



# SKS36-HFA00S09

SKS/SKM36

MOTOR FEEDBACK SYSTEMS

**SICK**  
Sensor Intelligence.

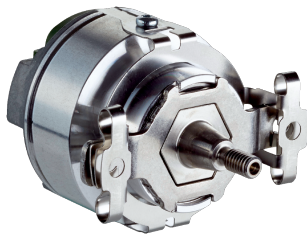


Illustration may differ



### Ordering information

Type	Part no.
SKS36-HFA00S09	1077421

M3 mounting screws for stator coupling not included with delivery.

Other models and accessories → [www.sick.com/SKS\\_SKM36](http://www.sick.com/SKS_SKM36)

### Detailed technical data

#### Features

<b>Special device</b>	✓
<b>Specialty</b>	Ceramic ball bearing <sup>1)</sup>
<b>Items supplied</b>	M3 mounting screws for stator coupling not included with delivery.

<sup>1)</sup> If encoders with hybrid bearings are exposed to high temperatures and high shock and vibration stresses, this could result in decreased availability. The user must perform suitable tests.

#### Safety-related parameters

<b>MTTF<sub>D</sub> (mean time to dangerous failure)</b>	210 years (EN ISO 13849) <sup>1)</sup>
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<sup>1)</sup> 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

<b>Sine/cosine periods per revolution</b>	128
<b>Number of the absolute ascertainable revolutions</b>	1
<b>Total number of steps</b>	4,096
<b>Measuring step</b>	2.5 " For interpolation of the sine/cosine signals with, e. g., 12 bits
<b>Integral non-linearity</b>	± 80 ", Error limits for evaluating sine/cosine period
<b>Differential non-linearity</b>	± 40 ", Non-linearity within a sine/cosine period
<b>Operating speed</b>	≤ 12,000 min <sup>-1</sup> , up to which the absolute position can be reliably produced
<b>Available memory area</b>	1,792 Byte
<b>System accuracy</b>	± 120 "

#### Interfaces

<b>Type of code for the absolute value</b>	Binary
<b>Code sequence</b>	Increasing, when turning the shaft For clockwise rotation, looking in direction "A" (see dimensional drawing), For clockwise shaft rotation, looking in direction "A" (see dimensional drawing)
<b>Communication interface</b>	HIPERFACE®

#### Electrical data

<b>Connection type</b>	Male connector, 8-pin, radial
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<sup>1)</sup> Without load.

<b>Supply voltage</b>	7 V DC ... 12 V DC
<b>Recommended supply voltage</b>	8 V DC
<b>Current consumption</b>	60 mA <sup>1)</sup>
<b>Output frequency for sine/cosine signals</b>	≤ 65 kHz

<sup>1)</sup> Without load.

## Mechanical data

<b>Shaft version</b>	Tapered shaft
<b>Flange type / stator coupling</b>	Spring mounting plate
<b>Dimensions</b>	See dimensional drawing
<b>Weight</b>	≤ 0.07 kg
<b>Moment of inertia of the rotor</b>	4.5 gcm <sup>2</sup>
<b>Operating speed</b>	12,000 U/min
<b>Angular acceleration</b>	≤ 500,000 rad/s <sup>2</sup>
<b>Operating torque</b>	0.2 Ncm
<b>Start up torque</b>	+ 0.3 Ncm
<b>Permissible movement static</b>	± 0.1 mm, - 0.4 mm, + 0.2 mm radial, axial, axial
<b>Permissible movement dynamic</b>	± 0.05 mm radial ± 0.1 mm axial
<b>Life of ball bearings</b>	3.6 x 10 <sup>9</sup> revolutions

## Ambient data

<b>Operating temperature range</b>	-20 °C ... +110 °C
<b>Storage temperature range</b>	-40 °C ... +125 °C, without package
<b>Relative humidity/condensation</b>	90 %, Condensation not permitted
<b>Resistance to shocks</b>	100 g, 6 ms, 6 ms (according to EN 60068-2-27)
<b>Frequency range of resistance to vibrations</b>	30 g, 10 Hz ... 2,000 Hz (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>	IP50, with mating connector inserted and closed cover (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-(0 V) connection of the supply voltage is also grounded here. If other shielding concepts are used, users must perform their own tests.

## Classifications

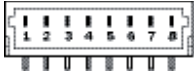
<b>ECLASS 5.0</b>	27270590
<b>ECLASS 5.1.4</b>	27270590
<b>ECLASS 6.0</b>	27270590
<b>ECLASS 6.2</b>	27270590
<b>ECLASS 7.0</b>	27270590
<b>ECLASS 8.0</b>	27270590
<b>ECLASS 8.1</b>	27270590
<b>ECLASS 9.0</b>	27270590
<b>ECLASS 10.0</b>	27273805
<b>ECLASS 11.0</b>	27273901



## PIN assignment

PIN	Signal	Colour of Wires	Explanation
1	$U_s$	red	Supply voltage 7 ... 12 V
2	+ SIN	white	Process data channel
3	REFSIN	brown	Process data channel
4	+ COS	pink	Process data channel
5	REFCOS	black	Process data channel
6	GND	blue	Ground connection
7	Data +	grey or yellow	RS-485-parameter channel
8	Data -	green or purple	RS-485-parameter channel

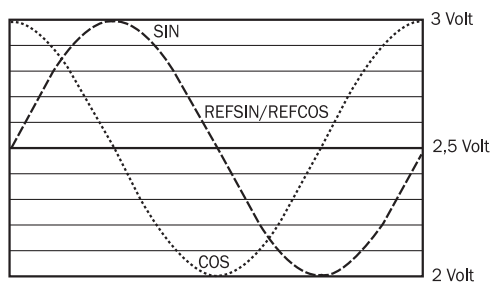
The housing is electrically connected to the motor housing, via the stator coupling.  
The GND (0 V) connection of the supply voltage has no connection to the housing.



View of the plug-in face

## Diagrams

Signal diagram for clockwise shaft rotation, looking in direction "A" (see dimensional drawing) 1 period =  $360^\circ : 128$



Operation note

Overview of supported commands for HIPERFACE®

Overview of supported commands			SKS	SKM
Command byte	Function	Code 0 <sup>1)</sup>	Comments	Comments
42h	Read position		12 bits	24 bits
43h	Set position	■		
44h	Read analog value		Channel number F0H 48h Temperature [°C]	Channel number F0H 48h Temperature [°C]
46h	Read counter			
47h	Increment Counter			
49h	Delete counter	■		
4Ah	Read data			
4Bh	Store data			
4Ch	Determine status of a data field			
4Dh	Create data field			
4Eh	Determine available memory area			
4Fh	Change access code			
50h	Read encoder status			
52h	Read out type label		Encoder type = 32h	Encoder type = 37h
53h	Encoder reset			
55h	Allocate encoder address	■		
56h	Read serial number and program version			
57h	Configure serial interface	■		
6AH	Set position with synchronization to process data channel			

<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.

Model-specific settings

Type-specific settings	SKS	SKM
Model ID (command 52h)	32h	27h
Free E <sup>2</sup> PROM [bytes]	1792	1792
Address	40h	40h
Mode_485	E4h	E4h
Codes 0 to 3	55h	55h
Counter	0	0

Overview of status messages for HIPERFACE®

	Status code	Description	SKS	SKM
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	■	■
	12h	Access to non-existent data field	■	■
Position	01h	Analog signals outside specification		
	1Fh	Speed too high, no position formation possible		
	20h	Singleturn position unreliable	■	■
	21h	Multiturn position error		■
	22h	Multiturn position error		■
	23h	Multiturn position error		■
Other	1Ch	Value monitoring of the analog signals (process data)		
	1Dh	Transmitter current critical or P2RAM-Error	■	■
	1Eh	Encoder temperature critical	■	■
	08h	Counter overflow	■	■


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


Characteristics applicable to all permissible environmental conditions

Signal	Values/unit
Signal peak, peak $V_{SS}$ of SIN, COS	0.8 V ... 1.1 V
Signal offset REFSIN, REFCOS	2.2 V ... 2.8 V

Recommended accessories

Other models and accessories → [www.sick.com/SKS\\_SKM36](http://www.sick.com/SKS_SKM36)

	Brief description	Type	Part no.
Programming and configuration tools			
	SVip® LAN programming tool for all motor feedback systems	PGT-11-S LAN	1057324
Other mounting accessories			
	BEF-MW-SKX36	BEF-MW-SKX36	2031079

	Brief description	Type	Part no.
Others			
	<ul style="list-style-type: none"> <li>• <b>Connection type head A:</b> Female connector, JST, 8-pin, straight</li> <li>• <b>Connection type head B:</b> Flying leads</li> <li>• <b>Signal type:</b> HIPERFACE®</li> <li>• <b>Cable:</b> 0.2 m, 8-wire</li> <li>• <b>Description:</b> HIPERFACE®, unshielded</li> </ul>	DOL-0J08-G0M2XB6	2031086



## 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.”

## WORLDWIDE PRESENCE:

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