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Press Information

The new Porsche 911 GT3

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March 2013

The new Porsche 911 GT3

The completely-redeveloped fifth generation of the 911 GT3 occupies the top position among Porsche sports cars with naturally-aspirated engines. Following the total production of 14,145 GT3 cars since 1999, the fifth generation of the 911 GT3 is a new car from the ground up. Both engine and transmission, as well as body and chassis, are entirely new, and extend the 911 GT3 concept with an impressive performance made possible with new active rear-wheel steering, as well as other features. This ensures that all successful characteristics of this track-developed sports car are preserved, with improved dynamic capability while preserving day-to-day drivability and most importantly, a highly emotional fun factor.

911 GT3 3.8-liter flat engine with 475 hp; Porsche seven-speed Doppelkupplung (PDK); rear wheel drive; acceleration from zero to 60 mph in 3.3 seconds; top track speed 195 mph

The powertrain of the new 911 GT3 is composed of a 3.8-liter boxer engine yielding 475 hp featuring a 9,000 rpm redline and a specially developed Porsche dual-clutch transmission (PDK) which drives the rear wheels. The six-cylinder engine is based on the 911 Carrera S engine, but shares only a few common parts. All other components, particularly the crankshaft and valve train, were specially adapted or developed for the GT3. For example, Porsche is once again using titanium connecting rods and forged pistons.

The Porsche dual-clutch transmission in this application has been specially developed for the 911 GT3: the characteristics are based directly on a sequential gearbox from racing, thereby providing further performance and dynamic advantages to the driver. Highlights include shorter gear ratios with closer spacing, even faster shifting, and shift paddles with shorter travel and increased tactile feedback, which now allow the driver to place the PDK in neutral simply by pulling on both paddles at the same time.

For the first time, Porsche is employing active rear wheel steering to achieve even higher steering precision and improved lateral dynamics. Depending on the speed, the rear wheels steer in the same or opposite direction of the front wheels, improving stability and agility. Other new features that improve driving dynamics are an electronically controlled, fully variable rear differential lock and dynamic engine mounts. The newly developed all-aluminum chassis can still be adjusted by height, toe and camber. Contact with the road is made by new 20-inch, forged alloy wheels with center-locking hubs in place of conventional wheel bolts.

The 2014 911 GT3 is based on the light yet stiff body of the current generation 911 Carrera, which employs a hybrid steel and aluminum construction; however, it comes with unique front and rear parts specific to the GT3. In addition, the 911 GT3 is 1.7 inches wider than a 911 Carrera S in the rear. Another distinctive feature is the large, fixed rear wing, which contributes to the exemplary aerodynamics.

By combining low air resistance with even more power, the 2014 911 GT3 sets new performance records. At full acceleration from standstill, the 60 mph mark is reached after just 3.3 seconds, and 124 mph is reached in less than twelve seconds. The top speed of 195 mph is reached in the seventh, the top gear of the PDK transmission. The lap time on the Nürburgring Nordschleife is even more impressive: the new 911 GT3 is capable of lapping this track, commonly regarded as the most difficult in the world, in less than 7:30 minutes.

Engine

Completely new: Sports engine with high-revving concept

The Porsche Motorsport Department has developed an entirely new engine for the 911 GT3. This engine is a synthesis of the previous GT3 high-performance engine and the new engine generation of the current 911 Carrera series. For instance, the new engine comes with typical motor sports technologies, such as dry sump lubrication, a high-revving concept, and titanium forgings. These are combined with the cutting-edge technologies of production engines such as direct injection, a demand-controlled oil pump, and lightweight design and materials. The resulting engine weighs around 55 pounds less than the previous model, and features a power output of 125 hp/liter of displacement.

The structural changes to the base engine were done with one principal goal: enhancing the high-revving character for which the 911 GT3 is known. These developments made it possible to increase the maximum engine speed to 9,000 rpm.

Valve control by rocker lever

The foundation for this outstanding performance is the low reciprocating mass of the crankshaft and valve train. As with the previous model, the new 911 GT3 features strong, and yet lightweight, forged aluminum pistons and forged titanium connecting rods. Furthermore, in addition to hollow valves, the new rocker arm valve control was a prerequisite for achieving a 9,000 rpm redline.

The low reciprocating mass of the internal components of this engine mean that the 911 GT3 engine imbues excellent response across the entire engine speed range. Overall, these features ensure a particularly sporty driving experience in all conditions.

Cylinder heads were an area of particular focus during engine development. They differ fundamentally from those of the base engine, and were specifically developed for the 911 GT3. To enable peak performance values and engine speeds, the new cylinder heads are equipped with large intake and exhaust ports, large valves, and separate valve control with rocker arms. Cooling and oil supply are also improved to manage the high loads encountered in performance driving.

The valve actuation via rocker arms with hydraulic valve clearance compensation is another unique feature. The concept embodied in the 911 GT3 engine originates from racing and allows very high engine speeds on the one hand, while the other cams with performance-oriented profiles permit for large strokes and long valve opening times. The advantage of the rocker arm control is mainly in the low moving masses that allow high engine speeds, and the large contact area between the cam and rocker arm.

As was the case in the previous-generation engine, the GT3 engine once again employs VarioCam variable valve control technology. The continuous angle adjustment of the camshafts allows both a broad torque curve while preserving better breathing at the top end of the engine speed range, in addition to assisting with meeting emissions performance criteria. The vane adjusters are made of aluminum to reduce weight. Each cylinder head is equipped with an integrated actuator for one of the high-pressure pumps of the direct injection system. Unlike the base engine, which is supplied by a high pressure pump with an axial arrangement, the new 911 GT3 comes instead with two radially driven high pressure pumps.

More power, improved efficiency: First GT3 engine with direct injection

For the first time, Porsche has opted for a 911 GT3 engine with direct injection technology. Compared to conventional manifold injection, this technology permits higher power and torque, as well as improved higher efficiency and lower CO₂ emissions. For use in the 911 GT3, this technology has been developed further, specifically with performance in mind. That's why the new high-performance sports car comes with a specially developed injection system with multi-hole injectors and significantly higher injection pressure. Compared with the swirl injectors of the 911 Carrera models, multi-hole injectors provide a larger usable range of fuel quantity injected. The new 911 GT3 comes with six-hole injectors fed by two fuel pumps which generate a system pressure of up to 2,900 psi. This means more fuel can be injected while the fuel is also able to be atomized more finely.

As a car developed from racing, a dry sump oil supply continues to be employed for the 911 GT3. Thus, the GT3 employs a unique oil pan. Just like the base engine, the high-performance engine is equipped with four suction points in the cylinder heads, an extraction tube in the oil pan, and an oil pressure pump. The 911 GT3 engine has two additional suction points in the oil pan at the front and rear, and is thus able to safely transfer oil to a separate oil tank during heavy acceleration and braking.

Dynamic engine mounts as standard

The standard equipment of the new 911 GT3 now includes a more advanced generation of the previously optional dynamic engine mounts, which were specially tuned. The controller uses the present 911 GT3 sensors to detect driving behavior, and hardens the normally soft engine mount. For this purpose, the mounts are filled with a liquid with suspended magnetic particles, which changes in viscosity in the presence of an electric field. This keeps the GT3 comfortable in everyday driving while essentially providing the benefits of solid engine mounts in spirited driving.

The intake system of the new 911 GT3 engine is also improved significantly. An air inlet with a specific plenum on the engine cover operates according to the ram-air principle and uses the air flow across the body for increased intake manifold pressure. The air then flows into a double-flow air filter, onto a flow and resistance-optimized air intake system, which was largely adopted from the current-generation 911 Carrera up to the throttle valve.

The composite intake manifold is also completely new. It is not only lighter than the aluminum system of the predecessor model, but also larger with further airflow improvements.

As was the case with the predecessor, the new 911 GT3 also offers the driver the possibility of increasing the torque in the mid range at the press of a button. When activated, the backpressure in the sports exhaust system is further reduced, increasing the torque in the 3,000 rpm to 4,000 rpm range by up to 26 lb. ft.

Switchable sports exhaust system with special exhaust manifolds

Naturally, the new 911 GT3 still comes with a sports exhaust system, which was largely adopted from the previous model. This means high-performance system uses two catalysts which are close to the engine and integrated into the manifolds. Two switchable front silencers and a common rear silencer with two central tailpipes ensure that the 911 GT3 meets noise requirements for road use.

Transmission**Doppelkupplung with special 911 GT3 attributes**

The dual-clutch transmission Porsche Doppelkupplung (PDK) originates from Porsche racing. With the 911 GT3, it returns to the mapping developed on the track: The motor sports engineers have revised the PDK extensively both in terms of mechanics and control technology for the new high-performance sports car. The resulting transmission provides the driver with all the essential driving dynamics of the previous manual transmission, complemented with the performance benefits of the dual-clutch transmission. It can even be driven much like a sequential manual gearbox – with even more performance and emotional driving fun.

Two modes are available to the driver: manual shifting or an adaptive shift program. Manual shifting is done using two paddles on the steering wheel, the left for upshifts and the right for downshifts. Shorter shifting travel and optimized actuating force result in even faster gearshifts with concise feedback, similar to the operating characteristics of the new 911 GT3 Cup race cars.

Alternatively, the driver can also shift using the selector lever, with a shift pattern based on that used in professional motor sports: shifting up is done by pulling the lever back, shifting down by pushing it forward.

Ready for the racetrack:**“lightening shifts” with extremely short reaction and gearshift times**

Gearshifting strategy and response times of the 911 GT3 PDK were designed for maximum performance, and are fundamentally different compared to other Porsche sports cars. This becomes apparent to the driver during manual upshifts in the form of a “lightning shift”, which permits reaction times of less than 100 milliseconds. To enhance driving performance, lightning shifts are implemented with a torque overshoot, and the gear change is conducted with a highly dynamic adaptation of the engine speed to the newly selected gear. The switching times are in a range that was previously reserved for the world of motor sports.

Paddle-neutral: the de-clutching function of the 911 GT3 PDK

The dynamics of a sports car driven to optimum lap times are also determined by the clutch. That's why the PDK comes with a "paddle-neutral" feature. If the driver pulls both shift paddles simultaneously, the clutches of the PDK are opened, and the flow of power between the engine and drive is cut off. Once both shift paddles are released, the clutch engages at lightning speed if the PSM is switched off. With PSM switched on, the clutch is closed quickly, but in a less abrupt manner. The driver can use the paddle-neutral feature for accelerating from a standstill. As is the case with manual transmission vehicles, the driver alone decides on how to accelerate using clutch and accelerator, without any assistance from drive and dynamic handling control systems if the driver selects them off.

Alternative: Adaptive shifting with sports strategies

For a first time, the PDK provides the driver of the new 911 GT3 with the alternative of leaving gear shifts to the adaptive transmission control. In principle, the PDK of the new 911 GT3 only comes with two switching strategies: Sport and Track. This means that the gear changes of the new 911 GT3 are always fast. Gear shifts and shift points are adapted to the dynamics of the driver.

Shorter gear ratios

Mechanical changes to the PDK primarily relate to its internal structure. For instance, the use of lightweight gears and wheels support the high-revving characteristics of the 911 GT3 engine. The total weight of the PDK transmission was reduced by about four pounds. Shorter gear ratios mean that top track speed is reached in the seventh and highest gear. In conjunction with revised internal gear ratios, the rear axle ratio is also shortened by 15 percent compared to 911 Carrera models.

Chassis

Even faster lap times: 911 GT3 with new rear-wheel steering

As with the engine, the chassis of the new 911 GT3 combines the strengths of the previous design with those of the current 911 Carrera chassis. The extended wheelbase and wider track width improve the support base, thereby increasing both longitudinal and transverse stability. All developments had only one goal in mind: to improve driving dynamics even further. That's why the Porsche extended the performance package of the 911 GT3 with yet another new feature: active rear-wheel steering.

The system comprises two electro-mechanical actuators, which are used at the left and right side of the rear axle instead of the conventional control arms. These allow the steering angle of the rear wheels to be varied by up to 1.5 degrees, depending on the speed. At speeds of up to 31 mph, the system steers the rear wheels in the opposite direction of the front wheels. This shortens the wheelbase virtually by around 5.9 inches and also results in significant improvements in agility and everyday usability, by shortening the turning radius.

At speeds above 50 mph, the system steers the rear wheels in the same direction as the front wheels. This results in a virtual wheel extension nearly 20 inches, thereby increasing high speed stability. Simultaneously, the side force on the rear axle triggered by the steering input of the driver is built up much faster than with a non-steered rear axle, which leads to a more spontaneous and harmonious initiation of the change in direction.

This variability means that the rear-wheel steering contributes significantly to resolve the inherent conflict of driving dynamics between agility and driving stability. This results in advantages when it comes to agility, driving safety and practicality, as well as increased driving performance. The rear-wheel steering thus played a decisive role in the further improvement of lap times at the Nürburgring.

Independent all-aluminum chassis lowered by 30 millimeters

The chassis of the new 911 GT3 is a largely new design based on the chassis of the 911 Carrera but lowered by 30 mm. Porsche Active Suspension Management (PASM) variable damping is standard equipment and includes two pre-selected specially tuned maps, as was the case with the predecessor model. At the front axle, independent wheel mounts, as well as extended wheel bearings and hubs, provide greater stability and strength. The transverse control arm at the front axle is also a new development that yields additional stability and reduced weight. The lightweight design also involves the use of lighter springs and damper struts an aluminum outer tube. These two measures alone resulted in a weight reduction of over six pounds compared to standard components.

The multi-link rear axle was also largely developed from scratch for the 911 GT3. Again, independent wheel mounts and wheel hubs, as well as larger mounts, result in increased stability and strength. The subframe of the high-performance sports car, including side panels and control arms, are exclusively made of hollow aluminum casting, which brings about a weight saving of around 8.6 lbs, as well as increased strength. The rear axle now also uses a spring-damper element with a so-called helper spring.

Leaving curves with more traction: PTV Plus

The rear axle of the new 911 GT3 is equipped with Porsche Torque Vectoring Plus (PTV Plus) as standard. The system, which was adapted specifically for the 911 GT3, consists of an electronically controlled, fully variable locking rear differential and selective braking interventions at the rear wheels. In combination, these features provide high traction on changing road surfaces, an improvement of lateral dynamics, more precise cornering, and increased driving stability.

The electromechanical steering system was also modified for the high-performance sports car. The use of characteristics specially developed for the 911 GT3 ensures that the direct steering feel with an appropriate response was preserved in all conditions.

The wheels, developed from scratch, round off the package of measures for further improvement of driving dynamics. Compared with the 19-inch wheels of the previous model, the current 20-inch GT3 wheels are not just one inch bigger, but also half an inch wider at the front. The tires on the front axle are also wider. The new 911 GT3 therefore rolls on wheels of size 9 J x 20 with sports tires 245/35 ZR 20 on the front axle, and size 12 J x 20 with sport tires 305/30 ZR on the rear axle.

The wheels are made of forged aluminum for the first time, resulting in low weight and high strength. In spite of the dimensions, the total weight of the wheels including special UHP tires (Ultra High Performance) is less than that of the previous model. This reduces not only the vehicle weight, but also unsprung mass to enhance driving dynamics. Again, the wheels come with a central locking system, which has been optimized further.

Further increase in braking power

Quintessentially Porsche: In the new 911 GT3, more dynamic driving performance goes hand in hand with further improvements in braking performance. At the rear axle, larger braking discs with a 380 mm diameter are used, the ventilation holes of the discs have been re-designed, and cooling was improved by way of additional brake cooling ducts on the rear axle. To reduce unsprung weight, the new 911 GT3 comes with racing-derived composite brake discs with friction rings made of cast iron and aluminum pots, just like its predecessor. The two components are still connected by stainless steel pins.

Body and aerodynamics

Unique appearance: Broad, with rear wing – and, for the first time, optional full-LED headlights

The wide body, the special front and rear design with a large wing, and the large wheels make the new 911 GT3 unmistakable at first glance. In addition, the new high-performance sports car is now also available optionally with a new generation of headlights that exclusively consist of LED light sources, giving the coupé a special appearance.

In visual terms, the full LED headlights differ significantly from the standard Bi-Xenon™ system. Instead of a cone-shaped light housing with round projection lens, two tube-shaped light housings are arranged in stages, and the lens contour is truncated at the top and bottom. The basic module in the upper tube is part of the low beam and illuminates the road in a wide and homogeneous manner. The second part of the low beam is located underneath in the Porsche Dynamic Light System (PDLS). Thanks to its swivel function and variable light distribution, this permits various functions such as dynamic cornering lights and low and high beams. The auxiliary high beam in the upper part of the full-LED headlight consists of two components to the left and right of the base module. Its high position provides an even better illumination of the road. The daytime running light consists of four LED spots and a revolving light ring.

Higher torsional stiffness due to new lightweight body

The body of the new 911 GT3 is a development based on the latest 911 Carrera. The extensive use of aluminum in the front and rear body, as well as the floor assembly, reduces the shell weight by around 13 percent over the previous model. Roof and wings, rear boot lid and doors are also made of aluminum alloy. In addition, the torsional rigidity was increased by about 25 percent. Both factors become immediately apparent when it comes to vehicle dynamics.

The front apron was newly designed for the new 911 GT3. In addition to the integration of the new front lights, the larger holes improve air supply to the radiator compared to the 911 Carrera. The conspicuous element of the particularly pronounced spoiler lip is the laterally raised spoiler contour. It consists of three parts: the continuous horizontal middle spoiler element, as well as the lateral continuations before the wheel arches. All three elements have a scoop-shaped, drawn-out lip, which improves the downforce generated by the front axle.

The distinctive identifying feature of the rear of the new 911 GT3 is its fixed wing. The completely newly developed decklid is made of a composite material consisting of glass and carbon fiber. Spoiler supports, the large ram-air intake for the air supply of the engine, and the spoiler lip are all integral components of the design. The rear spoiler is mounted on supports, which remains individually adjustable for use on the track. Further characteristic features of the 911 GT3 rear are the exhaust vents in the rear bodywork, with two on the side and one under the rear boot lid.

Downforce on the front and rear axle

The front and rear design are the result of consistent aerodynamic tuning of the new 911 GT3. This establishes a new balance between the three main requirements of low drag, reliable cooling of drive and brakes, as well as sportive downforce at higher speeds. Front and rear spoilers provide downforce at the front and rear axle, complemented by the underbody panel, which provides an additional diffuser effect due to its rising contour in the engine area.