HEIDENHAIN

Functional Safety

Product Information

EIB 3392 S

External Interface Box
in Cable Design

07/2018

EIB 3392 S

External interface box in cable design with firmware version 15

- **Input: HEIDENHAIN encoders with EnDat22 interface**
- **Output: DRIVE-CLiQ interface**

Encoder requirements

The EIB 3392 S makes it possible to connect encoders with the ordering designation EnDat22 to the DRIVE-CLiQ interface. The following encoder series (with or without functional safety) are supported:

- Absolute sealed linear encoders, such as:
  - LC 100, LC 400, LC 200
- Absolute exposed linear encoders, such as:
  - LIC 2000, LIC 4000
- Absolute angle encoders, such as:
  - RCN 2000, RCN 5000, RCN 8000
  - ROC 2000, ROC 7000
  - ECA 4000
- Absolute singleturn encoders, such as:
  - ECN 100
  - ECI 100, ECI 1100, ECI 1300
- Absolute multiturn encoders, such as:
  - EQI 1100, EQI 1300
- Length gauges
  - AT 3000
  - AT 1200

In principle, it is possible to connect further encoders featuring the EnDat22 interface depending, however, on the firmware level of the EIB and the subsequent electronics. Please contact HEIDENHAIN or the manufacturer of the subsequent electronics for further information.

The following encoder series with ordering designation EnDat22 cannot currently be connected to the DRIVE-CLiQ interface and therefore cannot be operated together with the EIB 3392 S:

- Encoders with the "EnDat incremental" profile, such as ERM 2400, LIP 200, EIB 100, EIB 300, EIB 1500
- Encoders with battery-buffered revolution counter, such as EBI 100, EBI 1100, EBI 4000

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 numbers can be read cyclically from the encoder to evaluate its functioning. The valuation numbers provide the current state of the encoder and ascertain the encoder's "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.

Fastening

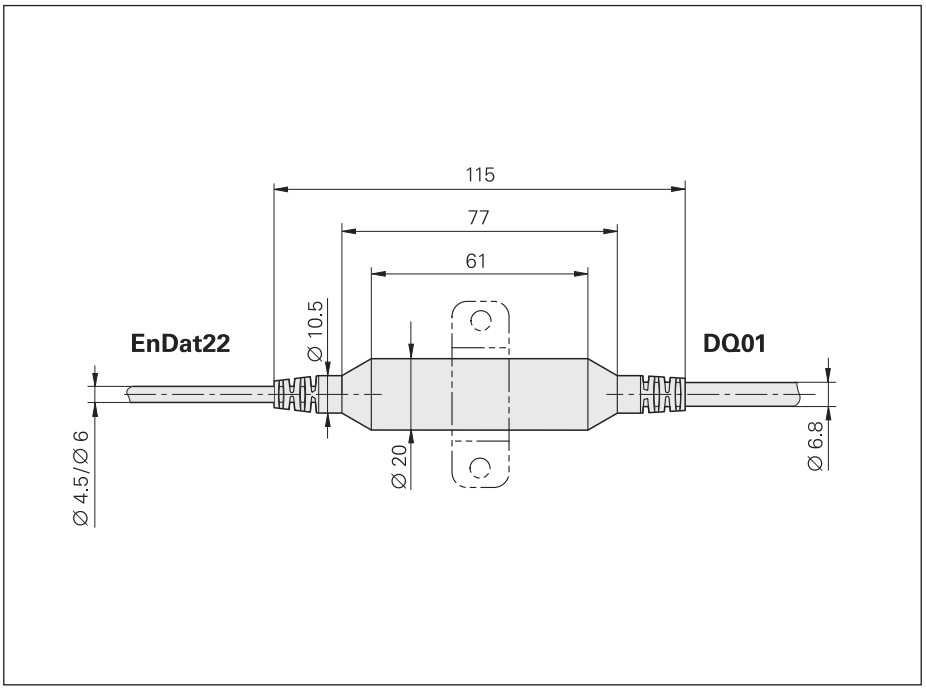
The EIB 3392 S must be fastened. This is possible, for example, with a 20 mm cable clamp (see also "Dimension drawing").

Voltage supply of encoder

The EIB 3392 S provides voltage of U_P = 8.0 V to the encoder. Please comply with the supply voltage range of the connected encoder. Due to their voltage range, certain encoders with the ordering designation EnDat22 cannot be connected, e.g. LC 1x3, LC 4x3, and ECN 225.

Firmware versions

The firmware version can be read out over the DRIVE-CLiQ parameter "Act_FW_Version" (index 0). The last two places of the displayed value are decisive.

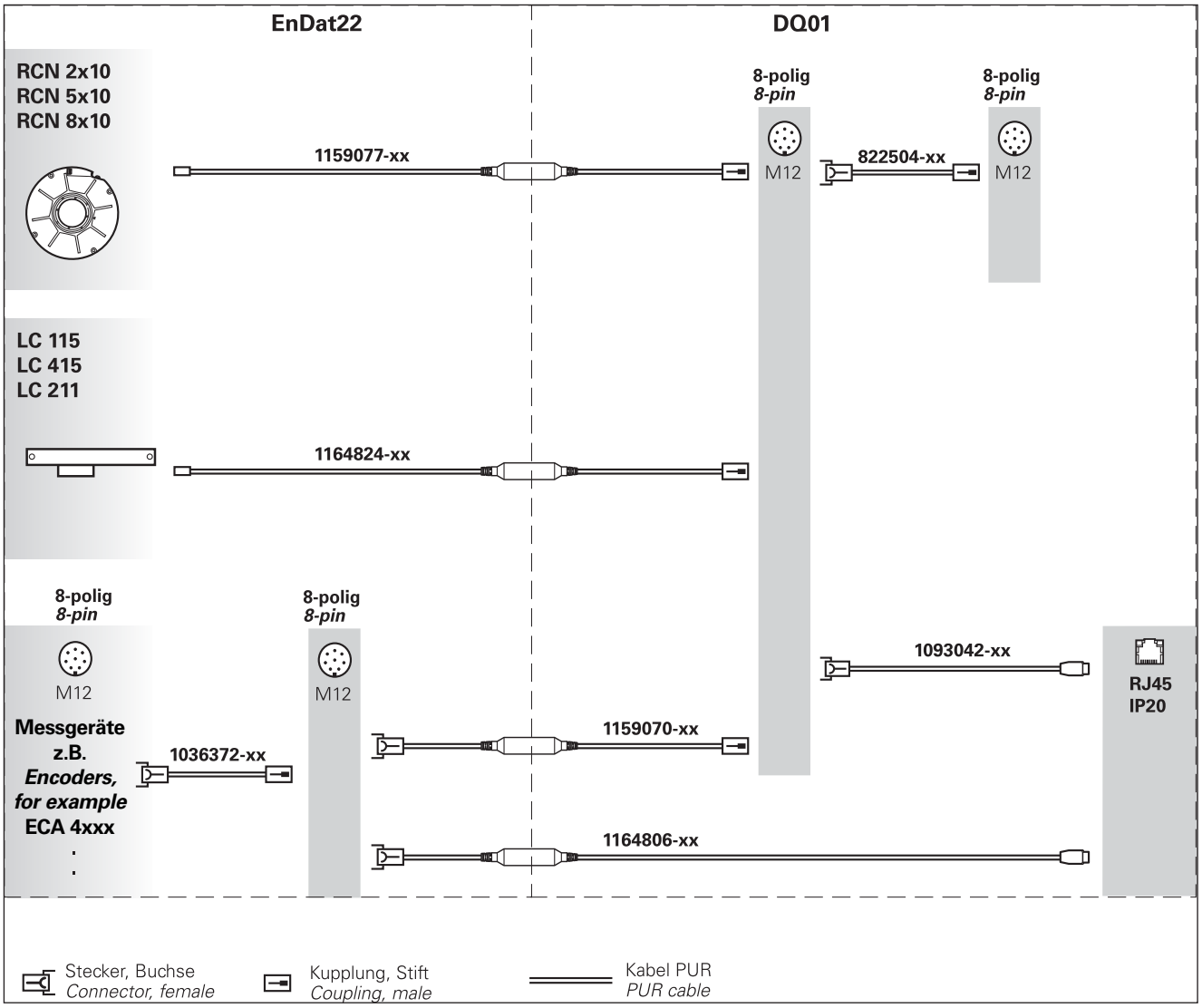


Specifications	EIB 3392 S
Functional safety	Depending on the connected encoder and subsequent electronics, suited for applications up to • SIL 2 according to EN 61 508 (further basis for testing: EN 61 800-5-2) • Category 3, PL d as per EN ISO 13 849-1:2016-06
PFH	$26 \cdot 10^{-9}$ (with respect to an operating altitude 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	Various connectors (see *Versions of the EIB 3392 S*)
Encoder supply voltage (U_{P2})	DC 8.0 V ±0.4 V, max. 1800 mW
Cable length	≤ 30 m [1)]
Output	
Interface	DRIVE-CLiQ
Ordering designation	DQ01
Electrical connection	Various connectors (see *Versions of the EIB 3392 S*)
Cable length	≤ 30 m [2)]
Voltage supply (U_{P1})	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:* ≤ 3200 mW *At 28.8 V:* ≤ 3300 mW *Typical* *At 24 V:* 1000 mW + 1.15 x P_{Mtyp} (with P_{Mtyp} = typical power consumption of the encoder)
Operating temperature	0 °C to 60 °C
Storage temperature	–30 °C to 70 °C
Vibration 55 Hz to 2000 Hz **Shock** 11 ms	100 m/s² (IEC 60 068-2-6) 200 m/s² (IEC 60 068-2-27)
Protection EN 60 529	IP65 [3)]
Mass	≈ 0,2 kg (with 1 m cable length on both sides)

1) With HEIDENHAIN cable; note the supply voltage at the encoder.
2) Depending on the output cable; the plug connection to the EIB is to be considered a DRIVE-CLiQ coupling.
3) Use the correct connector version

Versions of the EIB 3392 S

Overview of connection options (the encoders are examples)



Overview of ID numbers EIB 3392 S

ID	Input			Output		
	Connecting elements	**Cable Ø/A_P**	**Cable length**	**Connecting elements**	**Cable Ø/A_P**	**Cable length**
1159077-11	Ultra-lock connector, female, 12-pin	4.5 mm/ 2 · 0.16 mm^2	2.5 m	M12 connector, male, 8-pin	6.8 mm/ 1 · 0.24 mm^2	0.5 m
1164824-11	M12 connector, female, 14-pin	4.5 mm/ 2 · 0.16 mm^2	2.5 m	M12 connector, male, 8-pin	6.8 mm/ 1 · 0.24 mm^2	0.5 m
1159070-11	M12 connector, female, 8-pin	6 mm/ 2 · 0.16 mm^2	1 m	M12 connector, male, 8-pin	6.8 mm/ 1 · 0.24 mm^2	1 m
1164806-11	M12 connector, female, 8-pin	6 mm/ 2 · 0.16 mm^2	0.5 m	RJ45 connector, IP20, male, 6-pin	6.8 mm/ 1 · 0.24 mm^2	2.5 m

A_P: Cross-section of wires for supply voltage
Other versions are available upon request.

Temperature sensor information
The EIB 3392 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 four external temperature sensors (values are provided in the DRIVE-CLiQ parameter "Motor Temperature," numbered accordingly)

The EIB 3392 S can simultaneously process the information of one external and one internal temperature sensor. If more than one external temperature sensor is used, the value of the internal temperature sensor can no longer be provided.

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 84-130, PT 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.

Functional safety
In principle, the EIB can be used in safety-related applications only if functional safety is supported by the connected encoder. The characteristics with regard to functional safety are substantially determined by the connected encoder and the subsequent electronics (if necessary, contact the manufacturer; the EIB basically conveys the characteristics of the encoder).

The **safe position** is also substantially determined by the connected encoder and the subsequent electronics. The EIB itself does not influence the safe position. The "safe position" and "safety-related measuring step (SM)" of the connected EnDat encoder are required to calculate the safe position. Please contact the manufacturer of the subsequent electronics for further information.

The **PFH value** of the total system (EIB 3392 S + encoder) is the sum of the PFH values of the EIB 3392 S and the connected encoder. For information on the encoder, please refer to its documentation (product information document, brochure, and mounting instructions).

Please contact the manufacturer of the subsequent electronics for more information on the use of the EIB and encoder in safety-related applications.

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. Saving a datum shift in the EnDat encoder can also have limitations. Please contact HEIDENHAIN in such cases.

Note:
The software of the DRIVE-CLiQ subsequent electronics must be designed for operation of the EIB 3392 S in safety-related applications. For more information on availability, please refer to the manufacturer.

Designation of the connecting cables
The connecting cables for input and output have differing colors.

The interfaces and their ordering designations "EnDat22" and "DQ01" are printed on the ID label. Arrows indicate the proper connection.

EnDat22:
Black cable

DQ01:
Green cable

Interfaces

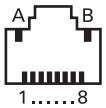
Pin layout of the EIB input

Mating connector
M12 coupling, 8-pin

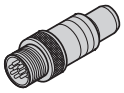
	Power supply				Serial data transfer			
	8	**2**	**5**	**1**	**3**	**4**	**7**	**6**
EnDat	**U_{P2}**	**Sensor** U_{P2}	**0 V**	**Sensor** 0 V	**DATA**	**$\overline{\text{DATA}}$**	**CLOCK**	**$\overline{\text{CLOCK}}$**

Siemens pin layout

RJ45 connector



M12 coupling, 8-pin



	Power supply		Serial data transfer			
	A	**B**	**3**	**6**	**1**	**2**
	1	**5**	**7**	**6**	**3**	**4**
	U_P	**0 V**	**TXP**	**TXN**	**RXP**	**RXN**

Cable shield connected to housing; **U_P** = Power supply voltage

HEIDENHAIN

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This Product Information 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 made.

For more information:

The instructions in the following documents describe the correct and intended operation of the EIB:

- Brochure, Product Information, and Mounting Instructions of the connected encoder
- *Safety-Related Position Measuring Systems* Technical Information: 596632-xx
- Mounting Instructions *EIB 3392 S* 1177939-xx

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