

SWOBODA LEVELLING SENSOR MODULE FOR AUTOMOTIVE APPLICATIONS



Swoboda levelling sensor modules are suitable for various automotive applications.

Swoboda reserves the right to apply changes to its products without prior notice.

INTRODUCTION

Within automotive applications, rotational angular levelling sensor systems are primarily used for automatic headlight levelling control and for advanced active (air) suspension control systems.

With an annual sales volume of several million units and multiple mass production facilities in Europe, China and America, Swoboda is a leading supplier of these sensor systems.

FEATURES & BENEFITS

- Modular system approach combining standard sensor modules with customizable mounting assemblies (levers, linkages, brackets)
- Supply voltage 4.5 V to 5.5 V
- Over voltage protection +24V
- Reverse voltage protection -14 V
- Angular range 0-360°
- Operating temperature range -40 to 125 °C
- Totally encapsulated housing with IP67 & IP9K rating
- Customer specific mechanical interface
- Available with various electrical interfaces:
 - Analog, 12 Bit
 - PWM 12 Bit, 150 to 2000 Hz
 - PSI5, 10 to 16 Bit, High/Low speed
 - SENT, 16 Bit
- Customer specific transfer function available on request
- 100% end of line testing and programming
- Full traceability, also including DMC laser marking

ADVANTAGES

- Functional, compact, robust and technically mature
- Standard off-the-shelf sensor modules
- Customer specific mechanical interface
- Customer specific electrical interface
- Fully automotive qualified and proven in use since 20 years
- Specific environmental qualifications

APPLICATION AREAS

- Automatic height level control systems for modern LED and HID headlight systems
- Active suspension & ride control systems
- Advanced air suspension systems
- On-board weighting (OBW) systems

Any questions about this product?

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PRINCIPLE OF OPERATION

The purpose of a modern automotive levelling sensor system is to measure the damper travel of each wheel or each axle in relation to the car body. Depending on the individual vehicle application and existing customer requirements up to four sensor modules are installed (one per each wheel). For simple static headlight, levelling control one sensor is sufficient while dynamic headlight adjustment requires two sensors (one per each axle). Active chassis control systems such as DCC (Dynamic Chassis Control) usually require three or four sensors.

In a typical application the levelling sensor system is connected to the car axle as well as to the car body to measure the relative up/down movement of the car axle. Since vehicle mounting locations vary tremendously the linkages and mounting brackets have to be customized for each specific vehicle platform. The sensor mechanics translates the linear up/down movement of the vehicle axle to an angular movement which is then converted to a related sensor output signal based on a pre-programmed transfer function. The sensor output signal(s) will be processed by the overlying electronics control unit (chassis ECU, headlight levelling ECU, etc.).

Various electronics sensor interfaces are existing in the market and supported by Swoboda. Usually the existing vehicle infrastructure determines which interface is required on sensor module level. Other than a conventional analog or PWM interface the modern PSI5 interface enables daisy-chaining of multiple sensor modules. It also allows the configuration and individual addressing of the different sensor systems. The standard protocols can be adjusted according to the customer preference and need (e.g. bit-Range, bit rate, timeslots, frequency, communication modes, error detection, transfer function).

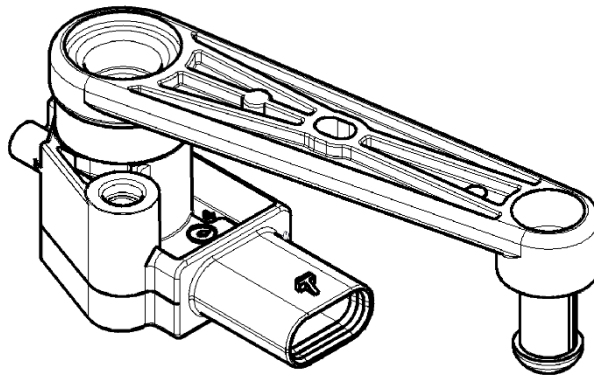
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SENSOR MODULE DETAILS:

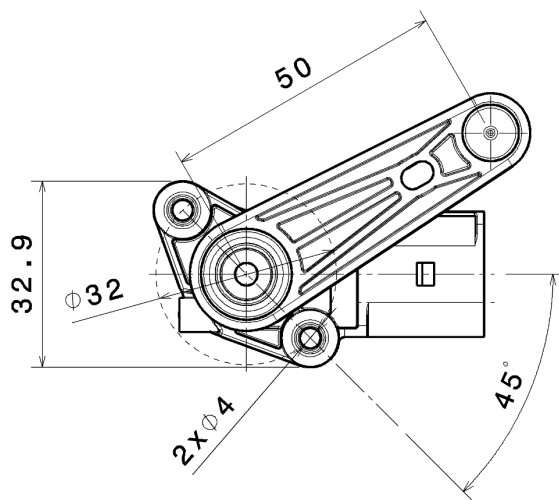
		
Full sensor assembly (ZSB) including linkage and brackets.	Rubber linkage	Mounting brackets
		
Plastics linkage with rubber ends	Stainless steel linkage with rubber ends	bent stainless steel linkage with rubber ends (customer specific)

Examples of typical brackets and linkages. Other designs are available on request based on customer specifications.

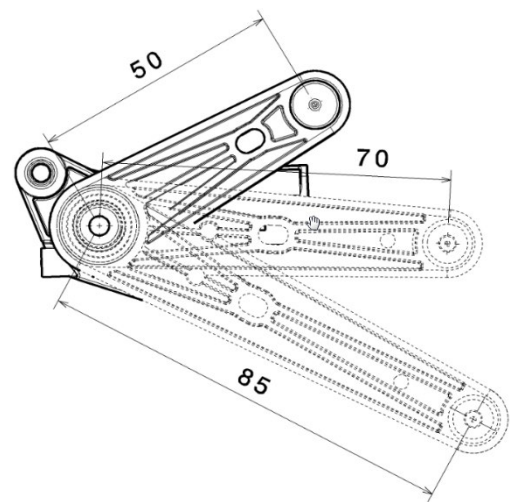
DRAWING:



Isometric 3D view of the Levelling sensor.



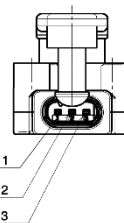
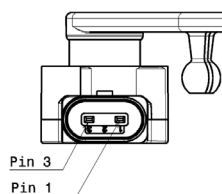
Key sensor module dimensions.



Customizable lever length.

Geraeteaufnahme 3-polig
passend zu Flachkontaktgehäuse/
Apparatus mounting 3-way to flat contact housing:
FEP Connector 42511400

Pinbelegung / Pin assignment
1: Ground
2: -
3: VCC / PS15 signal

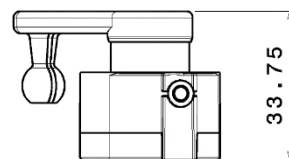
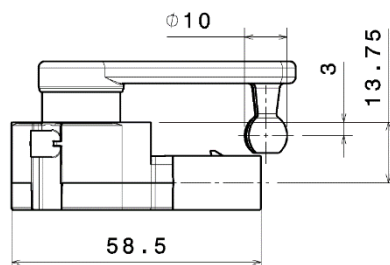


Geraeteaufnahme 3-polig
passend zu Flachkontaktgehäuse /
Apparatus mounting 3-way
matched to flat contact housing
Tyco: 1-1670917-1
Coding A

Pinbelegung / Pin assignment
1: VDD +5V
2: Out-Signal (Analog / analogue)
3: VSS Masse / GND

Pin assignment for PS15 output.

Pin assignment for analog, PWM & SENT output.



Example of customized lever design: "Pin-in" with "ball" head.

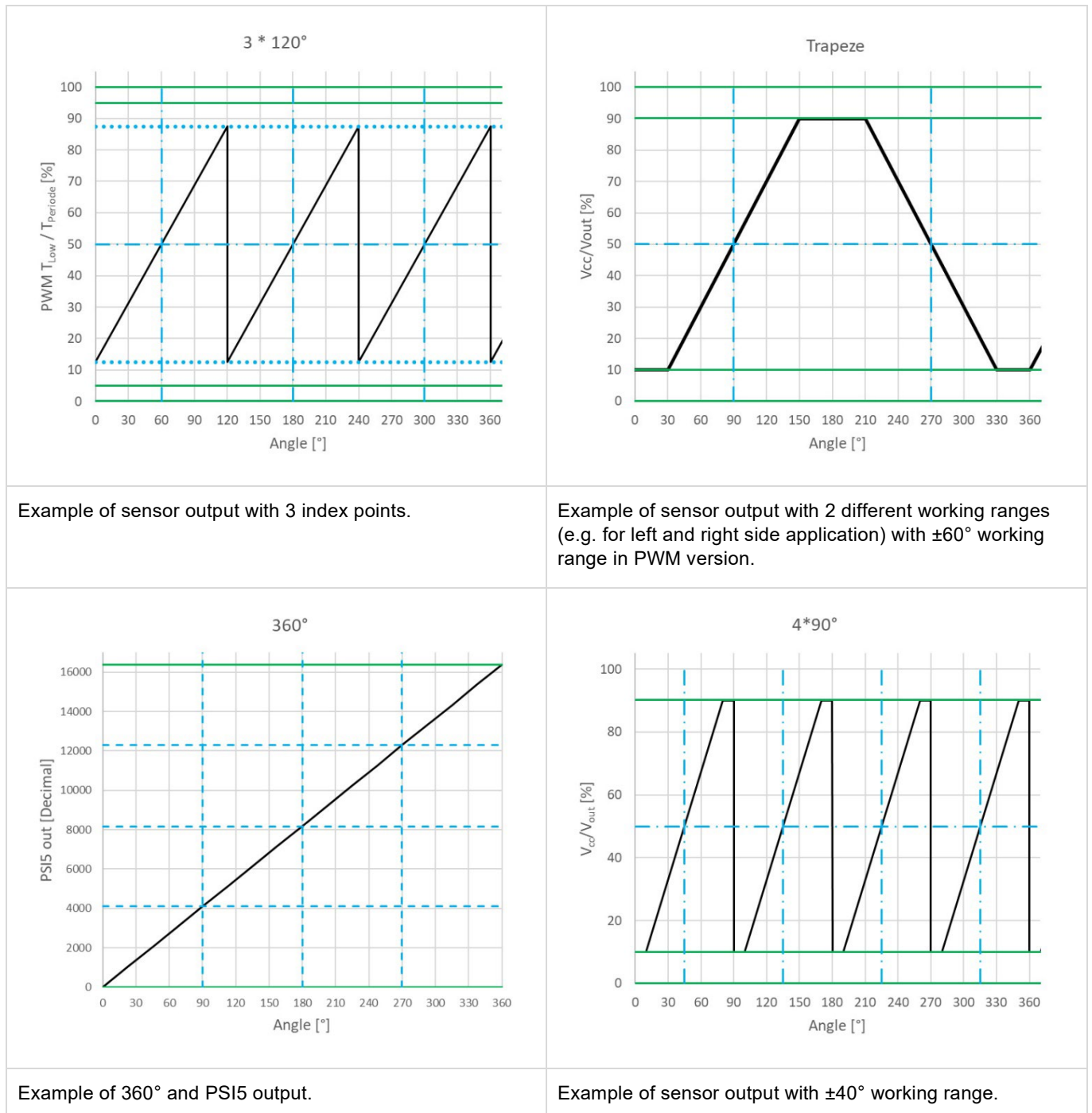
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NOMINAL OPERATING CHARACTERISTICS

Environmental requirements and technical specifications:

- Continuous Operating -40°C to +125°C / Survival (not powered) -40°C to +135°C
- Survival (paint rectification) +150°C for 1 hour
- Max Humidity (T > 0 °C) ~ 95%
- Magnetic field immunity up to 1000 A/m

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Examples of typical transfer functions (customizable on request) with different output formats and working ranges.