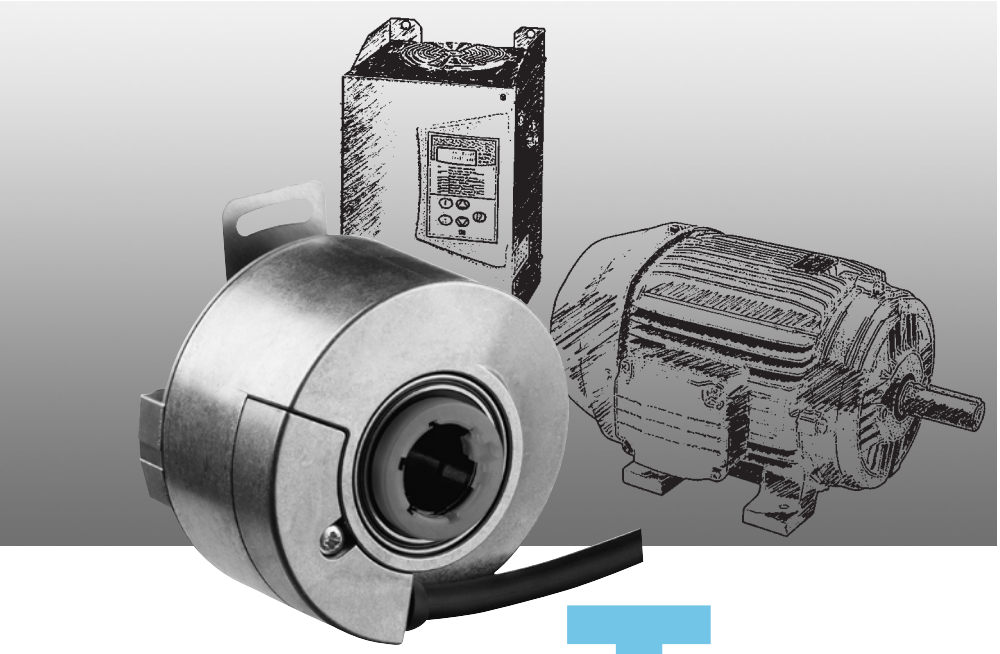
VFS60: Incremental Encoders for installation on asynchronous motors

DATA SHEET



Number of lines up to 10,000

Incremental Encoder

RoHS 2002/95/EC

The VFS60 is a high-resolution incremental hollow shaft encoder in a 60 mm housing.

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 VFS60 has a feature which substantially increases interference immunity and reliability especially for installation on asynchronous motors.

SICK | STEGMANN

04-2007

Number of lines up to 10,000

Incremental Encoder

- Cable outlet
- Protection class IP 65
- Electrical interfaces TTL, HTL

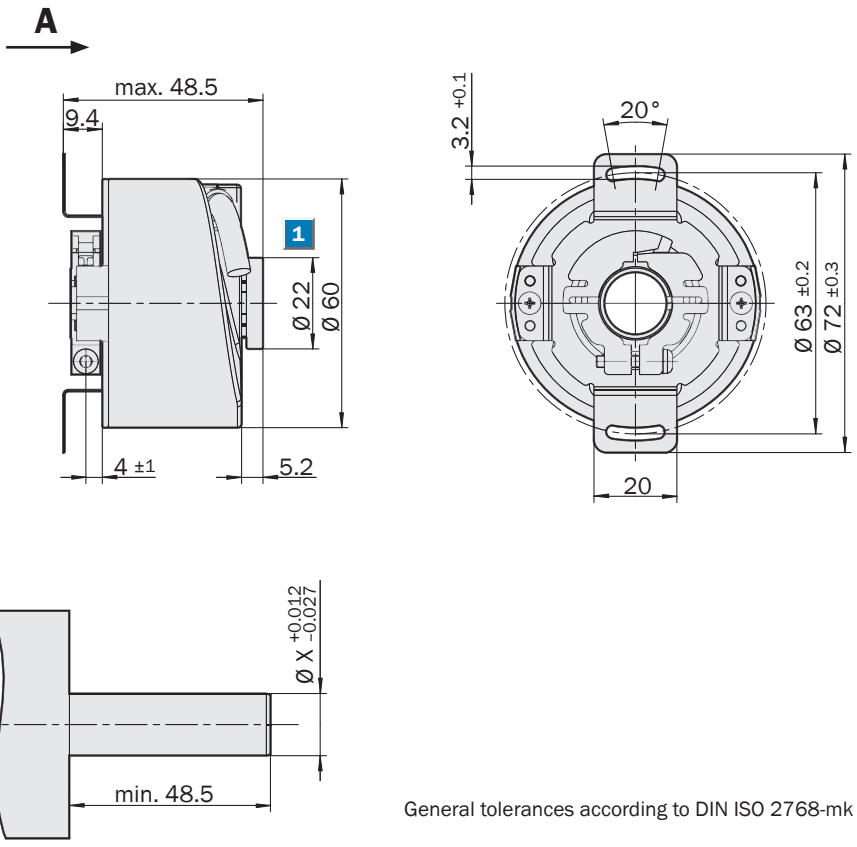
CE

RoHS 2002/95/EC

Accessories

Connection systems (page 6/7)
Mounting systems (page 6/7)

Dimensional drawing



Customer-side

General tolerances according to DIN ISO 2768-mk

1 Cable-Ø = 5,6 ± 0,2 mm
Bending radius R = 30 mm

Wire allocation, cable 8-core

Wire colour	Signal at TTL and HTL	Explanation
Red	+ Us	Supply voltage [1]
Blue	GND	0 V
White	A	Signal line
Pink	B	Signal line
Lilac	Z	Signal line
Brown	A_	Signal line
Black	B_	Signal line
Yellow	Z_	Signal line
Screen	Screen	Screen [2]

[1] Potential free to housing

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

Technical Data to DIN 32878		VFS60		
Type			**E**	**B**
Hollow shaft diameter		10, 12, 14, 15 mm and 3/8“, 1/2“		
Number of lines per revolution			1000, 1024,	1000, 1024, 2000,
			2000, 2048	2048, 4000, 4096,
				5000, 8192, 10,000
Electrical interface		TTL/RS422, 6-channel		
		HTL/push-pull, 6-channel		
Mass		0.2 Kg		
Moment of inertia to the rotor		40 gcm^2		
Measuring step		90°/number of lines electr.		
Reference signal	**Number**	1		
	Position	90° electr., logically connected with A and B		
Error limits			± 0.3°	± 0.05°
Measuring step deviation			± 0,2°	± 0.01°
Max. output frequency		TTL/RS422	300 KHz	600 KHz
		HTL/push-pull	300 KHz	600 KHz
Operating torque			9,000 min^{-1}	12,000 min^{-1} [1]
Angular acceleration		5 x 10^5 rad/s^2		
Operating torque	**at 20 °C**	0.6 Ncm		
Start up 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
axial		Static/dynamic	± 0.5/± 0.2 mm	± 0.5/± 0.2 mm
Bearing lifetime		3 x 10^9 revolutions		
Working temperature range			0 ... + 100 °C	– 20 ... + 100 °C
Storage temperature range (without package)			– 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
		To vibration [5]	20 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz
Protection class IEC 60529			IP 65	IP 65
Load current		4.5 ... 5.5 V, TTL/RS422	max. 30 mA	max. 30 mA
		10 ... 32 V, HTL/push-pull	max. 30 mA	max. 30 mA
No-load operating current		4.5 ... 5.5 V, TTL/RS422	40 mA	40 mA
		10 ... 32 V, HTL/push-pull	40 mA	40 mA
Initialisation time after power on		40 ms		

[1] Self-warming at max. operating speed circa. +40 K, when applying, note working temperature range

[2] Condensation of the optical scanning not permitted

[3] To DIN EN 61000-6-4 and DIN EN 61000-6-1

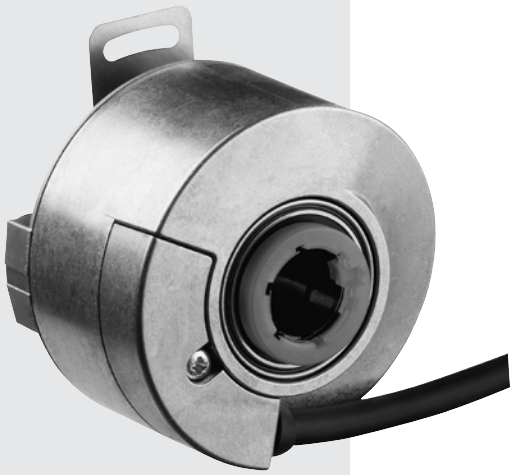
[4] To DIN EN 60068-2-27

[5] To DIN EN 60068-2-6

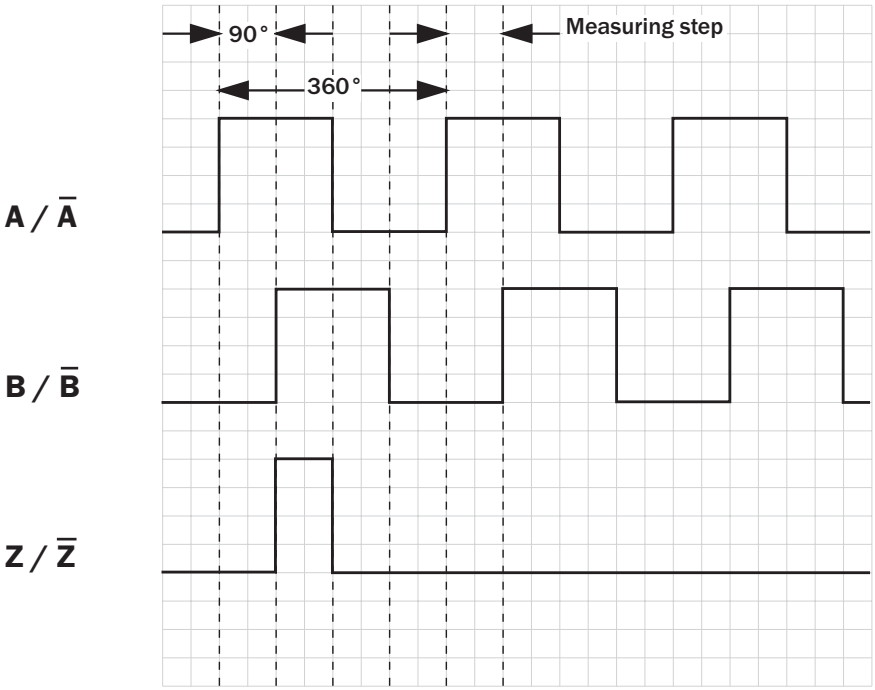
Number of lines up to 10,000

Incremental Encoder

- Cable outlet
- Protection class IP 65
- Electrical interfaces
  TTL, HTL



Incremental pulse diagram



CW with view on the encoder shaft in direction „A“ (cp. page 2)

Electrical interfaces			
Supply voltage	4.5 ... 5.5 V	10 ... 32 V	10 ... 32 V
Interfaces/drivers	TTL/RS422	TTL/RS422	HTL/push-pull

CE

RoHS 2002/95/EC

Accessories
Connection systems (page 6/7)
Mounting systems (page 6/7)

Order information

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
V	**F**	**S**	**6**	**0**		**–**	**T**								

Type (cp. technical data page 3)

E
B

Mechanical interface

Through hollow shaft 10 mm	= **4**
Through hollow shaft 12 mm	= **5**
Through hollow shaft 14 mm	= **7**
Through hollow shaft 15 mm	= **8**
Through hollow shaft 3/8 "	= **3**
Through hollow shaft 1/2 "	= **6**

Electrical interface

4.5 ... 5.5 V, TTL/RS422	= **A**
10 ... 32 V, TTL/RS422	= **C**
10 ... 32 V, HTL/push-pull	= **E**

Connection type

Cable 8-core, universal 0.5 m [1]	= **J**
Cable 8-core, universal 1.5 m [1]	= **K**

[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

No. of lines

Always 5 characters in clear text

Selection depending on the type, see below

Typ E – Number of lines per revolution

01000	01024	02000	02048

Typ B – Number of lines per revolution

01000	02000	04000	08192
01024	02048	04096	10000
		05000	

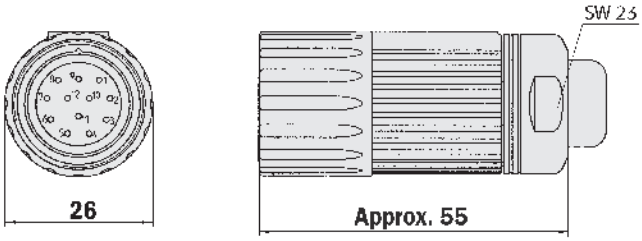
Others on request

Dimensional drawings and ordering information

Screw-in system M23, 12-pin

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

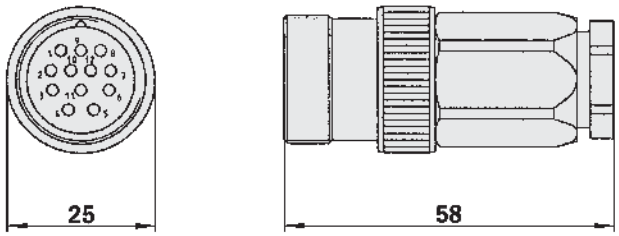
Type	Part no.	Contacts
DOS-2312-G	6027538	12



General tolerances according to DIN ISO 2768-mk

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

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 beeing 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

Order information

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 beeing 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, cable diameter

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

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