This sensor is designed to measure rotational movement and angular speed, e.g. steering wheel angle and steering wheel speed.

In order to achieve this, the sensor is using the giant magneto resistive (GMR) effect. The detection of the absolute angle is realized by means of toothed measuring gears with different ratio including small magnets. Corresponding GMR elements that change their electrical resistance according to the magnetic field direction detects the angle position of the measuring gears.

The measured voltages are A/D converted and a microcontroller performs the angle calculations. The steering angle and the steering angle speed are provided on a CAN-interface.

### Technical Specifications

**Mechanical Data**
- **Weight**: Approx. 34 g
- **Size**: 83 x 60 x 21.35 mm
- **Protection class**: IP5K0

**Electrical Data**
- **Power supply**: 7 to 16 V
- **Max input current**: < 150 mA
- **CAN speed**: 500 kbaud

### CAN Message

**CAN ID 01 0x2B0 LWS_Standard**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Value / Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6 5 4 3 2 1 0</td>
</tr>
<tr>
<td>0</td>
<td>LWS_ANGLE</td>
</tr>
<tr>
<td>1</td>
<td>LWS_ANGLE</td>
</tr>
<tr>
<td>2</td>
<td>LWS_SPEED</td>
</tr>
<tr>
<td>3</td>
<td>Reserved</td>
</tr>
<tr>
<td>4</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

**CAN ID 02 0x7C0 LWS_Config**

<table>
<thead>
<tr>
<th>Byte</th>
<th>Value / Bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>6 5 4 3 2 1 0</td>
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<tr>
<td>0</td>
<td>Reserved</td>
</tr>
<tr>
<td>1</td>
<td>CCW</td>
</tr>
</tbody>
</table>

### Signal Overview

**OK**: Failure status
- 1 Sensor information valid
- 0 Sensor information invalid, an internal sensor fault occurred

**CAL**: Calibration status
- 1 Sensor calibrated
- 0 Sensor not calibrated

**TRIM**: Trimming Status
- 1 Sensor trimmed
- 0 Sensor not trimmed, this is handled as a sensor failure (OK = 0)
CCW | Command code word
---|---
3h | Sets the signal LWS_Angle to 0°
5h | Resets the calibration status of the angle

**Characteristics**

**Steering Wheel Angle**
- Measuring range: ± 780°
- Absolute physical resolution: 0.1°
- Nonlinearity: ± 2.5°
- Hysteresis: 0° to 5°

**Angular Speed**
- Measuring range: 0 to 1016°/s
- Over range limit: ± 2,500°/s
- Absolute physical resolution: 4°/s

**Connectors and Wires**
- Connector: Bosch 7 pole
- Mating connector: F 02U B00 656-01
- Pin 1: Gnd
- Pin 2: 12 V
- Pin 3: CAN High
- Pin 4: CAN Low
- Pin 5: Not connected
- Pin 6: Not connected
- Pin 7: Not connected

**CAN Parameters**
- Byte order: LSB (Intel)
- CAN speed: 500 kbaud
- CAN update rate: 100 Hz / 10 ms

**Installation Notes**

The LWS can be connected directly to most control units and data logger systems via CAN bus.

Please avoid abrupt temperature changes.

Please ensure that the environmental conditions do not exceed the sensor specifications.

Please find further application hints in the offer drawing.

A zero adjustment is needed before using the sensor for the first time. To do so, reset the calibration with CCW = 5h. After resetting the calibration, a new calibration needs to be started with CCW = 3h. The sensor is now newly calibrated and can be used immediately.

Zero the sensor after every assembly.

**Safety Note**

The sensor is not intended to be used for safety related applications without appropriate measures for signal validation in the application system.

**Ordering Information**

Steering Wheel Angle Sensor LWS
Order number: F 02U V02 894-01

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**Dimensions**

![Dimensions Diagram](image-url)