

# Data Sheet GEL 15X

- Absolute encoder (serial interface)



01/01



## General

In contrast to incremental rotary encoders, absolute encoders supply unambiguous information in each angle position. The advantage of this process is that the actual position is always transmitted to the evaluation electronics even after a power failure. Measuring errors caused by faulty impulses and accumulating errors are excluded in addition.

- Single-turn: 4096 measuring steps per 360°  
(optional: 8192)
- Multi-turn: 4096 measuring steps per 360°  
(optional: 8192) with max 4096 rpm
- Permitted shaft load 250 N (axially and radially)

## Design

Flange and housing made of anodised aluminium. A 12-mm ball bearing with a sealing ring is used as the shaft bearing. We differentiate between clamping flange and synchronising flange.

## Measuring principle

The absolute encoders work on the optical measuring principle. The code disk is scanned via GaAlAs diodes. By using a special opto-array with a reference transistor (the load on the LED can be controlled here) and ASICs developed for this purpose it was possible to improve long-term reliability still further.

## Code types

The absolute encoders supply their information in Gray code.

# Technical data

<b>Electrical data</b>	
Sensor system	GaAlAs diode photo array, phototransistors
Measuring step deviation	$\leq \pm 2' 38''$
Output frequency	max. 10 kHz
Output code	Gray
Operating voltage range	+ 11 V ... + 30 V DC
Operating current	Single-turn: 60 mA, typical max. 80 mA Multi-turn: 70 mA, typical max. 90 mA
Electromagnetic compatibility EMC	Emitted interference DIN EN 50081-2 Interference immunity DIN EN 50082-2
<b>Mechanical data</b>	
Operating speed	3.000 min <sup>-1</sup> max. (permanent) 4.000 min <sup>-1</sup> max. (short-time) At max. shaft load and 20°C ... +60°C working temperature. Higher values possible with lower loads.
Angular acceleration	10 <sup>5</sup> rad/s <sup>2</sup> max.
Inertia torque (rotor)	45 gcm <sup>2</sup>
Operating torque (at speed of 1000 min <sup>-1</sup> )	$\leq 5$ Ncm (GEL 152/153/158/159), 8 Ncm (GEL 154/157)
Starting torque	$\leq 1$ Ncm (GEL 152/153/158/159), 4 Ncm (GEL154/157)
Approved shaft load	250 N axial and radial
Bearing service life	10 <sup>9</sup> revolutions
Weight	approx. 0.5 kg (GEL 153 /157 /159) approx. 0.7 kg (GEL 152 /154 /158)
<b>Environmental data</b>	
Working temperature range	-20°C ... +60°C (option -40°C ... +85°C)
Storage temperature range	-25°C ... +70°C
Permitted relative humidity	85 % without moisture condensation
Impact resistance	200 m/s <sup>2</sup> ; 11 ms (DIN IEC 68)
Vibration resistance	5 Hz ... 1000 Hz; 100 m/s <sup>2</sup> (DIN IEC 68)
Type of protection (DIN 40050)	GEL 152/153/158/159 IP 65 (Nilos ring) GEL 154/157 IP 66 (sealing ring)



# Pin layout, Input- and output circuit, Available designs

## Pin layout

7-pole plug connector (Binder)

Pole	Assignment	Description
1	$-U_B$	0 V DC
2	DATA +	in pairs twisted with pole 3
3	DATA -	in pairs twisted with pole 2
4	Cycle +	in pairs twisted with pole 5
5	Cycle -	in pairs twisted with pole 4
6	code direction E2, activ-low	low-signal high-signal
7	$+U_B$	+ 11 ... 30 V DC

## Available designs

Single-turn absolute encoder

Type	Outout circuit	Scope of delivery includes
GEL 153 G 4096 A 35	3	7-pole mating connector GG 76 (Binder)
GEL 157 G 4096 A 35		
GEL 159 G 4096 A 35		

## Available designs

Multi-turn absolute encoder

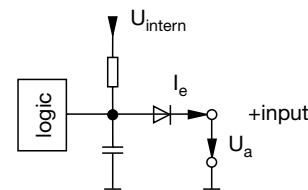
Type	Outout circuit	Scope of delivery includes
GEL 152 G 4096 N35	3	7-pole mating connector GG 76 (Binder)
GEL 154 G 4096 N35		
GEL 158 G 4096 N35		

## Accessories

**GW 76** 7-pole mating connector  
offset (optional)

### Input circuit E2

Function active-'low'-input



log 0 < 0.8 V  
log 1 > 3.2 V

### Output circuit 3

