



PORSCHE

# Press Information

Detroit Auto Show 2011

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January 2011

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World premiere in Detroit: mid-engine coupé as a technology test bed

## **Porsche 918 RSR – racing laboratory with even higher-performance hybrid drive**

Dr. Ing. h.c. F. Porsche AG, Stuttgart, is continuing to extend its performance and high efficiency competence via intensive development work in the field of hybrid technology. With the Porsche 918 RSR, the manufacturer of sporty premium vehicles is presenting a high-end synthesis of 2010's successful hybrid concepts. The two-seater mid-engine coupé 918 RSR clearly reveals what happens when the technology fitted in the 911 GT3 R hybrid and the design of the 918 Spyder are transferred to a modern, innovative super sports car.

With its highly-efficient flywheel accumulator, the 911 GT3 R hybrid racing car proved to be an attention magnet during competition racing on the Nürburgring Nordschleife circuit, during the American Le Mans Series races (ALMS) in Road Atlanta/USA and the ILMC run in China's Zhuhai. It demonstrated its massive performance potential under realistic motor racing conditions against top competitors. The 911 GT3 R Hybrid, referred to internally as the "Race Lab" actually surpassed the high expectations of Porsche Motorsport. Competitiveness, high reliability and exemplary fuel efficiency combined with top performance underscored the Porsche technicians' basic idea of generating additional power in an intelligent manner. The 911 GT3 R Hybrid obtains its additional power from its own vehicle dynamics when braking. Porsche is now transplanting this technology into the mid-engine coupé 918 RSR, the motor sports version of the 918 Spyder concept car.

From the tradition established by classic Porsche long-distance race cars such as the 908 long-tail coupé (1969) and the 917 short-tail coupé (1971), the Porsche designers created a link to the postmodernism of the "form follows function" philosophy. In the 918 RSR, the lines' elegant flow is dominated by muscular wheel arches, dynamic air intakes and a pulpit-like cockpit. A visible fan wheel between the ram air intake tubes and a rear spoiler with RS Spyder dimensions additionally emphasise the racing laboratory function. The new "liquid metal chrome blue" colour which has been created underscores the sculptured curves of the forms, whilst the typical Porsche hybrid orange colour on brake calipers and the body's longitudinal stripes lends remarkable touches.

Motor racing technology also dominates within the particularly light, torsionally stiff carbon fibre-reinforced plastic (CFRP) monocoque. The V8 engine is a further development of the direct injection engine from the successful RS Spyder race car and now offers an output of precisely 563 hp at 10,300 rpm in the 918 RSR. The electric motors on the two front wheels each contribute 75 kW, i.e. a total of 150 kW, to the peak drive power of exactly 767 hp. This additional power, which is generated during braking, is stored in an optimised flywheel accumulator.

In the 918 RSR, the two electric motors offer a torque vectoring function with variable torque distribution to the front axle. This additionally increases agility and improves steering response. Mounted upstream of the rear axle, the mid-engine is integrated with a racing transmission also based on the RS Spyder race car. This further developed six-speed constant-mesh transmission with longitudinally mounted shafts and straight-toothed spur gears is operated using two shift paddles behind the racing steering wheel.

The vehicle's functional equipment underscores its puristic motor racing character. Whether it be the characteristic doors which open obliquely upwards, the air intake in the roof between the wing doors, the quick-action locks on the front and rear CFRP lids, the two roof-mounted aerials for pit radio and telemetry, the RS Spyder-like small, lateral front flics or the air splitters beneath the front lip or no-profile racing slicks on 19" wheels with central locking, the vehicle can be clearly recognised as an experimental racing laboratory.

In contrast to the 918 Spyder concept car, unadorned racing atmosphere predominates in the interior of the 918 RSR. The figure-hugging bucket seat's brown leather covering cites the history of the gentleman driver; the gear flashes on the racing steering wheel and a recuperation display on the steering column in front of the display screen supply the pilot with information. Instead of the futuristic, ergonomically avant-garde centre console with touch-sensitive user interface from the 918 Spyder concept car, the 918 RSR's cockpit is split by a minimalistic console with rocker switches. Instead of a second seat, the flywheel accumulator is positioned to the right of the console.

This flywheel accumulator is an electric motor whose rotor rotates at up to 36,000 rpm to store rotation energy. Charging occurs when the two electric motors on the front axle reverse their function during braking processes and operate as generators. At the push of a button, the pilot is able to call up the energy stored in the charged flywheel accumulator and use it during acceleration or overtaking manoeuvres. The flywheel is braked electromagnetically in this case in order to additionally supply up to 2 x 75 kW, i.e. a total of 150 kW, from its kinetic energy to the two electric motors on the front axle.

This additional power is available for around eight seconds when the system is fully charged. In the successful 911 GT3 R Hybrid, this additional power can also be used as a consumption aid depending on the racing situation, e.g. to delay pit stops or reduce the fuel tank volume and therefore the weight of the vehicle.

With the new 918 RSR racing laboratory, Porsche is now elevating this motor racing hybrid concept to an experimental level. In the 918 RSR, "Porsche Intelligent Performance" equates to research into methods for further sustainable efficiency improvement under the intensified conditions of the race track, lap times, pit stops and reliability – a metier in which Porsche has been demonstrating its success for over 60 years.

Finally, the starting number, 22, pays homage to the anniversary of a further triumph. Back in the days when overall victories in Le Mans were not yet an entirely routine matter within the Porsche racing department, the pilots Dr. Helmut Marko and Gijs van Lennep were the first to cross the finishing line in 1971's 24-hour classic. The distance record set by their Porsche 917 short-tail coupé – 5335.313 kilometres (3315.21 miles) at an average speed of 222.304 km/h (138.13 mph) – did not remain unbeaten for an eternity, but for exactly 39 years until 2010. At the time, the 917 in the Martini colours was also an experiment and far ahead of its time: a magnesium space frame set new standards in Porsche's lightweight construction domain.

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Cayman R – the new top-of-the-range model for the mid-engine Coupés

## Lightweight with exceptionally sporting ambitions

The Porsche alphabet reserves the letter R for very special sports cars: R for responsive and refined – but most especially for racy. The new Cayman R combines all these attributes without compromise. The mid-engine Coupé is lighter and more powerful than the Cayman S and therefore quicker and more efficient, and is designed purely for driving dynamics. With its specially adapted sports chassis, it provides an even more precise driving experience than the Cayman S.

Its specifications are:

Cayman R	3.4-litre six-cylinder engine with 330 hp (243 kW); rear wheel drive; six-gear manual transmission, optional seven-gear Porsche double-clutch transmission (PDK); acceleration 0 – 100 km/h (62 mph) in 5.0 seconds, 4.9 seconds with PDK; top speed 282 km/h (175 mph), 280 km/h (174 mph) with PDK; fuel consumption (NEDC) 9.7 l/100 km (3.43 gallons imp. per 100 miles), 9.3 l/100 km (3.29 gallons imp. per 100 miles) with PDK.
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The main aim during the design of the Cayman R was to improve the two-seater even further in its performance, driving dynamics and agility through consistent weight reduction. Overall, the vehicle weight of the Cayman R was reduced by 55 kilograms to a DIN empty weight of 1295 kilograms compared with the Cayman S. This means that the Porsche engineers were able to reduce the power-to-weight ratio of the Coupé with standard manual transmission to 3.9 kilograms per horsepower, and the PDK version has 4.0 kilograms per horsepower.

The largest savings were achieved through the use of lightweight components and doing without convenience fittings. For example, the series version is not fitted with an air conditioning system or radio, which results in 15 kilograms less vehicle weight. On the bodywork side, a further 15 kilograms was saved through the use of aluminium doors as used in the

911 Turbo. Light sports bucket seats do not just improve the driver's side support in bends, but they also contribute to a further weight reduction with a saving of around 12 kilograms compared with the conventional seats used in the Cayman S. The reduced door trim without storage compartment and with door opening strap, dispensing with the instrument cluster cover and the cupholder in addition to a wide range of minor measures round off the lightweight package. As for the 911 GT3/GT3 RS and Boxster Spyder, an optional lithium-ion lightweight construction battery is also available. In addition, the top model in the mid-engine Coupé is equipped with the lightest 19 inch wheels the entire Porsche program can offer. The 10 spokes are so finely designed – but still extremely robust – that the complete rim set only weighs 40 kilograms.

The Cayman R's purpose and purist character can be seen at first glance. The extended silhouette of the bodywork, which has been lowered by 20 millimetres compared to the Cayman S, combined with the distinctive fixed rear spoiler, the high-quality silver-painted wheels and numerous sporting emphases in both the interior and exterior ensures an individual appearance. The exterior mirrors together with the "PORSCHE" lettering on the side, the lateral air intakes and the rear spoiler top section – in contrasting black or silver, depending on external colour –, in addition to the black-framed headlights take design cues from the classical Porsche racing cars.

Precisely this "PORSCHE" lettering was the trademark of the first Porsche with the "R" designation, the 911 R of 1967. It was created for racing sport use in a small series of 19 cars for a small circle of top private drivers and, of course, for the company itself. The "R" was a prototype based on the series Coupé with a 210 horsepower Carrera 6 engine and, thanks to its many plastic components and extremely sparse fittings, weighed only 830 kilograms. The 911 R demonstrated its stability and speed on the 84-hour "Marathon de la Route" on the Nürburgring in 1967, where Porsche used the race as a welcome endurance test for a new series component: Vic Elford, Hans Herrmann and Jochen Neerpasch won in a 911 R fitted with the new Sportomatic transmission. The successes cumulated. Entered by the factory, the 911 R was also a winner during the "Tour de France" driven by Gérard Larrousse in 1969.

Engine and gearbox

## **Snappy six-cylinder with more power**

The Cayman R engine doesn't just put out 10 horsepower more than the 3.4 litre Cayman S engine of the same size, it is also considerably more spontaneous. The main reason for the increased power is the changed exhaust system with its new head pipe and a modified engine control. Just as for engines made for motor racing, the Cayman R six-cylinder has been built to the high-revving concept and produces its maximum power of 330 hp at 7400 rpm, 100 rpm before its rotational-speed limit. This enables the driver to use the gear ratios of the manual transmission or PDK even better and to decrease the lap times. To match this, the accelerator pedal control characteristic curve has been designed with the emphasis on sport, so that the Cayman R reacts extremely spontaneously and powerfully to the driver's commands in interplay with the specially matched Porsche double-clutch transmission (PDK).

The flat engine, which was built following the classic Porsche principles, provides optimal conditions for use in the consistently driving dynamics-oriented Cayman R. Low weight, flat construction with low centre of gravity, reduced internal friction and low moving mass ensure high performance at simultaneous low fuel consumption. This means that the Cayman R only consumes 9.7 litres per 100 kilometres (3.43 gallons imp. per 100 miles) – 0.1 litres less than the Cayman S. The crankcase is divided in two and built using the closed-deck construction system. The engine suspension with additional transverse stops and special suspension identification ensure sporting comfort at high driving dynamics since the unit is fixed more firmly and therefore allows less relative movement to the body.

### **Sporting efficiency: direct fuel injection and VarioCam Plus**

Porsche also uses direct fuel injection in the new Cayman R's 3.4-litre engine. The carburetion is based on homogenous direct injection operation. The fuel, which is injected directly into the combustion chamber, mixes with the fresh induction air extremely evenly to enable optimum combustion. The injector is located between the two intake valves and places its injection jets directly into the two air flows. This means that air and fuel are mixed much

better in the cylinder – an important prerequisite for clean and complete combustion. Direct injection does not just have a positive effect on the efficiency, but also on the characteristics of the Cayman engine. The driver can feel this directly: since the fuel is injected fractions of a second before the combustion, the engine reacts very quickly to any movement of the accelerator pedal. The engine provides the torque required by the driver in its entirety as early as the next combustion cycle immediately after positional changes of the accelerator pedal.

The Cayman R communicates its willingness to perform to the driver right from the start. This means that the engine reacts with the accent on agile with a distinct speed overrun as soon as the warm engine is started. The engine sound has been improved yet again with internal engine measures and adopted to the overall sporty impression. As an example, the modified engine control creates the well-known motor racing “muttering” sound during trailing throttle state.

The sports car engine breathing characteristics are controlled via the high-speed-tested VarioCam Plus camshaft adjustment developed by Porsche, with its intake-side timing adjustments and valve lift switchover. The valve lift adjustment is carried out by hydraulically-controlled bucket tappets on the engine intake side which are operated by two differently-sized cams on the intake camshaft. Thanks to VarioCam Plus, optimum power and torque can be achieved. In addition, this system improves fuel consumption, emission behaviour and engine refinement. In combination with the direct fuel injection, this results in an increase in power and torque at the same time as a reduction in fuel consumption.

The demand-controlled oil pump also plays its part in the exemplary efficiency of Porsche engines. The oil circulation has been built based on the principle of integrated dry-sump lubrication and consists of an oil pump with four suction and one controlled pressure stages. The engine management adapts the pump capacity to current requirements at any time. A cogwheel which can be hydraulically moved along its axis, which means that the catching tooth width and therefore the geometrical displacement volume of the cogwheel set is changed, is used for this purpose. This means that the oil pump uses no more energy than is required and simultaneously ensures lubrication which matches requirements.

**Resonance intake system with control valves**

A resonance intake system fitted with a resonance and distribution pipe between the right-hand and left-hand intake manifold is responsible for fresh air regulation for the 3.4-litre engine. The controlled tuning flap enables adaptation of the air vibrations in the intake system to the corresponding engine speed, high torque even at low revolutions, a more even torque curve and high maximum power. The twin-flow distribution pipe with control valve also improves the torque at low engine revolutions.

**Exemplary emission behaviour**

The engine fulfils the emission limit values in accordance with Euro 5 and the ULEV (Ultra Low Emission Vehicle) Standard for the USA. In order to achieve this, the 3.4-litre engine works with the so-called high-pressure stratified charge injection on cold starting with a subsequent catalytic converter heating phase. Here, the dual injection increases the exhaust gas temperature and therefore heats the catalytic converter up as quickly as possible. The fuel-air mixture is ignited at a very late stage which further increases the exhaust gas temperature and reduces emissions during the start-up phase. Finally, the exhaust system with its two engine-bay pre-catalytic converters integrated in the elbows and its two main catalytic converters ensures as early and complete as possible cleaning of the exhaust gas.

The Cayman R exhaust system is based on the one used in the Cayman S, but it has an head pipe with increased diameter which results in further de-throttling on the exhaust gas side. In combination with the new engine application a power increase of 10 hp at higher revolutions is achieved in this way. The twin-flow double tailpipe of the Cayman R is coloured sporting black. The sports exhaust system, which is available on request, provides an impressive acoustic experience. It is also fitted with a twin-flow double tailpipe, but in this case the surface is stainless steel polished with a nano-coating.

**Six-gear manual transmission**

A six-gear manual transmission fitted as standard in the Cayman R transmits the engine power to the rear axle. The gear ratios are designed to support and match the engine's sporty characteristics perfectly, and the gear shifts during shifting up ensure winning forwards acceleration in combination with the high-revving engine. A short shifter is also available for particularly sportingly-minded drivers.

**Even more sporty and even more thrifty: the Porsche double-clutch transmission (PDK)**

The optional seven-gear Porsche double-clutch transmission (PDK) is also available for the Cayman R for further improvements to dynamics and economic efficiency. In principle, the PDK is a conventional manual transmission divided into two split transmissions with a hydraulic control unit. The core of this transmission is formed by two concentrically arranged multi-plate clutches nested inside each other in an oil bath, which are hydraulically operated. One clutch is responsible for the first split transmission with odd-numbered gears and reverse gear, the other clutch is responsible for the second split transmission with its even-numbered gears. The hydraulic control unit actuates both the clutches and the shift cylinders for shifting into the required gear ratios by means of a number of pressure valves. The gear shifts take place extremely quickly, without jerking and without interruption to the power flow because the clutch for one split transmission releases at exactly the same time as the other clutch engages. The major advantage is that gear shifting is up to 60% quicker than with manual or torque converter automatic transmissions because the gears have already been engaged during shifting.

The gear-shift strategy provided by the PDK has been thoroughly revised for the radical, puristic Cayman R. This leads to even more agility for the mid-engine sports car in all operating areas. The adaptive changing in the more sporty gearing coordination now takes place after only a few accelerator pedal movements, the transmission electronics reacts more quickly and more directly to the driver's requirement for more sportiness. This means that the vehicle retains its power in all gears, acceleration out of bends is possible with much higher power transfer to the wheels, and the driver is connected directly to the engine and transmission via the accelerator pedal. The agility has also been improved during braking manoeuvres just before tight bends. The braking shift-downs are more spontaneous and carried out at a higher engine speeds, which means earlier. Overall, the engine speed level between neutral and the shift speed up to the next highest gear has been adapted to the high-revving engine.

If the selector lever is set to D, gear-changing takes place completely automatically. In contrast to the other Cayman Coupés, the shifting points have been adjusted much later in each program so that the driver can make full use of the engine speed range. In combination with the PDK the Cayman R has been fitted with a three-spoke sports steering wheel

with gear-shift paddles, of which the right-hand paddle is responsible for shifting up and the left-hand for shifting down. The transmission response times in automatic and manual modes have been shortened even more in comparison with the other Cayman Coupés so that the driver can take direct control of power which is transmitted from the wheels to the road. Clutch operation takes place without driver action in every case. Gears one to six are spaced sportingly – the Cayman R achieves top speed in sixth gear. The seventh gear is designed with a higher gear ratio for less fuel consumption.

### **Sport Chrono package with Launch Control and racing gear-change strategy**

Things get even better. In order to use the new Cayman R's potential to its fullest, Porsche now offers the Sport Chrono or Sport Chrono Plus packages for the mid-engine sports car. The sport button in the centre console is used to activate the sport mode for both the engine and Porsche Stability Management (PSM). If the vehicle is equipped with PDK the Sport Plus button, which programs the double-clutch transmission for especially rapid gear shifting, is fitted. This means that an uncompromisingly sporty shift program is activated for the very best in driving performance on the circuit.

On top of this, the Sport Plus program allows activation of the so-called Launch Control for the best possible starting acceleration. To achieve this racing start, the driver has to actuate the brake pedal with his left foot and use his right foot to press the accelerator pedal right down (kick-down). This regulates the engine to a speed of 6500 rpm. As soon as the driver takes his foot off the brake pedal, the vehicle starts with the maximum possible acceleration. The Cayman R manages 0 to 100 km/h (62 mph) in only 4.7 seconds, in other words 2/10 of a second quicker than before.

The Sport Chrono Plus package is used in models with the optional PCM. It offers an additional performance display in the instrument cluster and individual memories for light, wiper and door lock settings.

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Suspension and brakes**Sports chassis with uncompromising tuning**

The extraordinary dynamics of the new Cayman R are linked directly to the specially developed and adapted sports chassis. The externally visible signs of this are that the new top model in the two-seater Coupé range is around 20 mm lower than the Cayman S. This lowering is coupled with shorter, more rigid springs and customised anti-roll bars on the front and rear axles. On top of this, the height of the centre of gravity has been lowered by a further two millimetres through weight-saving measures so that this is now 22 millimetres lower overall. Stiffer tuning has also been carried out on the dampers. The Cayman R's fathers have passed on a tracking width which is four millimetres wider at the front and two millimetres wider at the rear due to larger wheels with altered offset. The extremely light wheels reduce the unsprung weight and additionally improve the driving precision.

This chassis design – in connection with the largely evened-out axle-load distribution and the positioning of passengers and engine between the axles – allows an extremely dynamic way of driving with increased driving stability and high lateral acceleration in the Cayman R. The R model steers with even more agility and precision than the other mid-engine Coupés. Sway and pitch have been almost completely eliminated. The comparatively long wheelbase ensures additional stabilisation, especially during straight-ahead driving.

The front wheel suspension comprises a spring strut axle with trailing arms and wishbones. This design ensures very precise wheel guidance combined with a high degree of ride comfort. Additional rebound buffer springs in the damper strut reduce the sway angle, in other words the Coupé remains more stable even at high lateral acceleration. The rear spring struts are supported in special spring seats which additionally damp transmission of impact, noise and vibrations to the body and therefore increase the ride comfort even more.

A larger negative camber has also been set on both axles to increase the directional stability potential. The driving dynamics advantages of these chassis modifications are emphasised optimally in the Cayman R. The extremely high stiffness and torsional rigidity of the Cayman body offers the perfect basis for maximum steering precision. Taking the puristic and sporting design of the Cayman R into account, Porsche is dispensing with the optional extra of the Porsche Active Suspension Management (PASM) electronically-controlled damper system.

**Rear axle differential lock as standard**

A rear axle differential lock is taken for granted in a sports car with extremely sporty tuning. It has been designed for 22 percent locking value in traction and 27 percent in propulsion. This means that both traction and stability have been considerably improved, which in turn results in noticeable performance gains on winding routes, especially on circuits. A further benefit is the more stable load alteration behaviour. On top of this, the mechanical limited-slip differential relieves the electronic brake actuation (ABD) of the Porsche Stability Management (PSM) through its operating principle, since wheelspin is delayed on roads with less grip on one side due to the locking effect.

**Precise rack-and-pinion steering**

As in the case of Porsche's other mid-engine sports cars, the hydraulically-assisted rack-and-pinion steering transmits the driver's steering commands with variable steering ratios in the Cayman R as well. Firstly this makes excellent agility on winding roads possible, and secondly outstanding driving stability at very high speeds is simultaneously available. The steering ratio is larger in the central position, in other words during minor steering wheel turns. This means that the Coupé behaves extremely stably, especially at high speeds. If the steering wheel is turned by more than 30°, the steering ratio becomes increasingly more direct. This results in considerably more agility on winding roads and more manageability, for example when turning off, in tight bends or during parking. The steering wheel turns around two and a half rotations from stop to stop.

**High-performance brake system with optional ceramic discs**

Perforated and internally ventilated brake discs ensure excellent deceleration as standard. At the front, four-piston aluminium monoblock fixed callipers with a diameter of 318 mm (12.52") and a thickness of 28 mm (1.1") are used. On the rear axle, 24 mm (0.94") thick brake discs with a diameter of 299 mm (11.77") ensure optimum deceleration, and these are also gripped by four-piston aluminium monoblock fixed callipers.

The Porsche Ceramic Composite Brake (PCCB), which is available as an option, provides its very own braking dimension. The package consists of ceramic discs of 350 mm (13.78") diameter on all four wheels, and special brake pads provide extremely high and especially constant deceleration in connection with the yellow-painted six-piston aluminium fixed callipers on the front axle and four-piston aluminium fixed callipers on the rear axle. This guarantees extremely short braking distances even under extremely high requirements.

### **PSM with optimised response characteristics**

The Porsche Stability Management (PSM) ensures high active safety in its new development stage as standard. PSM includes ABS (anti-lock brake system), ASR (traction control system), MSR (engine braking control system), ABD (automatic braking differential) and the "Pre-filling of brake system" and "Braking assistant" functions. Pre-filling of the brake system increases the brake readiness and assists in reducing the stopping distance in emergency situations. As soon as the accelerator pedal is released rapidly, which is characteristic for forthcoming emergency braking, a specific amount of pressure is built up on the wheel brakes by the PSM hydraulic unit even before the brake pedal is actuated. This means that the brake pads are applied lightly to the brake discs. The response characteristics of the brake system are therefore improved considerably and the stopping distance is reduced.

The Brake Assistant is also responsible for reducing the stopping distance. As soon as the system detects emergency braking – when a specified actuation speed and a defined pedal force at the brake pedal is exceeded – the PSM hydraulic unit actively provides the brake pressure required for maximum deceleration. However, in order to prevent unwanted actuation of the brake assistant during very sporty driving, for example during circuit racing, the system is deactivated when the PSM has been switched off (PSM OFF) or if the optional Sport Chrono package sport button has been pressed.

As a basic rule, the PSM acts to ensure increased stability in critical driving situations close to the absolute limits through selective brake actuation. This means that the system can offer extremely high active driving safety along with the agility expected of a Porsche car, and therefore increased driving enjoyment. In order to make agile handling possible in tight bends, the PSM comes into operation later at lower driving speeds of up to around 70 km/h (43.5 mph). The driver can also switch off the PSM so that it only becomes active again during braking. Reactivation of the system only takes place if the brake pedal is depressed strongly and once the ABS regulation limit has been exceeded on at least one front wheel. The sporting driver can therefore enjoy considerable leeway since no PSM intervention takes place during light braking, which allows the vehicle to be braked neutrally into bends.

## Body and aerodynamics

### **High stiffness for precision and safety**

The best chassis, the most powerful braking system and the most dynamic drive can only be transformed into high driving performance if the common link – the body – is adopted correspondingly. The Cayman R has a huge initial advantage in this case: its structure is based on the Boxster, which has been constructed as an open sports car and therefore provides extremely high stability even without a roof. The integration of a fixed coupé roof resulted in an extremely rigid and torsionally stiff body which is now setting standards in the mid-engine sports coupé segment.

This extremely high stiffness has, on the one hand, immediate effects on the precision of the chassis: even major stimulation has absolutely no influence on the body structure geometry, which means that the chassis geometry remains unchanged – the sports Coupé appears to run literally on rails. On the other hand, stiff bodywork also means high passive safety. The Cayman R fulfils all current valid regulations in the relevant markets with respect to passive vehicle safety. It falls well below the limit values required by the legislators for frontal, oblique, side and rear impact in addition to rollover.

### **Vehicle bonnet and doors in aluminium**

The front luggage compartment lid on the sport Coupé is a shell structure in aluminium. The Cayman R's doors result in a further 15 kg of saved weight because, in comparison to the other Cayman models, they are manufactured in aluminium. The wide-opening tailgate with its large, heatable rear window in lightweight steel construction fits snugly in the flowing lines of the vehicle rear. A wiper for the rear window is available as an option.

**Safety first: six airbags as standard protection**

It's only natural that the Cayman R provides the same passive safety system as all Porsche sports cars. A head airbag combined with a thorax side airbag on the driver and passenger sides provide excellent protection against side impact over the entire longitudinal adjustment range of the seats. Porsche calls this combination POSIP, which is short for Porsche Side Impact Protection. The full-size airbags provide just as much protection against injury caused by frontal impact with their 62 litres on the driver side and 122 litres on the passenger side.

**Optimised aerodynamics with even less lift**

Tracking stability and road grip play an important role in safety and lateral stability in sports cars used for racing, especially at high speeds. For this reason, the Porsche engineers have reworked the Cayman R's aerodynamics in detail and have achieved considerably reduced lift values on both axles. The lift has been reduced by around 15 percent at the front axle, and by 40 percent at the rear axle. This is attributable to the more pronounced front spoiler lip and the fixed spoiler at the rear. It replaces the automatically extending split wing which is fitted as standard to the other Cayman models, and is based on a different aerodynamic principle. Optimised deflection blades for cooling air to the wheel housing panels also optimise brake cooling. The Cayman R has a  $C_d$  value of 0.30 both with manual six-gear transmission and with PDK.

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Interior and equipment**Less is more**

The interior of the new Cayman R presents itself in sporting functionality, and has been designed with the focus on purism, ergonomics and authenticity. The interior colour is principally black, and is supplemented with components in the exterior colour or colour accents of red or silver.

The fittings are concentrated on the essentials for reasons of weight. There is a storage compartment instead of a radio, the door pockets have been left out completely and the cupholder is only available on request. Instead of the metal levers normally found in Porsche cars, the Cayman R is fitted with a light fabric strap in the inside panelling for opening the door. Even the surround flanking the instrument cluster with its black instrument dials was on the Cayman R hit list. The centre console and decorative moulding around the switch panel are painted in vehicle colour. The fitting colour is black as standard with accented details in contrasting colours: the gear diagram on the shift lever, the door opening straps and the seatbelts are coloured in a contrasting luminous red or black depending on the external colour, and are also available in silver as an option.

The Cayman R is fitted with light sports bucket seats with a seat centre in Alcantara as standard. The seat shell construction is made of glass and carbon fibre-reinforced plastic, and plays an important part in weight reduction to a level of around 12 kilograms compared with the standard seats fitted to the Cayman S. The seat shell surface is finished in an optically attractive visible carbon.

**Diversity: options for individualisation**

You can take it for granted that the Cayman R offers every customer the opportunity to adapt the two-seater to his individual requirements. This is why almost all the options in the Cayman program are also available for the new R-type, and these range from climate control through a complete leather interior right up to Bi-Xenon headlights with dynamic

cornering lights and LED daytime driving lights. The sports seat can be ordered at no extra cost as an alternative to the extra-light standard sports bucket seats. The CDR-30 audio system can also be fitted at no extra cost on request. It is fitted with an easily-readable 5-inch monochrome screen. The integrated CD drive also plays music in MP3 format.

The Porsche Communication Management (PCM) including navigation module is also optionally available. It is used as a central controller for all fittings in the audio, communication and navigation sector. Its main feature is the 6.5 inch touch screen. In addition, external audio sources such as an iPod® or USB stick can be controlled via the PCM with the optionally available universal audio interface. Instead of the standard single CD/DVD drive, an integrated six-fold CD/DVD changer which is comfortably within the driver's reach is available as an option in PCM.

Car brand with a long tradition

## **60 Years of Porsche Cars in America**

It was 60 years ago, in the autumn of 1950, that the first Porsche cars were shipped to the USA. They were the legendary Porsche 356 models. Since then, what was at that time just a small sports car manufacturer has gone on to capture the hearts of American sports drivers – and a good number of Hollywood stars as well.

At the Paris Motor Show in 1950, the foundation for Porsche's entry into the American market was laid. At the time, a decisive meeting took place between Professor Ferdinand Porsche and the US automobile importer Maximilian E. Hoffman. Being an importer of a number of different European automobile brands on the American East Coast, Hoffman had his own dealership network at his disposal, as well as an unerring sense of what the upper class of America was looking for when it came to automobiles. Ferry Porsche and Hoffman concluded a deal soon afterwards for the delivery of 15 Porsches annually, the first three vehicles of which were shipped to the USA as early as October 1950.

When the first Porsche 356's arrived in the USA, Max Hoffman once again proved just how much marketing talent he had. In parallel with the presentation at his modern showroom on New York's Park Avenue, he also handed over a Porsche 356 to the private racing driver Briggs Cunningham, who soon began delivering the first victories on the race track. The Porsche 356 rapidly became the insider tip in the American racing scene, which had a positive effect on more than the sales figures. The German sports cars, fast and suitable for daily use at the same time, also became a hit in Hollywood, and were a favourite among film stars, James Dean in particular. The combination of racing sports and Hollywood glamour helped the Porsche brand name to achieve its unique lifestyle image in America, something which in turn reflected back to Europe.

Beyond that, Max Hoffman had recognised that there was a need for country-specific models if victory was going to be won in the long term on the important American market. Hoffman accordingly pressed for a particularly light and economical version, which from 1954 arrived on the market in the form of the 356 Speedster, based on the small series 356 America Roadster which had made its debut in 1952. With a basic price tag of 3,000 US dollars, the Speedster, with its spartan fittings, became a great sales success in sunny California in particular.

The success on the US market had an extraordinarily quick and positive effect on the sales figures of what was at the time Porsche KG. As early as the first few years of the co-operation, there were considerably more sports cars exported to the USA than the company's president, Ferry Porsche, had expected. In 1952, this amounted to 283 Porsche cars, meaning that some 21 per cent of total sales had gone to America. This proportion increased steadily in the years which followed, with the 50 per cent mark being exceeded for the first time in 1955 (from a total production of 3,624 vehicles). And in succeeding years this figure was surpassed again and again. In 1965, the last production year of the Porsche 356, the share of sales to the US amounted to a huge 74.6 per cent.

To this day, the United States market is still the most important sales outlet for Porsche. Headquarters for Porsche Cars North America is Atlanta, and in total there are around 200 Porsche dealers in the USA.

## Specifications of the Porsche Cayman R\*

<b>Body:</b>	Two-seater Coupé, fully galvanised, lightweight design steel body with aluminium doors, two-stage driver and front passenger airbags, side and head airbags for both driver and front passenger.
<b>Aerodynamics:</b>	Drag coefficient: $C_d = 0.30$ Frontal area: $A = 1.99 \text{ m}^2$ ; $C_d \times A = 0.597$
<b>Engine:</b>	Water-cooled six-cylinder flat six engine; aluminium engine block and cylinder heads; four overhead camshafts; four valves per cylinder; variable intake valve timing and valve lift switching (VarioCam Plus); hydraulic valve play compensation; active two-stage resonance intake system; direct petrol injection; integral dry sump lubrication system with on-demand oil pump; two three-way catalytic converters per cylinder bank, each with two oxygen sensors; 10.0 litre engine oil capacity, electronic ignition system with solid-state ignition current distribution (six ignition coils).
<b>Bore:</b>	97.0 mm (3.82")
<b>Stroke:</b>	77.5 mm (3.5")
<b>Displacement:</b>	3,436 cm <sup>3</sup>
<b>Compression Ratio:</b>	12.5:1
<b>Engine Power:</b>	243 kW (330 HP) at 7,400 rpm
<b>Max. Torque:</b>	370 Nm at 4,750 rpm
<b>Power Output per Litre:</b>	70.7 kW/litre (96.0 HP/litre)
<b>Maximum Revs:</b>	7,500 rpm
<b>Fuel Type:</b>	Premium Plus
<b>Electrical System:</b>	12V; 2,100 W three-phase generator; 60 Ah/280 A battery

\*Specifications may vary according to markets

**Power Transmission:** Engine and gearbox bolted together to form one unit; power transmission to rear wheels via double-joint cardan shafts. Six-speed manual transmission; optional Seven-speed Porsche Doppelkupplungsgetriebe (PDK)

Gear ratios:	Manual gearbox	PDK
1 <sup>st</sup> gear	3.31	3.91
2 <sup>nd</sup> gear	1.95	2.29
3 <sup>rd</sup> gear	1.41	1.65
4 <sup>th</sup> gear	1.13	1.30
5 <sup>th</sup> gear	0.95	1.08
6 <sup>th</sup> gear	0.81	0.88
7 <sup>th</sup> gear	–	0.62
Reverse	3.00	3.55
Final drive ratio:	3.89	3.25
Constant ratio		1.114
Clutch diameter:	240 mm	153 mm / 202 mm

**Chassis:** Front axle: strut suspension (McPherson design, optimised to Porsche requirements), with wheels independently mounted on wishbones, longitudinal control arms, tie rods and suspension struts; conical stump springs with inner-mounted, twin-tube gas-filled dampers.

Rear axle: strut suspension (McPherson design, optimised to Porsche requirements), with wheels independently mounted on wishbones, longitudinal control arms, tie rods and suspension struts; cylindrical coil springs with inner-mounted, twin-tube gas-filled dampers.

**Brakes:**

Dual-circuit brake system with individual axle split.

Front axle: four-piston aluminium monobloc brake callipers; perforated and internally ventilated brake discs with a diameter of 318 mm (12.52") and a thickness of 28 mm (1.1").

Rear axle: four-piston aluminium monobloc brake callipers; perforated and internally ventilated brake discs with a diameter of 299 mm (11.77") and a thickness of 24 mm (0.94").

Porsche Stability Management (PSM); vacuum brake booster; brake assist system.

**Wheels and Tyres:**

Front	8.5 J x 19	on	235/35 ZR 19
Rear	10 J x 19	on	265/35 ZR 19

**Weights:**

Unladen weight (DIN):	1,295 (1,320) kg
Permissible gross weight :	1,620 (1,645) kg

**Dimensions:**

Length	4,347 mm (171.14")
Width	1,801 mm (70.91")
Height	1,285 mm (50.59")
Wheelbase	2,415 mm (95.08")

Track widths	Front	1,490 mm (58.66")
	Rear	1,530 mm (60.24")

Luggage compartment vol.	Front	150 litres
	Rear	260 litres

Tank capacity:	54 litres (11.88 imp. gals.)
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The values in brackets refer to vehicles with PDK

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<b>Performance:</b>	Top speed	282 (280) km/h (175 (174) mph)
	Acceleration:	
	0 – 100 km/h (0-62 mph)	5.0 (4.9*) s
	0 – 200 km/h (0-124 mph)	17.2 (17.0**) s
<b>Consumption (NEDC):</b>	Urban	14.2 (14.0) litres (19.9 (20.2) mpg imp.)
	Extra-urban	7.1 (6.6) litres (39.8 (42.8) mpg imp.)
	Combined	9.7 (9.3) litres (29.1 (30.3) mpg imp.)
<b>CO<sub>2</sub> Emissions:</b>		228 (218) g/km
<b>Emission Category:</b>		Euro 5

The values in brackets refer to vehicles with PDK

\* In combination with the optional Sport Chrono Package and PDK, acceleration from zero to 100 km/h improves (0.62 mph) by 0.2 seconds to 4.7 seconds.

\*\*In combination with the optional Sport Chrono Package and PDK, acceleration from zero to 200 km/h improves (0.124 mph) by 0.3 seconds to 16.7 seconds.