

# SRM50-FFA0-S21

SRS/SRM50

MOTOR FEEDBACK SYSTEMS

**SICK**  
Sensor Intelligence.



Illustration may differ



### Ordering information

Type	part no.
SRM50-FFA0-S21	1037157

Other models and accessories → [www.sick.com/SRS\\_SRM50](http://www.sick.com/SRS_SRM50)

### Detailed technical data

#### Features

<b>Special device</b>	✓
<b>Specialty</b>	Extended voltage range
<b>Standard reference device</b>	SRM50-HFA0-K21, 1037071
<b>Items supplied</b>	Mounting screws for stator coupling or servo clamps not included with delivery.

#### Performance

<b>Sine/cosine periods per revolution</b>	1,024
<b>Number of the absolute ascertainable revolutions</b>	4,096
<b>Total number of steps</b>	134,217,728
<b>Measuring step</b>	0.3 " For interpolation of the sine/cosine signals with, e. g., 12 bits
<b>Integral non-linearity</b>	Typ. $\pm 45 "$ , Error limits for evaluating sine/cosine period, without mechanical tension of the stator coupling
<b>Differential non-linearity</b>	$\pm 7 "$ , Non-linearity within a sine/cosine period
<b>Operating speed</b>	$\leq 6,000 \text{ min}^{-1}$ , up to which the absolute position can be reliably produced
<b>Available memory area</b>	128 Byte
<b>System accuracy</b>	$\pm 52 "$

#### 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®

#### Electronics

<b>Connection type</b>	Male connector, 8-pin, radial
<b>Supply voltage</b>	5 V DC ... 12 V DC

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

<b>Recommended supply voltage</b>	8 V DC
<b>Current consumption</b>	80 mA <sup>1)</sup>
<b>Output frequency for sine/cosine signals</b>	≤ 200 kHz

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

## Mechanics

<b>Shaft version</b>	Tapered shaft
<b>Flange type / stator coupling</b>	Spring mounting plate, Spring mounting plate
<b>Dimensions</b>	See dimensional drawing
<b>Weight</b>	≤ 0.2 kg
<b>Moment of inertia of the rotor</b>	10 gcm <sup>2</sup>
<b>Operating speed</b>	≤ 12,000 min <sup>-1</sup>
<b>Angular acceleration</b>	≤ 200,000 rad/s <sup>2</sup>
<b>Operating torque</b>	0.2 Ncm
<b>Start up torque</b>	+ 0.4 Ncm
<b>Permissible movement static</b>	± 0.5 mm, radial ± 0.75 mm, axial
<b>Permissible movement dynamic</b>	± 0.1 mm, radial ± 0.2 mm, axial
<b>Angular motion perpendicular to the rotational axis, static</b>	± 0.005 mm/mm
<b>Angular motion perpendicular to the rotational axis, dynamic</b>	± 0.0025 mm/mm
<b>Life of ball bearings</b>	3.6 x 10 <sup>9</sup> revolutions

## Ambient data

<b>Operating temperature range</b>	-30 °C ... +115 °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, 10 ms, 10 ms (according to EN 60068-2-27)
<b>Frequency range of resistance to vibrations</b>	20 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>	IP40, with mating plug inserted (IEC 60529)

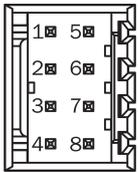
<sup>1)</sup> The EMC according to the standards quoted is achieved when the motor feedback system is mounted in an electrically conductive housing, which is connected to the central earthing point of the motor controller via a cable screen. The GND-(0 V) connection of the supply voltage is also grounded 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

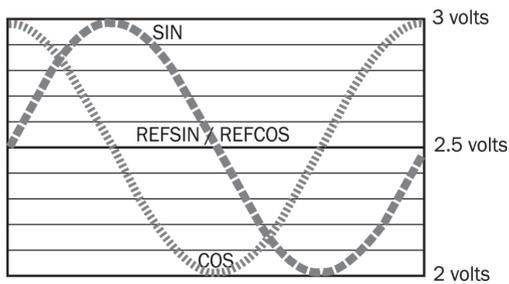


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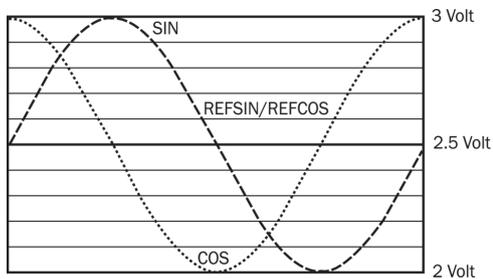


PIN	Signal	Wire colors (cable connection)	Explanation
1	U <sub>S</sub>	Red	Supply voltage
2	GND	Blue	Ground connection
3	REFSIN	Brown	Process data channel
4	REFCOS	Black	Process data channel
5	Data +	Gray or yellow	Parameter channel RS 485
6	Data -	Green or purple	Parameter channel RS 485
7	+ SIN	White	Process data channel
8	+ COS	Pink	Process data channel

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



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

Operation note 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

Operation note Overview of supported commands for HIPERFACE<sup>®</sup>

Command byte	Function	Code 0 <sup>1)</sup>	SRS Comments	SRM Comments
42h	Read position		15 bit	27 bit
43h	Set position	■		
44h	Read analog value		Channel number F0H 48h	Channel number F0H 48h
			Temperature [°C]	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 = 22h	Encoder type = 27h
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.

Operation note Overview of status messages for HIPERFACE<sup>®</sup>

	Status code	Description	SRS	SRM
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	■	■
Data	0Ch	Number of transmitted data is incorrect	■	■
	0Dh	Transmitted command argument is not allowed	■	■
	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	■	■
	13h	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		■
Other	23h	Multiturn position error		■
	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<sup>®</sup> - description, part no. 8010701

## Operation note Model-specific settings

Type-specific settings	SRS	SRM
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

## 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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