# Testing and programming unit
# GEL 211
## for sensors with sin/cos output 1 $V_{PP}$

LENORD +BAUER
... automates motion.

***Technical information*** ***Version 01-2016***

## General information

- Testing any sensors with sin/cos output 1 $V_{PP}$, e.g. MiniCODER
- Transmitting the data via WLAN to mobile terminals (tablet, PC etc.)
- Display of the data in a web browser, independent of the operating system

- Used for checking the signals for compliance with adjustable tolerance limits
  - sin/cos signals (amplitude, offset, phase offset)
  - Reference signal (amplitude, offset, position and width)
  - Target wheel (damage, concentricity, quality of the teeth)
- Defining and saving different tolerance limits

- **MiniCODER plus**: Used for setting the parameters
  - Automatic calibration of the sin/cos signals
  - Configuring/reading the operating hours counter
  - Saving the 7 configured speed ranges for the operating hours counter in one record
    Possible to save several records in the GEL 211

## Features

- Compact device suitable for mobile use
- Data display on terminals with web support

## Advantages

- **Eases assembly:** Due to the fast evaluation of the measured signals, the interactive correction of the signals and the graphic evaluation, the analysis of the signals is extremely straightforward.
- **Optimises maintenance and service work:** Diagnostics and parameter configuration on the MiniCODER plus are undertaken in the installed state, e.g. without opening the spindle. This aspect is particularly convenient and efficient.
- **Increases the reliability:** The measured values from the analysis and the spindle histogram are documented automatically by the generation of the report, which can be printed out and saved.

## Field of application

- Servicing and commissioning machine tools
- Servicing and commissioning HSC spindles
- Servicing and commissioning motors



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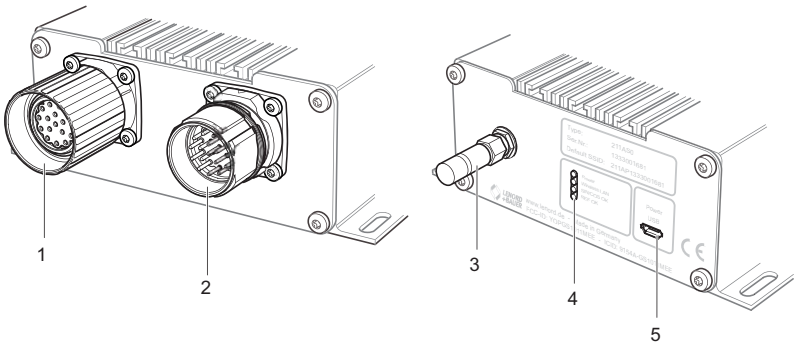
# Description

## Construction

The testing and programming unit can be integrated into an existing measuring circuit / test station or operated separately.

### Unit overview



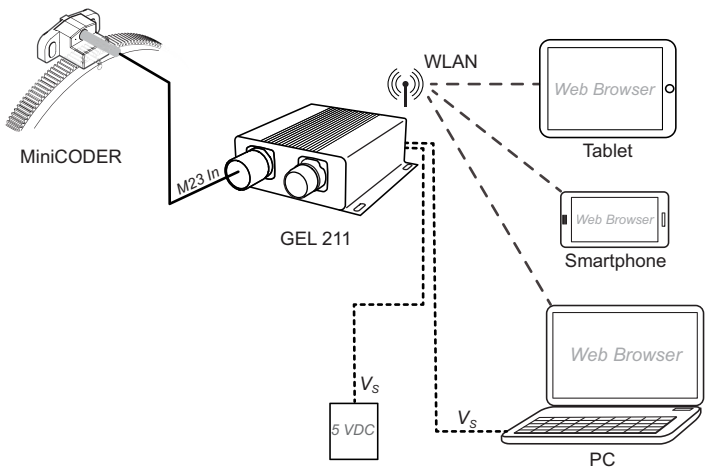

1 Input; female connector M23, 17-pin: Connection to the sensor (e.g. MiniCODER)
2 Output; male connector M23, 17-pin: Connection to measuring circuit / test station
3 WLAN antenna
4 LED displays (status indication for POWER; Wireless LAN; SIN/COS OK; REF OK)
5 Micro-USB port (type B): Supply voltage 5 V

For the duration of the analysis and configuration of the parameters the sensor[1] is connected to the female input connector.
Power is supplied to the unit and the sensor connected via

- the 17-pin male output connector or
- the Micro-USB female connector (connection of plug-type power supply unit, PC, laptop etc.).

Sensor signals are checked for compliance with the tolerance limits using the GEL 211. For this purpose different tolerance limits can be saved and retrieved.

### Application example




*Testing and programming unit as a mobile unit*
*separate power supply via Micro-USB plug-type power supply unit or PC*

[1] only MiniCODER plus

## Functionality

The functionality of the testing and programming unit is dependent on the sensor type.

| Function | | MiniCODER comfort | | MiniCODER plus |
|---|---|---|---|---|
| | | GEL 2444K_R | GEL 2444K_1 | GEL 2444K_P |
| Signal analysis: SIN/COS | ▶ Amplitude (peak-to-peak) of the sin/cos signals<br>▶ Amplitude difference (synchronism error)<br>▶ Offset on the sin/cos signals<br>▶ Phase difference between sin and cos signals | ✓ | ✓ | ✓ |
| Signal analysis: REF | ▶ Amplitude of the reference signal<br>▶ Quiescent level of the reference signal<br>▶ Position and width | ✓ | ✓ | ✓ |
| Tooth wheel analysis (1) | ▶ Concentricity and circularity of the tooth wheel via the fluctuation in the SIN/COS signals<br>▶ Quality of the teeth and signal quality via the standard deviation of the BQ value<br>▶ Identification of damage on the target wheel via the difference between $BQ_{min}$ and $BQ_{max}$. Damage to the tooth structure is apparent due to noticeable steps in the analysis curve. | ⛔ | ✓ | ✓ |
| Automatic sensor calibration | ▶ Optimising the amplitude synchronism<br>▶ Stepwise reduction/increase in the amplitudes of the sin/cos signals<br>▶ Minimising the offset on the sin/cos signals<br>▶ Commissioning wizard for the optimisation of the assembly times with automatic analysis reporting | ⛔ | ⛔ | ✓ |
| Analysis reports | ▶ Preparing the report with the measured values from signal analysis SIN/COS and REF and tooth wheel analysis | ✓ | ✓ | ✓ |
| Operating hours counter | ▶ Defining 7 speed ranges<br>▶ Retrieving and saving the operating hours<br>▶ Retrieving and saving the number of start-ups<br>▶ Preparing an operating hours report | ⛔ | ⛔ | ✓ |
| Information on the sensor | ▶ Reading the spindle number (assignment of the spindle)<br>▶ Reading the type code and serial number for the identification of the sensor<br>▶ Total operating time of the sensor<br>▶ Temperature peaks in the sensor: highest and lowest measured temperature | ⛔ | ⛔ | ✓ |
| Information on the GEL 211 | ▶ Firmware version<br>▶ Serial number<br>▶ WLAN SSID | ✓ Independent of the sensor | | |

✓ Function can be used
⛔ Function cannot be used

Explanation to sensor type
**R** with internal amplitude regulation
**1** without internal regulation
**P** configurable

(1) The tooth wheel is analysed with the aid of a mathematically defined evaluation quotient (BQ value).

# Description

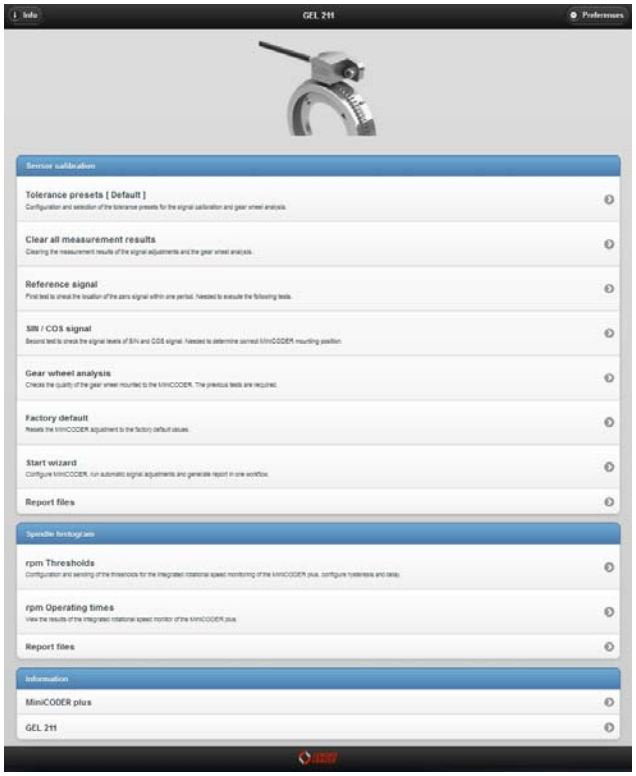
## User interface

The testing and programming unit communicates via WLAN with a client with web support (PC, tablet etc.) and is controlled via the web interface. For this purpose a modern browser and a modern operating system for mobile terminals is required:

- Firefox 10+
- Safari 5.0+
- Chrome 16+
- Opera 10+
- Android 3.0+
- iOS 5.0+
- Internet Explorer 9+ (not recommended)

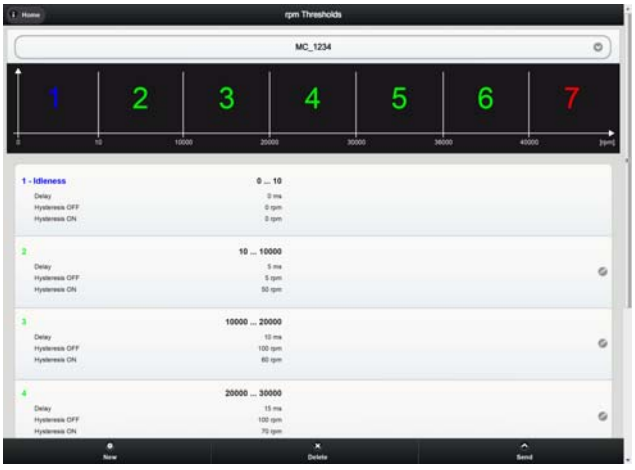
The user interface can be opened via the IP address of the unit.

The web interface has been developed for mobile terminals such that it can be used even with small displays. For optimal operation a display with a screen diagonal of 7 inches or larger is recommended.




*Start screen for the web interface*


*Display of the SIN/COS signals for the signal analysis information on the tooth-to-tooth values and indication of the average values over one turn*



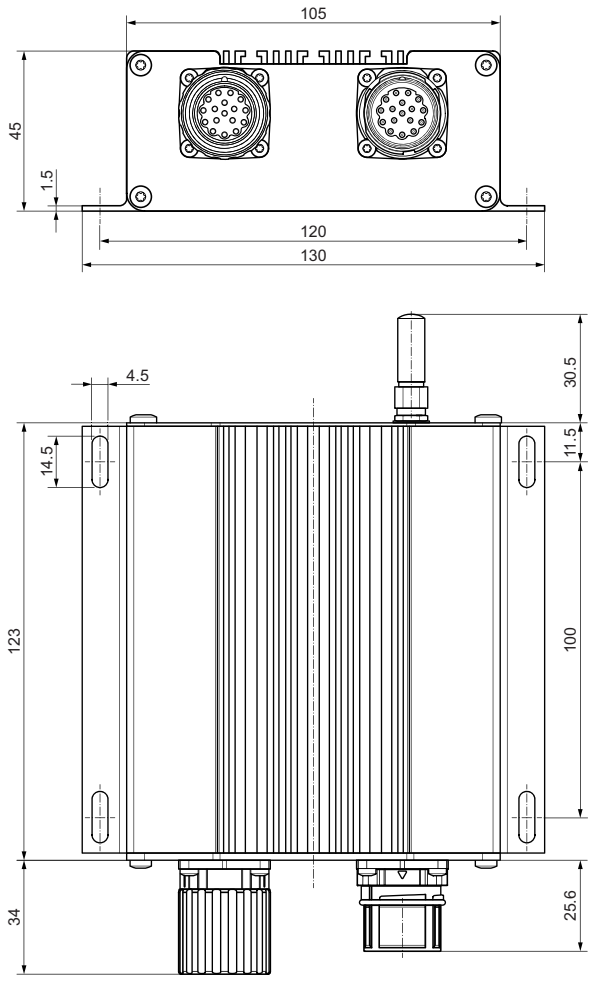

*Definition of speed ranges for the MiniCODER plus*


*Duration of operation in different speed ranges display of the configurable operating hours counter in the MiniCODER plus*

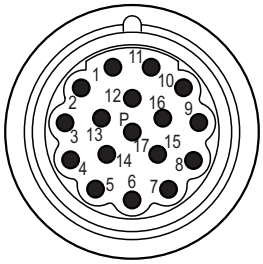
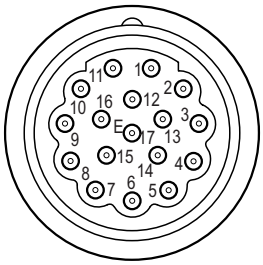
| | |
|---|---|
| **Electrical data** | |
| Supply voltage<br>• Current consumption via USB port | 5 V DC<br>≤ 500 mA |
| Connections | Micro-USB (type B)<br>Signal output: M23 female connector, 17-pin;<br>Signal input: M23 male connector, 17-pin |
| Data transmission | WLAN<br>Report files: WLAN or USB |
| WLAN module approvals | FCC ID: YOPGS1011MEE<br>IC ID: 9154A-GS1011MEE |
| **Mechanical data** | |
| Housing material | Anodised aluminium, black |
| Weight | Approx. 0.5 kg |
| **Ambient data** | |
| Operating temperature range | 0 °C … +70 °C |
| Storage temperature range | -20 °C … 85 °C |
| Protection class | IP 20 |
| Maximum relative humidity of air | 80% |
| Condensation | Not permitted |

# Dimensional drawings

**Dimensional drawing GEL 212**



**Pin layout**

| M23 connection | Pin | Signal | Function |
|---|---|---|---|
|  <br>*Input (female contacts)*<br>*Connection of the sensor* | 1 | SIN+ | Signal track 1 |
| | 2 | SIN- | Inverse signal track 1 |
| | 3 | REF+ | Reference track (zero signal) |
| | 7 | 0 V | Earth encoder supply (GND) |
| | 10 | $U_B$ | Encoder supply +5 V |
| | 11 | COS+ | Signal track 2 |
| | 12 | COS- | Inverse signal track 2 |
| | 13 | REF- | Inverse signal reference track |
|  <br>*Output (male contacts)* | 4 - 6<br>8 - 9<br>14 - 17 | | No evaluation |
| | The pin layout corresponds to the MiniCODER standard. Connections with the same number (1–9, 11–17) are connected through (exception: encoder supply, pin 10). | | |

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