Absolute Encoder GEL 15x

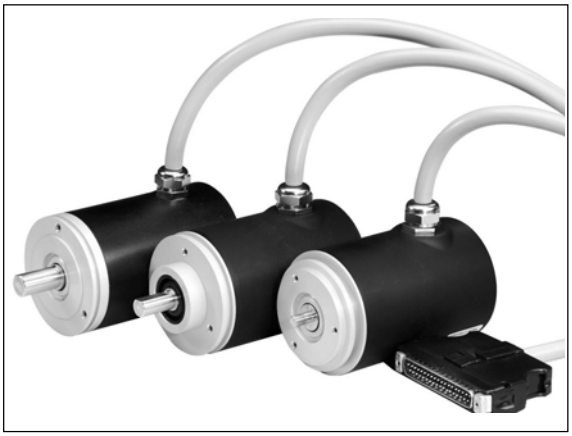
parallel interface

Technical information

SENSORLINE

LENORD+BAUER

version 09.06



General

In contrast to incremental rotary encoder, absolute encoders supply unambiguous code information in each angle position. The advantage of this method is that even after a power failure, the actual position is sent to the evaluation electronics. Measurement errors caused by missing pulses and cumulative errors are also eliminated.

- Single-turn: 4096 measurement increments per 360 ° (optional: 8192)
- Multi-turn: 4096 measurement increments per 360 ° (optional: 8192) with max. 4096 revolutions
- Permissible shaft load 250 N (axial and radial)

Design

The flange and housing consist of anodised aluminium. A 12 mm ball bearing with a sealing ring is used for the shaft bearing. Three different flange versions are available with GEL 153/157/159 (singleturn) and GEL 152/154/158 (multiturn).

Measurement principle

The encoder works on the optical measuring principle. The code disk is scanned via GaAlAs diodes. By using a special opt-array with a reference transistor (this keeps the load of the LED controllable) and ASICs developed by the company it has been possible to further improve long-term reliability.

Code types

The encoders supply their information in the Gray code.

Internet: http://www.lenord.de
E-Mail: info@lenord.de
Tel.: +49 (0)208 9963-0
Fax: +49 (0)208 676292
Lenord, Bauer & Co. GmbH
Dohlenstrasse 32
46145 Oberhausen, Germany

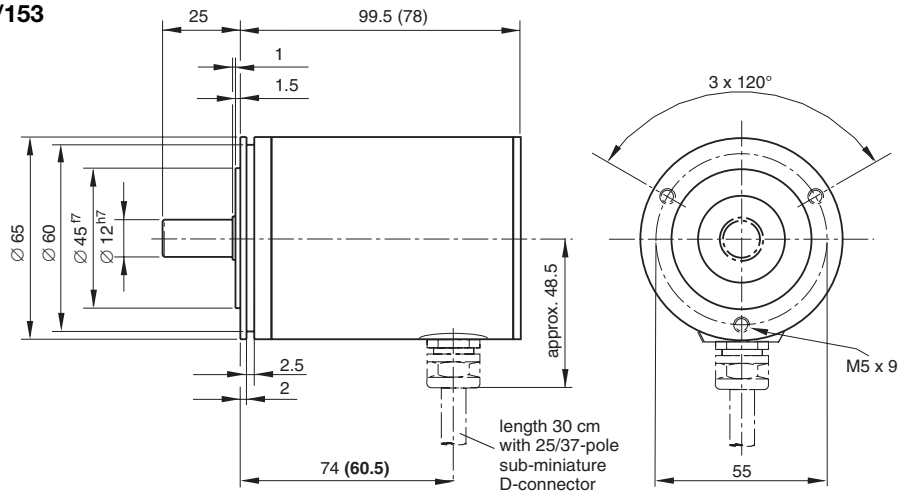
Technical data

Electrical data	
Sensor system	GaAlAs diode photo-array, photo-transistor array
Measurement increment deviation	$\leq \pm$ 2' 38"
Parallel outputs	ground-switching, positive-switching
Serial outputs (SSI)	RS 422 / 485
Output frequency	max. 10 kHz
Output code	Gray
Operating voltage range	+ 11 V ... + 30 V DC
Operating current	single-turn: 50 mA, typical, max. 70 mA multi-turn: 60 mA, typical, max. 80 mA
EMC, electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4
Mechanical data	
Operating speed	3000 rpm max. (continuous) 4000 rpm max. (short term) at max. shaft load and -20°C ... +60°C operating temperature, higher values are possible at low load.
Angle acceleration	10^5 rad/s^2 max.
Operating torque	$\leq$ 5 Ncm at a speed of 1000 rpm 8 Ncm at a speed of 1000 rpm (GEL 154/157)
Starting torque	$\leq$ 1 Ncm, 4 Ncm (GEL154/157)
Permissible shaft load	250 N axial and radial
Bearing life	10^9 revolutions
Weight	approx. 0.5 kg (GEL 153 /157 /159) approx. 0.7 kg (GEL 152 /154 /158)
Ambient data	
Operating temperature	-20°C ... +60°C (optionally -40°C ... +85°C)
Storage temperature range	-25°C ... +70°C
Permissible relative humidity	85 % without condensation
Shock resistance	200 m/s^2 ; 11 ms (DIN IEC 68)
Vibration resistance	5 Hz ... 1000 Hz; 100 m/s^2 (DIN IEC 68)
Protection type (DIN 40050) GEL 152/153/158/159 GEL 154/157	 IP 65 (Nilos ring) IP 66 (sealing ring)

Dimensions

Three different flange versions are available with GEL 153/157/159 (singleturn) and GEL 152/154/158 (multiturn).

Dimension GEL 152/**153**



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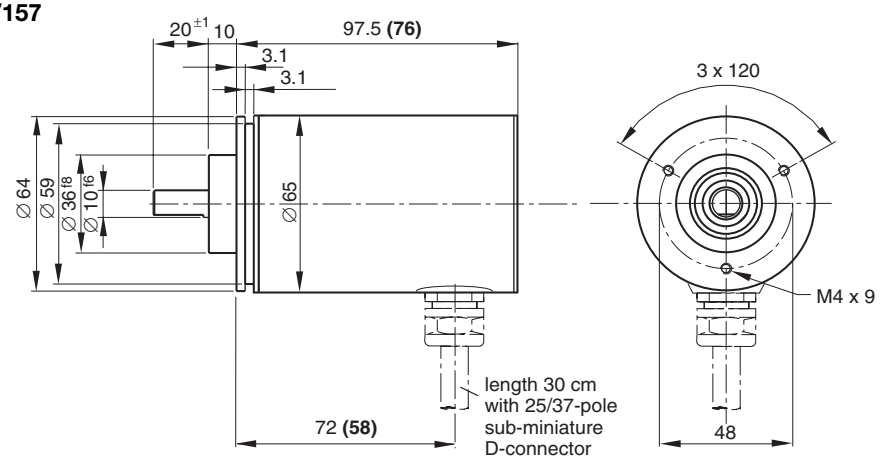
Dimension GEL 154/**157**



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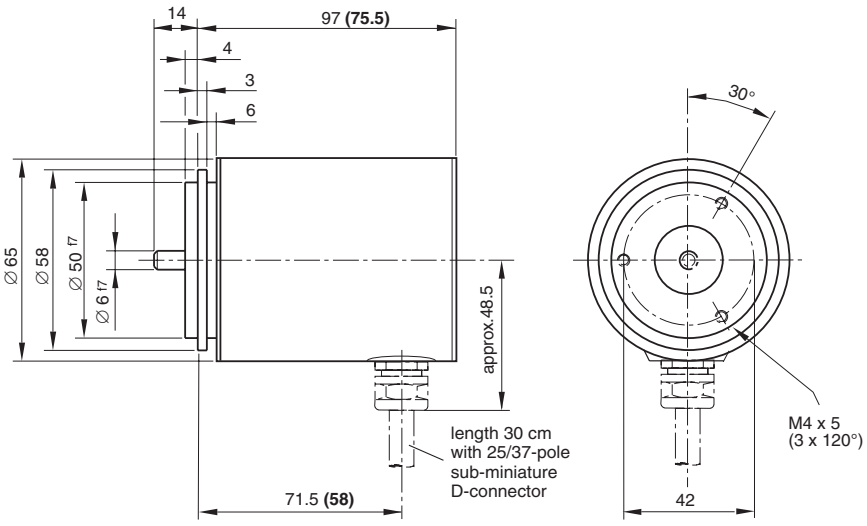
Dimension GEL 158/**159**



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Lenord, Bauer & Co. GmbH
Dohlenstrasse 32
46145 Oberhausen, Germany
Tel.: +49 (0)208 9963-0
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Available versions
Input and output circuits

Available versions
Single-turn encoders

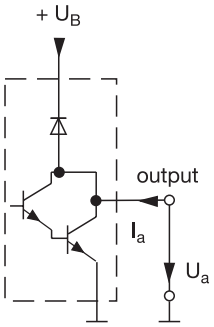
Type	Output circuit	Scope of delivery contains
GEL 153 G 4096 A **0**5	**0** (ground-switching)	37-pole D-sub-miniature mating connector
GEL 157 G 4096 A **0**5		
GEL 159 G 4096 A **0**5		
GEL 153 G 4096 A **2**5	**2** (positive-switching)	
GEL 157 G 4096 A **2**5		
GEL 159 G 4096 A **2**5		

Available versions
Multi-turn encoders

Type	Output circuit	Scope of delivery contains
GEL 152 G 4096 N **0**5	**0** (ground-switching)	25-pole D-sub-miniature mating connector
GEL 154 G 4096 N **0**5		
GEL 158 G 4096 N **0**5		
GEL 152 G 4096 N **2**5	**2** (positiv-switching)	
GEL 154 G 4096 N **2**5		
GEL 158 G 4096 N **2**5		

Output circuit 0

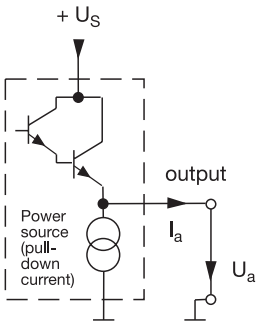
Open Collector
Darlington
(ground-switching)



$I_A \leq 50$ mA

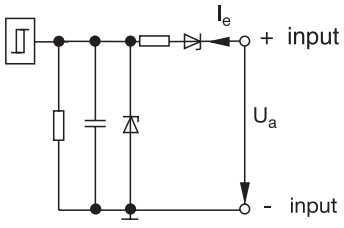
Output circuit 2

Open Emitter
Darlington
(positive-switching)



$I_A \leq 20$ mA

Input circuit E1
Function active „high" input

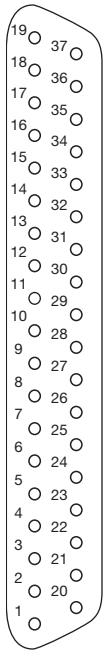


log 0 < 6 V DC
log 1 = 11 ... 24 V DC

Pin layout

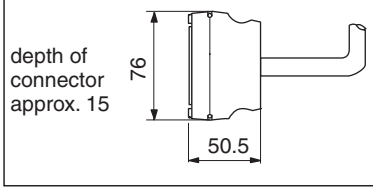
Multi-turn encoder
Connection assignment 37-pole, sub-miniature connector (IP 30)

Soldered side
(socket part)



1 to 24	*Bit 1*	lowest significant bit LSB
	Bit 24	most significant bit MSB
25	*Bit 25*	MSB with option 8192 increments / revolution
26	*Not occupied*	
27	*Not occupied*	
28	*Not occupied*	
29	*Not occupied*	
30	*Not occupied*	
31	*Latch*	Input circuit E1
32	*Enable*	Input circuit E1
33	*CW/CCW*	CW: with - U_B = 0 V connected (Pol 25) CCW: with + U_B = + 11 ... 30 V DC connected (Pol 24) or not connected
34	*0 V*	Reference potential
35	*Signal voltage*	5 ... 30 V (+U_S) only with output circuit 2
36	*Supply voltage*	11 ... 30 V (+U_B)
37	*Supply voltage*	0 V (-U_B) jumpered with Pole 34

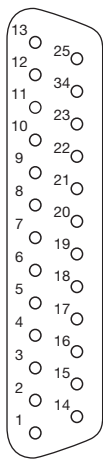
DB 37S



CCW = Rising code with clockwise rotation of the shaft
CCW = Rising code with counter-clockwise rotation of the shaft

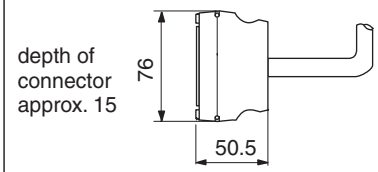
Single-turn encoder
Connection assignment 25-pole, sub-miniature connector (IP 30)

Soldered side
(socket part)



1	*Bit 1*	least significant bit LSB
2	*Bit 2*	
3 to 10	*Bit n*	
11	*Bit 11*	
12	*Bit 12*	most significant Bit MSB
13 bis 18	*Bit 13*	MSB with option 8192 increments / revolution
	Not occupied	
19	*Latch*	input circuit E1
20	*Enable*	input circuit E1
21	*CW/CCW*	CW: with - U_B = 0 V connected (Pol 25) CCW: with + U_B = + 11 ... 30 V DC connected (Pol 24) or not connected
22	*0 V*	reference potential
23	*Signal voltage*	5 ... 30 V (+U_S) only with output circuit 2
24	*Supply voltage*	11 ... 30 V (+U_B)
25	*Supply voltage*	0 V (-U_B) jumpered with contact 22

DB 25S



CCW = Rising code with clockwise rotation of the shaft
CCW = Rising code with counter-clockwise rotation of the shaft