# EDM35-0KF0A020A
EDS/EDM35

**MOTOR FEEDBACK SYSTEMS**

**SICK**
Sensor Intelligence.

# EDM35-0KF0A020A | EDS/EDM35
## MOTOR FEEDBACK SYSTEMS



Illustration may differ

## Ordering information

| Type | part no. |
|------|----------|
| EDM35-0KF0A020A | 1090709 |

Other models and accessories ➜ www.sick.com/EDS_EDM35

## Detailed technical data

### Features

| Items supplied | M3 mounting screws for stator coupling not included with delivery. |
|----------------|---------------------------------------------------------------------|

### Safety-related parameters

| $MTTF_D$ (mean time to dangerous failure) | 145 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

| Position | |
|----------|--|
| Resolution per revolution | 20 bit |
| System accuracy | ± 50 ″ [1] |
| Signal noise (σ) | ± 3 ″ [2] |
| Number of the absolute ascertainable revolutions | 4,096 |
| Available memory area | 8,192 Byte |
| Measurement principle | Optical |

[1] In accordance with DIN ISO 1319-1, position of the upper and lower error limit depends on the installation situation, specified value refers to a symmetrical position, i.e. deviation in upper and lower direction is the same.
[2] Repeatability standard deviation in accordance with DIN 1319-1:1995.

### Interfaces

| Code sequence | Increasing, when turning the shaft For clockwise rotation, looking in direction "A" (see dimensional drawing) |
|---------------|------------------------------------------------------------------------------------------------------------|
| Communication interface | HIPERFACE DSL® |
| Initialization time | ≤ 500 ms [1] |
| Measurement external temperature resistance | 32-bit value, without prefix (1 Ω) 0 … 209.600 Ω |

[1] From reaching a permitted operating voltage.
[2] Without sensor tolerance; at –40 °C … +160 °C: NTC +-2K; PTC+-3K (KTY84-130/PT1000). For additional conversion function of PT1000 to KTY84/130, see technical description.

| | 2) |
|---|---|

[1] From reaching a permitted operating voltage.

[2] Without sensor tolerance; at –40 °C ... +160 °C: NTC +-2K; PTC+-3K (KTY84-130/PT1000). For additional conversion function of PT1000 to KTY84/130, see technical description.

## Electronics

| | |
|---|---|
| **Connection type** | Male connector, 4-pin |
| **Supply voltage** | 7 V ... 12 V |
| **Warm-up time voltage ramp** | Max. 180 ms [1] |
| **Current consumption** | ≤ 150 mA [2] |

[1] Duration of voltage ramp between 0 and 7.0 V.

[2] Current rating applies when using interface circuit suggestions as shown in HIPERFACE DSL ® manual (8017595).

## Mechanics

| | |
|---|---|
| **Shaft version** | Tapered shaft |
| **Flange type / stator coupling** | Stator coupling |
| **Dimensions** | See dimensional drawing |
| **Weight** | ≤ 100 g |
| **Moment of inertia of the rotor** | 5 gcm² |
| **Operating speed** | ≤ 9,000 min⁻¹ |
| **Angular acceleration** | ≤ 250,000 rad/s² |
| **Start up torque** | ≤ 0.4 Ncm, +20 °C |
| **Permissible movement static** | ± 1 mm, axial [1] |
| **Permissible movement dynamic** | ± 0.1 mm, radial |
| **Life of ball bearings** | 50,000 h at 6,000 min⁻¹ (at a flange temperature of 70 °C) |

[1] Temperature expansion, mechanical attachment.

## Ambient data

| | |
|---|---|
| **Operating temperature range** | –40 °C ... +115 °C [1] |
| **Storage temperature range** | –40 °C ... +125 °C, without package |
| **Relative humidity/condensation** | 90 %, Condensation not permitted |
| **Resistance to shocks** | 100 g, 6 ms (according to 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, EN 61000-6-4 and IEC 61326-3 [2] |
| **Enclosure rating** | IP40, When cover is closed and mating connector is attached (IEC 60529-1) |

[1] Given typical thermal connection between motor flange and encoder stator coupling. The max. internal sensor temperature may not exceed 125 °C.

[2] According to the listed standards, EMC 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 shielding concepts are used, users must perform their own tests. Class A device.

## 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 |

## Certificates

| EU declaration of conformity | ✓ |
|---|---|
| UK declaration of conformity | ✓ |
| ACMA declaration of conformity | ✓ |
| Moroccan declaration of conformity | ✓ |
| China RoHS | ✓ |
| Information according to Art. 3 of Data Act (Regulation EU 2023/2854) | ✓ |

## Dimensional drawing
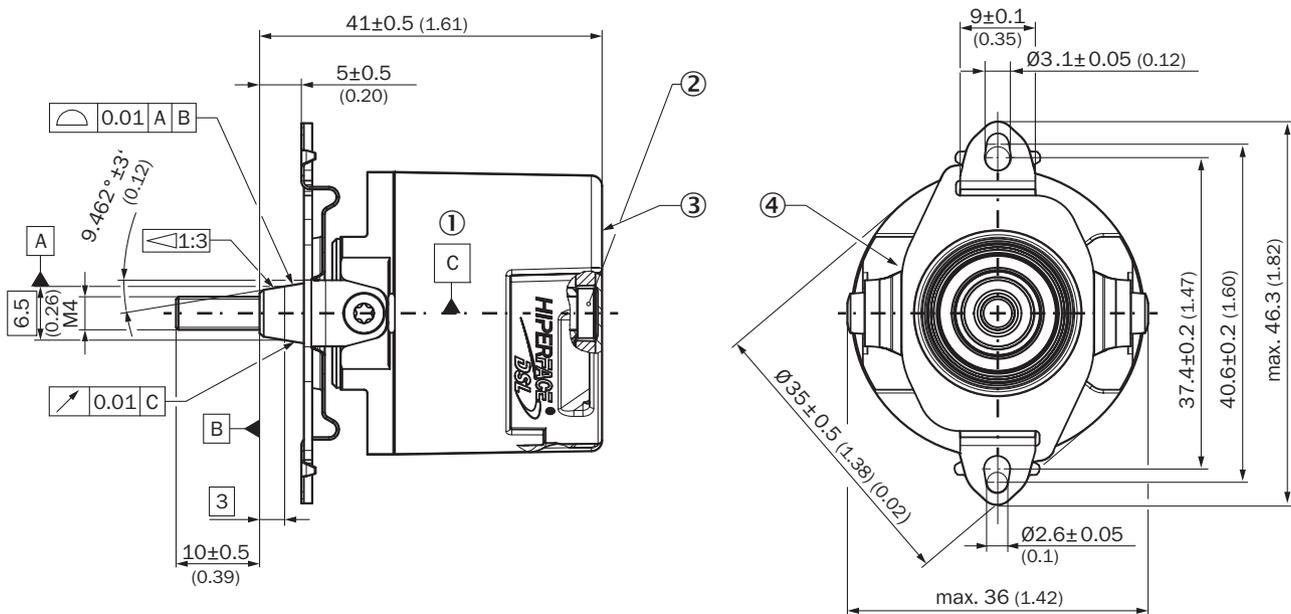


Dimensions in mm (inch)
① bearing of the encoder shaft
② torx 15 cylinder screw
③ measuring point for vibrations

④ Measuring point for operating temperature

## Attachment specifications
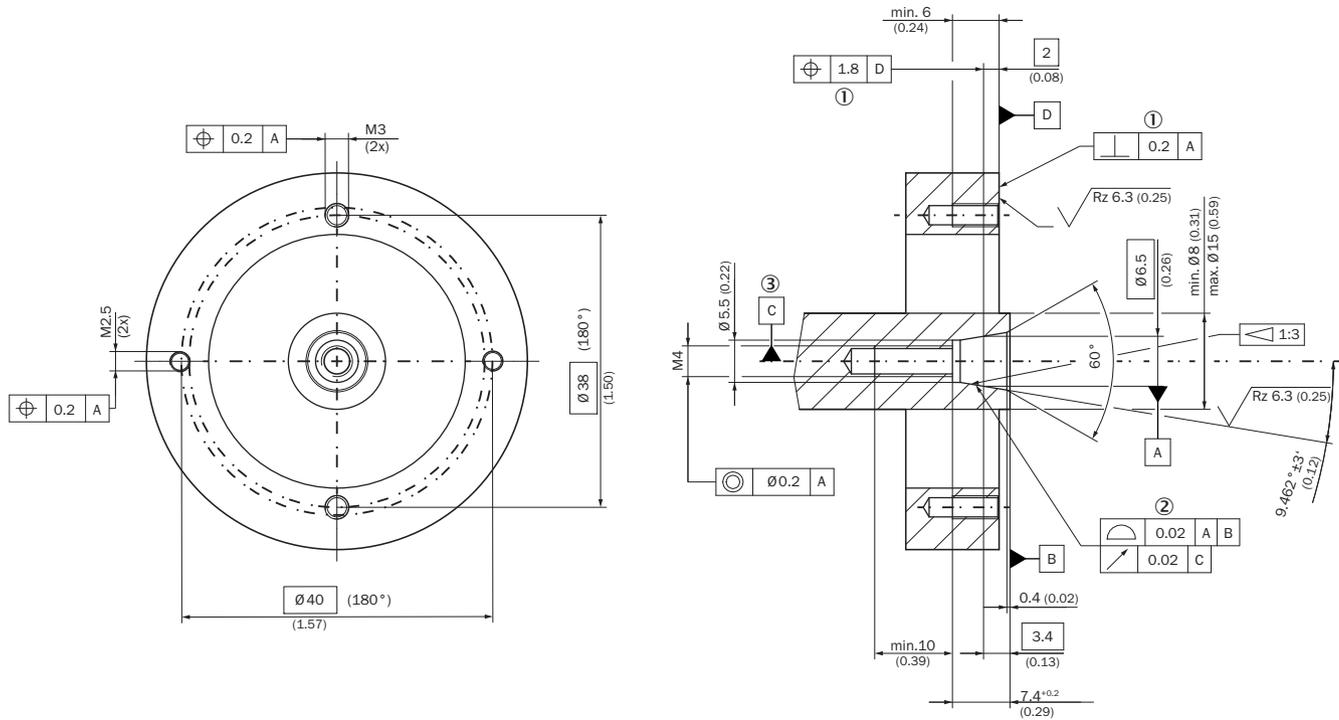
① permanently
② dynamic
③ bearing of the drive shaft

## Anschlussbelegung Temperature sensor pin assignment

**K connection type**

| PIN | Signal | Explanation |
|---|---|---|
| 1 | T+ | Thermistor connection |
| 2 | T- | Thermistor connection (to ground) |
| Recommended outer diameter of set of stranded wires: 2.2 mm ± 0.1 mm | | |
| Recommended mating connector: Harwin M80-8990205 | | |

## Anschlussbelegung Supply/Communication pin assignment
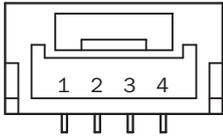
integrated in motor cable = K

| PIN | Signal | Explanation |
|---|---|---|
| 1 | – | Not connected - no function |
| 2 | $+U_S$/DSL+ | Supply 7 V ... 12 V |
| 3 | GND/DSL- | Ground connection |
| 4 | – | Not connected - no function |
| Recommended outer diameter of set of stranded wires: 2.8 mm ±0.3 mm | | |
| Recommended mating connector: JST (GHR-04V-S) | | |

## Diagrams

Typical inrush current (A)
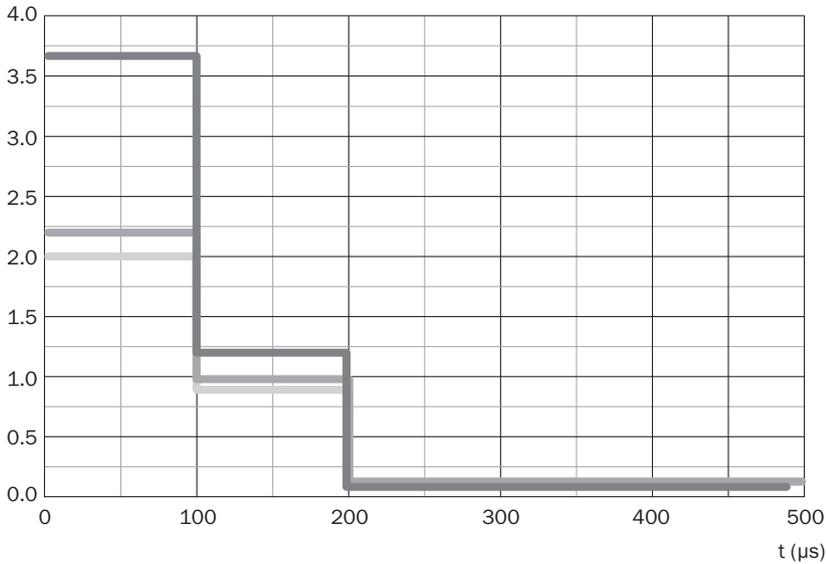


- 7 V Us
- 8 V Us
- 12 V Us

## Operation note Overview of warnings and fault indications

| Error type | Error register | Error bit | Description |
|---|---|---|---|
| Position (incremental) | 40h | 0 | A Protocol reset was executed |
| | 40h | 1 | Acceleration overflow, invalid position |
| | 40h | 2 | Test running |
| | 40h | 4 | Internal error in angular tracking, invalid position |
| | 40h | 5 | Internal error in vector length, invalid position |
| | 40h | 6 | Internal error in position counter, invalid position |
| | 40h | 7 | Internal error in position synchronization, invalid position |
| Position (absolute) | 41h | 0 | Error in absolute position in a rotation |
| | 41h | 1 | Multiturn amplitude error |
| | 41h | 2 | Multiturn sync error |
| | 41h | 3 | Multiturn vector length error |
| | 41h | 4 | Position cross check error |
| Initialization | 42h | 0 | Switch-on self-test undertaken (only safety versions) |
| | 42h | 1 | Warning safety parameter: error could be rectified (only safety variants) |
| | 42h | 2 | Error safety parameter: error cannot be rectified (only safety variants) |
| | 42h | 3 | Standard parameter error |
| | 42h | 4 | Internal communications error 1 |
| | 42h | 5 | Internal communications error 2 |
| | 42h | 6 | Internal general error |
| Checking | 43h | 0 | Critical temperature |
| | 43h | 1 | Critical LED current |
| | 43h | 2 | Critical supply voltage |
| | 43h | 3 | Critical speed |
| | 43h | 5 | Counter overflow |
| | 43h | 6 | Internal monitoring error |
| Access to resources | 44h | 0 | Invalid argument given during resource access procedure |
| | 44h | 1 | Resource access refused due to incorrect access level |
| | 44h | 2 | Internal error during resoure access |
| | 44h | 3 | Error when accessing a user file |
| User-defined warnings | 47h | 0 | User-defined warning 0 |
| | 47h | 1 | User-defined warning 1 |
| | 47h | 2 | User-defined warning 2 |
| | 47h | 3 | User-defined warning 3 |

## Operation note Supported resources for HIPERFACE DSL®

| RID | Name | time overrun [ms] | Description |
|---|---|---|---|
| 0x000 | ROOT | 75 | Top node of ressource tree (all nodes reachable from here) |
| 0x001 | IDENT | 75 | Node with pointers to all identification ressources |
| 0x002 | MONITOR | 75 | Node with pointers to all monitoring ressources |
| 0x003 | ADMIN | 75 | Node with pointers to all administration ressources |
| 0x004 | COUNTER | 75 | Node with pointers to all counter ressources |
| 0x005 | DATA | 75 | Node with pointers to all user file ressources |
| 0x006 | SENSHUB | 75 | Node with pointers to all SensorHub ressources |
| 0x080 | ENCTYPE | 120 | Base functionality of encoder |
| 0x081 | RESOLUTN | 120 | Number of steps per turn |
| 0x082 | RANGE | 120 | Number of encoded revolutions |
| 0x083 | TYPECODE | 120 | Type name of encoder |
| 0x084 | SERIALNO | 120 | Serial no of encoder |
| 0x085 | FWREVNO | 120 | Firmware and hardware revision of encoder |
| 0x086 | FWDATE | 120 | Firmware date of encoder |
| 0x087 | EESIZE | 120 | Total amount of memory for user files |
| 0x089 | VPOS2RES | 120 | Number of steps per turn (DSL Safe Position 2) |
| 0x0c0 | TEMPRNG | 90 | Min and max allowed ambient temperature of encoder |
| 0x0c1 | TEMPRTUR | 70 | Actual ambient temperature of encoder |
| 0x0c2 | LEDRANGE | 90 | Min and max allowed LED current of encoder |
| 0x0c3 | LEDCURR | 70 | Actual LED current of encoder |
| 0x0c4 | SUPRANGE | 90 | Min and max allowed supply voltage of encoder |
| 0x0c5 | SUPVOLT | 70 | Actual supply voltage of encoder |
| 0x0c6 | SPEEDRNG | 90 | Max allowed shaft speed of encoder |
| 0x0c7 | SPEED | 70 | Actual shaft speed of encoder |
| 0x0c8 | ACCRANGE | 90 | Max allowed shaft acceleration of encoder |
| 0x0cb | LIFETIME | 70 | Operating time and total shaft turns of encoder. For safety variants also remaining mission time is indicated. |
| 0x0cc | ERRORLOG | 100 | Stored error messages of encoder |
| 0x0cd | HISTOGRM | 70 | Usage history of encoder in histogram form |
| 0x0d5 | ERRLOGFI | 100 | Filters the error log entries |
| 0x100 | RESET | 240 | Reset or shutdown of encoder |
| 0x101 | SETPOS | 200 | Set encoder position to arbitrary preset value. Offset of position can be read back. |
| 0x104 | SETACCES | 70 | Set or read back access level |
| 0x105 | CHNGEKEY | 90 | Change password for access level |
| 0x107 | UWARNING | 90 | Set or read back user-defined warning boundaries |
| 0x108 | FACRESET | 1100 | Reset user settings of encoder to factory defaults |
| 0x109 | ENCIDENT | 90 | Set or read back user-defined encoder index (for multi-axis systems) |
| 0x10a | POSFILT | 90 | Set or read back position filter settings |
| 0x10f | SHUBTOUT | 90 | Access to sHub time-out settings |
| 0x111 | ENCINDEX | 90 | Set or read back user-defined encoder index (for multi-axis systems) |
| 0x11d | FEATURES | 90 | Set or read back encoder features |
| 0x11f | BOOTLOAD | 200 | Bootloader access for end user (planned) |
| 0x120 | READCNT | 90 | Read user counter value |
| 0x121 | INCCOUNT | 90 | Increment user counter value |
| 0x122 | RESETCNT | 90 | Reset user counter value |
| 0x130 | LOADFILE | 900 | Load user file |
| 0x131 | RWFILE | 260 | Read from or write to user file |
| 0x132 | FILESTAT | 70 | Read status of user file |
| 0x133 | MAKEFILE | 1100 | Create, change or delete user file |
| 0x134 | DIR | 150 | Read directory of accessible user files |
| 0x136 | FILEBACK | 90 | Set or read back status of user file backup |
| 0x200 | ACCESSIO | 70 | Access to simple I/Os connected directly to encoder |
| 0x201 | MANAGEIO | 180 | Manage simple I/Os |
| 0x202 | IDENTIO | 70 | Identify simple I/Os |
| 0x210 | SH_RESET | 180 | Reset of sHub |
| 0x218 | SH_FACSE | 255 | Reset user settings of sHub to factory defaults |
| 0x21d | SH_FEATS | 90 | Set or read back encoder features |
| 0x280 | SH_TYPE | 180 | Base functionality of sHub |
| 0x283 | SH_TYPCO | 180 | Type name of sHub |
| 0x284 | SH_SERNO | 180 | Serial no of sHub |
| 0x285 | SH_FWREV | 70 | Firmware and hardware revision of sHub |
| 0x286 | SH_FWDAT | 70 | Firmware date of sHub |
| 0x2c0 | SH_TEMPR | 180 | Min and max allowed ambient temperature of sHub |
| 0x2c4 | SH_SUPR | 180 | Min and max allowed supply voltage of sHub |
| 0x2cb | SH_LIFET | 70 | Operating time of sHub |
| 0x2cc | SH_ERRLG | 220 | Stored error messages of sHub |

## Operation note Supported access levels

| Access level | User | Standard access key |
|---|---|---|
| 0 | Execute (default setting) | - (no key required) |
| 1 | Operator | 1111 (31 31 31 31h) |
| 2 | Maintenance | 2222 (32 32 32 32h) |
| 3 | Authorized client | 3333 (33 33 33 33h) |
| 4 | User service | 4444 (34 34 34 34h) |

## Recommended accessories

| | Brief description | Type | part no. |
|---|---|---|---|
| **Mounting systems** | | | |
| | • **Description:** Screws with Precote 85-8 coating; M4*48 (4093779)<br>• **Packing unit:** 10 pieces | BEF-MK-S11 | 2103274 |
| | • **Description:** Screws with Precote 85-8 coating; M4*48 (4093779)<br>• **Packing unit:** 100 pieces | BEF-MK-S10 | 2103272 |
| | • **Description:** Screws with Precote 85-8 coating; M4*48 (4093779)<br>• **Packing unit:** 500 pieces | BEF-MK-S09 | 2103244 |
| **connectors and cables** | | | |
| | • **Connection type head A:** Female connector, stranded wire, 4-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** HIPERFACE DSL®<br>• **Cable:** 0.36 m, 2-wire<br>• **Description:** HIPERFACE DSL®, twisted, shielded | DOL-0B02-G0M3AC2 | 2108944 |
| | • **Connection type head A:** Female connector, stranded wire, 4-pin, straight<br>• **Connection type head B:** Flying leads<br>• **Signal type:** HIPERFACE DSL®<br>• **Cable:** 0.2 m, 2-wire<br>• **Description:** HIPERFACE DSL®, unshielded | DOL-0B02-G0M2XC2 | 2079920 |
| **device protection and care** | | | |
| | • **Description:** EDM35 cover set, 10 pcs | BEF-CAP-EDM-010 | 2139997 |
| | • **Description:** EDM35 cover set, 40 pcs | BEF-CAP-EDM-040 | 2139999 |

## SICK AT A GLANCE

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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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