



Automation of motion made by Lenord + Bauer

- ▶ Position acquisition
- ▶ Speed measurement
- ▶ Rotational speed measurement
- ▶ Temperature measurement
- ▶ Mileage acquisition
- ▶ Acceleration measurement
- ▶ Open loop control/closed loop control/positioning
- ▶ Adjustment/positioning

Our success is the success of our customers

Together with our customers, we have been developing solutions for efficient automation for more than forty years.

As experienced and innovative specialist for motion acquisition and control, we have the skills to understand motion as a whole and to develop and implement efficient solutions for process and motion sequences.

We recognise and analyse the automation potentials together with our customers from various sectors, such as mechanical engineering, steel industry, railway technology or power generation. Tailor-made solutions that go beyond pure product development are created in dialogue with you.

Today we represent the entire spectrum of highly efficient automation, ranging from problem analysis, complete process engineering, project management, product or software development, all the way to on-site commissioning.

Our robust sensors and controls, which are often customised or adapted, form the basis of these solutions. Producing these high-performance components and systems ourselves ensures reliable quality and innovative capacity.



„All over the world our customers demand pitch systems for extreme climatic conditions.

Based on durability and robustness, we have been using controls and sensors from Lenord + Bauer for over 10 years.“

Hermann Kestermann
SSB Wind Systems



„With Lenord + Bauer we have found a partner that develops and produces individual sensors - adapted to existing technical conditions - in a fast and reliable way. This gives us a competitive edge.“

Gerd Helm
Vossloh Kiepe GmbH

Contents

Sensors

Controls

	Position acquisition	Speed measurement	Rational speed measurement	Temperature measurement	Mileage acquisition	Acceleration measurement	Open loop control / closed loop control / positioning	Adjustment / positioning
02/03 Core competence / Content								
04/05 Industry know-how for more than 40 years								
06/07 From the initial idea to efficient automation solution								
08/09 Technology modules								
10/11 MiniCODER	●		●					
12/13 Incremental encoder	●	●	●					
14/15 Absolute encoders	●	●						
16/17 Speed sensors	●		●					
18/19 Temperature sensors and CombiCODER				●		●		
20/21 Odometer					●			
22/23 Redundant rotary encoders	●							
24/25 Application-specific encoder systems	●							
26/27 Customised sensors and measuring scales	●	●	●					
28/29 Compact controls							●	
30/31 Customised controls							●	
32/33 Bus terminals and bus terminal controllers for top hat rail mounting							●	
34/42 Positioning systems							●	●
43 Application support and training / Service and contact								

Precise acquisition, efficient control – even under extremely harsh conditions

A key task of automation is the precise acquisition of motion, its visualisation and reliable control. The innovative systems from Lenord + Bauer help our customers cope with even the harshest operating conditions.



Our automation portfolio offers the complete spectrum of state-of-the-art intelligent sensors and automation systems. Products from Lenord + Bauer allow high-precision acquisition, communication and visualisation of data such as positions, speeds, revolutions, mileage, but also of temperatures.

These high-availability sensor systems provide the reliable basis for exactly planned reactions. Our customers also use intelligent systems from Lenord + Bauer, which are often specifically developed or individually adapted, for subsequent open loop control, closed loop control or positioning.

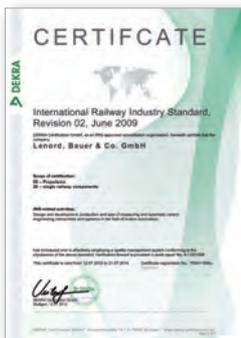
In this regard, long service life under particularly harsh environmental conditions is a typical requirement. Humidity, wind and dust, as well as mechanical loads and strong vibrations, are the rule.

With magnetic, contactless sensors and intelligent controls from Lenord + Bauer, our customers have practical, durable automation systems available to them.

All Lenord + Bauer products are of particularly robust design and tested to that effect. Thus, our automation solutions and products, which are largely resistant to strong interferences, form a long-lasting and reliable basis for the sustained success of our customers.

Availability is mainly a question of quality

High availability is one of the critical success factors of our customers. The Lenord + Bauer quality principle ensures this requirement.



Practical suitability and long-term availability of our automation solutions and products are of particular importance to our customers. The main objective is the reliable and long-term functionality of Lenord + Bauer products, even under harshest operating conditions. Quality in development and production form the basis for this principle. This is why, early on, we have implemented test strategies for quality assurance that accompany the entire development and production process. In addition, we continuously optimise these strategies in dialogue with our customers.

The following methods and other project-related tests ensure the high quality of our products:

- ▶ Use of modern CAD and CAE tools with integrated simulation and test routines
- ▶ Analysis methods for vibration and resonance effects (finite element method, FEM)

- ▶ Function tests, from single components to entire systems
 - ▶ Detailed optical fault analysis, followed by in-circuit tests
 - ▶ Shock and vibration tests according to industrial standards
 - ▶ Cyclic temperature tests under operating conditions, from -40 °C to +125 °C
 - ▶ Pressure tests up to 8 bar
 - ▶ EMC tests, as part of the CE declaration of conformity
 - ▶ Climate and salt spray test
- Lenord + Bauer is certified according to
- ▶ ISO 9001 (quality)
 - ▶ ISO 14001 (environment)
 - ▶ IRIS (International Railway Industry Standard)
 - ▶ UIC (International Union of Railways)



From the initial idea to efficient automation solution

Applying different core principles and high vertical integration allow us to develop and produce automation systems and products that give our customers a competitive edge and ensure long-term availability.



Our customers demand individual, innovative and highly integrated automation solutions and products as well as standard products within shortest time, from small series to thousands of pieces per year.



Lenord + Bauer is optimally prepared to meet this challenge. Our success is based on automation know-how and more than forty years of experience gathered from many industries. Lenord + Bauer uses the latest development tools and has a state-of-the-art production. New products are tested in our own application and test laboratory already during the development phase. Moreover, Lenord + Bauer has completed the fusion of mechanics and electronics to mechatronics in the areas of development and production years ago.

This close connection between mechanical and electronic development, design and production gives our customers the necessary competitive edge. The reliable quality of the products is ensured. This results in shorter innovation cycles and minimised reaction times, for instance in case of individual developments.

In-house electronic development and production

- ▶ Layout of analogue and digital circuits
- ▶ Micro system technology
- ▶ Industrial PC technology
- ▶ Packaging technology
- ▶ Encapsulation and micro encapsulation technology
- ▶ Micro assembly technology
- ▶ Manual and SMD placement of printed circuit boards

In-house mechanical development and production

- ▶ Design of individual, customised housings in various materials
- ▶ High-precision work pieces, e.g. measuring scales
- ▶ Development of mechatronics solutions, such as format adjustment

In-house software development

- ▶ Development of intelligent sensors
- ▶ Development of customer-specific functions in C/C++ and CoDeSys at operating system level, e.g. VxWorks
- ▶ Framework technologies



Railway technology

Absolute reliability and robustness due to magnetic and contactless technology

Solutions for:

- ▶ Engine speed measurement
- ▶ Wheel slide protection
- ▶ Wheel slip protection
- ▶ Train control
- ▶ Mileage acquisition
- ▶ Temperature measurement

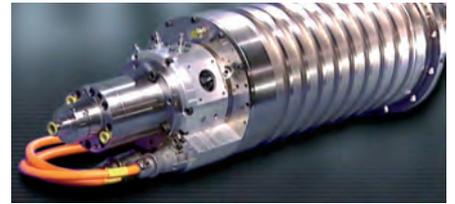


Energy

Efficiently regulated energy production through innovative control technology and sensors

Solutions for:

- ▶ Wind turbines
- ▶ Tidal power plants
- ▶ Photovoltaic plants
- ▶ Biogas plants



Machine tool engineering

Efficient regulation of high speeds exceeding $100,000 \text{ min}^{-1}$ from the world market leader with a global market share of about 80%

Solutions for:

- ▶ A-, B- and C-axes
- ▶ High-speed spindles



Marine

Maximum availability and reliability, maintenance-free sensor system operation

Solutions for:

- ▶ Pod drives
- ▶ Direct-drive ship propulsion
- ▶ Large rotor diameters



Mobile machines

Sustainable use of resources, protection of people and machines through reliable sensors

Solutions for:

- ▶ Municipal vehicles
- ▶ Construction machines
- ▶ Agricultural and forestry machines



General mechanical engineering services

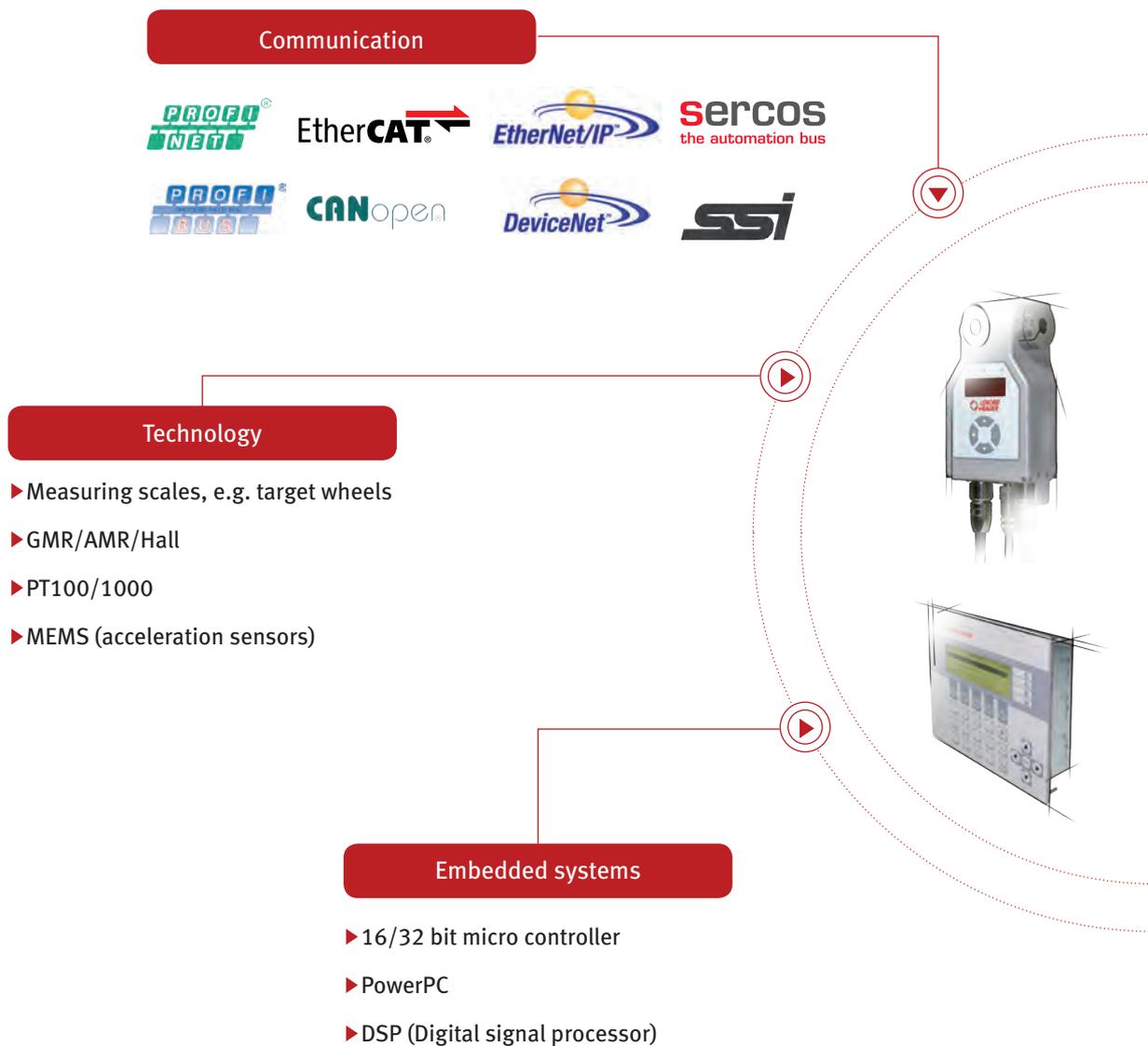
Engineering, with the goals of: Efficient production, reduction of downtimes, increased machine safety, original equipment or retrofitting

Solutions for:

- ▶ Packaging, filling and rolling machines
- ▶ Blast furnaces
- ▶ Conveyor and crane systems
- ▶ Storage systems
- ▶ Food industry
- ▶ Special purpose machine construction

Extensive automation know-how

We contribute to the success of our customers by using high-performance components or intelligent systems.



Engineering

- ▶ Product development
- ▶ Application development
- ▶ Programming in C++
- ▶ Web technology (server)



System integration

- ▶ Housing technology
- ▶ Encapsulation technology
- ▶ Fabrication
- ▶ Hybrid technology

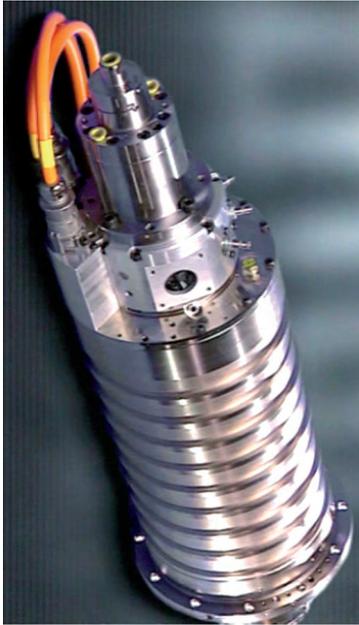
Interfaces

- ▶ TTL
- ▶ HTL
- ▶ Stand still voltage
- ▶ 4 to 20 mA
- ▶ 0 to 10 V
- ▶ RS 232/485



MiniCODER

The highly integrative MiniCODERs are the alternative to conventionally mounted encoders in drives.

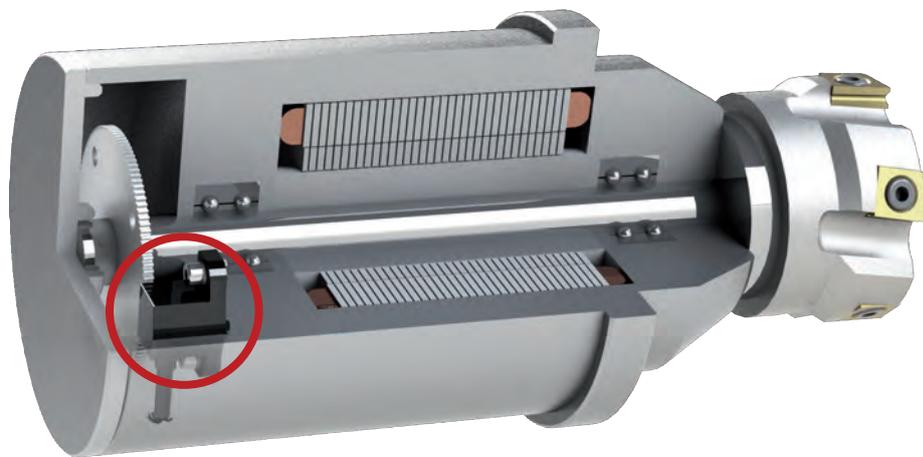


The incremental acquisition of rotational movements is performed by contactless scanning of a ferromagnetic target wheel. Due to the high level of vertical integration at Lenord + Bauer, it is possible to design and produce the suitable measuring scale for almost any application in the machine tool sector.

MiniCODERs do not need their own bearings and are therefore wear and maintenance free. With regard to performance, they are in no way inferior to sensor systems with bearings. Very high rotational speeds and tooth frequencies up to 200 kHz can be achieved.

The fully encapsulated construction in connection with EMC-compliant circuit and screening technique make the MiniCODERs a compact measuring system according to protection class IP 68, offering a high level of electrical and mechanical robustness.

As world market leader in this field, Lenord + Bauer can look back on many years of experience with the individual and application-oriented use of MiniCODERs as space-saving and high-precision measuring system. We use this knowledge to meet the increasing demands of the market, together with our customers.





GEL 2432

- ▶ Output signal 1 V_{pp} or 5 V TTL
- ▶ Measurement of rotational speed and linear motion
- ▶ Integrated interpolation factor to increase resolution



GEL 2442/GEL 2443

- ▶ Safety integrated
- ▶ Optional amplitude control
- ▶ Output signal 1 V_{pp}
- ▶ Optional reference signal



GEL 2444 K

- ▶ Operating temperature up to 120 °C
- ▶ IP 68
- ▶ Speed range from 0 to over 100,000 min⁻¹
- ▶ Tangential cable outlet



GEL 2444 T

- ▶ Output signal 5 V TTL
- ▶ High EMC resistance
- ▶ Optional reference signal



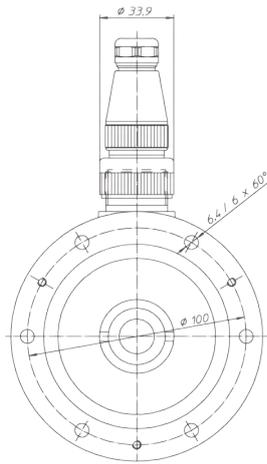
Target wheels

- ▶ Individually adapted
- ▶ High precision
- ▶ Speed range from 0 to over 100,000 min⁻¹

	GEL 2432	GEL 2442/2443	GEL 2444 K	GEL 2444 T
Output signal	5 V TTL/ RS422, 1 V _{pp}	1 V _{pp}	1 V _{pp}	5 V TTL/ RS422
Interpolation	1 to 20	-	1 to 20	
Protection class	IP 67	IP 68		
Supply voltage	5 V DC	5 V DC		
Power consumption without load	< 0.2 W	≤ 0.3 W		
Measuring scales	Target wheels/measuring rods	Target wheels		
Width of target wheel	min 2.0 mm	min 4.0 mm		

Incremental encoder

Incremental encoders for truly heavy-duty applications.



Incremental encoders convert rotational movement into electrical signals. The encoders from Lenord + Bauer combine the advantages of a magnetic measuring system with a robust mechanical design. They have proven themselves worldwide in various applications, even in most harsh industrial environments. It goes without saying that these encoders offer high reliability and a long service life. To guarantee these requirements, the incremental encoders can be equipped with additional features.

Protection against humidity

The encoder's electronic is coated with a highly effective protection against humidity, salt-water atmosphere and corrosive vapours. This ensures proper functioning even under tough conditions for years to come.

Condensed water outlet

In case of repeated condensation, water may accumulate in the encoder. This water can drain off through the condensed water outlet. Alternatively, sintered elements or breathable membranes may also be used for pressure balance.

Protection against vibration

The additional fixing of mechanical parts with special plastic prevents the electronics and the connections inside the encoder from vibrating. This allows trouble-free continuous operation even when exposed to extreme vibration and shock.



GEL 207/208

- ▶ High resolution
- ▶ Extremely robust
- ▶ Express service (24 h)



GEL 260

- ▶ Integrated interpolation
- ▶ Optional explosion protection
- ▶ Speedometer output



GEL 209

- ▶ High resolution
- ▶ Integrated bearing pedestal
- ▶ Express service (24 h)



GEL 2010

- ▶ Stainless steel 1.4305
- ▶ Encapsulated electronics
- ▶ Acid-resistant



GEL 219

- ▶ Square flange
- ▶ High shaft load (500 N)
- ▶ Condensed water outlet



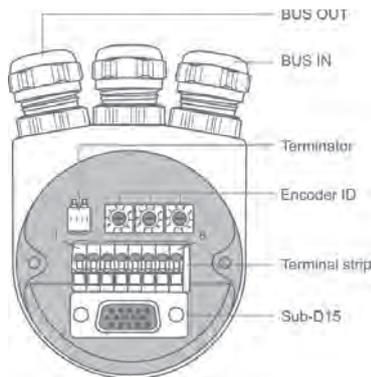
GEL 293

- ▶ Flexible coupling
- ▶ Extreme protection against vibration
- ▶ Speedometer output

	GEL 207/208	GEL 209	GEL 219	GEL 2010	GEL 260	GEL 293
Max. resolution (steps)	136192	136192	136192	1024	273408	266240
Housing diameter	58 mm	58 mm	58 mm	58 mm	90 mm	115 mm
Protection class	IP 65	IP 65	IP 65	IP 67	IP 65	IP 66
Temperature range	-20 °C to +85 °C	-20 °C to +85 °C	-20 °C to +85 °C	-20 °C to +70 °C	-20 °C to +85 °C	-20 °C to +85 °C
Supply voltage	10 to 30 V; 5 V	10 to 30 V; 5 V	10 to 30 V; 5 V	10 to 30 V; 5 V	10 to 30 V; 5 V	10 to 30 V; 5 V
Signals	A/B/N A̅/B̅/N̅	A/B/N A̅/B̅/N̅	A/B/N A̅/B̅/N̅	A/B/N A̅/B̅/N̅	A/B/N A̅/B̅/N̅	A/B/N A̅/B̅/N̅
Signal level	HTL TTL	HTL TTL	HTL TTL	HTL TTL	HTL TTL	HTL TTL
Additional signals		Speedometer signal			Speedometer signal	

Absolute encoders

High-resolution magnetic absolute encoders with intelligent digital and analogue interfaces.



Absolute encoders have proven successful in industrial application. The need for innovative encoders grows with increasing requirements on highly dynamic control processes and degree of automation. By combining a robust mechanical design with high-resolution and magnetic sensing principles, Lenord + Bauer has been setting standards for years.

The magnetic innovation: Metallic contour disc and innovative vernier evaluation

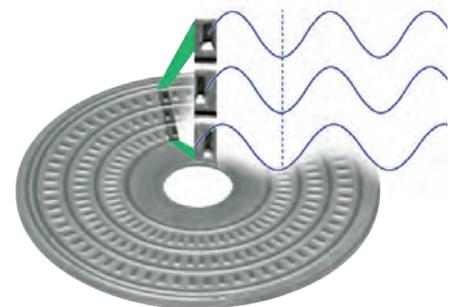
The absolute encoders GEL 235, 2351 and 2352 are true innovators. The well-known vernier principle has been used on these encoder types, in line with a new method. This technology is based on scanning an integrated, high-precision code disc made of ferromagnetic steel. The magnetic system works with a high resolution and offers decisive advantages. Unlike optical systems with transparent code discs, the scanning performance of the metallic contour disc is not affected by contamination or condensation.



Integrated flexibility

The functional principle of the absolute encoders GEL 2035 and 2037 is based on contactless magnetic scanning of a diametric magnet that is embedded in the encoder shaft.

The orientation of the magnetic field is acquired directly as absolute position within a single turn via magneto-resistive (MR) sensors. The rotations are acquired either by an electronic or mechanical gear and also placed in non-volatile storage. Magnetic scanning is not subject to ageing and is resistant to temperature fluctuations, contamination or condensation.





GEL 235

- ▶ Modular fieldbus cap
- ▶ High resolution through contour disc
- ▶ High operating temperature range
- ▶ ATEX certification



GEL 2035

- ▶ IP 69K option
- ▶ Heavy-duty flange option
- ▶ Additional resolver signal



GEL 2351

- ▶ Intelligent analogue interface
- ▶ High resolution through contour disc
- ▶ Stainless steel design



GEL 2037

- ▶ Heavy-duty flange
- ▶ Magnetic gear
- ▶ Salt mist resistant



GEL 2352

- ▶ Integrated digital interface (SSI, CANopen)
- ▶ High resolution through contour disc
- ▶ Compact design

EtherCAT

CANopen

PROFIBUS

SSI

	GEL 235	GEL 2035	GEL 2037	GEL 2351	GEL 2352
Resolution per revolution	65536	4096	8192	65536	65536
Number of revolutions	4096	4096	4096	-	4096
Housing diameter	58 mm	58 mm	58 mm	58 mm	58 mm
Length of housing	46.5 mm (SSI) 75 mm (fieldbus)	43.1 mm	45 mm	24 mm	24 mm
Absolute accuracy	0.1°	0.8°	0.8°	0.1°	0.1°
Max. protection class	IP 67	IP 69K	IP 67	IP 67	IP 67
Temperature range	-40 °C to +105 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C	-40 °C to +85 °C
Supply voltage	10 to 30 V 5 V	10 to 30 V	10 to 30 V 5 V	15 to 30 V	10 to 30 V
Interfaces	SSI CANopen PROFIBUS-DP EtherCAT	4 to 20 mA SSI SSI+Resolver CANopen	SSI SSI+Resolver	4 to 20 mA 0 to 10 V	SSI CANopen
Options	Explosion protection stainless steel	IP 69K heavy-duty flange	-	Stainless steel	Stainless steel

Speed sensors

Successful for more than 20 years. High precision speed sensors from Lenord + Bauer, suitable for even the harshest conditions.



IRIS
Certification

UIC
INTERNATIONAL UNION
OF RAILWAYS

By scanning a measuring scale, speed sensors generate pulses and can thus detect rotational and translational motion. Target wheels or measuring rods made of ferromagnetic or electroconductive materials serve as respective measuring scales.

Due to the compact and resistant construction of the speed sensors, they are predestined for use in rail traffic. For years, the sensors from Lenord + Bauer have already been successfully applied in drive controls, brake systems or train control all over the world, even under harshest conditions. Thanks to the extremely robust design, these reliable and high-precision measuring systems are also ideal for hydraulic cylinders used in the heavy industry for instance, on oil drilling platforms or in lock gates. Also available as ATEX-compliant version for potentially explosive atmospheres.

The high reliability of the sensors also reduces the life cycle costs of the end user.

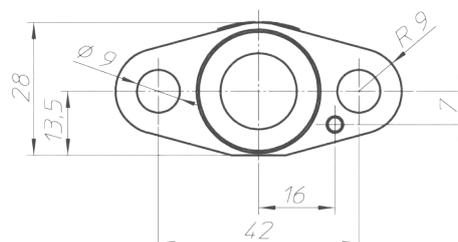
The speed sensors provide the square-wave signals required for the respective application on up to 2 channels as voltage or current signals. They measure tooth frequencies from 0 to 25 kHz. A stand still voltage signal, as required for instance for

brake systems, can also be realised. The electronic system is protected against shock and vibrations by multi-step encapsulation. All speed sensors are tested in accordance with EN 50155 and protection class IP 68. This includes, for example, EMC and temperature compatibility, as well as shock and vibration.

As an option, Lenord + Bauer offers sensors with pulse multiplication.

Restrictions in design force customers to revert to existing measuring scales, which, however, do not meet the requirements of the control in use. For example, the pulses provided by the scanned measuring scale exceed the amount that can be processed. Sensors of the GEL 247 series are prepared for such a case. Sensor types that divide the pulse numbers sensor-internally by a factor of up to 10 are available upon request.

In connection with years of know-how in the fabrication of sensor systems, Lenord + Bauer can fulfil almost all customer requirements.





GEL 247

- ▶ 1 or 2 channel output
- ▶ Module 1 to 3.5
- ▶ Measuring frequency from 0 Hz



GEL 2470

- ▶ Aluminium housing
- ▶ Large air gap up to 4 mm
- ▶ Module 1 to 3.5



GEL 2471

- ▶ Measuring scale made of non-magnetic material
- ▶ IP 68
- ▶ Module 2 or 3



GEL 2472

- ▶ 2 DC-isolated systems in one housing
- ▶ Robust stainless steel housing
- ▶ Different supply voltages



GEL 2474/GEL 2475/GEL 2476

- ▶ Current, voltage and stand still voltage output
- ▶ Stainless steel housing
- ▶ Increased sensing distance



GEL 2477

- ▶ High resolution through pulse multiplication
- ▶ 2 channel
- ▶ Square wave signals



GEL 2478

- ▶ ATEX certification (IIG Ex ib IIB T4)
- ▶ Scanning of measuring rods
- ▶ Increased sensing distance



GEL 248

- ▶ Module 0.7 to 4.00
- ▶ Compact design
- ▶ Large air gap up to 3.5 mm (module 4)

	GEL 247	GEL 2470	GEL 2471	GEL 2474/ GEL 2475/ GEL 2476	GEL 2477	GEL 2478	GEL 248
Supply voltage U_s	10 to 30 V DC	10 to 30 V DC	10 to 20 V DC	10 to 30 V DC	10 to 30 V DC	10 to 28 V DC (ATEX) 10 to 30 V DC (without ATEX)	10 to 30 V DC (with HTL output); 5 V ± 10 % (with TTL output)
Max. number of channels	2	2	2	2	2	2	2
Current consumption (without load)	< 15 mA to 60 mA (depending on waveform)	≤ 28 mA	40 mA	< 12 mA to 60 mA	≤ 50 mA	< 45 mA	≤ 50 mA
Module target wheel	1.00 to 3.50	1.00 to 3.50	2.00/3.00	depending on encoder type 1.00 to 3.50	1.00	1.00 to 3.50	0.70 to 4.00
Max. permissible air gap (depending on module)	0.1 mm to 1.3 mm	0.2 mm to 4.0 mm	Typ. 0.7 mm to 0.8 mm	0.2 mm to 3.0 mm	0.4 mm to 1.0 mm	0.2 mm to 3.0 mm	0.2 mm to 3.5 mm
Material target wheel	Ferromagnetic steel	Ferromagnetic steel	Elect. conductive materials	Ferromagnetic steel	Ferromagnetic steel	Ferromagnetic steel	Ferromagnetic steel

Temperature sensors and CombiCODER

Temperature acquisition in rail vehicles is becoming ever more important. The GEL 2161 from Lenord + Bauer is the right instrument for this task.



Temperature sensors

With fire protection according to DIN 5510 and NF F16-101, measuring range from -40 °C to + 250 °C, protection class IP 68 and type tests according to EN 50155, these temperature sensors are precisely tailored to the harsh conditions prevailing in rail traffic.

The fact that the GEL 2161 is available in two, three or four wire technology confirms the claim that Lenord + Bauer produces customer-oriented and application-specific sensors. Based on our many years of experience in the fabrication of sensor systems, we can direct the signals

of a temperature sensor and, for instance, a speed sensor to one connector, thus minimising our customers' cabling by combining the two sensors.

CombiCODER

Due to a lack of installation space and steadily increasing requirements it is necessary to combine several sensor types into one system. Resulting from this situation, Lenord + Bauer developed the combi sensors. They enable us to provide speed sensors with temperature sensors and vibration sensors in one housing according to customer's requirements.



GEL 2161

- ▶ Measuring range
-40 °C to +250 °C
- ▶ 2, 3 and 4 wire technology
- ▶ PT100-/PT1000 technology
- ▶ Type test according to
EN 50155



CombiCODER

- ▶ Multi-channel speed sensor
with interpolation
- ▶ Multi-channel speed sensor +
temperature sensor
- ▶ Multi-channel speed sensor +
temperature sensor + shock
sensor



	GEL 2161
Measuring element	PT100/PT1000
Wire technology	2, 3, 4
Limit value deviation	Tolerance class B
Electromagnetic compatibility	Rail vehicles: EN 50121-3-2
Measuring range	-40 °C to +250 °C
Protection class	IP 68
Type test	EN 50155

Odometer

Energy autonomous mileage acquisition to optimise maintenance intervals for freight vehicles.



To ensure the traffic safety of rail vehicles it is necessary to monitor the axle mileage to prevent accidents by replacing or turning tyres in a timely manner, or by inspecting the wheel bearings. These days it is common to lease instead of buy freight vehicles, calculating costs on a mileage basis. Hence, a reliable and accurate measurement of the distance travelled is also in the interest of the vehicle owners.

Existing mechanical or mechatronic odometers are prone to strong mechanical loads, or they require a battery for energy supply, which in turn increases maintenance costs. An alternative is the use of a maintenance-free, energy autonomous electronic mileage counter that extracts the required energy from the rotational axis motion by means of induction. At the same time it detects the revolutions and stores the counter reading. A RFID reader allows readout of the stored vehicle data

as well as preparation and transfer of the data for automatic evaluation. The resulting optimisation of the maintenance cycles offers a high cost savings potential.

Acquired or stored data

- ▶ Mileage
- ▶ Date and time of readout
- ▶ Mileage during previous readout
- ▶ Wheel set type and wheel set number
- ▶ Wheel diameter
- ▶ Vehicle number
- ▶ Vehicle keeper marking
- ▶ Status display for a previous exceedance of temperature limits





GEL 2510

- ▶ Magnetic sensor technology:
Robust and durable, resistant to dirt, oil, humidity and vibration
- ▶ Energy autonomous, no battery required
- ▶ Contact-less scanning, maintenance-free
- ▶ Compact and unobtrusive
- ▶ Tamper-proof
- ▶ Type test according to EN 50155
- ▶ Approved for use in potentially explosive areas (e.g. refineries)
- ▶ Wireless transmission via RFID technology
- ▶ Simple transmission from reader to PC via USB
- ▶ Simple data processing and reporting



2510PPC

- ▶ Robust industrial design
- ▶ Microsoft WindowsMobile™ Operating system
- ▶ Wireless RFID communication
- ▶ Touch screen and button operation
- ▶ Simple data transmission to PC via USB
- ▶ Convenient data evaluation

	GEL 2510		2510PPC
Operating and storage temperature range	-40 °C to +85 °C	Application	Energy autonomous mileage acquisition to optimise maintenance intervals for freight vehicles
Protection class	IP 68	Supply	3800 mAh NiMH rechargeable
Shock/vibration	IEC 6173 Cat 3.	Display	240 x 320 Pixel Colour TFT
EMC	EN 50121-3-2	RFID communication	installed
Ignition protection	II 2G EEx ib IIB T4	Temperature range	-30 °C to +60 °C
Type test	EN 50155	Protection class	IP 67

Redundant rotary encoders

Traditionally safe. Incremental redundant rotary encoders facilitate safety functions in modern mechanical engineering.



Tandem encoder GEL 290

The concept

Process automation, process data acquisition and the necessity to monitor and protect processes require several separate encoders mounted on one shaft. To meet this requirement, the encoders must be equipped with a continuous shaft or hollow shaft. The assembly and coupling of the encoders requires special design features. In this regard, the mounting length of the encoder system must be kept short enough to permit trouble-free application.

The solution

Thanks to the integration of a flexible coupling in the encoder, the tandem solution allows assembly of different encoders in a relatively short kit. The individual encoders are equipped with a flexible-mounted hollow shaft, into which coupling elements are fitted. The encoders are attached to each other in a space-saving way via the coupling elements. Each tandem system must have at least one basic module GEL 290. The end element of an encoder system can be an encoder with a hollow shaft, or a device with a solid shaft. This is a simple way to achieve diverse redundancy with conventional methods.

Integrated redundant rotary encoder system GEL 2036

The design of conventional tandem systems is such that it always requires a sufficiently large assembly area. Based on this requirement, Lenord + Bauer has advanced the magnetic sensor technology for redundant absolute encoders. A 58 mm diameter standard housing has been equipped with a redundant multiturn encoder with SSI interface. Completely DC-isolated sensor levels achieve, for instance, 256 steps per revolution, with a total resolution of 65536 steps. Additional resolution and encoder variations can be realised in combination with SSI or fieldbus interfaces.



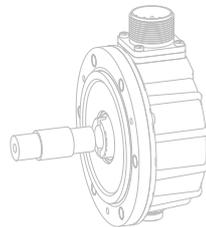
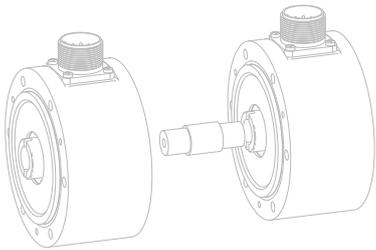
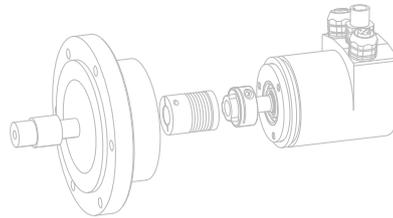
GEL 2036

- ▶ Compact design
- ▶ DC-isolated sensor units
- ▶ Integrated fieldbus interfaces



GEL 290

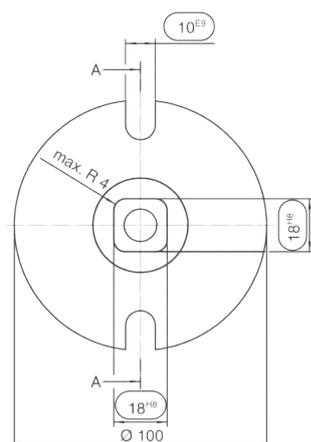
- ▶ Combination of incremental and absolute encoders
- ▶ Modular design
 - Basic module: Incremental encoder
 - Additional module: Incremental encoder
 - End element: Absolute encoder or incremental encoder
- ▶ A maximum of three systems can be combined



	GEL 2036	GEL 290	
		Incremental encoder	Absolute encoder
Resolution per revolution	256	266240	65536
Number of revolutions	256	-	4096
Housing diameter	58 mm	115 mm	58 mm
Length of housing	50 mm	61 mm	46.5 mm (SSI) 75 mm (fieldbus)
Incremental deviation	± 1°	0.01°	0.1°
Max. protection class	IP 64	IP 66	IP 67
Temperature range	-40 °C to +85 °C	-20 °C to +85 °C	-40 °C to +105 °C
Supply voltage	2 x 10 to 30 V	10 to 30 V	10 to 30 V 5 V
Interfaces	SSI CANopen	-	SSI CANopen PROFIBUS-DP EtherCAT
Signals	-	A/B/N $\bar{A}/\bar{B}/\bar{N}$	-
Signal level	-	HTL TTL	-
Additional signals	-	Speedometer signal	-

Application-specific encoder systems

Focusing on the essential. Extreme environmental conditions call for individual product characteristics.



Each application has its own specific requirements. As a rule, 80% of all applications can be covered with standard products. If standard products are no longer adequate, Lenord + Bauer offers application-specific sensors that are tailored exactly to the needs of the customer.

Multichannel encoder GEL 27XX

The multi-channel incremental encoder has been specifically developed for the requirements of the rail vehicle industry. The encoder has been designed to provide independent output signals for different control electronics such as engine speed measurement, wheel slide protection, train control and rolling distance measurement.

On the inside, the incremental encoder features a metallic measuring scale that is connected with the axis. This measuring scale is scanned by one or several magnetic sensors. The evaluation electronics generates pulses whose output is in the form of square-wave signals with defined voltage or current levels. The output frequency is proportional to the rotational speed of the axis. The signals are evaluated in the vehicle control electronics.

Types GEL 2710 and 2712 are designed for bogies with outside bearings. They are flanged onto the bearing cover of the wheel set and driven by a clutch disc, for instance. The GEL 2701 is suitable for bogies with inside bearings. The wheel set is equipped with a rotor flange, allowing the incremental encoder to turn freely. A torque support connected to the bogie frame prevents the encoder from simultaneous rotation. All types can be customised with various cables, protective sleeves and plugs

Encoder for extreme applications GEL 2952

This encoder was specifically designed for the extreme loads experienced in rail traffic. An encapsulated sensor module inside a stainless steel housing provides excellent protection in case of extreme use. An integrated, patented flexible coupling with a 20 mm diameter also permits mounting to drive elements with high axial and radial shaft motion.



GEL 27XX

- ▶ Max. 8 channels
- ▶ Max. 3 different pulse numbers
- ▶ Various flange forms for each vehicle



GEL 2952

- ▶ Patented flexible coupling
- ▶ Encapsulated electronics
- ▶ Stainless steel housing



	GEL 27XX	GEL 2952
Max. resolution	200	1024
Housing diameter	155 mm	115 mm
Protection class	IP 67	IP 67
Temperature range	-40 °C to +100 °C	-40 °C to +120 °C
Supply voltage	10 to 30 V 5 V	10 to 30 V 5 V
Signals	A/B/N $\bar{A}/\bar{B}/\bar{N}$	A/B/N $\bar{A}/\bar{B}/\bar{N}$ sin/cos
Signal level	HTL TTL	HTL TTL

Customised sensors and measuring scales

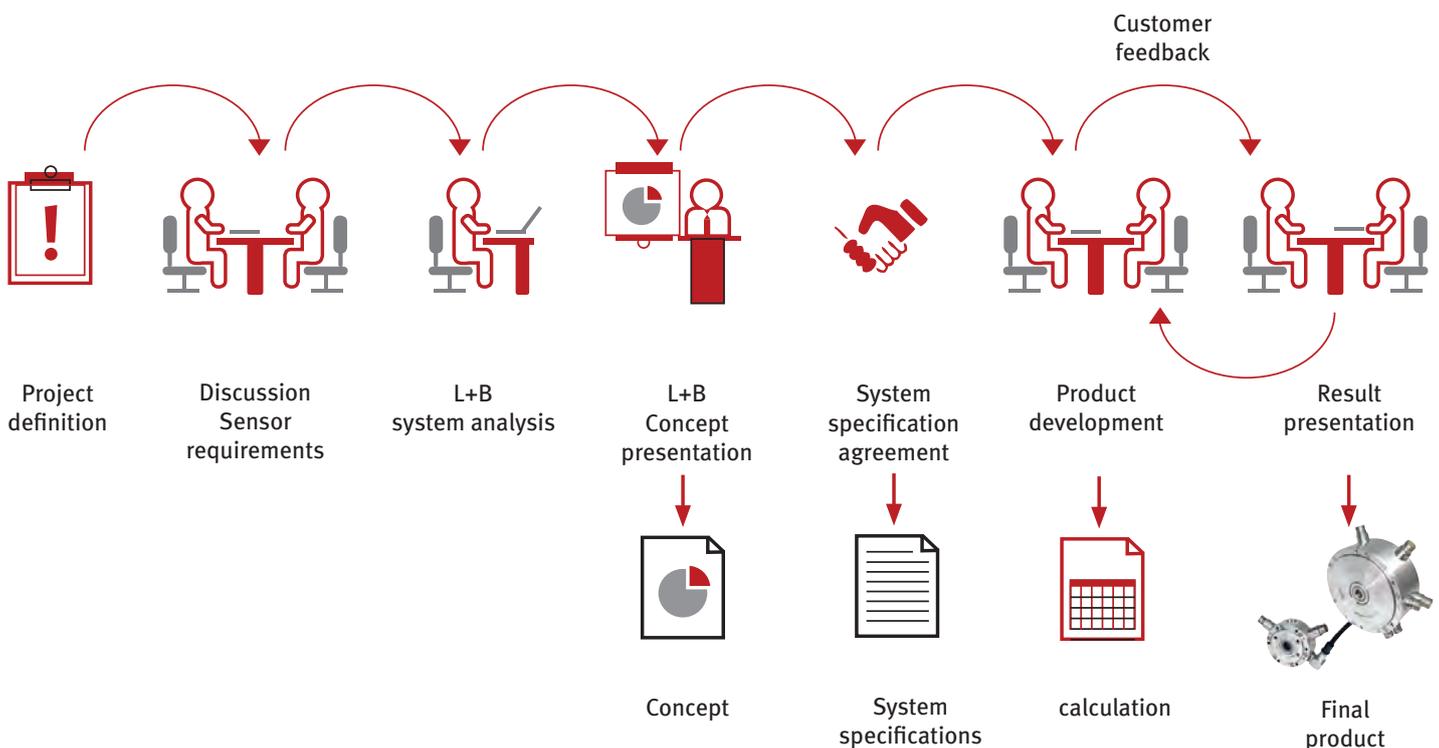
Tailored to your applications. Based on its technology modules and extensive knowledge of the industry, Lenord + Bauer provides the right sensor solution for your respective requirements.



Extreme conditions of use

With our many years of experience in project engineering of client-specific sensor systems from design to realisation, we produce optimised system solutions for our customers based on our technology modules. Fundamental technical knowledge and long-term cooperation with established system houses and research institutes form the basis for our innovative short cycle product developments.

Together with our customers we develop a sensor concept that is tailored specifically to the requirements of the application. Robust basic sensors and core know-how in the areas of magnetic circuit and measuring scale permit product use in applications that are not suitable for standard solutions. The high level of vertical integration allows Lenord + Bauer to quickly develop prototypes for complex projects and produce small series in any field.





**Example:
Sensors for marine propulsion**

- ▶ Six-fold redundancy
- ▶ Extremely high availability
- ▶ Long-term supply capability
- ▶ Stainless steel



**Example:
Tooth wheels**

- ▶ Definition of tooth shape
- ▶ In-house production of measuring scales
- ▶ In-house test bench

**Example:
Slotted disc with sensor**

- ▶ Definition of slot contour
- ▶ Customised sensor contour
- ▶ Qualification of measuring scale

	Customised sensors
Measuring scales	Development and production of customer-specific measuring scales
position sensors	Combination of incremental and absolute measuring techniques
Additional sensors	Temperature, acceleration
Housing design	Adaptation of housing to respective mounting conditions. Separation of sensor and evaluation is possible
Max. protection class	IP 69K
Temperature range	-40 °C to +120 °C
Supply voltage	10 to 30 V 5 V
Interfaces	Incremental or analogue
Communication	SSI CANopen PROFIBUS-DP EtherCAT ProfiNet
Options	Explosion protection Stainless steel

Compact controls

Reliable MotionControllers for sophisticated tasks in rough environments



Throughout the world, the motion controllers from Lenord + Bauer meet all onshore and offshore requirements. They are optimised for the rough environment of rotor hubs in wind turbines, used as Hot Climate Version (HCV) in the hot and humid area of South China or as Cold Climate Version (CCV) for -20 °C temperatures at 2000 m altitude in the Central Asian Plateau. Lenord + Bauer MotionControllers have been successfully used all over the world for more than 15 years and in over 20,000 wind turbines.



The controllers of the product family GEL 82XX feature a terminal with LC display, keyboard, integrated IEC 61131 PLC, fieldbus systems and multi axis control with a maximum of six axes. A total of up to 64 axes can be controlled via the CAN bus. In addition to being equipped with a wide range of digital and analogue inputs and outputs, the controllers can evaluate up to six SSI encoder signals.



Create your target application in less time with CoDeSys

The uniform programming environment CoDeSys tool runs in parallel to the multi axis control and provides complete parameter transparency. According to requirements, the suitable IEC programming languages can be selected for each individual module. The IEC 61131-3 programming languages FBD, LD, ST, IL, SFC are available.



Establishing connection with open system communication

System communication is the basis of modern control solutions. In the product family GEL 82XX, two CAN interfaces as well as two serial interfaces are already integrated. In addition, an extension slot allows the use of other standard bus systems without adaptation of the PLC.





GEL 8231/8232 MotionController for wind turbines

- ▶ Positioning controller for max. 6 axes
- ▶ Open to all standard fieldbus systems
- ▶ Extended temperature range



GEL 8240 MotionPLC

- ▶ Cam plates and main shafts
- ▶ CNC function
- ▶ Automation of complex motion sequences
- ▶ Ready-made solutions, e.g. „Flying saw“ or „Rotating cutter“



GEL 8241 MotionPLC

- ▶ Cam plates and main shafts
- ▶ CNC function
- ▶ Automation of complex motion sequences
- ▶ Ready-made solutions, e.g. „Flying saw“ or „Rotating cutter“
- ▶ 4 x PT100 inputs



GEL 8251 Compact Controller

- ▶ Positioning controller for max. 6 axes
- ▶ Optimised for use in wind turbines
- ▶ Extended temperature range
- ▶ 6 x SSI encoder inputs

	GEL 8231/8232	GEL 8240	GEL 8241	GEL 8251
LCD and keyboard	Yes			Yes
Digital inputs	22		22 to 30	30
Digital outputs	15			15
Analogue inputs	1		3	3
Analogue outputs	3			3
PT100 inputs	-		4	0 to 4
SSI encoder inputs	3			6
Serial interface	2			2
CANopen	2			2
PROFIBUS-DP	optional			optional
EtherNet/IP	optional			optional
DeviceNet	optional			optional

Customised controls

Lenord + Bauer develops robust compact controls for installation in switch cabinets, for top hat rail mounting or as overall decentralised control system.



Customised electronics

Based on our 40 years of know-how from control and sensor development, as well as 15 years experience in automation of wind turbines, Lenord + Bauer - in cooperation with its customers - continuously implements new, technologically advanced and customised control solutions.

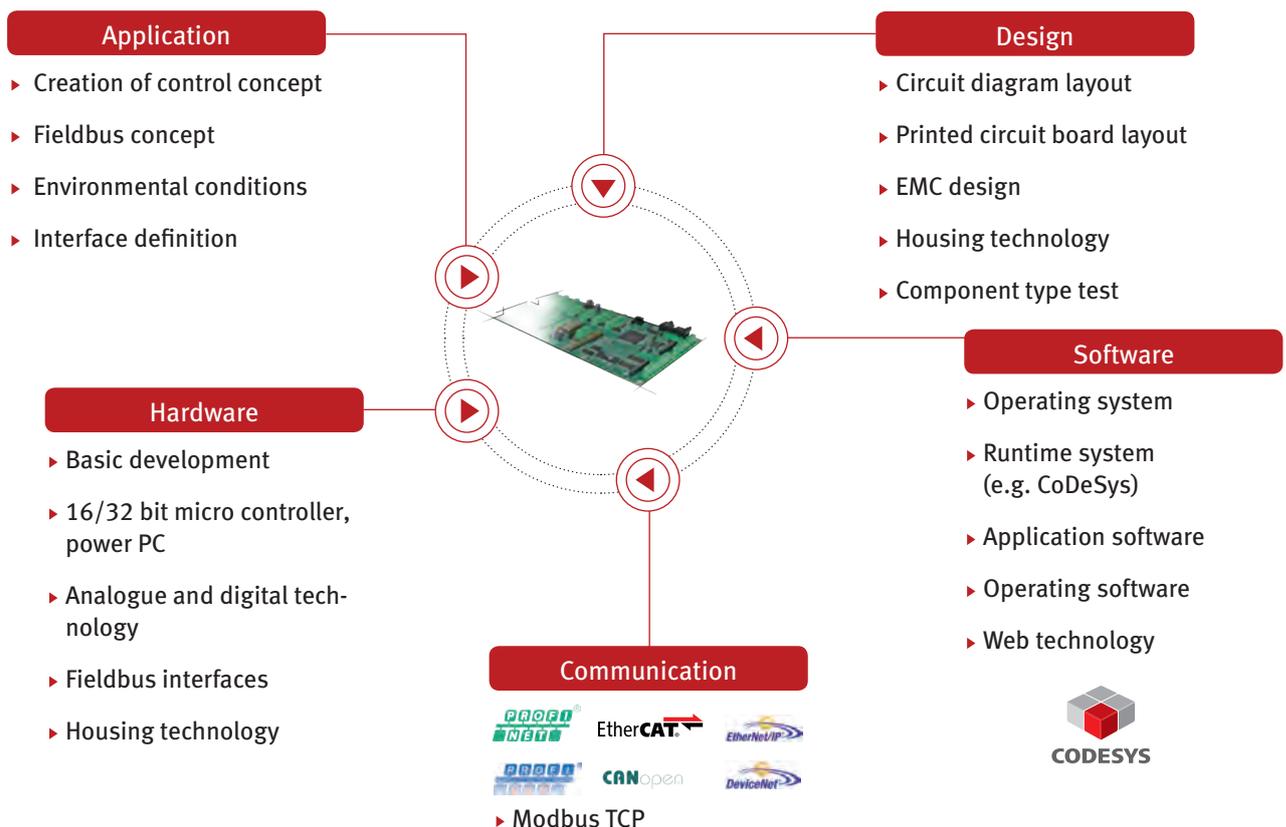
- ▶ Fast and uncomplicated development of prototypes for your specific application
- ▶ Quality-tested series production of your solution (for annual quantities from only one to thousands of pieces)
- ▶ Short development cycles, comprehensive customer project support and industry-specific application know-how

Take advantage of our experience to secure your success

- ▶ High level of experience from worldwide application of our products
- ▶ Efficient combination of robust mechanics with latest hardware and software solutions

Fields of application

- ▶ Wind turbines (onshore, nearshore, offshore)
- ▶ Hydropower
- ▶ Robust industrial environments
- ▶ Mechanical engineering

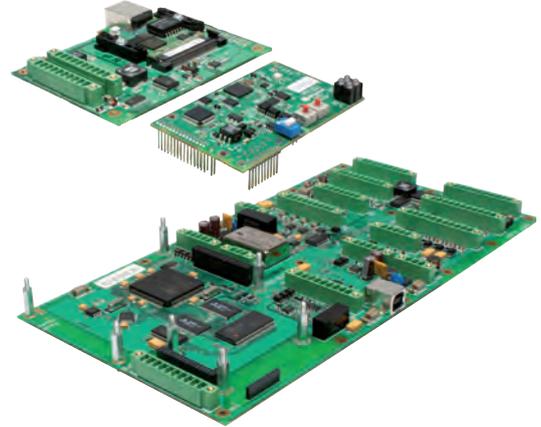




GEL 8710 MotionController

Customised positioning controller for maximum 3 axes. Offers the complete performance range for complex motion automation.

- ▶ Open to all standard fieldbus systems
- ▶ Modular expandable
- ▶ Customised form factor
- ▶ Optimised for use in wind turbines



GEL 89135 Fieldbus extension module

- ▶ PROFIBUS-DP



GEL 890520 Multifunction module for MotionController GEL 8710

- ▶ Multifunction I/O card
- ▶ Ethernet TCP/IP
- ▶ Remote service Web (via WEB browser)
- ▶ FTP, HTTP communication

	GEL 8710	GEL 89135	GEL 890520
Digital inputs	16	-	8
Digital outputs	8	-	8
Analogue inputs	2	-	-
Analogue outputs	1	-	-
PT100 inputs	4	-	-
SSI encoder inputs	2	-	-
Serial interface	1 to 2	-	-
USB port	1	-	-
PLC function IEC 61131-3	optional	-	-
CANopen	2	-	-
PROFIBUS-DP	-	1	-
EtherCat	-	-	-
EtherNet/IP	-	-	1
DeviceNet	optional	-	-
InterBUS-S	optional	-	-

Decentral control for top hat rail

MotionControl system solutions from one source.



Use the fieldbus terminal controller GEL 8500 to extend Lenord + Bauer PLC or display controls in a fast and convenient way. All MotionControllers and MotionPLCs from Lenord + Bauer feature a CANopen master function, allowing trouble-free extension via the fieldbus terminal controller.

Brief description

The fieldbus terminal controller GEL 8500 for extended temperature range is a CANopen enabled remote module with six digital inputs and outputs, as well as four PT100 inputs. As a special feature, two 230 V AC switched outputs are integrated. The fieldbus interface is designed as a CANopen slave in accordance with CiA Draft Standard DS301 and DS401.

The tall design, and thus minimum space requirement in the switch cabinet on the top hat rail, makes the controller ideal for decentralised solutions. The controller is mounted on a standard top hat rail.

The signal connection level has been developed for permanent wiring with connector strips. Connection is in front via spring-cage terminals. Multicolour LEDs on the front provide information on power supply, device status as well as fieldbus status of the equipment.

In addition to the flexible and decentralised extension of I/O for controls and frequency converters, the controller GEL 8500 can also decentralise functions in your machine thanks to sufficient computing power.

Decentralisation of functions

Besides its use as remote module, the fieldbus terminal controller can be equipped with customised software. This customised software and the corresponding Windows service tool make it possible to swap certain functions from the PLC to the device.

Communication

The fast and convenient data exchange with the superimposed fieldbus master control or the service and operating software is based on CAN bus and the USB port.

Parameterisation of special functions via Windows service tool

The controller GEL 8500 is parameterised via CAN bus, USB service port or via service and operating software.

Use in wind turbines

The controller GEL 8500 has been optimised for the rough environment of the rotor hub on wind turbines. It is therefore in compliance with all onshore or offshore requirements, as well as all CCV and HCV requirements.

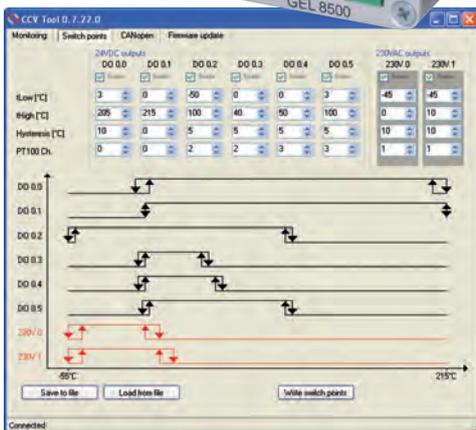
-50 °C to +85 °C
Dew-point resistant



GEL 8500

Fieldbus terminal controller for wide temperature range

- ▶ Extended temperature range
- ▶ Operating temperature
-40 °C to +85 °C
- ▶ Storage temperature
-50 °C to +85 °C
- ▶ Digital outputs 230 V AC
- ▶ Coated printed circuit boards
- ▶ Compact and robust construction
- ▶ Installation altitude 3000 m



CANopen



CANopen

	GEL 8500
CANopen	Slave (DS301, DS401)
Interface	USB (for Windows service tool)
LCD and keyboard	-
Digital inputs 24 V DC	6
Digital outputs 24 V DC	6
Digital outputs 230 V AC	2
Analogue inputs	-
PT100 inputs	4
Analogue outputs	-
Operating temperature	-40 °C to +85 °C
Storage temperature	-50 °C to +85 °C

Format adjustment with system

Easy integration, quicker changes, fewer sources of error – but the innovative positioning system has much more to offer.

A change in batch size and frequent product changes require quick conversion of production plants and machines. If this task is still performed by handwheel, valuable time may be lost. This is particularly the case on processing smaller batch sizes. Furthermore, manual conversion does not ensure absolute repeat accuracy.

To save time, money and trouble, it is better to rely on innovative solutions: fully-automated feed axes that permit the efficient production even of smaller batch sizes. Like the PowerDRIVE-System from Lenord + Bauer.

The clever complete package

The innovative positioning system offers a complete system solution for the efficient and flexible integration of positioning drives in modern production plants. It makes the integration and commissioning of automated feed axes extremely easy and greatly reduces cabling work. The PowerDRIVE-System is also an innovative solution for continuous cyclic operation.

The system consists of three main components. Firstly: the compact, fully-automated positioning drives PowerDRIVE. Secondly: the intelligent decentralised communication unit, the PowerDRIVE-Box, which controls the complete power management of the positioning drives and greatly simplifies the connection work. And thirdly: the hybrid cable suitable for drag chains, PowerDRIVE-Connect.

Efficient to the core

The PowerDRIVE-System guarantees maximum repeat accuracy and prevents adjustment errors. Once formats have been set they can be managed in a database as "recipes". However, new formats are also added quickly and easily. This feature increases the plant availability and increases the productivity. In this way the cost-effectiveness is significantly increased, particularly in the case of frequent format changes and small batch sizes. At the same time the flexibility of the machine or plant is increased.

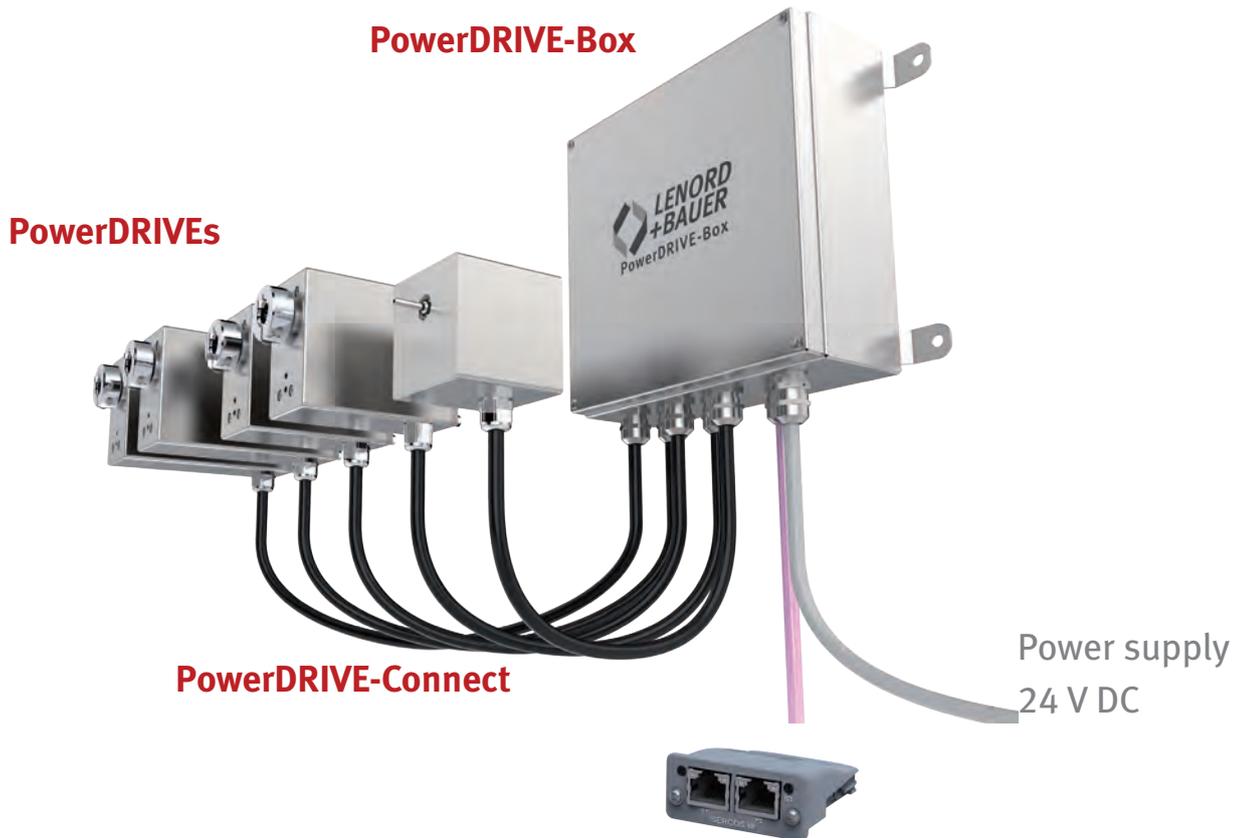
In addition to the numerous advantages of the individual components, which will be addressed in more detail on the following pages, the PowerDRIVE-System also offers you distinct advantages in relation to support or the logistics chain. The basic system, which is always the same and consists of the PowerDRIVE and PowerDRIVE-Box, can be used in conjunction with all control systems and interfaces thanks to the plug-in communication modules. In this way maximum flexibility is ensured.

The entire system at a glance

PowerDRIVE-System	
PowerDRIVE	Compact design: 2 Nm at 230 min ⁻¹ / 5 Nm at 100 min ⁻¹ / 10 Nm at 40 min ⁻¹ Short design: 1.4 Nm at 230 min ⁻¹ / 3.5 Nm at 100 min ⁻¹ / 7 Nm at 40 min ⁻¹ Cube design: 0.4 Nm (750 min ⁻¹ , duty cycle 25 %), continuous operation: 0.25 Nm (duty cycle 50 %, 500 ms) Supply voltage 24 V DC / hybrid cable / plug outlet / joystick for commissioning / manual emergency adjustment / holding brake optional
PowerDRIVE-Connect	Freely configurable hybrid cable suitable for drag chains Auto-configuration of the PowerDRIVES Automatic PowerDRIVE parameter settings
PowerDRIVE-Box	Connection of up to 5 PowerDRIVES Integrated power management and electronic fuse for cable protection Plug-in interface modules For mounting on top hat rails and for installation outside the switch cabinet

PowerDRIVE-System

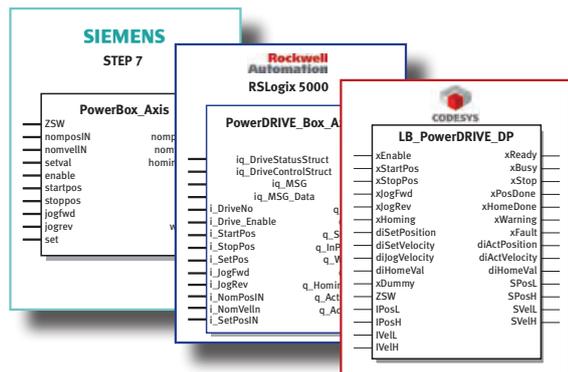
The components of the PowerDRIVE-System



Plug-in modules for all common bus systems



Function blocks for CODESYS, STEP 7 and RSLogix 5000



A format change can be so efficient

The compact and fully automatic positioning drives can be completely integrated into a wide range of machinery and plants.

The core of the system is formed by the compact positioning drives PowerDRIVE specially developed for fully automatic format adjustment. Each positioning drive forms a complete mechatronic unit, consisting of a DC brushless motor, a novel magnetic multiturn absolute rotary encoder, a 32-bit microcontroller, a compact power amplifier, as well as an efficient spur gear. Optionally, robust stainless steel housings (1.4301) or stiff aluminium housings (AlMgSi) are available in two designs. With its high protection class (IP 67), the PowerDRIVE is suitable for a wide range of applications in various industrial areas.

Depending on application and mounting position, mechanical self-locking of the feed axes is not always ensured. The optional holding brake guarantees secure retention even in case of shock and vibration loads - especially on vertical feed axes. All devices are equipped with a mechanical manual emergency adjustment feature and have a micro-joystick with which the positioning drives can also be operated without prior PLC programming.

Fully automatic format adjustment with high repeat accuracy

A prerequisite for exact format adjustment with high repeat accuracy is the exact acquisition of the shaft position. The integrated, battery-less, magnetic, absolute measuring system detects the position immediately after the power is switched on. Reference search routines are therefore a thing of the past. Once formats have been prepared they can be saved in a database as "recipes" and can therefore be retrieved at any time. In this way adjustment errors on a format change are avoided and set-up times significantly reduced.

Advantages of the connection technology

The PowerDRIVES can be supplied with a hybrid cable or connectors. The power supply for the motor and the logic, as well as the bus connection, is integrated into the hybrid cable PowerDRIVE. In addition, hybrid connectors are also available; these have a quick-release feature. This innovative connection technology is therefore extremely cost-effective and cost-saving.



Technical data

PowerDRIVE	GEL 6110 compact design	GEL 6110 short design
Dimensions (W × H × D)	60 × 100 × 163 mm	60 × 100 × 125 mm
Protection class	IP 67	IP 67
Housing material	Aluminium / stainless steel	Aluminium / stainless steel
Nominal torque	2 / 5 / 10 / 15 Nm	1.4 / 3.5 / 7 / 10.5 Nm
Measuring system	Magnetic, multiturn	Magnetic, multiturn
Accuracy	± 1.8°	± 1.8°
Acquisition	342 turns	342 turns
Motor	DC brushless	DC brushless
Operating temperature range	-10 °C to +60 °C	-10 °C to +60 °C
Duty cycle	Duty cycle > 50 % (load-dependent)	Duty cycle > 50 % (load-dependent)
Interfaces	PROFIBUS-DP / CANopen	PROFIBUS-DP / CANopen
Cable outlets	Connector M12 / hybrid cable	Connector M12 / hybrid cable

The PowerDRIVE reduces the set-up times on format adjustment.



- ▶ DC brushless motor
- ▶ Compact spur gear
- ▶ Designs:
 - Compact with length of 163 mm
 - Short with length of 125 mm
 - Angled gear with total length of 221 mm
- ▶ Robust housing made of stainless steel (1.4301) or aluminium (AlMgSi), sealed using Viton
- ▶ Magnetic absolute multiturn sensor
- ▶ Operating temperatures
 - 10 °C to + 60 °C
- ▶ Integrated joystick



Variety also in the shaft connection

The positioning drives are designed for connection to the following shafts with a form-fit, clamped connection:

- ▶ Semi hollow shaft from 10 to 20 mm diameter
- ▶ 10 mm square / 10 mm solid shaft
- ▶ Flush hollow shaft (only form-fit)
- ▶ Angled gear with through hollow shaft 20 mm

Unrivalled in continuous cyclic operation

The innovative drive solution is optimised for usage in the food and feed industry.

High requirements are placed on machines for the food sector, as food must be transported, dispensed, packed and labelled under hygienic conditions. As such all areas of the machinery, above all the parts that carry product, must be easy to clean. Such machinery often operates continuously. To ensure a long service life, the drive solution used must not be overloaded. At the same time, the drives must operate quietly and evenly to prevent damage to delicate foods during transport. Clever, flexible drive technology that can be operated continuously is therefore required.

Drive solution for continuous cyclic operation

For continuous cyclic operation, Lenord + Bauer developed a cube-shaped PowerDRIVE with an edge length of only 80 mm and a nominal torque of 0.4 Nm. It is excellently suited to continuous cyclic operation at 0.25 Nm, 50 % duty cycle and a cycle time of 1 s. This positioning drive is equipped with a robust, incremental measuring system. The position of the shaft is referenced once per turn via a proximity switch input. This PowerDRIVE is also extremely compact and meets the requirements as per IP 67. At temperatures from -10 °C to +60 °C this positioning drive operates reliably over the long-term.

Quickly and easily disconnected

This variant is designed for connection to the PowerDRIVE-Box and is supplied with a hybrid cable outlet or hybrid connector. With the M23 quick-release connector, the positioning drive is quickly connected and just as quickly disconnected again. Along with the contacts to the power supply, there is a screened bus element for the communication in the connector. For maintenance and service work, the positioning drive can therefore be reliably and quickly disconnected from the power supply in a matter of seconds.

Tailored to the requirements

The installation of the PowerDRIVE is flexible and can be adjusted to the related application. The hygiene requirements have also been taken into account here. All external parts can be cleaned easily. If necessary, the drive can be removed or rotated easily to clean also the drive wheels if necessary.

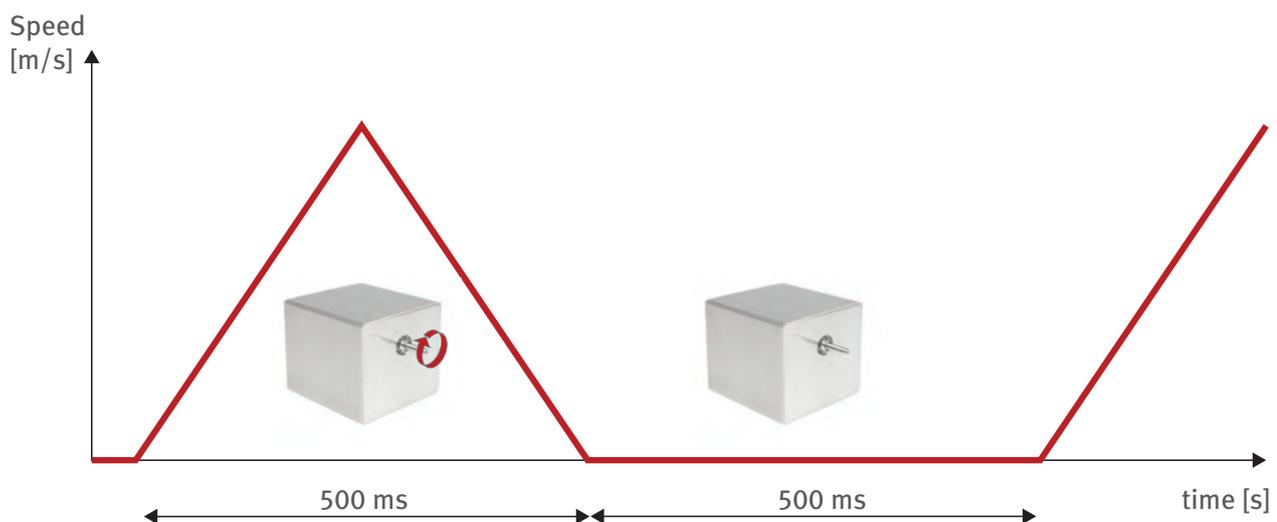
Technical data

PowerDRIVE	GEL 6108 – for continuous cyclic operation
Dimensions (W × H × D)	80 × 80 × 80 mm
Protection class	IP 67
Housing material	Stainless steel
Nominal torque	Positioning: 0.4 Nm (750 min ⁻¹ , duty cycle 25 %), continuous cyclic operation: 0.25 Nm (duty cycle 50 %, 500 ms)
Measuring system	Magnetic, incremental (single turn upon request)
Accuracy	± 7.5°
Acquisition	96 increments per turn, proximity input for referencing
Motor	DC brushless
Operating temperature range	-10 °C to +60 °C
Duty cycle	Duty cycle > 50 % (load-dependent)
Interfaces	CANopen
Cable outlets	M12 connector and hybrid cable

The PowerDRIVE operates reliably in continuous cyclic operation and is problem-free in relation to hygiene.



- ▶ DC brushless motor
- ▶ 0.25 Nm in cyclic operation (at 50% duty cycle, 500 ms)
- ▶ Operating torque 0.4 Nm
- ▶ Laser-welded stainless steel housing (1.4301), sealed using Viton
- ▶ Compact size (80 mm x 80 mm x 80 mm)
- ▶ Incremental measuring system with proximity switch input for referencing
- ▶ Optional with single turn absolute sensor



Full power with half the effort

The decentral control unit PowerDRIVE-Box minimises the wiring effort and has an extremely flexible interface.

Each positioning drive is part of a complete system and must be integrated into the plant control system. This task is very simple with the decentral control unit. Up to 5 PowerDRIVEs can be connected to the PowerDRIVE-Box. The motor power for the positioning drives connected is monitored and switched by the integrated power management in the PowerDRIVE-Box.

Simple, powerful communication

The communication with the plant control system is via the variable interface modules. Irrespective of whether PROFINET, EtherNet/IP, sercos III, EtherCAT, CANopen, PROFIBUS-DP or DeviceNet, all common interfaces are available with the plug-in modules. This flexibility of the interface eases component management and reduces the inventory costs.

Demanding applications

The PowerDRIVE-Box comes in a compact housing made of die-cast aluminium for mounting on top hat rails. For particularly demanding applications, a variant with stainless steel housing and cable glands is available. This variant meets the requirements of protection class IP 69K. As such it is suitable for installation outside the switch cabinet in food production plants.

The hybrid cables of the positioning drives are fixed directly to the easily accessible spring-cage terminals to ensure a simple and economical connection work. It is recommended to use a 24 V DC / 40 A voltage-stabilised power supply unit.

Safe shut-down

The supply of power to the motor and logic in the positioning drives is separate. As such the drives can also be shut down via certified safety relays. In this case the drive is shut down safely. At the same time the state monitoring remains in operation. Essential requirements from the new Machinery Directive can therefore be met.

With the aid of the auto-configuration and automatic parameter settings, the intelligent PowerDRIVE-Box simplifies commissioning and ensures the PowerDRIVEs are integrated efficiently. In the case of an error, the positioning drive can be switched back on either via the higher level control system or directly on the PowerDRIVE-Box using push-buttons.

Technical data

PowerDRIVE-Box	GEL 6505A – IP 20	GEL 6505B – food grade / IP 69K
Logic supply	24 V DC / 1 A	
Motor supply	24 V DC / 40 A	
Dimensions (W × H × D)	188 × 120 × 56 mm	250 × 250 × 100 mm
Protection class	IP 20	IP 69K
Housing material	Aluminium cast	Stainless steel
Assembly	Top hat rail	Installation outside the switch cabinet
Connection of PowerDRIVEs	5	
Possible interface modules	PROFINET-I/O, EtherNet/IP, sercos III I/O profile, EtherCAT, PROFIBUS-DP, CANopen, DeviceNet	
Operating temperature range	-10 °C to +60 °C	
Features	Integrated power management / auto-configuration of the PowerDRIVEs / Motor protection and cable protection integrated into PowerDRIVE-Box	

The PowerDRIVE-Box optimises component management.

IP 20 design



- ▶ Integrated power management for up to 5 PowerDRIVES
- ▶ Electronic fuse for cable protection
- ▶ Plug-in interface modules
- ▶ Robust housing made of stainless steel or die-cast aluminium
- ▶ Automatic configuration and setting of parameters for the PowerDRIVES
- ▶ Easy to install connection technology with PowerDRIVE-Connect

IP 69K design



EtherCAT[®]



PROFI[®]
NET



PROFI[®]
BUS



EtherNet/IP[®]



CANopen[®]



sercos[®]
the automation bus



DeviceNet[®]



Efficient integration in the control system

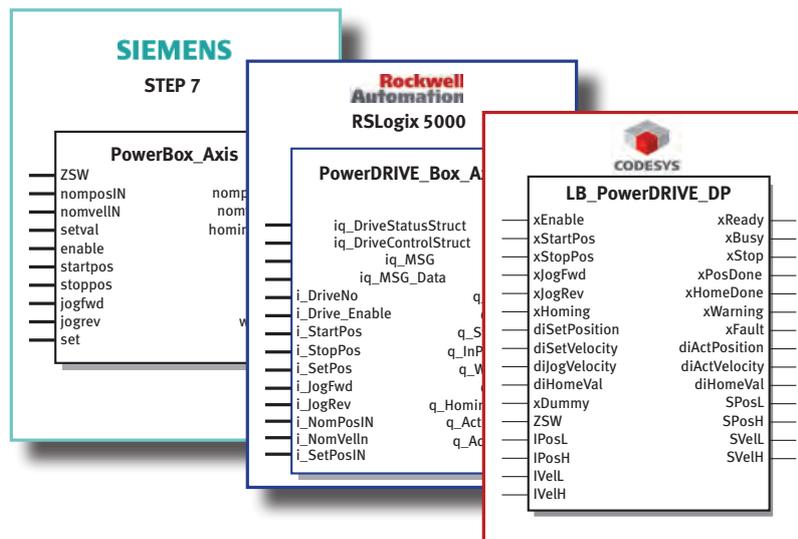
Pre-defined templates and software modules minimise the engineering effort and reduce the commissioning costs.

Time is money, particularly in the software, testing and commissioning area. We support you with pre-defined software function blocks for CODESYS, STEP7® and RSLogix software, the integration of the PowerDRIVE-System in existing applications.

Function blocks for the direct coupling of the PowerDRIVES via CANopen or PROFIBUS-DP to the higher level control system are available to the user. The function blocks are simply instanced to suit the number of PowerDRIVES in the application.

Lenord + Bauer also offers, free of charge, function blocks and templates for the integration of the PowerDRIVE-Box in the control system concept. These are matched to the plug-in module's bus system and provide the communication with the plant control system.

As such the function blocks significantly ease the integration of the PowerDRIVE-System into the plant control system and save time and money during software engineering and during commissioning.



Function blocks already exist for these control systems

Manufacturer	Control system	Bus system	Programming system
Siemens	S7 300/400	PROFIBUS-DP and ProfiNET I/O	STEP 7
ELAU / Schneider	C200/400/600	PROFIBUS-DP	CODESYS V2.3
	PacDRIVE3	PROFIBUS-DP	CODESYS V3.1
	PacDRIVE3	sercosIII	CODESYS V3.1
Eaton	V1xx	CANopen	CODESYS V2.3
Janz	eMPC	CANopen	CODESYS V2.3
AMK	A5	EtherCAT	CODESYS V2.3
Lenze	Lenze (3200C)	EtherCAT	CODESYS V3.0
Rockwell	CompactLogix	Ethernet IP	RSLogix 5000

Application support and training

We support our customers right from the time an automation solution is planned and accompany the entire process, with focus on the individual customer.



The expertise acquired in automation technology allows Lenord + Bauer to provide its customers with a high level of knowledge already at the time of planning and project engineering of machines, plants and systems. Together with our customers we develop hardware and software concepts and specify individual products and sensors.

Our sector and product management is engaged in professional dialogue with the customer. Requirements are addressed on site at customer's facility and problems are analysed together. This is how innovative automation solutions are created at Lenord + Bauer.

According to customer's requirements, we offer our support during project engineering and commissioning. Our software specialists develop applications, software modules and couple devices from other manufacturers via various fieldbus systems. We focus on the function of the machines or system as a whole, not only our own product. We never leave our customers „out in the cold“; we work with them to find solutions for virtually any challenge.

During project engineering or after successful commissioning, we provide intensive instruction and training. Challenge us! We look forward to your automation task and a successful cooperation.

Service and contact



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You are looking for a competent contact person or the relevant employee for your topic in our company. Our call centre will be happy to assist you!
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You urgently need the products, or have questions on delivery conditions, repairs or status of a current order. Our Customer Centre assists you with business queries!
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You have technical questions concerning our products? Do you need help with commissioning? Our competent support staff in the office will be happy to offer you advise and practical help.
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