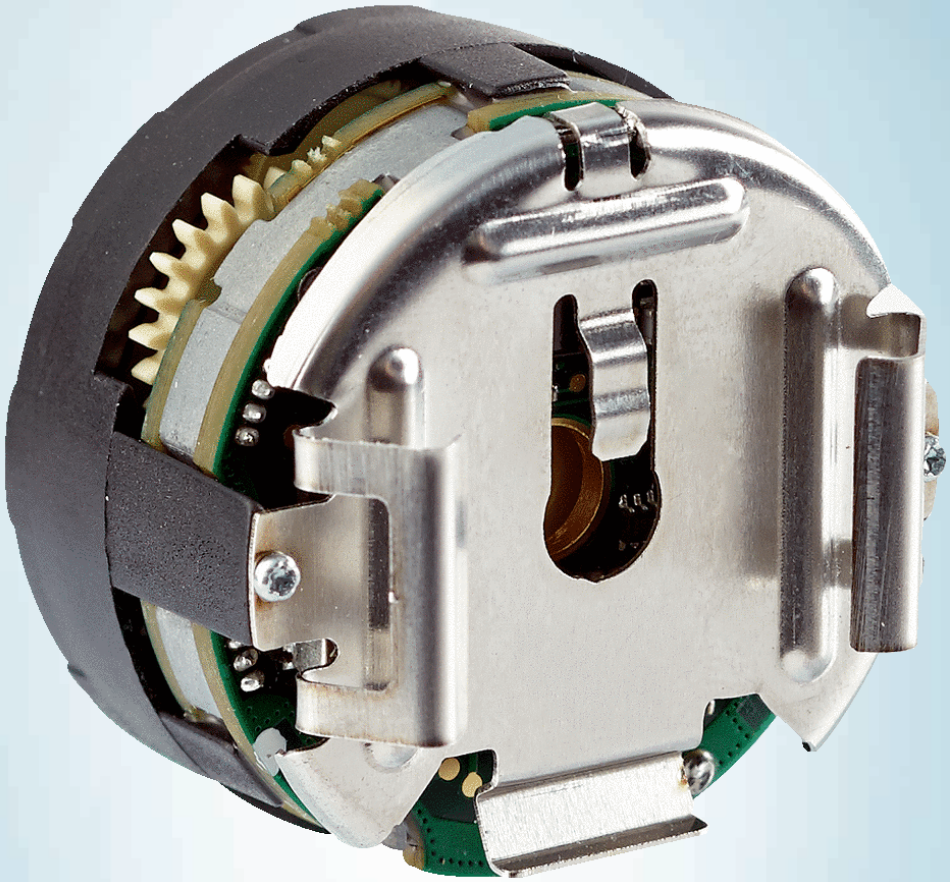
Product data sheet



# SEL34-HFB0K02

## SEK/SEL

**MOTOR FEEDBACK SYSTEMS**

SICK
Sensor Intelligence.

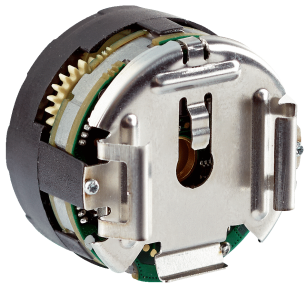


Illustration may differ

## Ordering information

| Type | Part no. |
|---|---|
| SEL34-HFB0K02 | 1053403 |

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

## Detailed technical data

### Safety-related parameters

| | |
|---|---|
| **$MTTF_D$ (mean time to dangerous failure)** | 275 years (EN ISO 13849) [1] |

[1] 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

| | |
|---|---|
| **Sine/cosine periods per revolution** | 16 |
| **Number of the absolute ascertainable revolutions** | 4,096 |
| **Maximum number of steps per revolution** | 2,097,152 via RS485 |
| **Total number of steps** | 512 |
| **Measuring step** | 20 ″ For interpolation of the sine/cosine signals with, e. g., 12 bits |
| **Integral non-linearity** | ± 288 ″, Error limits for evaluating sine/cosine period<br>Typical values at nominal position ± 0.1 mm und +20 °C |
| **Differential non-linearity** | ± 144 ″, Error limits for evaluating sine/cosine period, typical values at nominal position ± 0.1 mm und +20 °C |
| **Operating speed** | ≤ 6,000 $min^{-1}$, up to which the absolute position can be reliably produced |
| **Available memory area** | 1,792 Byte |
| **System accuracy** | ± 432 ″ |

### Interfaces

| | |
|---|---|
| **Type of code for the absolute value** | Binary |
| **Code sequence** | For clockwise shaft rotation, looking in direction “A” (see dimensional drawing) |
| **Communication interface** | HIPERFACE® |

### Electrical data

| | |
|---|---|
| **Connection type** | Male connector, 8-pin, radial |
| **Supply voltage** | 7 V DC ... 12 V DC |
| **Recommended supply voltage** | 8 V DC |
| **Current consumption** | ≤ 50 mA |

## Mechanical data

| | |
|---|---|
| **Shaft version** | Tapered shaft |
| **Weight** | ≤ 0.04 kg |
| **Moment of inertia of the rotor** | 1 gcm² |
| **Operating speed** | 12,000 min⁻¹, 12,000 U/min |
| **Angular acceleration** | ≤ 500,000 rad/s² |
| **Permissible radial shaft movement** | ± 0.15 mm |
| **Permissible axial shaft movement** | ± 0.3 mm |

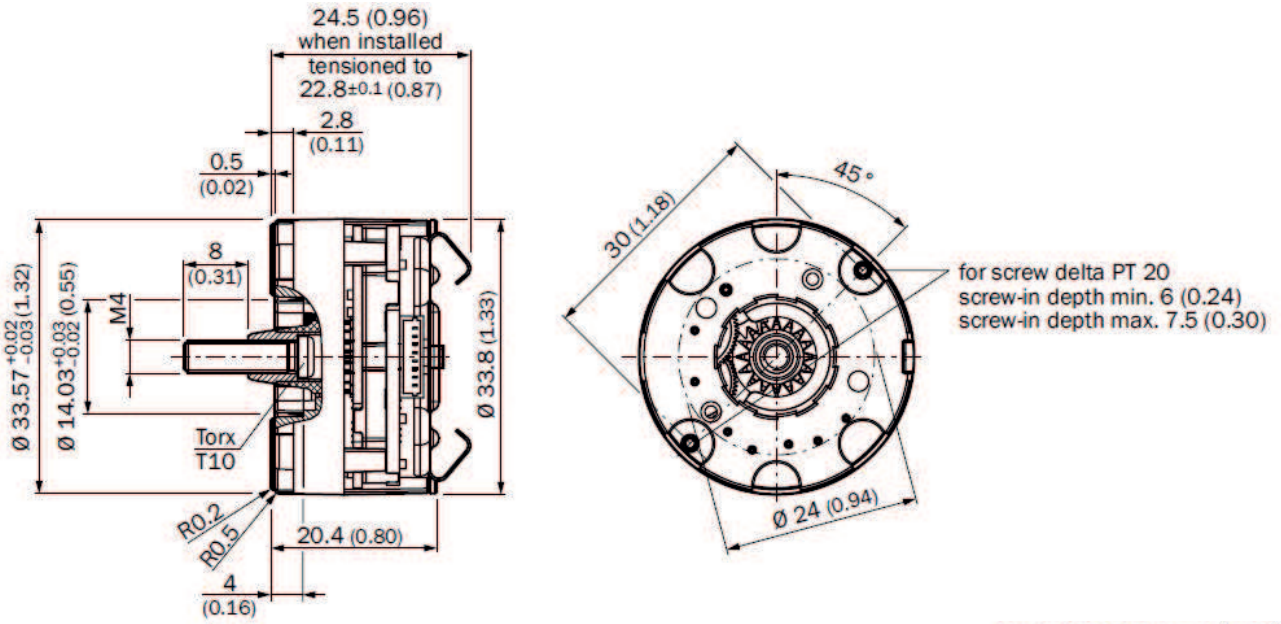
## Ambient data

| | |
|---|---|
| **Operating temperature range** | –20 °C ... +115 °C |
| **Storage temperature range** | –50 °C ... +125 °C, without package |
| **Relative humidity/condensation** | 90 %, Condensation not permitted |
| **Resistance to shocks** | 100 g, 10 ms (EN 60068-2-27) |
| **Frequency range of resistance to vibrations** | 50 g, 10 Hz ... 2,000 Hz (EN 60068-2-6) |
| **EMC** | According to EN 61000-6-2 and EN 61000-6-3 |
| **Enclosure rating** | IP20, built-on version, with mating connector inserted and closed cover (IEC 60529) |

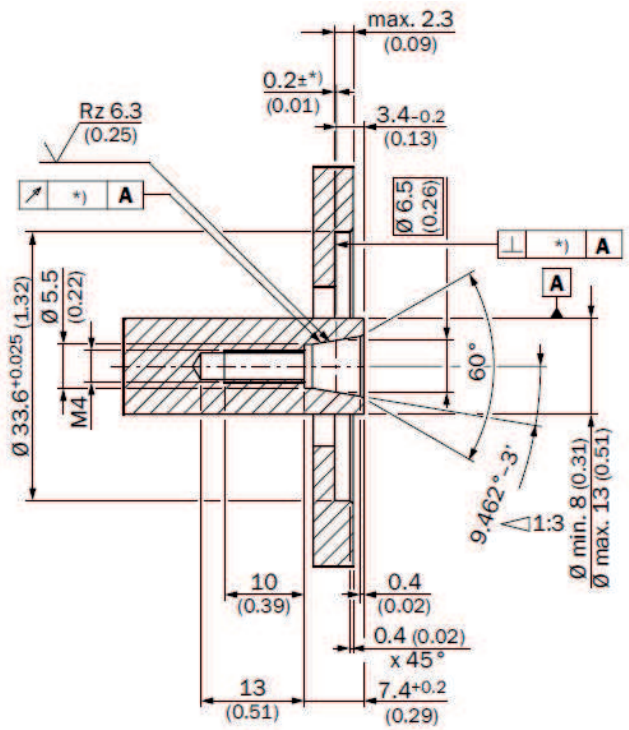
## Classifications

| | |
|---|---|
| **ECLASS 5.0** | 27270590 |
| **ECLASS 5.1.4** | 27270590 |
| **ECLASS 6.0** | 27270590 |
| **ECLASS 6.2** | 27270590 |
| **ECLASS 7.0** | 27270590 |
| **ECLASS 8.0** | 27270590 |
| **ECLASS 8.1** | 27270590 |
| **ECLASS 9.0** | 27270590 |
| **ECLASS 10.0** | 27273805 |
| **ECLASS 11.0** | 27273901 |
| **ECLASS 12.0** | 27273901 |
| **ETIM 5.0** | EC001486 |
| **ETIM 6.0** | EC001486 |
| **ETIM 7.0** | EC001486 |
| **ETIM 8.0** | EC001486 |
| **UNSPSC 16.0901** | 41112113 |

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




## Attachment specifications

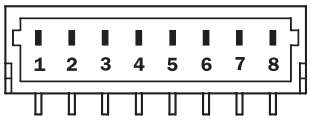



*) Size of tolerance reduce the allowed movement of the shaft, see data sheet.

All dimensions in mm (inch)

## PIN assignment

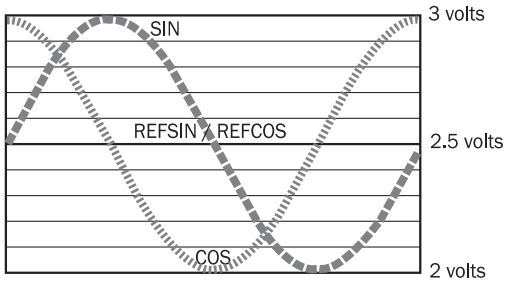
View of the plug-in face

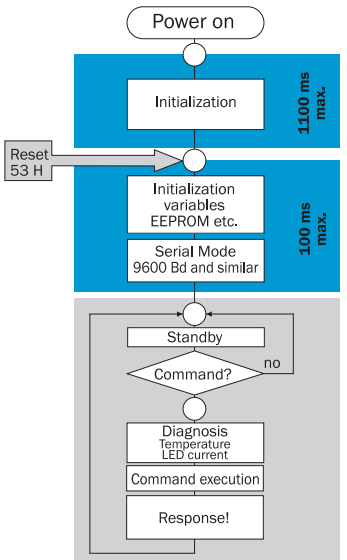



| PIN | Signal | Wire colors (cable connection) | Explanation |
|---|---|---|---|
| 1 | $U_S$ | Red | Supply voltage |
| 2 | + SIN | White | Process data channel |
| 3 | REFSIN | Brown | Process data channel |
| 4 | + COS | Pink | Process data channel |
| 5 | REFCOS | Black | Process data channel |
| 6 | GND | Blue | Ground connection |
| 7 | Data + | Gray or yellow | Parameter channel RS 485 |
| 8 | Data - | Green or purple | Parameter channel RS 485 |
| The GND connection (0 V) of the supply voltage is not connected to the housing | | | |

## Diagrams

Signal diagram for clockwise shaft rotation, looking in direction “A” (see dimensional drawing) 1 period = 360° : 16




CAUTION:
No **RS485 communication** is possible during the phases highlighted in blue

## Operation note

Charactersitics applicable to all permissible environmental conditions

| Signal | Values/unit |
|---|---|
| Signal peak, peak $V_{SS}$ of SIN, COS | 0.8 V ... 1.2 V |
| Signal offset REFSIN, REFCOS | 2.2 V ... 2.8 V |

Model-specific settings

| Type-specific settings | SEK34 | SEL34 |
|---|---|---|
| Model ID (command 52h) | 42h | 47h |
| Free $E^2$PROM [bytes] | 1792 | 1792 |
| Address | 40h | 40h |
| Mode_485[1) 2)] | E4h | E4h |
| Codes 0 to 3 | 55h | 55h |
| Counter | 0 | 0 |
| [1)] The baud rate 9600 is set by default. Other baud rates cannot be selected. | | |
| [2)] When using the motor feedback systems SEK34/SEL34, please ensure that the controller's auto-baud function is not enabled, since these motor feedback systems compensate for minor variations when transmitting at a baud rate of 9600. | | |

Overview of status messages for HIPERFACE®

| | Status code | Description | SEK34 | SEL34 |
|---|---|---|---|---|
| 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 | 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) | ■ | ■ |
| | 1Eh | Encoder temperature critical | ■ | ■ |
| | 08h | Counter overflow | ■ | ■ |

Overview of supported commands for HIPERFACE®

| Overview of commands supported | | | SEK34 | SEL34 |
|---|---|---|---|---|
| **Command byte** | **Function** | **Code 0** [1] | **Comments** | **Comments** |
| 42h | Read position | | 9 bits | 21 bits |
| 43h | Set position | ■ | | |
| 44h | Read analog value | | Channel number F0H[2] 48h | Channel number F0H[2] 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 = 42h | Encoder type = 47h |
| 53h | Encoder reset | | | |
| 55h | Allocate encoder address | ■ | | |
| 56h | Read serial number and program version | | | |

[1] The commands thus labelled include the parameter “Code 0”. Code 0 is a byte inserted into the protocol, for additional safeguarding of vital system parameters against accidental overwriting. When shipped, “Code 0” = 55h.

[2] Temperature compatible with SCx (encoder temperature [°C] *2.048 – 40).

## Recommended accessories

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

| Brief description | Type | Part no. |
|---|---|---|
| Other mounting accessories | | |
| Test gauge for SEK/SEL34, SEK/SEL37, and EES/EEM37 | BEF-MW-PL | 2084768 |
| Others | | |
| • **Connection type head A:** Flying leads<br>• **Connection type head B:** Flying leads<br>• **Signal type:** HIPERFACE®, HIPERFACE®<br>• **Items supplied:** By the meter<br>• **Cable:** 8-wire, PUR, halogen-free<br>• **Description:** HIPERFACE®, HIPERFACE®, shielded | LTG-2708-MW | 6028361 |

# 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.”**

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