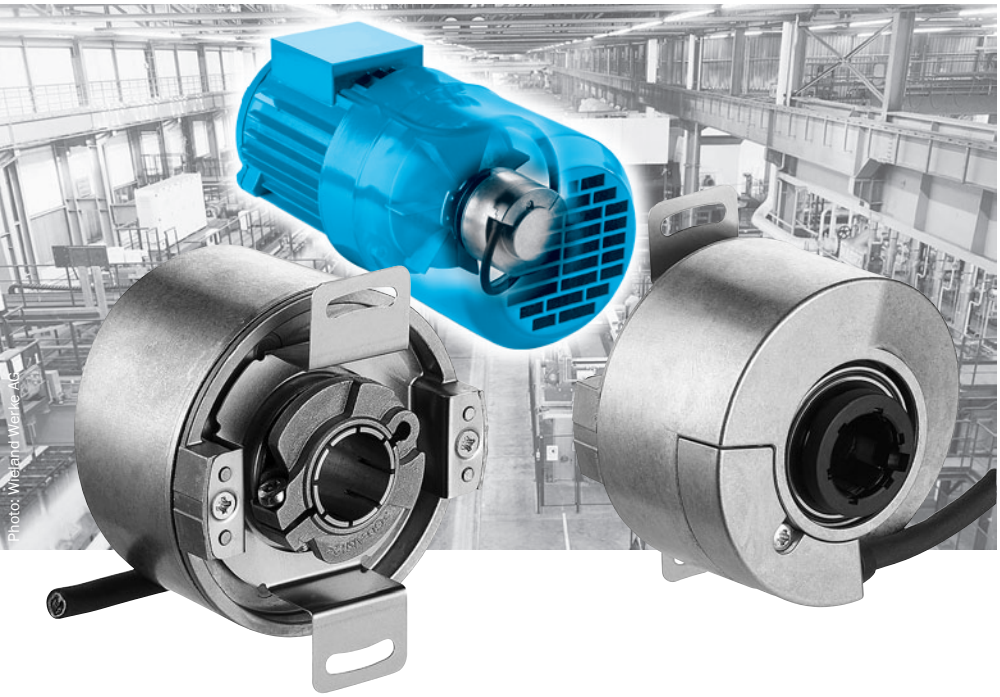
VFS60: Motor Feedback System for installation on asynchronous motors



Select the motor feedback system to suit your individual requirements. Possible product variations:

- Through hollow or blind hollow shaft
- Cable outlet universal 0.5 m or 1.5 m
- Number of lines from 1 up to 65.536
- Interfaces TTL, HTL or Sinus 0.5 V_{PP} and versions with programmable level of output signals
- Zero pulse width programmable by customer

Number of lines up to 65.536

Motor Feedback Systems

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

VFS60 series encoders have been designed for arduous applications in harsh industrial environments, and especially for mounting to asynchronous motors.

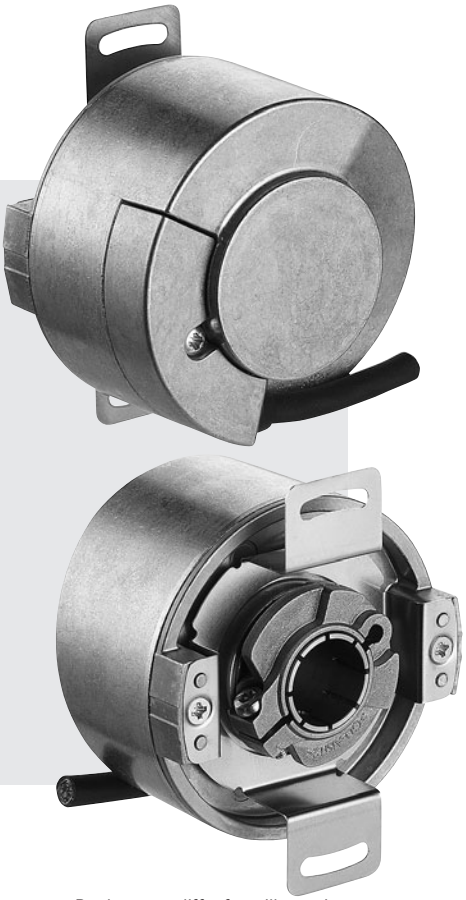
An Electrically insulating hollow shaft clamping arrangement is available for special applications, significantly increasing the interference immunity.

SICK
Sensor Intelligence.

Number of lines up to 65.536

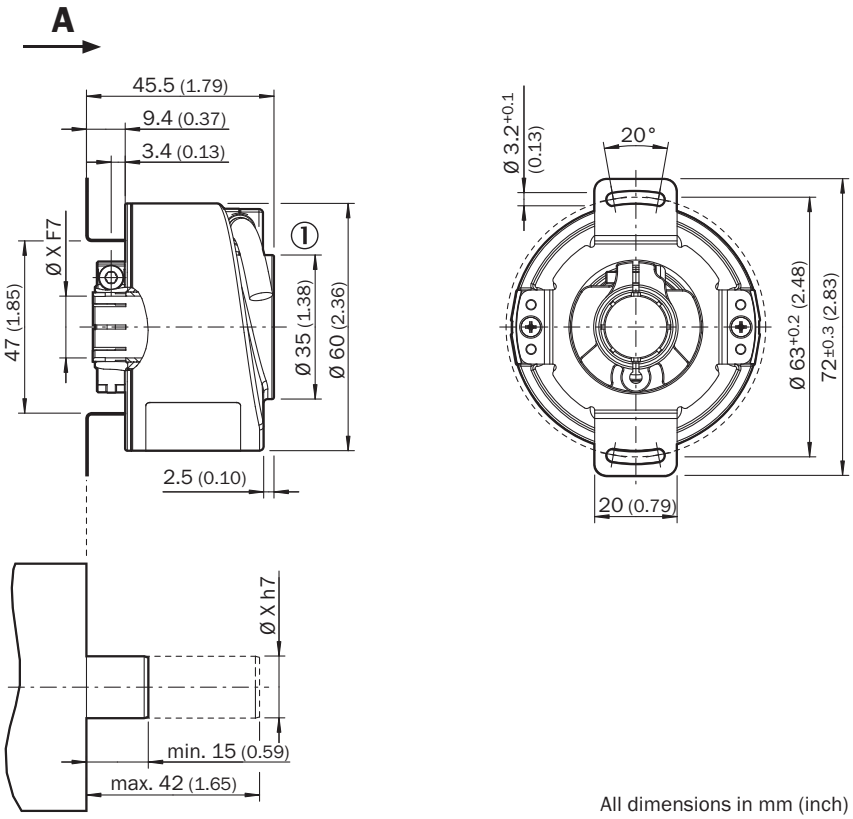
Motor Feedback Systems

- Cable outlet
- Protection class IP 67
- Electrical interfaces
  TTL, HTL, Sinus 0.5 V_{PP}



Product may differ from illustration

Dimensional drawing blind hollow shaft, cable outlet



Customer-side

All dimensions in mm (inch)

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

Colour of wires	Signal TTL, HTL	Signal Sinus 0.5 V_{PP}	Explanation
Brown	$\overline{A}$	COS–	Signal line
White	A	COS+	Signal line
Black	$\overline{B}$	SIN–	Signal line
Pink	B	SIN+	Signal line
Yellow	$\overline{Z}$	$\overline{Z}$	Signal line
Lilac	Z	Z	Signal line
Blue	GND	GND	Ground connection of the encoder
Red	$+U_S$	$+U_S$	Supply voltage [1]
Screen	Screen	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.

[1] Potential free to housing

Accessories

Connection systems (page 16)

Technical data to DIN 32878		VFS60 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 ... 5.5 V, Sinus 0.5 V_{PP}			
		4.5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		TTL/HTL	1000, 1024	1000, 1024, 2000	1 ... 8192
			2000, 2048	2048, 4096, 8192	16384, 32768
				16384, 32768, 65536	65536
		Sinus 0.5 V_{PP}	1024		
Mass		0.2 kg			
Moment of inertia to the rotor		40 gcm²			
Measuring step		90° electric/number of lines			
Reference signal	**Number**	1			
TTL/HTL	**Position**	90° electr., gated with A and B			
Sinus 0.5 V_{PP}	**Position**	90° electr., gated with Sin. and Cos.			
Error limits			± 0.3°	± 0.05°	± 0.03°
Measuring step deviation			± 0.2°	± 0.01°	± 0.01°
Max. output frequency		TTL/RS422	300 kHz	600 kHz	820 kHz
		HTL/push-pull	300 kHz	600 kHz	820 kHz
		Sinus 0.5 V_{PP}	200 kHz		
		TTL/HTL programmable			820 kHz
Operating speed [1]			6,000 min^{-1}	6,000 min^{-1}	6,000 min^{-1}
Angular acceleration		5 x 10^5 rad/s²			
Operating torque	**at 20 °C**	0.6 Ncm			
Starting torque	**at 20 °C**	0.8 Ncm			
Permissible shaft loading					
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			–30 ... + 100 °C	–30 ... + 100 °C	–30 ... + 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]	70 g/6 ms	70 g/6 ms	70 g/6 ms
		To vibration [5]	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz
Protection class to IEC 60529					
Shaft side			IP 65	IP 65	IP 65
Housing side		Cable outlet	IP 67	IP 67	IP 67
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
		4.5 ... 32 V, TTL/HTL programmable			max. 30 mA
Load resistance		4.5 ... 5.5 V, Sinus 0.5 V_{PP}	min. 120 Ω		
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 ... 5.5 V, Sinus 0.5 V_{PP}	40 mA		
		4.5 ... 32 V, TTL/HTL programmable			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 ... 5.5 V, Sinus 0.5 V_{PP}	40 ms		
		4.5 ... 32 V, TTL/HTL programmable			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,
at Sinus 0.5 V_{PP} acc. to EN 61000-6-2 and EN 61000-6-3

[4] To EN 60068-2-27

[5] To EN 60068-2-6

Order information TTL and HTL interface

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**B**								

Type (cp. technical data page 3)

E
B

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

4.5 ... 5.5 V, TTL/RS422	= **A**
10 ... 32 V, TTL/RS422	= **C**
10 ... 32 V, HTL/Push pull	= **E**
4.5 ... 5.5 V, Sinus 0.5 V_{PP}	= **N**

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.

Type E – Electrical interface A, C, E; Number of lines per revolution

01000	01024	02000	02048

Others on request

Type E – Electrical interface N; Number of lines per revolution

1024

Type B – Electrical interface A, C, E; Number of lines per revolution

01000	02000	04096	16384	65536
01024	02048	08192	32768	

Others on request

Order example Motor Feedback System VFS60, type E, blind hollow shaft 10 mm, Electrical interface 10 ... 32 V, HTL/push-pull, cable 8-core, universal 0.5 m, 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
V	**F**	**S**	**6**	**0**	**E**	**–**	**B**	**D**	**E**	**J**	**0**	**1**	**0**	**2**	**4**

Order information TTL or HTL programmable

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**B**								

Type (cp. technical data page 3)
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
4,5 ... 32 V, TTL/HTL programmable = **P**

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
Factory-programmed to 1024

Order example Motor Feedback System VFS60, type A, blind hollow shaft 8 mm, programmable number of lines from 1 ... 8192, Electrical interface 5 ... 32 V, cable 8-core, universal 0.5 m

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**	**A**	**–**	**B**	**B**	**P**	**J**	**0**	**1**	**0**	**2**	**4**

Factory-programmed number of lines: 1024, level of output signal: TTL

Programming Tool for VFS60

Model name	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

Model name	Part No.
DSL-2D08-G0M5AC3	2046579

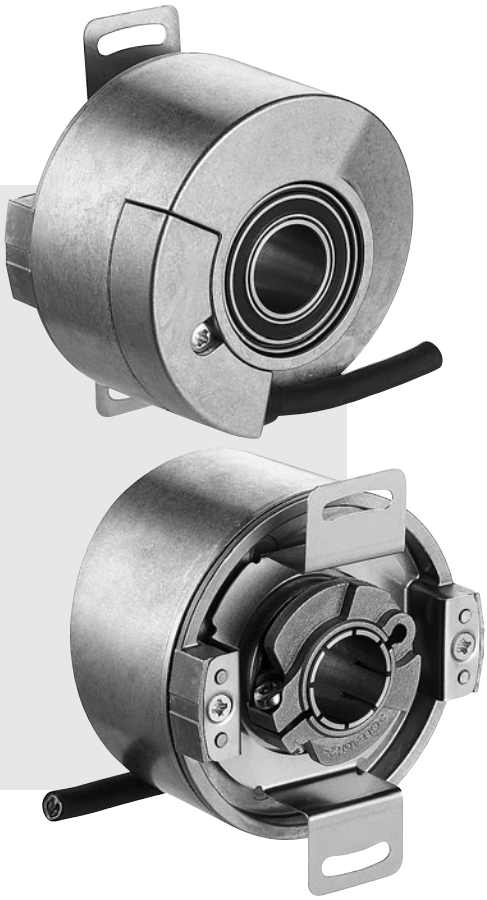
Adapter cable PGT-08-S incremental with Cable connector SUB-D 9-pin male and cable connector M23 12-pin female, ready-made with cable 8-core, 4 x 2 x 0,08 mm², with screening

Model name	Part No.
DSL-3D08-G0M5AC3	2046580

Number of lines up to 65.536

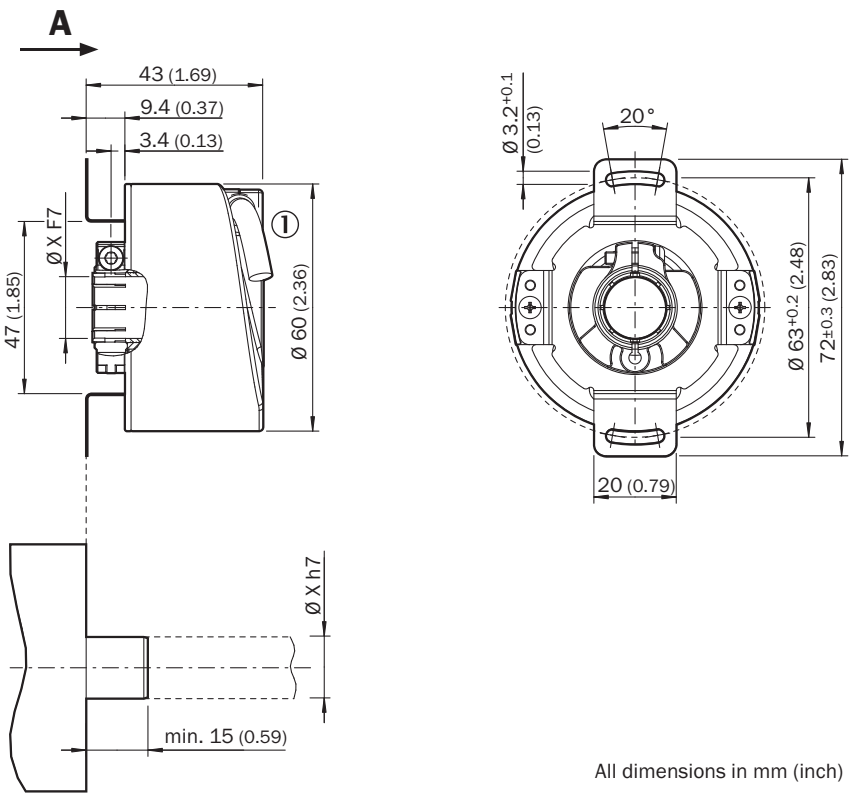
Motor Feedback Systems

- Cable outlet
- Protection class IP 65
- Electrical interfaces
  TTL, HTL, Sinus 0.5 V_{PP}



Product may differ from illustration

Dimensional drawing through hollow shaft metal, cable outlet



All dimensions in mm (inch)

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

Colour of wires	Signal TTL, HTL	Signal Sinus 0.5 V_{PP}	Explanation
Brown	$\overline{A}$	COS–	Signal line
White	A	COS+	Signal line
Black	$\overline{B}$	SIN–	Signal line
Pink	B	SIN+	Signal line
Yellow	$\overline{Z}$	$\overline{Z}$	Signal line
Lilac	Z	Z	Signal line
Blue	GND	GND	Ground connection of the encoder
Red	$+U_S$	$+U_S$	Supply voltage [1]
Screen	Screen	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.

[1] Potential free to housing

Accessories

Connection systems (page 16)

Technical data to DIN 32878		VFS60 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			
		4.5 ... 5.5 V, Sinus 0.5 V_{PP}			
		4.5 ... 32 V, TTL/HTL programmable			
Number of lines per revolution		TTL/HTL	1000, 1024	1000, 1024, 2000	1 ... 8192
			2000, 2048	2048, 4096, 8192	16384, 32768
				16384, 32768, 65536	65536
		Sinus 0.5 V_{PP}	1024		
Mass		0.2 kg			
Moment of inertia to the rotor		40 gcm²			
Measuring step		90° electric/number of lines			
Reference signal	**Number**	1			
TTL/HTL	**Position**	90° electr., gated with A and B			
Sinus 0.5 V_{PP}	**Position**	90° electr., gated with Sin. and Cos.			
Error limits			± 0.3°	± 0.05°	± 0.03°
Measuring step deviation			± 0.2°	± 0.01°	± 0.01°
Max. output frequency		TTL/RS422	300 kHz	600 kHz	820 kHz
		HTL/push-pull	300 kHz	600 kHz	820 kHz
		Sinus 0.5 V_{PP}	200 kHz		
		TTL/HTL programmable			820 kHz
Operating speed [1]			9,000 min^{-1}	9,000 min^{-1}	9,000 min^{-1}
Angular acceleration		5 x 10^5 rad/s²			
Operating torque	**at 20 °C**	0.6 Ncm			
Starting torque	**at 20 °C**	0.8 Ncm			
Permissible shaft loading					
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			–30 ... + 100 °C	–30 ... + 100 °C	–30 ... + 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]	70 g/6 ms	70 g/6 ms	70 g/6 ms
		To vibration [5]	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz
Protection class to IEC 60529					
Shaft side			IP 65	IP 65	IP 65
Housing side		Cable outlet	IP 65	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
		4.5 ... 32 V, TTL/HTL programmable			max. 30 mA
Load resistance		4.5 ... 5.5 V, Sinus 0.5 V_{PP}	min. 120 Ω		
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 ... 5.5 V, Sinus 0.5 V_{PP}	40 mA		
		4.5 ... 32 V, TTL/HTL programmable			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 ... 5.5 V, Sinus 0.5 V_{PP}	40 ms		
		4.5 ... 32 V, TTL/HTL programmable			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,
at Sinus 0.5 V_{PP} acc. to EN 61000-6-2 and EN 61000-6-3

[4] To EN 60068-2-27

[5] To EN 60068-2-6

Order information TTL and HTL interface

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**T**								

Type (cp. technical data page 7)

E
B

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

4.5 ... 5.5 V, TTL/RS422	= **A**
10 ... 32 V, TTL/RS422	= **C**
10 ... 32 V, HTL/push-pull	= **E**
4.5 ... 5.5 V, Sinus 0.5 V_{PP}	= **N**

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.

Type E – Electrical interface A, C, E; Number of lines per revolution

01000	01024	02000	02048

Others on request

Type E – Electrical interface N; Number of lines per revolution

1024

Type B – Electrical interface A, C, E; Number of lines per revolution

01000	02000	04096	16384	65536
01024	02048	08192	32768	

Others on request

Order example Motor Feedback System VFS60, type E, through hollow shaft 10 mm, Electrical interface 10 ... 32 V, HTL/push-pull, cable 8-core, universal 0.5 m, 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
V	**F**	**S**	**6**	**0**	**E**	**–**	**T**	**D**	**E**	**J**	**0**	**1**	**0**	**2**	**4**

Order information TTL or HTL programmable

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**T**								

Type (cp. technical data page 7)
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
4,5 ... 32 V, TTL/HTL programmable = **P**

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
Factory-programmed to 1024

Order example Motor Feedback System VFS60, type A, through hollow shaft 8 mm, programmable number of lines from 1 ... 8192, Electrical interface 5 ... 32 V, cable 8-core, universal 0.5 m

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**	**A**	**–**	**T**	**B**	**P**	**J**	**0**	**1**	**0**	**2**	**4**

Factory-programmed number of lines: 1024, level of output signal: TTL

Programming Tool for VFS60

Model name	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

Model name	Part No.
DSL-2D08-G0M5AC3	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

Model name	Part No.
DSL-3D08-G0M5AC3	2046580

Number of lines up to 65.536

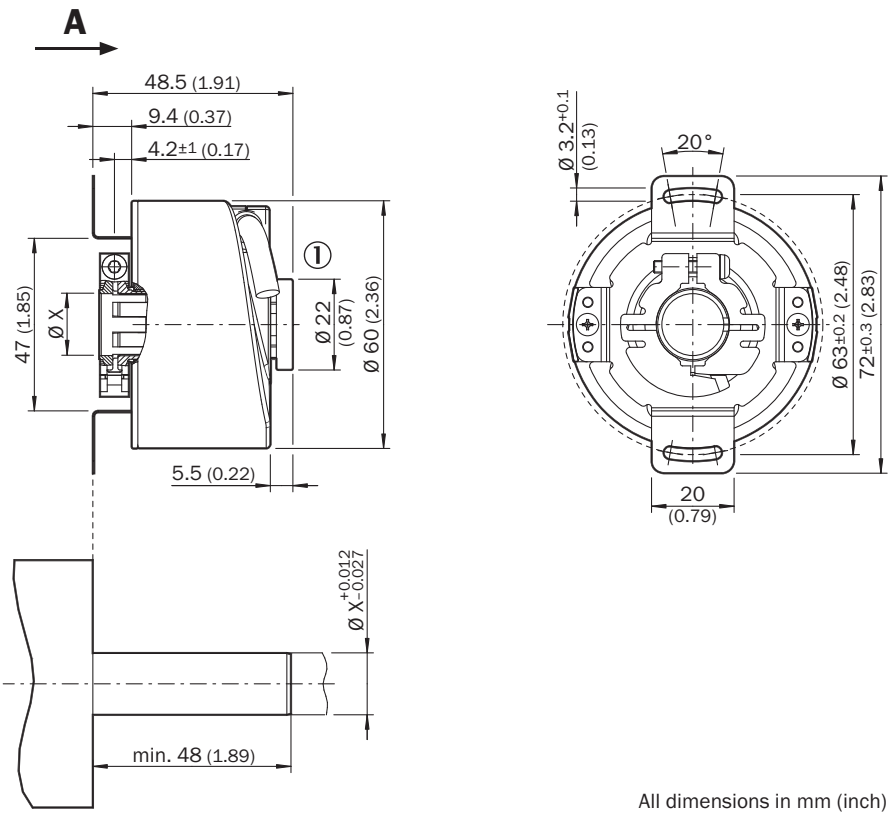
Motor Feedback Systems

- Insulating hollow shaft clamping
- Cable outlet
- Protection class IP 65
- Electrical interfaces TTL, HTL



Product may differ from illustration

Dimensional drawing through hollow shaft plastic, cable outlet



All dimensions in mm (inch)

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

Colour of wires	Signal TTL, HTL	Explanation
Brown	$\overline{A}$	Signal line
White	A	Signal line
Black	$\overline{B}$	Signal line
Pink	B	Signal line
Yellow	$\overline{Z}$	Signal line
Lilac	Z	Signal line
Blue	GND	Ground connection of the encoder
Red	$+U_S$	Supply voltage [1]
Screen	Screen	Screen on the encoder side connected to the housing. On the control side connected to earth.

[1] Potential free to housing

Accessories

Connection systems (page 16)

Technical data to DIN 32878		VFS60 through hollow shaft plastic			
Type			**E**	**B**	**A**
Shaft diameter		10, 12, 14, 15 mm and 3/8", 1/2"			
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			1000, 1024,	1000, 1024, 2000,	1 ... 8192
			2000, 2048	2048, 4096, 8192	16384, 32768
				16384, 32768, 65536	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			± 0.2°	± 0.01°	± 0.01°
Max. output frequency		TTL/RS422	300 kHz	600 kHz	820 kHz
		HTL/push-pull	300 kHz	600 kHz	820 kHz
		TTL/HTL programmable			820 kHz
Operating speed [1]			9,000 min^{-1}	12,000 min^{-1}	12,000 min^{-1}
Angular acceleration		5 x 10^5 rad/s^2			
Operating torque	**at 20 °C**	0.6 Ncm			
Starting torque	**at 20 °C**	0.8 Ncm			
Permissible shaft loading					
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			–30 ... + 100 °C	–30 ... + 100 °C	–30 ... + 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]	70 g/6 ms	70 g/6 ms	70 g/6 ms
		To vibration [5]	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz	30 g/10 ... 2000 Hz
Protection class to IEC 60529					
Shaft			IP 65	IP 65	IP 65
Housing side		Cable outlet	IP 65	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
		4,5 ... 32 V, TTL/HTL programmable			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
		4,5 ... 32 V, TTL/HTL programmable			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

[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

Order information TTL and HTL interface

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**T**								

Type (cp. technical data page 11)
E
B

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

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.

Type E – Number of lines per revolution

01000	01024	02000	02048

Others on request

Type B – Number of lines per revolution

01000	02000	04096	16384	65536
01024	02048	08192	32768	

Others on request

Order example Motor Feedback System VFS60, type E, through hollow shaft 10 mm, Electrical interface 10 ... 32 V, HTL/push-pull, cable 8-core, universal 0.5 m, 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
V	**F**	**S**	**6**	**0**	**E**	**–**	**T**	**4**	**E**	**J**	**0**	**1**	**0**	**2**	**4**

Order information TTL or HTL programmable

Motor Feedback System VFS60, 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
V	**F**	**S**	**6**	**0**		**–**	**T**								

Type (cp. technical data page 11)
A

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

Electrical interface
4,5 ... 32 V, TTL/HTL programmable = **P**

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
Factory-programmed to 1024

Order example Motor Feedback System VFS60, type A, through hollow shaft 14 mm, programmable number of lines from 1 ... 8192, Electrical interface 5 ... 32 V, cable 8-core, universal 0.5 m

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**	**A**	**–**	**T**	**7**	**P**	**J**	**0**	**1**	**0**	**2**	**4**

Factory-programmed number of lines: 1024, level of output signal: TTL

Programming Tool for VFS60

Model name	**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

Model name	**Part No.**
DSL-2D08-G0M5AC3	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

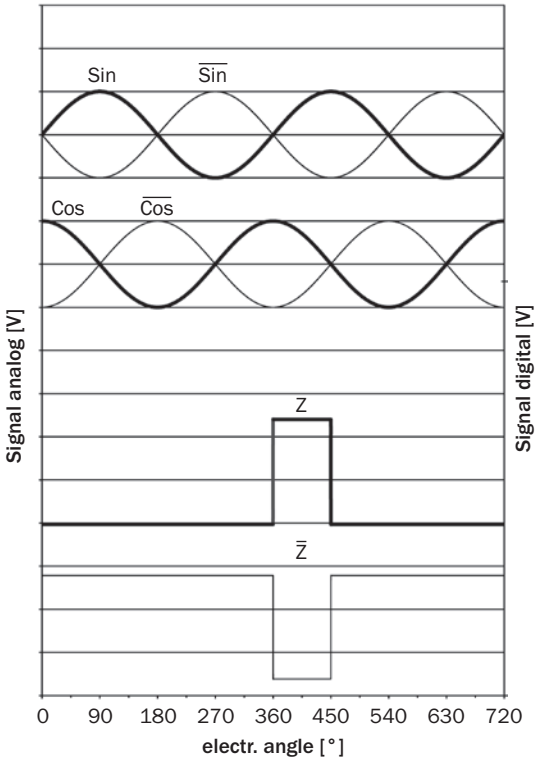
Model name	**Part No.**
DSL-3D08-G0M5AC3	2046580

Interfaces

Electrical interfaces Sinus 0.5 V_{PP}

Supply voltage	4.5 ... 5.5 V
Output	Sinus 0.5 V_{PP}

Signal diagram for clockwise rotation of the shaft looking in direction “A”, see dimensional drawing



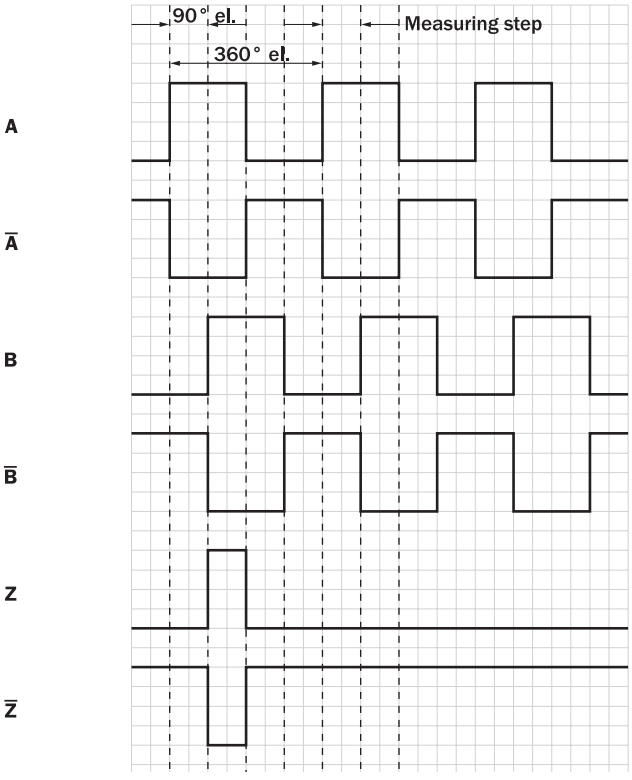
Interface signals Sin, $\overline{Sin}$, Cos, $\overline{Cos}$	analog differential
Signal before differential generation at load 120 Ω	0.5 V_{PP} ± 20 %
Signal offset	2.5 V ± 10 %

Interface signals Z, $\overline{Z}$	digital differential
Signal before differential generation at load 120 Ω	Low: 1.6 V ± 15%; High: 2.9 V ± 15 %

Electrical interfaces TTL/HTL

Supply voltage	4.5 ... 5.5 V	10 ... 32 V	10 ... 32 V	5 ... 32 V
Output	TTL/RS422	TTL/RS422	HTL/push-pull	HTL/TTL programmable

Incremental pulse diagram for clockwise rotation of the shaft looking in direction “A”, see dimensional drawing



Programming Tool

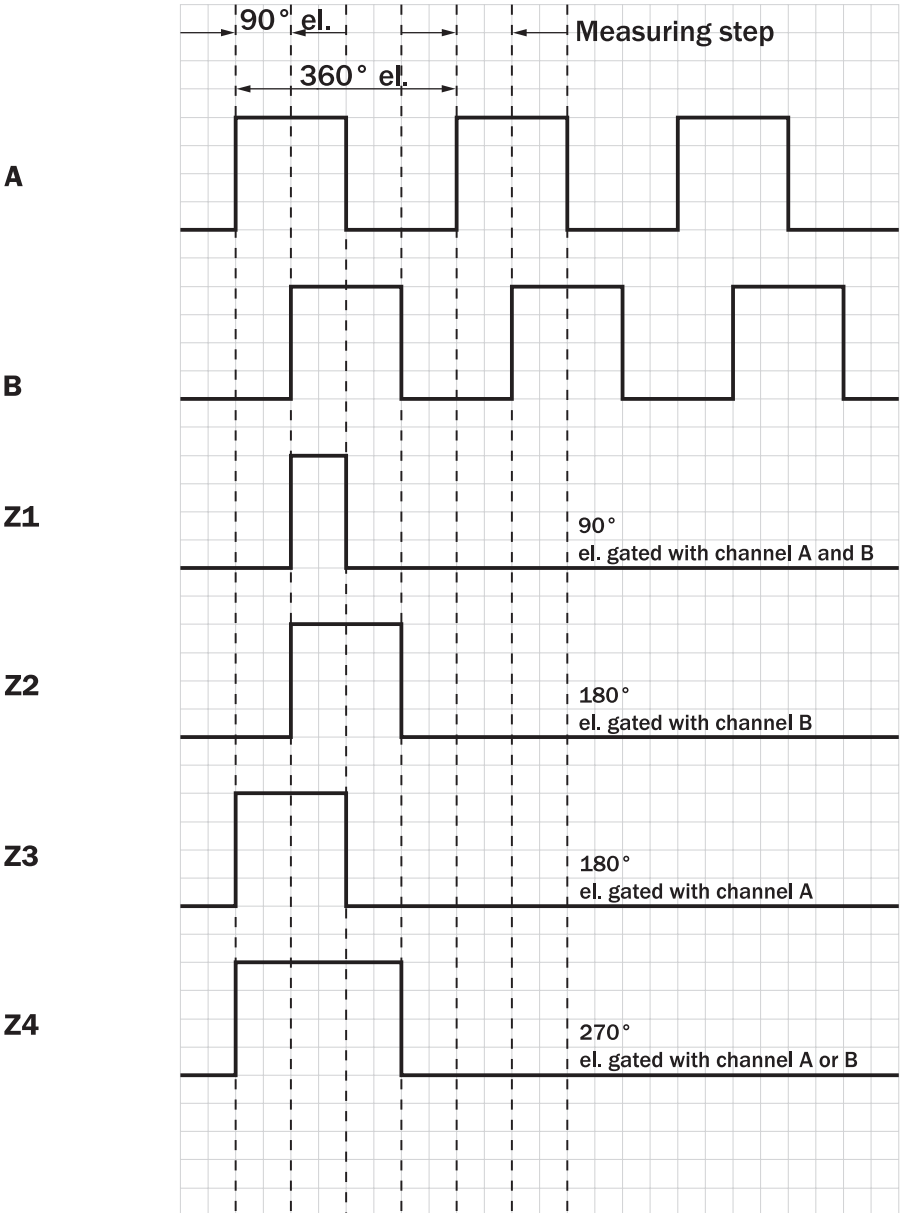
Programming Tool for VFS60		
Model name	**Part No.**	**Contacts**
PGT-08-S	1036616	12



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	
Model name	**Part No.**
DSL-2D08-G0M5AC3	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	
Model name	**Part No.**
DSL-3D08-G0M5AC3	2046580

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



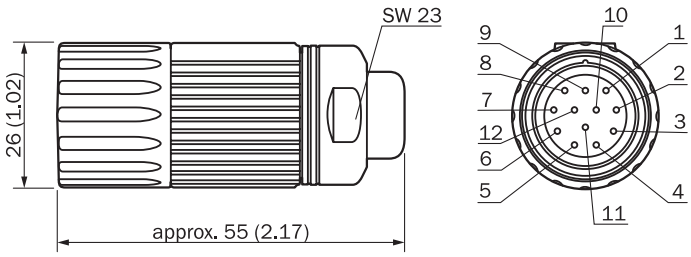
CW with view on the encoder shaft in direction "A"

Dimensional drawings and ordering 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

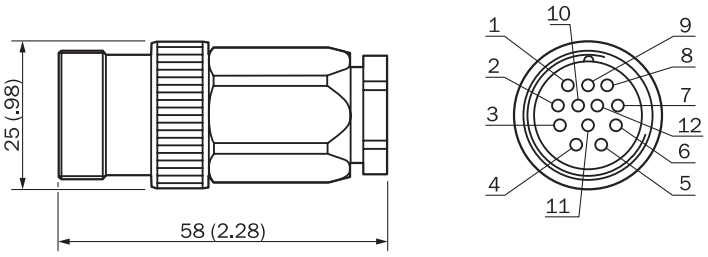


All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

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

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

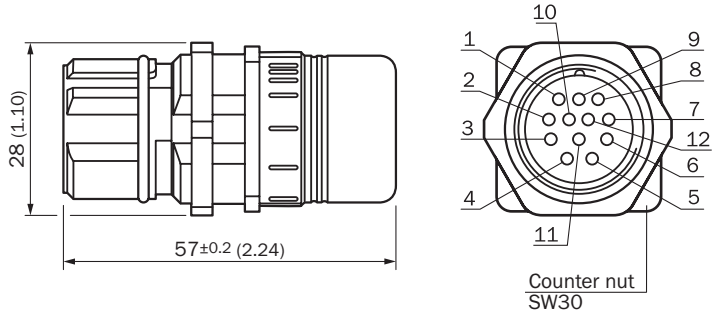


All dimensions in mm (inch)

General tolerances according to DIN ISO 2768-mk

Cable connector M23 male, 12-pin, straight, screened, for rear panel installation

Model name	Part No.	Contacts
STE-2312-GX	6028548	12



All dimensions in mm (inch)

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

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

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

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 ordering information

Cables

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

Model name	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

Model name	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

Model name	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 beeing dragged, cable diameter 7.8 mm

Model name	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

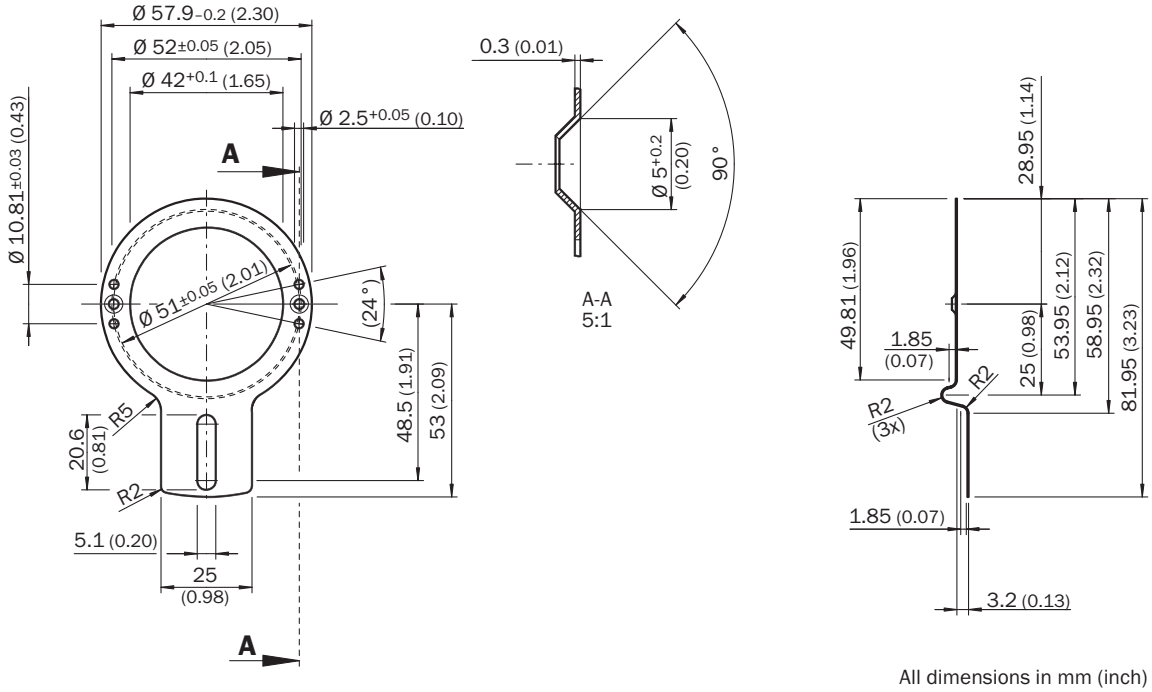
Model name	Part No.	Cable length
DOL-0J08-G0M5AA3	2046873	0.5 m
DOL-0J08-G1M5AA3	2046874	1.5 m
DOL-0J08-G03MAA3	2046875	3.0 m
DOL-0J08-G05MAA3	2046876	5.0 m
DOL-0J08-G10MAA3	2046877	10.0 m



Further mounting versions

Version 1

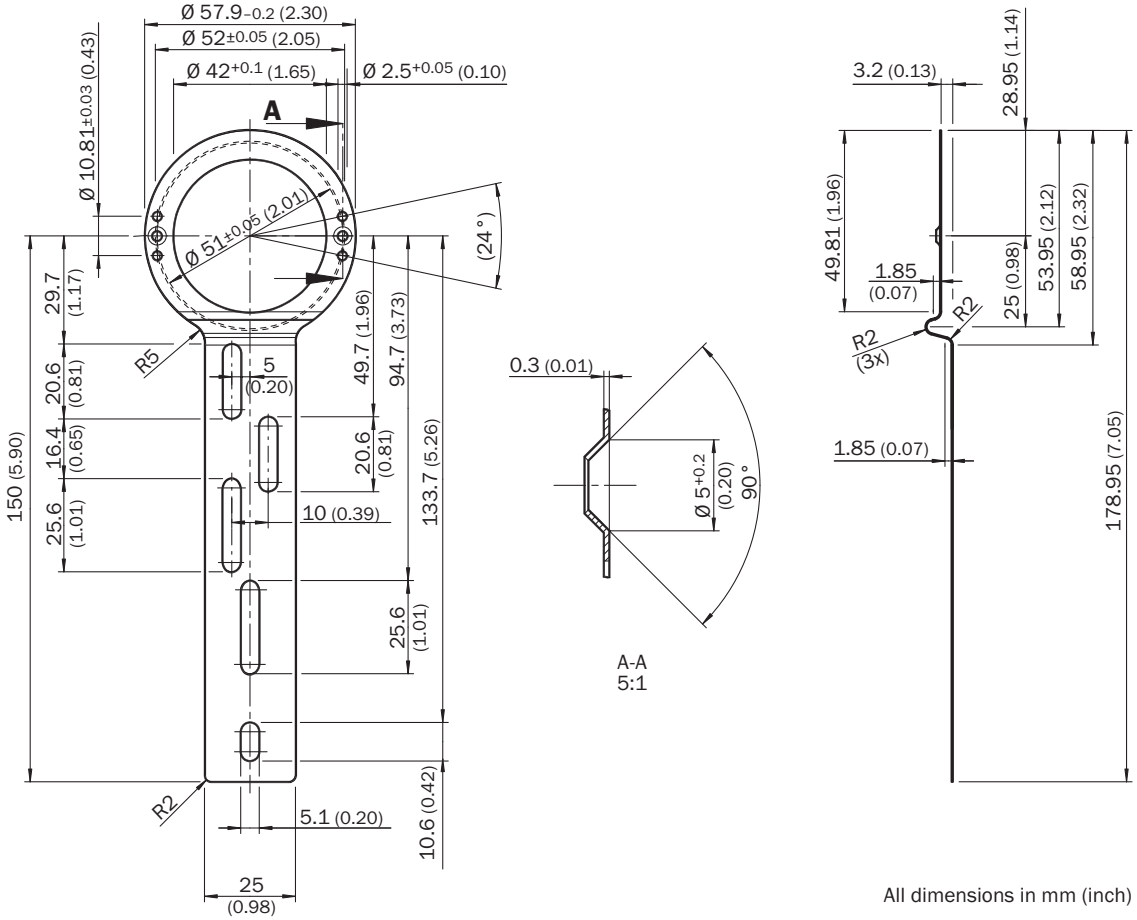
Model name	Part No.
BEF-DS01DFS/VFS	2047428



All dimensions in mm (inch)

Version 2

Model name	Part No.
BEF-DS02DFS/VFS	2047430

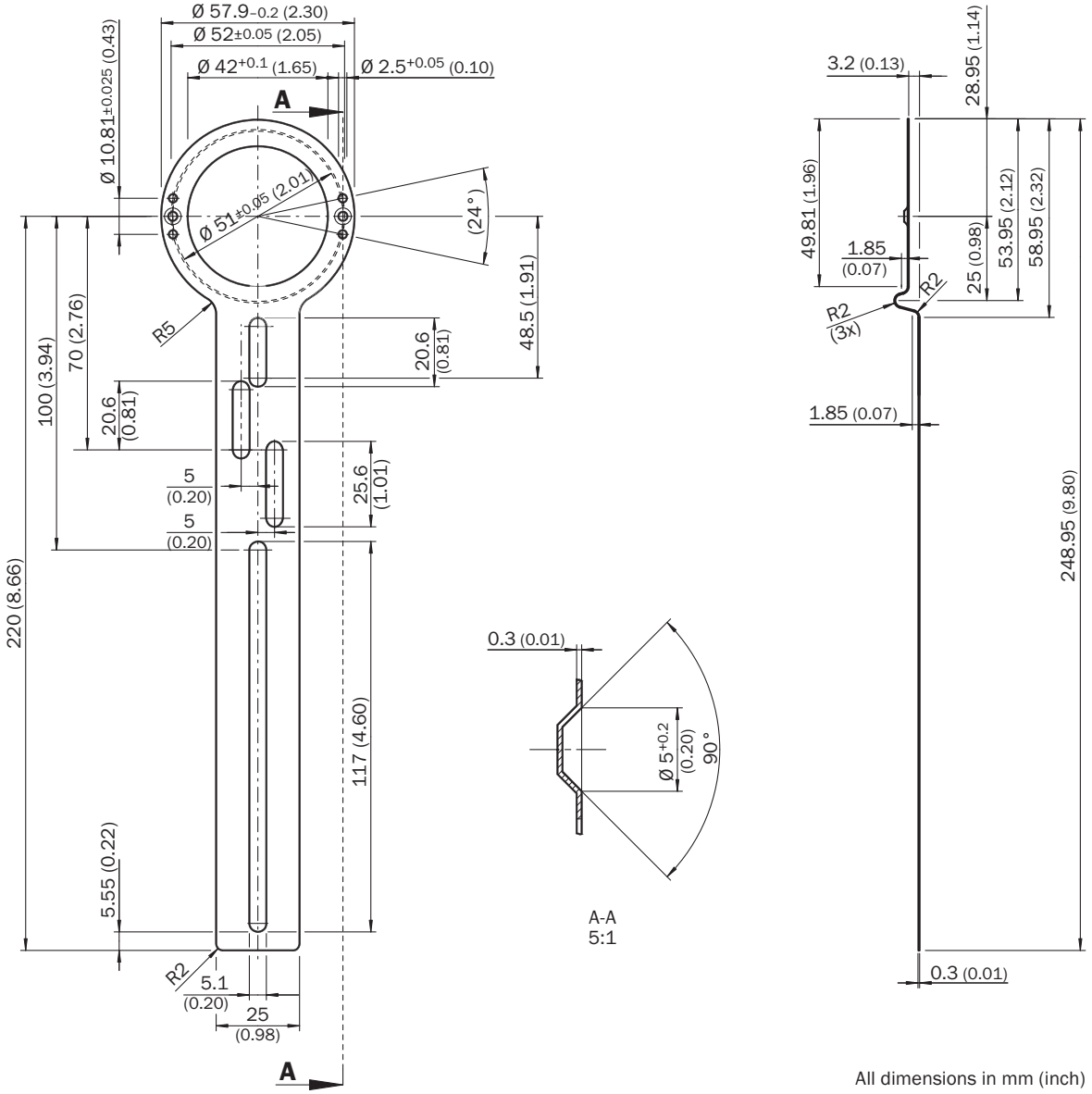


All dimensions in mm (inch)

Further mounting versions

Version 3

Model name	Part No.
BEF-DS03DFS/VFS	2047431



All dimensions in mm (inch)

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