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Global Automotive Sensors Market – Sensor Types and Applications

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Abstracts

Global Automotive Sensors Market Trends and Outlook

Automotive Sensors are highly sophisticated devices, capable of detecting, analyzing, recording and responding to alterations in a variety of internal and external factors, such as temperature, pressure, light and motion by converting them into electrical signals. The information thus acquired is then transmitted to the vehicle's electronic control unit or to the driver directly in order that any variation from normal settings be acted upon forthwith, thereby ensuring the maximization of safety, efficiency and performance. Automotive Sensors form vital components that allow a vehicle to operate in a smooth and trouble-free manner. In terms of classification, these sensors can firstly be based on the physical characteristics they measure and secondly on the underlying technology used by them. With regard to the first criterion, the major types of Automotive Sensors include Pressure, Temperature, Position, Speed and Level Sensors, while the technological categorization comprises Capacitive, Ultrasonic, Infrared, Piezoelectric, Hall Effect and Resistive Sensors. Key applications of Automotive Sensors include Chassis, Exhaust Systems, Powertrain Systems, Safety & Security Systems, Telematics and Vehicle Body Electronics.

The development of efficient sensor technologies is being stimulated by innovations in technology, resulting in a perceptible transformation in Automotive Sensors. With the introduction of autonomous and semi-autonomous vehicles, requirement for sophisticated sensors, such as LiDAR, radar and cameras providing crucial navigation and safety systems data has increased significantly. Miniaturization, connectivity and integration are other factors that cause an enhancement in performance and reliability of Automotive Sensors. Furthermore, Artificial Intelligence (AI) and Machine Learning (ML) algorithms are being incorporated into sensors for enabling effective processing of

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data to improve vehicle safety and functionality.

The global market for Automotive Sensors is estimated at US$33.2 billion in 2024 and is anticipated to register a strong 2024-2030 CAGR of 12.4% in reaching a projected US$66.8 billion by 2030. Some of the underlying forces driving the market for Automotive Sensors include demand for advanced driver-assistance systems (ADAS) and in-vehicle safety features, which have become ubiquitous in modern vehicles. Because of consumer preference for automobiles that offer better safety, convenience and connectivity, manufacturers have taken to integrating more and more sensors into their vehicle designs. Stringent regulatory policies aimed at improving vehicle safety and minimizing environmentally-harmful emissions, such as NOx and carbon monoxide, are playing their part in incorporating sensors that can detect them. Safety features in vehicles, such as collision avoidance and lane departure warning systems, have also gained considerable importance, the effective working of which necessitate sensors as integral components. Several market players have initiated R&D efforts to develop innovative sensor technologies that can fulfil these essential criteria to maintain vehicle safety and integrity.

Automotive Sensors Regional Market Analysis

Asia-Pacific forms the largest global market for Automotive Sensors and is also likely to be the fastest growing over the analysis period. China has outpaced even the whole of North America, let alone the United States, as the global auto manufacturing hub. As per 2023 production statistics provided by the International Organization of Motor Vehicle Manufacturers (OICA), the total number of cars and commercial vehicles produced in the country stood at 30.16 million units, with the same for overall North America (including the United States, Canada & Mexico) standing at 16.17 million units (a difference of a staggering 86.5%). Keeping these figures in mind and also noting that countries, such as Japan, South Korea and India also have significant auto production figures, there can be no two ways that the market for Automotive Sensors in Asia-Pacific is dominant. The shift towards electrical and hybrid vehicles to combat the serious issue of pollution in the region has further been responsible for increasing the demand for sensors used for various purposes in such automobiles. The original automobile hubs of North America and Europe will also maintain healthy demand for Automotive Sensors, with a number of manufacturers integrating these devices into their vehicles to ensure operational safety and efficiency in other parameters.

Automotive Sensors Market Analysis by Type

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By type, the global market for Pressure Sensors used in vehicles is the largest, as these are highly important devices used for the early detection of faults in hydraulic brakes, optimizing the fuel mix to match the air pressure, enabling the automatic cleaning of exhaust filters, monitoring exhaust recirculation, checking pressures of critical fluids, detecting leaking vapors and ensuring faster deployment of airbags in case of a crash. However, the demand for Automotive Gas Sensors is anticipated to post the fastest growth over the 2024-2030 analysis period. These high-sensitivity devices are capable of detecting various gases, such as flammable & toxic gases and carbon dioxide, even in lithium-ion batteries used in electric vehicles.

Automotive Sensors Market Analysis by Vehicle Type

The use of Automotive Sensors in Passenger Cars (PCs) is the largest globally, with an estimated share of over 77% in 2024. The primary reason for this includes the number of PCs being manufactured and sold worldwide on an annual basis. Now, with a growing number of autonomous and electric vehicles entering the parc, it is a foregone conclusion that the demand for sensors used for various operations in these vehicles will maintain a steady growth over the coming period. On the other hand, the market for Automotive Sensors in Light Commercial Vehicles (LCVs) is likely to witness the fastest growth, since the need for sensors in this vehicular category has been increasing following government regulations and use of sensors in hitherto underused or unused application areas.

Automotive Sensors Market Analysis by Application

Among the various applications of sensors in automobiles, Powertrain Systems account for the largest share and will also expand at the fastest CAGR during the analysis period. A vehicle's powertrain comprises some of the most important components, including the engine, transmission, driveshaft, axles and differential. A powertrain control module (PCM) is essential for improving fuel economy and complying with environmental regulatory policies by controlling exhaust emissions. As such, it can be considered as the main computer of any vehicle that controls fuel delivery and emissions, among others, thereby having a considerable impact on engine performance and drivability. Other fast- growing applications of Automotive Sensors include Exhaust Systems and Safety & Security Systems.

Automotive Sensors Market Analysis by Fitting Type

By far, the market for Automotive Sensors as fitted by OEMs is dominant, since a

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number of manufacturers have now entered the market to make sensors specifically designed for their vehicles, owing to which the demand for the same is also likely to witness the fastest growth. Aftermarket refers to sensors made by other companies that usually are compatible with several auto makes and models. A major difference between OEM and aftermarket parts is that the former are more likely to be covered by warranties, offering the option of replacement in case of failure within the specified period.

Automotive Sensors Market Report Scope

This global report on Automotive Sensors analyzes the global and regional markets based on sensor type, vehicle type, application and fitting type for 2021-2030 period with forecasts from 2024 to 2030 in terms of value in US$. In addition to providing profiles of major companies operating in this space, the latest corporate and industrial developments have been covered to offer a clear panorama of how and where the market is progressing.

Key Metrics

Historical Period: 2021-2023

Base Year: 2024

Forecast Period: 2024-2030

Units: Value market in US$

Companies Mentioned: 40+

Automotive Sensors Market by Geographic Region

North America (The United States, Canada and Mexico)

Europe (France, Germany, Italy, Russia, Spain, The United Kingdom and Rest of Europe)

Asia-Pacific (China, Japan, India, South Korea and Rest of Asia-Pacific)

South America (Argentina, Brazil and Rest of South America)

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Middle East & Africa

Automotive Sensors Market by Type

Gas Sensors

Image Sensors

Position Sensors

Pressure Sensors

Safety Sensors

Speed Sensors

Temperature Sensors

Other Sensors (incl. Chemical Sensors, Current Sensors, Force Sensors, Humidity Sensors, Inertial Sensors, Knock Sensors, Level Sensors, LiDAR Sensors, Magnetic Sensors, Radar Sensors & Torque Sensors)

Automotive Sensors Market by Application

Chassis

Exhaust Systems

Powertrain Systems

Safety & Security Systems

Telematics

Vehicle Body Electronics

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Automotive Sensors Market by Vehicle Type

- Passenger Cars (PCs)
- Light Commercial Vehicles (LCVs)
- Heavy Commercial Vehicles (HCVs)

Automotive Sensors Market by Fitting Type

- Aftermarket Fitting
- OEM Fitting

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