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Technical Information

GEL SEI10

Incremental Bearingless Rotary Encoders

Compact 2-Channel Hall-Effect High-Speed Speed Sensor

D-51T-SEI10 | Status 2026-08-28

LENORD +BAUER

Finding solutions.
Founding trust.

Motion sensors and integrated drive technology

General Information

- Maintenance-free and wear-free Speed Sensor based on magnetic sensing
- Detection of measurement elements (such as target wheels made of ferromagnetic materials)
- Reliable detection of high rotational speeds down to creeping movements (0 Hz…40 kHz)
- Most reliable rotation direction detection through evaluation of two channels
- Robust and compact stainless steel housing for use in harsh and confined applications



Features

- 2-channel incremental Speed Sensor with differential measurement based on the magnetic principle
- Highest signal quality for reliable evaluation in control systems
- Custom assembly options
- High EMC immunity for interference-free signal transmission in demanding industrial environments
- Meets the strict requirements of DIN EN 50155 and UN-ECE R10
- Highest product quality with optional certification according to DNV, SIL, ATEX, or IECEx
- ASIL B (D) compliant (ISO 26262) or SIL 2 to SIL 3 (IEC 61508) (available upon request with selectable fault detection)

Advantages

- Optimized lifecycle costs
- Maintenance- and wear-free
- Space-saving and compact
- Easy integration
- Easy to install thanks to state-of-the-art calibration technology
- High signal quality
- Cost-effective
- Well-suited for safety applications

Applications

- High-resolution measurement of rotational speed and direction of rotation in motors, chassis, or directly on wheels; particularly robust for heavy-duty applications.
  - On- and off-road industrial vehicles
  - Agricultural vehicles
  - Special-purpose machinery

Do you have specific requirements regarding the flange shape, tube length, number of channels, cable protection, cable outlet, connector assembly, or the EMC design? Please contact us. Our experts can create the optimal solution for your application from an extensive modular system and will be happy to advise you on the most cost-effective custom adaptation.

support@lenord.de or +49(0)208 9963-215

Technical Data

Power Supply	Option A 5 V	Option B 24 V
Electrical Data		
Supply voltage U_B (reverse polarity protected)	5 V DC ± 10% 4.5 ... 5.5 V DC	4.5 ... 24 V DC
Current consumption I_B (no load)	Maximum: 30 mA	Maximum: 70 mA
Frequency range (input frequency)	Maximum: 40 kHz	
Duty cycle	Typical: 50% (Minimum: 40% / Maximum: 60%)	
phase offset (1)	Typical: 90° (Minimum: 70° / Maximum: 110°)	
Mechanical Data		
Housing material / Flange material	Stainless steel (aluminum and brass available upon request)	
Sensor weight (including 2 m cable)	approx. 140 g	
Cable Data		
Cable	halogen-free and with a Shield (2)	
Cable diameter	5.2 ± 0.1 mm	
Cable cross-section	4 × 0.5 mm²	
Minimum bending radius (static/dynamic)	16 mm / 27 mm	
Environmental testing		
Working and operating temperature(3)	-40 °C ... +125 °C	
Storage temperature	-40 °C ... +125 °C	
Dielectric Strength	500 V AC / 750 V DC (DIN EN 50155:2022-06)	
Electromagnetic compatibility	DIN EN 61000-4-2:2009-12 (ESD handling only) DIN EN 61000-4-4:2013-04 (fast transients and bursts) VO043644-21-100941 (UNECE R10) VW TL81000 (2021-19) - Interference Emission Antennas (RE-Test) - Interference Immunity Antenna ALSE - Interference Immunity Current Injection (BCI)	
Salt Spray Test	ISO 9227-11	
Vibration Resistance	ISO 16750-3	
Chemical Exposure	ISO 16750-5	
Degree of protection on the measurement side (4)	IP 67	
Vibration resistance	DIN EN 61373:2011-04 (shock and vibration) DIN EN 60068-2-6:2008-10 (sinusoidal vibration)	
MTTF value	2,000,000 h at 55 °C	
Requirements for the target wheel		
Material	ferromagnetic steel	
Tooth profile	Involute gearing per DIN 867 (others available upon request)	
Width	≥ 10 mm (smaller widths available upon request)	
Module m	1.00 / 1.25 / 1.50 / 1.75 / 2.00	
Air gap	See air gap table	

(1) High-precision phase shift available as an option
(2) Specifications available upon request
(3) Short duration of extreme temperatures
(4) The Degree of protection on the cable entry side depends on the cable gland or cable protection

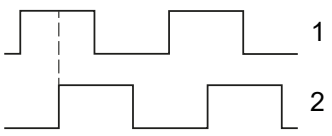
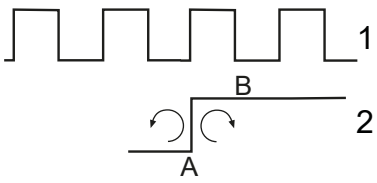
Description

The SEI10 is a sensor for rotational speed and position detection of ferromagnetic target wheels in electric motors for automotive and industrial applications.

The sensor features two independent differential channels. It is capable of eliminating the effects of magnetic and system offsets and detecting false output transitions caused by vibrations in electric motors during startup and at low rotational speeds. Various signal output patterns are available for controlling rotational speed and direction of rotation with high accuracy.

Advanced calibration methods are used to optimize signal offset and amplitude. This makes the sensor highly insensitive to variations in air gap, speed, and temperature.

The sensor is available for a wide range of applications that require two-phase rotational speed and position signals or simultaneous high-resolution rotational speed and direction information. Selectable options for the fault detection mode are available upon request to support ASIL B, ASIL B (D), SIL 2, or SIL 3 applications.

Output Signals and Connectors			
Output Signals		**Supply Voltage**	**Pulse Diagram**
NPN	2 channels, 90° phase offset	4.5 V ... 24 V	
NPNQ	Open collector channel 1 at double the frequency, Track 2 for direction of rotation	4.5 V ... 24 V	 A First switching point after direction change B $V_{OUT\ (HIGH)}$

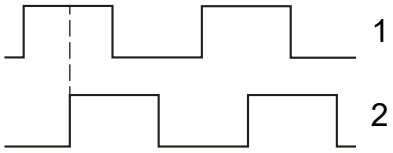
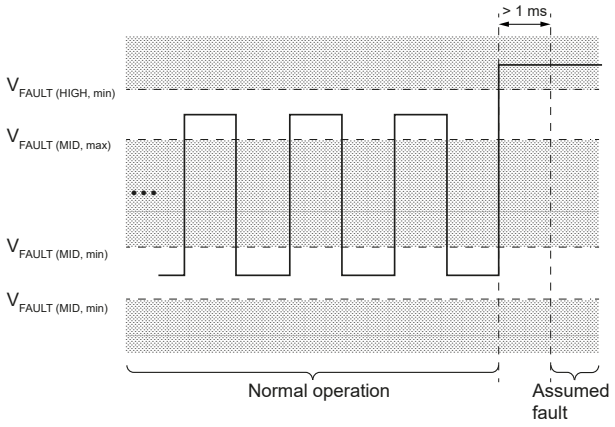
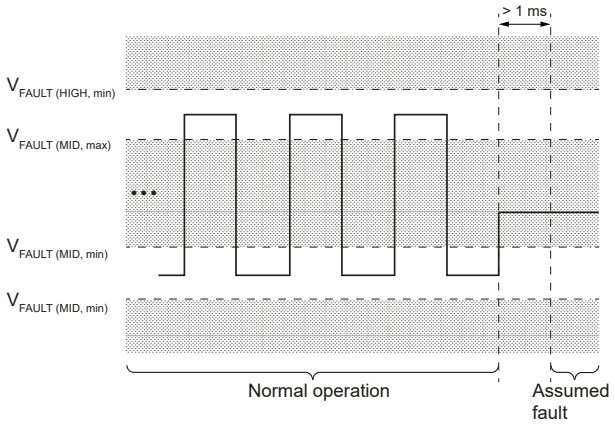
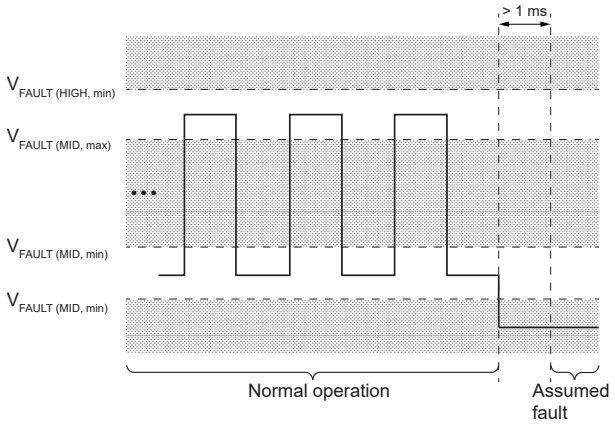
Pin Assignment

Follow the EMC guidelines in the accompanying documents.

Function	Color
Track 2 / Direction of rotation	white
Track 1	Yellow
UB	black
GND	blue

Output Signals

Safety functionality—upon request

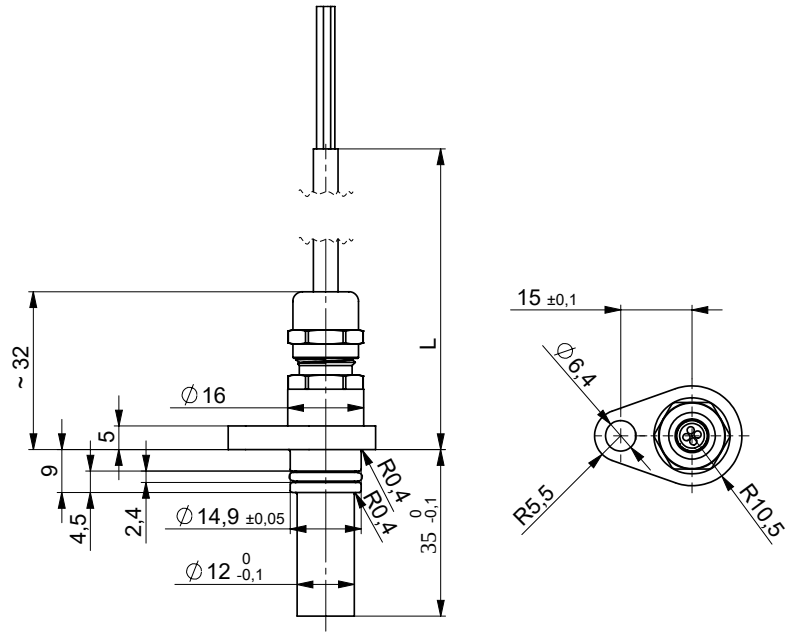
Output signals		Supply voltage	Pulse diagram
NPNA	2 channels, 90° phase offset	Low signal: 0.5 ... 1.25 V High signal: 3.75 V ... 4.5 V	
	Internal diagnostics trigger(1) error conditions. High voltage signal	≥ 4.5 V > 1 ms	
	Error in the IC output control Medium voltage signal	1.25 V ... 3.75 V > 1 ms	
	Output short-circuited to ground Low voltage signal	≤ 0.5 V > 1 ms	
All values apply with a pull-up resistor of 3 kΩ			

(1) The causes of errors can be found in the safety manual

Dimensional Drawing and Drilling Layout

Dimension Drawing

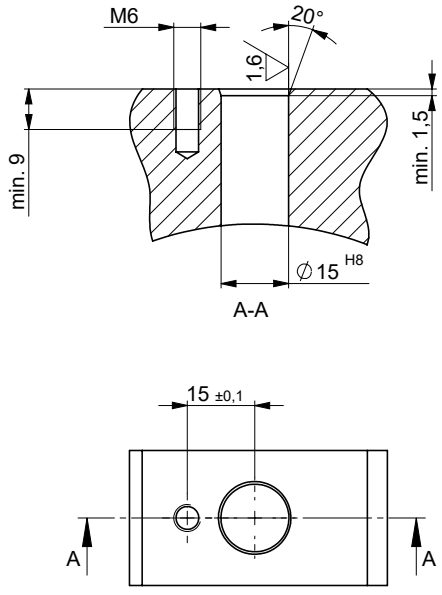
All dimensions in mm; general tolerance DIN ISO 2768 mK



L depends on the Type Code

Drilling pattern

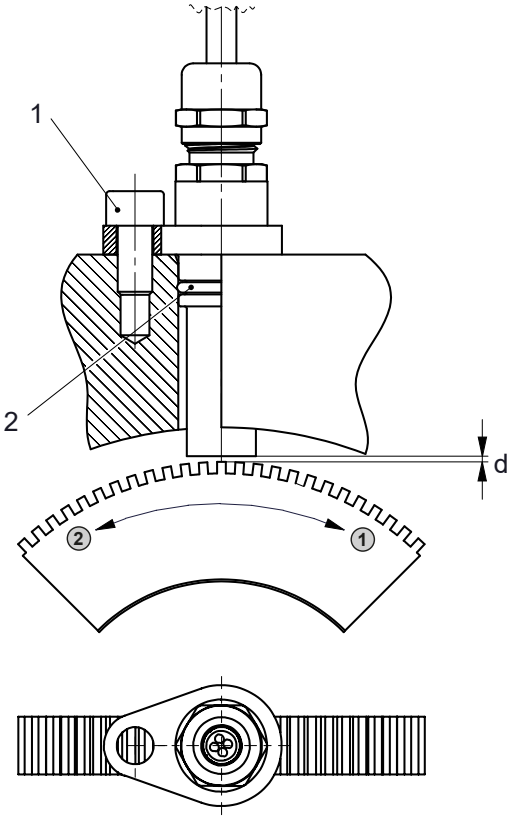
All dimensions in mm, general tolerance DIN ISO 2768 mK



The drilling pattern applies to sensors with a Module of 2.00. If the Target wheel has a different Module, the sensor's mounting angle changes. Corresponding drawings are available upon request.

Installation Drawing

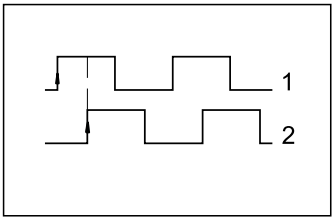
All dimensions in mm; general tolerance DIN ISO 2768 mK



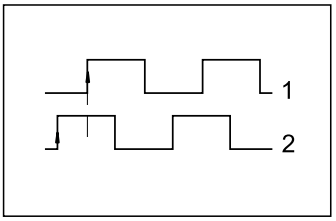
d Air gap (see air gap table)

1 Mounting screw (recommended: M6 x 20, DIN EN ISO 4762)
2 Sealing ring 11.8 x 1.8

Direction-of-rotation signal 1



Direction-of-rotation signal 2



Other mounting orientations (such as rotated by 45°) are available upon request.

The installation drawing applies to sensors with a Module of 2.00. If the Target wheel has a different Module, the sensor's mounting angle changes. Corresponding drawings are available upon request.

Installation Instructions

To ensure proper installation, always follow all notes and instructions in the sensor's accompanying documentation.

- Cable-securing recommendation: 300 mm from the connector
- Tightening torque for M6 screws depends on the threaded hole and fastener material
- The EMC notes in the accompanying documentation must be observed.
- **Shielding Concept:** If the electromagnetic environment requires special shielding concepts, Lenord+Bauer provides extensive knowledge and experience to assist with integrating the sensor into the application's shielding concept.

Air Gap Table

Module	Permissible air gap	Nominal air gap	Max. Permissible Runout
1.00	0.2 … 0.8 mm	0.5 mm	± 0.3 mm
1.25	0.2 … 1.2 mm	0.7 mm	
1.50	0.2 … 1.6 mm	0.9 mm	
1.75	0.2 … 2.0 mm	1.2 mm	
2.00	0.2 … 2.4 mm	1.5 mm	

Type Code GEL SEI10

SEI10	Product code
	Flange mounting
A	Simple screw connection
	Diameter
12	Pipe diameter in mm
	Power supply
A	5 V DC ± 10% (4.5 ... 5.5 V DC)
B	24 V (4.5 ... 24 V DC)
	Module m
100	m = 1.00
125	m = 1.25
150	m = 1.50
175	m = 1.75
200	m = 2.00
	Output
0	NPN: Open collector, channel 1 and channel 2
1	NPNQ: Open collector channel 1 at double the frequency, channel 2 for direction of rotation
2	NPNA: Open-collector channels 1 and 2, error detection for safety applications (1)
	Settings
A	Standard phase setting (2)
	Cable Length L (3)
01000	Cable length 1000 mm
02000	Cable length 2000 mm
	Cable
A	Unshielded cable
B	Cable with shielding (not connected on the sensor side)
	Cable connection
00	Flying lead
01	Connector plug available upon request
	Cable protection
A	Without cable protection
B	WITH cable protection
	Housing Material
E	Stainless steel
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SEI10 _ __ _ ___ _ _ ____ _ __ _ _	◄ **Type Code**

(1) Upon request
(2) Ideal conditions depend on the user's application
(3) Other cable lengths are available upon request

A Y-number is assigned for customer-specific designs. Custom designs are manufactured according to drawings or application descriptions and may differ from the standard technical specifications.

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