



PORSCHE



2017 Porsche Panamera

Technical Information

Contents

Highlights	3
The new Porsche Panamera	
The new Porsche Panamera	5
The sports car among luxury sedans	
Concept and design	7
The design of the new Panamera forges a link to the Porsche 911	
Powertrain	9
New V6 and V8 twin-turbo engines, new eight-speed PDK and active all-wheel drive	
Chassis	15
Increased spread between performance and comfort	
Body	18
High-strength lightweight aluminum/steel hybrid construction	
Infotainment, Connectivity, Driver Assistance	19
New levels of comfort, connectivity and safety	
Technical Data	23

Highlights

The new Porsche Panamera

The Panamera – reworked from the ground up – meets high standards as both a sports car and a grand turismo. Its engines and chassis are completely new; the chassis is re-engineered and the human machine interface and display concept is interpreted for a tech savvy audience. At its launch, the second generation of the Porsche Panamera will be available in two all-wheel drive versions: Panamera 4S and Panamera Turbo.

- Concept** Four-door sports car. The concept of the four-seat sports sedan combines the performance of a high-performance sports car with the comfort of a luxury sedan. The trunk and folding rear seat backrests combine to allow up to 46. cu.-ft. (1,304 liters) of luggage volume making the Panamera the most versatile model in its class.
- Design** Expressively designed – with extended, dynamic proportions, athletic shoulders and an extremely fast roof line, this is an evolutionary design. This flyline is typical of Porsche cars and forges a stylistic link to the 911 design icon.
- Drive** Two new twin-turbo engines:
Panamera 4S: 2.9-liter V6 gasoline engine with 440 hp.
Panamera Turbo: 4.0- liter V8 gasoline engine with 550 hp.
New Porsche dual-clutch transmission (PDK) with eight speeds.
All-wheel drive for all models.
- Chassis** Broad spread between performance and comfort characteristics raises standards in the luxury segment. New features include rear-axle steering, three-chamber air suspension, electromechanical roll stabilization system dubbed Porsche Dynamic Chassis Control Sport (PDCC Sport) with Porsche Torque Vectoring Plus (PTV Plus), as well as networking of all chassis systems via 4D Chassis Control.
- Body** A new lightweight body utilizes an optimum mix of aluminum/steel hybrid construction for increased rigidity. Increased use of aluminum: outer door panels, hood, hatch and front fenders – now include large body-in-white parts and the entire side panels and roof. Chassis panels are combined using hemming, flow-drill screws, rivets, and welding.

Electronics

Featuring Porsche Advanced Cockpit and state-of-the-art connectivity, the new Panamera utilizes black panel surfaces and interactive displays to combine the visual and intuitive operation of smartphones with the practical aspects of controlling an automobile. New LED Matrix headlights and new assistance systems such as Porsche InnoDrive and Night Vision Assistant improve efficiency and driver support.

The new Porsche Panamera

The sports car among luxury sedans

Porsche stands for building unique cars – and the Panamera is one such car that has been developed for sports car drivers who appreciate four doors and four seats, and for sedan drivers who swear by sports cars; opposites which the Panamera reconciles in superior style. The second generation of the Panamera is advancing to become a performance icon of the luxury class. In this evolution, Porsche has systematically improved the Panamera concept – with a four door car that has been redesigned and restyled down to the last detail. Its engines and chassis are completely new, the chassis re-engineered, and the human machine interface concept and display are interpreted for a tech savvy audience by incorporating multi-touch gesture control. The new Panamera extends the borders between an ambitious sports car and a comfortable cruising sedan with technical highlights such as rear-axle steering, electromechanical roll compensation and a three-chamber air suspension.

911 design language with a dynamic flyline

Visually, the unique concept of this Porsche is reflected in a new expressive design: unmistakably a Panamera, unmistakably a sports car – with long, dynamic proportions, pronounced shoulders, and an extremely fast roof line that is 20 mm (.79 inches) lower at the rear. This flyline creates a stylistic link to the 911 design icon.

New V6 and V8 twin-turbo engines with ample power and full-bodied sound

A Porsche has always impressed with more than just power; its efficiency is equally important. To make the new Panamera even more efficient than the previous model, the second generation Panamera has all new engines. They have been made more powerful, while significantly improving fuel economy and reducing emissions. Two new twin-turbo direct injection engines are being introduced at the market launch in the Panamera Turbo and the Panamera 4S. All models are equipped with a permanent, fully variable all-wheel drive system and a new eight-speed Porsche dual-clutch transmission (PDK). A 4.0-liter V8 gasoline engine that delivers 550 hp propels the Panamera Turbo while a V6 gasoline engine with a displacement of 2.9 liters and an output of 440 hp drives the Panamera 4S.

Top of the line performance in a tailored suit

In keeping with the overall concept of increasing usability while improving performance, there are numerous changes to the suspension system in the second generation Panamera. First, a new electromechanical steering system for the front wheels, and rear-axle steering for the rear wheels simultaneously improves high-speed stability and slow-speed maneuverability. Ride-height adjustable adaptive air suspension is available with a new three-chamber technology, including electronic damper control (Porsche Active Suspension Management PASM). Also available is an enhanced electromechanical Porsche Dynamic Chassis Control Sport (PDCC Sport) system including Porsche Torque Vectoring Plus (PTV Plus). The integrated 4D Chassis Control system analyzes the driving conditions in real time and enables optimized and

coordinated use of all systems together for even better handling in the new Panamera. Furthermore, the brakes are even more powerful than before to bring the braking power in line with the increased performance.

Intuitive interface with full functionality in the Porsche Advanced Cockpit

Porsche's modern interior concept has been reinterpreted for the next generation in the new Panamera. Black panel surfaces and interactive displays combine a clear and intuitive user interface similar to smartphones. Classic buttons and conventional instruments have been reduced significantly. Instead touch-sensitive panels and individually configurable displays take center stage in the new Porsche Advanced Cockpit. Despite a significantly extended range of communication, convenience and assistance systems, the different functions can now be used and operated more clearly and intuitively.

Next generation assistance systems

The Panamera is equipped with many standard and optional assistance systems, which are designed to make driving safer and more efficient. The most significant new system includes a night vision assistant, which uses a thermal imaging camera to detect people and large animals and displays a color highlighted warning indicator in the cockpit. Looking especially far ahead along the road is the new Porsche InnoDrive, which includes adaptive cruise control. Based on three-dimensional, high-resolution navigation data, it computes and activates the optimal acceleration and deceleration rates as well as gear selections and coasting phases, for the next 1.8 miles. In doing so, this electronic co-pilot automatically adjusts the throttle and transmission while taking corners, hills and speed limits into account for optimized driving. Other vehicles and current speed limits are detected by the radar and video sensors and incorporated into the control system.

The design of the new Panamera forges a link to the Porsche 911

The exterior character of the second generation Panamera has also been sharpened to reflect Porsche's sports car heritage, and is therefore based on dynamic proportions. The new Panamera is 198.78 inches (5,049 millimeters) long, a gain of 1.34 inches (34 mm); 76.26 inches (1,937 millimeters) wide, which is 0.24 inches (6 mm) wider, and 56.02 inches (1,423 millimeters) high, equating to 0.20 inches (5 mm) taller. There is ample space for four people to travel comfortably; the rear also offers plenty of space for use as a chauffeured limousine. In addition, the Porsche Panamera offers the best layout variability of any model in the luxury class, making it the most practical for everyday use with a 40:20:40 split of the folding rear bench backrests and 17.4 to 46.0 cu.-ft. (495 to 1,304 liters) of luggage capacity.

Despite the slight increase in height and the exceptionally spacious interior, the new Panamera appears lower and longer. This is primarily due to the 20 mm reduction in height above the rear of the passenger compartment while maintaining substantial headroom. This changes the car's image completely. The wheelbase has been increased by 30 mm to 2,950 mm (116.14 inches); this too lengthens the car's proportions. The front wheels were shifted further forward (12 mm), reducing the front overhang and making the distance between the A-pillar and the front axle – even larger. The rear overhang is longer, giving the car a more powerful appearance.

The Panamera has only grown 6 mm (0.24 inches) in width, but it feels like several centimeters. This effect is created by such features as the A-shaped air intake, which extends out to the sides and creates a new front-end design. At the same time, a precisely designed crossbar in the radiator grill emphasizes the car's width. The arrow-shaped hood accelerates this visual effect further forward and lower than before – due to the prominently contoured power dome, whose lines now reach into the bumper. The lower front end was enabled by the compact construction of the new engines. To the left and right of the power dome, the hood blends precisely into the stronger flares of the front fenders – a classic Porsche design trait. Also exuding confidence is the look of the LED headlights with their four-point LED daytime running lights, of which two versions are available.

The new silhouette reflects the flyline of a sports car more than ever thanks to the dynamic roof line. Two precisely executed edges on the lateral roof line visually lower the silhouette's center of gravity. The look of the side windows has also been redesigned: visually, their continuous surface together with the rear body lines create a stylistic affinity to the Porsche 911. Integral design components, such as the air outlets behind the front wheels and the fender flares also have a powerful look: the large arches provide space for the different alloy wheels available – from 19-inch standard wheels on the Panamera 4S, to 20-inch standard wheels for the Panamera Turbo. 21-inch wheels are optionally available for both models.

The Panamera's distinctive form factor and look is clearer from the rear than from any other perspective. The 'greenhouse' – made up of the roof, roof pillars and window surfaces – is supported by a powerful and broad shoulder section. In addition to the three-dimensional PORSCHE lettering, the most prominent components identifying the rear body are the three-dimensional LED rear lights with integrated four-point brake lights.

The rear lights are interconnected by a narrow LED strip. Together, these elements create an unmistakable night design. Integrated seamlessly and elegantly into the tailgate, which features electric opening and closing as standard, is the extendible rear spoiler that is now finished in body color. On the Panamera Turbo, the wing also splits as it extends, thereby gaining additional surface area. Completing the lower rear body is a diffuser into which the dual stainless steel tailpipes of the exhaust system are integrated on the left and right. The Panamera 4S can be recognized by round tailpipes, while the Panamera Turbo has trapezoidal tailpipe trims.

Powertrain

V6 and V8 twin-turbo direct injection engines

The new Porsche Panamera debuts in two variants: the Panamera Turbo and the Panamera 4S. Both models have new engines, permanent all-wheel drive, and a new eight-speed Porsche dual-clutch transmission (PDK).

A four-liter V8 gasoline engine that delivers 550 hp, propels the Panamera Turbo, while a 2.9-liter V6 gasoline engine with 440 hp drives the Panamera 4S.

New twin-turbo eight-cylinder engine for the Panamera Turbo

Key development goals in the new Panamera Turbo engine were maximum efficiency and extraordinary performance. A further objective of the new engine line-up was a flexible structure with modular components, so that other variants such as hybrid versions can be implemented rapidly. To meet these specifications, Porsche engineers developed a modular high-tech generation of V8 engines whose technical architecture brings parameters such as low fuel consumption and low emission figures into harmony with high power and torque figures – normally contrasting parameters.

The Panamera Turbo initially has the most powerful V8 gasoline engine of the new engine generation. Between 5750 and 6000 rpm, the four-liter engine develops maximum power output of 550 hp. At just above 3000 rpm, the engine already breaks through the 340 hp threshold. The maximum torque of 567 lb.-ft. is available between 1960 and 4500 rpm. Maximum engine speed is 6800 rpm.

The eight-cylinder engine propels the Panamera Turbo from 0 to 60 mph in 3.6 seconds. With the Sport Chrono Package, the sprint time is 3.4 seconds. The Panamera Turbo has a top track speed of 190 mph. These are impressive figures which underscore how easily the engine is able to power the Panamera with its power-to-weight ratio of just 8.0 lb/hp.

The new 3,996 cc, eight-cylinder engine is longitudinally-mounted with a cylinder bank angle of 90 degrees. The four intake and exhaust camshafts can each be adjusted by 50 degrees and are chain driven. The dominant technical characteristics of the V8 twin-turbo direct injection gasoline engine are the new central turbo layout with turbochargers located within the V, injectors located centrally in the combustion chamber, circuit racetrack compatible oil circulation, nearly wear-free coating of the cylinder linings, and cylinder deactivation.

Innovative cylinder deactivation – four pistons capable of deactivating

The Panamera Turbo features the first Porsche engine to be equipped with an adaptive cylinder control system. In part-load operation, the system transforms from an eight-cylinder into a four-cylinder engine. The deactivation and reactivation of the cylinders are controlled by VarioCam Plus with a two-stage sliding cam system. The valve gear of cylinders two, three, five and eight can be deactivated or reactivated as required. The

intake and exhaust valves of these cylinders are completely shut down in four-cylinder operation. Cylinder deactivation is operational over an engine speed range from 950 to 3500 rpm and up to a torque limit of 184 lb.-ft.

Weight reduction of greater than 20 pounds and compact package

The new eight-cylinder engine utilizes a more compact design that is up to 20.9 pounds lighter than its predecessor. Porsche has achieved the weight reduction with various engineering measures. For example, the aluminum crankcase weighs just 86.2 pounds – this corresponds to 14.7 pounds less weight than the comparable 4.8-liter engine of the previous model. Every component has been analyzed and made lighter where possible. For example, Porsche has reduced the crankshaft drive's weight by 3.0 pounds. The special design of the crankcase drive with its crankshaft supported by five bearings is another element of compact engine design: the crankshaft drive is characterized by the use of an intermediate shaft that is used to drive the water pump and the timing drive. Thanks to the toothed gear drive of the water pump inside the engine, Porsche was able to compress the engine package. Also having a positive influence on mounting space and weight are the central turbo layout and a 0.8-liter reduction in engine displacement. The progress that has been made is all the more noteworthy, because the maximum specific power of the new four-liter V8 is much higher than that of the 4.8-liter engine. The new engine of the Panamera Turbo, for instance, has a specific power of 137.5 hp/l; this figure was 108.3 hp/l in the previous model.

Central turbo layout – a design trait of both Panamera engines

The V8 gasoline engine of the Panamera Turbo exhibits exceptional agility into the higher rpm and power regions. At the same time, the eight-cylinder engine produces its maximum torque at very low revs. This is an engine characteristic that also applies to the new V6 gasoline engine. This type of sports car dynamic is largely attributed to the central turbo layout that is a feature of twin-turbo setup in all Panamera models.

Sophisticated twin-scroll turbochargers supply compressed air to the V8's combustion chambers. The two counter-rotating turbines produce maximum torque figures at very low engine speeds. The maximum charge pressure of the turbochargers is 18.8 psi. A compressor driven by the exhaust gas compresses the intake air in each turbocharger. The flow of this intake air is configured as a dual-branch system for optimal engine response. It flows from the outside, and after passing through the intercoolers on the left and right sides upstream of the V8, passes through one throttle valve on each side and into the left and right cylinder banks. The intercoolers ensure that the temperature of the intake air, which has been heated by the compression process, is further reduced. This boosts the density of the air, which ensures the cylinders are filled with oxygen.

Injectors positioned centrally – perfect for V6 and V8 engines

Another unifying property of both Panamera engines is that the injectors – with their high-pressure injection valves – are positioned centrally in the combustion chamber. Injector valves with seven nozzle holes are used; their jets are individually aligned to achieve perfect homogeneity of the mixture and optimal combustion – in every

operating phase. Porsche utilizes injectors to implement injection strategies that are specific to engine start, heating of the catalytic converters, the engine warm-up phase and the hot operating engine. One high-pressure pump is used per cylinder bank; the maximum injection pressure is 3625 psi (250 bar), significantly higher than the previous engine's 2030.5 psi (140 bar).

Emissions control with catalytic converter located in the inner V

The V8 engine also features a dual-branch exhaust system with upstream catalytic converters and main catalytic converters as well as upstream and downstream silencers. Like the central turbo layout, another engineered feature of the eight-cylinder engine is the close proximity of the catalytic converter to the engine within the inner V. This configuration allows the emissions control system to quickly reach its optimal operating temperature. In addition, catalytic converter heating is accelerated in the engine start phase by opening the turbocharger's wastegate valve.

Iron alloy of the cylinder linings reduces wear and oil consumption

A highlight of the V8 engine is an iron coating of the cylinder linings in a cast aluminum block. It significantly reduces internal friction and wear (even with poor fuel quality) as well as oil consumption. In the manufacturing process, an atmospheric plasma spray method is used to apply an extremely tough and low-friction iron coating to the cylinder surface. The layer is only 150 micrometers thick.

Compared to previous concepts implemented in V8 engines, lining wear is reduced by one-tenth at the motion reversal point (top-dead-center and bottom-dead-center) of the piston rings. The design of the lightweight cast pistons has been adapted to the new alloy. The piston rings have a chrome nitrite coating, which harmonizes perfectly with the iron coating. In the interplay of all these measures, oil consumption has also been reduced by up to 50 percent compared to the previous engine.

Reliable oil circulation under high performance

Every Porsche must operate reliably under racetrack driving conditions, too. The new Porsche Panamera meets this challenge impressively – for example, with an innovative oil circulation system, the layout even compensates for extreme lateral and longitudinal accelerations.

A special feature is that the oil passages are partitioned into oil supply for the engine and oil supply for the cylinder head. The supply openings in the oil passages are optimized for the specific components in the oil circulation system. This has a positive effect on the time required to build up oil pressure at engine start. The fast pressure build-up is also assisted by a check valve in the oil pump – it ensures that the large volume of oil in the inner V does not flow back into the oil pan, causing the engine to run empty. A variable vane oil pump utilizes a map-operated valve to ensure appropriate oil pressure values. Integrated into this control valve is an oil pressure limiting routine, which automatically activates for engine start and at low outdoor temperatures. An electronic switching valve located centrally in the inner V also controls the piston spray nozzles according to piston cooling needs and map parameters. This type of control

reduces churning losses, and the oil circulation volume is also controlled. The Porsche Panamera Turbo performs exceptionally well on the Nürburgring-Nordschleife at high speeds.

Sport Chrono Package and Sport Response button

The optional Sport Chrono Package with launch control and mode switch – including Sport Response button on the multi-function steering wheel – has been perfectly configured for high performance use. The mode switch previously introduced in the Porsche 918 Spyder gives direct access to the four driving modes (Normal, Sport, Sport Plus and Individual) with an ergonomically positioned rotary switch on the steering wheel. Sport Plus mode is ideal for the highest level of performance. Here, the drivetrain is pre-conditioned for optimal response and maximum acceleration. In addition, active suspension components – such as the three-chamber air suspension, Porsche Active Suspension Management (PASM), PDCC Sport, Porsche Torque Vectoring Plus, and rear-axle steering – switch to a sportier mode for maximum performance.

The Sport Response Button is located in the center of the mode switch. Depressing the button instantly calls up the maximum power potential of the Panamera for 20 seconds. When activated, the engine response is more direct and spontaneous; furthermore, the PDK switches to an even more dynamic shifting map than in Sport Plus mode and immediately shifts down to a speed range of 3000 to 6000 rpm (unless the button is pressed under full load). Gears are changed extremely late.

The new 2.9-liter engine in the Panamera 4S

The six-cylinder gasoline engine in the Panamera 4S is also a completely new development. Like the V8 in the Panamera Turbo, this V-engine features a 90 degree cylinder angle but with a displacement of 2,894 cc. The figures: the V6 twin-turbo engine in the Panamera 4S delivers maximum output of 440 hp at 5650 rpm. This corresponds to specific output of 152 hp/l. The six-cylinder engine produces a constant 405 lb.-ft. of torque (gain of 22.1 lb.-ft.) over a wide speed range from 1750 to 5500 rpm. This creates a torque plateau rather than a torque curve. The Panamera 4S can reach 60 mph in just 4.2 seconds (4.0 seconds with the Sport Chrono Package). The Panamera 4S reaches a top track speed of 179 mph.

Like the eight-cylinder engine, a main feature of the new six-cylinder engine is the central turbo layout. The two turbochargers of the new V6 engine are also integrated centrally between the cylinder banks. Here, too, the air drawn in is routed through a dual-branch conduit to each turbocharger and to the combustion chambers to improve the engine's responsiveness.

In addition, the arrangement of the oil cooler and the oil filter in the inner V and the centrally located injectors forge a link to the V8 engine. However, unlike the eight-cylinder engine, the V6 engine's exhaust manifold is positioned in the inner V to further save weight.

Overall, the new six-cylinder engine has a very high rate of integrated functional parts. In addition to the exhaust manifold, these include the partly cast-on intake manifold and the oil cooler. The sandcast crankcase of the V6 turbo engine is made of a lightweight aluminum alloy. This enables a high level of functional integration to reduce the weight. The engine of the Panamera 4S therefore weighs 10.3 pounds less than the V6 turbo in the previous model.

V6 engine with variable timing of the intake valves

The central positioning of the gasoline direct injectors in the combustion chambers is a common feature of the six- and eight-cylinder engines. Like the V8 engine, the centrally positioned high-pressure injection valves also lead to significantly improved combustion and therefore greater efficiency and an agile response. However, there are also differences between the V6 and V8 engines. For example, the intake valves of the six-cylinder engine have variable timing for optimal efficiency and dynamics in both part-load and high-load operation.

In part-load operation, the combustion process of the V6 engines is characterized by a shorter compression phase with a higher compression ratio. In combination with a normal expansion phase (but longer in duration than compression phase), this results in clear efficiency and fuel consumption advantages. The following applies: the shorter the intake opening time, the higher the compression ratio and the efficiency gain. However, the shorter opening time reduces the fill of the combustion chamber. This is why the valve timing and compression have a variable design: the intake valve control switches to longer intake timing as soon as the driver requests more power. This ensures that the engine delivers the maximum power with optimal efficiency in the full load range as well.

Like the first generation Panamera, the new V6 engines also feature VarioCam Plus. The system enables the intake and exhaust camshafts to be adjusted (each by up to 50 degrees) and the switching of the valve stroke of the intake camshafts. VarioCam Plus distinguishes between phases with normal power demand – for example, cruising – and very dynamic phases – for example, overtaking. Depending on the position of the accelerator pedal, the stroke of the intake valve can therefore be switched between six and ten millimeters. The variable valve stroke and the variable opening times of the intake valves result in high engine response, especially in the partial load range.

World premiere of the first Porsche eight-speed PDK in the Panamera

The second generation Panamera is the first model from Porsche to feature a dual-clutch transmission with eight speeds. The new eight-speed PDK can be used in conjunction with rear-wheel or all-wheel drive and in the future it can also be used in combination with a high-performance hybrid module. The eight-speed transmission generally enables an even better gear ratio spread and – with top comfort and agility – further reduction in fuel consumption as the seventh and eighth gears are designed as engine speed-reducing overdrive gears. All Panamera models reach their top track speed in sixth gear.

Like all dual-clutch transmissions, the Panamera's new eight-speed PDK shifts without any interruption in tractive power as the next gear ratio is pre-engaged waiting to be activated in a fraction of a second. The sporty and yet extremely comfortable shift characteristics of the PDK are therefore perfect for a dynamic sports sedan like the Porsche Panamera. The eight-speed PDK is designed for torques of up to 737.5 lb.-ft.

Chassis

Increased spread between performance and comfort

In keeping with the overall concept of the new Panamera, the new chassis also combines the cruising comfort of a luxury sedan with the performance of a true sports car. This is achieved by supplementing the impressive basic layout with several innovative systems. The wider fleet of chassis and suspension systems includes an adaptive air suspension with new three-chamber technology, including PASM (Porsche Active Suspension Management) electronic damper control, the enhanced Porsche Dynamic Chassis Control Sport (PDCC Sport) system including Porsche Torque Vectoring Plus (PTV Plus) and electromechanical power steering. In addition, the integrated Porsche 4D Chassis Control system analyses and synchronizes all chassis systems in real time and optimizes the handling performance of the new Panamera. With rear-axle steering, Porsche brings the handling precision of a sports car to the Panamera for the first time. Finally, the performance of the brake system has also been improved.

Perfectly coordinated suspension concept as a basis

Porsche has fitted an enhanced aluminum double-wishbone suspension with forged aluminum transverse links and hollow aluminum lightweight swiveling bearings at the front of the Panamera. The optimized axle and elasto-kinematics provide for maximum precision and agility coupled with improved ride comfort. To further increase the comfort there is a large hydraulically dampened elastomeric mount on the lower wishbone. The stabilizer connection on the pivot bearing allows comfort-optimized single-tube shock absorbers to be used. A rigid bolted aluminum sub-frame in combination with the new electromechanical steering system ensures excellent driving dynamics and agile handling; among other things steering precision and directional stability have been improved. A more advanced lightweight multi-link suspension is also fitted on the rear-axle with forged top aluminum wishbones and hollow lower aluminum wishbones. Here, too, the optimized suspension and elasto-kinematics ensure maximum agility and precision coupled with enhanced ride comfort. Furthermore, the modified structure enables the integration of a rear-axle steering system, a new electromechanical PDCC Sport and a new three-chamber adaptive air suspension.

Rear-axle steering now also available in the Panamera

A newly developed rear-axle steering system is now available as an option for the first time. At low speeds of up to around 30 mph, the rear wheels steer variably based on driving speed, in the opposite direction to the front wheels up to a maximum steering angle of 2.8 degrees. This virtually shortens the wheelbase. The advantages: more dynamic turn-in characteristics in corners and much easier maneuvering and parking in tight spaces. At speeds above around 30 mph, the rear wheels steer in the same direction as the front axle depending on the speed. The result: a virtual wheelbase extension and increased driving stability, for example when changing lanes on the highway. The Panamera's new rear-axle steering system therefore optimizes overall active stability and driving dynamics and the reduced steering angle needed at low

speeds also enhances comfort. And that's not all: the use of the rear-axle steering system allows a much more direct steering ratio on the front axle with a steering feel that is unique in the competitive field.

Integrated Porsche 4D Chassis Control

Porsche has developed a centrally networked control system for the chassis of the new Panamera – 4D Chassis Control. To date, the chassis systems have worked largely independently of one another using their own sensors and reacting to the other systems. Porsche 4D Chassis Control analyzes the current driving situation centrally in all three dimensions (longitudinal, lateral, and vertical acceleration), and uses this information to calculate expected driving conditions and communicates in real time to all chassis systems – a fourth dimension of chassis control. This enables the systems to act together for the driving situation ahead. One example: during dynamic cornering the standard PASM electronic damper control and the optional systems – the adaptive air suspension (standard on the Panamera Turbo), rear-axle steering, PTV Plus and PDCC Sport – work together for optimal turn-in properties, maximum agility and stability. The Porsche 4D Chassis Control gives input to the chassis systems when the vehicle starts to turn in. This means that the systems act at an early juncture for maximum cornering performance.

Porsche Active Suspension Management (PASM)

Porsche Active Suspension Management (PASM) is an electronic damper control system. It reacts to the road condition and the driving style and depending on this it continuously regulates the damping values for each wheel individually. The PASM fitted in the current Panamera features a new, lighter damper and improves the responsiveness and the spread between comfort and sport. In addition, three driving modes are available: “Normal,” “Sport,” and “Sport Plus.”

This is how PASM works: sensors register body movements that occur during acceleration, braking, dynamic cornering, and uneven roads. PASM sends the acquired data to Porsche 4D Chassis Control system. The new control center calculates the current driving conditions and regulates the damper stiffness of the PASM system according to the preset mode. Thanks to 4D Chassis Control, the control parameters of the other electronic chassis systems are also coordinated with this selected mode. The perceptible result: enhanced driving stability, performance, and comfort.

PASM holds even greater potential in conjunction with the adaptive air suspension: as both the damper characteristics and the spring rates can be varied and combined. In this case, the result is an even greater spread between sportiness and comfort.

Adaptive air suspension including PASM

For the second generation Panamera, Porsche has now developed a new three-chamber air suspension. The adaptive air suspension with this new technology sets standards – especially in terms of comfort level. The system has three instead of two air chambers per strut which results in 60 percent greater air volume. This enables a much larger spread of spring rates. The suspension can therefore be set to a more

comfortable low basic spring rate as the spring rate is electronically adjusted in the fraction of a second as soon as this becomes necessary, when accelerating and braking or to reduce rolling motion, for example.

In addition, the air suspension offers the familiar advantages of leveling control. Alongside the normal level, a lift and a low level are available. The lift level raises the chassis by 20 millimeters (0.79 inches), in order to prevent the front from touching the ground on steep garage exits. When the low level is activated the front axle is lowered by 28 millimeters (1.10 inches) and the rear-axle by 20 millimeters (0.79 inches) to improve aerodynamics and handling at high speeds.

Active roll compensation PDCC Sport including PTV Plus

The new Porsche Dynamic Chassis Control Sport (PDCC Sport) optimizes the driving dynamics in the Panamera through the integration of electromechanical stabilizers. The system regulates faster than those with hydraulic actuators to stiffen the stabilizers to prevent body rolling motion. In the Panamera this active roll compensation forges links to 911 models. Porsche combines PDCC Sport in the Panamera with Porsche Torque Vectoring Plus (PTV Plus).

The electronically controlled rear-axle differential lock provides for variable drive-torque distribution between the rear wheels while braking interventions at individual wheels generate additional steering torque at the rear-axle. This results in even more agile turn-in characteristics. On the other hand, PTV Plus provides for noticeable additional traction when accelerating out of corners by specifically locking the differential. The combination of both technologies – PDCC Sport and PTV Plus – elevates the Panamera as a sports sedan to a class of its own in terms of driving dynamics.

Body

High-strength lightweight aluminum/steel hybrid construction

The new Panamera has a redesigned high-tech lightweight body with even more aluminum than before. On the predecessor, the outer-door panels, hood, hatch, and front fenders were made of aluminum. With the new Panamera, Porsche is now going much further and also producing large body parts such as the whole side section and the roof in aluminum.

The Panamera body is based on the Modular Standard Drive Train Platform (MSB), which Porsche is responsible for developing in the Volkswagen Group. One of the many advantages of the MSB is its great versatility. For example, Porsche is able to produce the new Panamera at its Leipzig plant with two different wheelbases and all conceivable drive types for this segment.

Further body derivatives are also relatively easy to realize. The platform consists of three modules: front body, middle floor section, and rear body. In the case of the Porsche Panamera these modules are produced in “lightweight multi-material.”

This is an innovative cocktail of different kinds of materials including various steel alloys, aluminum, and plastic. Furthermore, a new manufacturing process is used to produce the firewall cross member, which is very important for crash properties. On the Panamera this ultra-high-strength tube is made of boron-alloyed steel. Although high-strength boron steel tubes of this type exist, never before have they been realized in the automotive industry in the complexity of the Panamera's firewall cross member. Furthermore, the whole firewall and the passenger cell offer optimal protection thanks to the use of high-strength, hot-formed steels.

This type of material distribution – lightweight aluminum surfaces combined with high-strength steel structures – is a recurrent theme in the Panamera. As outlined, the side parts of the new model are also made of aluminum and the same applies to the floor, roof and front end. Special processes are needed to join aluminum and steel so that these two very different materials do not react with one another. For example, to join the lightweight aluminum parts of the side wall with the high-strength steel side wall structure, Porsche combines roller hemming (a form-locking method of joining components without welding spots) with a bonding process.

New levels of comfort, connectivity and assistance

Digitalization of the automobile is currently changing mobility more intensively and faster than ever. Completely new display and control concepts, more intelligent and networked assistance systems, and continually faster and more powerful on-board electronics are leading to new levels of driving comfort and connectivity with the outside world. The new Panamera is a reflection of this trend; it is the most digitalized and networked model that Porsche has launched on the market yet. But the Panamera is not a car that filters away the driving experience with electronics. Rather, Porsche has taken advantage of today's digitalization capabilities to build a Panamera that combines maximum comfort and maximum dynamics and is intuitive to operate.

Porsche Advanced Cockpit – digitalized for the future

The new Panamera exhibits a completely new display and control concept. Touch-sensitive surfaces replace buttons in many areas, and high-resolution displays are integrated into the interior. The digitalization of the Porsche interior, which began with the 918 Spyder, is now in its next development stage and has reached the luxury sedan segment aboard the Panamera in the form of the new Porsche Advanced Cockpit. From the low seat position typical of sports cars, drivers not only see the traditional front-end landscape of the car's fenders and power dome, but also two 7-inch displays that are placed along the driver's line of sight for ideal ergonomics. Each can feature two instruments, and located centrally between these two displays, is the tachometer, which is still an analog instrument in keeping with tradition.

To the immediate left of the tachometer is the virtual speedometer. Shown inside of the speedometer is clearly organized information about the assistance systems – the instrument is therefore known as “Speed & Assist.” As is usual at Porsche, the speed being driven is shown digitally within the analog tachometer. To the right of the tachometer is the “Car & Info” display. Vehicle settings can be made or retrieved, and information from the trip computer can be accessed here. The driver can freely configure the two smaller round instruments next to the Speed & Assist and Car & Info instruments in a defined frame. All of this is intuitively controlled via buttons on the multifunction steering wheel.

Meanwhile, the gear shift console between the driver and the front passenger is dominated by the 12.3-inch touch display integral for the operation of the next generation Porsche Communication Management (PCM) system. A sub-area of the start screen can be customized by tile-shaped windows. User operation also incorporates the new multi-touch gesture control. Just like with a smartphone or tablet, it is possible to use two fingers to rotate navigation maps in any desired direction. Moreover, the display recognizes handwriting, making it easy to write navigation destinations on the screen.

These standard features are integrated as part of the PCM system: Connect Plus with features such as an online navigation module including real-time traffic information plus Google Earth and Google Street View, smartphone integration via Apple CarPlay, and LTE phone module with SIM card reader and wireless Internet access. Connect Plus also integrates apps into the PCM such as parking places (parking place search and availability), fuel prices (fuel station search including display of fuel prices), message dictate (SMS via voice control), Twitter (tweets are read aloud, information is shown on the display), train arrival, flight information, weather (current location or destination), event information and news.

Also on-board: the online functions of Porsche Car Connect with Remote Vehicle Status (e.g. central locking status), Remote Services (remote control of functions) and Porsche Vehicle Tracking System (PVTs, vehicle location tracking in case of car theft). Porsche Car Connect is an app and is operated via smartphone, and is compatible with the Apple Watch. Navigation destinations can even be selected from a device at home for later transfer to the PCM.

The menus are clearly and intuitively structured. When the user's hand approaches the PCM, proximity sensors detect this and open a menu bar on the left side of the 12.3-inch display that offers additional context-related functions. If a menu level has multiple pages, the user can scroll through the menu by a swiping motion from side to side – just like on a smartphone. On the right side of the display, tiles – which are known as widgets here – can be shown and personalized in a user-defined layout. The widgets extend the main PCM menu by adding individually configurable screens. Depending on the user's taste or the situation, the user can have navigation info, the current playlist or climate control shown in the widgets.

Direct touch control reorganizes center console functions

The PCM area, with its high-end, high-resolution display, transitions harmoniously into the black panel concept of the center console with a shift-by-wire gear selector for the PDK. A new control panel on the center console with touch-sensitive switches enables intuitive control of various vehicle and climate control functions. Even the louvers of the central air vent are electrically adjusted by touch-sensitive sliders. Rear passengers can control air conditioning and infotainment functions from a seven-inch black panel in conjunction with an optional four-zone automatic climate control system.

Networked electronics revolutionize assistance and comfort

The Panamera is equipped with many standard and optional light and driver assistance systems, which make life more convenient while driving. The most important technologies include night vision assistant, Porsche InnoDrive including adaptive cruise control, LED Matrix headlights, an advanced lane-change assistant, and a lane departure warning system including road sign recognition. All of these features are available for the first time in the Panamera.

LED Matrix headlights

All new Panamera cars are equipped with LED headlights including four-point LED daytime running lights as standard. LED headlights, including the Porsche Dynamic Light System (PDLS), are standard in the Panamera Turbo, and available on the Panamera 4S.

Optionally, the newly developed LED Matrix headlights with PDLS Plus can be ordered as optional equipment. This is a system with which Porsche transfers the maximum potential of today's lighting technology into the Panamera. The LED Matrix headlights contain a total of 109 LEDs for all lighting functions. The LED Matrix module alone comprises 84 LEDs (pixels).

Night vision assistant

The new night vision assistant is one of the assistance systems that help to avoid critical situations before they occur. It utilizes a thermal imaging camera to detect people and large animals and displays a color highlighted warning indicator in the cockpit. The system is able to classify the heat source and thereby make distinctions, such as between a person and a parked motorcycle with a warm engine.

Persons or larger animals are first displayed in yellow in the instrument cluster in front of the driver. If the system recognizes a hazard based on the movement and location of a person or animal, the highlighting changes from yellow to red and an audible warning is given. Within urban areas, the night vision assistant is deactivated to avoid false alarms, such as being triggered by a dog being walked on a leash on the sidewalk.

InnoDrive including adaptive cruise control

Looking especially far ahead along the road is the new Porsche InnoDrive, which includes adaptive cruise control. Based on navigation data, the system calculates the optimal acceleration and braking figures for the next 1.8 miles (3.0 kilometers) and these figures are implemented via the engine, eight-speed PDK, and the brake system. In doing so, this electronic co-pilot automatically takes corners, hills and speed limits into account. The traffic situation in front of the car is captured by radar and video sensors, and control is adapted accordingly. The system significantly improves the Panamera's efficiency. Currently, there is no comparable technology worldwide.

In addition, Porsche InnoDrive offers convenience and dynamic benefits when driving with automatic adaptive cruise control. The system even recognizes roundabouts and independently adapts its speed to conditions ahead. When the Sport mode is activated, the InnoDrive also switches to a dynamic characteristic map. As in classic adaptive cruise control, the radar and video sensors naturally also continually monitor the distance to vehicles ahead and adjust this gap continually. InnoDrive is expected to become available starting in January 2017 in Germany, the Netherlands, Belgium, Luxembourg, Switzerland, Austria, Spain, Portugal, France, Italy, England and Ireland. The USA, Canada and many other countries will follow shortly thereafter.

Adaptive cruise control

The functional range and properties of the adaptive cruise control have been significantly improved. Crucial here are two important innovations that were used to modify the system of the first generation Panamera: instead of one radar sensor (usually integrated in the middle of the lower fascia), two are used in the new Panamera. They are integrated in the lower bumper on the left and right sides. In addition, the cruise control system now also incorporates camera sensors into its control. This system extension makes monitoring of the distance to vehicles ahead more reliable. In addition, vehicles merging into the car's own lane from adjacent lanes are detected much sooner. If necessary, the system can bring the car to a standstill. Thanks to a stop-and-go function, the Panamera can also resume driving autonomously. If the standstill lasts longer than three seconds, all the driver needs to do to drive off again is to briefly tap the accelerator pedal or resume the function from the steering wheel stalk.

Automatic adaptive cruise control is active over a driving speed range from 18 to 130 mph. If at all possible, the system also utilizes the coasting function (engine idling, clutches disengaged) to further reduce fuel consumption.

Lane-change assist

The lane-change assist, which is already familiar from the first Panamera and other Porsche cars, has been enhanced further. The new system uses two radar sensors in the rear bumper to detect the distance to vehicles approaching on an adjacent lane from the rear and their driving speeds. If these two factors are judged to be critical, a visual warning indicator is shown in the side mirror on the relevant side of the car. This enhances monitoring of vehicles in difficult to see locations.

The new lane-change assist detects vehicles at distances of up to 230 feet, and it can now be activated over a driving speed range from 9 to 155 mph. Since the driving speed at which the system is activated has been lowered, the lane-change assist can now be used for turning maneuvers in the city as well.

Lane Keep Assist including road sign recognition

The Lane Keep Assist system being offered for the first time in the Panamera reduces the risk of unintentionally leaving one's own driving lane. The system now being implemented in the Panamera is one of the most advanced of its kind. It detects lane markings via a camera in the windshield and operates over a driving speed range from 40 to 155 mph. As soon as the driver leaves the lane without activating the turn signal, the car automatically steers via the new electromechanical steering system. If desired, the driver can also configure the PCM to output an audible warning and a visual warning in the instrument cluster. One component of the system is road sign recognition. It utilizes the same camera as the lane keep assist.

	Panamera 4S	Panamera Turbo
Engine		
Type	V6 twin turbo	V8 twin turbo
Valves/Cylinder	4	4
Displacement	2,894 cc	3,996 cc
Bore x Stroke	84.5 x 86.0 mm	86.0 x 86.0 mm
Max power	440 hp @ 5650-6600 rpm	550 hp @ 5750-6000 rpm
Max torque	405 lb-ft @ 1750-5500 rpm	567 lb-ft @ 1960-4500 rpm
Output per liter	152 hp/liter	138 hp/liter
Compression ratio	10.5:1	10.1:1
Max engine speed	6800 rpm	6800 rpm
Cooling system	Water cooling, thermal management with control thermostat and potted water pump	
Valve control	VarioCam Plus: variable cam phasing on intake and exhaust cam, valve lift switching on intake	VarioCam Plus with adaptive cylinder control: variable cam phasing on intake and exhaust cam, cylinder deactivation via two-stage sliding cams on take and exhaust cams

Power transmission	
Drive system	Porsche Traction Management (PTM): active all-wheel drive with electronically- and map-controlled multi-plate clutch, variable torque distribution between front and rear axles
Transmission	8-speed Porsche Doppelkupplung (PDK)
Gear ratios	1st: 5.97
	2nd: 3.24
	3rd: 2.08
	4th: 1.42
	5th: 1.05
	6th: 0.84
	7th: 0.68
	8th: 0.53
	Reverse: 5.22
	Rear axle: 3.36

Chassis		
Suspension	Steel springs with Porsche Active Suspension Management (PASM)	Adaptive air suspension with three-chamber air springs and Porsche Active Suspension Management (PASM)
Front axle	Aluminum double wishbone suspension	
Rear axle	Aluminum multi-link suspension	
Steering	Electromechanical servo steering; optional rear axle steering	
Steering ratio	15.5:1 (center position) up to 9.3:1 With rear axle steering: 14.2:1 center, up to 9.3:1	
Steering wheel diameter	375 mm	
Turning circle diameter	39.0 ft With rear axle steering: 37.4 ft	
Driving stability system	Porsche Stability Management (PSM) incl. ABS with extended brake functions	

Brakes		
Brake system	Front: 6-piston aluminum monoblock fixed calipers; Rear: 4-piston aluminum monoblock fixed calipers	
Brake discs, front axle	Grey cast iron, internally vented	
	Diameter: 360 mm	410 mm
	Thickness: 36 mm	38 mm
Brake discs, rear axle	Grey cast iron, internally vented	
	Diameter: 330 mm	380 mm
	Thickness: 28 mm	30 mm

Wheels and Tires		
Front	9J x 19 ET 64 265/45 ZR 19	9.5J x 20 ET 71 275/40 ZR 20
Rear	10.5J x 19 ET 62 295/40 ZR 19	11.5J x 20 ET 68 315/35 ZR 20

Dimensions		
Length	198.8 in / 5049 mm	
Width (with mirrors)	76.3 in / 1937 mm (85.2 in / 2165 mm)	
Height	56.0 in / 1423 mm	56.2 in / 1427 mm
Wheelbase	116.1 in / 2950 mm	
Track width, front	1671 mm (19" wheels)	1657 mm (20" wheels)
Track width, rear	1651 mm (19" wheels)	1639 mm (20" wheels)

Luggage volumes and weights		
Luggage volume	17.4 - 46.0 cu ft / 495-1304 liters	
Curb weight (DIN)	4123 lbs/1870 kg	4398 lbs/1995 kg
Allowable gross weight	5501 lbs/2495 kg	5699 lbs/2585 kg
Weight-to-power ratio	9.5 lbs/hp; 4.3 kg/hp	7.9 lbs/hp; 3.6 kg/hp

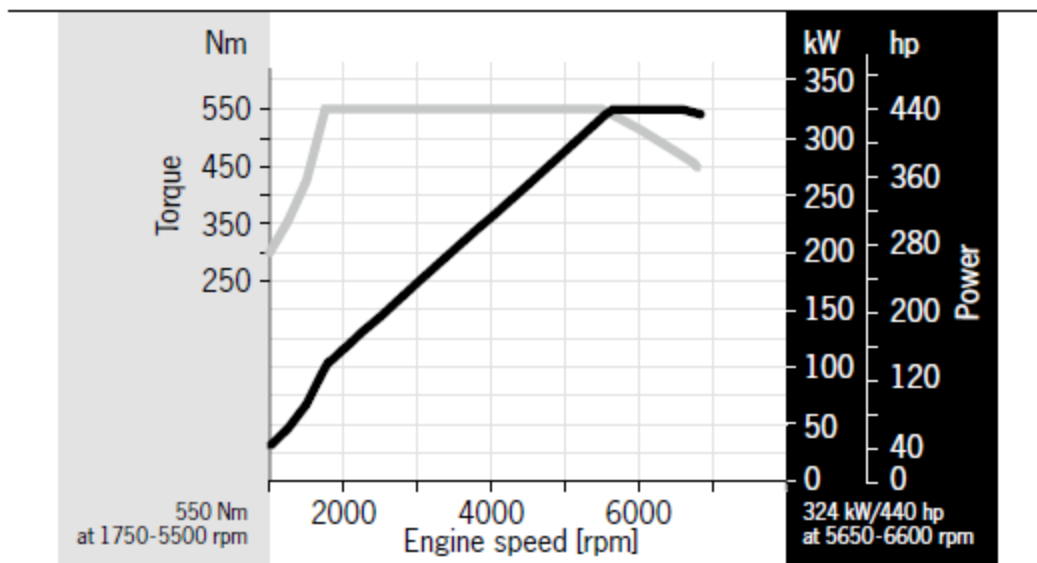
Driving performance		
Top speed	179 mph	190 mph
Acceleration	0-60 mph: 4.2s	3.6s
w/ Sport Chrono Package	0-60 mph: 4.0s	3.4s

Fuel and emissions		
Emissions standard	Euro 6	
Fuel type	Super	
Fuel tank capacity	19.8 g (23.8 optional)	23.8 g

Aerodynamics		
Air drag coefficient, c_d	0.29	0.3
Frontal area, A	2.37 sq m	2.38 sq m
$c_d \times A$:	0.687	0.714

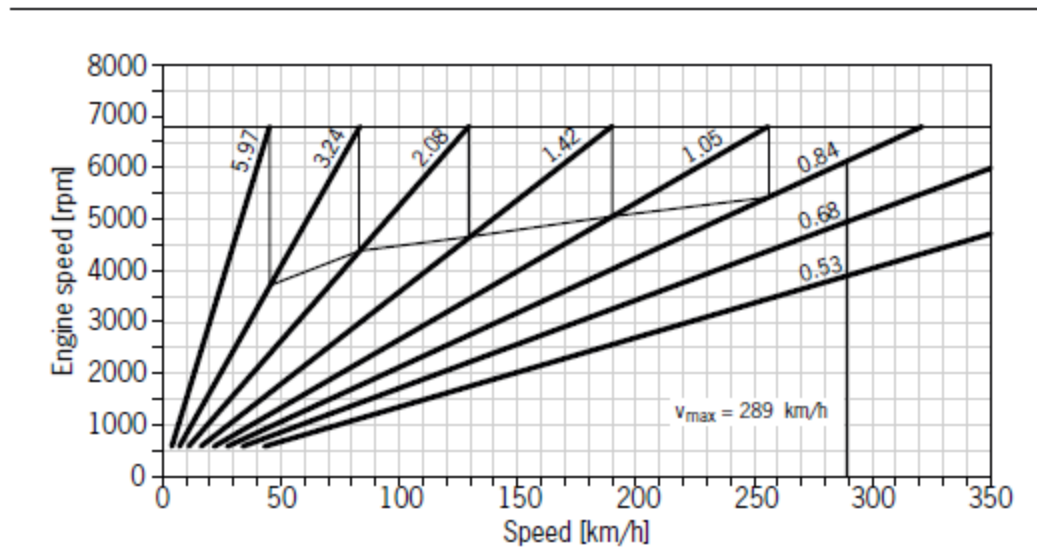
Porsche Panamera 4S

Power and torque

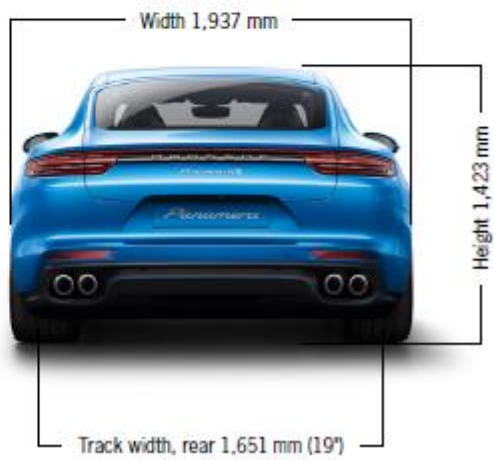


Porsche Panamera 4S

8-speed Porsche Doppelkupplung (PDK)

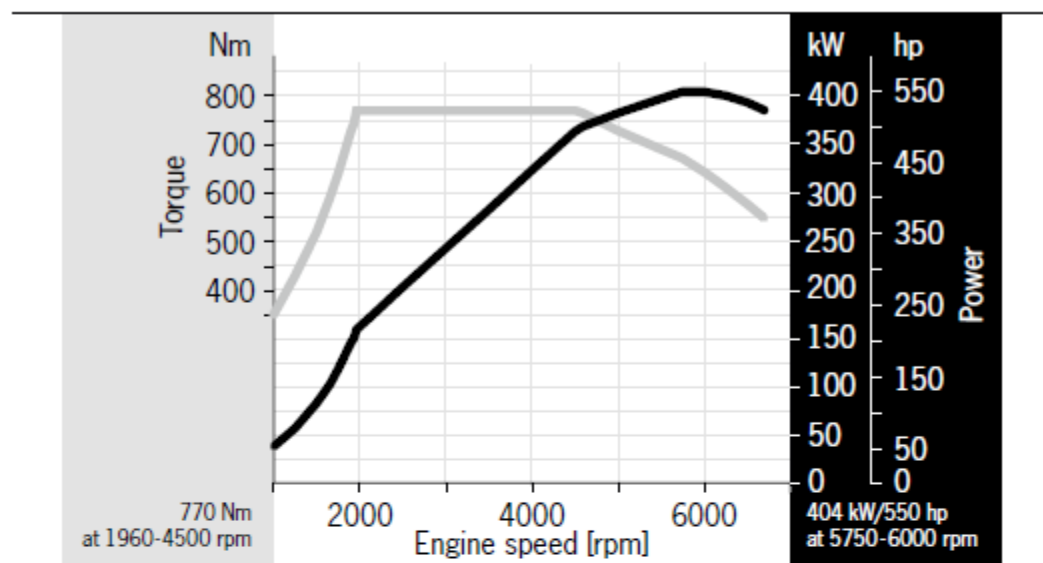


Panamera 4S



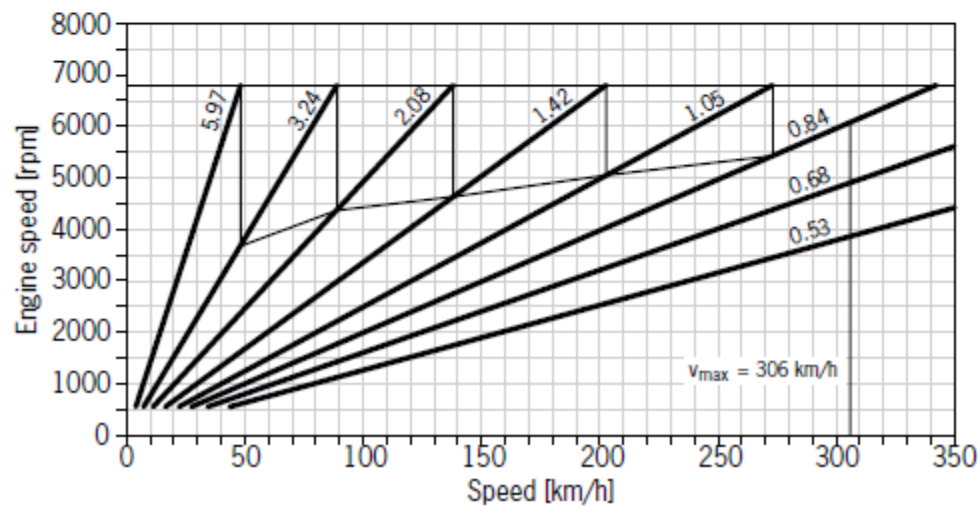
Porsche Panamera Turbo

Power and torque



Porsche Panamera Turbo

8-speed Porsche Doppelkupplung (PDK)



Porsche Panamera Turbo

