



Mercedes-Benz

Press Information

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Meet the S-Class DIGITAL: "Innovation by Intelligence"

Driving enjoyment at the highest level: protected and supported

Stuttgart. The new Mercedes-Benz S-Class reaches new levels in terms of intelligence and overall driving experience. The digital innovations such as Mercedes-Benz User Experience (MBUX)¹ include new features that make driving even more enjoyable and safer. Additional features that help to make the driving experience more comfortable and safer include rear-axle steering with a large steering angle, and the all-new rear airbag. Furthermore, as a new function of PRE-SAFE® Impulse Side – the vehicle body can be raised just before a side impact thanks to the E-ACTIVE BODY CONTROL suspension. Following further systematic development, the driver assistance systems are taking a step closer to autonomous driving. With improved environmental sensors, the parking systems provide the driver improved support when maneuvering at low speeds. Additionally, visualization now reaches new levels by virtue of integration into the intuitive operation of MBUX.

Can a luxury sedan with a long wheelbase be almost as maneuverable and agile as a compact car around town? The answer is, yes, if it has all-wheel steering with a large steering angle at the rear axle.

Are more safety innovations even possible in the interior? Yes, as the S-Class demonstrates additional safety innovations with the world's first rear airbag for severe frontal collisions that deploys from the front seat backrests, extending the protective systems for the two passengers on the outer rear seats.

Can the E-ACTIVE BODY CONTROL suspension improve not only comfort, but also safety? Yes, in addition to the well-proven PRE-SAFE® Impulse Side system, the new S-Class is able to raise the entire vehicle body immediately before an impending side collision. This can benefit all the occupants.

Can the driver assistance systems be improved even further? Yes, in the new S-Class, Mercedes-Benz takes another big step towards its goal of accident-free driving. The driver is assisted in controlling the vehicle by numerous new and

¹ [Meet the S-Class DIGITAL](#): "My MBUX" (Mercedes-Benz User Experience)



extended driver assistance systems. They thereby have a reduced workload in day-to-day situations, allowing them to drive comfortably and safely. When put in a dangerous situation, the assistance systems are able to help the driver respond to impending collisions as the situation demands, and ideally prevent them. Active Parking Assist and the 360° camera with a new 3D view assist allow the driver to easily and conveniently park, unpark and negotiate tight spaces.

"The new S-Class brings full justice to its innovative tradition. The new generation will once again set the pace in the automotive industry: the S-Class has trailblazing innovations in every area, from safety and comfort to efficiency. One common theme is systematic digitalization, both in development terms and in the vehicle itself. Intelligent networking of different systems gives our customers tangible added value."

Dr. Uwe Ernstberger, Head of S and C-Class model series product group

"With the new S-Class we are now proudly presenting the world's first frontal airbag for the passengers in the rear. The rear airbag with an innovative, tubular structure is unique, allowing it to deploy in a gentle manner. Naturally the passengers should continue to fasten their seatbelts, and now with the new, illuminated-design belt buckles, putting on seatbelts is now even more intuitive."

Dr. Thomas W. Hellmuth, Head of Body and Safety

"The rear-axle steering makes the S-Class as maneuverable as a compact car. Even for the S-Class with a long wheelbase, the turning radius is reduced to under 36 feet. And thanks to Active Parking Assist with 360° camera, the vehicle can fit into tight parking spaces while monitoring whether anybody is moving within that space. When leaving a space, the S-Class keeps a wary eye out for crossing traffic."

Jürgen Weissinger, Chief Engineer S-Class

"If the sensors discover an impending side-on crash, PRE-SAFE® Impulse Side preventatively raises the body by up to 3 inches with the aid of E-ACTIVE BODY CONTROL – in this way the impact is directed to particularly resilient structures in the lower part of the vehicle. As another feature celebrating its world premiere, the exit warning function now gives a warning as soon as the driver or front passenger reaches for the door. This is because the MBUX Interior Assistant recognizes when a hand approaches the door handle,"

Dr. Michael Hafner, Head of Automated Driving

Overview of key features

With five multi-core processors, more than 20 sensors and the use of the stereo camera, the optional E-ACTIVE BODY CONTROL suspension responds predictively to different driving situations:

- Fully-active suspension on a 48-volt basis, with very wide variation of handling characteristics in the different driving modes
- The system's control units analyze the driving situation 1,000 times per second, and adapts the suspension accordingly
- E-ACTIVE BODY CONTROL regulates the damping and spring forces individually at each wheel, and not only counters body roll, but also pitch and lift
- In the COMFORT driving mode, ROAD SURFACE SCAN uses the stereo multi-purpose camera (SMPC) to monitor the road surface ahead of the vehicle. The spring struts are then actuated to greatly reduce body movements when crossing over road bumps
- In CURVE driving mode the vehicle actively leans into bends. The leaning function and comfortable suspension setup greatly benefit ride comfort, especially for passengers with a sensitive stomach
- E-ACTIVE BODY CONTROL enables a new PRE-SAFE® function when a lateral collision is detected (see below)

Thanks to the optional **rear-axle steering**, the S-Class is as maneuverable as a compact car. The steering angle at the rear axle is up to ten degrees, allowing impressive maneuverability and agility in urban areas. At the same time the handling benefits from a virtual extension of the wheelbase at higher speeds:

- With all-wheel steering and a large steering angle at the rear, the turning radius of the S-Class is reduced by up to 7 feet. This gives the long-wheelbase S-Class a turning circle of less than 36 feet
- This extraordinary maneuverability and agility is also achieved by combining the rear-axle steering with a more direct front-axle steering ratio
- Integrated actuation of the steering and brakes makes handling even more precise and stable in dynamic situations
 - When opting for this feature, customers have a choice between two variants: one with a rear steering angle of up to ten degrees and one with up to 4.5 degrees

The new S-Class also sets standards where **accident safety** is concerned:

- With a new function of PRE-SAFE® Impulse Side, Mercedes-Benz has now augmented its measures in the pre-impact phase:
 - When there is a potential for a side impact, the vehicle body can be raised by the E-ACTIVE BODY CONTROL suspension (optional) within a few tenths of a second. This directs the forces of the impact towards particularly resistant structures in the lower area of the vehicle
- The occupant protection measures are derived from many of the innovations in the [Experimental Safety Vehicle \(ESF\) 2019](#):
 - The optional new rear airbag is the world's first frontal airbag for the two passengers on the outer rear seats. Its design with an innovative, tubular structure is unique. As a result it deploys especially gently, and in severe frontal collisions it can greatly reduce the loads acting on the heads and necks of the outer rear passengers
 - The new optional illuminated designer belt buckles are easy to locate. This makes buckling the seatbelt more intuitive

- In combination with the MBUX Interior Assistant, a camera can now be used to detect a child seat on the front passenger seat for the first time. A belt fastening message for the child seat appears in the central display before the driver pulls away

The latest generation of the Driver Assistance Package has new and numerous improved functions. For example:

- Active Blind Spot Assist:
 - The exit warning function now gives a warning as soon as the driver or front passenger reach for the door. This is because the MBUX Interior Assistant recognizes when a hand approaches the door handle
 - A visual warning is given by a red warning triangle in the exterior mirror and via the active ambient lighting

Thanks to improved environmental sensors and integration with MBUX, the parking systems give the driver improved support when maneuvering at low speeds:

- Active Parking Assist:
 - Improved environmental sensors: 12 ultrasonic sensors at the front and rear, with improved performance
 - Newly developed, comprehensible and simplified user interface, integrated into MBUX, convenient touch control
 - The positions of road users and objects can be registered reliably and precisely
 - Emergency braking function when reversing
 - Integration of the optional rear axle steering, commensurate trajectory planning
- Parking package with 360° camera (standard):
 - Extended environmental sensors, now with sensor fusion: Four additional cameras (front, rear, exterior mirrors)
 - These enable more available parking spaces to be recognized
 - Parking spaces defined by lines (not by vehicles) can also be used for automated parking for the first time
 - The four individual camera images are combined into a three-dimensional image of the vehicle's surroundings. This is shown in the central display with dynamic perspectives
 - The three-dimensional image can be intuitively rotated around the vehicle as a virtual camera view, and even has a zoom function
 - Extended side view makes for easier maneuvering near parallel obstacles such as curbs, garage walls, etc.
 - Automatic braking for pedestrians either forwards or when reversing if Parking Assist is active
 - Collision prevention around the entire vehicle is possible, while complying with the strict requirements of UNECE R79 for automated parking
 - Model of the vehicle is calculated in real time
 - Shows the vehicle status (i.e. indicators, braking)
 - Reveals visual obstructions (i.e. open doors, folded mirrors)

The major innovations in detail

E-ACTIVE BODY CONTROL (optional): Adds semi-supporting hydropneumatics to the air suspension. The air springs bear the base load of the vehicle body and gradually regulate the level. The hydropneumatics generate dynamic forces that overlay the air suspension forces, and actively support and dampen the vehicle body. At each wheel, a damper is installed within the axle whose two working chambers have an adjustable damping valve and a hydraulic pressure reservoir. The damper is connected to an intelligent motor/pump unit in the 48 V network by hydraulic lines. Actuation of the motor/pump unit enables the hydraulic fluid to be displaced to create a difference in pressure within the damper, allowing an active force to be generated. The motor/pump units at all four wheels are coordinated by a central control unit which also actuates the valves and the compressor for the air springs, and therefore always controls the entire suspension system.

Rear airbag (available with the Executive Rear Seat Package): Cylindrical, tubular structures are inflated with compressed gas and deploy a wing-shaped structure. A large, tent-like airbag deploys between the two wings, and this is inflated by the surrounding air via specially patented valves in the skin. These valves are designed so that the air cannot escape when the rear passenger is immersed in the airbag. The comparatively small volume of the tubes allows rapid deployment of a relatively large airbag volume. This takes place with comparatively low force and a low risk of injury, as the tubular wings give way to obstacles. The airbag enhances the restraining effect of the belt system, and can support the head and neck to decrease the loads on them significantly. In combination with a beltbag and the inflatable seatbelt, the S-Class sets new standards for rear seat occupant safety.

Rear-axle steering: An electric motor drives a spindle at the rear axle via a drive belt. This makes axial adjustments to the spindle. Depending on the speed and the steering angle, the rear wheels are turned in the same or the opposite direction as the front wheels (same-direction or counter-direction steering). In simplified terms, this produces more agility and a smaller turning radius through counter-steering and more stability with same-direction steering. In the S-Class, the full steering angle of ten degrees is especially helpful during parking maneuvers. The environmental data of the vehicle sensors (radar, camera, ultrasonic) are used for large steering angles to adapt the maximum angle to the relevant situation. The system switches from counter-direction to same-direction steering at more than 35 mph. The different driving modes rely on different steering strategies. The respective rear-axle angles and trajectories are shown in the driving mode menu in the central display. The 10° rear axle steering has a special snowchain mode. When activated by the driver, the steering angle at the rear axle is reduced and the steering characteristics are adapted for the special conditions of surface snow.

PRE-SAFE® Impulse Side: In addition to the familiar functions, the body of the new S-Class can be slightly raised just before the collision when it senses an impending side impact. The side-mounted radar sensors are able to recognize and track a potential side crash at an early stage. The actuator is the E-ACTIVE BODY CONTROL suspension, which can raise the body upwards by up to 3 inches. This reduces the loads on the door structures, as the door sill can absorb more of the load thanks to its higher position. As a result deformation of the passenger cell and the loads acting on the occupants can be reduced.

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employees worldwide. Ola Källenius is Chairman of the Board of Management of Mercedes-Benz AG. The company focuses on the development, production and sales of passenger cars, vans and services. Furthermore, with its pioneering innovations, the company aspires to be a leader in the fields of connectivity, automated driving and alternative powertrains. The product portfolio comprises the Mercedes-Benz brand with the sub-brands Mercedes-AMG, Mercedes-Maybach and Mercedes me, as well as the smart brand and the EQ product and technology brand for electric mobility. Mercedes-Benz AG is one of the largest manufacturers of premium passenger cars. In 2019, it sold nearly 2.4 million passenger cars and more than 438,000 vans. In its two business segments, Mercedes-Benz AG is continually expanding its worldwide production network with over 40 production sites on four continents, while gearing itself to meet the requirements of electric mobility. At the same time, the company is constructing its global battery production network on three continents. Sustainable actions play a decisive role in both business segments. To the company, sustainability means creating lasting value for all stakeholders: customers, employees, investors, business partners and society as a whole. The basis for this is Daimler's sustainable business strategy. In this, the company takes responsibility for the economic, ecological and social effects of its business activities and looks at the entire value chain.