



- Contactless, wear-free sensor system
- Includes Multiple simultaneous interfaces
 - CANopen Safety
 - Highspeed SSI or BiSS
 - Incremental or Comutational HTL/ TTL
- SIL2 DIN EN 61508
- Safe position and safe speed signal
- Resolution up to 2 097 152 steps / 360° <) (21-bit)
- High accuracy Encoder
- Compact version available
 - outer diameter: 50mm, height: 15 mm
 - Custom solutions available



KEY INFORMATION OVERVIEW

DESIGN & FUNNCTION

Recording of the angular position - absolute singleturn transmission - data output plus parameterisation and diagnosis via CANopen.

Highspeed data output via SSI or BiSS or Incremental signalling.

Robust housing manufactured from seawater-resistant aluminium - electrical connection via connector or cable outlet.

Two-part design with active stator and passive rotor.

Simultaneous position output via all interfaces.

FEATURES INTERFACE

The combined use of multiple interfaces allows different requirements to be covered by just one device.

- A complex safety-oriented interface such as CANopen to meet functional safety requirements.
 - CANopen Safety protocol
The CANopen Safety protocol is implemented according to EN 50325-5, CiA DS301 Version 4.2.0, CiA DS406 Version 4.1.0 and CiA DS305.
- A SSI or BiSS interface optimized for low delay for use as a motor feedback sensor.
- An Incremental Interface, where Comutational is also possible serving as a further compatibility bridge for various applications

GENERAL INFORMATION

The aim of this device is to combine the two applications - fast feedback for a motor and safe signals. For this purpose, the available interfaces with different requirements are selected and implemented.

A selection of interfaces optimized for short delays between sensor value recording and output consists of SSI, BiSS and Incremental. These interfaces are not intended to change the parameters of the rotary encoder, but are used purely - as directly as possible - to output the position value. Not all signal post-processing

is available via these interfaces.

The much more complex interfaces such as CANopen not only allow safe output of position and speed, but also parameterization of the encoder. The extended options for post-processing and parameters result in a longer delay between data acquisition and output for these interfaces. The focus of these interfaces lies on the safe output of position and speed and the wide range of options for parameterizing the encoder behaviour via the PLC.

TECHNICAL DATA

ELECTRICAL DATA

Sensor system	inductive
Operating voltage	+ 9 VDC to + 36 VDC (reverse voltage protection)
Power consumption	< 3 W
Switch-on current	< 500 mA
Resolution / Total step count	Absolute (SSI / BiSS / CANopen) 20 bit = 1 048 576 Steps / 360° Incremental or Comutational (HTL / TTL) 16 bit = 65 536 Steps / 360° (All interfaces can be indivually specified in terms of Resolution upon order)
Measuring range	1 revolution (360°)
Absolute accuracy of the position value	At 25°C ± 0.005 % (± 0.018°, ± 65 arcsec) -40°C to +85°C ± 0.01 % (± 0.036°, ± 130 arcsec) (Higher accuracys on request)
Repeatability of the position value	± 0.0005 % (± 0.0018°, ± 6.5 arcsec)
Output code	binary
Code path	CW / CCW
Speed signal	16-bit, with prefix unit: steps / gate time (gate time range adjustable, 10 ... 1000 ms)

CANOPEN INTERFACE PROPERTIES

CiA DS301	CANopen Application Layer and Communication Profile, Version 4.2.0
CiA DS406	CANopen - Device Profile for Encoders, Version 4.1.0
CiA DS305	CANopen - Layer Setting Services and Protocol (LSS)
DIN EN 50325-5: 2016-06	2016-06 Industrial communication sub-system based on ISO 11898 (CAN) - Part 5: Functionally safe communication based on EN 50325-4.
CAN-Interface	according to ISO/DIS 11898
Address setting	over LMT/LSS or SDO
Terminating resistance	to be implemented separately (optionally: circuit board mounted)
Max. transmission length	30 m
Bootloader function	yes
	System prerequisites:
	■ PCAN-USB adapter (www.peak-system.com) including USB cable for PC connection
	■ CANopen tester TWK software, hex file for updating
	■ encoder connecting cable
Number of PDOs	2 Tx
Number of SRDOs	2 Tx (CANopen Safety SIL2)
PDO-Modes	sync, async, cyclic, acyclic
SRDO-Mode	cyclic (CANopen Safety SIL2)
Variable PDO-Mapping	yes
Emergency Message	yes
Heartbeat	yes
No. of SDOs	1 Rx/1 Tx

TECHNICAL DATA

SYSTEM DATA

Duty cycle (rise time) supply voltage	500 ms (10 % to 90 %)
Boot up time	< 500 ms
Maximum usage duration	20 years (higher values on demand)

MECHANICAL DATA

Operating speed	15 000 rpm max.
Acceleration	t.b.d.

ENVIRONMENTAL DATA

Operating temperature range	-40°C to +82°C
Storage temperature range	-40°C to +60°C (due to packaging)
Resistance	To shock 500 m/s ² ; 11 ms (DIN EN 60068-2-27)
	To vibration 250 m/s ² ; 10 to 2000 Hz (DIN EN 60068-2-6)
Protection type	IP66/IP67, IP69K optional (DIN EN 60529)
Salt mist test	Test Kb according to IEC60068-2-52

TECHNICAL DATA

EMC STANDARDS

EN 61000-6-4:2006 + A1:2011	EMC Part 6-4: Generic standards-Emission standard for industrial environments
EN 61000-6-2:2005	EMC Part 6-2: Generic standards-Immunity for industrial environments
EN 61000-4-2:2009	EMC Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
EN 61000-4-3:2006 A1:2008 + A2:2010	EMC Part 4-3: Testing and measurement techniques - Radiated, radio frequency, electromagnetic field immunity test
EN 61000-4-4:2004	EMC Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
EN 61000-4-5:2006	EMC Part 4-5: Testing and measurement techniques - Surge immunity test
EN 61000-4-6:2009	EMC Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-8:2010	EMC Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test. Power frequency magnetic field immunity test: 30 A/m, test criterion A, 100 A/m, test criterion B
EN 61000-4-16:2016	EMC Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbance in the frequency range 0 Hz to 150 kHz
EN 61000-4-29:2000	EMC Part 4-8: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests
IEC 61326-3-2:2018	Electrical equipment for measurement, control and laboratory use - EMC requirements Part 3-2: Immunity for safety-related systems and for equipment intended to perform safety related functions (functional safety) - industrial applications with specified electromagnetic environment

SAFETY DATA

Safety values acc. to **EN 61508** PFH t.b.d.
 SFF t.b.d.
 HFT 0
 SIL SIL2

Max. operating life 20 years (longer operating life on request)

ELECTRICAL CONNECTION

The encoder itself is equipped with a compact modular plug. This connector contains the signals of all interfaces. The interface-typical plugs are provided via an adapter.

Article specific Pinout is provided upon request.

ORDER CODE FORMAT

LBN / HBN	150-100	C	S	S	20	R	S4	V2	S	B	20	IT	10	N	01
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STANDARD VERSION

LBN HBN	LBN Absolute inductive encoder with CANopen Interface HBN Absolute High resolution magnetic encoder with CANopen Interface		
150-100	Size	75-25 100-50 125-75 150-100 175-125 200-150 225-175 250-200	in mm. Approximately to the outer and inner diameter of the sensor unit Individual sizes on request
A	Housing material	A S V C	Aluminium 3.2315 (AlMgSi1) Stainless steel 1.4305 (AISI 303) Stainless steel 1.4404 (AISI 316L) only circuit board
S	Mounting stator	S	Screw connection
S	Mounting rotor	S	Screw connection
20	Resolution	16 17 18 19 20	16 bit = 65 536 Steps / 360° 17 bit = 131 072 Steps / 360° 18 bit = 262 144 Steps / 360° 19 bit = 524 288 Steps / 360° 20 bit = 1 048 576 Steps / 360°
R	Output code	R	Binary code
S4	Profile	C3 S0 S4 M1	CANopen Standard CANopen Safety SIL2, Zertifizierung in Vorbereitung CANopen Safety SIL2, DIN EN 61508 Zertifiziert CANopen Multi sensor interface
V2	Functional Isolation	V2	-Ub = CAN_GND ≠ shield
S	Electrical connection	S	Axial connector
B	High speed Output	B E	BiSS-Interface, absolute position SSI-Interface, absolute position leave blank if output is not needed
20	Resolution High speed output	16 17 18 19 20	16 bit = 65 536 Steps / 360° 17 bit = 131 072 Steps / 360° 18 bit = 262 144 Steps / 360° 19 bit = 524 288 Steps / 360° 20 bit = 1 048 576 Steps / 360°
IT	Incremental Output	IT IH CT CH	Incremental, TTL (ABZ) Incremental, HTL (ABZ) Commutational, TTL (UVW) Commutational, HTL (UVW) leave blank if output is not needed
10	Resolution Incremental Output	5 ... 16	5 bit = 32 Steps / 360° ... 16 bit = 65 536 Steps / 360°
N	Basic Output	N	CANopen-Interface
01	Electrical and mechanical variants*	01	Standard

* The basic versions according to the data sheet bear the number 01. Deviations are identified with a variant number and are documented at TWK.

DOCUMENTATION

DOCUMENTATION

The following documents can be found in the Internet under www.twk.de/en in the documentation area, model LBN / HBN.

- Data sheet 17685
- Manual t.b.d.
- Common connection assignment t.b.d.
(special variants may have a separate connection assignment on request)
- Certificate SIL2 t.b.d.
- CANopen EDS files available on request
- Reach compliant QS 15286
- RoHS compliant QS 13284
- CE Declaration of conformity ZE 12467
- UKCA Declaration of conformity ZE 16569
- Installation instructions t.b.d.
- CRC checksum calculation program www.twk.de/files/CRC-Calculator20.zip

INSTALLATION DRAWINGS

DRAWINGS

LBN: Outer diameter: 150mm, inner diameter: 100mm
Custom Variant: 02

