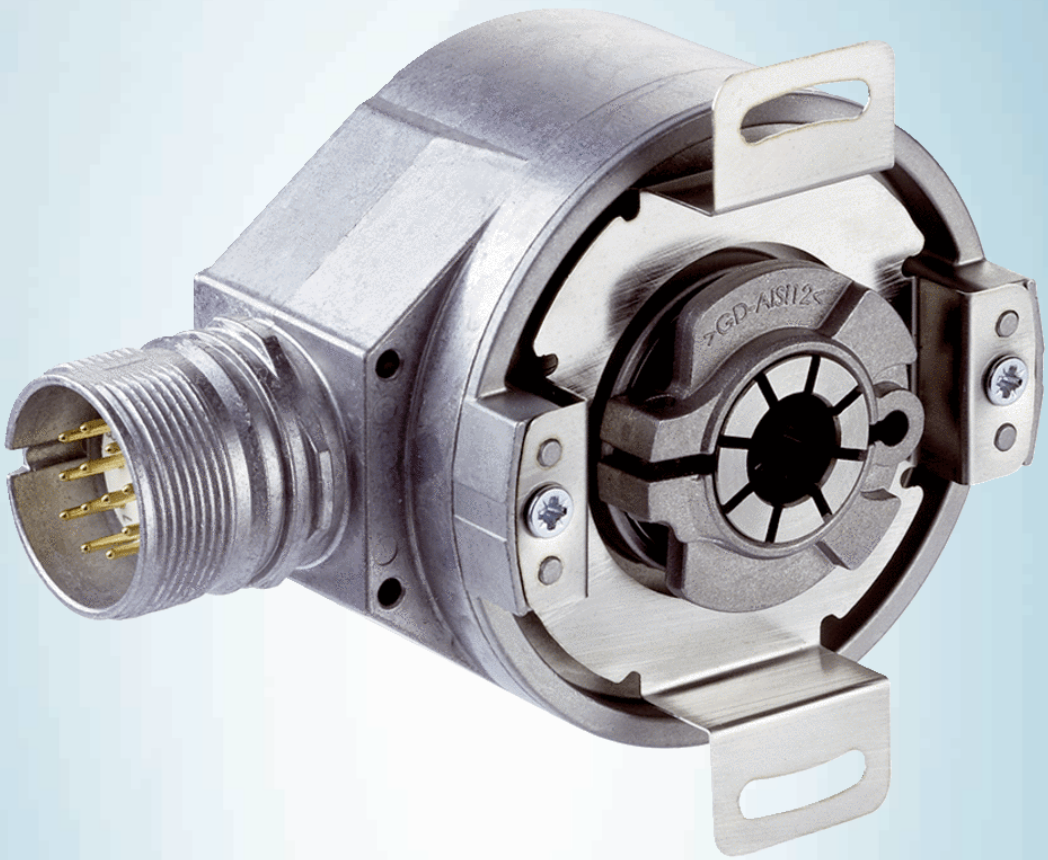
Product data sheet



SFS60-HPAB0K02

SFS/SFM60

MOTOR FEEDBACK SYSTEMS

SICK
Sensor Intelligence.

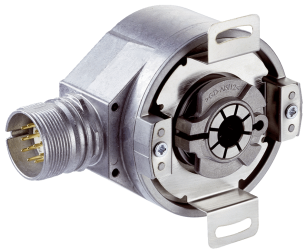


Illustration may differ

Ordering information

Type	Part no.
SFS60-HPAB0K02	1053300

Other models and accessories ➜ www.sick.com/SFS_SFM60

Detailed technical data

Safety-related parameters

$MTTF_D$ (mean time to dangerous failure)	230 years (EN ISO 13849) [1]

[1] This product is a standard product and does not constitute a safety component as defined in the Machinery Directive. Calculation based on nominal load of components, average ambient temperature 60 °C, frequency of use 8760 h/a. All electronic failures are considered hazardous. For more information, see document no. 8015532.

Performance

Sine/cosine periods per revolution	1,024
Number of the absolute ascertainable revolutions	1
Total number of steps	32,768
Measuring step	0.3 ″ For interpolation of the sine/cosine signals with, e. g., 12 bits
Integral non-linearity	Typ. ± 45 ″, Error limits for evaluating sine/cosine period, without mechanical tension of the stator coupling
Differential non-linearity	± 7 ″, Non-linearity within a sine/cosine period
Operating speed	≤ 6,000 min^{-1}, up to which the absolute position can be reliably produced
Available memory area	1,792 Byte
System accuracy	± 52 ″

Interfaces

Type of code for the absolute value	Binary
Code sequence	Rising, For clockwise shaft rotation, looking in direction “A” (see dimensional drawing)
Communication interface	HIPERFACE®

Electrical data

Connection type	Male connector, M23, 12-pin, radial
Supply voltage	7 V DC ... 12 V DC
Recommended supply voltage	8 V DC
Current consumption	< 80 mA (without load)
Output frequency for sine/cosine signals	≤ 200 kHz

Mechanical data

Shaft version	Blind hollow shaft
Shaft diameter	15 mm
Shaft material	Stainless steel
Flange material	Zinc diecast
Housing material	Aluminum die cast
Flange type / stator coupling	Stator coupling (BEF-DS07XFX)
Dimensions	See dimensional drawing
Weight	≤ 0.25 kg
Moment of inertia of the rotor	40 gcm²
Operating speed	≤ 9,000 min^{-1} [1]
Angular acceleration	≤ 500,000 rad/s²
Operating torque	0.6 Ncm (+20 °C)
Start up torque	+ 0.8 Ncm (+20 °C)
Permissible movement static	± 0.3 mm, ± 0.5 mm radial, axial
Permissible movement dynamic	± 0.1 mm radial ± 0.2 mm axial
Life of ball bearings	3.6 x 10^9 revolutions

[1] Allow for self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

Ambient data

Operating temperature range	–40 °C ... +115 °C
Storage temperature range	–40 °C ... +115 °C, without package
Relative humidity/condensation	90 %, Condensation not permitted
Resistance to shocks	100 g, 6 ms (according to EN 60068-2-27)
Frequency range of resistance to vibrations	20 g, 10 Hz ... 2,000 Hz (EN 60068-2-6)
EMC	According to EN 61000-6-2 and EN 61000-6-3 [1]
Enclosure rating	IP65, with mating connector inserted (IEC 60529)

[1] The EMC according to the standards quoted is achieved when the motor feedback system is mounted in an electrically conductive housing, which is connected to the central earthing point of the motor controller via a cable screen. The GND-(0 V) connection of the supply voltage is also grounded here. If other shielding concepts are used, users must perform their own tests.

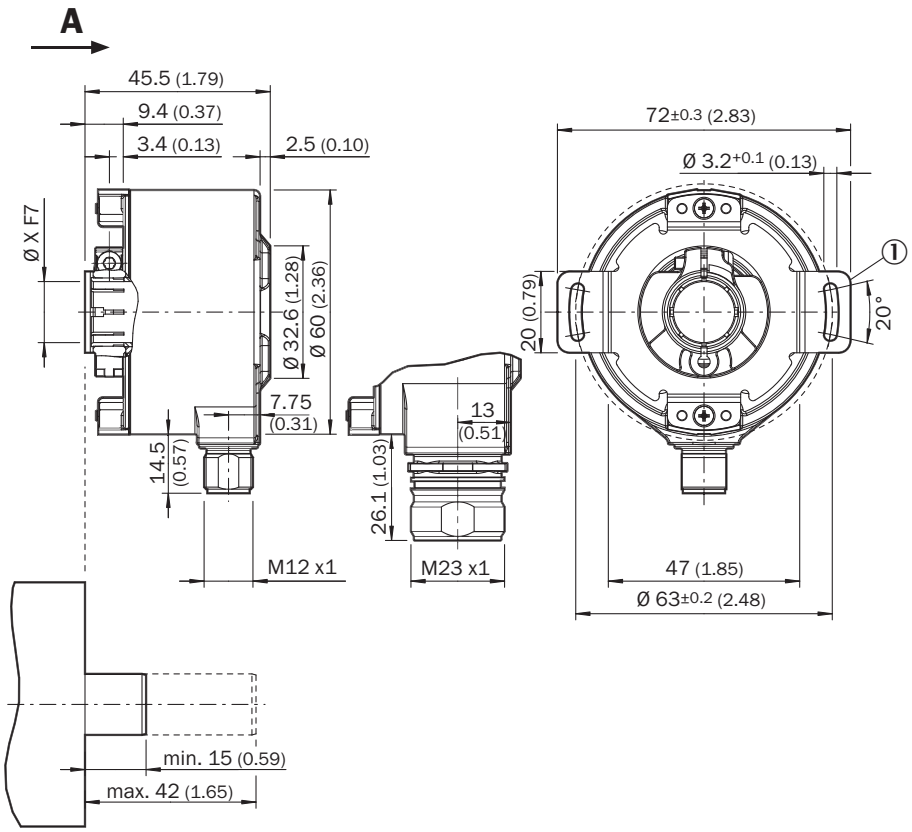
Classifications

ECLASS 5.0	27270590
ECLASS 5.1.4	27270590
ECLASS 6.0	27270590
ECLASS 6.2	27270590
ECLASS 7.0	27270590
ECLASS 8.0	27270590
ECLASS 8.1	27270590
ECLASS 9.0	27270590
ECLASS 10.0	27273805
ECLASS 11.0	27273901

ECLASS 12.0	27273901
ETIM 5.0	EC001486
ETIM 6.0	EC001486
ETIM 7.0	EC001486
ETIM 8.0	EC001486
UNSPSC 16.0901	41112113

Dimensional drawing (Dimensions in mm (inch))

Blind hollow shaft, male connector - standard system

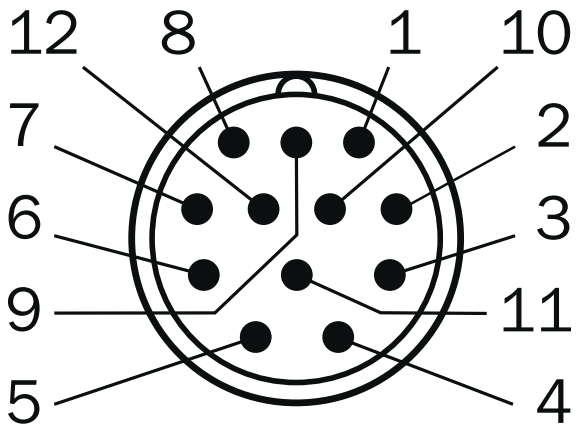


General tolerances according to DIN ISO 2768-mk

① Dimensional drawing of the stator coupling may differ depending on the variant. Please also refer to the dimensional drawing of the stator coupling.

PIN assignment

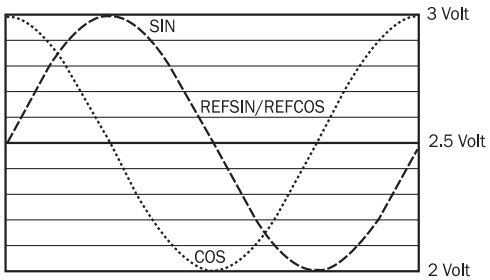
View of the M23 male connector plug-in face



PIN	Signal	Explanation
1	REFCOS	Process data channel
2	Data +	Parameter channel RS 485
3	N.C.	Not assigned
4	N.C.	Not assigned
5	+ SIN	Process data channel
6	REFSIN	Process data channel
7	Data -	Parameter channel RS 485
8	+ COS	Process data channel
9	N.C.	Not assigned
10	GND	Ground connection
11	N.C.	Not assigned
12	U_S	Supply voltage
Housing	Screen	Screen connected to encoder housing

Diagrams

Signal specification of the process channel



Signal diagram for clockwise rotation of the shaft looking in direction "A" (see dimensional drawing)1 period = 360 ° : 1024

Recommended accessories

Other models and accessories ➜ www.sick.com/SFS_SFM60

	Brief description	Type	Part no.
Programming and configuration tools			
	SVip® LAN programming tool for all motor feedback systems	PGT-11-S LAN	1057324
Flanges			
	One-sided stator coupling, slot, slot radius 33 mm to 48.5 mm, slot width 5.1 mm	BEF-DS01DFS/VFS	2047428
	One-sided stator coupling, slot, slot radius 32.25 mm to 141.75 mm, slot width 5.1 mm	BEF-DS02DFS/VFS	2047430
	One-sided stator coupling, slot, slot radius 33 mm to 211.9 mm, slot width 5.1 mm	BEF-DS03DFS/VFS	2047431
	Stator coupling, 16.5 mm high	BEF-DS05XFX	2057423
	Stator coupling with hole circle diameter Ø72 mm	BEF-DS07XFX	2059368
Others			
	• **Connection type head A:** Female connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Description:** HIPERFACE®, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: –20 °C ... +130 °C • **Connection systems:** Solder connection	DOS-2312-G	6027538
	• **Connection type head A:** Male connector, M23, 12-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental, RS-422 • **Description:** HIPERFACE®, SSI, Incremental, RS-422, shielded, M23 male connector • **Connection systems:** Solder connection	STE-2312-G	6027537
	DOL-2308-G1M5JB2	DOL-2308-G1M5JB2	2031069
	• **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** HIPERFACE® • **Cable:** 3 m, 8-wire, PUR, halogen-free • **Description:** HIPERFACE®, shielded	DOL-2308-G03MJB2	2031070
	• **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** HIPERFACE® • **Cable:** 5 m, 8-wire, PUR, halogen-free • **Description:** HIPERFACE®, shielded	DOL-2308-G05MJB2	2031071
	• **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** HIPERFACE® • **Cable:** 10 m, 8-wire, PUR, halogen-free • **Description:** HIPERFACE®, shielded	DOL-2308-G10MJB2	2031072

	Brief description	Type	Part no.
	• **Connection type head A:** Female connector, M23, 12-pin, straight • **Connection type head B:** Flying leads • **Signal type:** HIPERFACE® • **Cable:** 15 m, 8-wire, PUR, halogen-free • **Description:** HIPERFACE®, shielded	DOL-2308-G15MJB2	2031073
	• **Connection type head A:** Female connector, M23, 12-pin, angled, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Description:** HIPERFACE®, SSI, Incremental, shielded, Head A: female connector, M23, 12-pin, angled, shielded, for cable diameter 4.2 mm ... 6.6 mm Head B: - Operating temperature: –20 °C ... +130 °C • **Connection systems:** Solder connection	DOS-2312-W01	2072580
	• **Connection type head A:** Female connector, M23, 9-pin, straight, A-coded • **Signal type:** HIPERFACE®, SSI, Incremental • **Description:** HIPERFACE®, SSI, Incremental, shielded, Head A: female connector, M23, 9-pin, straight, shielded, for cable diameter 5.5 mm ... 10.5 mm Head B: Operating temperature: –20 °C ... +130 °C • **Connection systems:** Solder connection	DOS-2309-G	6028533

SICK AT A GLANCE

SICK is one of the leading manufacturers of intelligent sensors and sensor solutions for industrial applications. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents and preventing damage to the environment.

We have extensive experience in a wide range of industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our customers need. In application centers in Europe, Asia and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes us a reliable supplier and development partner.

Comprehensive services complete our offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

For us, that is “Sensor Intelligence.”

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