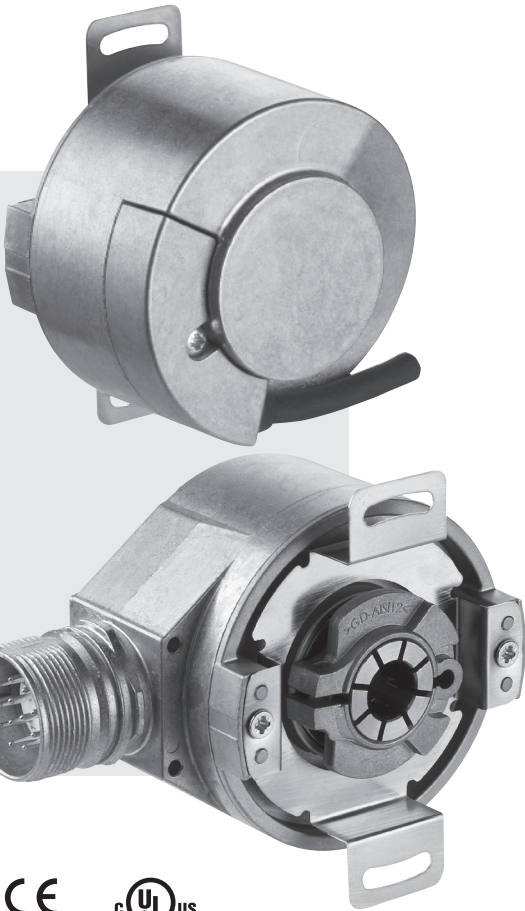


Number of lines
1 up to 65,536

Incremental Encoder

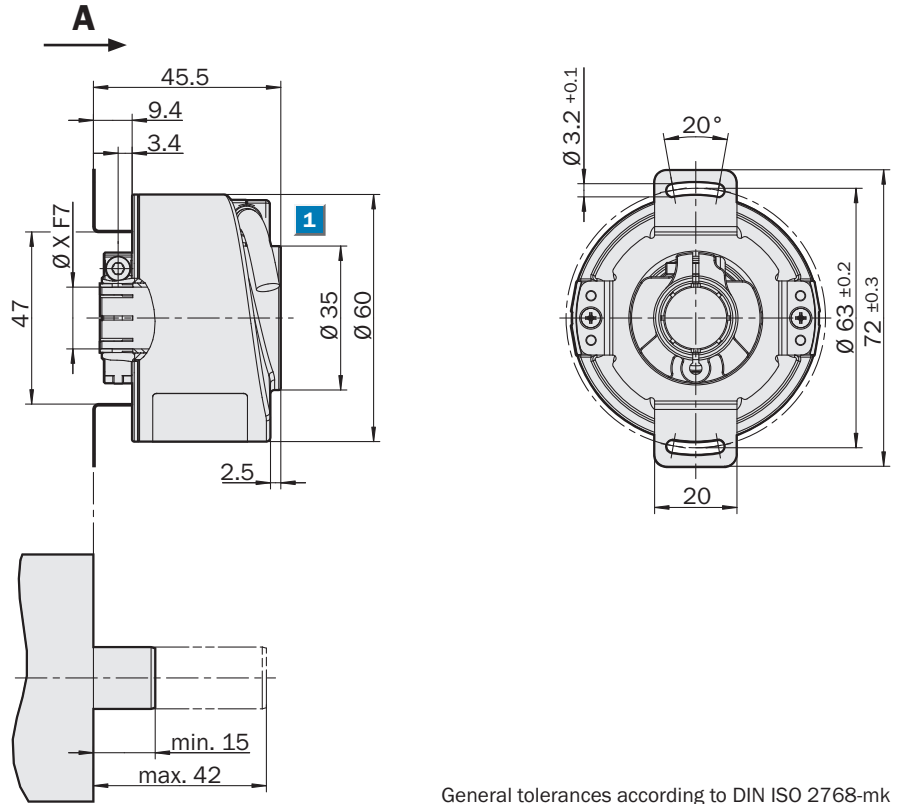
- Connector or cable outlet
- Protection class IP 65
- Electrical interfaces
TTL, HTL
- Number of lines, level of output signal and zero pulse width freely programmable



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

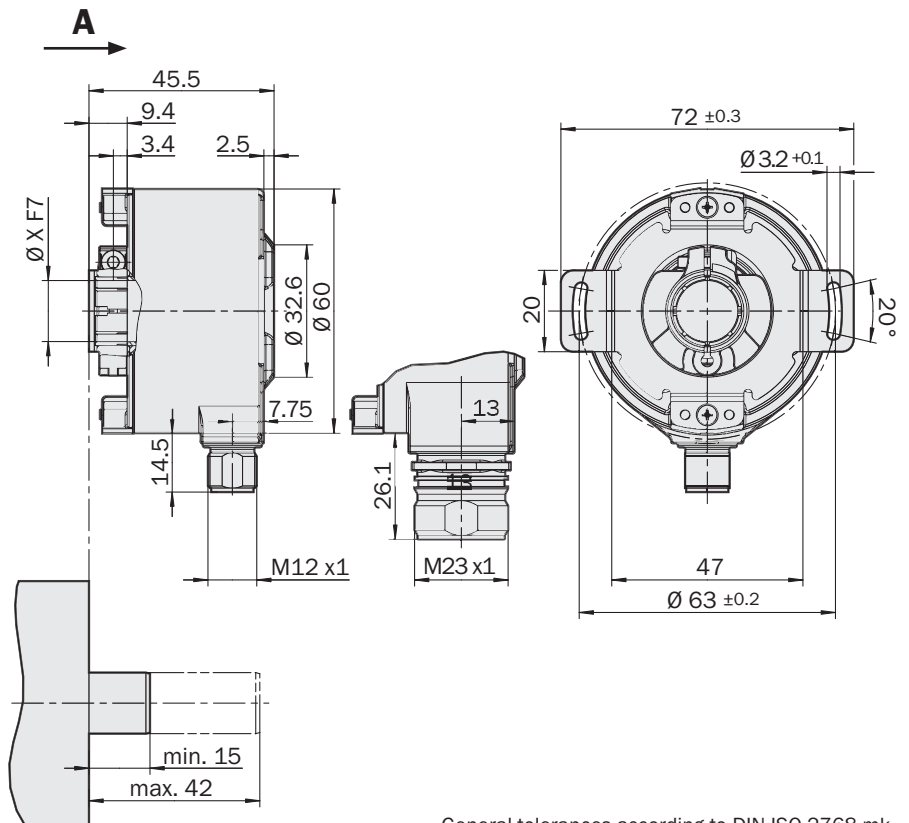


General tolerances according to DIN ISO 2768-mk

Customer-side

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

Dimensional drawing blind hollow shaft, 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			
	4.5 ... 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 to IEC 60529				
Shaft Side		IP 65	IP 65	IP 65
Housing side	Connector outlet ⁶⁾	IP 67	IP 67	IP 67
Housing side	Cable outlet	IP 67	IP 67	IP 67
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
	4,5 ... 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
	4,5 ... 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
	4,5 ... 32 V, TTL/HTL programmable		max. 30 ms	max. 30 ms

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

²⁾ Condensation of the optical scanning not permitted

³⁾ To EN 61000-6-2 and EN 61000-6-4

⁴⁾ To EN 60068-2-27

⁵⁾ To EN 60068-2-6

⁶⁾ With mating connector fitted

DFS60 Incremental Encoder blind hollow shaft

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

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

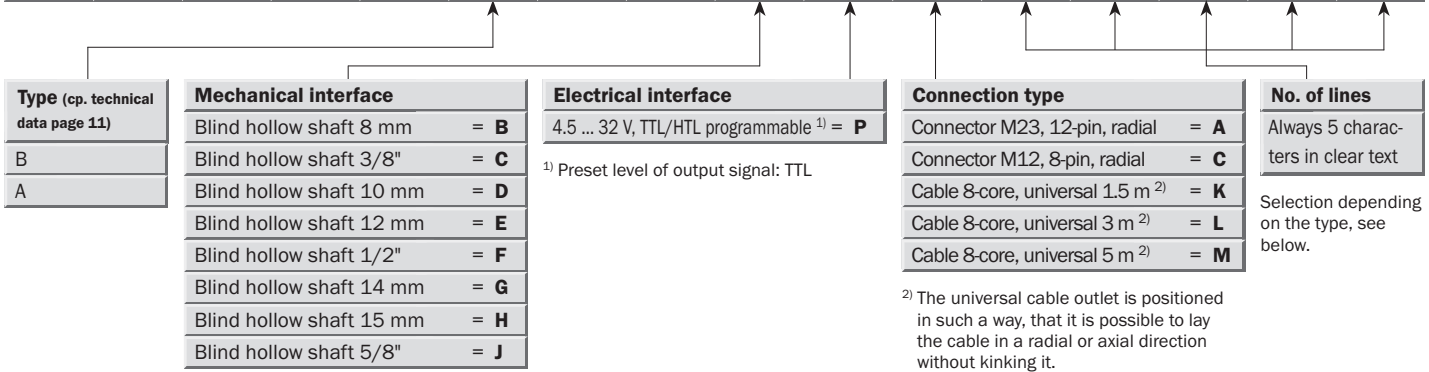
Electrical interface 10 ... 32 V, HTL/push-pull, connector M12, 8-pin, radial, number of lines 1024

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								



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	
Blind hollow shaft		Blind hollow shaft		Blind hollow shaft		Blind hollow shaft	
Connector M23		Connector M12		Cable 1,5 m		Cable 3 m	
Type	Part no.	Type	Part no.	Type	Part no.	Type	Part no.
DFS60B-BBPA10000	1036765	DFS60B-BBPC10000	1036773	DFS60B-BBPK10000	1036781	DFS60B-BBPL10000	1036789
DFS60B-BCPA10000	1036766	DFS60B-BCPC10000	1036774	DFS60B-BCPK10000	1036782	DFS60B-BCPL10000	1036790
DFS60B-BDPA10000	1036767	DFS60B-BDPC10000	1036775	DFS60B-BDPK10000	1036783	DFS60B-BDPL10000	1036791
DFS60B-BEPA10000	1036768	DFS60B-BEPC10000	1036776	DFS60B-BEPK10000	1036784	DFS60B-BEPL10000	1036792
DFS60B-BFPA10000	1036769	DFS60B-BFPC10000	1036777	DFS60B-BFPK10000	1036785	DFS60B-BFPL10000	1036793
DFS60B-BGPA10000	1036770	DFS60B-BGPC10000	1036778	DFS60B-BGPK10000	1036786	DFS60B-BGPL10000	1036794
DFS60B-BHPA10000	1036771	DFS60B-BHPC10000	1036779	DFS60B-BHPK10000	1036787	DFS60B-BHPL10000	1036795
DFS60B-BJPA10000	1036772	DFS60B-BJPC10000	1036780	DFS60B-BJPK10000	1036788	DFS60B-BJPL10000	1036796

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	
Blind hollow shaft		Blind hollow shaft		Blind hollow shaft		Blind hollow shaft	
Cable 5 m		Connector M23		Connector M12		Cable 1,5 m	
Type	Part no.	Type	Part no.	Type	Part no.	Type	Part no.
DFS60B-BBPM10000	1036797	DFS60A-BBPA65536	1036805	DFS60A-BBPC65536	1036813	DFS60A-BBPK65536	1036821
DFS60B-BCPM10000	1036798	DFS60A-BCPA65536	1036806	DFS60A-BCPC65536	1036814	DFS60A-BCPK65536	1036822
DFS60B-BDPM10000	1036799	DFS60A-BDPA65536	1036807	DFS60A-BDPC65536	1036815	DFS60A-BDPK65536	1036823
DFS60B-BEPM10000	1036800	DFS60A-BEPA65536	1036808	DFS60A-BEPC65536	1036816	DFS60A-BEPK65536	1036824
DFS60B-BFPM10000	1036801	DFS60A-BFPA65536	1036809	DFS60A-BFPC65536	1036817	DFS60A-BFPK65536	1036825
DFS60B-BGPM10000	1036802	DFS60A-BGPA65536	1036810	DFS60A-BGPC65536	1036818	DFS60A-BGPK65536	1036826
DFS60B-BHPM10000	1036803	DFS60A-BHPA65536	1036811	DFS60A-BHPC65536	1036819	DFS60A-BHPK65536	1036827
DFS60B-BJPM10000	1036804	DFS60A-BJPA65536	1036812	DFS60A-BJPC65536	1036820	DFS60A-BJPK65536	1036828

Order information		Order information	
DFS60 Incremental Encoder Type A		DFS60 Incremental Encoder Type A	
Blind hollow shaft		Blind hollow shaft	
Cable 3 m		Cable 5 m	
Type	Part no.	Type	Part no.
DFS60A-BBPL65536	1036829	DFS60A-BBPM65536	1036837
DFS60A-BCPL65536	1036830	DFS60A-BCPM65536	1036838
DFS60A-BDPL65536	1036831	DFS60A-BDPM65536	1036839
DFS60A-BEPL65536	1036832	DFS60A-BEPM65536	1036840
DFS60A-BFPL65536	1036833	DFS60A-BFPM65536	1036841
DFS60A-BGPL65536	1036834	DFS60A-BGPM65536	1036842
DFS60A-BHPL65536	1036835	DFS60A-BHPM65536	1036843
DFS60A-BJPL65536	1036836	DFS60A-BJPM65536	1036844

Programming Tool (page 23)