFS60 Incremental Encoder Type A
Through hollow shaft plastic	Through hollow shaft plastic	Through hollow shaft plastic	Through hollow shaft plastic
Cable 5 m	Connector M23	Connector M12	Cable 1,5 m
Type	Type	Type	Type
Part no.	Part no.	Part no.	Part no.
DFS60B-T3PM10000	DFS60A-T3PA65536	DFS60A-T3PC65536	DFS60A-T3PK65536
1036869	1036875	1036881	1036887
DFS60B-T4PM10000	DFS60A-T4PA65536	DFS60A-T4PC65536	DFS60A-T4PK65536
1036870	1036876	1036882	1036888
DFS60B-T5PM10000	DFS60A-T5PA65536	DFS60A-T5PC65536	DFS60A-T5PK65536
1036871	1036877	1036883	1036889
DFS60B-T6PM10000	DFS60A-T6PA65536	DFS60A-T6PC65536	DFS60A-T6PK65536
1036872	1036878	1036884	1036890
DFS60B-T7PM10000	DFS60A-T7PA65536	DFS60A-T7PC65536	DFS60A-T7PK65536
1036873	1036879	1036885	1036891
DFS60B-T8PM10000	DFS60A-T8PA65536	DFS60A-T8PC65536	DFS60A-T8PK65536
1036874	1036880	1036886	1036892

Order information	Order information
DFS60 Incremental Encoder Type A	DFS60 Incremental Encoder Type A
Through hollow shaft plastic	Through hollow shaft plastic
Cable 3 m	Cable 5 m
Type	Type
Part no.	Part no.
DFS60A-T3PL65536	DFS60A-T3PM65536
1036893	1036899
DFS60A-T4PL65536	DFS60A-T4PM65536
1036894	1036900
DFS60A-T5PL65536	DFS60A-T5PM65536
1036895	1036901
DFS60A-T6PL65536	DFS60A-T6PM65536
1036896	1036902
DFS60A-T7PL65536	DFS60A-T7PM65536
1036897	1036903
DFS60A-T8PL65536	DFS60A-T8PM65536
1036898	1036904

Number of lines
1 up to 65,536

Incremental Encoder

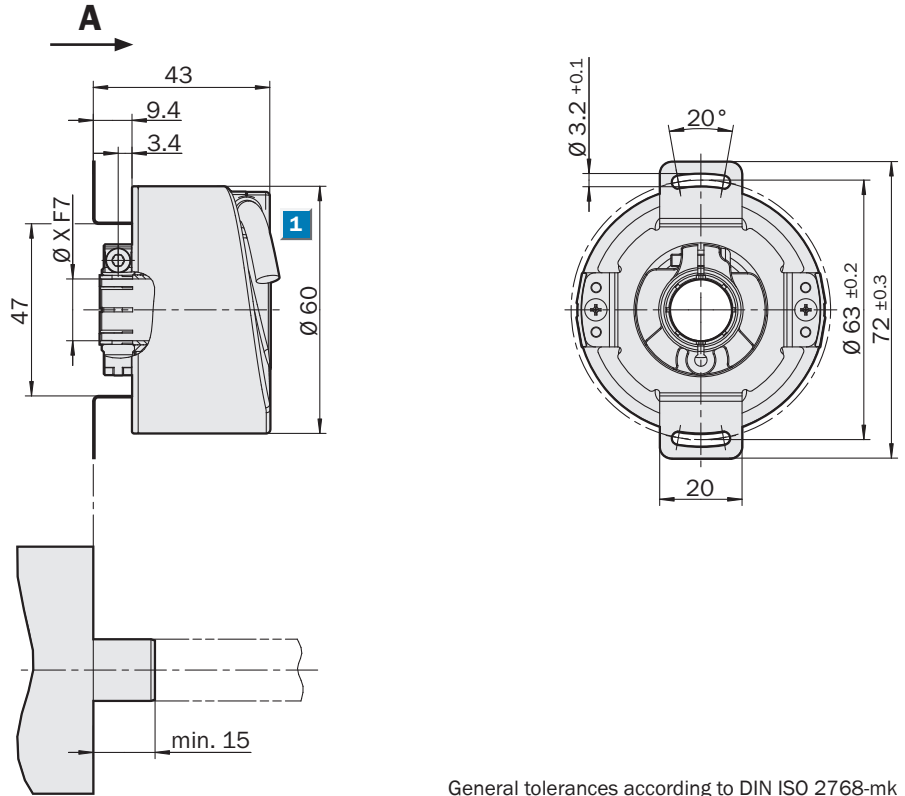
- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of
output signal and zero pulse
width freely programmable



Accessories
Connection systems (page 24/25)
Mounting systems (page 26/27)
Programming Tool (page 23)

Pin assignment (page 22)

Dimensional drawing through hollow shaft metal, cable outlet

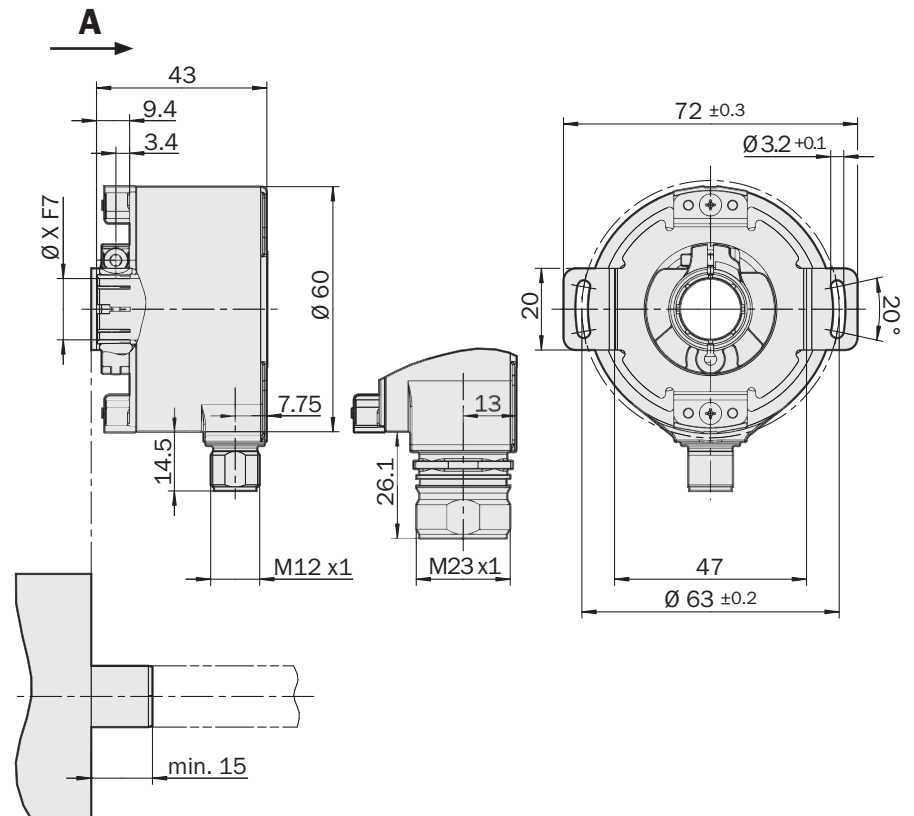


General tolerances according to DIN ISO 2768-mk

Customer-side

- 1 Cable-Ø = 5.6 ± 0.2 mm
Bending radius R = 30 mm

Dimensional drawing through hollow shaft metal, connector outlet M12 and M23



General tolerances according to DIN ISO 2768-mk

Customer-side

Technical Data to DIN 32878		DFS60 through hollow shaft metal		
Type		E	B	A
Shaft diameter	8, 10, 12, 14, 15 mm a. 3/8", 1/2", 5/8"			
Electrical interface	4.5 ... 5.5 V, TTL/RS422			
	10 ... 32 V, TTL/RS422			
	10 ... 32 V, HTL/push-pull			
	5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		100 ... 2048	1 ... 10000	1 ... 65536
Mass	0.2 kg			
Moment of inertia to the rotor	40 gcm ²			
Measuring step	90° electric/number of lines			
Reference signal	Number	1		
	Position	90° electr., gated with A and B		
Error limits		± 0.3°	± 0.05°	± 0.03°
Measuring step deviation	Number of lines 1 ... 99		± 0.08°	± 0.04°
	Number of lines 100 ... 10,000	± 0.2°	± 0.01°	± 0.008°
	Number of lines > 10,000			± 0.002°
Max. output frequency	TTL/RS422	300 kHz	600 kHz	820 kHz
	HTL/push-pull	300 kHz	600 kHz	820 kHz
	TTL/HTL programmable		600 kHz	820 kHz
Operating speed ¹⁾		9,000 rpm	9,000 rpm	9,000 rpm
Angular acceleration	5 x 10 ⁵ rad/s ²			
Max. Operating torque at 20 °C	0.6 Ncm			
Starting torque at 20 °C	0.8 Ncm			
Permissible movement of the drive element				
radial	Static/dynamic	± 0.3/± 0.1 mm	± 0.3/± 0.1 mm	± 0.3/± 0.05 mm
axial	Static/dynamic	± 0.5/± 0.2 mm	± 0.5/± 0.2 mm	± 0.5/± 0.01 mm
Bearing lifetime	3 x 10 ⁹ revolutions			
Working temperature range		0 ... + 70 °C	-20 ... + 100 °C	-20 ... + 100 °C
Storage temperature range (without package)		-40 ... + 100 °C	-40 ... + 100 °C	-40 ... + 100 °C
Permissible relative humidity ²⁾	90 %			
EMC ³⁾				
Resistance	To shocks ⁴⁾	50 g/6 ms	70 g/6 ms	60 g/6 ms
	To vibration ⁵⁾	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	20 g/10 ... 2000 Hz
Protection class IEC 60529		IP 64	IP 65	IP 65
Load current	4.5 ... 5.5 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, TTL/RS422	max. 30 mA	max. 30 mA	max. 30 mA
	10 ... 32 V, HTL/push-pull	max. 30 mA	max. 30 mA	max. 30 mA
	5 ... 32 V, TTL/HTL programmable		max. 30 mA	max. 30 mA
No-load operating current	4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, TTL/RS422	40 mA	40 mA	40 mA
	10 ... 32 V, HTL/push-pull	40 mA	40 mA	40 mA
	5 ... 32 V, TTL/HTL programmable		60 mA	60 mA
Initialisation time after power on	4.5 ... 5.5 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, TTL/RS422	40 ms	40 ms	40 ms
	10 ... 32 V, HTL/HTL programmable	40 ms	40 ms	40 ms
	5 ... 32 V, TTL/HTL programmable		1000 ms	1000 ms

¹⁾ Self-warming 3.3k/1,000 min⁻¹
when applying, note working temperature range

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

Order information TTL and HTL interface

DFS60 Incremental Encoder, through hollow shaft metal

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	Point 15	Point 16
D	F	S	6	0		-	T								

Type (cp. technical data page 19)	Mechanical interface Through hollow shaft	Electrical interface	Connection type	No. of lines
E	Metal 8 mm = B	4.5 ... 5.5 V, TTL/RS422 = A	Connector M23, 12-pin, radial = A	Always 5 characters in clear text
B	Metal 3/8" = C	10 ... 32 V, TTL/RS422 = C	Connector M12, 8-pin, radial = C	
A	Metal 10 mm = D	10 ... 32 V, HTL/push-pull = E	Cable 8-core, universal 1.5 m ¹⁾ = K	Selection depending on the type, see below.
	Metal 12 mm = E		Cable 8-core, universal 3 m ¹⁾ = L	
	Metal 1/2" = F		Cable 8-core, universal 5 m ¹⁾ = M	
	Metal 14 mm = G			
	Metal 15 mm = H			
	Metal 5/8" = J			

¹⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Type E – Number of lines per revolution

00100	00314	00500	01000	02000
00200	00360	00512	01024	02048
00250		00720	01250	

Type B – Number of lines per revolution

00050	00300	00500	01000	02000	04000	07200	Others on request
00100	00314	00512	01024	02048	04096	08192	
00200	00360	00720	01250	02500	05000	10000	
00250				03600			

Type A – Number of lines per revolution

00100	00300	00500	01000	02000	04000	07200	16384
00200	00314	00512	01024	02048	04096	08192	32768
00250	00360	00720	01250	02500	05000	10000	65536
				03600			Others on request

DFS60 Incremental Encoder, type E, through hollow shaft metal, diameter 10 mm,

Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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	Point 15	Point 16
D	F	S	6	0	E	-	T	D	E	C	0	1	0	2	4

Order information TTL or HTL programmable

DFS60 Incremental Encoder, through hollow shaft metal

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	Point 15	Point 16
D	F	S	6	0		-	T								

Type (cp. technical data page 19) B A	Mechanical interface Through hollow shaft Metal 8 mm = B Metal 3/8" = C Metal 10 mm = D Metal 12 mm = E Metal 1/2" = F Metal 14 mm = G Metal 15 mm = H Metal 5/8" = J	Electrical interface 5 ... 32 V, TTL/HTL programmable ¹⁾ = P ¹⁾ Preset level of output signal: TTL	Connection type Connector M23, 12-pin, radial = A Connector M12, 8-pin, radial = C Cable 8-core, universal 1.5 m ²⁾ = K Cable 8-core, universal 3 m ²⁾ = L Cable 8-core, universal 5 m ²⁾ = M	No. of lines Always 5 characters in clear text Selection depending on the type, see below.
--	--	---	--	---

²⁾ The universal cable outlet is positioned in such a way, that it is possible to lay the cable in a radial or axial direction without kinking it.

Order information	
DFS60 Incremental Encoder Type B	
Through hollow shaft metal	
Connector M23	
Type	Part no.
DFS60B-TBPA10000	1036905
DFS60B-TCPA10000	1036906
DFS60B-TDPA10000	1036907
DFS60B-TEPA10000	1036908
DFS60B-TFPA10000	1036909
DFS60B-TGPA10000	1036910
DFS60B-THPA10000	1036911
DFS60B-TJPA10000	1036912

Order information	
DFS60 Incremental Encoder Type B	
Through hollow shaft metal	
Connector M12	
Type	Part no.
DFS60B-TBPC10000	1036913
DFS60B-TCPC10000	1036914
DFS60B-TDPC10000	1036915
DFS60B-TEPC10000	1036916
DFS60B-TFPC10000	1036917
DFS60B-TGPC10000	1036918
DFS60B-THPC10000	1036919
DFS60B-TJPC10000	1036920

Order information	
DFS60 Incremental Encoder Type B	
Through hollow shaft metal	
Cable 1,5 m	
Type	Part no.
DFS60B-TBPK10000	1036921
DFS60B-TCPK10000	1036922
DFS60B-TDPK10000	1036923
DFS60B-TEPK10000	1036924
DFS60B-TFPK10000	1036925
DFS60B-TGPK10000	1036926
DFS60B-THPK10000	1036927
DFS60B-TJPK10000	1036928

Order information	
DFS60 Incremental Encoder Type B	
Through hollow shaft metal	
Cable 3 m	
Type	Part no.
DFS60B-TBPL10000	1036929
DFS60B-TCPL10000	1036930
DFS60B-TDPL10000	1036931
DFS60B-TEPL10000	1036932
DFS60B-TFPL10000	1036933
DFS60B-TGPL10000	1036934
DFS60B-THPL10000	1036935
DFS60B-TJPL10000	1036936

Order information	
DFS60 Incremental Encoder Type B	
Through hollow shaft metal	
Cable 5 m	
Type	Part no.
DFS60B-TBPM10000	1036937
DFS60B-TCPM10000	1036938
DFS60B-TDPM10000	1036939
DFS60B-TEPM10000	1036940
DFS60B-TFPM10000	1036941
DFS60B-TGPM10000	1036942
DFS60B-THPM10000	1036943
DFS60B-TJPM10000	1036944

Order information	
DFS60 Incremental Encoder Type A	
Through hollow shaft metal	
Connector M23	
Type	Part no.
DFS60A-TBPA65536	1036945
DFS60A-TCPA65536	1036946
DFS60A-TDPA65536	1036947
DFS60A-TEPA65536	1036948
DFS60A-TFPA65536	1036949
DFS60A-TGPA65536	1036950
DFS60A-THPA65536	1036951
DFS60A-TJPA65536	1036952

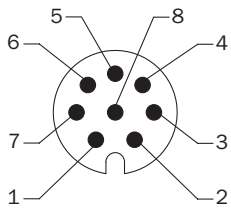
Order information	
DFS60 Incremental Encoder Type A	
Through hollow shaft metal	
Connector M12	
Type	Part no.
DFS60A-TBPC65536	1036953
DFS60A-TCPC65536	1036954
DFS60A-TDPC65536	1036955
DFS60A-TEPC65536	1036956
DFS60A-TFPC65536	1036957
DFS60A-TGPC65536	1036958
DFS60A-THPC65536	1036959
DFS60A-TJPC65536	1036960

Order information	
DFS60 Incremental Encoder Type A	
Through hollow shaft metal	
Cable 1,5 m	
Type	Part no.
DFS60A-TBPK65536	1036961
DFS60A-TCPK65536	1036962
DFS60A-TDPK65536	1036963
DFS60A-TEPK65536	1036964
DFS60A-TFPK65536	1036965
DFS60A-TGPK65536	1036966
DFS60A-THPK65536	1036967
DFS60A-TJPK65536	1036968

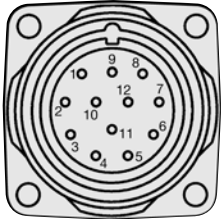
Order information	
DFS60 Incremental Encoder Type A	
Through hollow shaft metal	
Cable 3 m	
Type	Part no.
DFS60A-TBPL65536	1036969
DFS60A-TCPL65536	1036970
DFS60A-TDPL65536	1036971
DFS60A-TEPL65536	1036972
DFS60A-TFPL65536	1036973
DFS60A-TGPL65536	1036974
DFS60A-THPL65536	1036975
DFS60A-TJPL65536	1036976

Order information	
DFS60 Incremental Encoder Type A	
Through hollow shaft metal	
Cable 5 m	
Type	Part no.
DFS60A-TBPM65536	1036977
DFS60A-TCPM65536	1036978
DFS60A-TDPM65536	1036979
DFS60A-TEPM65536	1036980
DFS60A-TFPM65536	1036981
DFS60A-TGPM65536	1036982
DFS60A-THPM65536	1036983
DFS60A-TJPM65536	1036984

Programming Tool (page 23)



View to the connector M12 fitted to the encoder body



View to the connector M23 fitted to the encoder body

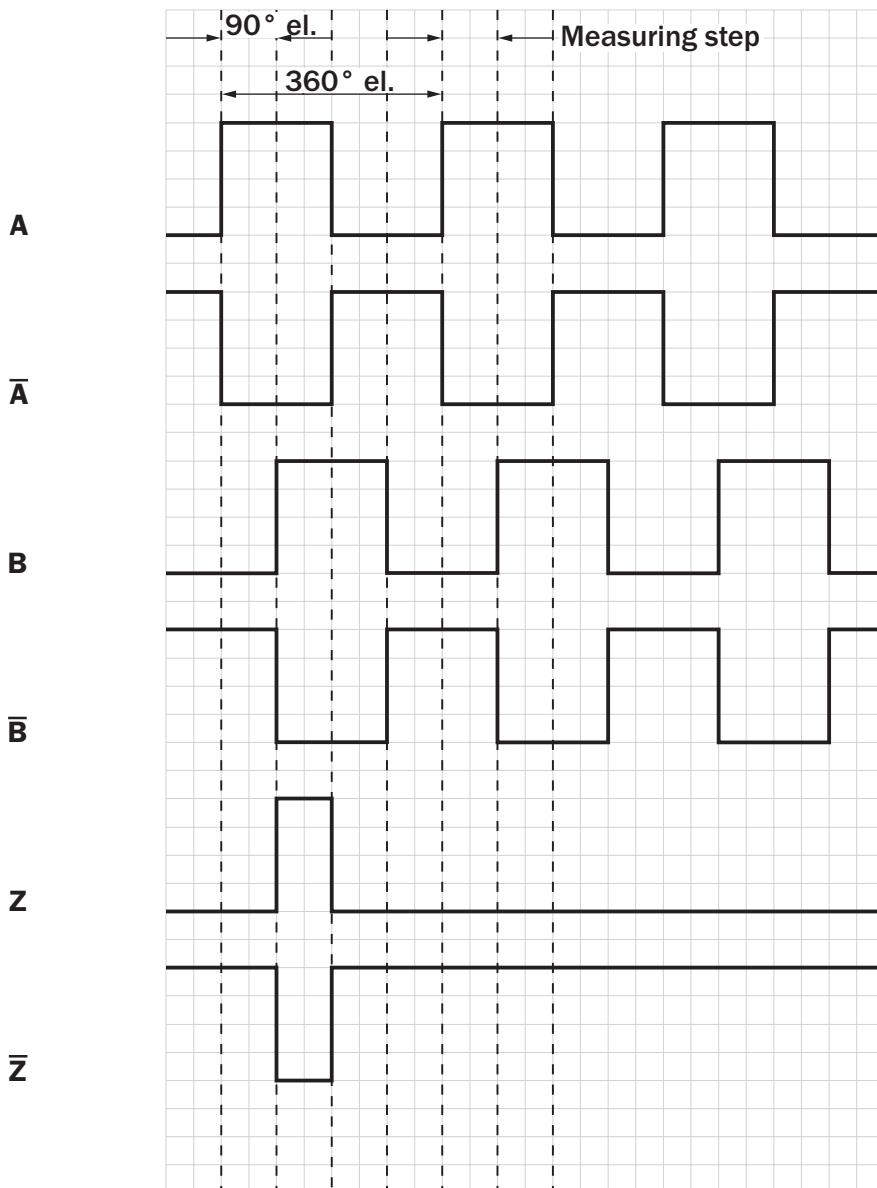
Pin and wire allocation, cable 8-core

PIN, 8-pin M12 Connector	PIN, 12-pin M23 Connector	Colour of wires	Signal TTL, HTL	Explanation
1	6	Brown	\bar{A}	Signal line
2	5	White	A	Signal line
3	1	Black	\bar{B}	Signal line
4	8	Pink	B	Signal line
5	4	Yellow	\bar{Z}	Signal line
6	3	Lilac	Z	Signal line
7	10	Blue	GND	Ground connection of the encoder
8	12	Red	+U _s	Supply voltage ¹⁾
-	9	Screen	Screen	Screen ²⁾
-	2	-	N. C.	
-	11	-	N. C.	

¹⁾ Potential free to housing

²⁾ Screen on the encoder side connected to the housing. On the control side connected to earth.

Incremental pulse diagram



CW with view on the encoder shaft in direction "A", see dimensional drawing.

Programming Tool

Programming Tool for DFS60

Type	Part no.	Contacts
PGT-08-S	1036616	12



Adapter cable PGT-08-S incremental with Cable connector SUB-D 9-pin male and cable connector M12 8-pin female, ready-made with cable 8-core, 4 x 2 x 0,08 mm², with screening

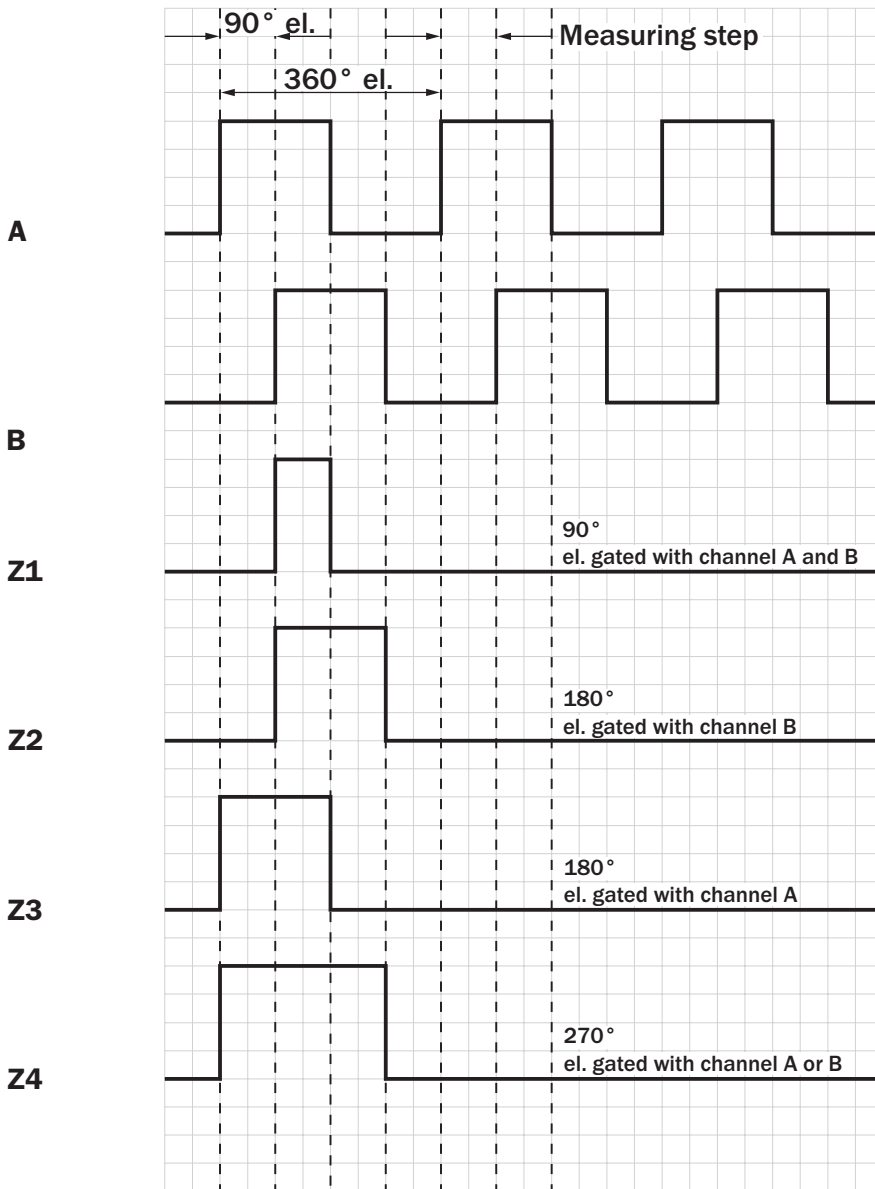
Type	Part no.
DSL-2D08-GOM5AC3	2046579

Adapter cable PGT-08-S incremental with Cable connector SUB-D 9-pin male and cable connector M23 12-pin female, ready-made with cable 8-core, 4 x 2 x 0,08 mm², with screening

Type	Part no.
DSL-3D08-GOM5AC3	2046580

- Programmable by customer
- every number of lines from 1 ... 65536
 - zero pulse width 90°, 180° or 270°
 - level of output signal TTL or HTL

Zero pulse width 90°, 180° or 270° programmable



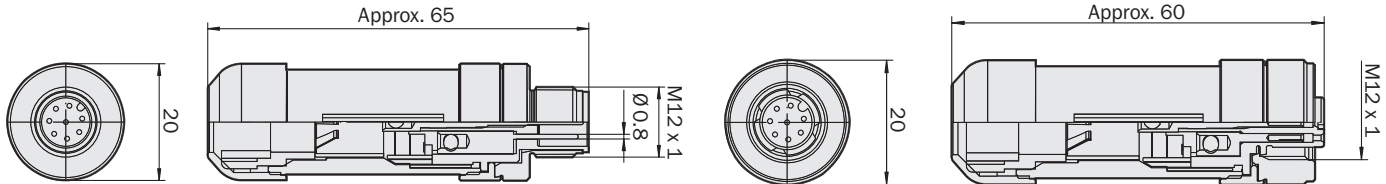
CW with view on the encoder shaft in direction "A"

Dimensional drawings and ordering information

Round screw system M12

Cable connector M12 male, 8-pin, straight, screened, for field assembly (adapter side)		
Type	Part no.	Contacts/cable diameter
STE-1208-GA	6028370	8 / 4 ... 8 mm

Cable connector M12 female, 8-pin, straight, screened, for field assembly (adapter side)		
Type	Part no.	Contacts/cable diameter
DOS-1208-GA	6028369	8 / 4 ... 8 mm



Cables

Cable 8-core, per metre, 4 x 2 x 0.15 mm², with screening, cable diameter 5.6 mm

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

Cable 11-core, per metre, 4 x 2 x 0.25 + 2 x 0.5 + 1 x 0.14 mm², with screening, cable diameter 7.5 mm

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

Cable 12-core, per metre, 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

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

Cable 12-core, per metre, 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

Type	Part no.	Wires	Explanation
LTG-2612-MW	6028516	12	UV and salt water resistant

Cable 8-core inc. sealing, 4 x 2 x 0.15 mm², with screening, cable diameter 5.6 mm

Type	Part no.	Cable length
DOL-0J08-G0M5AA3	2046873	0.5 m
DOL-0J08-G1M5AA3	2046874	1.5 m
DOL-0J08-G03MAA3	2046875	3.0 m
DOL-0J08-G05MAA3	2046876	5.0 m
DOL-0J08-G10MAA3	2046877	10.0 m



Dimensional drawings and ordering information

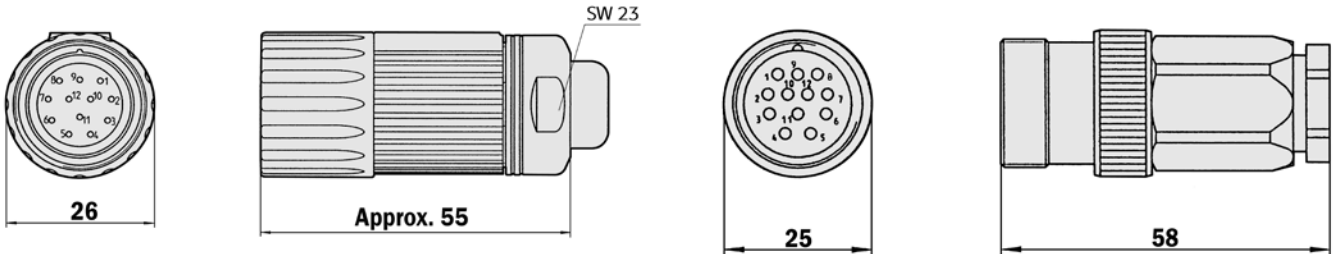
Screw-in system M23, 12-pin

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



General tolerances according to DIN ISO 2768-mk

General tolerances according to DIN ISO 2768-mk

Cable 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

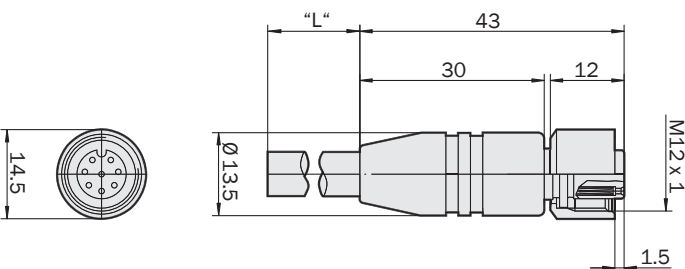
Type	Part no.	Contacts	Cable length
DOL-2312-G02MLA3	2030682	12	2.0 m
DOL-2312-G07MLA3	2030685	12	7.0 m
DOL-2312-G10MLA3	2030688	12	10.0 m
DOL-2312-G15MLA3	2030692	12	15.0 m
DOL-2312-G20MLA3	2030695	12	20.0 m
DOL-2312-G25MLA3	2030699	12	25.0 m
DOL-2312-G30MLA3	2030702	12	30.0 m

Cable connector M23 female, 12-pin, straight, cable 11-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

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

Female connector M12, 8-pin, straight, pre-wired with cable 8-wire, 4 x 2 x 0.25 mm², 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

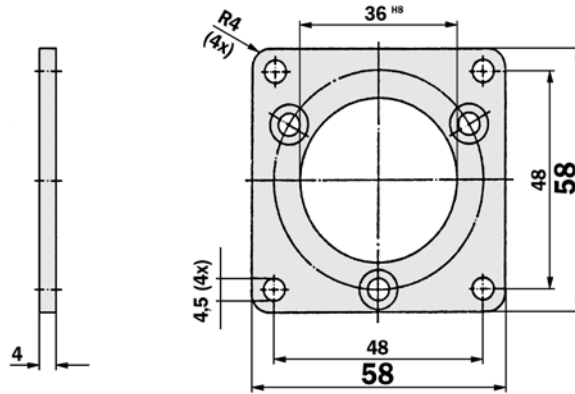


Dimensional drawings and ordering information

Mechanical Adapters

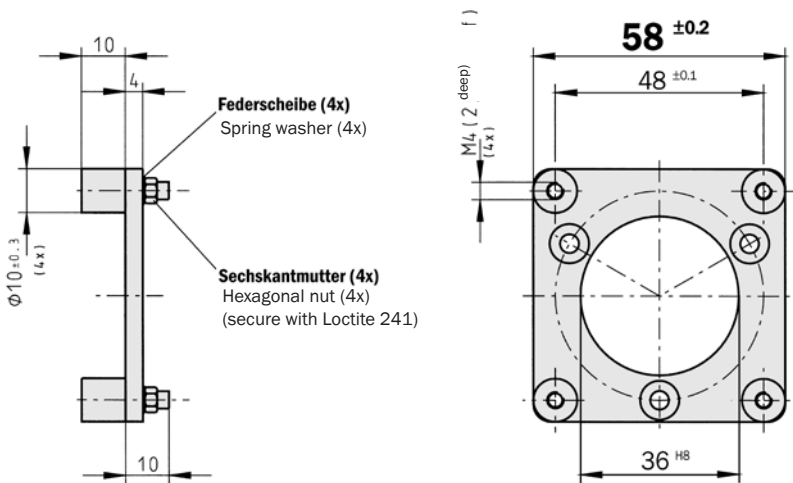
Adapter flange of aluminium for face mount flange, spigot 36 mm

Type	Part no.	Adaption
BEF-FA-036-060REC	2029162	To 60 mm square mounting plate



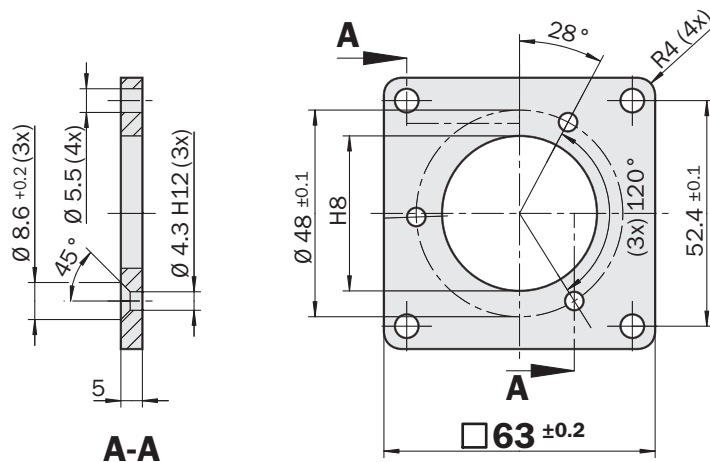
Adapter flange of aluminium for face mount flange, spigot 36 mm

Type	Part no.	Adaption
BEF-FA-036-060RSA	2029163	To 60 mm square mounting plate with shock absorbers



Adapter flange of aluminium for face mount flange, spigot 36 mm

Type	Part no.	Adaption
BEF-FA-036-063REC	2034225	To 63 mm square mounting plate

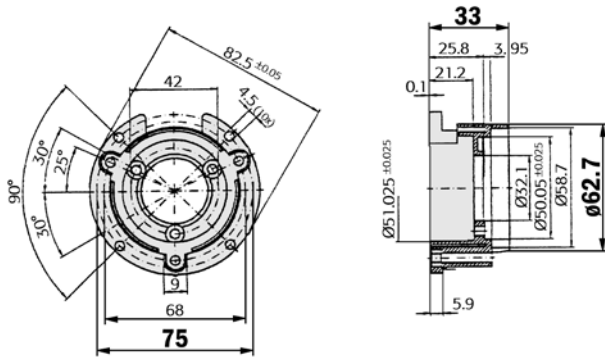


Dimensional drawings and ordering information

Mechanical Adapters

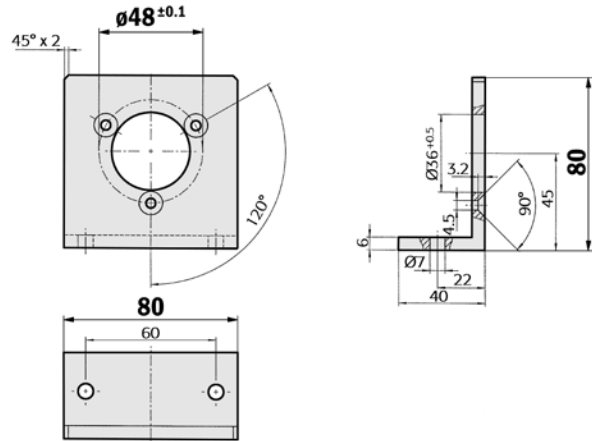
Mounting bell incl. fixing set for encoder with servo flange

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



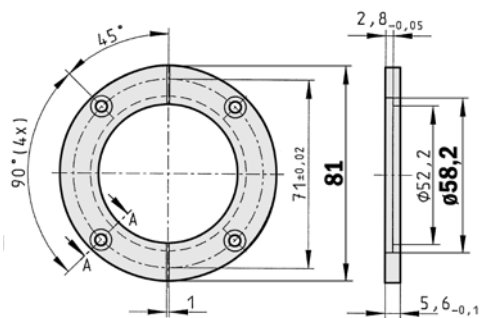
Mounting angle incl. fixing set for encoder with face mount flange

Type	Part no.	Flange spigot
BEF-WF-36	2029164	Diameter 36 mm



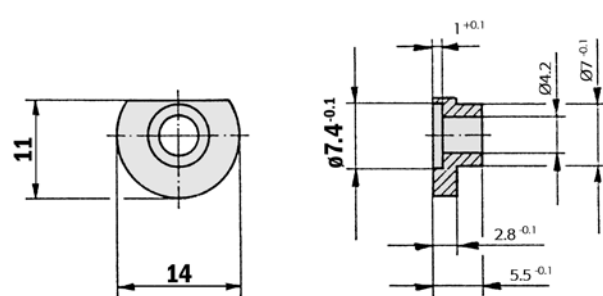
Servo clamps half ring, Set (comprises 2 pieces) for servo flanges with spigot diameter 50 mm

Type	Part no.
BEF-WG-SF050	2029165



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

Type	Part no.
BEF-WK-SF	2029166

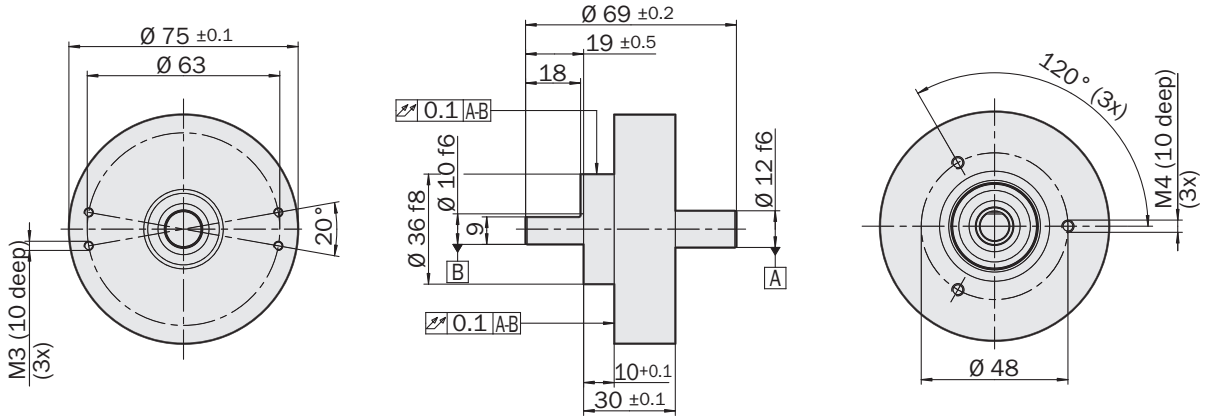


Dimensional drawings and ordering information

Mechanical Adapters

Heavy duty bearing block for very large radial and axial shaft loads

Type	Part no.
BEF-FA-B12-010	2042728

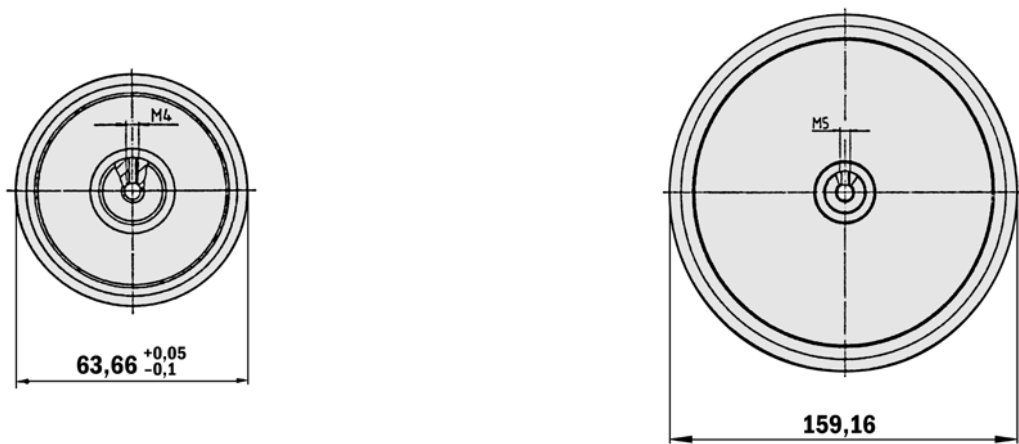


Measuring wheel for encoder shafts with diameter 10 mm, type material plastic (Hytrel), wheel material plastic with aluminium hub

Type	Part no.	Circumference	Surface
BEF-MR-010020	5312988	0.2 m	Smooth
BEF-MR-010020G	5318678	0.2 m	Knurled

Measuring wheel for encoder shafts with diameter 10 mm, type material plastic (Hytrel), wheel material plastic with aluminium hub

Type	Part no.	Circumference	Surface
BEF-MR-010050	5312989	0.5 m	Smooth



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