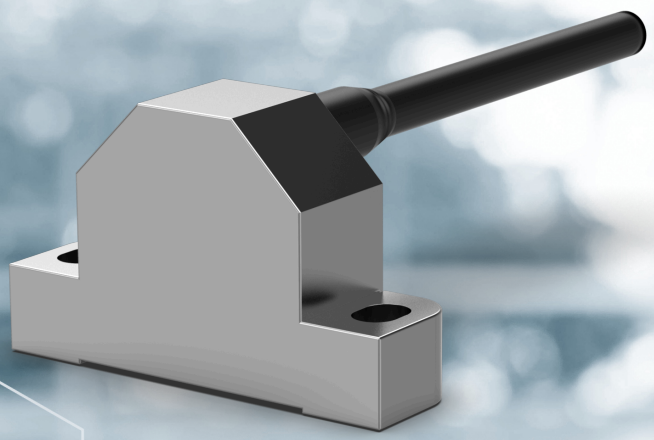
Made in Germany

www.lenord.com



Technical Information

GEL 248

Incremental Bearingless Rotary Encoders

Compact 2-Channel Hall-Effect Speed Sensor with HTL or TTL Output Signals

D-51T-248 | Status 2026-07-07

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 ferromagnetic measuring elements (such as gears, racks, slotted discs, and sprockets)
- Reliable detection of high rotational speeds down to creeping movements (0 Hz…25 kHz)
- Most reliable rotation direction detection through evaluation of two channels
- Extra-compact Rotary Encoders for easy integration into all industrial applications

Features

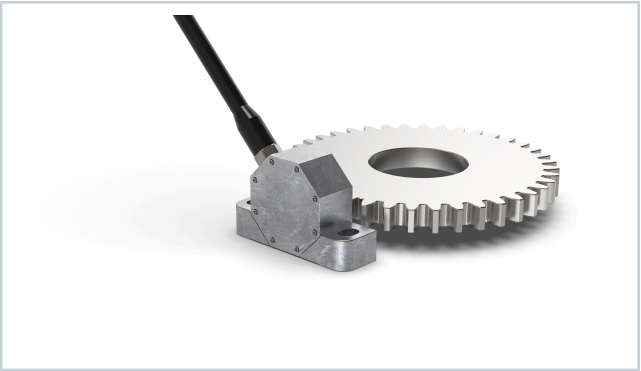
- Incremental, differential-measuring 1-/2-channel Speed Sensor based on the magnetic principle
- Highest signal quality for reliable evaluation in control systems
- Robust and compact die-cast zinc housing
- Suitable for various measuring elements, such as gears, racks, slotted discs, or sprockets
- Measuring elements with a Module of 1.00 to 4.00 are possible
- Highest signal quality for reliable evaluation in control systems

Advantages

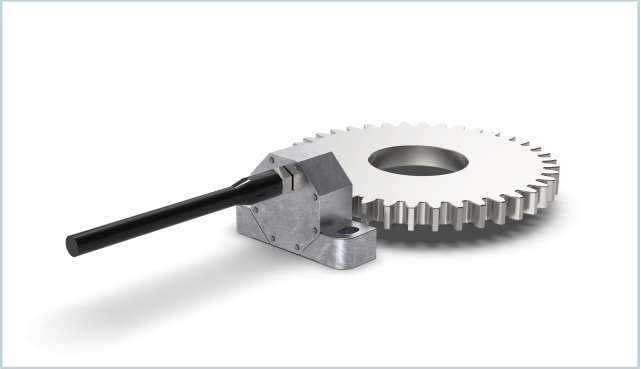
- Optimized lifecycle cost
- Maintenance-free and wear-free
- Space-saving and compact
- Easy integration
- Easy to install
- High signal quality

Applications

- Rotational speed and position measurement on gearboxes, machines, and motors
- Fluid technology
  - Use in hydraulic pumps
  - Use in hydraulic motors



Side cable outlet with screw sleeve



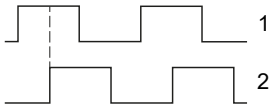
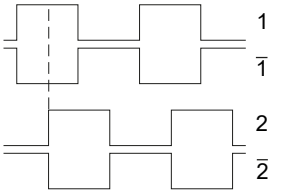
Radial cable outlet with screw sleeve

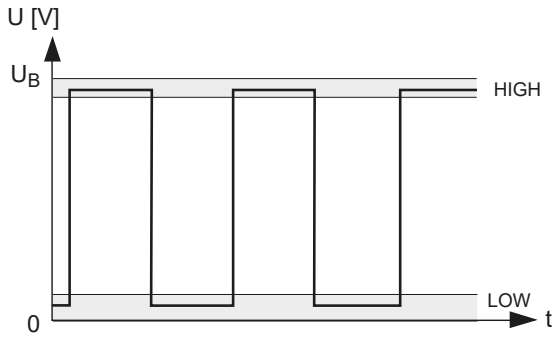
Technical Data: Voltage Output

Signal Pattern	V	X	T
Electrical Data			
Supply voltage U_B (reverse-polarity protected)	10 ... 30 V DC		5 V ± 10%
Current consumption I_B (no load)	≤ 50 mA		
Output signal (short-circuit-proof)	Square-wave signals		
Output level	HTL		TTL
Output signal level (High) (1)	≥ U_B - 2 V		≥ 3.5 V
Output signal level Low (1)	≤ 1.5 V		≤ 0.8 V
Output current per channel	≤ 20 mA		
Frequency range	0 ... 20 kHz		
Duty cycle	50% ± 20% (2)		
phase offset	typ. 90°		
Mechanical Data			
Sensor housing material	Zinc		
Sensor weight (including 2 m cable)	approx. 150 g		
Cable Data			
Cable	halogen-free and with a Shield (3)		
Cable diameter	5.5 ± 0.2 mm	5 - 0.3 mm	5 - 0.3 mm
Cable cross-section	4 × 0.5 mm²	9 × 0.15 mm²	9 × 0.15 mm²
Minimum bending radius (static/dynamic)	11 mm / 28 mm	10 mm / 25 mm	10 mm / 25 mm
Environmental testing			
Working and operating temperature	-40 °C ... +120 °C		
Storage temperature	-40 °C ... +120 °C		
Insulation resistance	500 V DC, > 1 MΩ		
Dielectric strength	500 V AC, 1 minute		
Electromagnetic compatibility Emission Immunity	 DIN EN 61000-6-4; DIN EN 61000-6-3 DIN EN 61000-6-2; DIN EN 61000-6-1		
Degree of protection on the measurement side (4)	IP 68		
Vibration resistance	200 m/s² (EN 60068-2-6)		
Shock resistance	200 m/s² (EN 60068-2-6)		
MTTF	2,000,000 h at 55 °C		
Requirements for the target wheel			
Target wheel material	Ferromagnetic steel		
Tooth profile of Target wheel	Involute gearing per DIN 867		
Width of target wheel	≥ 10 mm		
Permissible eccentricity	≤ 0.3 mm		
Modules m of the Target wheel	1.00 to 4.00 (others available upon request)		
Air gap	*see „**Air gap table**“, page 6*		

(1) Depends on output current and temperature
(2) Applies to operation at rated air gap and with gear teeth per DIN 867
(3) Specifications available upon request
(4) The Degree of protection on the cable outlet side depends on the cable gland or cable protection

Output Signals and Connectors

Signal Pattern		
Output Signals		**Pulse diagram**
V	2 channels, 90° phase offset Supply voltage: 10 ... 30 V DC	
X	2 channels, 90° phase offset, with inverted channels Supply voltage: 10 ... 30 V DC	
T	2 channels, 90° phase offset, with inverted channels Supply voltage: 5 V ± 10%	

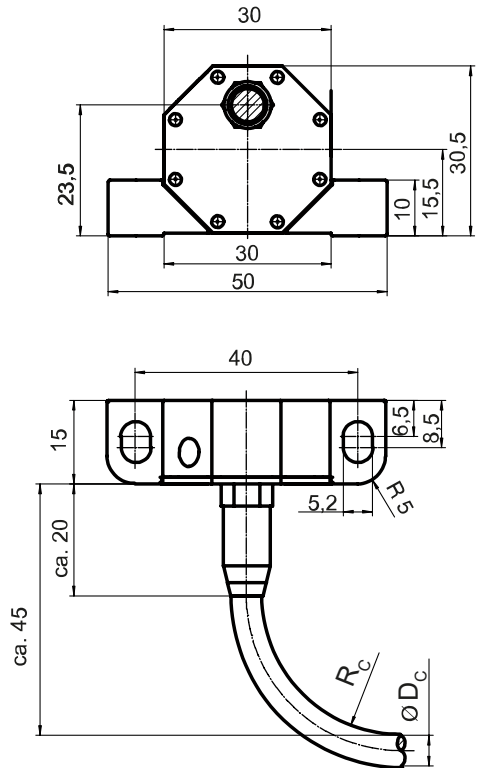
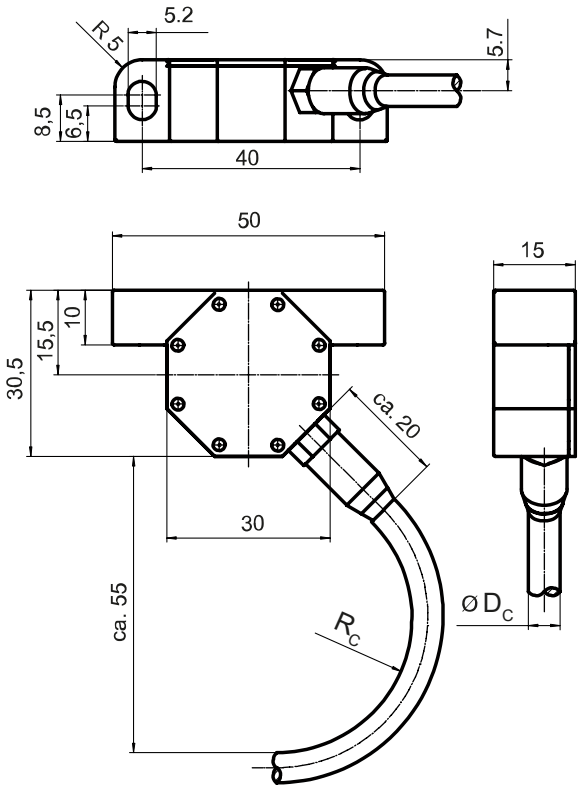
Output signal level – voltage output	
	Signal Patterns **V**, **X** U_B 10 ... 30 V DC High ≥ UB - 2 V Low ≤ 1.5 V Signal **Pattern T** U_B 5 V ± 10% High ≥ 3.5 V Low ≤ 0.8 V

Pin Assignment

Follow the EMC guidelines in the accompanying documents.

Flying lead			
Signal	**V**	**X**	**T**
Channel 1	YE	YE	YE
Channel 2	WH	WH	WH
Channel 1 inverted		BK	BK
Channel 2 inverted		BN	BN
GND (0 V)	BU	BU	BU
+U_B	RD	RD	RD
Cables / Shields	1 / 1	1 / 1	1 / 1
Cable shield directly attached to the sensor or, optionally, capacitively attached. Wire color codes: **BK** black, **BN** brown, **BU** blue, **GY** gray, **PK** pink, **RD** red, **WH** white, **YE** yellow			

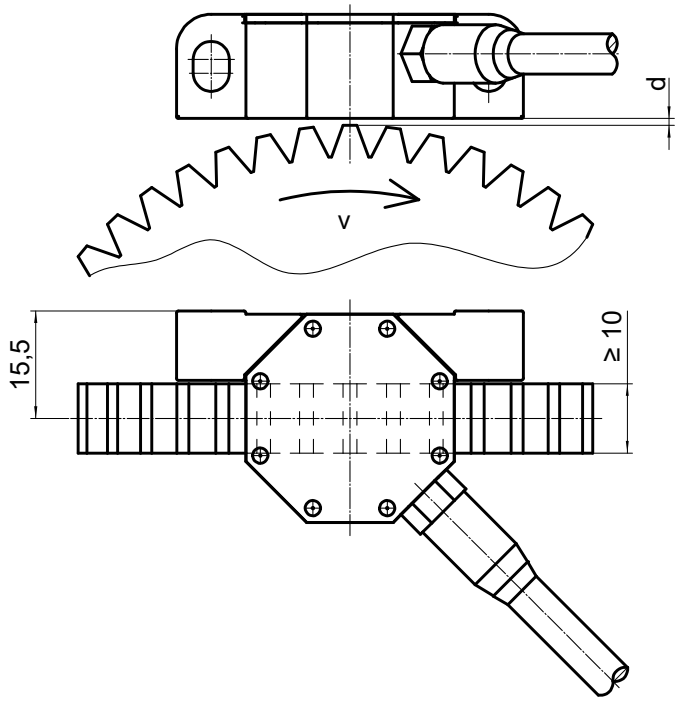
Dimension Drawings

Dimensions	
All dimensions in mm; general tolerance DIN ISO 2768 mK	
Cable outlet A (Radial cable outlet with screw sleeve)	**Cable outlet B** (Side cable outlet with screw sleeve)
	

R_C	Minimum dynamic bending radius (see Cable Data)
ø D_C	Cable diameter (see Cable Data)

Installation Drawing

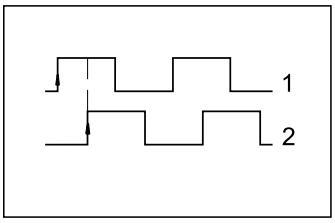
All dimensions in mm; general tolerance DIN ISO 2768 mK



d Air gap (see air gap table)

v Direction of rotation of the Target wheel (forward)

Signal for direction of rotation 1



Air gap table

Module (m)	Permissible air gap d
1.00	0.2 … 1.2 mm
1.25	0.2 … 1.2 mm
1.50	0.2 … 1.6 mm
1.75	0.2 … 1.6 mm
2.00	0.2 … 2.0 mm
2.25	0.2 … 2.0 mm
2.50	0.2 … 2.6 mm
3.00	0.2 … 2.6 mm
3.50	0.2 … 2.8 mm
4.00	0.2 … 2.8 mm

Despite its high immunity to interference, the sensor must be integrated into a shielding concept to ensure EMC compliance.

Follow the EMC guidelines in the accompanying documentation.

Type Code GEL 248

248	Product Type					
	Signal Pattern					
	V	2-channel square-wave signals with 90° phase offset, HTL				
	X	2-channel square-wave signals with a 90° phase offset and their inverse signals, HTL				
	T	2-channel square-wave signals with a 90° phase offset and their inverted signals, 5 V TTL / RS-422				
		Output circuit				
		2	Push-pull output stage			
			Module			
			M100	Module 1.00		
			M125	Module 1.25		
			M150	Module 1.50		
			M175	Module 1.75		
			M200	Module 2.00		
			M225	Module 2.25		
			M250	Module 2.50		
			M300	Module 3.00		
			M350	Module 3.50		
			M400	Module 4.00		
				Cable length in meters		
				01	1 m	
				02	2 m	
				05	5 m	
				10	10 m	
					Cable outlet	
					A	radial, with screw sleeve
					B	side, with screw sleeve
▼	▼	▼	▼	▼	▼	
248	_	_	_ _ _ _	_ _	_	◄ **Product code**

Custom Special Designs

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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