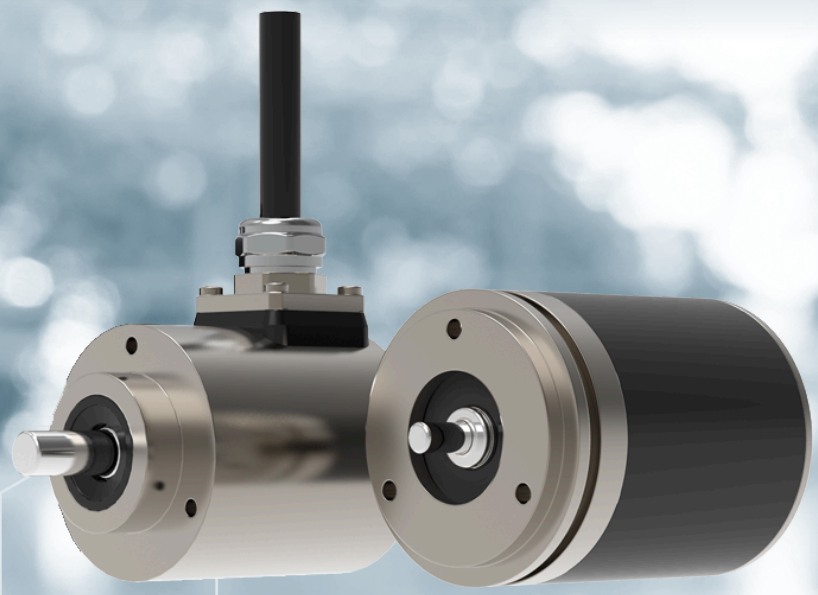
Made in Germany

www.lenord.com



Technical Information

GEL 207/208

Incremental encoder

for heavy duty applications

D-02T-207-208 | Date of issue 2025-09-15

LENORD +BAUER

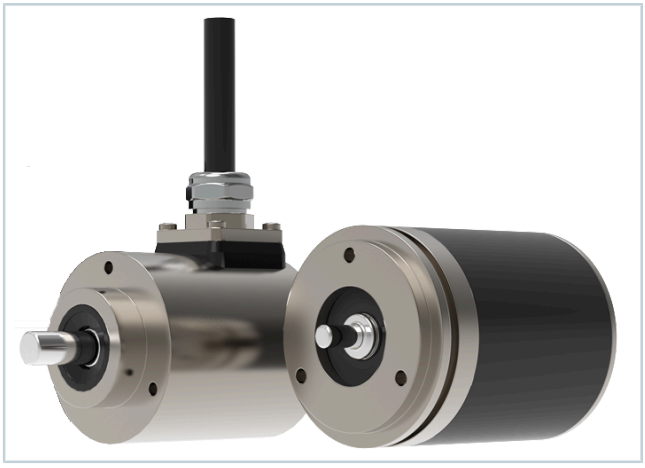
Finding solutions. Founding trust.

Motion sensors and integrated drive technology

General

- High-resolution magnetic incremental rotary encoders with robust mechanical design.
- Worldwide proven technology in various applications, suitable for harsh industrial environments
- All types available with radial and axial connector or cable outlet.
- High reliability and long service life characterize the magnetic incremental encoders

For heavy duty applications
GEL 207 With synchronizing flange, shaft diameter and length selectable
GEL 208 With clamping flange, shaft diameter and length selectable



Properties

- High resolution up to 136192 pulses per revolution
- Reference signal
- Cable or connector outlet, axial or radial
- Various shaft diameters from 6 mm to 16 mm
- High electromagnetic compatibility

Advantages

- Absolute operational reliability even in case of high humidity (condensation) and frequent change of ambient temperature
- Withstands extreme impacts and vibration
- Resistant to dirt and oil
- Long-term stable temperature behavior
- No ageing of the magnetic sensor technology

Field of application

- Heavy industry
- Paper and packaging machines
- Transportation and storage systems
- Machines for processing steel, wood, stone, plastics, etc.
- Bottling lines

Description

Design

The magnetic incremental rotary encoders of the GEL 207 und GEL 208 series are based on contactless magnetic scanning of a target wheel integrated in the encoder. The resilient steel housing with a diameter of 58 mm is electroplated and black chromatized. The rotary encoders are available with radial or axial connector or cable outlet.
The maximum angular acceleration is extremely high, as the encoder shaft and the target wheel are pressed together form-fit and form a mechanical unit. The encoder shaft should be connected to the drive shaft via a flexible coupling so as not to exceed the permissible shaft load.
Optionally, the rotary encoders can include, for example, a condensed water outlet or additional protection measures against humidity and vibration of the electronic parts for harsh environmental conditions.

Sensing principle

The differential, magnetic field-dependent sensors scan without contact the tooth structure of the target wheel and output a sine and cosine voltage. The integrated evaluation electronics in ASIC and SMD technology converts the analog sensor signals into incremental output signals.
Square-wave signals are output with different signal patterns which provide a clear direction detection and high data reliability. Additionally, a reference pulse can be output.

Available number of pulses

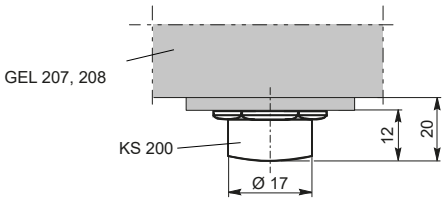
The high-resolution rotary encoders of the series GEL 207 and 208 are available with pulse numbers ranging from 37 to 136,192 pulses per revolution.
The realizable pulse numbers can be found online atwww.lenord.deand are available upon request.

Protection against humidity

The encoder electronics are coated with a highly effective protection against humidity, salt water atmosphere and corrosive vapors. This ensures years of trouble-free operation even in harsh environments.

Condensed water outlet

Water can accumulate in the encoder if condensation is present repeatedly. This water can drain off through the condensed water outlet. When installing the encoder, make sure that the outlet points downwards. The degree of protection goes down to IP 64.



The position of the condensed water outlet must be specified when ordering.

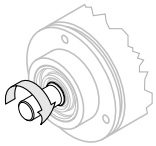
Vibration protection

By additionally fixing mechanical parts with special plastic, vibrations of the electronics and connection technology in the encoder are prevented. This enables flawless continuous operation even under extreme vibration and shock loads.

Output signals

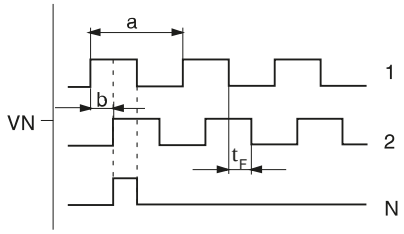
Signal pattern

The signal patterns are shown for clockwise rotation, that means, looking at the encoder shaft, the shaft rotates clockwise.



Signal pattern V, VN

The “V” signal pattern refers to two tracks with square-wave signals offset by 90°. On the third track N a reference signal of defined length is output once per revolution. Reference signals of other lengths are available upon request.



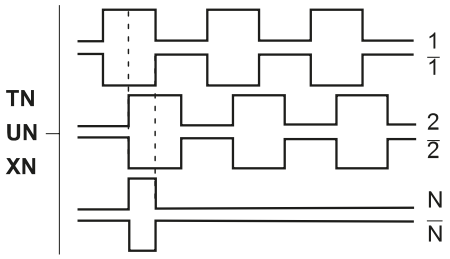
a	360° electrical
b	90° phase offset
t_F	Time between edges (at an output frequency of 200 kHz the time between edges is t_F > 0.6 µs)

	U_B (1)	U_{out}(2)
V, VN	10 to 30 V DC	HTL

(1) Supply voltage
(2) Output signal level

Signal pattern T, TN, U, UN, X, XN

The two pulse outputs and the reference signal are also output as inverse signals.



	U_B (1)	U_{out}(2)
T, TN	+ 5 V DC ± 5 %	TTL
U, UN	10 to 30 V DC	TTL
X, XN	10 to 30 V DC	HTL

(1) Supply voltage
(2) Output signal level

Output signal level

The signal patterns V, VN, X and XN have HTL levels, the signal patterns T, TN, U and UN have TTL levels. All outputs have a push-pull power amplifier and have sustained short circuit protection.
The peak output current for discharging the cable capacitance is 100 mA.

Maximum cable lengths

Signal pattern		at output frequency f of						
		5	**10**	**20**	**50**	**100**	**200**	**[kHz]**
T, TN, U, UN	TTL (U_{out} = 5 V)	200	200	200	200	145	72	[m]
V, VN	HTL (at U_{out} = 20 V)	200	200	200	80	40	20	[m]
X, XN	HTL (at U_{out} = 20 V)	200	200	100	40	20	10	[m]

Technical data voltage output

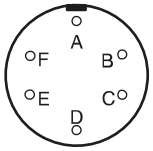
Signal pattern	T, TN	U, UN	V, VN	X, XN
General				
Resolution (pulses per revolution)	37 to 136192			
Measuring range	36 to 0.003°			
Error limit	0.14°(1)			
Electrical data				
Supply voltage	5 V DC ± 5 %	10 to 30 V DC		
Power consumption	≤ 1.0 W	≤ 1.3 W		
Output frequency	≤ 200 kHz(2)			
Output signal level	TTL		HTL	
Output level high	≥ U_B - 1.00 V at I = 10 mA; ≥ U_B - 1.20 V at I = 30 mA	4.00 V atI = 10 mA; ≥ 3.85 V atI = 30 mA	≥ U_B - 1.80 V at I = 10 mA; ≥ U_B - 2.20 V at I = 30 mA	
Output level low	≤ 0.75 V at I = 10 mA; ≤ 1.00 V at I = 30 mA		≤ 1.15 V at I = 10 mA; ≤ 1.55 V at I = 30 mA	
Environmental tests				
Working temperature	0 °C to +70 °C -20 °C to +85 °C (optional)			
operating temperature	-20 °C to +85 °C			
Storage temperature	-40 °C to +120 °C			
Degree of protection	IP 65			
Vibration resistance option (DIN IEC 600068, Part 2-6)	100 m/s², (10 to 2000 Hz, 10 frequency cycles			
Shock resistance option (DIN IEC 60068, Part 2-27)	1000 m/s², 11 ms			
Electromagnetic compatibility	EN 61000-6-1 to 4			
Insulation resistance	500 V DC, > 1 MΩ			
Voltage sustaining capability	500 V AC, 1 minute			
Mechanical data				
Shaft diameter	see type code			
Weight	500 g			
Maximum operating speed	10,000 r.p.m.			
Moment of inertia of rotor	7 x 10^{-5} kgm²			
Operating torque	0.03 Nm (< 0.1 Nm(3))			
Starting torque	0.05 Nm (0.1 Nm(3))			
Permissible shaft load (Point of application 15 mm in front of flange system)	200 N axial, 200 N radial			
Bearing life at max. shaft load at half shaft load	 2000 × 10^6 revolutions 12600 × 10^6 revolutions			

(1) Value at maximum resolution, values for lower resolutions upon request
(2) more details upon request
(3) with option ball bearing cover plate (IP 50)

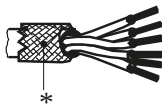
Assignment

Assignment for signal pattern V, VN

Connector outlet – Option A or B

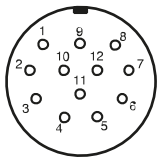
6-pin connector		Signal	Description
	F	U_B	Operating voltage
	A	GND	Weight
	D	N	Reference signal
	B	1	Track 2
	C	2	Track 1
Mating connector GG 66 contained in scope of supply			

Cable outlet – Option F or G

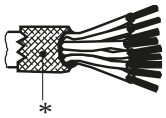
6-core cable		Signal	Description
	yellow	U_B	Operating voltage
	green	GND	Weight
	gray	N	Reference signal
	white	1	Track 2
	brown	2	Track 1
* Screening on encoder side not connected			

Assignment for signal pattern T, TN, U, UN, X, XN

Connector outlet – Option C or D

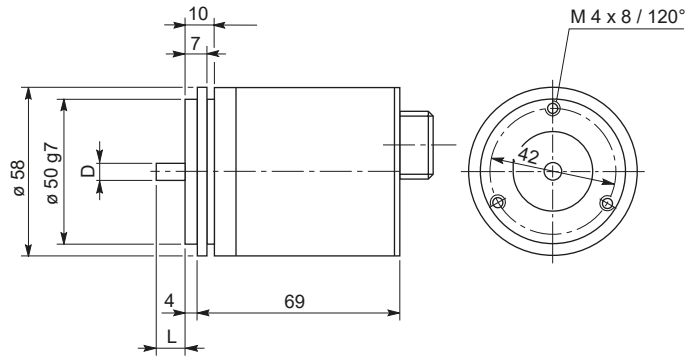
12-pin connector		Signal	Description
	12	U_B	Operating voltage
	10	GND	Weight
	3	N	Reference signal
	4	/N	Reference signal, inverted
	8	2	Track 2
	1	/2	Track 2, inverted
	5	1	Track 1
	6	/1	Track 1, inverted
Mating connector GG 66 contained in scope of supply			

Cable outlet – Option H or I

10-core cable		Signal	Description
	red	U_B	Operating voltage
	blue	GND	Weight
	violet	N	Reference signal
	yellow	/N	Reference signal, inverted
	pink	2	Track 2
	black	/2	Track 2, inverted
	white	1	Track 1
	brown	/1	Track 1, inverted
Mating connector GG 66 contained in scope of supply			

Dimensional drawings

Dimensional drawing GEL 207 – Rotary encoder with synchro flange, connector outlet axial



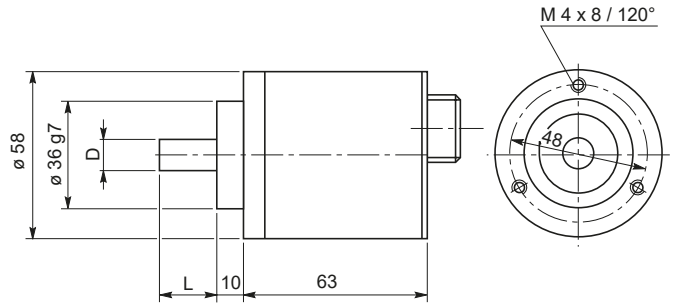
Dimensions in mm

Shaft diameter/length

Option	D h6	L
0	6	10
2	8	27
4, 5, (1)	10	20
6, 7, (1)	12	27

Option**0**= standard
(1) shaft mit Woodruff key

Dimensional drawing GEL 208 – Rotary encoder mit clamping flange, connector outlet axial



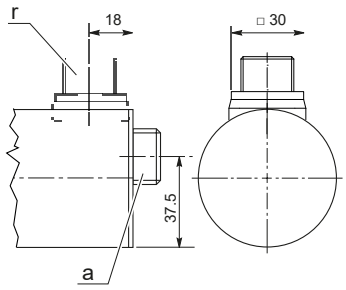
Dimensions in mm

Shaft diameter/length

Option	D h6	L
1	6	10
0, 5	10	20
2	8	27
6, 7, (1)	12	27

Option**0**= standard
(1) shaft mit Woodruff key

Dimensional drawing Connector outlet, axial or radial

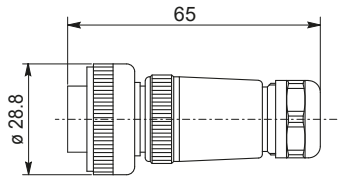


a Axial connector outlet
r Radial connector outlet

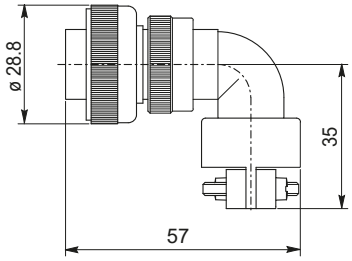
Dimensions in mm

Dimensional drawings Mating connectors

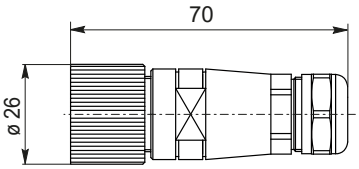
BS1111= GG 66 6-pin, straight



BS1113= GW 66 6-pin, angled



FS1139= GG 126 12-pin, straight



Dimensions in mm

Type code GEL 207/208

2									
	Type								
	07	with synchro flange							
	08	with clamping flange							
		Signal pattern							
		T	2 square-wave signals phase-shifted by 90° and their inverse signals (TTL)						
		U	2 square-wave signals phase-shifted by 90° and their inverse signals (TTL)						
		V	2 square-wave signals phase-shifted by 90° (HTL)						
		X	2 square-wave signals phase-shifted by 90° and their inverse signals (HTL)						
			Reference signal						
			-	without reference signal					
			N	with reference signal					
				Number of pulses					
				XXXXXX	Number of pulses per revolution (37 to 136192)				
					Connector/Cable outlet				
					A	6-pin connector, axial			
					B	6-pin connector, radial			
					C	12-pin connector, axial			
					D	12-pin connector, radial			
					F	6-core cable, axial			
					G	6-core cable, radial			
					H	10-core cable, axial			
					I	10-core cable, radial			
						Shaft diameter/length			
						0	Standard GEL 207: d = 6 mm, L = 10 mm GEL 208: d = 10 mm, L = 20 mm		
						1	d = 6 mm, L = 10 mm (only GEL 208)		
						2	d = 8 mm, L = 27 mm		
						4	d = 10 mm, L = 20 mm (only GEL 207)		
						5	d = 10 mm, L = 20 mm Woodruff key		
						6	d = 12 mm, L = 27 mm		
						7	d = 12 mm, L = 27 mm Woodruff key		
							Additional protective measures		
							0	without additional protective measures	
							1	Humidity protection	
							2	Vibration protection	
							3	Humidity and vibration protection	
							4	Humidity protection and condensed water outlet	
							5	Humidity protection and condensed water outlet and vibration protection	
								Temperature range	
								1	0 °C to +70 °C
								3	-20 °C to +85 °C
▼	▼	▼	▼	▼	▼	▼	▼	▼	
2	__	_	_	_____	_	_	_	_	**◀Product code**

A Y-number is assigned for a customer-specific version. A special version is manufactured according to drawing or application description and may deviate from the standard technical specifications.

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