swoboda
technologies

SWOBODA SEAT TRACK POSITION SENSOR
FOR AUTOMOTIVE APPLICATIONS

The Swoboda Seat Track Position Sensor is compatible with most common seat tracks.

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

INTRODUCTION

Seat Track Position Sensors are primarily used to identify the position of the front seat in order to adjust the vehicle airbag based on how closely a human being is positioned to the respective airbag.
Usually Swoboda Seat Track Position Sensors are designed as a one-piece "pre-stressed" module which combines Hall-based sensor electronics and magnet in a compact housing. Other configurations such as two-piece sensor systems are also available on request.
All sensors are fully automotive qualified and can also be used in other application areas such as end switches for stowable seats or convertible roof rail mechanics.

ADVANTAGES

- Safety level ASIL-A
- Fully programmable sensor characteristics for maximum flexibility according to customer requirements
- High accuracy achieved by end-of-line programming
- Fully automotive (IATF 16949) qualified and proven in use
- Local manufacturing capabilities available on global level

FEATURES & BENEFITS

- Standardized one-piece sensor modules available, integrating electronics and magnet in a compact housing
- Customized outer sensor plastic housing to best possibly fit given building space and seat rail mounting requirements
- Fully automotive qualified according to customer requirements including ISO 26262 (ASIL-A) compliance for safety critical applications
- Wide operating voltage range
- Programmable switching points & output current range
- Integrated self-diagnostics functions
- Under-voltage lock-out protection
- Short term sample availability to support first functional tests on customer level at an early project stage
- Support for cable outlet as well as embedded connector designs

APPLICATION AREAS

- Seat track position
- Stowable seat position
- Convertible roof rail position
- Sun roof position
- Steering rack position
- Other switching applications

Any questions about this product?
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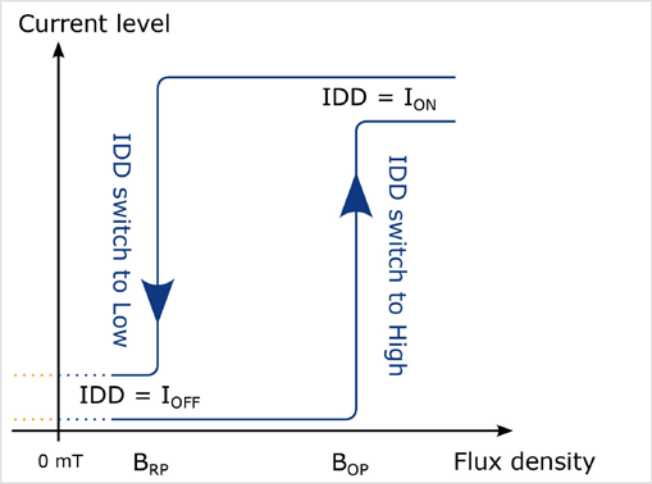
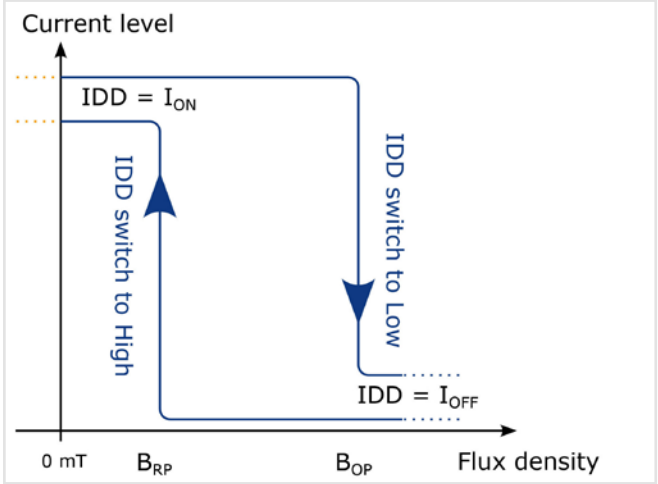
PRINCIPLE OF OPERATION

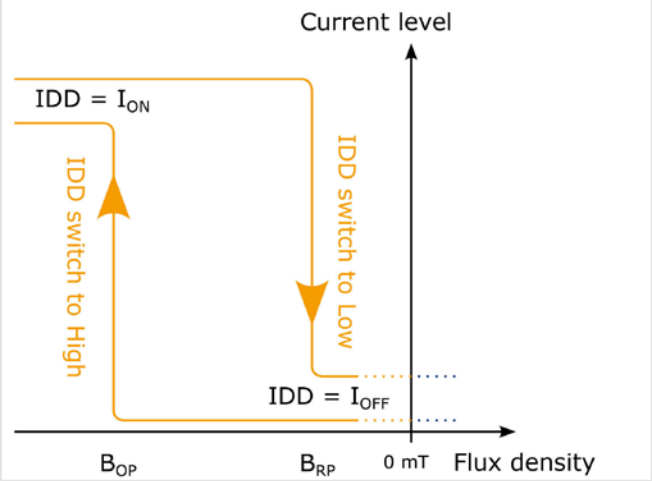
The one-piece sensor module is designed to measure the distance between two ferromagnetic elements like a simple switch. The built-in Hall-based sensor ASIC measures the flux density difference caused by an approaching or deviating ferromagnetic material. The closer the ferromagnetic material (e.g. the seat rail) is positioned towards the sensor module the higher the resulting flux density. The flux density switching levels of release point and operating point (BRP and BOP) are programmable depending on the given application requirements. When the flux density level is above or under these two pre-programmed switching points the sensor will set the output signal accordingly. Based on application requirements the sensor switching points can be programmed between South active pole and North active pole, either in standard or inverted output mode.



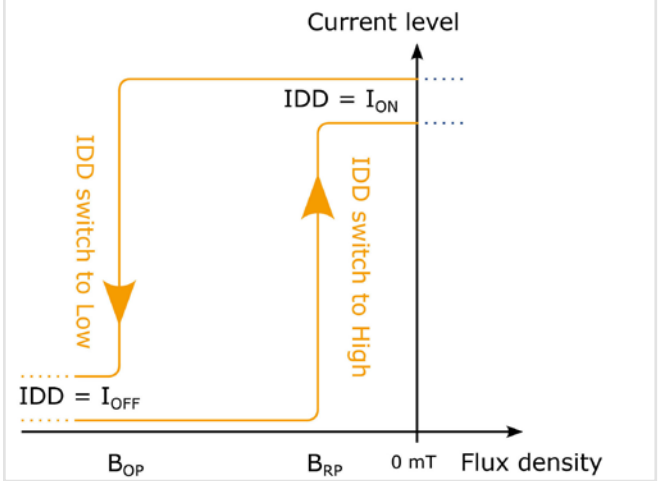
Direct South Active Pole



Inverted South Active Pole



Direct North Active Pole



Inverted North Active Pole

B_{OP}: flux density level, operating point *B_{RP}: flux density level, release point*

I_{ON}: Current On *I_{OFF}: Current Off*

For particular applications a two-piece sensor system can be beneficial, consisting of a standard sensor module and a separate magnetic target. Such modular sensor system will only detect the approaching magnetic target instead of any ferromagnetic part. In this case the sensor measures the magnetic flux difference between air and magnetic target.

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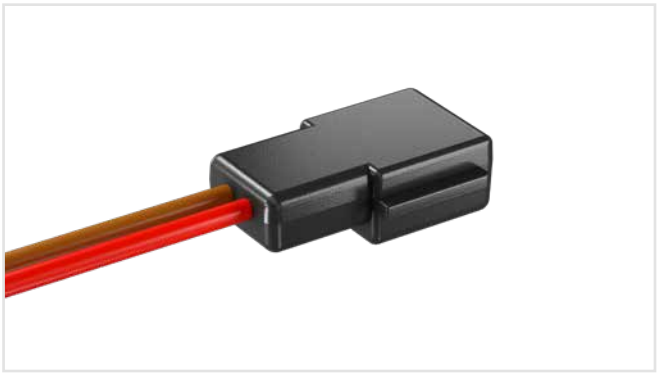
NOMINAL OPERATING CHARACTERISTICS

SIGNAL DESCRIPTION	UNITS	MIN.	NOM.	MAX.	REMARKS
Vcc	[V]	4	-	24	
Vcc typ	[V]		9		
Vrcc	[V]			-15	
Ambient temperature	[°C]	-40	-	85	
Storage temperature	[°C]		107		For 2.4 h
Protection			IP67		
Traceability					DMC code or other customer requirements
Direct Mode I_{OFF}	[mA]	2 to 5	or	5 to 6.9	For proper output signal level matching between sensor and the overlying customer electronics control unit (ECU) the output current level IOFF is programmable based on customer requirements.
Direct Mode I_{ON}	[mA]	12	to	17	
Inverted Mode I_{OFF}	[mA]	2 to 5	or	5 to 6.9	
Inverted Mode I_{ON}	[mA]	12	to	17	

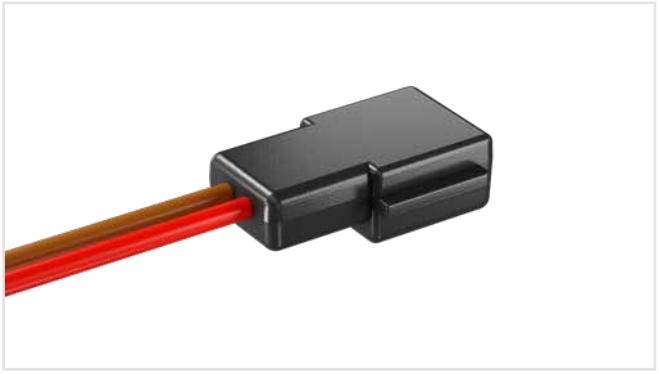
FOLLOWING THE THE STANDARD ONE-PIECE MODULE:



Standard one-piece sensor module, straight version

Standard one-piece sensor module, bent version

FOLLOWING THE FIGURE OF THE TWO-PIECE APPLICATIONS:



Standard sensor module

Separate target with embedded magnet

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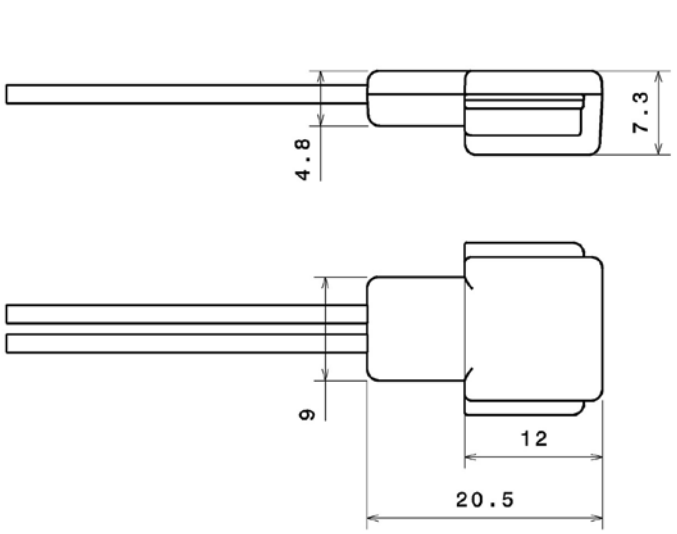
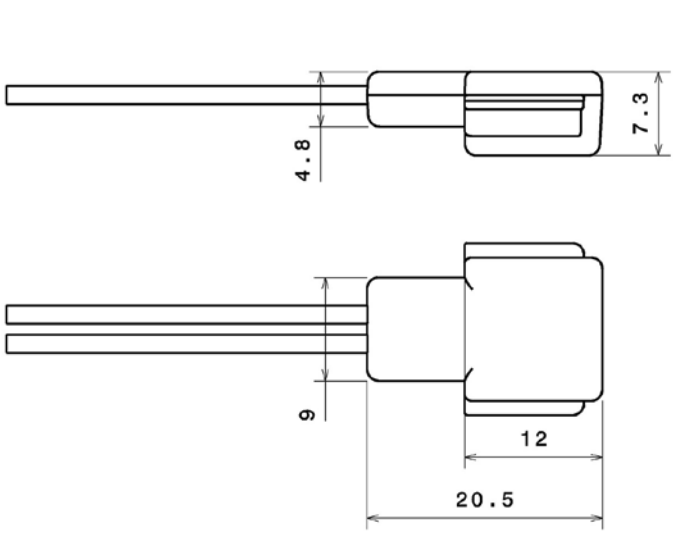
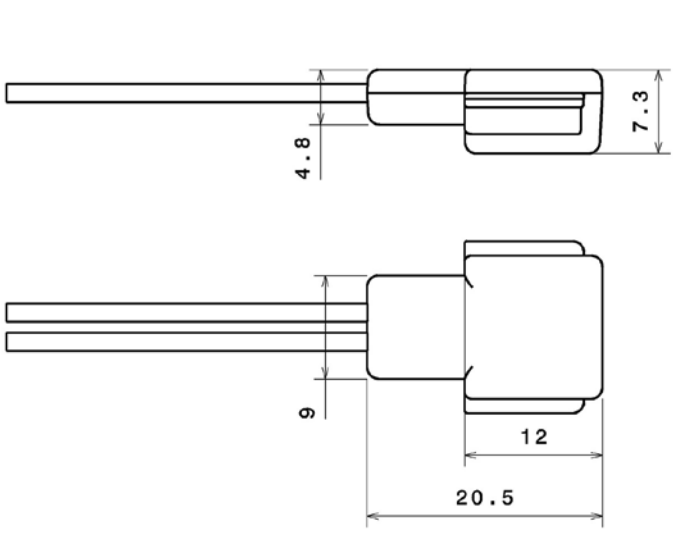
DRAWINGS



One-piece sensor module, straight version design



One-piece sensor module, bent version design



Two-piece system, sensor module design

Customized sensor module and target designs are available on request.

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