Electronic odometer
GEL 2510
for rail vehicles

LENORD +BAUER
... automates motion.

Technical information ***Version 08.12***

General

- Energy self-sufficient and compact sensor for the contactless acquisition of mileage
- Magnetic sensor technology is robust and durable, and also resistant to dirt, oil, humidity and vibration
- Reliable and exact mileage acquisition
- Non-volatile storage of the mileage, as well as axle and wagon information
- Monitoring of temperature thresholds using integrated temperature sensor
- High EMC performance and interference immunity, ATEX approved
- Authenticated, wireless data transmission using RFID reader
- Maintenance-free sensor with long service life without battery

Features

- High protection class IP 68
- Energy self-sufficient, no batteries
- High vibration resistance IEC 6173 cat. 3
- Ignition protection II 2 G EEx ib IIB T4
- Operating temperature -40 °C to +85 °C

Advantages

- Easy, tamper-proof installation in bearing cover, can be retrofitted
- Maintenance-free and durable as no battery and no mechanical wear parts
- Safe even in potentially explosive atmospheres
- Convenient data evaluation with secure RFID data transmission
- Integrated temperature threshold monitoring

Fields of application

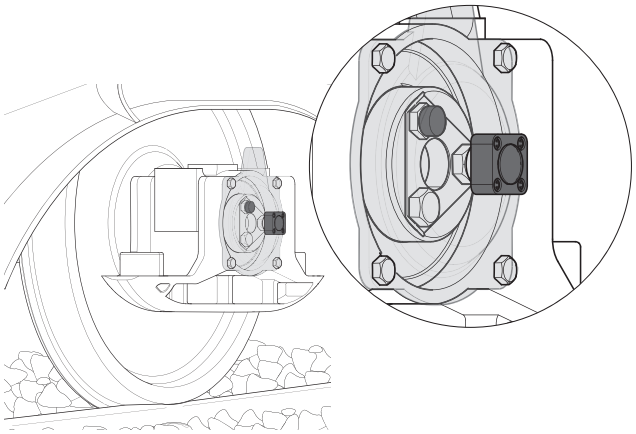
- Railway goods wagons and tank wagons, also in potentially explosive atmospheres.

Internet: www.lenord.de
E-Mail: info@lenord.de
Phone: +49 208 9963–0
Fax: +49 208 676292
Lenord, Bauer & Co. GmbH
Dohlenstraße 32
46145 Oberhausen, GERMANY

Description

Construction and design

The GEL 2510 was specially developed for the reliable and exact acquisition of the mileage of carrying axles on rail vehicles. The maintenance-free and energy self-sufficient sensor obtains the necessary energy from the rotary movement of the axle and transmits the mileage and wagon data acquired to a mobile terminal using RFID.
The measuring system comprises a magnet assembly that, e.g., is fastened to the pressure plate for the wheel bearing, and the GEL 2510. The latter is mounted on the exterior on the wheel bearing cover and features a low overall height of 25 mm. Due to the contactless magnetic scanning, the measuring system is mechanically de-coupled from the axle.



GEL 2510 mounted on wheel set bearing cover with magnet assembly mounted underneath

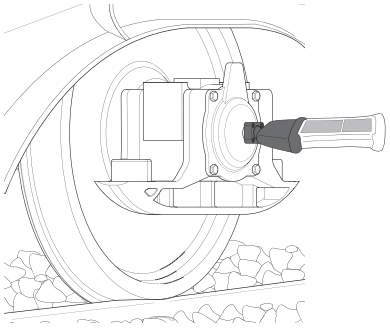
To be able to equip the most common wheel bearing types, 4 housing shapes are available. As a result the GEL 2510 can be integrated into existing wheel sets without the need for design modification.
The fastening screws are protected by the protective caps, these caps are firmly pressed on after assembly. The protective caps cannot be removed without damaging them, as a result tampering can be detected at any time.
The odometer GEL 2510 is certified in accordance with ATEX, ignition protection II 2 G EEx ib IIB T4, and can be used in potentially explosive atmospheres.
The odometer does not contain any wear parts and does not require a battery, as a consequence it is completely maintenance-free and extremely durable.

Function

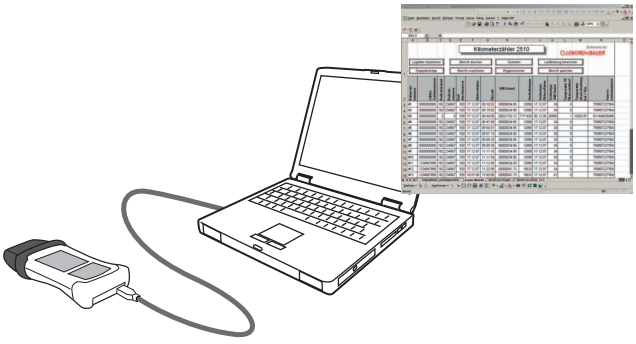
The odometer is mounted in the existing wheel set bearing cover such that the active surface on the sensor can reliably detect the magnetic field from the magnet assembly.
If the wagon is in motion, the magnet rotates with the axle and therefore moves past the odometer's sensor surface. During this process it induces in the odometer pulses that are counted to acquire the mileage. Along with the mileage, the odometer registers any temperatures that exceed the stipulated temperature thresholds. In addition, the pulses provide the necessary energy to operate the odometer. The data acquired is saved in an internal non-volatile memory. The internal memory can be read or written using a reader while the wagon is stationary.

Programming and data transmission

To program the odometer and to read the data acquired a mobile reader with additional RFID communication modules is used. The reader, an industrial PDA of type TDS Recon X, is equipped with a touchscreen and keypad and is available as an accessory.
To transmit data, the coil cover on the mobile reader is placed against the odometer with the wagon stationary. To ensure error-free data transmission, the reader outputs an acoustic warning signal which is muted on correct alignment.



During each transmission all the data are read electronically, an error due to reading or allocating the data incorrectly is therefore not possible.
The data in the odometer are encrypted to protect them against unauthorised access. They can only be read using the related reader.
The data transmission and configuration are undertaken using the application software RW2510. The software is installed on the reader in the factory and makes it possible to read, edit and write data in conjunction with the electronic odometer. Upon request the software can be customised for the specific customer, e.g. with access restrictions.



The data is transmitted from the reader to the PC via a USB port. The data collected can be further processed using common Office applications, ERP systems or maintenance programs.

Technical data - odometer GEL 2510

Odometer GEL 2510	
Power supply	No external supply (power is produced by a magnet/coil system while the axle rotates; the power is induced into the reader by the handheld that reads out the odometer data)
Rated voltage (internal)	6 V DC in readout mode; 4-19 V DC in run mode
Operating and storage temperature	-40 °C - +85 °C
Humidity	0-98%, condensing
Protection class	IP 68
EMC	according to EN 50121-3-2
Shock/vibration	according to IEC 61373, Cat. 3
Explosion protection	according to ATEX Directive 94/9/EC
Explosion-protection class	II 2G EEx ib IIB T4
Certificate number	BVS 06 ATEX E027
Type test	according to EN 50155
Air gap between magnet and odometer	3.5 mm ±3 mm
Material for odometer housing	aluminium AlSi12, anodised
Weight of odometer	approx. 250 g
Weight of magnet assembly	approx. 125 g (MG 25101)
Recording velocity	from 30 rpm
Maximum volocity	> 1200 rpm
Temperature monitoring	threshold 70 °C and 85 °C

Technical data - reader 2510PPC

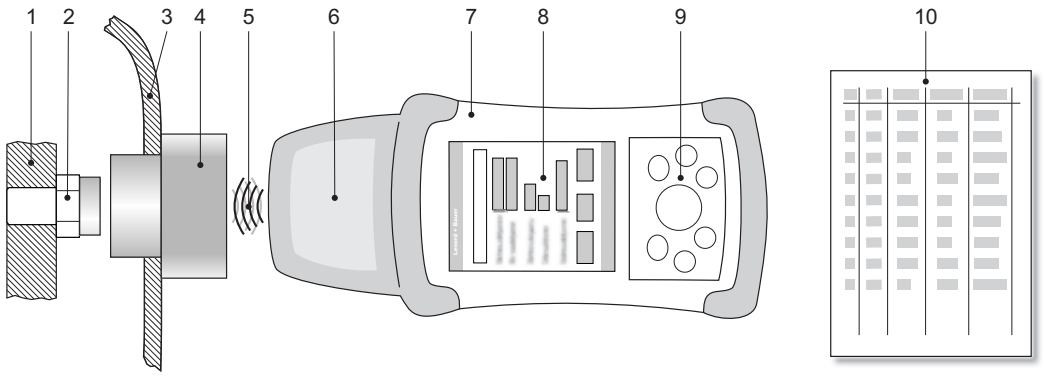
Reader 2510PPC	
Operating temperature	-30 °C to +60°C
Storage temperature	-40 °C to +70°C
Memory	256 MB Flash
Processor	400 MHz Intel PXA255 X-Scale processor
Display	TFT color display
Protection class	IP 67
Vibration	MIL-STD 810F, method 514.5 procedure I & II
Length	165 mm
Width	95 mm
Height	45 mm
Weight	490 g incl. battery pack

Technical data - magnet assembly MG 25104 / MG 25105

Magnet assembly MG 25104 / MG 25105	
Design • MG 25104 • MG 25105	Magnet on screw M20 × 60 M20 × 65
Property class DIN ISO 4017	10.9

Reader

Measuring system – construction



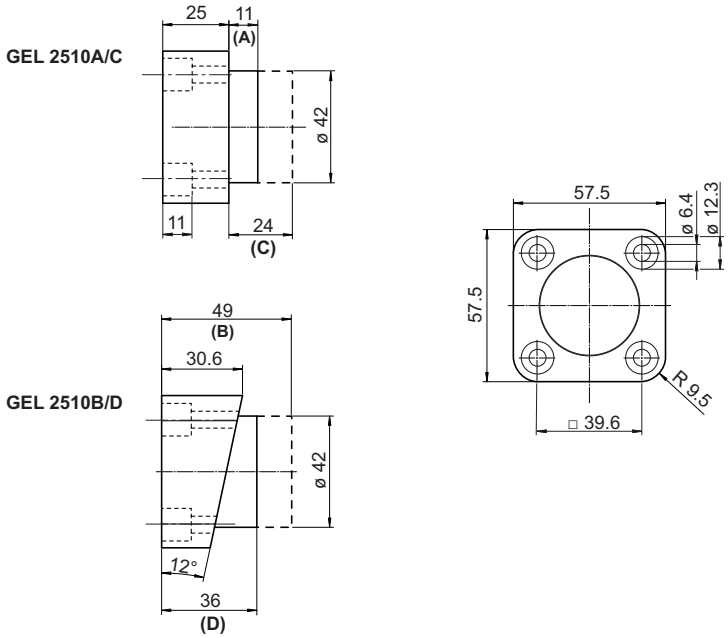
1 Pressure plate on the wheel bearing
2 Magnet assembly
3 Wheel set bearing cover
4 Odometer GEL 2510
5 RFID field
6 RFID communication modules
7 Reader (industrial PDA TDS Recon X)
8 Data display and entry screen (touchscreen)
9 Control panel (navigation keys)
10 Table with saved data (external application)

Parameters saved

Parameter	Explanation
Serial number	Odometer serial number as per rating plate
Mileage	Value currently saved in the odometer (calculated from the number of wheel revolutions and the specific wheel diameter configured for the wheel set)
Wheel set type and wheel set number	Unique identification and allocation
Wheel diameter	Value configured for the wheel set. Can be corrected at any time (e.g. after re-profiling the wheel) to increase the accuracy. The kilometres counted up to this point are retained and the count is continued with the new diameter.
Vehicle keeper marking	Factory-programmed identification number for the odometer owner (VKM in accordance with ERA-OTIF)
Wagon number	Standardised identification data (UIC); optional information
Last read on ..... at ...	Date of the previous read action saved in the odometer Related mileage
Reconfigured on ... at ...	Date of the last write action saved in the odometer Related mileage
Temperature > 70/85 °C (yes/no)	Status indication for exceeding the temperature of 70 °C and/or 85 °C in the past
Counter reading	Number of wheel revolutions acquired up to now
Save cycles	Number of times the mileage has been saved
Resolution DZ	Mode of operation set in the configuration mode: Standard = normal operation Test = higher resolution for short test distances; after a distance of approx 11 km the odometer switches automatically to Standard
Resolution PWRF	
Chip ID	Identification number of the RFID chip used in the odometer
Firmware version	Odometer firmware version currently loaded

Dimensional drawings

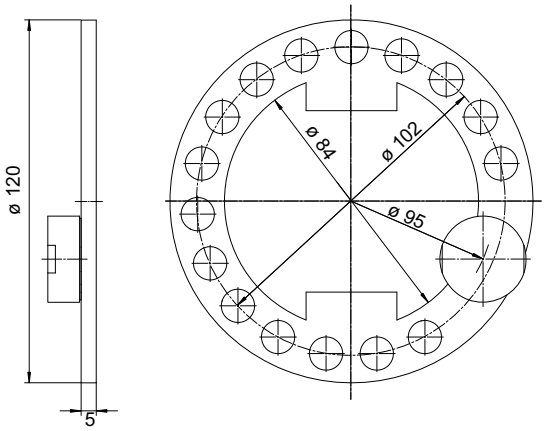
Odometer GEL 2510 with design A / B / C / D



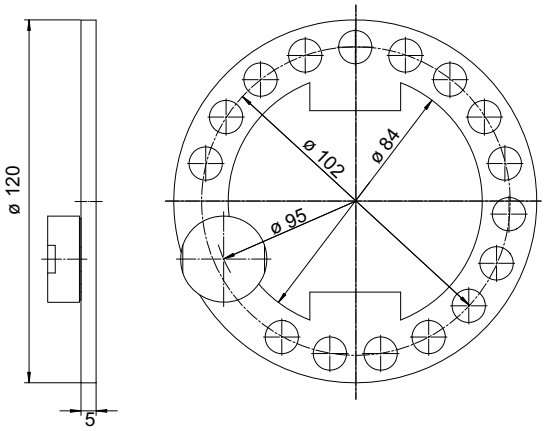
All figures in mm

Magnet assemblies

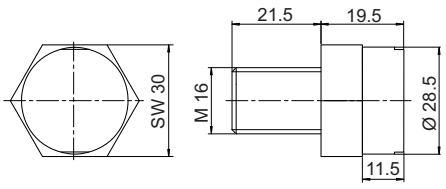
MG 25102



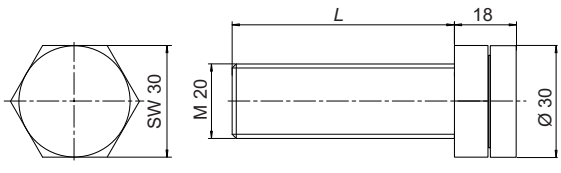
MG 25103



MG 25101



MG 25104 / MG 25105



L =	60	MG 25104
	65	MG 25105

All figures in mm

Type code, accessories

Type code

		Version
	A	Short and straight
	B	Long and angular
	C	Long and straight
	D	Short and angular
2510	_	

Note: Customer-specific modifications to mechanical and electrical features are in principle possible. Such special designs have the identifier GEL 2510Y..., are manufactured to drawing or application description, and can vary from the standard technical specification.

Mounting kit

The mounting kits are included in the scope of supply of the GEL 2510.

Design	Mounting kit	Scope of supply
A	MB 25101	1 mounting kit: 1 gasket set, 4 fastening screws, 4 pairs of Nordlock locking washers, 4 protective covers for fastening screws
B	MB 25102	1 mounting kit: 1 gasket set, 4 fastening screws, 4 pairs of Nordlock locking washers, 4 protective covers for fastening screws
C	MB 25101	1 mounting kit: 1 gasket set, 4 fastening screws, 4 pairs of Nordlock locking washers, 4 protective covers for fastening screws
D	MB 25102	1 mounting kit: 1 gasket set, 4 fastening screws, 4 pairs of Nordlock locking washers, 4 protective covers for fastening screws

Accessories

Description	Order no.
Magnet assembly, screw M16 x 21.5	MG 25101
Magnet assembly, locking ring, magnet right	MG 25102
Magnet assembly, locking ring, magnet left	MG 25103
Magnet assembly, screw M20 x 60	MG 25104
Magnet assembly, screw M20 x 65	MG 25105
Industrial PDA type TDS Recon X (handheld) with RFID communication modules and application software RW2510	2510PPC

EXAM
BBG Prüf- und Zertifizier GmbH

(1) # EG-Baumusterprüfbescheinigung

(2) **- Richtlinie 94/9/EG -**
Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen

(3) ## BVS 06 ATEX E 027

(4) **Gerät:** **Umdrehungszähler Typ GEL 2510**

(5) **Hersteller:** **Lenord, Bauer & Co. GmbH**

(6) **Anschrift:** **46145 Oberhausen**

(7) Die Bauart dieses Gerätes sowie die verschiedenen zulässigen Ausführungen sind in der Anlage zu dieser Baumusterprüfbescheinigung festgelegt.

(8) Die Zertifizierungsstelle der EXAM BBG Prüf- und Zertifizier GmbH, benannte Stelle Nr. 0158 gemäß Artikel 9 der Richtlinie 94/9/EG des Europäischen Parlaments und des Rates vom 23. März 1994, bescheinigt, dass das Gerät die grundlegenden Sicherheits- und Gesundheitsanforderungen für die Konzeption und den Bau von Geräten und Schutzsystemen zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen gemäß Anhang II der Richtlinie erfüllt.
Die Ergebnisse der Prüfung sind in dem Prüfprotokoll BVS PP 06.2011 EG niedergelegt.

(9) Die grundlegenden Sicherheits- und Gesundheitsanforderungen werden erfüllt durch Übereinstimmung mit

EN 50014:1997 + A1 – A2 Allgemeine Bestimmungen
EN 50020:2002 Eigensicherheit ´i´

(10) Falls das Zeichen „X" hinter der Bescheinigungsnummer steht, wird in der Anlage zu dieser Bescheinigung auf besondere Bedingungen für die sichere Anwendung des Gerätes hingewiesen.

(11) Diese EG-Baumusterprüfbescheinigung bezieht sich nur auf die Konzeption und die Baumusterprüfung des beschriebenen Gerätes in Übereinstimmung mit der Richtlinie 94/9/EG.
Für Herstellung und in Verkehr bringen des Gerätes sind weitere Anforderungen der Richtlinie zu erfüllen, die nicht durch diese Bescheinigung abgedeckt sind.

(12) Die Kennzeichnung des Gerätes muss die folgenden Angaben enthalten:

II 2G EEx ib IIB T4

EXAM BBG Prüf- und Zertifizier GmbH
Bochum, den 02. März 2006

Zertifizierungsstelle Fachbereich

Dinnendahlstraße 9 44809 Bochum Telefon 0234/3696-105 Telefax 0234/3696-110

We have agencies in:
Austria
Belgium
Canada
China
Czech Republic
Denmark
Finland
France
Germany
Great Britain
Israel
Italy
Korea
Malaysia
Netherlands
Norway
Portugal
Sweden
Switzerland
Spain
Turkey
USA

LENORD +BAUER
... automates motion.

Lenord, Bauer & Co. GmbH
Dohlenstraße 32
46145 Oberhausen, GERMANY
Phone: +49 208 9963–0
Fax: +49 208 676292
Internet: www.lenord.de
E-Mail: info@lenord.de

IRIS Certification ISO 9001 ISO 14001