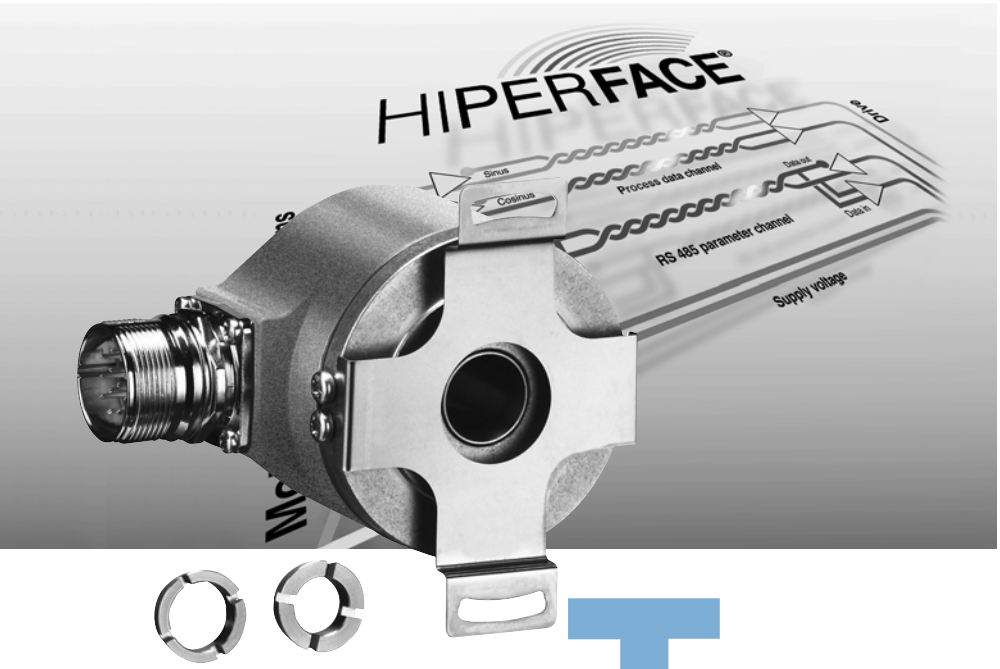
SinCos® SRS 64, SRM 64: Motor Feedback Systems with HIPERFACE®-Interface for Self-Ventilated and Force-Ventilated Drives

DATA SHEET



1,024 sine/ cosine periods

Motor Feedback Systems

HIPERFACE® by SICK|STEGMANN

Writing motor-specific data to the electronic type label and programming are important features of these series.

Possible product variations:

Hollow shafts up to 14 mm in diameter

The SRS/SRM series of motor feedback systems are used worldwide in many different applications and environments.

Absolute positioning with 32,768 steps per revolution and a maximum of 4,096 revolutions give a total resolution of 134,217,728 steps.

SICK|STEGMANN

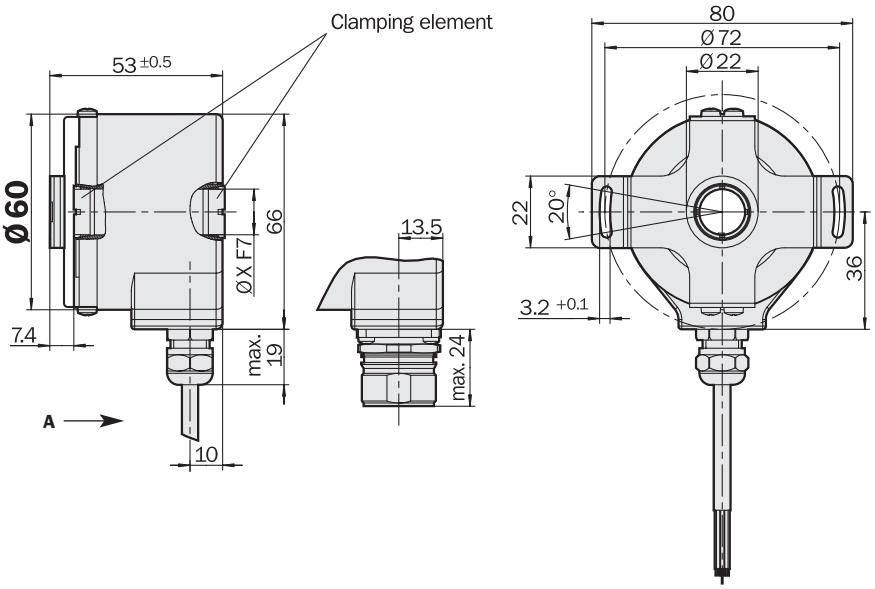
07-2005

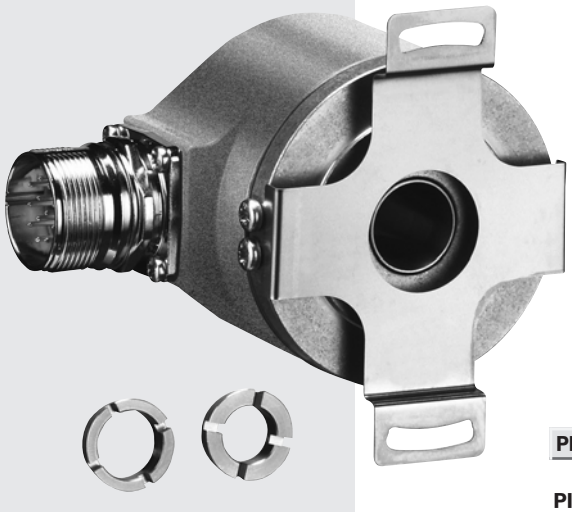
1,024 sine/ cosine periods

Motor Feedback Systems

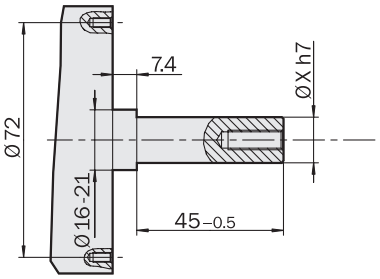
- 1,024 sine/cosine periods per revolution
- Absolute position with a resolution of 32,768 steps per revolution
- 4,096 revolutions can be measured (Multiturn)
- Programming of the positional value
- Electronic type label

Dimensional drawing SRS/SRM 64





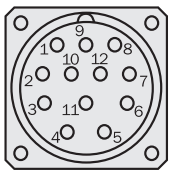
Proposed customer fitting



General tolerances to DIN ISO 2768-mk

PIN and wire allocation

PIN	Signal	Colour of Wires	Explanation
1	REFCOS	black	Process data channel
2	Daten +	grey	RS-485-parameter channel
3	N. C.	–	N. C.
4	N. C.	–	N. C.
5	SIN	white	Process data channel
6	REFSIN	brown	Process data channel
7	Daten –	green	RS-485-parameter channel
8	COS	pink	Process data channel
9	N. C.	–	N. C.
10	GND	blue	Ground connection
11	N. C.	–	N. C.
12	U_s	red	Supply voltage 7 … 12 V



View of the plug-in face

Screen connection on connector housing

N. C. = Not connected

Accessories

- Connection technology
- Programming tool
- Clamping elements

Technical Data according to DIN 32878		Hollow Shaft SRS/SRM 64	SRS	SRM
Number of sine/cosine periods per revolution		1,024	■	■
Dimensions		mm (see dimensional drawing)	■	■
Mass		0.3 kg	■	■
Inertial rotor moment		45 gcm^2	■	■
Type of code for the absolute value		Binary	■	■
Code sequence for clockwise shaft rotation, looking in direction "A" (see dimensional drawing)		Increasing	■	■
Measurement step after generating arctan with 12 bit resolution		0.3 angular seconds	■	■
Total number of steps	Single SRS	32,768	■	
	Multi SRM	134,21,728 = 4,096 x 32,768		■
Error limits for the digital absolute value				
via RS 485		± 90 angular seconds	■	■
Error limits for evaluating the "1,024" signals,				
integral non-linearity		± 45 angular seconds	■	■
Non-linearity within a sine/cosine period				
differential non-linearity		± 7 angular seconds	■	■
Output frequency for sine/cosine signals		0 … 200 kHz	■	■
Working speed up to which the absolute position can be reliably produced		6,000 min^{-1}	■	■
Max. operating speed		9,000 min^{-1}	■	■
Max. angular acceleration		5 x 10^5 rad/s^2	■	■
Operating torque		0.2 Ncm	■	■
Starting torque		0.4 Ncm	■	■
Permissible shaft movement				
static	radial/axial	± 0.1 mm/± 2 mm	■	■
dynamic	radial/axial	± 0.05 mm/± 0,2 mm	■	■
Angular motion, perpendicular to the rotational axis				
static		34 x 10^{-3} mm/mm	■	■
dynamic		17 x 10^{-3} mm/mm	■	■
Life of ball bearings		3.6 x 10^9 revolutions	■	■
Working temperature range		– 20 … + 110 °C	■	■
Storage temperature range		– 20 … + 115 °C	■	■
Permissible relative humidity [1]		90 %	■	■
Resistance				
to shocks [2]		100/10 g/ms	■	■
to vibration [3]		20/10 … 2000 g/Hz	■	■
Protection to IEC 60529 [4]		IP 65	■	■
EMC [5]			■	■
Operating voltage range		7 … 12 V	■	■
Recommended supply voltage		8 V	■	■
Max. operating current, no load		< 80 mA	■	■
Available memory area				
within EEPROM 512		128 bytes	■	■
within EEPROM 2048		1,792 bytes	■	■
Interface signals				
Process data channel = SIN, REFSIN, COS, REFCOS		Analogue, differential	■	■
Parameter channel = RS 485		Digital	■	■

[1] Condensation not permissible

[2] To DIN EN 60068-2-27

[3] To DIN EN 60068-2-6

[4] In assembled state

[5] To DIN EN 61000-6-2 and DIN EN 61000-6-3

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. This is also where the GND (0 V) connection of the supply voltage is linked to earth. Users must perform their own tests when other screen designs are used.

Ordering information

SRS/SRM 64; hollow shaft *

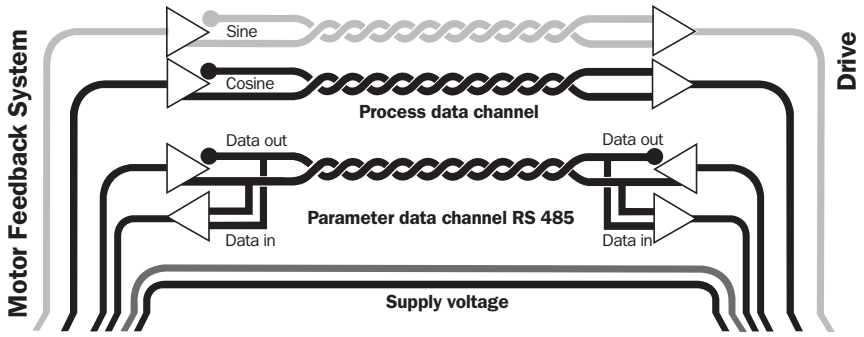
Type	Part no.	Description
SRS64-HRK0-K01	1 034 225	Single, 512 EEprom, cable 1.5 m
SRS64-HRA0-K01	1 034 223	Single, 512 EEprom, connector
SRM64-HRK0-K01	1 034 164	Multi, 512 EEprom, cable 1.5 m
SRM64-HRA0-K01	1 034 162	Multi, 512 EEprom, connector
SRS64-HRK0-K02	1 034 226	Single, 2048 EEprom, cable 1.5 m
SRS64-HRA0-K02	1 034 224	Single, 2048 EEprom, connector
SRM64-HRK0-K02	1 034 165	Multi, 2048 EEprom, cable 1.5 m
SRM64-HRA0-K02	1 034 163	Multi, 2048 EEprom, connector

* **Clamping elements for 10, 12, 14 mm and 3/8" and 1/2" as accessories separate order item (see page 6).**

HIPERFACE® by SICK|STEGMANN

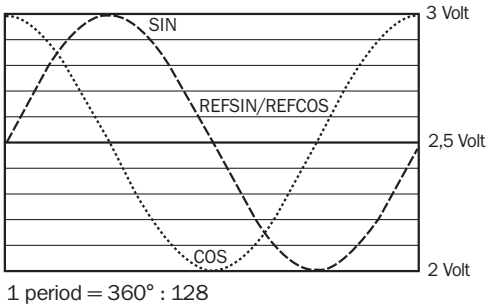
Electrical interface

- Safe data transmission
- High information content
- Electronic rating plate
- Only 8 leads
- Bus-enabled parameter channel
- Process data channel in real time



Signal specification of the process data channel

Signal diagram for clockwise rotation of the shaft, looking in direction "A"



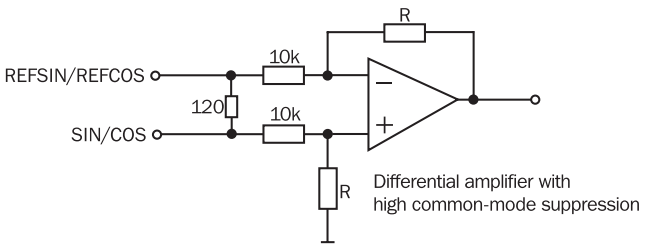
1 period = 360° : 128

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.

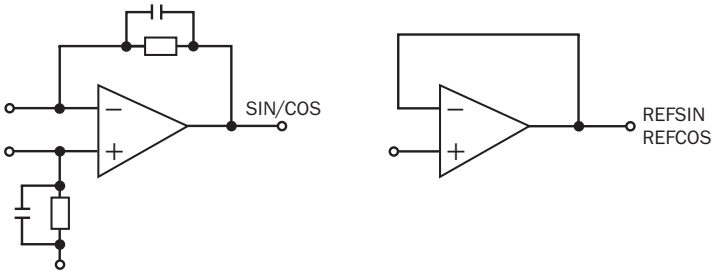
Sophisticated technology guarantees stable amplitudes of the analogue signals across all specified environmental conditions, with a maximum variation of only 20%.

Characteristics applicable to all environmental conditions stated	
Signal	**Values/Units**
Signal peak, peak V_{ss} of SIN, COS	0.9 ... 1.1 V
Signal offset REFSIN, REFCOS	2.2 ... 2.8 V

Recommended receiver circuit for sine and cosine signals



The output circuit of the process data channel within the SinCos encoder



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Type-specific settings	SRS	SRM
Type ID (command 52h)	22h	27h
Free EEPROM [bytes]	128/1,792	128/1,792
Address	40h	40h
Mode_485	E4h	E4h
Codes 0 … 3	55h	55h
Counter	0	0

Overview of commands supported			SRS	SRM
Command byte	Function	Code 0 [1]	Comments	Comments
42h	Read position			
43h	Set position	•		
44h	Read analogue value		Channel number 48h	Channel number 48h
			Temperature [°C]	Temperature [°C]
46h	Read counter			
47h	Increase counter			
49h	Reset counter	•		
4Ah	Read data			
4Bh	Save 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 name plate		Encoder type = 22h	Encoder type = 27h
53h	Encoder reset			
55h	Allocate encoder address	•		
56h	Read serial number and program version			
57h	Configure serial interface	•		

[1] Code 0 is a byte inserted into the protocol, for additional safeguarding of vital system parameters against accidental overwriting.
When shipped, "Code 0" = 55h.

Overview of status messages				
Error type	Status code	Description	SRS	SRM
	00h	The encoder has recognised no error	•	•
Initialisation	01h	Faulty compensating data	•	•
	02h	Faulty internal angular offset	•	•
	03h	Data field partitioning table damaged	•	•
	04h	Analogue limit values not available	•	•
	05h	Internal I^2C bus not operational	•	•
	06h	Internal checksum error	•	•
Protocol	07h	Encoder reset occurred as a result of program monitoring	•	•
	09h	Parity error	•	•
	0Ah	Checksum of the data transmitted is incorrect	•	•
	0Bh	Unknown command code	•	•
	0Ch	Number of data transmitted is incorrect	•	•
	0Dh	Command argument transmitted is not allowed	•	•
Data	0Eh	The selected data field must not be written to	•	•
	0Fh	Incorrect access code	•	•
	10h	Size of data field stated cannot be changed	•	•
	11h	Word address stated, is outside data field	•	•
	12h	Access to non-existent data field	•	•
Position	01h	Analogue signals outside specification	•	•
	1Fh	Speed too high, no position formation possible	•	•
	20h	Singleturn position unreliable	•	•
	21h	Positional error Multiturn		•
	22h	Positional error Multiturn		•
	23h	Positional error Multiturn		•
Other	1Ch	Monitoring the value of the analogue signals (process data)		
	1Dh	Transmitter current critical (dirt, transmitter breakage)	•	•
	1Eh	Encoder temperature critical	•	•
	08h	Counter overflow	•	•

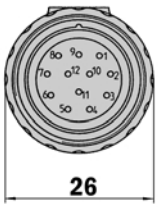
Dimensional drawings and ordering information

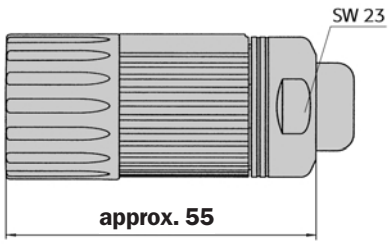
Clamping elements, set (contents 2 off)

Type	Part no.	Size
BEF-MW-SR64D14	2 031 074	14 mm
BEF-MW-SR64D12	2 031 075	12 mm
BEF-MW-SR64D10	2 031 076	10 mm
BEF-MW-SR64D1E2	2 031 077	1/2 Zoll
BEF-MW-SR64D3E8	2 031 078	3/8 Zoll

Connector M23 female, 12 pin, straight

Type	Part no.	Contacs
DOS-2312-G	6 027 538	12

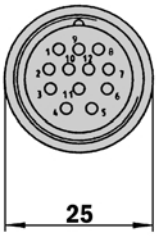


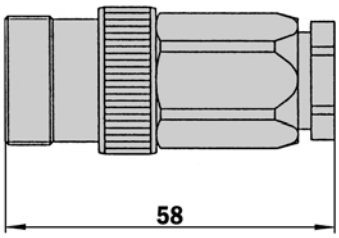


General tolerances to DIN ISO 2768-mk

Connector M23 male, 12 pin, straight, screened

Type	Part no.	Contacts
STE-2312-G	6 027 537	12





General tolerances to DIN ISO 2768-mk

Cable connector M23, 12 pin, straight, cable 8 core, HIPERFACE®, screened

Type	Part no.	Contacts	Wire length
DOL-2308-G1M5JB2	2 031 069	12	1.5 m
DOL-2308-G03MJB2	2 031 070	12	3.0 m
DOL-2308-G05MJB2	2 031 071	12	5.0 m
DOL-2308-G10MJB2	2 031 072	12	10 m
DOL-2308-G15MJB2	2 031 073	12	15 m

HIPERFACE® cable 8 wires, supplied by the metre 4 x 2 x 0,15 mm², screened, flexible

Type	Part no.	Cores
LTG-2708-MW	6 028 361	8

Dimensional drawings and ordering information

Programming tool for HIPERFACE®-devices		
Type	**Part no.**	**Motor Feedback System**
PGT-03-S	1 034 252	SRS/SRM 64

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