BRIEF INFORMATION

Particulate matter sensor PM 2.5

→ Monitors and controls the concentration of particulate matter precisely
→ Based on the optical principle of scattered light for particle detection
→ Fast response time of < 5 seconds enables reaction to environmental conditions to take place in real time

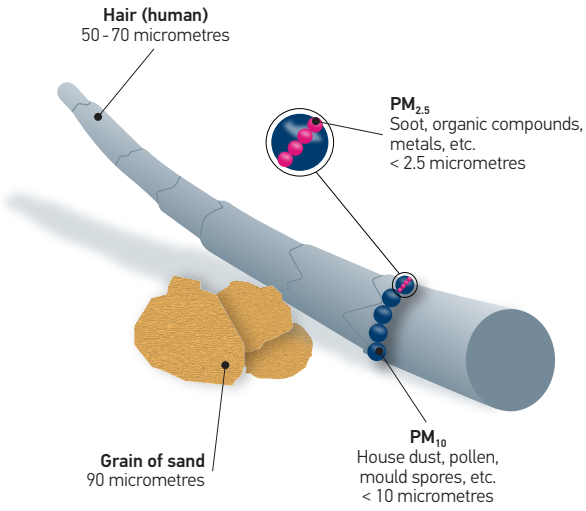
PRODUCT FEATURES

Application

The particulate matter sensor was developed for monitoring and measuring the quality of indoor air (in the cabin) and that of the intake air.

Particulate matter is one of the most dangerous pollutants for the human body. Because of their small size, the particles can penetrate deep into the lungs. Over a longer period of time, they can cause lung diseases such as bronchitis or asthma and even contribute towards cardiovascular diseases. With the PM 2.5 sensor, long-term damage to health caused by air pollution can be prevented if the sensor in the vehicle is used to bring about extended recirculation.

Size comparison of particulate matter



Design and function

The PM 2.5 sensor is integrated into the ventilation control system. Because of its compact design, the sensor can usually be placed in the same spot as where the air is to be sucked in. A cover cap is sufficient to prevent coarse dirt and water from entering the sensor. If the air is to be drawn in elsewhere, hoses for intake air and exhaust air must be laid there. The organising of such hoses can either be arranged by the customer or provided by HELLA following the relevant consultation.

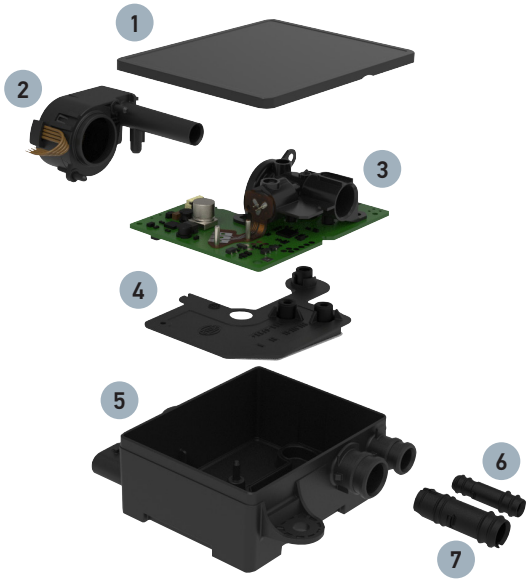
The PM 2.5 sensor detects and counts particles by means of light scattering: when air flows through the detection chamber, particles pass a laser beam which is scattered on the particles. The scattered light is received by a diode and converted into an electrical signal which is used to calculate the particle concentration.

The calculated values are transmitted to the vehicle via a LIN interface and thus signal to the air-conditioning system to switch, for example, to recirculation mode, before larger quantities of particulate matter enter the vehicle.

If two sensors are used, both the indoor and outdoor air quality can be monitored. This gives the user additional features such as an automatic air recirculation function or a filter service display as required.

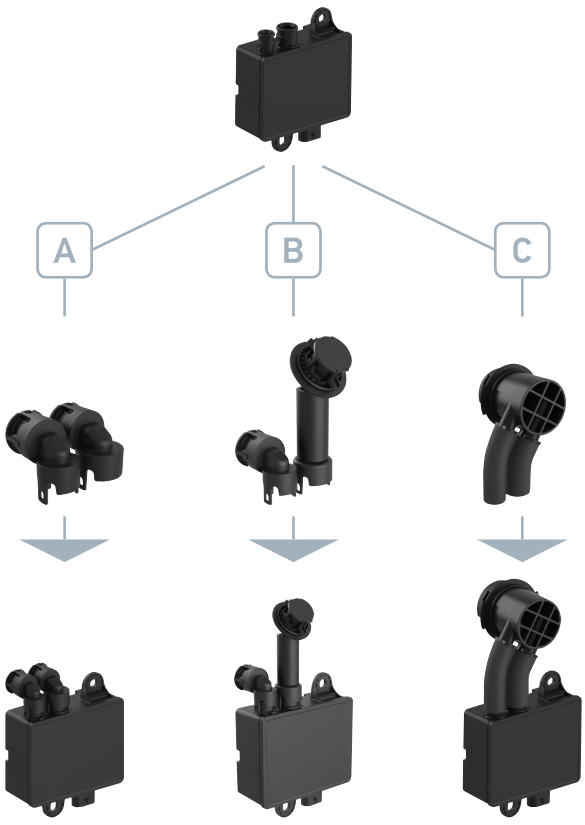
These measures help to significantly improve air quality in vehicle interiors and to reduce the health consequences of exposure to particulate matter. As a welcome side effect, vehicle operating costs can be reduced because the intervals at which filters are changed become significantly longer.

DESIGN CONCEPT PM 2.5 SENSOR



1) Housing cover
2) Fan and laser unit
3) Printed circuit board
4) Cover plate and filter
5) Lower part of housing and contact pins
6) Air outflow
7) Intake air

INSTALLATION EXAMPLES INSIDE THE CABIN



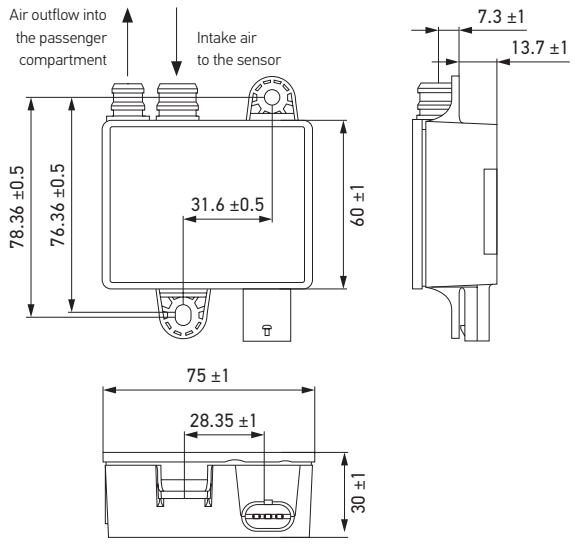
A) Air measurement in sensor environment
B) Air measurement at a different location with hose
C) Intake procedure on the filter box

TECHNICAL DETAILS

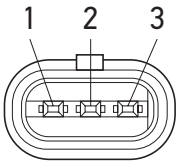
Technical data	
Operating voltage	8 V to 18 V
Operating temperature	- 40 °C to + 85 °C
Voltage	12 V
Relative air humidity	5 – 95 %
Interface	LIN
Overvoltage	18.5 V (1 h); 26 V (1 min.)
Max. supply current at 12 V	< 300 mA (< 3.6 W)
Mounting bracket	Connector must point to the side or downwards, not upwards
Protection class	IP 5K4K
Noise development	≤ 40 dB(A) at 0.5 m distance
Measuring range (inside / outside)	5 to 1,000 µg / m³
Particles*	0.3 µm to 5 µm
Response time	≤ 5 s
Resolution	1 µg / m³
Tolerances	5 µg / m³: at 5 to 50 µg / m³ + 10 %: at > 50 to 1,000 µg / m³ 10 µg / m³: at 10 to 50 µg / m³ 20 %: at > 50 to 1,000 µg / m³
Weight	< 150 g
Mating connector	Hirschmann 872-858-541**

* The air must be pre-filtered for particles > 50 µm and liquid water droplets.
** These accessories are not included in the scope of delivery. Available from Hirschmann.

Dimensional sketch

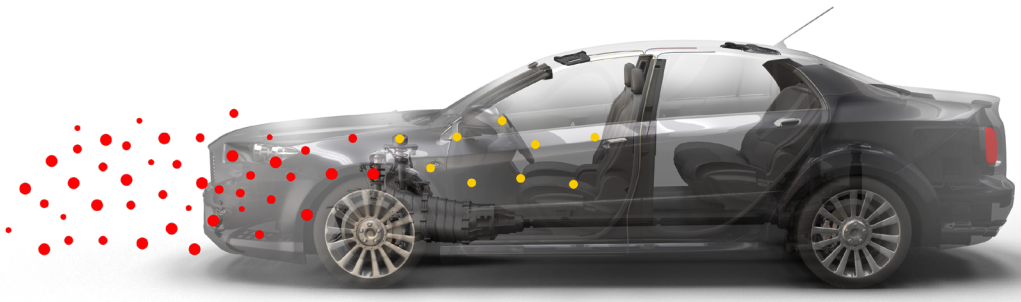


Pin assignment



1	GND
2	LIN
3	12 V

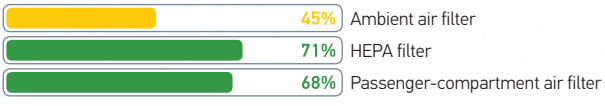
APPLICATION EXAMPLE



The following information, for example, can be called up on the vehicle display:

Display of air quality inside and outside the cabin

Display of the current filter effectiveness and filter load



PROGRAMME OVERVIEW

Product image	Description	Voltage	Part number
	Particulate matter sensor PM 2.5 for particles 0.3 µm to 5 µm	12 V	**On request***

* The sensors must be specially adapted to suit every vehicle model. All part numbers are therefore assigned on a customer-specific basis.

ACCESSORIES

Product image	Description	Part number
Air measurement in the immediate sensor environment		
	Mushroom head closures	**On request**
Air measurement at a different location with hose If the air is to be drawn in elsewhere, hoses for air intake and exhaust air must be laid there. The organising of such hoses can either be arranged by the customer or provided by HELLA following consultation.		
	A mushroom head closure and a hose with cover cap	**On request**
Intake procedure on the filter box		
	Connecting hoses with bayonet lock	**On request**