Product Information

EIB 2391 S
External Interface Box
Encoder requirements

The EIB 2391 S makes it possible to connect encoders with the ordering designation EnDat22 to the DRIVE-CLiQ interface.

Depending on the firmware version of the EIB and the subsequent electronics, it might be possible to also attach other encoders with an EnDat22 interface. Please contact HEIDENHAIN or the manufacturer of the subsequent electronics for further information.

The firmware version of the EIB and the subsequent electronics for more information

After switch-on, the EIB tests various characteristics of the connected encoder and automatically adapts itself to it. If the encoder does not meet the necessary requirements, an error message is issued via the DRIVE-CLiQ interface.

Online diagnostics

With EnDat 2.2 encoders, valuation values can be read cyclically from the encoder to evaluate its functioning. These valuation numbers indicate the encoder’s current status and can be used to determine its “function reserves.” These function reserves are also transmitted via the DRIVE-CLiQ interface and can be displayed in the higher-level control. Further information is available from HEIDENHAIN upon request.

Temperature sensor information

The EIB 2391 S does not have a temperature sensor input, but it can evaluate the temperature sensor information from connected EnDat encoders and pass it through the DRIVE-CLiQ interface. Up to four types of temperature information can be transmitted. The EIB 2391 S supports transmission from:

- an internal temperature sensor (value is provided in the DRIVE-CLiQ parameter “Encoder Temperature”)
- up to three external temperature sensors (values are provided in the DRIVE-CLiQ parameter “Motor temperature 1-4”)

The calculation of the motor temperature is determined by the connected encoder and the characteristics of the encoder.

The evaluation of the connected sensors can be set via the DRIVE-CLiQ interface, depending on the settings of the EnDat encoder. This allows temperature sensors of types KTY 94-130, FT 1000, and PTC to be evaluated. For more information, please contact HEIDENHAIN.

You can find further information on the availability and mapping of the temperature sensor information in the documentation of the connected EnDat encoder.

Firmware versions

Two firmware versions are available for the EIB 2391 S. The firmware version can be read out over the DRIVE-CLiQ parameter “Act_FW_Version” (index 0). The final two digits of the displayed value are decisive. The following information is given with reference to these two places.

EIB 2391 S with ID '768200-01'

- Delivered with firmware version 11
- The update from firmware version 11 to version 15 is possible via the DRIVE-CLiQ interface
- Will be replaced by EIB 2391 S with ID '768200-02'

EIB 2391 S with ID '768200-02'

- Delivered with firmware version 15
- Replaces the EIB 2391 S with ID '768200-01' because it is backwards compatible

Please note:

- A downgrade from firmware version 15 to version 11 is not permissible
- Further information, please refer to the documentation for the DRIVE-CLiQ subsequent electronics.

Restrictions

With linear encoders featuring measuring lengths greater than 50 m, there may under certain circumstances be limitations in the output of the commutation angle via the DRIVE-CLiQ interface. Please contact HEIDENHAIN in such cases. HEIDENHAIN recommends setting the datum shift in the subsequent electronics. If the datum shift is used in the EnDat area, it must be less than 3 m, and no position values less than zero may result.

TIME_MAX_ACTVAL

The calculation time TIME_MAX_ACTVAL specifies the earliest time (relative to the request time) after which the transfer of data from the encoder to the control can begin. The value depends on the parameters of the connected encoder (calculation time and resolution) and the cable length. Furthermore, there can be restrictions when setting the cycle times. For more information, please refer to the documentation for the DRIVE-CLiQ subsequent electronics.

NOTE:

The software of the DRIVE-CLiQ subsequent electronics must be designed for operation of the EIB 2391 S in safety-related applications. For more information on availability, please refer to the manufacturer.
**Interfaces**

**Pin layout of the EIB input**

- **Connector**: 8-pin M12 coupling (male)
- **Power supply**
  - 8
  - 5
  - 1
  - 7
  - 6
- **Serial data transmission**
  - 4
- **Sensor U2**: Brown/Green
- **Sensor U1**: Blue/White
- **0V**: Green/White
- **DATA**: White/Pink
- **CLOCK**: Violet/Gray
- **Cable shield**: connected to housing; **Uph** = Power supply voltage

**Pin layout of the EIB output**

- **On the EIB 2391 S**
  - **8-pin M12 flange socket (male)**
- **Power supply**
  - 1
  - 5
  - 3
  - 7
  - 6
  - 2
- **Serial data transmission**
  - 8
- **Miscellaneous**
  - /

**Adaptation cables and adapter cables**

- **Adapter cable**
  - With 8-pin M12 connector (male) and R445 Siemens connector (IP87)
  - Cable length: 1 m
- **Connecting cable**
  - With 8-pin M12 connector (male) and 8-pin M12 coupling (male)

**Value**

- **Ø 6.8 mm**: 1094652-01
- **Ø 6.8 mm**: 1020042-xx
- **Ø 6.8 mm**: 822504-xx

---

**Specifications**

**EIB 2391 S**

**Functional safety**
- Depending on the connected encoder and subsequent electronics, suited for applications with up to:
  - SIL 2 as per EN 61508
  - Category 3 PL d as per EN ISO 13849-1:2016-05

**PFH**
- 26 · 10⁻⁶ (with respect to an operating elevation of ≤ 1000 m above sea level)

**Safe position**
- Determined by the connected encoder and the subsequent electronics (i.e. through the configuration); the EIB has no influence on the safe position

**Input**

- **Interface**: EnDat 2.2
- **Ordering designation**: EnDat22 (note the Encoder requirements)
- **Electrical connection**: 8-pin M12 connector (female)
- **Encoder supply voltage** (Up)
  - DC 5.1 V ±0.15 V, max. 2500 mW

**Output**

- **Interface**: DRIVE-CLiQ
- **Firmware**: 01.32.2716
- **SINAMICS, SIMOTION**
  - ≥ V4.6.1F3
- **SINUMERIK with safety**
  - ≥ V4.7 SP1 HF1
- **SINUMERIK without safety**
  - ≥ V4.5 SP2 HF4
- **Calculation time**
  - TIME_MAX_ACTVAL
  - Refer to TIME_MAX_ACTVAL on page 3
- **Ordering designation**: DQ01
- **Electrical connection**: 8-pin M12 connector (male)
- **Cable length**: ≤ 100 m

**Supply voltage** (Up)
- DC 24 V (16.0 V to 28.8 V)
- up to DC 36.0 V possible without impairing functional safety

**Power consumption**
- Maximum: At 16.0 V: ≤ 4.1 W
- At 28.8 V: ≤ 4.35 W
- Typical: At 24 V: 1.1 W + 1.15 · PMtyp (with PMtyp = typical power consumption of the encoder)

**Elevation**
- ≤ 1000 m

**Operating temperature**
- 0 °C to 60 °C

**Storage temperature**
- -30 °C to 70 °C

**Vibration**
- 55 to 2000 Hz
- Shock: 11 ms

**Protection**
- EN 60529: IP65

**Mass**
- 180 g

---

1) Information from Siemens as per the document “Certified encoders with DRIVE-CLiQ Dependencies on SIMOTION / SINUMERIK and SINAMICS Hardware and Software versions” (version: 04/2019)

2) With HEIDENHAIN cable: Comply with the supply voltage at the encoder

3) Depending on the output cable; the plug connection to the EIB is to be considered a DRIVE-CLiQ coupling.

---

**Further information**

Comply with the requirements described in the following documents to ensure correct and intended operation:
- Brochure, Product Information, and Mounting Instructions of the connected encoder
- Mounting Instructions: EIB 2391 S 895532
- Brochure: Interfaces of HEIDENHAIN Encoders 1078628-xx
- Brochure: Cables and Connectors 1200163-xx

This Product Information document supersedes all previous editions, which thereby become invalid. The basis for ordering from HEIDENHAIN is always the Product Information document edition valid when the order is placed.

---

**HEIDENHAIN**

**DR. JOHANNES HEIDENHAIN GmbH**

**Dr. Johannes-Heidenhain-Straße 5**

**83301 Traunreut**, **Germany**

+49 8669 31-0

+49 8669 32-9061

E-mail: info@heidenhain.de

[www.heidenhain.de](http://www.heidenhain.de)

---

**Cable shield**

- Connected to housing

---

**Important statement**

This document is a registered trademark of Siemens Aktiengesellschaft.