Testing and programming unit **GEL 211**

for sensors with sin/cos output 1 $V_{\mbox{\scriptsize PP}}$ and reference signal



Technical information

Version 2014-09



General information

- Testing any sensors with sin/cos output 1 V_{PP} and reference signal, 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 readings from the operating hours counter 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

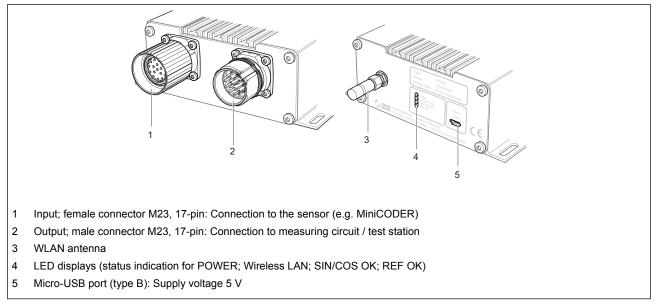
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Description

Construction

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

Unit overview



Sensor signals are checked for compliance with the toler-

ance limits using the GEL 211. For this purpose different

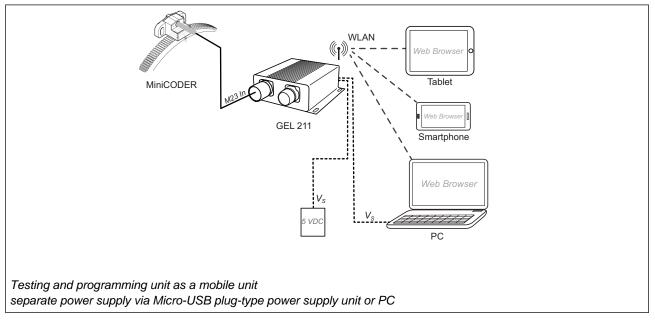
tolerance limits can be saved and retrieved.

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 plugtype power supply unit, PC, laptop etc.).

Application example



(1) only MiniCODER plus

Functionality

The functionality of the testing and programming unit is dependent on the sensor type. A differentiation is made between the following sensor types:

 MiniCODER comfort: Any sensors with sin/cos output (1 V_{PP}) and reference signal GEL 2444K_1xxxxxx: with reference signal, without internal regulation GEL 2444K_Rxxxxxx: with reference signal and internal amplitude regulation
 MiniCODER plus: GEL 2444K_PGxxxxxx: configurable MiniCODER

Overview of functions

| | | Sensor type | | |
|--|--|---|----------------|--|
| Function | | MiniCODER comfort | MiniCODER plus | |
| Signal analysis: SIN/COS | Amplitude (peak-to-peak) of the sin/cos signals Amplitude difference (synchronism error) Offset on the sin/cos signals Phase difference between sin and cos signals | Ø | Ø | |
| Signal analysis: REF | Amplitude of the reference signal Quiescent level of the reference signal Position and width | Ø | 0 | |
| Tooth wheel analy- sis ⁽¹⁾ | Concentricity and circularity of the tooth wheel via the fluctuation in the SIN/COS signals Quality of the teeth and signal quality via the standard deviation of the BQ value 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. | Ø | 0 | |
| Automatic sensor calibration | Optimising the amplitude synchronism Stepwise reduction/increase in the amplitudes of the sin/cos signals Minimising the offset on the sin/cos signals Commissioning wizard for the optimisation of the assembly times with automatic analysis reporting | • | 0 | |
| Analysis reports | Preparing the report with the measured values from sig- nal analysis SIN/COS and REF and tooth wheel analy- sis | Ø | 0 | |
| Operating hours counter | Defining 7 speed ranges Retrieving and saving the operating hours Retrieving and saving the number of start-ups Preparing an operating hours report | • | 0 | |
| Information on the sensor | Reading the spindle number (assignment of the spindle) Reading the type code and serial number for the identification of the sensor Total operating time of the sensor Temperature peaks in the sensor: highest and lowest measured temperature | 0 | 0 | |
| Information on the GEL 211 | Firmware version Serial number WLAN SSID | Independent of the second s | of the sensor | |

Function can be used

Function cannot be used

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

Description

User interface

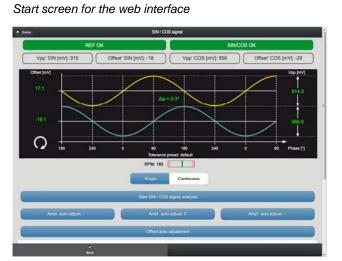
The testing and programming unit communicates via WLAN with a client with web support (PC, tablet etc.) and is controlled via the web interface. For this purpose a modern browser and a modern operating system for mobile terminals is required:

- 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.

| ** | QEL 211 | Prelanacca |
|---|------------------------------|--------------------------------|
| Sensor calibration | | |
| Tolerance presets Configuration and association of the biterance presents for the signal calibration and gear wheel analysis | al i | 0 |
| Clear all measurement results Charge the measurement muchs of the signal adjustments and the past wheel analysis | | 0 |
| Reference signal Fast text to check the location of the para signal within one partial. Needed to execute the following | Made. | 0 |
| SIN / COS signal Second test to check the signal levels of the SIN and COB signal. Needed to determine the casted | MostCODER resurfug position. | 0 |
| Gear wheel analysis Checks the quality of the part wheel incorted to the MosCCODIN. The previous tests are required | | 0 |
| Factory default Result the ModCODER to the factory default values. | | 0 |
| Start wizard Configure MiniCOCER: run automatic signal adjustments, and persents report in ree workflow. | | 0 |
| | 0 === | |



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

| | | MC_1234 | | | 0 |
|--|----------|----------------------------|---------|----------|------|
| | 2 3 | 4 | 5 | 6 | |
| | 10000 | 25008 | 30000 > | 0000 400 | 00) |
| 1 - Idleness | | 0 10 | | | |
| Delay Hysteresis OFF Hysteresis ON | | 0 ma 0 spm 0 spm | | | |
| í. | | 10 10000 | | | |
| Delay Hysteresis OFF Hysteresis ON | | 5 ma 5 spm 53 spm | | | 0 |
| í. | 100 | 90 20000 | | | |
| Detay Hysteresis OFF Hysteresis ON | | 10 ma 100 rpm 60 rpm | | | 0 |
| | 200 | 00006 00 | | | |
| Delay Hysteresis OFF Hysteresis ON | | 15 ms 100 rpm 70 rpm | | | |
| - | . | × | | <u>.</u> | |

Definition of speed ranges for the MiniCODER plus

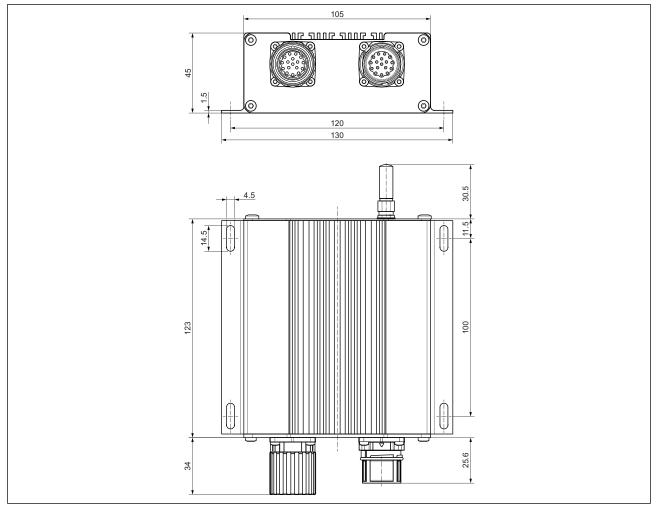
| | perating times | | | |
|------------|---|--|---|--|
| Sp | andle: FR123 | | | |
| 6.0% | 15.1% | 18.9% | 125 | 42% |
| 2000 20000 | 30000 | 36000 | - 4000 |) pp |
| Time (M | | Rafis | | 6 |
| 48:12:07 | | 38.7 % | | |
| 9:00:47 | | 7.2% | | |
| 7:25:20 | | 8.0 % | | |
| 18.45:12 | | 15.1 % | | |
| 23-35:58 | | 18.9% | | |
| 12:15:33 | | 9.8 % | | |
| 5:17:07 | | 42% | | |
| 76:19:55 | | | | |
| 124:32:02 | | | | |
| 276:08:00 | | | | |
| | 40% 2000 70% 2000 70% 2000 4412207 800.47 72520 184512 223556 184512 223556 184512 223556 184512 223556 1845202 | 2000 2000 2000 Tanapi 48:1227 90047 72529 18:45:12 22:3556 12:1533 5.1797 79:19:55 12:4529 | B/X 53.7% 16.2% 0000 3000 3000 3000 Time (I) None 400 3000 Time (I) None 3000 3000 1000 3000 3000 3000 2020 60.5% 14.12.07 22.5% 12.15.33 8.8 % 51.707 4.2 % 78.19.55 12.45.202 12.45.202 12.45.202 | BD 53.75 H.BP BP 000 2000 3000 3000 excel 7000 3000 3000 excel excel 72520 6.0 % 14.8 % excel 15.1 % 72553 8.4 % 51707 4.2 % 15.1 % 781855 124.5202 excel 15.1 % 15.1 % |

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

| Electrical data | | | | |
|----------------------------------|--|--|--|--|
| Supply voltage | 5 V DC | | | |
| Current consumption via USB port | ≤ 500 mA | | | |
| Connections | Micro-USB (type B) | | | |
| | Signal output: M23 female connector, 17-pin; | | | |
| | Signal input: M23 male connector, 17-pin | | | |
| Data transmission | WLAN | | | |
| | Report files: WLAN or USB | | | |
| WLAN module approvals | FCC ID: YOPGS1011MEE | | | |
| | 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



Connection

Pin layout

| M23 connection | Pin | Signal | Function | |
|---|--|----------------|--------------------------------|--|
| | 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 | |
| Input (female contacts) Connection of the sensor | 11 | COS+ | Signal track 2 | |
| | 12 | COS- | Inverse signal track 2 | |
| | 13 | REF- | Inverse signal reference track | |
| $ \begin{pmatrix} \bigcirc 110 & 10 \\ \bigcirc 16 & 012^{20} \\ \bigcirc 0 & 0E_{O}(7, 13) \\ \bigcirc 0 & 015 & 040 \end{pmatrix} $ | 4 - 6 8 - 9 14 - 17 | | No evaluation | |
| Output (male contacts) | 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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Subject to technical modifications and typographical errors. The latest version can be downloaded at www.lenord.com.

