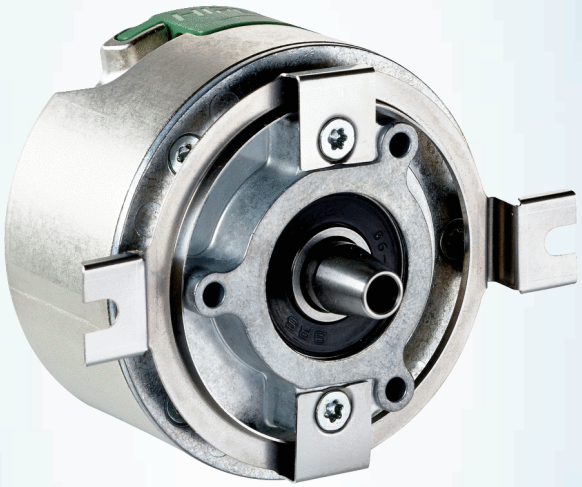
Online data sheet



# EFS50-2KF0A021A

## EFS/EFM50

**MOTOR FEEDBACK SYSTEMS ROTARY HIPERFACE DSL®**

SICK
Sensor Intelligence.

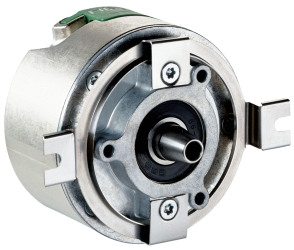


Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| EFS50-2KF0A021A | 1073487 |

Other models and accessories ➜ www.sick.com/EFS_EFM50

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **Safety integrity level** | SIL2 (IEC 61508), SILCL2 (EN 62061) [1] |
| **Category** | 20 years |
| **Systematic suitability** | SC 3 (IEC61508) |
| **Test rate** | 1 h |
| **Maximum demand rate** | 216 µs |
| **Performance level** | PL d (EN ISO 13849) |
| **Safety related resolution** | Channel 1 = 23 bit, channel 2 = 12 bit |
| **$PFH_D$: Probability of dangerous failure per hour** | 3,8 x 10^-8 |
| **Safety-related accuracy** | ± 0.09° |

[1] For more detailed information on the exact configuration of your machine/unit, please consult your relevant SICK branch office.

### Performance

| | |
|---|---|
| **Resolution per revolution** | 21 bit 1 bit |
| **Number of the absolute ascertainable revolutions** | 1 |
| **Measuring step per revolution** | 2,097,152 |
| **Signal noise (σ)** | ± 2 |
| **Error limits positional values integral non-linearity in angular seconds** | ± 45 [1] |
| **Error limits positional values differential non-linearity in angular seconds** | ± 7 [1] |
| **System accuracy** | ± 52 |
| **Max. speed when switching on and resettingthe motor feedback system** | ≤ 6,000 $min^{-1}$ |
| **Available memory area** | 8,192 Byte |

[1] See diagrams regarding the error limits.

## Interfaces

| | |
|---|---|
| **Code sequence** | Increasing, when turning the shaft For clockwise rotation, looking in direction “A” (see dimensional drawing) |
| **Communication interface** | HIPERFACE DSL® |
| **Initialization time** | Max. 500 ms [1] |
| **Measurement external temperature resistance** | 32-bit value, without prefix (1 Ω) 0 ... 209.600 Ω [2] |
| **Available memory area** | 8,192 Byte |

[1] From reaching a permitted operating voltage.
[2] Without sensor tolerance; at −17 °C ... +167 °C: NTC +-2K (103 GT); PTC+-3K (KTY84/130).

## Electrical data

| | |
|---|---|
| **Supply voltage range** | 7 V ... 12 V |
| **Warm-up time voltage ramp** | Max. 180 ms [1] |
| **Operating current** | Max. 150 mA [2] |
| **Operating power consumption (no load)** | ≤ 150 mA |
| **Output frequency for the digital positionvalue** | 0 kHz ... 75 kHz |

[1] Duration of the voltage ramp between 0 and 7.0 V, see diagram “Current consumption” in the diagram section.
[2] Current rating applies when using interface circuit suggestions as shown in HIPERFACE DSL ® manual (8017595).

## Mechanical data

| | |
|---|---|
| **Shaft version** | Tapered shaft |
| **Flange type/stator coupling** | Stator coupling |
| **Dimensions** | See dimensional drawing |
| **Weight** | 0.2 kg |
| **Moment of inertia of the rotor** | 10 gcm² |
| **Operating speed** | ≤ 12,000 min⁻¹ |
| **Angular acceleration** | ≤ 200,000 rad/s² |
| **Start up torque** | ≤ 0.4 Ncm |
| **Permissible shaft movement, radial static, dynamic** | ± 0.2 mm, 0.025 mm |
| **Permissible shaft movement, axial static, dynamic** | ± 0.95 mm, ± 0 mm |
| **Permissible radial shaft movement** | ± 0.2 mm [1] |
| **Permissible axial shaft movement** | ± 0.95 mm |
| **Life of ball bearings** | See diagram 3 |
| **Connection type** | Connector, 4-pin |

[1] Permitted when using the elastomer stator coupling. When the spring plate stator coupling is being used, voltage-free mounting is assumed.

## Ambient data

| | |
|---|---|
| **Operating temperature range** | –30 °C ... +115 °C [1] |

[1] The max. internal sensor temperature may not exceed 125 °C. The defined measuring point on the encoder (see dimensional drawing) must be used for measuring the operating temperature. For typical values for self-heating, see diagram 3 (electrical) and diagram 4 (mechanical).
[2] EMC according to the listed standards is guaranteed if the motor feedback system with mating plug inserted is connected to the central grounding point of the motor controller via a cable shield. If other screening concepts are used, users must perform their own tests.

| | |
|---|---|
| **Storage temperature range** | –40 °C ... +120 °C, without package |
| **Relative humidity/condensation** | 90 %, Condensation not permitted |
| **Resistance to shocks** | 100 g, 6 ms, 6 ms (according to EN 60068-2-27) |
| **Frequency range of resistance to vibrations** | 20 g, 10 Hz ... 2,000 Hz (according to EN 60068-2-6) |
| **EMC** | According to EN 61000-6-2, EN 61000-6-3 and IEC61326-3-1 [2)] |
| **Enclosure rating** | IP40, with mating connector inserted and closed cover (acc. to EN 60529-1) |

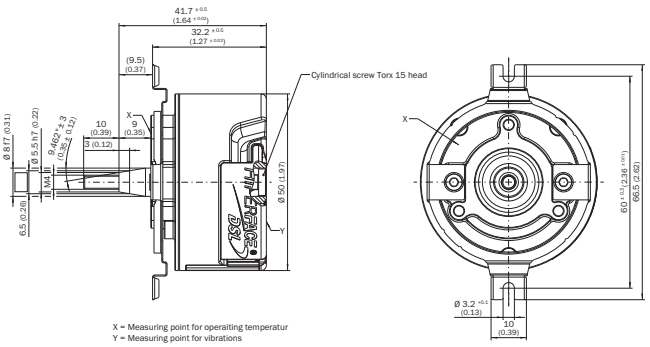
[1)] The max. internal sensor temperature may not exceed 125 °C. The defined measuring point on the encoder (see dimensional drawing) must be used for measuring the operating temperature. For typical values for self-heating, see diagram 3 (electrical) and diagram 4 (mechanical).

[2)] EMC according to the listed standards is guaranteed if the motor feedback system with mating plug inserted is connected to the central grounding point of the motor controller via a cable shield. If other screening concepts are used, users must perform their own tests.

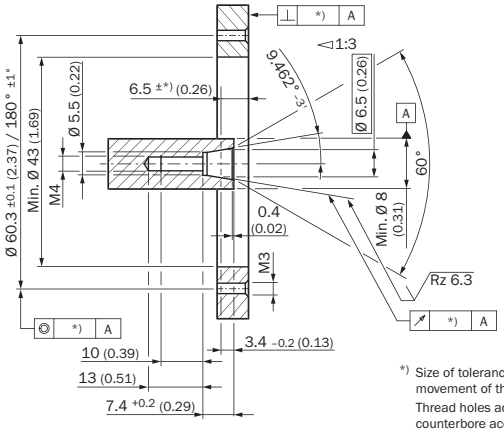
## Classifications

| | |
|---|---|
| **ECl@ss 5.0** | 27270590 |
| **ECl@ss 5.1.4** | 27270590 |
| **ECl@ss 6.0** | 27270590 |
| **ECl@ss 6.2** | 27270590 |
| **ECl@ss 7.0** | 27270590 |
| **ECl@ss 8.0** | 27270590 |
| **ECl@ss 8.1** | 27270590 |
| **ECl@ss 9.0** | 27270590 |
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

## Dimensional drawing (Dimensions in mm (inch))



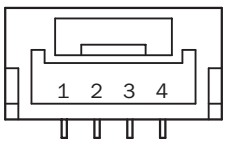
## Proposed fitting




*) Size of tolerance reduce the allowed movement of the shaft, see data sheet.
Thread holes according DIN 13 with counterbore according DIN 76
min. 1.05 x diameter of thread.

## PIN assignment

### Supply / Communication pin assignment

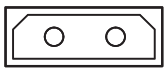



**Integrated in the motor cable = J, K**

| PIN | Signal | Explanation |
|---|---|---|
| 1 | | not connected |
| 2 | $+U_S$/DSL+ | Power supply/DSL-Data |
| 3 | GND/DSL– | Ground connection/DSL-Data |
| 4 | | not connected |

Recommended outer diameter of stranded cable: 4 mm +0/–0.3 mm
Recommended mating connector: JST (GHR-04V-S)

### Temperature sensor pin assignment



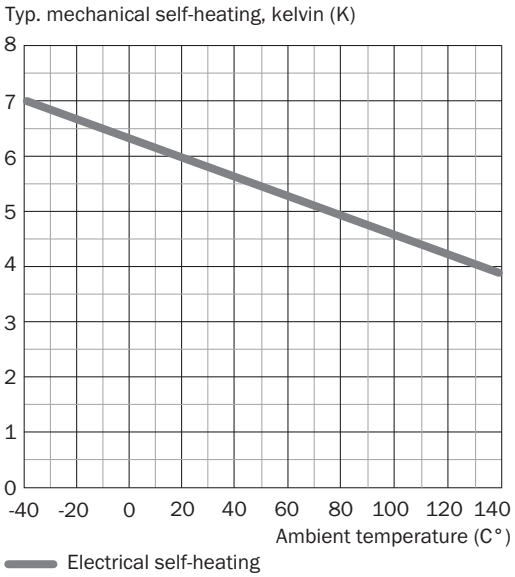

| PIN | Signal | Explanation |
|---|---|---|
| 1 | T+ | Thermistor connection |
| 2 | T– | Thermistor connection (Ground) |

Recommended outer diameter of stranded cable: 2.2 mm ± 0.1 mm
Recommended mating connector: Harwin M80-8990205

## Diagram

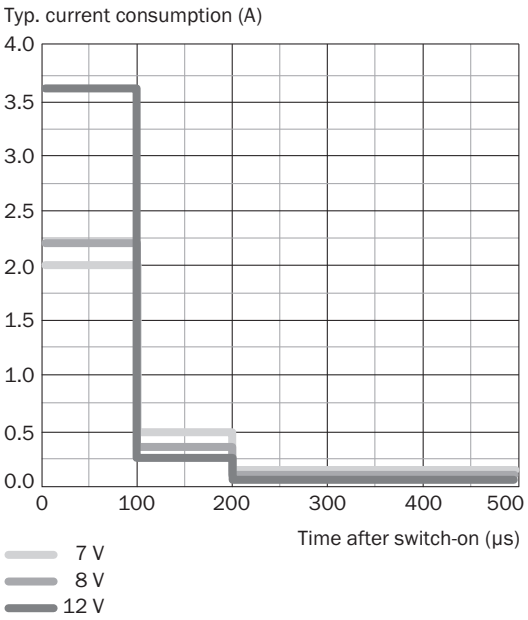
Electrical self-heating

Diagram 3




Power consumption

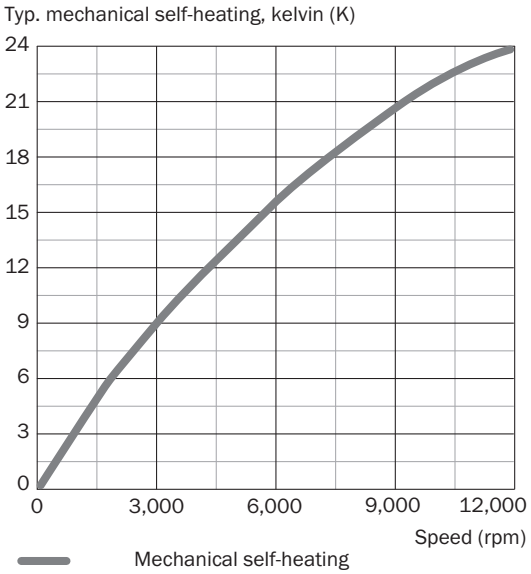
Diagram 2




This diagram shows the switch-on current

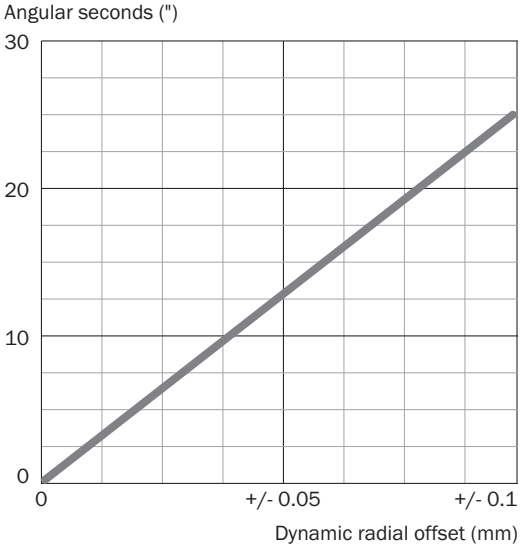
## Mechanical self-heating

Diagram 4




## Error limits

Diagram 1



## Recommended accessories

Other models and accessories ➜ www.sick.com/EFS_EFM50

| | Brief description | Type | Part no. |
|---|---|---|---|
| **Other mounting accessories** | | | |
|  | Servo clamps, small, for servo flange (clamping claws, mounting eccentric), 3 pcs, without mounting hardware, without mounting hardware | BEF-WK-RESOL | 2039082 |
| **Plug connectors and cables** | | | |
|  | Head A: female connector, stranded cable, 4-pin, straight<br>Head B: cable<br>Cable: HIPERFACE DSL®, unshielded, 0.2 m | DOL-0B02-G0M2XC2 | 2079920 |
|  | Head A: female connector, M12, 4-pin, straight<br>Head B: female connector, JST, 4-pin, straight<br>Cable: HIPERFACE DSL®, shielded, 1 m | DSL-1202-G01MA | 2061361 |
| **Programming and configuration tools** | | | |
|  | 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 |

# 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:

Contacts and other locations –www.sick.com