

EDM35-2VF0A024A

EDS/EDM35

MOTOR FEEDBACK SYSTEMS

SICK
Sensor Intelligence.

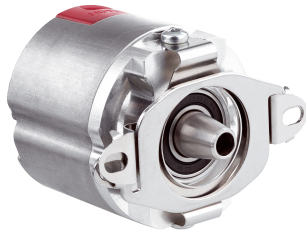


Illustration may differ



Ordering information

| Type | Part no. |
|-----------------|----------|
| EDM35-2VF0A024A | 1106851 |

M3 mounting screws for stator coupling not included with delivery.

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

| | |
|---|---|
| Safety integrity level | SIL 2 (IEC 61508), SILCL3 (IEC 62061) ¹⁾ |
| Category | 3 (EN ISO 13849-1:2015) |
| Systematic suitability | SC 3 (IEC61508) |
| Test rate | 24 h |
| Maximum demand rate | 216 μs |
| Performance level | PL d (EN ISO 13849-1:2015) |
| Basis for safety function | Safe singleturn absolute position |
| Safety-related resolution | 13 bits |
| Maximum difference between Safe Position 1 and Safe Position 2 | 3 increments |
| PFH (mean probability of a dangerous failure per hour) | 33×10^{-9} ²⁾ |
| T_M (mission time) | 20 years |
| Safety-related accuracy | 0.135° ³⁾ |

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

²⁾ At 60 °C ambient temperature.

³⁾ The safety-related accuracy specifies the maximum position error limit with which the safety functions can be supported. This results from the safety-related resolution: ($360^\circ / 13 \text{ bit} = 0.045^\circ$). The accuracy to be used for project planning results from the maximum difference between Safe Position 1 and Safe Position 2. Thus the following relationship exists (safety-related accuracy = number of increments difference between Safe Position 1 and Safe Position 2 * 0.045).

Performance

| | |
|--|--------------------------|
| Position | |
| Resolution per revolution | 24 bit |
| System accuracy | $\pm 25''$ ¹⁾ |
| Signal noise (σ) | $\pm 1''$ ²⁾ |
| Number of the absolute ascertainable revolutions | 4,096 |

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.

| | |
|-----------------------|------------|
| 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 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.

Electrical data

| | |
|---|---------------------------|
| Connection type | Male connector, 8-pin |
| Supply voltage | 7 V ... 12 V |
| Warm-up time voltage ramp | Max. 180 ms ¹⁾ |
| Current consumption | ≤ 150 mA ²⁾ |
| Compatible with sHub[®] | ✓ |

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).

Mechanical data

| | |
|---------------------------------------|--|
| Shaft version | Tapered shaft |
| Flange type / stator coupling | Stator coupling |
| Dimensions | See dimensional drawing |
| Weight | ≤ 100 g |
| Moment of inertia of the rotor | 5 gcm ² |
| Operating speed | ≤ 9,000 min ⁻¹ |
| Angular acceleration | ≤ 250,000 rad/s ² |
| Start up torque | ≤ 0.6 Ncm, +20 °C |
| Permissible movement static | ± 1 mm axial ¹⁾ |
| Permissible movement dynamic | ± 0.025 mm radial ²⁾ |
| Life of ball bearings | 50,000 h at 6,000 min ⁻¹ (at a flange temperature of 70 °C) |

¹⁾ Temperature expansion, mechanical attachment.

²⁾ For SIL2 version.

Ambient data

| | |
|------------------------------------|----------------------------------|
| Operating temperature range | -40 °C ... +115 °C 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 connector 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.

| | |
|--|---|
| 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: 2016, EN 61000-6-4: 2006, IEC 6100-6-7: 2014 ²⁾ |
| Enclosure rating | IP40, When cover is closed and mating connector is attached (IEC 60529-1) |

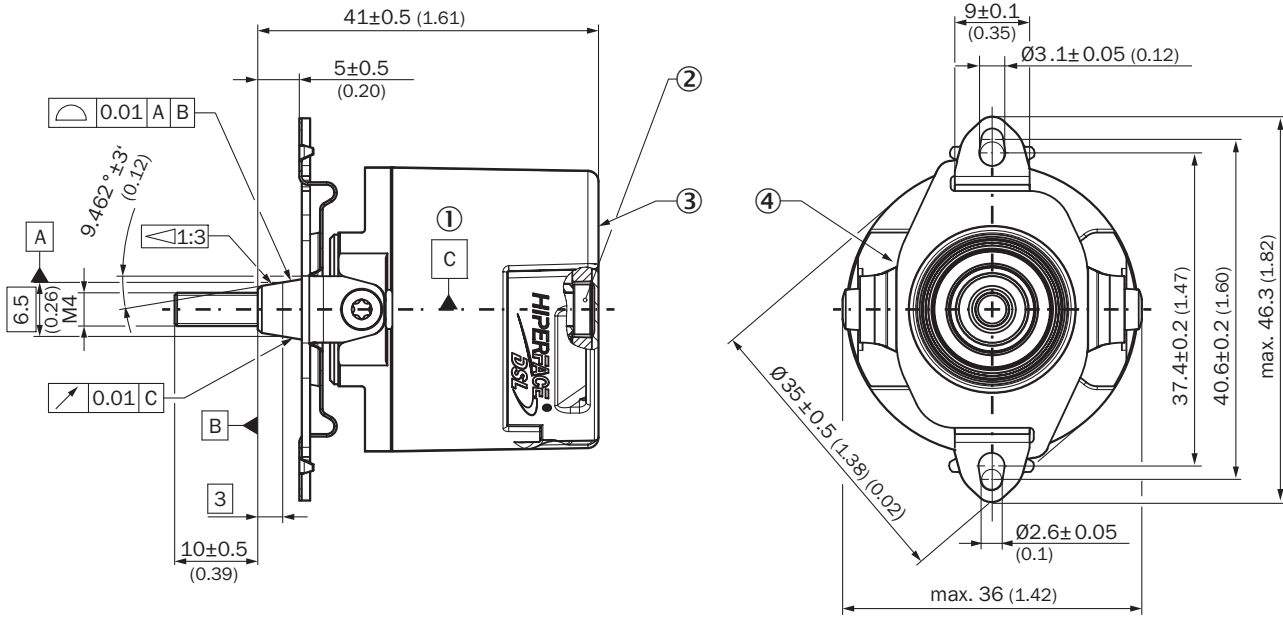
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Classifications

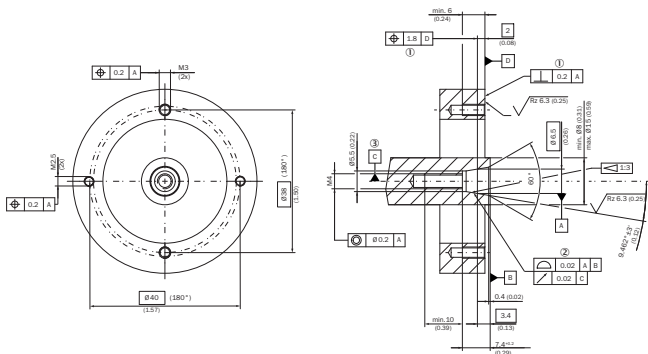
| | |
|-----------------------|----------|
| ECLASS 5.0 | 27270590 |
| ECLASS 5.1.4 | 27270590 |
| ECLASS 6.0 | 27270590 |
| ECLASS 6.2 | 27270590 |
| ECLASS 7.0 | 27270590 |
| ECLASS 8.0 | 27270590 |
| ECLASS 8.1 | 27270590 |
| ECLASS 9.0 | 27270590 |
| ECLASS 10.0 | 27273805 |
| ECLASS 11.0 | 27273901 |
| 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))



- ① Bearing of the encoder shaft
- ② Torx 15 cylinder screw
- ③ Measuring point for vibrations
- ④ Measuring point for operating temperature

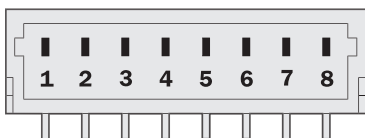
Attachment specifications



- ① Permanently
- ② Dynamic
- ③ Bearing of the drive shaft

PIN assignment

Supply/Communication pin assignment



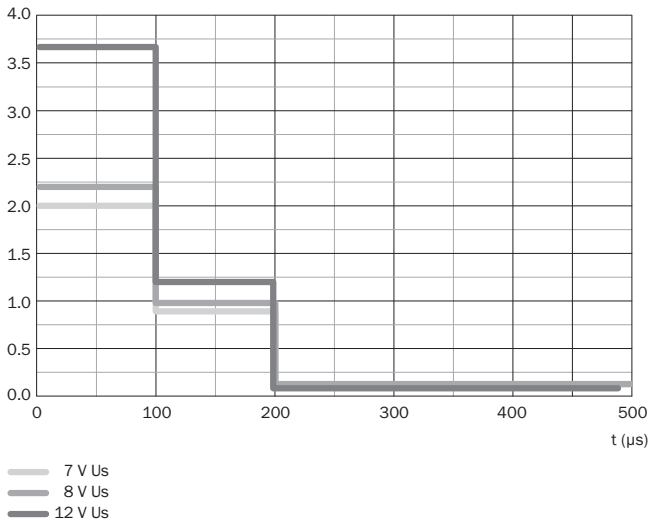
V connection type

| PIN | Signal | Explanation |
|-----|-----------------|------------------------|
| 1 | +U _S | Supply |
| 2 | GND | Ground connection |
| 3 | DSL- | DSL negative |
| 4 | DSL+ | DSL positive |
| 5 | RxD+ | Receiver data positive |
| 6 | RxD- | Receiver data negative |
| 7 | TxD- | Sender data negative |
| 8 | TxD+ | Sender data positive |

Recommended mating connector: JST (GHR-08V-S)

Diagrams

Typical inrush current (A)



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) |

Supported resources for HIPERFACE DSL®

| RID | Name | time overrun [ms] | Description |
|-------|----------|-------------------|--|
| 0x000 | ROOT | 75 | Top node of resource tree (all nodes reachable from here) |
| 0x001 | IDENT | 75 | Node with pointers to all identification resources |
| 0x002 | MONITOR | 75 | Node with pointers to all monitoring resources |
| 0x003 | ADMIN | 75 | Node with pointers to all administration resources |
| 0x004 | COUNTER | 75 | Node with pointers to all counter resources |
| 0x005 | DATA | 75 | Node with pointers to all user file resources |
| 0x006 | SENSHUB | 75 | Node with pointers to all SensorHub resources |
| 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 | CHNGKEY | 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 |

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 |
| Checking | 42h | 6 | Internal general error |
| | 43h | 0 | Critical temperature |
| | 43h | 1 | Critical LED current |
| | 43h | 2 | Critical supply voltage |
| | 43h | 3 | Critical speed |
| | 43h | 5 | Counter overflow |
| Access to resources | 43h | 6 | Internal monitoring error |
| | 44h | 0 | Invalid argument given during resource access procedure |
| | 44h | 1 | Resource access refused due to incorrect access level |
| | 44h | 2 | Internal error during resource access |
| User-defined warnings | 44h | 3 | Error when accessing a user file |
| | 47h | 0 | User-defined warning 0 |
| | 47h | 1 | User-defined warning 1 |
| | 47h | 2 | User-defined warning 2 |
| | 47h | 3 | User-defined warning 3 |

Recommended accessories

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

| Brief description | Type | Part no. |
|-------------------------|-----------------|----------|
| Spare parts | | |
| EDM35 cover set, 10 pcs | BEF-CAP-EDM-010 | 2139997 |
| EDM35 cover set, 40 pcs | BEF-CAP-EDM-040 | 2139999 |

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