

Motor racing technology: mixed tyre diameter and width for the first time

The chassis of the Porsche 911 sets standards for sports cars – and has done so in every generation for more than 50 years. With the chassis of the new 911, Porsche further exploits the driving dynamics potential. The basis for this is provided by the new mixed tyre configuration, with 20-inch wheels on the front axle and 21-inch wheels on the rear axle. At the same time, the tyres on the rear drive axle are significantly wider than on the front wheels. This results in a track that is 46 mm wider at the front of both models, as well as a 39 mm-wide track width at the rear of the 911 Carrera S. This combination enables the rear axle to build up higher lateral stability, and further improves the traction of the rear-wheel-driven 911. The mixed tyres also have a considerable influence on the vehicle balance. The handling is even more neutral and controllable. The vehicle has an extremely low understeer or oversteer tendency and therefore provides the driver with higher safety reserves, particularly with a dynamic driving style. The refined chassis design is completed by the next generation of Porsche Active Suspension Management (PASM), offering a significantly enhanced balance of sportiness and comfort. The PASM chassis is equipped with controlled shock absorbers as standard. It can be replaced with the PASM sports chassis, for a 10-millimetre-lowered body.

Sportier and more comfortable: further developed PASM with a wider spread

Porsche has extensively further developed PASM for the new 911. The latest generation of dampers features fully revised engineering. The main stage valve and the pressure chambers for the rebound and compression stage are controlled within a few milliseconds by means of a high-precision control valve that is infinitely adjustable using magnetic force. This enables precise adjustment of the damping force at any time. In addition, the Porsche chassis specialists have developed separate software controls for the new damper technology, which perfectly align the damper function to their application in the new 911.

The combination of new hardware and software results in significant advantages. When needed, the new PASM offers significantly softer damping than the previous system, and therefore greater comfort both in the compression and rebound stage. Quick, brief stimuli in particular – for example from cobblestones – are dampened with much greater success. At the same time, the new PASM offers the opportunity to have the dampers act more firmly, resulting in significant driving dynamics advantages with respect to roll stability, road connection, steering behaviour, and possible cornering speeds.

A PASM sports chassis lowered by ten millimetres is also available. The entire setup is designed specifically for enhanced driving dynamics and enables both greater agility on curves and more stability on high-speed stretches.

The Wet driving programme: the world's first wetness recognition – fitted as standard

The new 911 is the first in the world to feature an innovative system for recognising significant wetness on the road, including the Wet driving programme that can be manually selected at any time. This program has been specially developed to support the driver in

wet conditions. The system uses acoustic sensors in the front wheel housings to recognise sprayed-up splash water, and in this way can detect wetness on the road. This makes it fundamentally different from windscreen wiper rain sensors, which only react optically to water droplets on the windscreen, independently of the road conditions. The response behaviour of the PSM and PTM systems is preconditioned if a road is recognised as wet. The system informs the driver of the detected wetness and recommends manually switching to Wet mode.

The corresponding function can either be activated in the new button bar above the centre console or is integrated in the mode switch with the optional Sport Chrono Package. If the driver activates this mode, the Porsche Stability Management (PSM), Porsche Traction Management (PTM), aerodynamics, optional Porsche Torque Vectoring (PTV) Plus, and drive responsiveness are adapted to the conditions in such a way as to guarantee the best possible driving stability. From 90km/h, the rear spoiler is adjusted to maximum downforce, the cooling air flaps open, the accelerator pedal characteristic is flatter, and PSM Off or Sport mode can no longer be activated. The Wet driving programme is essentially based on a concept that the Porsche Advanced Development department had already developed to functional maturity in the middle of the 1990s, as part of the Prometheus European research programme.

New brake system setup with optimised brake response

The new wheel sizes with further-developed tyres led to a completely new chassis setup. This resulted in renewed improvements in wet grip and dry handling as well as in rolling resistance. The spring and anti-roll bar rates are higher and the brake system operates more precisely. Because the new rear wheels can transmit a higher braking force, the diameter of the rear brake discs has been increased from 330 millimetres to 350 millimetres. The brake pedal ratio has been shortened. The pedal is now made of an organic sheet composite material consisting of steel, carbon fibre and plastics. It weighs around 300 grams less than the previous steel component. There is a more immediate brake response, and the driver can also feel a very precise pressure point because of the firm connection. Sporty drivers in particular will value this optimised feedback. The brake system modifications are rounded off by the change from a pneumatic brake booster to an electric booster.

The race track-proven Porsche Ceramic Composite Brake (PCCB) is still optionally available for all 911 models. The ceramic brake offers low weight and practically no fading.

Direct steering ratio for greater agility

In order to further increase the agility and dynamic turn-in behaviour of the new 911, the steering ratio is around 11% more direct on the standard sports cars and approximately 6% more direct on vehicles with optional rear-axle steering. The 911 is even more agile as a result and provides even greater driving pleasure on winding roads. A new, typically Porsche steering controller is also used for improved feedback on the steering wheel. Thanks to the enhanced algorithm, the road conditions – dry, wet or snow – can be better taken into account to achieve the desired handling.

The comfort-oriented Power Steering Plus is optionally available. At low speeds, this steering operates with an adapted steering support, enabling particularly easy manoeuvring and parking.

Rear-axle steering plus lightweight battery

The rear axle steering improves both day-to-day usability and performance. The system has been further adapted for the new 911. Depending on driving speed, it directs the rear wheels to move up to two degrees either in the same direction as the steering angle on the front axle, or in the opposite direction. The result is that the 911 is even more agile when cornering, and its smaller turning circle makes it easier to manoeuvre in urban traffic. Higher speeds increase driving stability, when changing lanes for example. The rear-axle steering is also linked to use of a new lithium iron phosphate battery. This technology has its origins in motor sports. The service life of the lithium iron phosphate battery is 2.5 times that of a conventional lead-acid battery, but at 12.7 kilograms, it weighs less than half as much. The optional Porsche Dynamic Chassis Control (PDCC) is also available with rear-axle steering option. This system features active anti-roll bars and practically eliminates body roll when cornering.

Lift system for the front axle

The optional electro-hydraulic lift system allows the front axle to be raised by around 40 millimetres. Thanks to the increased approach angle and ground clearance, at the front axle, the system makes it easier to drive into garages and multi-storey car parks, for example.