



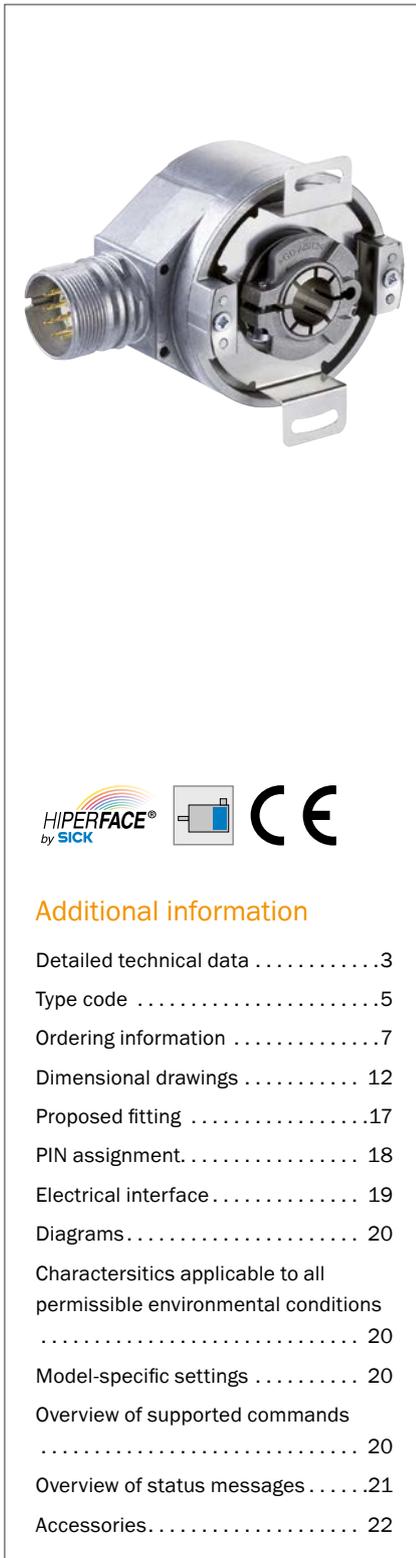
## SFS/SFM60

HIGH-RESOLUTION MOTOR FEEDBACK SYSTEM IN HOLLOW SHAFT DESIGN

Motor feedback systems rotary HIPERFACE®

**SICK**  
Sensor Intelligence.

# HIGH-RESOLUTION MOTOR FEEDBACK SYSTEM IN HOLLOW SHAFT DESIGN



## Product description

SICK is rounding out its portfolio with the optical high-resolution SFS/SFM60 motor feedback systems in hollow shaft design. Especially with self- and force-ventilated synchronous motors, this mechanical component meets customer requirements, as do various hollow shafts and high protection classes (IP 65). A wide variety of product variants fulfills nearly every requirement. The SFS/SFM60 motor feedback sys-

tems use a globally standardized interface. It provides maximum flexibility and reduces installation times - plug & play at its best. The rugged shaft bearing increases the service life and at the same time reduces the servicing and maintenance requirements. It also achieves optimum concentricity and a previously unattainable low level of vibration even at maximum operating speeds.

## At a glance

- HIPERFACE® motor feedback system in singleturn and multiturn design, compatible with the world's leading drive systems
- 1,024 sine/cosine periods per revolution
- Absolute position with a resolution of 32,768 increments per revolution and 4,096 revolutions with the multiturn system
- Mechanical flexibility through different blind hollow shaft and through hollow shaft diameters (8 to 15 mm diameter), available with various stator couplings
- IP65 protection class
- Certified according to SIL2/PL d (only valid for SFS60S/SFM60S...)

## Your benefits

- Convenient traceability and simple maintenance thanks to storage of motor-specific data in the electronic type label
- Large ball bearing distances reduce uneven wear and minimize vibration on the encoder housing, which increases the encoder's service life
- The nickel code disk offers a high degree of vibration resistance and an extended temperature range
- Shorter development times through standardized mechanical interface
- Platform for the future, since all electrical interfaces (TTL/HTL, 1Vpp, SSI, PROFIBUS, HIPERFACE DSL®) are or will be available in this mechanical component

## Additional information

Detailed technical data	3
Type code	5
Ordering information	7
Dimensional drawings	12
Proposed fitting	17
PIN assignment	18
Electrical interface	19
Diagrams	20
Characteristics applicable to all permissible environmental conditions	20
Model-specific settings	20
Overview of supported commands	20
Overview of status messages	21
Accessories	22

→ [www.sick.com/SFS\\_SFM60](http://www.sick.com/SFS_SFM60)

For more information, simply enter the link or scan the QR code and get direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.



## Detailed technical data

## Performance

	Singleturn Standard system	Multiturn Standard system	Singleturn Safety system	Multiturn Safety system
Number of sine/cosine periods per revolution	1,024			
Number of the absolute ascertainable revolutions	1	4,096	1	4,096
Total number of steps	32,768	134,217,728	32,768	134,217,728
Measuring step	0.3 " For interpolation of the sine/cosine signals with, e. g., 12 bits			
Integral non-linearity	Typ. $\pm 45 "$ , Error limits for evaluating sine/cosine period, without mechanical tension of the stator coupling			
Differential non-linearity	$\pm 7 "$ , Non-linearity within a sine/cosine period			
Operating speed	6,000 min <sup>-1</sup> , up to which the absolute position can be reliably produced			

## 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®
Available memory area	1,792 Byte

## Electrical data

Supply voltage range	7 V DC ... 12 V DC
Recommended supply voltage	8 V DC
Operating power consumption (no load)	< 80 mA (without load)
Output frequency for sine/cosine signals	0 kHz ... 200 kHz

## Mechanical data

	Singleturn Standard system	Multiturn Standard system	Singleturn Safety system	Multiturn Safety system
Shaft version	Blind hollow shaft Through hollow shaft			
Shaft material	Stainless steel			
Flange material	Zinc diecast			
Housing material	Aluminum die cast			
Flange type/stator coupling	Stator coupling			
Dimensions	See dimensional drawing			
Weight	$\leq 0.25$ kg			
Moment of inertia of the rotor	40 gcm <sup>2</sup>		56 gcm <sup>2</sup>	
Operating speed	$\leq 9,000$ min <sup>-1</sup> <sup>1)</sup>		$\leq 6,000$ min <sup>-1</sup> <sup>1)</sup>	
Angular acceleration	$\leq 500,000$ rad/s <sup>2</sup>			
Operating torque	0.6 Ncm (+20 °C)			
Start up torque	0.8 Ncm (+20 °C)			
Permissible shaft movement, radial static/dynamic	$\pm 0.3$ mm / $\pm 0.1$ mm		$\pm 0.3$ mm / $\pm 0.05$ mm	
Permissible shaft movement, axial static/dynamic	$\pm 0.5$ mm / $\pm 0.2$ mm		$\pm 0.5$ mm / $\pm 0.1$ mm	
Life of ball bearings	3.6 x 10 <sup>9</sup> revolutions			

<sup>1)</sup> Take into account self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

	Singleturn Standard system	Multiturn Standard system	Singleturn Safety system	Multiturn Safety system
<b>Connection type</b>	Male connector M23, 12-pin, radial Male connector M12, 8-pin, radial Cable, 8-wire, radial, 1.5 m			

<sup>1)</sup> Take into account self-heating of 3.3 K per 1,000 rpm when designing the operating temperature range.

### Ambient data

	Singleturn Standard system	Multiturn Standard system	Singleturn Safety system	Multiturn Safety system
<b>Operating temperature range</b>				
Male connector M23, 12-pin	-40 °C ... +115 °C		-30 °C ... +95 °C	
Male connector M12, 8-pin	-40 °C ... +115 °C		-30 °C ... +95 °C	
Cable, 8-wire	-40 °C ... +115 °C		-30 °C ... +85 °C	
<b>Storage temperature range</b>				
Male connector M23, 12-pin	-40 °C ... +115 °C, without package		-40 °C ... +100 °C, without package	
Male connector M12, 8-pin	-40 °C ... +115 °C, without package		-40 °C ... +100 °C, without package	
Cable, 8-wire	-40 °C ... +115 °C, without package		-40 °C ... +90 °C, without package	
<b>Relative humidity/condensation</b>	90 %, Condensation not permitted			
<b>Resistance to shocks</b>	100 g, 6 ms (according to EN 60068-2-27)			
<b>Frequency range of resistance to vibrations</b>				
Male connector M23, 12-pin	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)		10 g, 10 Hz ... 1,000 Hz (according to EN 60068-2-6)	
Male connector M12, 8-pin	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)			
Cable, 8-wire	20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6)			
<b>EMC</b>	According to EN 61000-6-2 and EN 61000-6-3 <sup>1)</sup>			
<b>Enclosure rating</b>	IP65, with mating connector inserted (according to IEC 60529)			

<sup>1)</sup> 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 (0V) connection of the supply voltage is also grounded here. If other screening concepts are used, users must perform their own tests.

### Safety-related parameters

<b>Note</b>	Following values only valid for SIL2 certified versions
<b>Safety integrity level</b>	SIL2 (IEC 61508), SILCL2 (EN 62061) <sup>1)</sup>
<b>Category</b>	3 (EN ISO 13849)
<b>Test rate</b>	Not required
<b>Maximum demand rate</b>	Continuous (analog signals)
<b>Performance level</b>	PL d (EN ISO 13849) <sup>2)</sup>
<b>PFH<sub>D</sub>: Probability of dangerous failure per hour</b>	1.7 x 10 <sup>-8</sup> <sup>2)</sup>
<b>T<sub>M</sub> (mission time)</b>	20 years (EN ISO 13849)
<b>Safety-related accuracy</b>	± 0.09° (for square counting) <sup>3)</sup>
<b>Safety-related measuring step</b>	0.09° (for square counting)

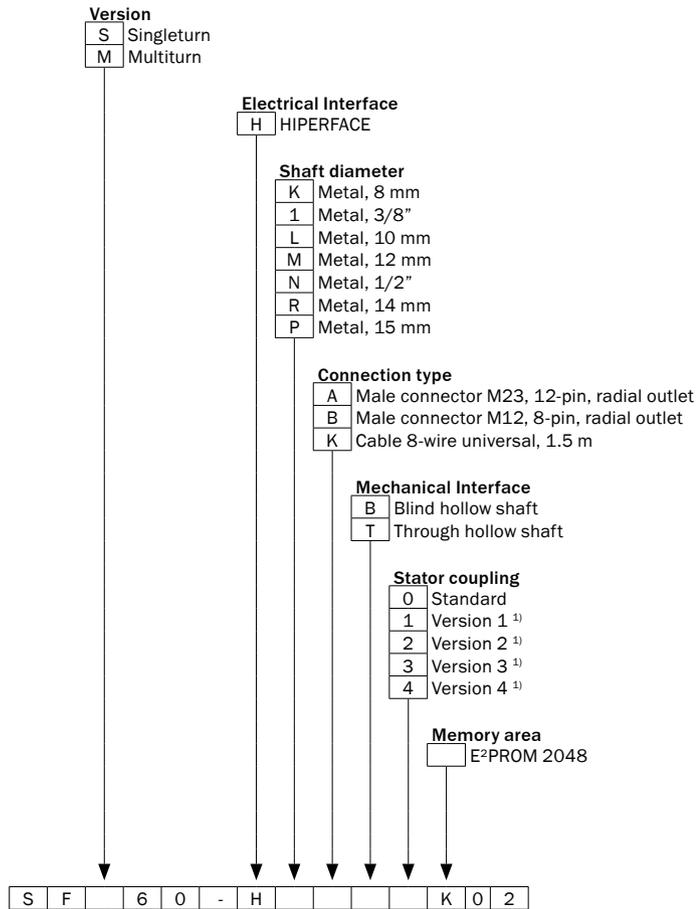
<sup>1)</sup> For more detailed information on the exact configuration of your machine/unit, please consult your relevant SICK branch office.

<sup>2)</sup> The enclosure rating (in accordance with IEC 60529) is achieved with attached mating connector and was tested with the shaft in a horizontal position.

<sup>3)</sup> The values displayed apply to a diagnostic degree of coverage of 90%, which must be achieved by the external drive system. In the event of resonance, suitable tests have to be carried out on the entire drive system.

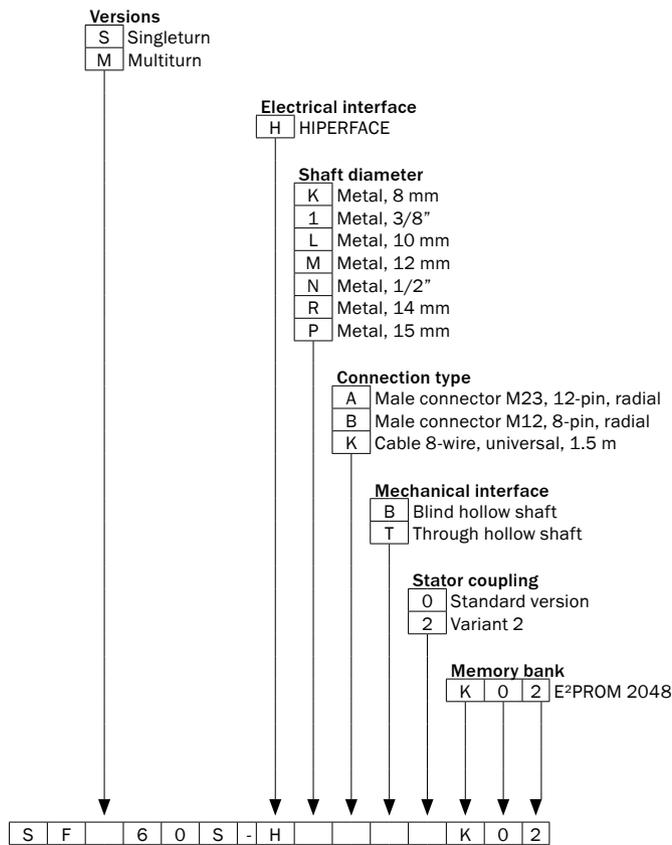
Type code

Standard system



<sup>1)</sup> Versions 1-4 see accessories.

Safety system



Ordering information

Singleturn standard system

- **Available memory area:** E<sup>2</sup>PROM 2048
- **Stator coupling:** stator coupling
- **Electrical interface:** HIPERFACE®
- **Programmable/configurable:** ✓

Shaft version	Shaft diameter	Type	Part no.
Blind hollow shaft	3/8"	SFS60-H1KB0K02	1079679
	1/2"	SFS60-HNKB0K02	1056052
	8 mm	SFS60-HKAB0K02	1067393
		SFS60-HKKB0K02	1057855
	10 mm	SFS60-HKKB4K02	1063741
		SFS60-HLAB0K02	1064491
		SFS60-HLAB2K02	1073250
	12 mm	SFS60-HLKB0K02	1077799
		SFS60-HMAB0K02	1053951
		SFS60-HMKB0K02	1054955
	14 mm	SFS60-HMKB3K02	1066060
		SFS60-HRAB0K02	1060326
		SFS60-HRAB4K02	1063805
		SFS60-HRKB0K02	1052193
	15 mm	SFS60-HPAB0K02	1053300
		SFS60-HPBB0K02	1069097
SFS60-HPKB1K02		1072785	
Through hollow shaft	3/8"	SFS60-H1AT0K02	1078707
	1/2"	SFS60-HNAT0K02	1052148
		SFS60-HNAT1K02	1085798
		SFS60-HNBT0K02	1059826
		SFS60-HNBT2K02	1054384
		SFS60-HNBT4K02	1079469
		SFS60-HNKT0K02	1052143
	8 mm	SFS60-HNKT4K02	1052168
	10 mm	SFS60-HKKT4K02	1066193
		SFS60-HLAT0K02	1052146

Shaft version	Shaft diameter	Type	Part no.
Through hollow shaft	10 mm	SFS60-HLAT4K02	1053117
		SFS60-HLKT0K02	1052142
		SFS60-HLKT4K02	1052166
	12 mm	SFS60-HMAT0K02	1051085
		SFS60-HMAT4K02	1053185
		SFS60-HMBT0K02	1051088
		SFS60-HMBT4K02	1066342
		SFS60-HMKT0K02	1051090
		SFS60-HMKT4K02	1052164
		SFS60-HRAT0K02	1050530
	14 mm	SFS60-HRAT2K02	1077675
		SFS60-HRAT3K02	1054036
		SFS60-HRAT4K02	1052866
		SFS60-HRBT4K02	1073257
		SFS60-HRKT0K02	1050528
		SFS60-HRKT1K02	1075193
		SFS60-HRKT2K02	1067392
		SFS60-HRKT4K02	1052162
	15 mm	SFS60-HPAT0K02	1055984
		SFS60-HPAT1K02	1072187
		SFS60-HPAT4K02	1056954
		SFS60-HPBT0K02	1069143
		SFS60-HPKT0K02	1050531
		SFS60-HPKT1K02	1056307
SFS60-HPKT4K02	1057557		

Multiturn standard system

- **Available memory area:** E<sup>2</sup>PROM 2048
- **Stator coupling:** stator coupling
- **Electrical interface:** HIPERFACE®
- **Programmable/configurable:** ✓

Shaft version	Shaft diameter	Type	Part no.
Blind hollow shaft	3/8"	SFM60-H1BB0K02	1062801
	1/2"	SFM60-HNBB0K02	1062406
	3/8"	SFM60-H1KB0K02	1081090
	1/2"	SFM60-HNKB0K02	1078830
	8 mm	SFM60-HKAB0K02	1064321
		SFM60-HKAB1K02	1060822

Shaft version	Shaft diameter	Type	Part no.
Blind hollow shaft	8 mm	SFM60-HKKB0K02	1055058
		SFM60-HKKB1K02	1083535
	10 mm	SFM60-HLAB0K02	1060907
		SFM60-HLAB1K02	1055926
		SFM60-HLAB2K02	1068209
		SFM60-HLBB0K02	1054267
		SFM60-HLKB0K02	1054723
		SFM60-HMAB0K02	1053160
	12 mm	SFM60-HMAB2K02	1087928
		SFM60-HMAB4K02	1053373
		SFM60-HMBB0K02	1065249
		SFM60-HMBB1K02	1084966
		SFM60-HMKB0K02	1071476
		SFM60-HMKB1K02	1067363
	14 mm	SFM60-HMKB4K02	1053626
		SFM60-HRAB0K02	1061912
		SFM60-HRBB0K02	1061913
		SFM60-HRKB0K02	1052192
	15 mm	SFM60-HRKB2K02	1065169
		SFM60-HPAB0K02	1053573
		SFM60-HPAB2K02	1060552
		SFM60-HPBB0K02	1053042
		SFM60-HPKB0K02	1053044
		SFM60-HPKB1K02	1073532
Through hollow shaft	3/8"	SFM60-HPKB4K02	1053045
	1/2"	SFM60-H1AT4K02	1055822
		SFM60-HNAT0K02	1052147
		SFM60-HNAT2K02	1073085
		SFM60-HNAT4K02	1056747
	3/8"	SFM60-HNBT0K02	1071619
		SFM60-H1KT0K02	1062528
	1/2"	SFM60-HNKT0K02	1052157
		SFM60-HNKT4K02	1052167
	8 mm	SFM60-HKAT0K02	1051817
		SFM60-HKBT0K02	1068070
		SFM60-HKKT0K02	1060851
		SFM60-HKKT2K02	1062108
		SFM60-HKKT4K02	1084218
	10 mm	SFM60-HLAT0K02	1052145
		SFM60-HLAT4K02	1053229
SFM60-HLBT0K02		1068916	
SFM60-HLBT1K02		1068998	

Shaft version	Shaft diameter	Type	Part no.
Through hollow shaft	10 mm	SFM60-HLKT0K02	1052140
		SFM60-HLKT1K02	1084455
		SFM60-HLKT4K02	1052165
	12 mm	SFM60-HMAT0K02	1051086
		SFM60-HMAT1K02	1055302
		SFM60-HMAT4K02	1053367
		SFM60-HMBT0K02	1051089
		SFM60-HMKT0K02	1051091
		SFM60-HMKT4K02	1052163
		SFM60-HRAT0K02	1050529
	14 mm	SFM60-HRAT4K02	1052258
		SFM60-HRBT0K02	1075710
		SFM60-HRBT4K02	1054584
		SFM60-HRKT0K02	1050527
		SFM60-HRKT2K02	1055237
		SFM60-HRKT4K02	1052161
		SFM60-HPAT0K02	1065325
	15 mm	SFM60-HPAT1K02	1075115
		SFM60-HPAT3K02	1081813
		SFM60-HPAT4K02	1053777
		SFM60-HPBT0K02	1053366
		SFM60-HPBT1K02	1076374
		SFM60-HPKT0K02	1051311
		SFM60-HPKT3K02	1079421
SFM60-HPKT4K02	1067461		

Singleturn safety system

- **Safety system:** ✓
- **Available memory area:** E<sup>2</sup>PROM 2048
- **Stator coupling:** stator coupling
- **Electrical interface:** HIPERFACE®
- **Programmable/configurable:** ✓

Shaft version	Shaft diameter	Type	Part no.
Blind hollow shaft	14 mm	SFS60S-HRKB0K02	1081501
Through hollow shaft	1/2"	SFS60S-HNAT0K02	1081512
		SFS60S-HNKT0K02	1081511
	10 mm	SFS60S-HLAT0K02	1081510
		SFS60S-HLKT0K02	1081509
	12 mm	SFS60S-HMAT0K02	1081507
		SFS60S-HMBT0K02	1081508
		SFS60S-HMKT0K02	1081506
	14 mm	SFS60S-HRAT0K02	1081505
		SFS60S-HRKT0K02	1081504
	15 mm	SFS60S-HPAT0K02	1076959
		SFS60S-HPKT0K02	1076852

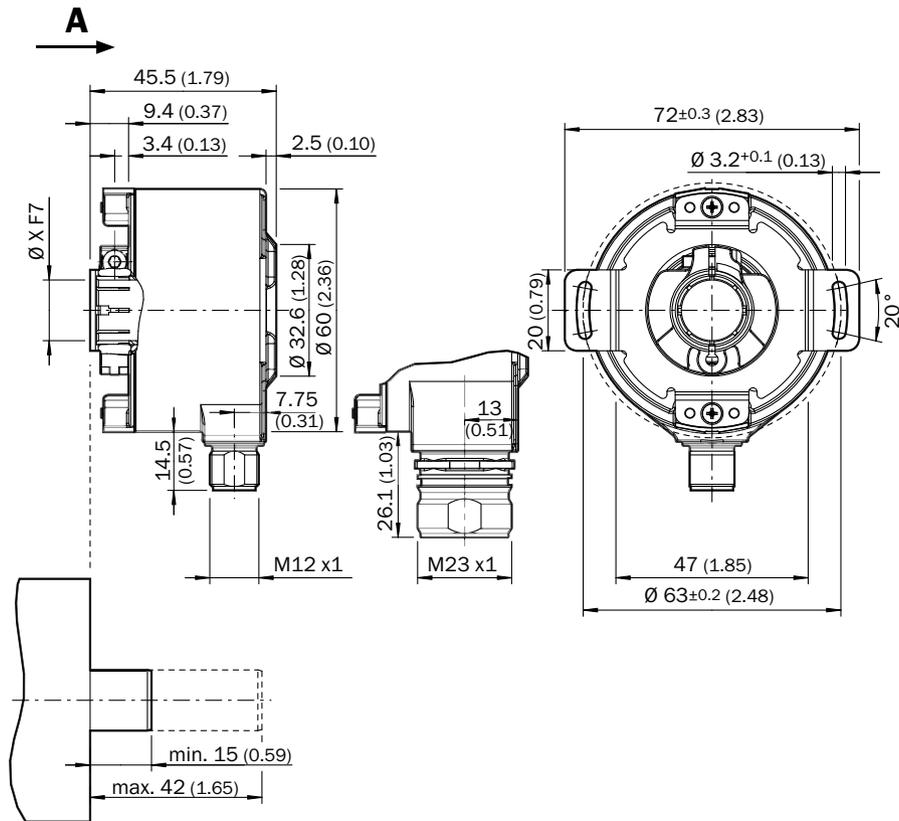
Multiturn safety system

- **Safety system:** ✓
- **Available memory area:** E<sup>2</sup>PROM 2048
- **Stator coupling:** stator coupling
- **Electrical interface:** HIPERFACE®
- **Programmable/configurable:** ✓

Shaft version	Shaft diameter	Type	Part no.
Blind hollow shaft	3/8"	SFM60S-H1BB0K02	1081520
	8 mm	SFM60S-HKAB0K02	1081519
	10 mm	SFM60S-HLBB0K02	1081518
	12 mm	SFM60S-HMAB0K02	1081517
		SFM60S-HMKB0K02	1081516
	14 mm	SFM60S-HRKB0K02	1081513
	15 mm	SFM60S-HPAB0K02	1081515
		SFM60S-HPBB0K02	1081149
		SFM60S-HPKB0K02	1081514
	Through hollow shaft	1/2"	SFM60S-HNAT0K02
SFM60S-HNKT0K02			1081531
8 mm		SFM60S-HKAT0K02	1081530
10 mm		SFM60S-HLAT0K02	1081529
		SFM60S-HLKT0K02	1081528
12 mm		SFM60S-HMAT0K02	1081526
		SFM60S-HMBT0K02	1081527
		SFM60S-HMKT0K02	1081525
14 mm		SFM60S-HRAT0K02	1081523
		SFM60S-HRKT0K02	1081521
15 mm		SFM60S-HPAT0K02	1076948
		SFM60S-HPBT0K02	1081524
		SFM60S-HPKT0K02	1076951

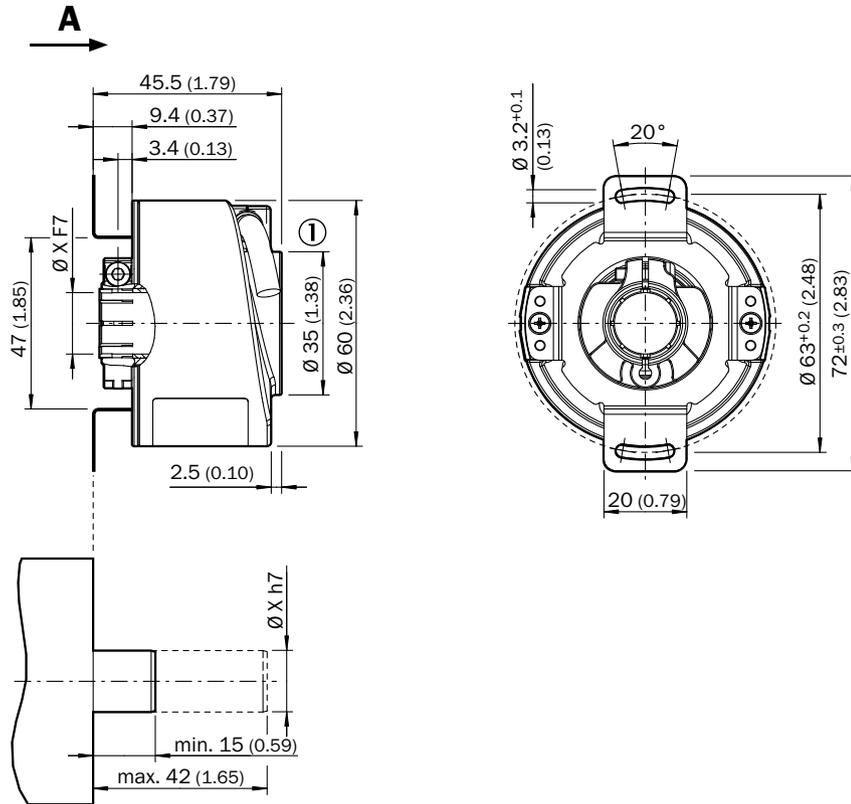
Dimensional drawings (Dimensions in mm (inch))

Blind hollow shaft, connector outlet - standard system



General tolerances according to DIN ISO 2768-mk

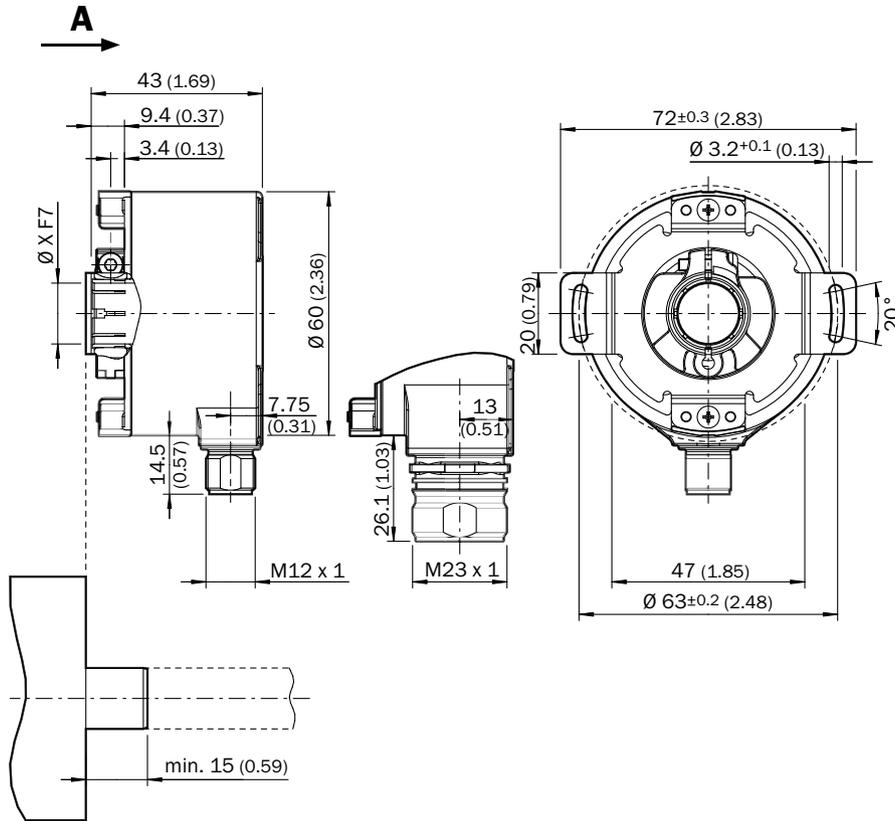
Blind hollow shaft, cable outlet - standard system



General tolerances according to DIN ISO 2768-mk

① Cable diameter = 5.6 mm +/- 0.2 mm bend radius = 30 mm

Through hollow shaft, connector outlet - standard system



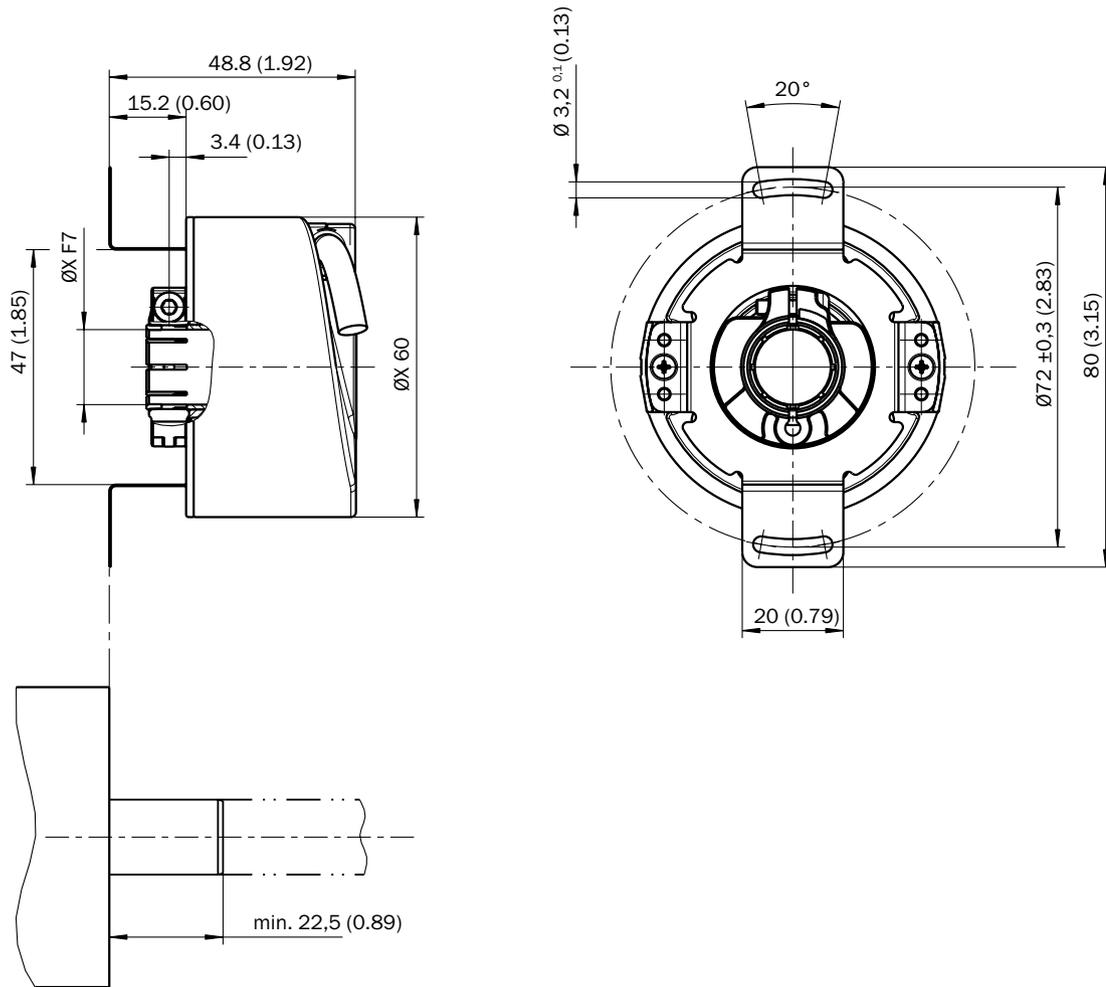
General tolerances according to DIN ISO 2768-mk





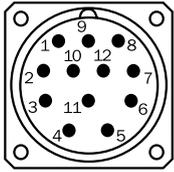
Proposed fitting

Version 4



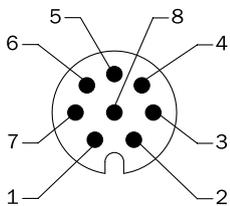
### PIN assignment

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 <sub>s</sub>	Supply voltage
Housing	Screen	Screen connected with encoder housing

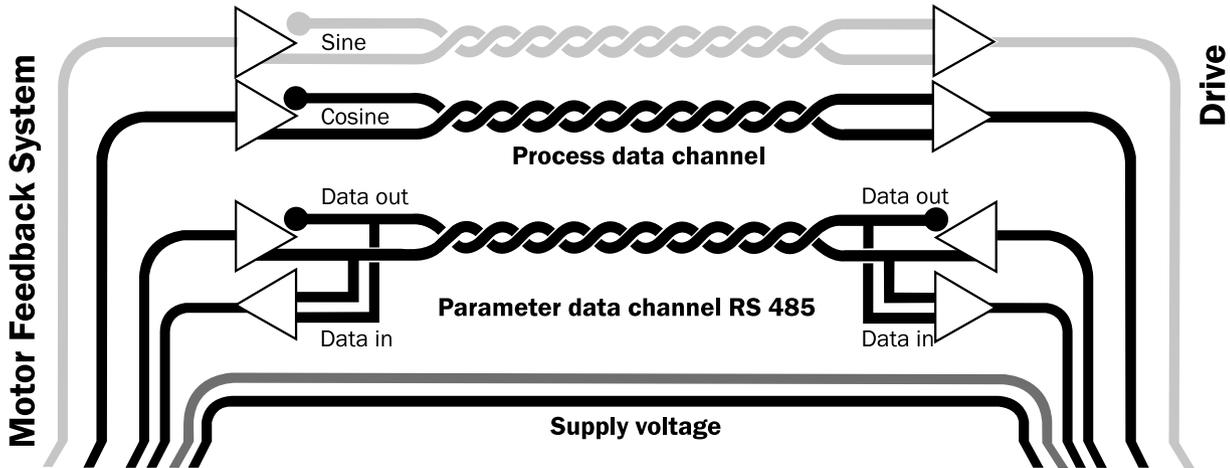
View of the M12 male connector plug-in face



PIN	Signal	Explanation
1	REFSIN	Process data channel
2	+ SIN	Process data channel
3	REFCOS	Process data channel
4	+ COS	Process data channel
5	Data +	Parameter channel RS 485
6	Data -	Parameter channel RS 485
7	GND	Ground connection
8	U <sub>s</sub>	Supply voltage
Housing	Screen	Screen connected with encoder housing

Colour of wires (cable outlet)	Signal	Explanation
Brown	REFSIN	Process data channel
White	+ SIN	Process data channel
Black	REFCOS	Process data channel
Pink	+ COS	Process data channel
Gray or yellow	Data +	Parameter channel RS 485
Green or purple	Data -	Parameter channel RS 485
Blue	GND	Ground connection
Red	U <sub>s</sub>	Supply voltage
Screen		Screen connected with encoder housing

Electrical interface



- ① Secure data transmission
- ② High information content
- ③ Electronic type label
- ④ Only 8 cables
- ⑤ Bus-compatible parameter channel
- ⑥ Process channel in real time

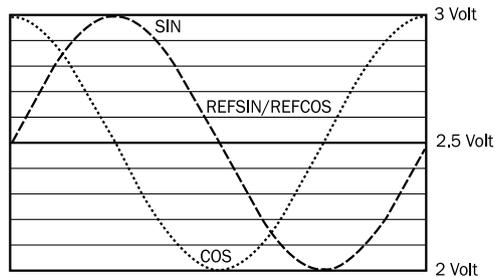
## Technical Description

Details regarding the diagrams

Access to the process data used for speed control, i.e. to the sine and cosine signals, is practically always 'online'. When the supply voltage is applied, the speed controller has access to this information at any time. Sophisticated technology

guarantees stable amplitudes of the analogue signals across all specified environmental conditions, with a maximum variation of only 20 %.

## Diagrams



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

## Characteristics applicable to all permissible environmental conditions

Signal	Values/unit
Signal peak, peak $V_{SS}$ of SIN, COS	0.9 V ... 1.1 V
Signal offset REFSIN, REFCOS	2.2 V ... 2.8 V

## Model-specific settings

	SFS	SFM
Model ID (command 52h)	22h	27h
Free E <sup>2</sup> PROM [bytes]	128/1.792	128/1.792
Address	40h	40h
Mode_485	E4h	E4h
Codes 0 to 3	55h	55h
Counter	0	0

## Overview of supported commands

Command byte	Function	Code 0 <sup>1)</sup>	SFS	SFM
			Comment	Comment
42h	Read position	■		
43h	Set position			
44h	Read analog value		Channel number 48h	Channel number 48h
			Temperature [°C]	Temperature [°C]
46h	Read counter			
47h	Increase counter			
49h	Delete counter	■		
4Ah	Read data			
4Bh	Store data			
4Ch	Determine status of a data field			
4Dh	Create data field			

Command byte	Function	Code 0 <sup>1)</sup>	SFS	SFM
			Comment	Comment
4Eh	Determine available memory area			
4Fh	Change access code			
50h	Read encoder status			
52h	Read out type label		Encoder type = 22h	Encoder type = 22h
53h	Encoder reset			
55h	Allocate encoder address	■		
56h	Read serial number and program version			
57h	Configure serial interface	■		

<sup>1)</sup> The commands thus marked include the parameter 'Code 0'. Code 0 is a byte inserted into the protocol to provide additional protection of vital system parameters against accidental overwriting. When the device is supplied, 'Code 0' = 55h.

## Overview of status messages

	Status code	Description	SFS	SFM
Error type	00h	The encoder has not detected any faults	■	■
Initialization	01h	Incorrect alignment data	■	■
	02h	Incorrect internal angular offset	■	■
	03h	Data field partitioning table destroyed	■	■
	04h	Analog limit values not available	■	■
	05h	Internal I2C bus inoperative	■	■
	06h	Internal checksum error	■	■
Protocol	07h	Encoder reset occurred as a result of program monitoring	■	■
	09h	Parity error	■	■
	0Ah	Checksum of transmitted data is incorrect	■	■
	0Bh	Unknown command code	■	■
	0Ch	Number of transmitted data is incorrect	■	■
	0Dh	Transmitted command argument is not allowed	■	■
Data	0Eh	The selected data field may not be written to	■	■
	0Fh	Incorrect access code	■	■
	10h	Size of specified data field cannot be changed	■	■
	11h	Specified word address lies outside the data field	■	■
Position	12h	Access to non-existent data field	■	■
	01h	Analog signals outside specification	■	■
	1Fh	Speed too high, no position formation possible	■	■
	20h	Singleturn position unreliable	■	■
	21h	Multiturn position error	■	■
Other	22h	Multiturn position error	■	■
	23h	Multiturn position error	■	■
	1Ch	Value monitoring of the analog signals (process data)	■	■
	1Dh	Transmitter current critical (contamination, transmitter breakage)	■	■
	1Eh	Encoder temperature critical	■	■
	08h	Counter overflow	■	■

For more information on the interface see HIPERFACE® - description, part no. 8010701

Accessories

Mounting systems

Flanges

Flange plates

Figure	Brief description	Type	Part no.
	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 63 mm	BEF-DS07XFX	2059368

Dimensional drawings → page 24

Shaft adaptation

Collets and clamping rings

Figure	Brief description	Type	Part no.
	PEEK conductor insulation (shaft diameter 8 mm, outer diameter 10 mm)	PEEK CONDUCTOR INSULATION	2065642
	PEEK conductor insulation (shaft diameter 10 mm, outer diameter 12 mm)	PEEK CONDUCTOR INSULATION	2064571
	PEEK conductor insulation (shaft diameter 12 mm, outer diameter 14 mm)	PEEK CONDUCTOR INSULATION	2064573
	PEEK conductor insulation (shaft diameter 1/2"(12.7 mm), outer diameter 15 mm)	PEEK CONDUCTOR INSULATION	2064572

Connection systems

Plug connectors and cables

Cables (ready to assemble)

Brief description	Type	Part no.
Head A: cable Head B: cable Cable: HIPERFACE®, HIPERFACE®, drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.15 mm <sup>2</sup> , Ø 5.3 mm	LTG-2708-MW	6028361

Connecting cables with female connector

Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M12, 8-pin, straight Head B: cable Cable: drag chain use, PUR, halogen-free, shielded, 4 x 2 x 0.25 mm <sup>2</sup> , Ø 7 mm	2 m	DOL-1208-G02MAC1	6032866
		5 m	DOL-1208-G05MAC1	6032867
		10 m	DOL-1208-G10MAC1	6032868
		20 m	DOL-1208-G20MAC1	6032869

Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: cable Cable: HIPERFACE®, HIPERFACE®, drag chain use, PUR, shielded, Ø 5.6 mm	3 m	DOL-2308-G03MJB2	2031070
		5 m	DOL-2308-G05MJB2	2031071
		10 m	DOL-2308-G10MJB2	2031072
		15 m	DOL-2308-G15MJB2	2031073
		1.5 m	DOL-2308-G1M5JB2	2031069

Dimensional drawings → [page 27](#)

#### Connection cables with female connector and male connector

Figure	Brief description	Cable length	Type	Part no.
	Head A: female connector, M23, 12-pin, straight Head B: male connector, M23, 17-pin, straight Cable: HIPERFACE®, unshielded, 5.6 mm	1 m	DSL-2317-G01MJB2	2071328
	Head A: female connector, JST, 8-pin, straight Head B: male connector, M23, 17-pin, straight Cable: HIPERFACE®, unshielded, 5.6 mm	1 m	DSL-2317-G01MJB6	2071327
	Head A: female connector, M12, 8-pin, straight Head B: male connector, M23, 17-pin, straight Cable: HIPERFACE®, unshielded, 5.6 mm	1 m	DSL-2317-G01MJC1	2071329
	Head A: female connector, terminal box, 8-pin, straight Head B: male connector, M23, 17-pin, straight Cable: HIPERFACE®, unshielded, 5.6 mm	1 m	DSL-2317-G01MJC6	2071330

Dimensional drawings → [page 27](#)

#### Female connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: female connector, M12, 8-pin, straight, A-coding Head B: - Cable: Incremental, SSI, shielded, CAT5, CAT5e	DOS-1208-GA01	6045001
	Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	DOS-2312-G	6027538
	Head A: female connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, PBT UL 94-V0, shielded	DOS-2312-G02	2077057
	Head A: female connector, M23, 12-pin, angled Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	DOS-2312-W01	2072580

Dimensional drawings → [page 27](#)

#### Male connectors (ready to assemble)

Figure	Brief description	Type	Part no.
	Head A: male connector, M12, 8-pin, straight, A-coding Head B: - Cable: Incremental, shielded, CAT5, CAT5e	STE-1208-GA01	6044892
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, RS-422, shielded	STE-2312-G	6027537

Figure	Brief description	Type	Part no.
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, PBT UL 94-V0, shielded	STE-2312-G01	2077273
	Head A: male connector, M23, 12-pin, straight Head B: - Cable: HIPERFACE®, SSI, Incremental, shielded	STE-2312-GX	6028548

Dimensional drawings → page 27

### Further accessories

#### Programming and configuration tools

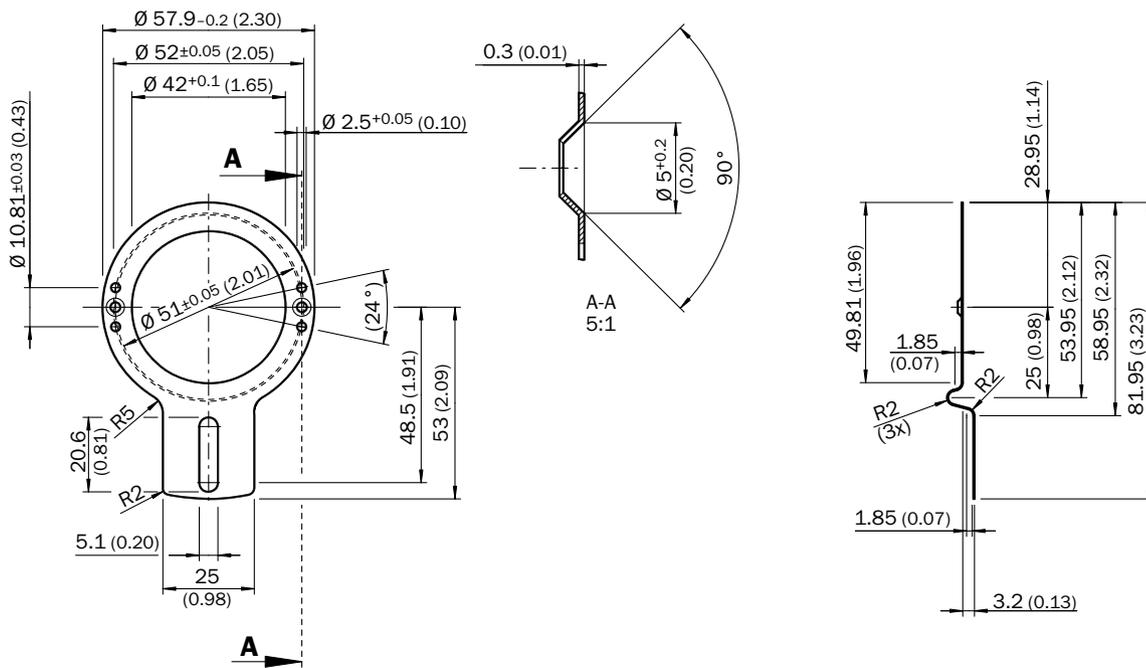
Figure	Brief description	Type	Part no.
	SVip® LAN programming tool for all motor feedback systems	PGT-11-S LAN	1057324
	SVip® WLAN programming tool for all motor feedback systems	PGT-11-S WLAN	1067474

Dimensional drawings → page 30

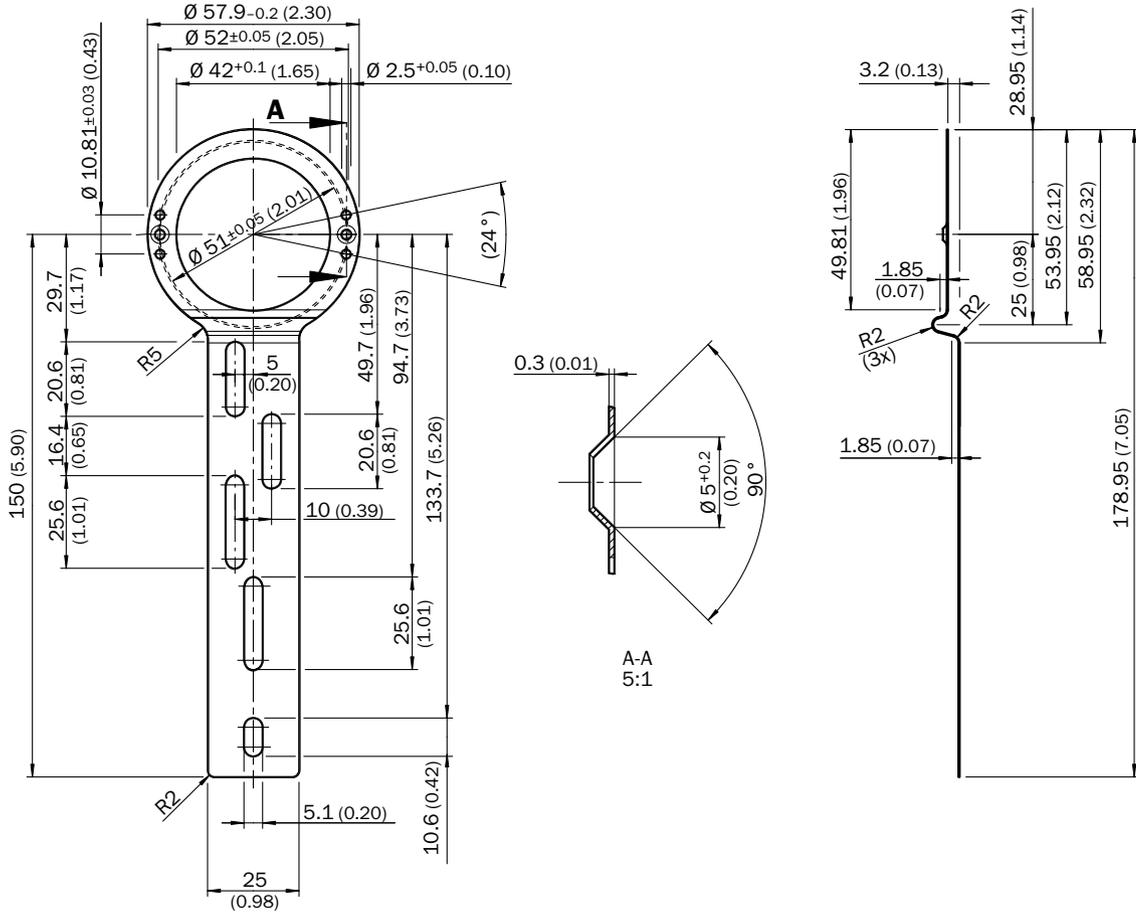
### Dimensional drawings for accessories (Dimensions in mm (inch))

#### Flanges

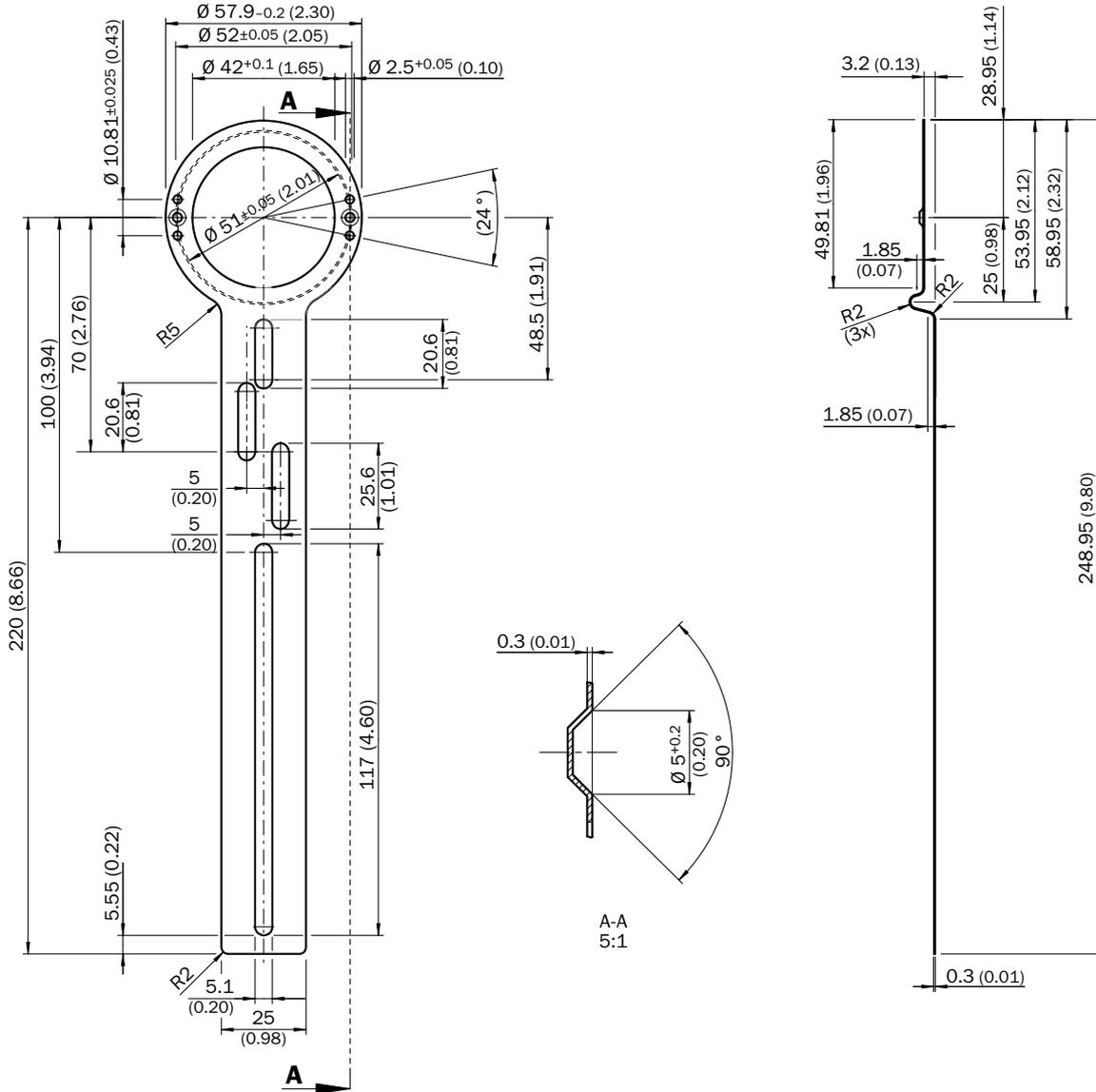
##### BEF-DS01DFS/VFS



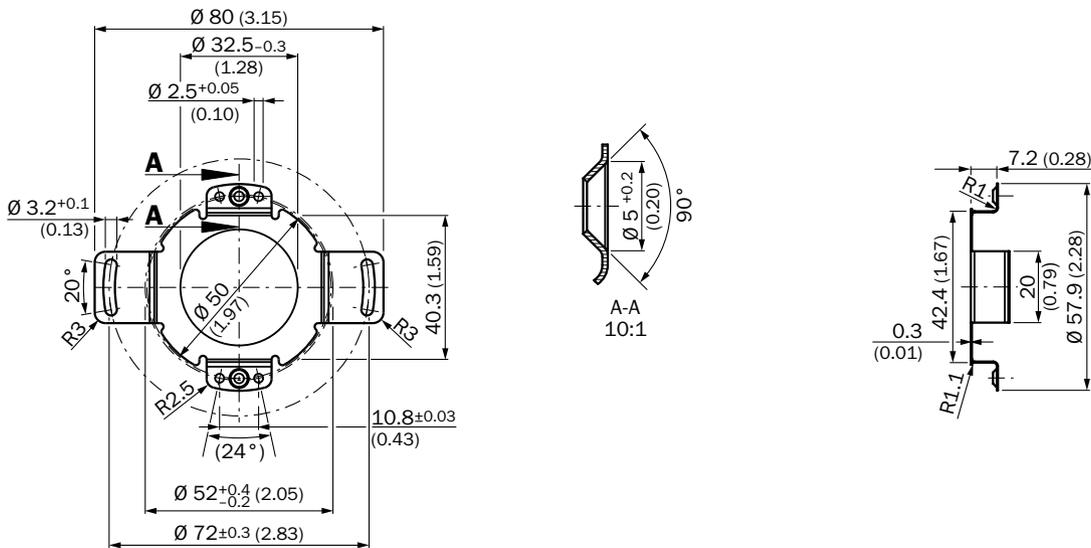
BEF-DS02DFS/VFS



BEF-DS03DFS/VFS

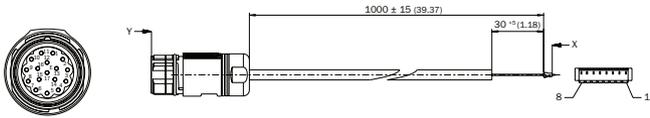


BEF-DS05XFX



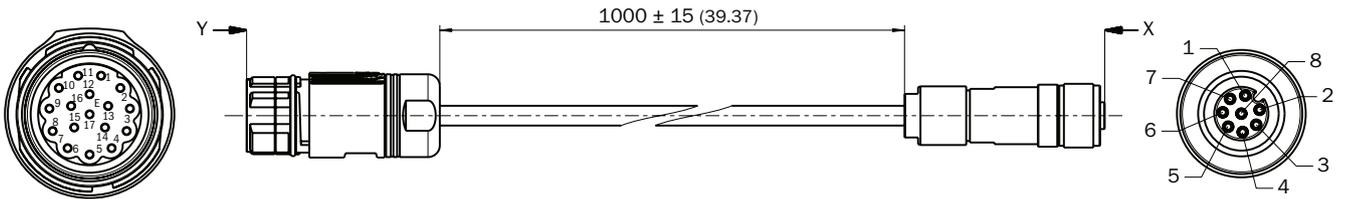


DSL-2317-G01MJB6

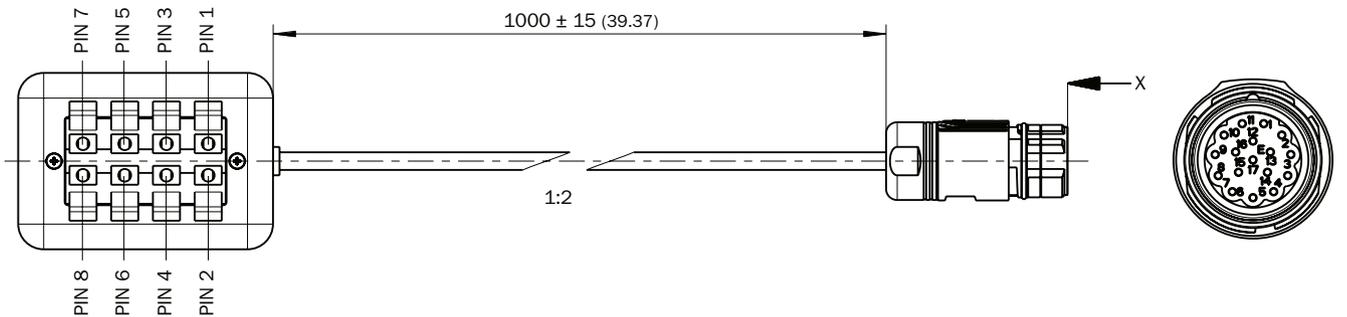


- ② blu
- ③ red
- ⑦ blk
- ⑩ pnk
- ⑫ vi
- ⑭ yel
- ⑮ brn
- ⑯ wht

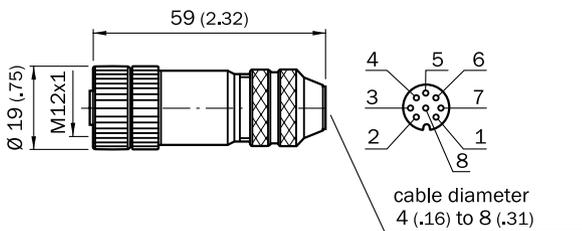
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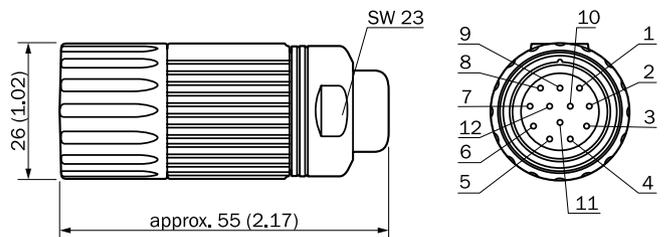
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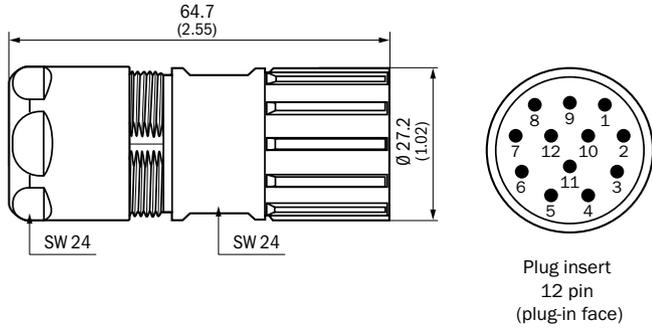
DOS-1208-GA01



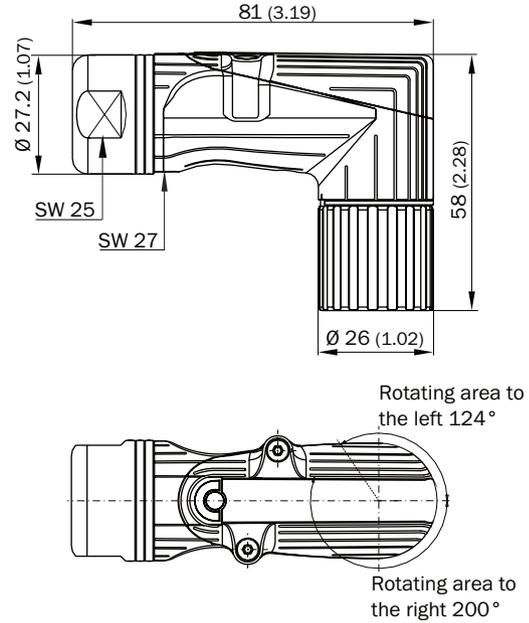
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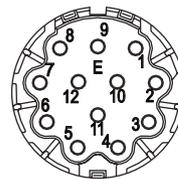
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DOS-2312-W01

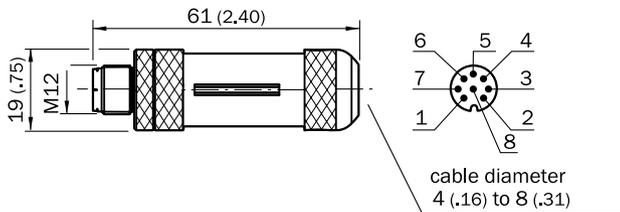


**Main dimensions**  
Plug

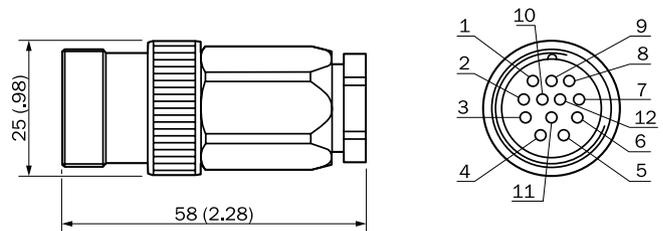


**Contact arrangement**  
Mating view

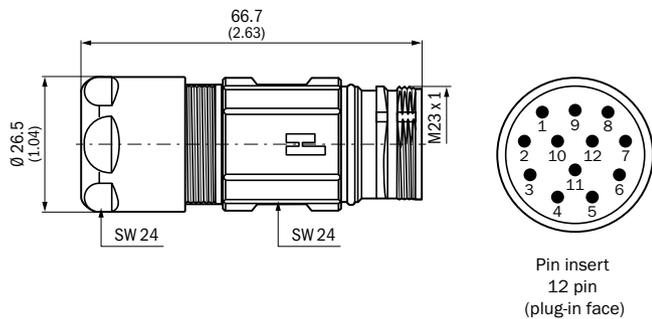
STE-1208-GA01



STE-2312-G



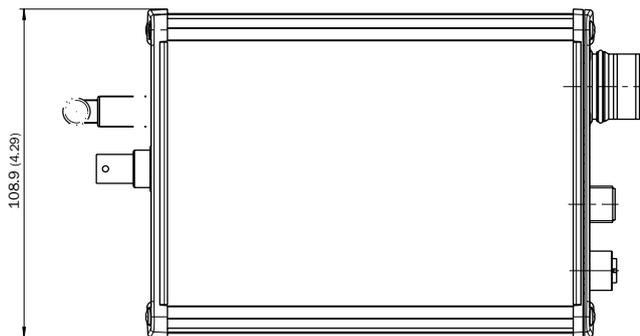
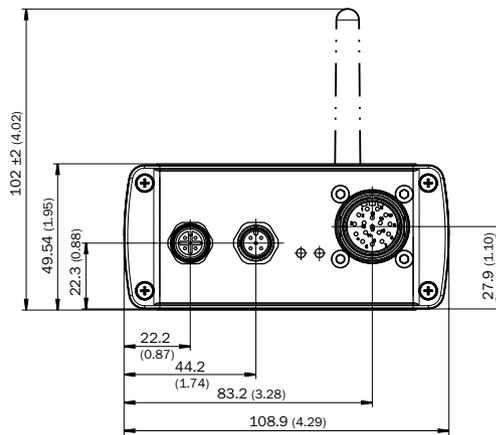
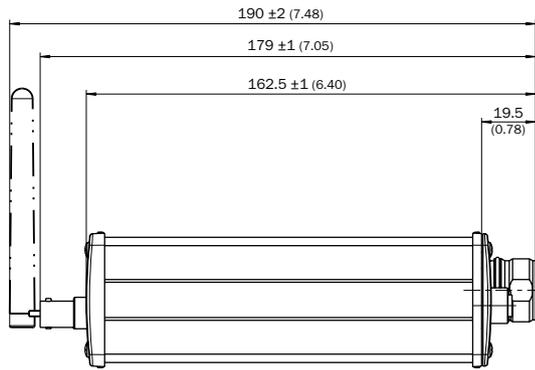
STE-2312-G01  
STE-2312-GX



Programming and configuration tools

PGT-11-S LAN

PGT-11-S WLAN



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