Product Information

EIB 2391 S
External Interface Box
EIB 2391 S
External interface box with firmware version 15
• Input: HEIDENHAIN encoders with EnDat22 interface
• Output: DRIVE-CLiQ interface

Encoder requirements
The EIB 2391 S makes it possible to connect encoders with the EnDat22 ordering designation to the DRIVE-CLiQ interface. Depending on the firmware version of the EIB and the downstream electronics, it may be possible to connect other encoders with an EnDat22 interface. For more information, please contact HEIDENHAIN or the manufacturer of the downstream electronics. After switch-on, the EIB checks 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.

DRIVE-CLiQ is a registered trademark of Siemens AG

<table>
<thead>
<tr>
<th>Compatible with EIB 2391 S</th>
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<tbody>
<tr>
<td>Absolute enclosed linear encoders, e.g., LC 100, LC 400, LC 200</td>
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<tr>
<td>Absolute exposed linear encoders, e.g., LIC 4100, LIC 3100, LIC 2100</td>
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<tr>
<td>Absolute angle encoders, e.g., RCN 2001, RCN 5001, RCN 8001, RCN 6000</td>
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<tr>
<td>Absolute angle encoders, e.g., ROC 2000, ROC 7000</td>
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<tr>
<td>Absolute angle encoders, e.g., EON 2000, ECA 4000</td>
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<tr>
<td>Absolute angle encoders, e.g., ECM 2400, MRP 2000, MRP 5000, MRP 8000, SRP 6000</td>
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<tr>
<td>Absolute singleturn rotary encoders, e.g., EON 100, ECI 100, ECI 1100, ECI 1300</td>
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<tr>
<td>Absolute multiturn rotary encoders, e.g., EQI 1100, EQI 1300</td>
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<tr>
<td>Length gauges, e.g., AT 3500, AT 1200</td>
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<tr>
<td>Incremental EnDat encoders, e.g., ERM 2400, LIP 200, EIB 100, EIB 300, EIB 1500</td>
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<tr>
<td>Encoders with a battery-buffered revolution counter, e.g., EBI 100, EBI 1100, EBI 4000</td>
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</table>

Online diagnostics
With EnDat 2.2 encoder the value of the cycle times. For more information about the availability of the data transfer 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. There can also be limitations with regard to the cycle times. For more information, please refer to the documentation of the downstream electronics (DRIVE-CLiQ).

<table>
<thead>
<tr>
<th>Firmware versions</th>
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</thead>
<tbody>
<tr>
<td>Two firmware versions are available for the EIB 2391 S. The firmware version can be read out via 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 digits.</td>
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<tr>
<td>EIB 2391 S with ID 768200-01</td>
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<tr>
<td>Delivered with firmware version 11</td>
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<tr>
<td>An update from firmware version 11 to version 15 is possible via the downstream electronics (DRIVE-CLiQ).</td>
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<tr>
<td>Will be replaced by EIB 2391 S with ID 768200-02</td>
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<tr>
<td>EIB 2391 S with ID 768200-02</td>
</tr>
<tr>
<td>Delivered with firmware version 15</td>
</tr>
<tr>
<td>Replaces the EIB 2391 S with ID 768200-01 because it is backwards compatible</td>
</tr>
</tbody>
</table>

Please note: A downgrade from firmware version 15 to version 11 is not permissible.

Functional safety
The EIB can be used in safety-related applications, but only if functional safety is supported by the connected encoder. The characteristics pertaining to functional safety are largely determined by the connected encoder and the downstream electronics (if required, contact the manufacturer; the EIB passes on the main characteristics of the encoder). The safe position is also largely determined by the connected encoder and the downstream electronics. Please note:

The safe position and “safety-related applications” are determined by the software. For more information, please contact the manufacturer of the downstream electronics.

The PHV value of the overall system (EIB 2391 S + encoder) is the sum of the PHV values of the EIB 2391 S and the connected encoder. The calculation time TIME_MAX_ACTVAL specifies the earliest time (relative to the request time) after which data transfer 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. There can also be limitations with regard to the cycle times. For more information, please refer to the documentation of the downstream electronics (DRIVE-CLiQ).

Please note:
In order for the EIB 2391 S to be operated in safety-related applications, the software must be designed in conformity with the downstream DRIVE-CLiQ electronics. For more information about availability, please contact the manufacturer.

Limitations
For linear encoders with measuring lengths greater than 50 m, there may be limitations to the output of the commutation angle via the DRIVE-CLiQ interface under certain circumstances. Please contact HEIDENHAIN in such cases. HEIDENHAIN recommends setting the datum shift in the downstream electronics. If the datum shift is used in the EnDat area, then it must be less than 3 m and not result in position values less than zero.

TIME_MAX_ACTVAL
The value depends on the parameters of the connected encoder (calculation time and resolution) and the cable length. There can also be limitations with regard to setting the cycle times. For more information, please refer to the documentation of the downstream electronics (DRIVE-CLiQ).

Please note:
In order for the EIB 2391 S to be operated in safety-related applications, the software must be designed in conformity with the downstream DRIVE-CLiQ electronics. For more information about availability, please contact the manufacturer.

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Specifications | EIB 2391 S
---|---
**Functional safety** | Depending on the connected encoder and downstream electronics, suitable for applications with up to:
• SIL 2 as per EN 61508 (further basis for testing: EN 61800-5-2)
• Category 3, PL d, in accordance with EN ISO 13849-1:2015

**PFH** | $26 \cdot 10^{-9}$ (with respect to an operating elevation of ≤ 1000 m above sea level)

**Safe position** | Determined by the connected encoder and the downstream electronics (including 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 ($U_{UP2}$)** | DC 5.1 V ±0.15 V, max. 2500 mW
- **Cable length** | ≤ 100 m

**Output**

- **Interface** | DRIVE-CLiQ
- **Firmware** | 01.32.27.15
- **Siemens, SIMOTION** | ≥ V4.6HF3
- **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** | ≤ 95 m

**Pin layout of the EIB input**

- **Power supply**
  - #8: Brown/Green
  - #2: Blue
  - #5: White/Green
  - #1: White
  - #3: Gray
  - #4: Pink
  - #7: Violet
  - #6: Yellow

- **Serial data transmission**
  - #6: Clock
  - #7: Clock
  - #1: DATA
  - #3: DATA
  - #4: Sensor 0V
  - #5: Sensor
  - #2: UP2

**Pin layout of the EIB output**

- **Power supply**
  - #6: UP1
  - #7: 0 V
  - #3: RXN
  - #4: TXP
  - #2: TXN

- **Serial data transmission**
  - #8: CLOCK

**Miscellaneous**

- **Adaptor cable**
  - With 8-pin M12 connector (female) and RJ45 Siemens connector (IP67), cable length: 1 m
  - Ø 8.6 mm
  - 1084240-01

- **Connecting cable**
  - With 8-pin M12 connector (female) and 8-pin M12 coupling (male)
  - Ø 8.8 mm
  - 822504-xx

**Vibration** | 55 to 2000 Hz
**Shock** | 11 ms
**Temperature** | 0 °C to 60 °C
**Storage temperature** | -30 °C to 70 °C
**Protection rating** | IP65
**Mass** | 180 g

**More 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
- Brochure: Interfaces of HEIDENHAIN Encoders
- Brochure: Cables and Connectors
- Technical Information: Safety-Related Position Measuring Systems
- Operating Instructions: EIB 2391 S

For implementation in a control or inverter, comply with the following:
- Information from the manufacturer of the downstream electronics about the use of the EIB 2391 S in safety-related applications