Chassis and driving dynamics

Motorsport chassis with active performance systems

The outstanding driving performance offered by the new 911 GT2 RS cannot be adequately classified using the conventional acceleration values in the longitudinal direction. Instead, it is the absolute precision, predictability and lateral adhesion on challenging and highly dynamic routes that make the vehicle so fascinating to drive. It was these characteristics that enabled the 911 GTS RS to achieve a record lap on the Nürburgring and slash the previous record for road-approved sports cars by quite some margin (6 minutes, 52.01 seconds). In total, the high-performance sports car tackled five laps of the course, each in less than 6 minutes 50 seconds. The record lap for the 911 GT2 RS was ultimately completed later in ideal outdoor conditions with a time of 6 minutes 47.3 seconds. As is customary for record drives, the time was measured along the 20.6-kilometre stretch. The vehicle's average speed was 184.11 km/h.

At the source of these impressive driving dynamics is a thoroughbred motorsport chassis that virtually eliminates all elastokinematics. For the first time in a Porsche road vehicle, all chassis joints have been replaced by steel ball joints on the new 911 GT2 RS. Delivering a high level of precision and smoothness, these ball joints ensure a particularly firm connection between the chassis and the body. Interfering movement from an elastically supported engine mass could affect the level of precision acquired from this setup. That is why the 911 GT2 RS features dynamic engine mounts; the firmness of these mounts is controlled depending on the particular driving situation at hand. In the event of load changes and on fast bends, a firmer engine mount noticeably stabilises the handling. What's more, dynamic engine mounts reduce the vertical vibrations of the engine when accelerating under full load. The result is more uniform and increased propulsion force at the rear axle with higher traction and better acceleration. When adopting a moderate driving style, the softer setting of the dynamic engine mounts increases driving comfort.

Other chassis components from the 911 GT3 RS such as the wheel mounts and split links have also been taken from the field of motor racing. The front axle is set up as a McPherson spring strut axle with helper springs that individually guides the wheels suspended on the crossmembers and wishbones. At the rear axle, a multi-link suspension with helper springs is used to guide the wheels. To reduce the weight, Porsche uses lightweight springs on the 911 GT2 RS. The spring rates of the coil springs and torsion springs are just like those seen in the field of motorsport. What the driver loses in terms of comfort is gained back several times over in lateral stability. The height, camber and track, as well as the anti-roll bars, can all be individually adjusted for use on the race track.

Porsche also offers a new hydraulic lift system on the front axle as an option for the 911 GT2 RS. This system is four kilograms lighter than the previous version. With this feature, the vehicle can be raised at the front by approximately 30 millimetres up to a speed of 50 km/h – all at the touch of a button. This reduces the risk of the car catching on kerbs, ramps or garage entrances.

Best grip: Mixed tyres and ceramic brakes

Ultra High Performance tyres take on the job of transferring the longitudinal and lateral forces. As is often seen with high-performance sports cars from Porsche, the front and

rear axles differ not only in terms of width, but also in size. The front axle is equipped with 9.5-inch-wide 265/35 ZR 20 tyres with a diameter of 20 inches. The 12.5 J x 21 alloy wheels at the back are equipped with 325/30 ZR 21-category tyres. The new forged alloy wheels with central locking are painted in Metallic White-Gold and bear the “GT2 RS” logo. The Tyre Pressure Monitoring (TPM) system is included as standard and not only issues a warning in the event of gradual or sudden pressure loss, it also has a race circuit mode, which takes into account the lower air pressure of cold tyres at the start of the track session.

Engine power of 515 kW (700 hp) and a racing chassis demand the best braking system that Porsche has ever developed. The 911 GT2 RS is equipped with the Porsche Ceramic Composite Brake (PCCB) system as standard. The perforated ceramic brake discs have a diameter of 410 millimetres at the front and 390 millimetres at the back. Yellow-painted six-piston fixed callipers made from aluminium monobloc at the front axle and four-piston aluminium-monobloc fixed callipers at the rear axle ensure a high and above all constant brake pressure when decelerating. The extremely light but exceptionally fading-resistant brake discs weigh only about half as much as conventional cast-iron discs. This not only has a noticeably positive effect on driving performance and fuel consumption, but also reduces the unsprung and rotary masses in particular. The result: improved road grip, better handling and enhanced driving and rolling comfort, particularly on uneven roads.

Active driving dynamics system on a par with the field of motorsport

The precision offered by the racing chassis provides the backbone for the driving dynamics systems fitted in the 911 GT2 RS. The PASM shock-absorber system and rear-axle steering are among the computer-controlled chassis functions on offer. The Porsche Stability Management (PSM) system and the fully variable PTV Plus differential lock optimise handling through the propulsion and brake forces. All systems communicate with one another and are optimally tuned to one another taking key racing considerations into account.

The Porsche Active Suspension Management (PASM) system adjusts the damper force at each individual wheel based on parameters developed specifically for the 911 GT2 RS. The driver can choose between two programs. Normal mode is designed for sporty driving on public roads and race tracks in the wet. Sport mode adjusts the damper forces for maximum lateral acceleration and the best possible traction on the race track.

Depending on the speed plus the driving and steering situation, the rear-axle steering system simultaneously increases stability or agility. The characteristics of these properties have also been tuned with sportiness in mind. At low speeds, the system steers the rear wheels in the opposite direction to the turned front wheels. Tight bends can be driven through more dynamically, increasing agility. In everyday situations, parking is made easier and the vehicle’s turning circle is reduced. At high speeds, the system moves the rear wheels in the same direction as the turned front wheels. This increases driving stability, which really pays off when changing lanes quickly or performing overtaking manoeuvres on the race track.

“PSM Sport” for the fastest lap times

The latest generation of PSM is ideally suited to the requirements of the 911 GT2 RS. The sensitive and precisely dosed control interventions can be completely deactivated in two

stages. The first deactivation stage, “PSM Sport”, differs quite significantly in terms of function from the full system, “PSM On”. The “Sport” function enables significantly larger yaw movements around the vertical axis and a higher degree of slip on the drive wheels. In this way, “PSM Sport” allows more ambitious drivers to push the limits even further while offering the same emergency reserve as a vehicle with the stability control system switched on: Braking heavily in the ABS control range activates the stabilising support provided by the PSM in full again, as long as the brake pedal remains depressed.

The Porsche Torque Vectoring Plus (PTV Plus) is the ideal partner for PSM. The PTV Plus works with an electronically controlled, fully variable rear differential lock and takes all driving parameters that are relevant to lateral dynamics into account in its interventions. The result is greater traction, increased lateral dynamics and significantly increased stability during load changes in bends and during lane changes. What’s more, the system also makes targeted braking interventions on the inside rear wheel, giving the outside rear wheel increased drive torque. The system also improves steering behaviour and increases agility.