

**PORSCHE**

996 Carrera  
Buyers Guide

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## Introduction

The 911 first appeared in 1963 and gradually evolved over the years from the original 2.0 litre engined model to the 3.6 litre 993 which appeared in 1993. In many ways, the 993 was worlds apart from the first ever 911, but it maintained the same DNA. However, although the 993 was a superb machine, Porsche wanted to reach a wider market and the quirky design was off-putting to some buyers who wanted something more conventional. Furthermore, the air-cooled engine had reached the end of its development potential and the engineers were unable to squeeze more power from it, and at the same time conform to modern noise and emissions regulations, virtually dictating that liquid cooling be adopted.

What was needed then was an all new 911. That car was to be known as the 996, introduced in 1997. Larger than its predecessor, the 996 offered more space, more comfort, better handling, more power, better economy and a water cooled engine - albeit still with a rear mounted flat-6.

The 996 began to take shape as early as 1991, two years before the 993 saw the light. The 993 formed a short-term defence against the crushing economic recession, but for the long term strategy, the company decided to design two new product families sharing what amounted to a common platform – the 986 Boxster and the 996. At the heart of both new product families was the engine.

A brand new all-alloy flat six was designed for use in both cars: a 2.5 litre unit for the Boxster and in 3.4 litre form for the 996. Both engines featured four valves per cylinder actuated by twin overhead camshafts per cylinder bank (a first for a production 911), and even in its most basic 3.4 litre form, the 911 offered a creditable 300bhp. Power passed through either a six-speed manual gearbox or an optional five-speed Tiptronic automatic gearbox.

Few Porsches have polarised enthusiast opinion as heatedly as the 996 model 911 Carrera. First seen in public at the Frankfurt motor show in September 1997, and on sale from the late autumn of that year. For those that could get over the fact that the 911 icon had now become water-cooled, welcomed it with open arms, and in significant numbers too. It was as modern, as contemporary, as attractive and above all as fresh as could have realistically been hoped for, and had just the right blend of restrained aggression and timeless elegance to make it seem as much at home in town as on a track.

A couple of years after the launch of the 996, no one was saying a great deal about the 993. The leading commentators had only words of utmost praise for the model. Evo said: 'You'd have to be perverse to declare that the old car was better'. While Autocar said: 'You could be forgiven for thinking of the 911 as the finest sports car in the world right now.'

By the time production finally ceased in early 2005 it had sold well over 150,000 units of all types. Along with the Boxster, it helped transform Porsche from an ailing independent car maker to what is now the most profitable car company in the world with over 100,000 cars produced a year.

## Model History and Variants

### September 1997

The 996 was finally unveiled at the Frankfurt Motor show where the world got its first glimpse of the car, that along with its little brother, the Boxster, would turn Porsche's fortunes around.

What Porsche was about to undertake with the 996 and Boxster was something the company had never attempted and was still rare practice in the automobile industry – to build 2 distinct models based around the same platform. Porsche's CEO Dr. Wendelin Wiedeking, was dividing Porsche's 1 billion dollar budget directly between the 2 cars. Not only would he save money in obvious areas such as component sharing, but it also halved Porsche's crash testing requirements. As a measure of just how inefficient Porsche production had become, the 996 was built using 70% fewer suppliers than the 993 and as with the 993, had many of its parts delivered to the factory pre-assembled.

The bulk of the 996's designing was undertaken by Hong Kong born Pinky Lai who was working under design chief - Harm Lagaay. The result was an aerodynamic success, for while the 996 was 30mm wider and 173mm longer than the 993 it replaced, its drag coefficient was just 0.30 as opposed to 0.33 for the 993. Interior space was also improved as it grew by 185mm in length and 30mm in width.

When the time finally came to quieten the 911, the Porsche engineers knew they had only one option, which was to leave the engine where it was but cool it with water – a task which wasn't as simple as it might sound. To mount the radiators in the nose and create an optimum shape for the ducts that feed them, the car had to be longer. To do that they had to stretch the nose, which meant altering the front wings and the roof to maintain the lines of the car. Preserving the old while meeting new legislation was, according to a senior engineer, much more difficult than designing a completely new car.

Work on the chassis was undertaken by Bernd Kahnau. Changes included a McPherson strut design that was a full 32% stiffer than the 993's, made possible because the 996 boasted an 81mm longer wheelbase. The rear suspension was an adaptation of the 993's multi-link setup this time utilising all-new parts cast from aluminium. As with the 993 the rear suspension provided toe-in during fast cornering to aid stability, and to further help this cause the front suspension was also designed to toe-out under similar conditions. With a monocoque some 45% stiffer than the 993's, all these factors combined to greatly improve the stability of the 996's handling.

### Appearance

The 996's body was entirely new. Although it was instantly recognisable as a 911, the 996's smooth clean lines were more modern and aerodynamically more efficient than the 993's. The windscreen was more steeply raked, the air intake had disappeared from the top of the front lid, the quarterlights in the doors had gone, and at the rear there was no longer a full width-reflector. The body was said to be safer in an accident and quieter at high speed, and thanks to the efforts of the Japanese consultants brought in by CEO Dr. Wendelin Wiedeking, cheaper to build than any of its recent predecessors.

Perhaps the most noticeable and controversial visual change was at the front of the car. The 911's trademark round headlamps were replaced by distinctive new units with integral orange-coloured indicators, which inevitably were soon likened to fried eggs.

### Interior

The interior of the 996 was completely new. Out went the quirky dashboard design that could trace its ancestry back to 1963. The trademark 5 dials remained, with the big rev-counter immediately ahead of the driver – but they were now overlapped to make them more easily visible through the steering wheel. Gone was the offset pendant pedal arrangement, and in came a heating system that actually worked!

## October 1998

The cabriolet version of the 996 as well as the four-wheel drive Carrera 4, were unveiled at the Paris motor show. The 1999 model year also brought POSIP, or the Porsche Side Impact Protection System, an exhaust system tuned for better sound and clear lenses front and rear for the indicators.

### Cabriolet

The 996 cabriolet boasted a roof that was developed in conjunction with the Boxster's soft top. Designed and built by Car Top Systems, the roof itself was constructed of a steel, aluminium and magnesium frame that folded into a Z-shape 3 layer roof and plastic rear screen, which could be raised or lowered in 20 seconds. An added bonus was that the roof could be activated using a button on the key fob. As with many of the 996's parts the roof was delivered to Zuffenhausen ready assembled, leaving Porsche to simply bolt it to the cars. All cabriolets came with a hardtop (weighing 32kg), although many owners chose to leave them at their dealers only to never pick them up again.

### Carrera 4

The 4 wheel drive version went on sale at the end of 1998 costing £3000 more than the Carrera. In order to make room for the 4 wheel-drive hardware, The C4 had to be re-engineered from the windscreen forward. Front suspension was tilted to the rear to make room for the driveshafts, while space under the front boot was reduced from 130 litres to 100 litres. The 996 was also the first generation of 4 wheel drive 911 available with Tiptronic transmission. Porsche's automatic gearbox (manufactured by ZF) finally benefited from a fifth forward ratio (the manual box was a new 6-speed Getrag design).

The 4-wheel drive hardware of the C4 would transfer between 5 and 40% of the drive to the front wheels via its viscous coupling now housed in the front differential, dependent on rear wheel slip. Despite weighing 55Kg more than the Carrera, its superior traction off the line meant that the C4 was just as quick in a straight line. Weight balance was almost identical to the Carrera, 40/60 front/rear for the C4 compared to 38/62 for the Carrera. Brakes for both the Carrera and C4 were 4 pot front and rear items, designed by Porsche and supplied by Brembo, with front discs measuring 318mm in diameter and rears 300mm, cross-drilled internally vented.

The C4 now came with Porsche Stability management (PSM). This traction control system was developed by Bosch and fine-tuned by Porsche's engineers at Weissach and served to group together a series of safety devices (including traction control, anti-slip control and Automatic Brake Differential – ABD) that had in the past worked independently of each other. Traction control now communicated with ABS and a brake differential control to create a system that could brake each wheel individually. The PSM 'brain' monitored the speed of each wheel, throttle position, what gear you were in, steering angle, lateral acceleration and yaw to calculate whether it needed to intervene. Porsche, however allowed a 7 degree slip angle before it kicked in, applying a brake to an inside rear wheel in the event of understeer or an outside front brake to counter oversteer.

Visually the differences between the Carrera and C4 were limited to 'Carrera 4' badging, titanium coloured callipers on the C4 (the Carrera had black items) and black wheel centres on new-design 17-inch alloys.

For 2000 Porsche also upgraded the Carrera with the C4's drive-by-wire electronic throttle mechanism (E-Gas) and improved engine management system, and the option of PSM (earlier cars only had a basic traction control system).

## September 2001

The second-generation 3.6-litre face-lift version was introduced at the Frankfurt Motor Show in September 2001, as well as the new Targa and C4S models.

Mechanical teething problems aside, one of the greatest criticisms of the original 3.4 litre 996 was that from the 'A' pillar forwards it was identical to the Boxster. This did not find favour with 911 owners who spent tens of thousands more on their car only to be associated with its younger brother.

### Exterior

The most obvious visual change was the introduction of the turbo's 'teardrop' headlamps. They were still 'all-in-one' items, incorporating the front indicators as well as the driving lamps, but they were distinctive and finally differentiated the Carrera from the Boxster. The front bumper moulding was revised to give a more aggressive appearance and improved airflow to the radiators, while the rear bumper was given more angular lines and a small under-lip.

Porsche went to great lengths in the facelift 996 to improve the exhaust note, much criticised on the 3.4 litre version as being too 'whiney'. The result is a gruffer sound at low revs and a satisfying 'bark' at higher revs. However, noise regulations mean that Porsche has had to tone down the sound across the board, hence many 996 buyers ticking the 'Sports Exhaust' option.

### Interior

Changes to the interior included for the first time a glovebox. The boot lid openers were now electrically actuated rather than with mechanical levers. A double cup-holder was also introduced just above the Porsche Communication Management (PCM) unit. The buttons now featured a matt (as opposed to gloss) finish and the turbo trip computer and instrumentation was introduced. The 4 spoke steering wheel previously found on the 993 and 3.4-litre 996 was now replaced with a 3 spoke item which was 5mm smaller. The sound system was also improved.

Other minor improvements included seat belt tensioners with belt force limiters, a larger centre air conditioning vent, memory seats option now included memory via the key fob, and CAN wiring of the instrument cluster, DME, Tiptronic, PSM, and air conditioning was now introduced.

### Engine

The engine came in for some changes too with Porsche claiming 90% new parts. Capacity had been increased from 3387cc to 3596cc and power up from 300bhp to 320bhp at 6800rpm. Maximum torque was up too from 258ft/lb at 4600 to 273 ft/lb at 4250 rpm.

The enlargement of the engine was achieved by increasing the stroke to 82.8mm from the previous 78mm, while the bores remained the same at 96mm. The reason for not increasing the size of the bores was to ensure the combustion chambers retained a lower surface to volume ratio, meaning less heat loss, increased fuel economy and better torque levels.

The turbo's VarioCam Plus system was fitted to the revised Carrera and this, together with the new, larger valves, meant extensive redesigns to the cylinder heads and new camshafts were required too. To help cope with the extra torque produced by the revised engine, Porsche beefed up the transmissions. The six speed manual gearbox (G96/01 for the Carrera and G96/31 for the C4) was updated with 3 (instead of the previous 2) input shaft bearings to cope with the extra power and was made using stronger steel for its components. A third bearing was also added behind the clutch to counteract vibrations from the input shaft. A new, four satellite differential was fitted too. The optional Tiptronic S transmission was now based on the unit found in the 996 turbo, but with revised final drive ratios. Bosch Motronic ME 7.8 was also now introduced as well as PSM 5.7 and ABS 5.7.

The 996's running gear came in for some improvement as well. The front track was widened by 10mm to 1465mm, while the wheel offset was 5mm less. The 18 inch option wheels were one inch

wider at both ends than the standard 17 inch wheels: 8 inches at the front and 10 inches at the rear. A sports suspension also became available which lowered the height by 10mm. Brakes remained the same, but with improved ventilation at the front.

The body was stiffer too at 25% for the coupe and 10% for the cabriolet (coming from reinforcements to the sills, the floorpan and the roof), although the car did gain 25kg more weight. Coefficient of drag however, remained at 0.30, yet lift was reduced and an air intake underneath the floor of the car improved gearbox cooling by 20%.

The extra 20bhp of the facelift 996 however only improved the 0-62 of the Carrera from 5.2 to 5.0 seconds, while the maximum speed increased from 174 to 178mph. This is primarily because the later car weighs 25kg more than its predecessor, due in no small part to the extra body stiffness. In practice however the facelift model feels quite a bit quicker – useable low and mid-range torque are improved, while VarioCam Plus goes a long way to making the engine smoother, and so more drivable, at lower revs.

### Cabriolet

The 3.6 litre 996 cabriolet brought one important improvement over its predecessor: a heated glass rear window. Furthermore, the rear window was made as part of a detachable panel, meaning that if the hood was damaged but the window was fine, you could still utilise the original glass and vice versa.

### Targa

The new Targa followed the form used previously on the 993. Previous 911 Targas had a very different roofline with a lift out roof panel between the windscreen and 'B' pillar hoop. However the new car's roofline looked much like the 996 coupe's. At the touch of a button a glass roof panel slid back under the rear window to give open top motoring when required, and the refinement and security of a coupe at other times. When the roof was closed the rear window would be opened like a hatchback to allow luggage to be loaded into the rear of the car.

An opening rear window had been planned for the very first 911s back in 1963 but issues over leaks, wind noise and rattling put paid to that idea. The Targa's retractable glass roof panel appears to seamlessly blend into the rear window, however, the window is actually hinged on the crossmember and is openable via the key-fob or by a switch on the driver's door sill. The glass sections stretched right from the tip of the windscreen to the engine cover, and gave a continuous surface of almost 17 square feet. Inside the car there is a real sense of space and openness. The laminated glass roof panel was 7.45mm thick and the rear window 3.85mm thick, both being formed from special, UV ray absorbing material, and an electric roller blind helped keep the sun from baking the occupants in the summer.

Only available in rear wheel drive the Targa weighed 80kg more than the coupe and Porsche quoted 0-60 times comparable to the cabriolet's. It had a higher centre of gravity too so Porsche fitted stiffer anti-roll bars. That modified roofline gave the Targa 30 litres more luggage space than the coupe (once the rear seats were folded flat) and headroom in the new Targa was also superior to that in the coupe.

### Carrera 4S

Carrying on from the 993 version, the C4S was given the turbo wide body (60mm wider than the Carrera at the rear) and the Carrera 4 running gear, but didn't come with the turbo's rear spoiler or massive air scoops in the rear wing. It also marked the return of the rear reflector strip, last seen on the 993. The car also sat 10mm lower (although the US version retained the standard height), as it had up-rated suspension based on the turbo's (however the rear springs were softer because the engine was lighter), but it shared the turbo's 18inch hollow-spoke alloys. The C4S also shared the turbo's brakes including the 'Big-red' callipers. The front spoiler lip was also subtly altered from the turbo's to keep the aerodynamic balance right, due to the rear spoiler being the standard retractable

item as opposed to the part-fixed turbo wing. The C4S central air intake now served to send cooling air to the front brakes, whereas on the turbo it contained a third radiator.

The problem with the C4S is that it didn't offer any greater performance over the C4. It was some 65kg heavier (resulting in a 0-60 time 0.1 seconds slower than the C4) and less aerodynamically efficient (resulting in a top speed 3mph lower than the C4). Many regard it however, as the best looking 996 derivative and went on to be a much sought after model.

### **June 2003**

In the summer of 2003 a C4S cabriolet was introduced, whose roof could now be raised and lowered in 20 seconds at speeds of up to 50km/h (31mph) (as could all of the latest version of the 911 cabriolets). The C4S cabriolet had an advantage over the regular cabriolet in that the reinforcements increased torsional stiffness by 4.5%, and flexural stiffness by 3%. The Carrera C4S – in the absence of a 997 version, continued to be built well into 2005.

### **September 2003**

#### **911 'Anniversary' model**

Finally in September 2003 the Carrera Anniversary was introduced to celebrate 40 years of the 911. Finished in special metallic paint it featured turbo front grilles, chrome 18 inch wheels and chrome tailpipes. The engine produced 345bhp (25bhp more than standard) while the suspension was firmed up and lowered by 10mm. The cabin featured grey leather and various items of body coloured trim. Only 1963 examples were produced and each uniquely badged '911'

## **Things to look out for** **(A Buyer's Checklist)**

The 996 is a complicated piece of machinery, and early models are now 9 years old. Whilst the majority of well serviced and cared-for cars give largely trouble-free motoring, there are areas that need careful attention when viewing a prospective purchase. Please don't be put off by this rather exhaustive list. It was compiled after visits to independent Porsche workshops, where we asked the proprietors to try and list every issue that they had seen more than once. We hope it will provide a useful checklist when viewing a car, but would recommend a professional inspection by an Official Porsche Centre, or a recognised independent Porsche specialist. Most genuine sellers have come to expect this, and be wary of any that will not agree to it.

### **Bodyshell**

The 996 has what amounts to a fully galvanised body shell, so corrosion shouldn't be an issue – unless the car has been damaged in an accident and then badly repaired. The front and rear bumpers are always the most vulnerable, so check inside the luggage compartment and the engine bay for signs of new panels – and for bent ones that have been beaten straight. At the front, you will need to peel back or remove the moulded carpets by undoing the plastic screws. This will also allow you to check the paint-code label on the left-hand side of the compartment.

### **Engine**

As the engine and gearbox are both 'sealed units' Porsche replace them rather than repair them if faulty. However, independents have recently come up with less costly solutions if an engine or gearbox has failed out of warranty.

The collapse of one of the cylinder walls is a rare but costly problem with the M96 engine block, which seems to be less common in the 3.6 than in the 3.4. In almost all cases it's the centre cylinder (of either bank) affected, usually happening between 14,000 and 68,000 miles, and the crack always appears at the top (head end) of the block. This is thought to arise due to a lack of rigidity somewhere between the block itself and the integral Lokasil liner. The problem manifests itself with cross-contamination of the engine oil and coolant, followed by excessive steam coming out of the exhaust. If the coolant header tank has an oily residue then you definitely have a problem. Other signs are a yellowy condensation in the oil filler tube (but this is much more likely to suggest condensation in the filler pipe caused by short journeys). When you drive the car, the temperature gauge should read no higher than just above the 80-degree mark and the oil pressure gauge should read about 1.0 bar at idle, and between 4.0-5.0 bar as you rev the engine). If the car does have a cylinder block failure you can buy a new engine from Porsche (around £11,000) or a second hand unit (around £3,500) from a specialist dismantler. Another option would be to go for a Silsleeve motor from Oxfordshire based Autofarm (around £8,400) which uses a re-engineered crankcase with specially designed liners.

Another rare problem is with intermediate shaft bearing failures leading to engine failure. This seems to be confined to the later 3.6 litre engine of the 996. Porsche recognised this problem and introduced a modified shaft with a larger end bearing.

A rough idle is usually the result of a fault in one of the two VarioCam solenoids (about £450 each, although sometimes it's just a poor connection). Wear in the chain guides on the short exhaust to inlet camshaft drive (where the VarioCam mechanism operates) may also be the cause, producing what seems like 'confusion' of the engine management system. Porsche introduced modified chain guides for the 3.6 litre engine, and these can be retro-fitted to earlier units.

A hesitation as you accelerate is very likely to be a faulty air-mass sensor (they can easily be cleaned, but if that fails, a replacement will cost around £149)



## Rear Main Seal

The RMS is an oil seal used where the crankshaft passes through the rear of the crankcase. It can be found underneath the rear of the car. In a survey conducted by PCGB in 2004 for the Boxster (same engine block as 996), 24% of respondents reported failure(s). Multiple occurrences do exist but are rare. Although many iterations of the seal have been introduced by Porsche, the problem has still not been resolved even on the current 997 model. Even when the seal does leak it tends to be little more than a nuisance, usually leaving just a few oil drops on the garage floor. As it is a gearbox-out job, owners often wait until the clutch needs replacing to fix the seal at the same time (it is an easy to replace £8 part). It has been said that cars with Tiptronic gearboxes are less prone to failure, but are more expensive to fix.

## Gearbox

The Gearbox's seem to be very reliable especially the Tiptronic. However, very rarely a whine may be heard from the pinion-shaft bearings, but this can be solved as rebuild parts are available from the US.

## Suspension

On higher mileage cars (usually above 60k) a clonking sound when driving over bumps may be heard. This usually means a new set of anti-roll-bar drop-links need to be bought at around £30 each, or suspension bushes (cost from £10 per pair). Lower suspension control arms also tend to go on higher mileage cars, and these cost approximately £150 each.

## Bumpers

Stone chips are inevitable on such a low slung car and will often be found on the bumper, bonnet and mirrors and are not a big issue. Although cracks in the bumpers may be more serious as they are made of polyurethane, and in the event of a minor knock, should deform on impact and return to shape. Any cracking would therefore show signs of a fairly hard knock, which may have affected the chassis. A front bumper re-spray will usually cost around £250, but a Porsche approved bodyshop will charge over £1350, as they will usually remove the entire bumper, strip it down, and re-spray the entire unit.

## Climate Control

It is important to look through the air intakes for leaves in the cooling-system and air-con radiators, or even for signs of the matrices corroding, almost certainly as a result of previous accumulation of rubbish. The debris tends to trap moisture against the aluminium matrices, and can eventually rot them, which can cost £500 to replace. The best way to clean the area is by either using a vacuum cleaner hose through the gaps in the front bumper, or by removing the bumper entirely to gain access to the radiators (See instructions here: <http://www.porscheclubgbforum.com/tm.asp?m=231942>). Make sure to check that the air-con blasts freezing cold air at it's lowest setting. If this is not the case, it may need a re-gassing and a new filter-dryer canister (about £150 all in).

## Spare Tyre/Toolkit

The regular C2 996s come with an inflated space-saver spare wheel, stored in the front compartment. The Carrera 4 versions also came with a compressor to inflate it. There should also be a jack and basic toolkit. Make sure the toolkit contains a towing eye and the locking wheel nut key.

## Windows

The doors should open and close smoothly, and the windows should drop a few millimetres as you start to pull on the door handles. This is to avoid damaging the upper section of the door sealing rubber. If the windows do not drop as you open the doors, the culprit is likely to be a micro-switch inside each panel - known as the door switch assembly - that might need replacement, (the cost is approximately £125). Porsche rectified this fault in 2001.

## Door catches

On cars before 2000, the area around the 'B' post door catches were prone to rusting. The problem is caused by the catches moving slightly each time the door closes, thus breaking the paint seal. On post 2000 cars a gasket was placed behind the catch solving the problem. Porsche will not rectify this problem even though the bodyshell of the Porsche is covered under their 10yr Long-life Guarantee. This is a fairly common problem and should be addressed before rust progresses further.

## De-laminating windscreen

The windscreen of all 996s are prone to delaminating (milky white effect) in the corner of the 'A' pillars and bonnet. This can be replaced by your insurance company, by just paying the excess (usually £50 or so) without affecting your no-claims history.

## Rear Wing

The rear wing should automatically deploy at 75mph (120kmh) and retract again at 37 (60kph) to aid cooling, and down-force. It can also be activated by means of a switch down on the side of the driver's footwell. However if you have a fixed rear spoiler (eg GT3 bodykit , Porsche Aerokit etc) the rear spoiler raising mechanism is disabled. Make sure the spoiler works correctly. A new spoiler will cost around £80+fitting.

## Tyres

Tyres should be worn evenly across the tread. Tyres should be of matching brand across axle (preferably all four corners) and should all be of equal 'N' rating (see <http://www.porscheclubgbforum.com/tm.asp?m=230744>). Uneven wear suggests geometry problems, which could cost in the region of £250-350 to sort out. Tyres - 17inch F/R cost from £110/£130, and the optional 18inch F/R cost from £120/£180.

## Coil packs

A fairly common cause of misfire can be the failure (usually cracking) of one of the six individual spark coils. Each plug needs to be isolated in turn to isolate the offending item. Coil packs cost around £26 each.

## Ignition switches

It is not uncommon for the ignition switch fail. The plastic barrel can crack, preventing the switch from returning to it's 1<sup>st</sup> position once the engine has started. Also the contacts in the switch can break, causing strange electrical faults. This is however an easy fix (see instructions here: <http://www.porscheclubgbforum.com/tm.asp?m=231803>)

## Expansion Tank

A common problem is the expansion tank cracking leading to a loss of coolant, and eventually to the engine overheating. The expansion tank (or header tank) can be found at the left rear of the engine bay. This item costs approximately £250 to replace.

### Centre Console Storage Bin

The hinge on the console is prone to breaking, but there is an easy and cheap solution. (For DIYers see this thread: <http://www.porscheclubgbforum.com/tm.asp?m=231560>) which should cost around £18 in parts)

### Bonnet opening levers

These are found on the driver's side sill and are prone to scuffing on pre-facelift cars with their larger mechanical levers. The replacement parts cost around £150

### Cabriolet top

On Pre-facelift cars the rear plastic screen is prone to cracking across the middle unless the 'Boxster chop' is performed (while the top is half-way through its drop, you run your hand horizontally across the rear window to ensure an even fold). A replacement will cost approximately £250 and a replacement hood around £750 fitted (non-Porsche)

### Servicing

A full service history is very important when considering a 996. Expect the car to be serviced at an OPC for the first 2-3 years (the warranty runs for 2 years), thereafter any well known independent will do. The 996 needs to be serviced every year or 12,000 miles, and has to be serviced at an OPC or an approved centre so as to not invalidate the warranty. OPC prices can be seen at this link <http://www.porsche.com/all/uk/?westlondon>, with details of the maintenance schedules listed here:- [http://www.porscheclubgb.org/clientftp/Register/996/tec\\_996\\_maintenance\\_schedules.pdf](http://www.porscheclubgb.org/clientftp/Register/996/tec_996_maintenance_schedules.pdf). An example of an independent centres pricing can be found here - <http://www.wrighttune.co.uk>.

### VIN number

The VIN (Vehicle Identification Number) is located in three places: behind the base of the windscreen on the passenger side, on the driver side door-catch panel and on a tab just below the front of the fuel tank in the front compartment. Using the VIN decoder (see thread <http://www.porscheclubgbforum.com/tm.asp?m=232196>), make sure the model you are buying is not just an updated previous model.

### VIL number

The VIL (Vehicle Identification Label) can be found in 2 places: A white sticker under the bonnet and a white sticker found in the 'Guarantee and maintenance' booklet. Use the options decoder to decipher the optional extras found after the Country code of the car (Cxx). The country code will signify for which market the car was made. A C16 signifies the UK. A missing VIL under the bonnet could suggest the car was involved in an accident requiring the bonnet to be replaced. A missing VIL from the 'Guarantee and maintenance' booklet could suggest a duplicate booklet and/or a personal import. A list of option codes and paint codes is available at <http://www.porscheclubgbforum.com/tm.asp?m=230691>

The best bet is to get a PPI done by a knowledgeable Porsche specialist or by Porsche themselves (Porsche 111 point inspection costing £170 see <http://www.porscheclubgbforum.com/tm.asp?m=232940> for details on the inspection and warranty). If a PPI is carried out by Porsche and no issues need rectifying (any issues may be rectified by an independent garage as long as OEM parts are used) then a 1 year – 0 excess warranty can be taken out costing £895. You can renew your car's warranty each year until it is 9 years old or has reached 125,000 miles.

## Technical Section

### Engine

At the heart of the new 911 was what was arguably the most controversial component, the new water-cooled engine. The M96 engine (found on the 986/987/996/997 - not GT2/GT3 or turbo variants) was the first mass-produced six-cylinder water-cooled power unit from Porsche. The reasoning behind the car and the engine lies in two necessities of 21<sup>st</sup> century motoring: economy of manufacture and environment. Pre-Boxster/996 Porsches were too expensive to make, and ever tightening emissions requirements needed to be achieved.

To survive, Porsche had to embrace real world production techniques as perfected by the Japanese (ie, make it right first time, and don't get involved in costly post-production rectification.)

Meeting emissions requirements was not just a case of using the right sort of catalytic converter and engine management system. Super-efficient combustion was essential – and best achieved by multi-valve (in this case 4 valve per cylinder) technology and high compression ratios. The inevitable result is more heat generation, and so the need for liquid cooling for Porsche's new generation engine.

The new engine was made of just 408 parts as opposed to 480 needed for the 993, and was also smaller, measuring 70mm shorter and 120mm lower. The engine also utilised a variable intake manifold that opened a butterfly valve in the inlet tract when engine speeds were below 2700 and above 5100 to maximise cylinder filling and fine-tune induction roar.

Two radiators were mounted in the nose of the car and provided coolant for both the block and new heads. Each of the pistons had 3 rings (2 for compression, one for oil control), measured 96mm in diameter and operated with a 78mm stroke, resulting in an engine capacity of 3387cc (200cc less than the 993 or 964 engines). With an eye to future developments, Porsche had left 118mm gaps between each cylinder, making boring out the cylinders for more capacity relatively easy.

The M96 unit began life in the 2.5 litre Boxster engine with an 85.5mm diameter piston attached to a crankshaft with 72mm stroke, while the move to 2.7 litres was effected by simply extending the stroke to 78mm. This longer crank then became the basis for the 3.4 litre 996 engine but with 96mm pistons. The final iteration of the 996 engine – the 3.6 litre – retained the original piston size but increased stroke to 82.8mm.

With the 928 and 944, Porsche used AluSil (aluminium-silicone) as it's prime material for the complete block castings, allowing the pistons to run directly in their bores without the need for separate liners. But the material is expensive – and so a cost effective (cheaper?) alternative was found with the Lokasil process, that allows the high silicone content necessary for the piston contact area to be concentrated only in the bore area of the block. Hence the LOC(K)alised SILicone tag.

The engine block was pressure cast from aluminium alloy with horizontally opposed (in banks of three) Lokasil cylinders, while the heads were alloy. Pistons were driven by a seven-bearing crankshaft, able to rev to a limited 7300rpm, while at the base of the engine could be found the 'integrated dry sump' lubrication system, designed to reduce oil starvation when cornering hard. To run the required 24 valves Porsche employed twin overhead camshafts on each cylinder bank equipped with VarioCam. This, along with fuel injection and ignition, was controlled by a Motronic 5.2 engine management system.

The 996 exhaust was delivered to Porsche fully assembled. Built by Gillet, the exhaust was made up of a lightweight three branch manifold per bank that was linked to a cylindrical catalyst at the rear of the engine. The end result was proclaimed by Autocar as "One of the seminal powerplants of the decade" with 300bhp at 6800rpm and 258lb/ft of torque at 4600rpm.

## VarioCam Plus

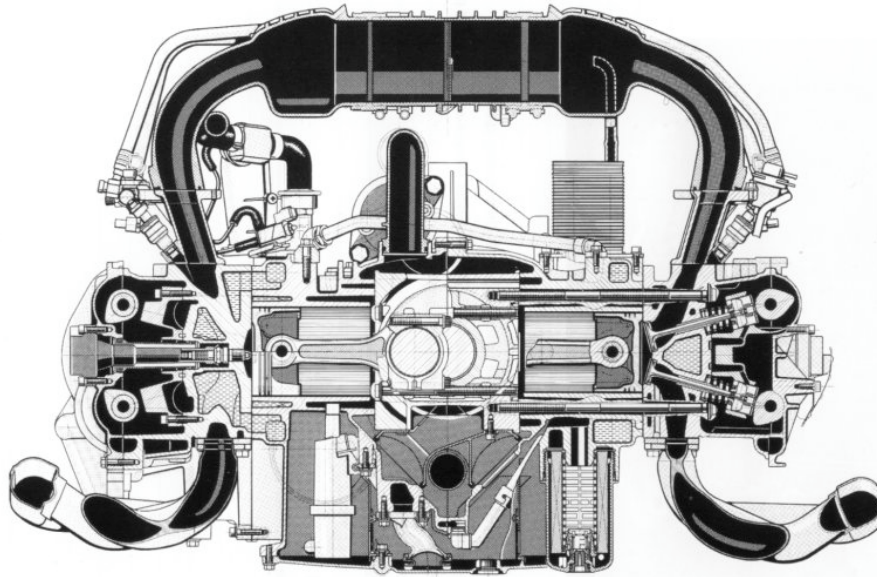
Porsche's variable valve timing system, Variocam, was first introduced with the four cylinder 968 in 1991. Using the timing chain to vary the phase angle of the camshaft, it provided 3-stage variable valve timing which meant better torque, increased refinement and lower emissions. When the 996 was first introduced, it's new engine's four valves per cylinder technology – made possible by virtue of it being water cooled - meant it was thus fitted. For the 996 turbo and GT2, however, a more advanced system, VarioCam Plus, was developed and, apart from the name, this system and the original VarioCam are poles apart, sharing virtually nothing at all. Despite Porsche proudly patenting the original VarioCam system, it was actually inferior to the hydraulic actuator type systems favoured by other car makers such as Honda's Vtec system, as it doesn't allow as much variation to phase angle. VarioCam Plus, as used in the 996 turbo and 3.6 litre 996, changed all of that by using hydraulic actuators instead of chains.

The most important change of the 'Plus' is the addition of variable valve lift, implemented by using variable hydraulic tappets. Every valve is served by three camshaft lobes. The centre one has less lift (3mm) and shorter duration for valve opening; it's known as the 'slow' cam. The other two outer camshaft lobes are both the same, with fast timing and high lift (10mm). Camshaft lobe selection is made by the two-piece variable tappet, consisting of an inner tappet and an outer (ring-shaped) tappet, which are locked together by a hydraulically operated pin passing through them. The outer (or 'fast') cam lobes actuate the valve, providing high lift and long duration opening. When the tappets are not locked together, the valve will be actuated by the inner ('slow') cam lobe via the inner tappet, with the outer tappet moving independently of the valve lifter. When fitted to the 3.6 litre 996, this simple system allowed for bigger power gains from relatively small changes to the engine's internal capacity and is now used on each vehicle Porsche builds. It offers more top end speed, greater mid-range punch and sharper throttle response, all the while keeping refinement levels high and emission levels low.

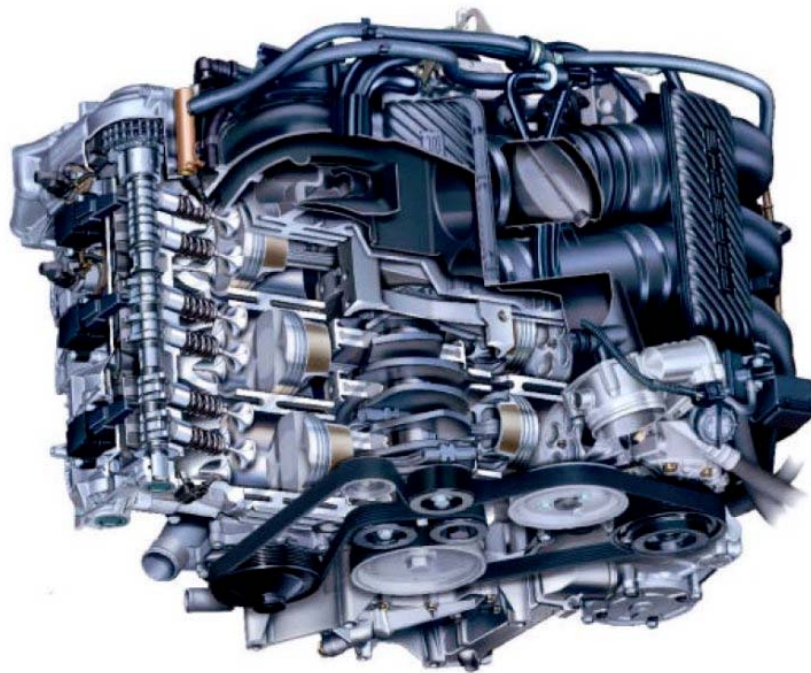
**PORSCHE**

996 Carrera  
Technical File

Compiled by:  
Richard Hamilton  
&  
Rodney Naghar

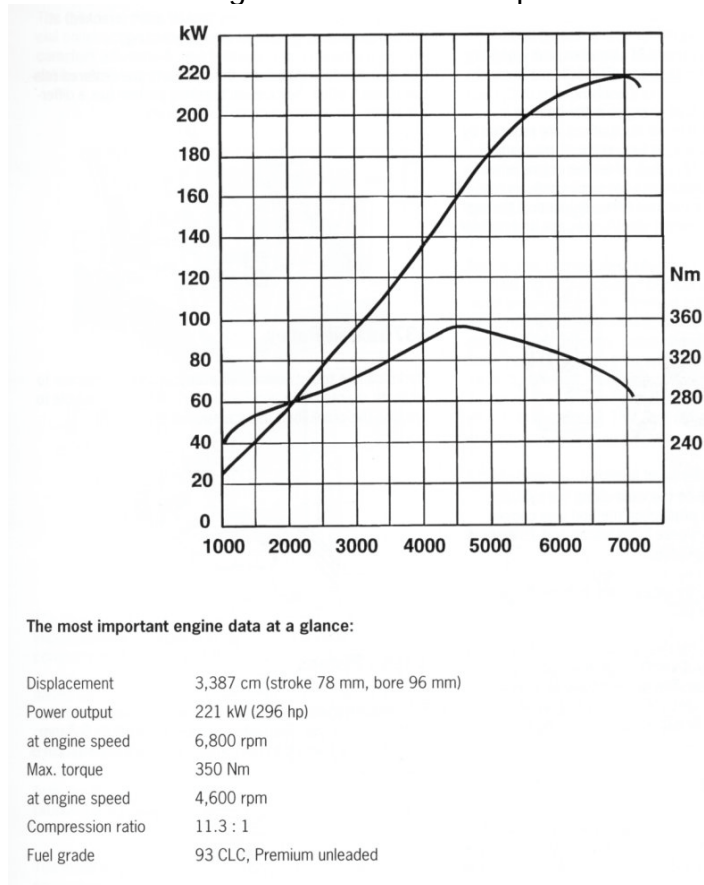


M96.01 3.4 Litre Engine Cross-section

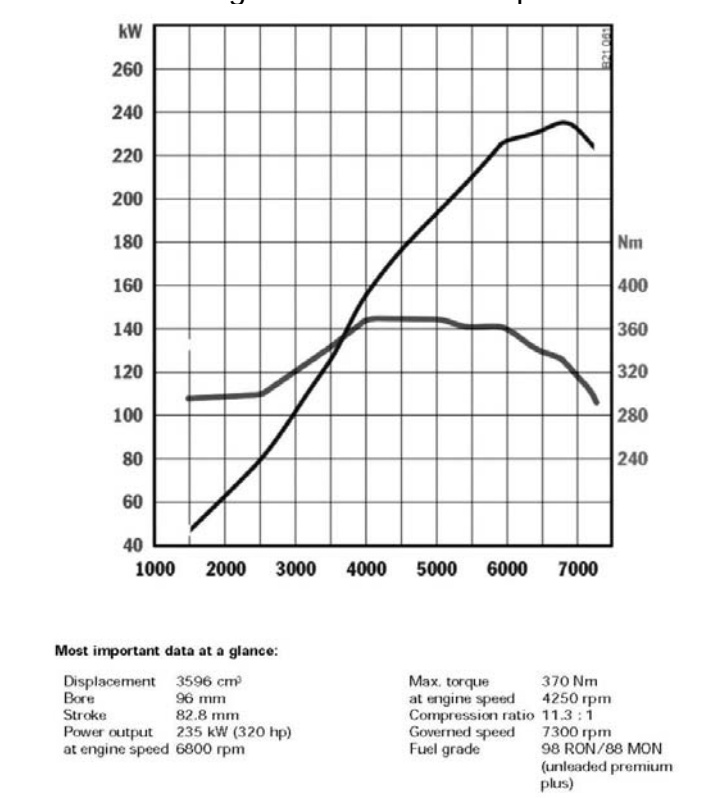


M96.03 3.6 Litre Engine Cutaway

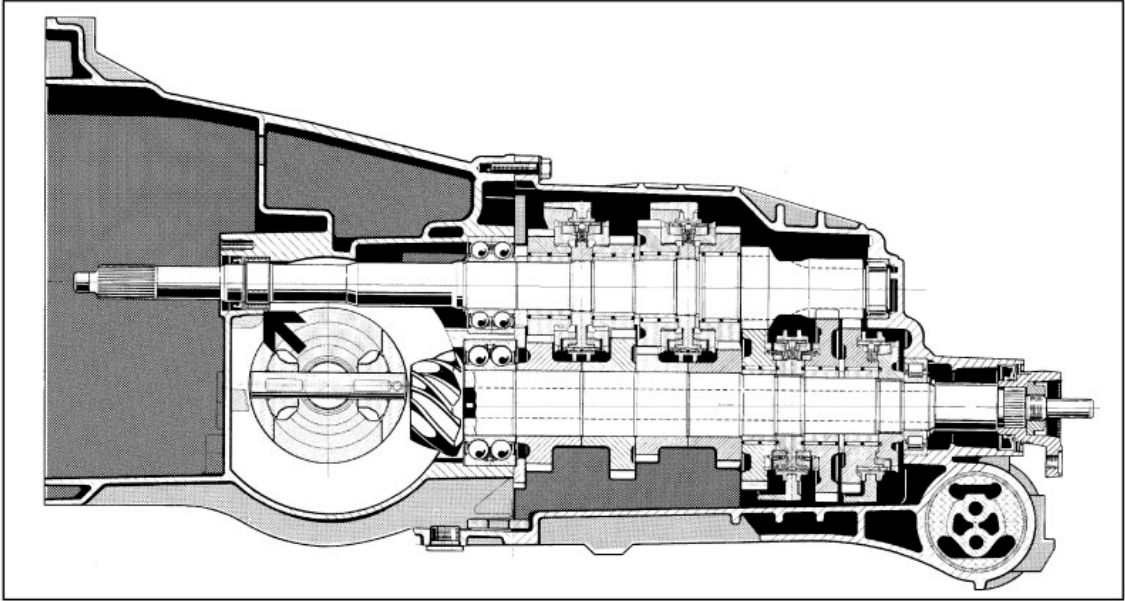
### 3.4 Litre Engine Power and Torque Curves



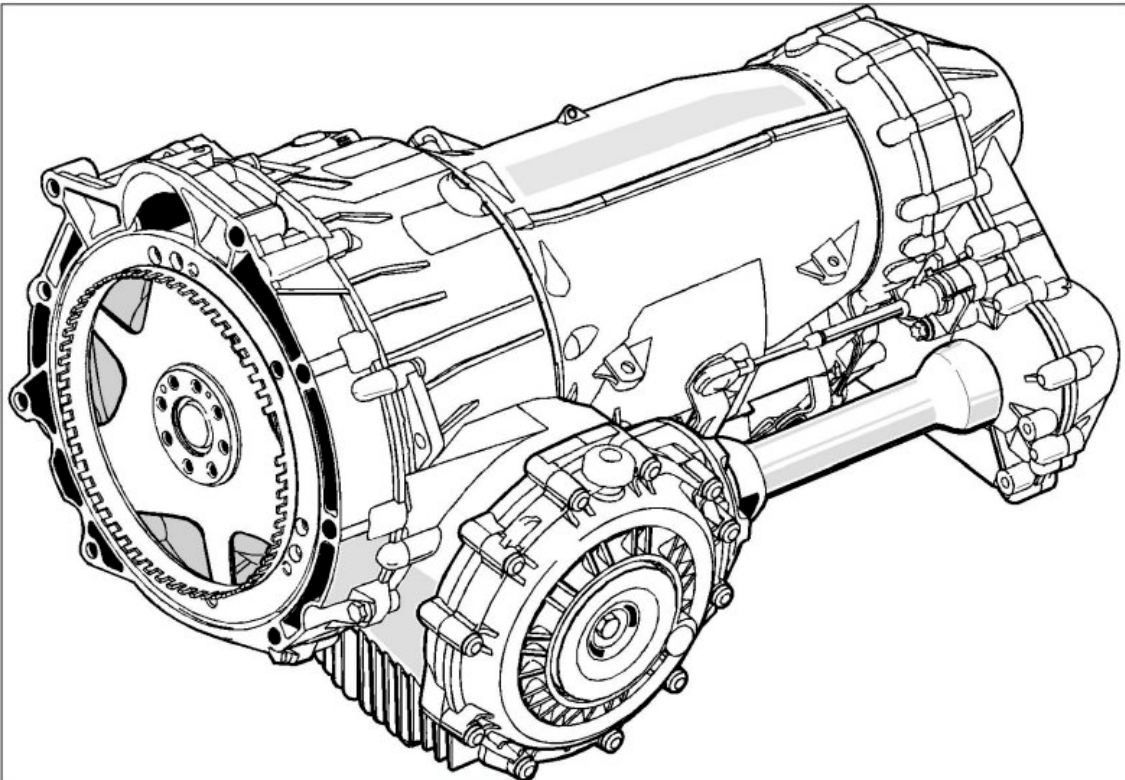
### 3.6 Litre Engine Power and Torque Curves



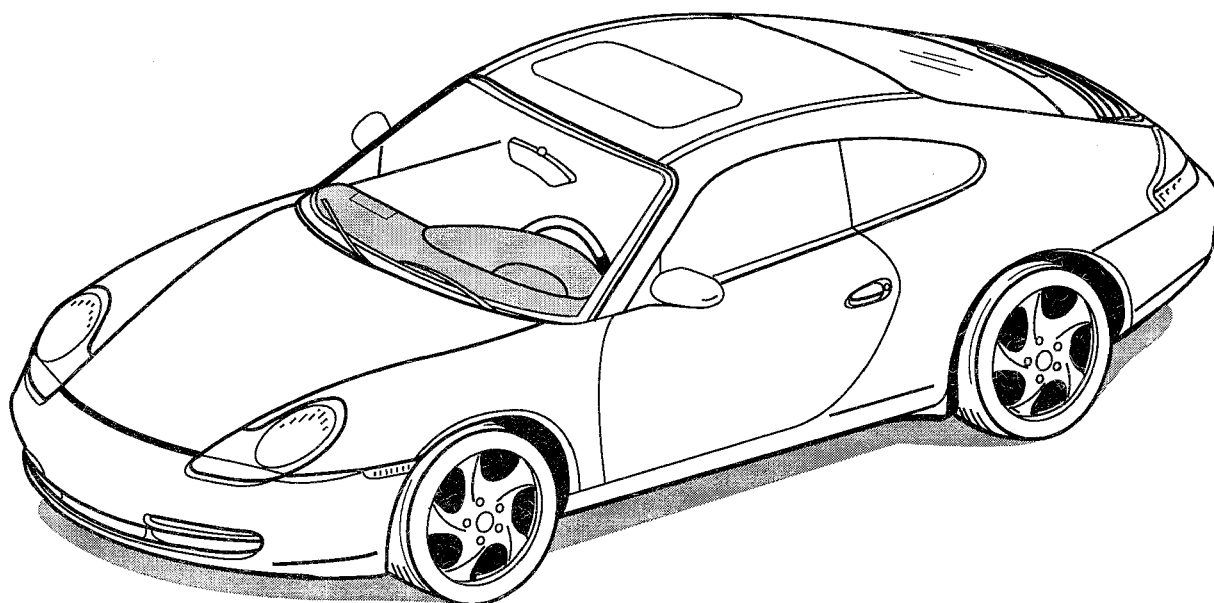




G96.01 6-speed Manual Transmission Cross-section



A96.50 5-speed Tiptronic Transmission



52 - 97

**0 Technical data****Engine**

<b>Engine type:</b>		M 96/01
Number of cylinders	6	
Bore	mm (in.)	96 (3.78)
Stroke	mm (in.)	78 (3.07)
Displacement	cm <sup>3</sup> (cu. in.)	3387 (206.67)
Compression ratio	11.3 : 1	
Max. engine power as per 80/1269/EWG	kW (HP)	220 (300)
at engine speed	rpm	6800
Max. torque as per 80/1269/EWG	Nm (ftlb.)	350 (259)
at engine speed	rpm	4750
Max. litre output	kW/l (HP/l)	63.8 (86.8)
Rpm limitation by fuel supply interruption at	rpm	7300
Idle speed	rpm	700
Automatic transmission	rpm	700
Engine weight as per DIN 70020 A	Manual trans.	Automatic transmission
kg (lbs)	190* (418.86)	179 (394.60)

\* including ZMS (dual-mass flywheel)

**Engine design**

Type	6-cylinder aluminium opposed-cylinder engine, water cooled
Radiators	Two in the front end (+ 3rd radiator in Tiptronic vehicle)
Crankcase	Vertically split light alloy cylinder housing with separate crankshaft bearing housing
Crankshaft	Forged, supported by 7 bearings
Crankshaft bearings	Plain bearings
Connecting rods	Forged
Con-rod bearings	Plain bearings
Pistons	Light alloy, pressed
Cylinders	Lokasil cylinder lining
Cylinder head	3-part light alloy head
Valve guide	Pressed in
Valve arrangement	2 inlet valves suspended in parallel V arrangement 2 exhaust valves suspended in parallel V arrangement
Valve control	Via flat-based tappets
Camshaft	From the crankshaft via a double chain to the intermediate shaft, and from there to the exhaust camshafts via one double chain each. Inlet camshaft coupled with exhaust camshaft via a single chain.

Camshaft adjustment	Porsche VarioCam with 25° adjustment								
Valve clearance	Hydraulic valve clearance compensation								
Valve timing with 1 mm valve travel and zero clearance	<table> <tr> <td>Inlet opens</td> <td>15° after TDC</td> </tr> <tr> <td>Inlet closes</td> <td>59° after BDC</td> </tr> <tr> <td>Outlet opens</td> <td>39° before BDC</td> </tr> <tr> <td>Outlet closes</td> <td>7° before TDC</td> </tr> </table>	Inlet opens	15° after TDC	Inlet closes	59° after BDC	Outlet opens	39° before BDC	Outlet closes	7° before TDC
Inlet opens	15° after TDC								
Inlet closes	59° after BDC								
Outlet opens	39° before BDC								
Outlet closes	7° before TDC								
Intake system	2-stage tuned-intake system (plastic)								
<b>Engine cooling</b>	Water cooling; two radiators ahead of the front wheels. (Additional radiator for Tiptronic vehicles) Two electric fans, controlled in two stages								
<b>Engine lubrication</b>									
Type	Integrated dry sump								
Oil cooling	Via oil-water heat exchanger								
Oil filter	On pressure side behind oil pump								
Oil pressure at $n = 5000$ rpm	Approx. 0.5 bar at 90 °C								
Oil pressure indication	Oil pressure indicator light								
Oil consumption	Approx. 1.0 l/1000 km								

<b>Exhaust system</b>		2-pipe system with one 3-way catalytic converter per pipe, 2 rear mufflers
<b>Emission control</b>		Oxygen sensor closed-loop control and 3-way catalytic converter (metallic substrate) USA - additional electrical secondary-air pump
<b>Heating</b>		Via water heat exchanger, closed loop-controlled on air side
<b>Fuel system</b>		
Fuel injection		DME (Digitale - Motor - Elektronik – engine control module ECM) Injection valves controlled sequentially
Fuel supply		1 electrical internal gear pump
Fuel quality (RON)		98 unleaded
<b>Electrical system</b>		
Radio interference suppression		ECE - R 10 and 72/245/EWG
Rated voltage	V	12
Battery capacity	Ah/A	70/340
Rated generator output	W	1680 (alternator)

Ignition	DME (ECM), individual ignition coils, knock control
Firing order	1 - 6 - 2 - 4 - 3 - 5
Ignition timing control	Via DME (ECM)
Spark plugs	Bosch FR 6 LDC <i>FOR 6 KAC</i> <del>Beru 14 FR 6 LDU</del>
Electrode gap      mm (in)	0.8 + 0.1 (0.031 + 0.004)
<b>Power transmission</b>	Engine and transmission bolted together to form a power unit. Power is transferred to the rear wheels via double-jointed drive shafts.
<b>Clutch</b>	
Manual transmission	Single-plate dry clutch Hydraulic actuation Double-mass flywheel
Contact plate	GGG 60 (nodular cast iron)
Clutch plate $\varnothing$	240
Automatic transmission:	
Torque converter $\varnothing$ mm (in)	260 (11.03) Screw center point diameter 282 (11.11) Largest outer diameter, screwed axially

Moving-off ratio		1.92
Stall speed	rpm	2450
Transmission	Manual transm.	Tiptronic
	Carrera 2	Carrera 2
	G 96.00	A 96.00
Number of gears, forward/reverse	6/1	5/1
Internal designation		
Transmission ratios (i)		
1st gear	3.82	3.66
2nd gear	2.20	2.0
3rd gear	1.52	1.41
4th gear	1.22	1.0
5th gear	1.02	0.74
6th gear	0.84	—
Reverse gear	3.55	4.10
Final drive:	Bevel gear wheel	
Final drive ratio (i)	3.444	3.676
Transmission weight (dry) kg (lbs)	60.5 (133.4)	106.82 (235.48) with torque converter 94.72 (208.8) without torque converter
Transmission weight (wet and ready for installation) kg (lbs)	62.9 (138.6)	115.62 (254.88) with torque converter 103.52 (228.21) without torque converter
<b>Body designs</b>	Lightweight, galvanized all-steel integral body-frame Full-size airbag for driver and passenger Coupé: Number of seats = 2 + 2	



**Running gear**

Front axle		Spring strut axle: Wheels individually suspended by control arms with trailing arms and spring struts (McPherson type, Porsche optimized) Springs: One truncated cone spring per wheel, with vibration damper inside spring
Vibration dampers		Double-acting hydraulic twin-tube gas-filled vibration dampers
Steering		
Steering wheel ø	mm (in)	380 (14.97)
Steering ratio		16.9 : 1 Left-hand drive vehicle 16.9 : 1 Right-hand drive vehicle
Turning circle ø	m (ft)	10.6 (34.8)
Track circle ø	m (ft)	10.2 (33.5)
Steering wheel revolutions from lock to lock		2.98 Left-hand drive vehicle 2.98 Right-hand drive vehicle
Power steering pump		Driven via poly V-belt Ratio i = 1 : 1.18
Rear axle		Multi-link axle
Wheel suspension		Wheels individually guided by 5 control arms
Springs		Cylindrical coil spring per wheel, with coaxial vibration damper inside spring
Vibration dampers		Double-acting hydraulic single-tube gas-filled vibration dampers

**Brakes**

Operating brake		Foot operated, hydraulic-mechanical boost Dual-circuit brake system, 4-piston Al monobloc brake calipers at FA and RA, distributed per axle, internally ventilated brake discs at front and rear axles, ABS standard, Traction Control (TC) optional with switch-over possibility to automatic brake differential (ABD).
Vacuum brake booster (boost factor)		3.85
Brake master cylinder $\varnothing$	mm (in)	23.81/23.81 (0.94/0.94)
Brake master cylinder stroke	mm (in)	18/18 (0.71/0.71)
Pressure reducer	- switching-on pressure - reducing factor	55 bar 0.46
Brake disc $\varnothing$	mm (in)	Front 318 (12.53) Rear 299 (11.78)
Effective brake disc $\varnothing$	mm (in)	Front 261.8 (10.31) Rear 247.6 (9.75)
Brake disc thickness	mm (in)	Front 28 (1.10) Rear 24 (0.95)
Effective total brake area per wheel	cm <sup>2</sup> (sq.in)	Front 127 (19.69) Rear 98 (15.195)
Piston $\varnothing$ in brake caliper	mm (in)	Front 36 (1.42) and 40 (1.576) Rear 28 (1.10) and 30 (1.182)
Parking brake		Drum-type parking brake

Brake drum ø	mm (in)	180 (7.092)
Brake shoe width	mm (in)	25 (0.985)
Lining area per wheel	cm <sup>2</sup> (sq.in)	85 (13.08)

### Wheels and tyres

Summer tyres		Rim offset (mm)
Tyre size, front – on wheel	205/50 ZR 17 - 7 J x 17	55 *
Tyre size, rear – on wheel	255/40 ZR 17 - 9 J x 17	55 *
Tyre size, front – on wheel	225/40 ZR 18 - 7.5 J x 18	50 *
Tyre size, rear – on wheel	265/35 ZR 18 - 10 J x 18	65 *
Winter tyres **		Rim offset (mm)
Tyre size, front – on wheel	205/50 R 17 89T M + S - 7 J x 17	55
Tyre size, rear – on wheel	225/45 R 17 90T M + S - 8.5 J x 17	50 ***

\* Only if specified make is fitted.

\*\* M + S tyres with higher load rating and/or higher speed symbols can also be mounted optionally (max. "H" = max. 210 km/h).

\*\*\* Snow chains approved if special chains are used.

**Spare wheel**

High-pressure tyre		105/95 * - R 17 * bound to make	
Wheel		3.5 J x 17 rim offset 19	
Tyre pressure		17"	18"
front	bar	2.5	2.5
rear	bar	2.5	3.0
Spare wheel	bar	4.2	4.2

**Dimensions**

Length	mm (in)	4430 (174.54)	
Width	mm (in)	1765 (69.5)	
Height	mm (in)	1305 (51.42) at DIN empty weight	
Wheel base	mm (in)	2350 (92.59)	
Track widths		17"	18"
Front	mm (in)	1455 (57.33)	1465 (57.72)
Rear	mm (in)	1500 (59.10)	1480 (58.31)
Ground clearance	mm (in)	100 (3.94) 65 (2.56) at max. gross weight	

	Vehicle in design position *	
Ramp angle	Degrees	13.0
Overhang angle, front	Degrees	12.0
Overhang angle, rear	Degrees	14.5

\* Design position according to Porsche definition:

DIN empty	+ driver	=	68 kg
	+ passenger	=	34 kg
	+ luggage	=	10 kg

### Weights according to DIN 700 20

	Manual transmission	Tiptronic
Empty weights according to equipment kg (lbs.)		
Front	500 - 540	505 - 545
Rear	820 - 840	860 - 880
Total, Coupé	1320 - 1380 *	1365 - 1425 *
	(2909.9 - 3042.2)	(3009.1 - 3141.4)

\* For EU homologation plus 75 kg driver's share (35 kg at front axle, 40 kg at rear axle)

## Permissible axle load

Coupé, front	775 (1708.49)	775 (1708.49)
rear	1100 (2425.06)	1100 (2425.06)

Max. gross weight	1720 (3791.74)	1765 (3791.74)
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## Max. trailer load

Braked	none	none
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Unbraked	none	none
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Permissible towed weight	none	none
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Permissible drawbar load	none	none
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## Permissible roof load, kg (lbs.)

With original Porsche Roof Transport System	75 (165)	75 (165)
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**Filling capacities:**

Measurement of the engine oil level by instrument or oil dipstick.  
The Driver's Manual is definitive.

## Engine specification

Approved:

Europe - According to ACEA Specification A4 - 96 and special Porsche requirements (refer to Techn. Info bulletin about engine oils)

USA, RoW - According to API SG and SHn Specifications and special Porsche requirements (refer to Techn. Info bulletin about engine oils)

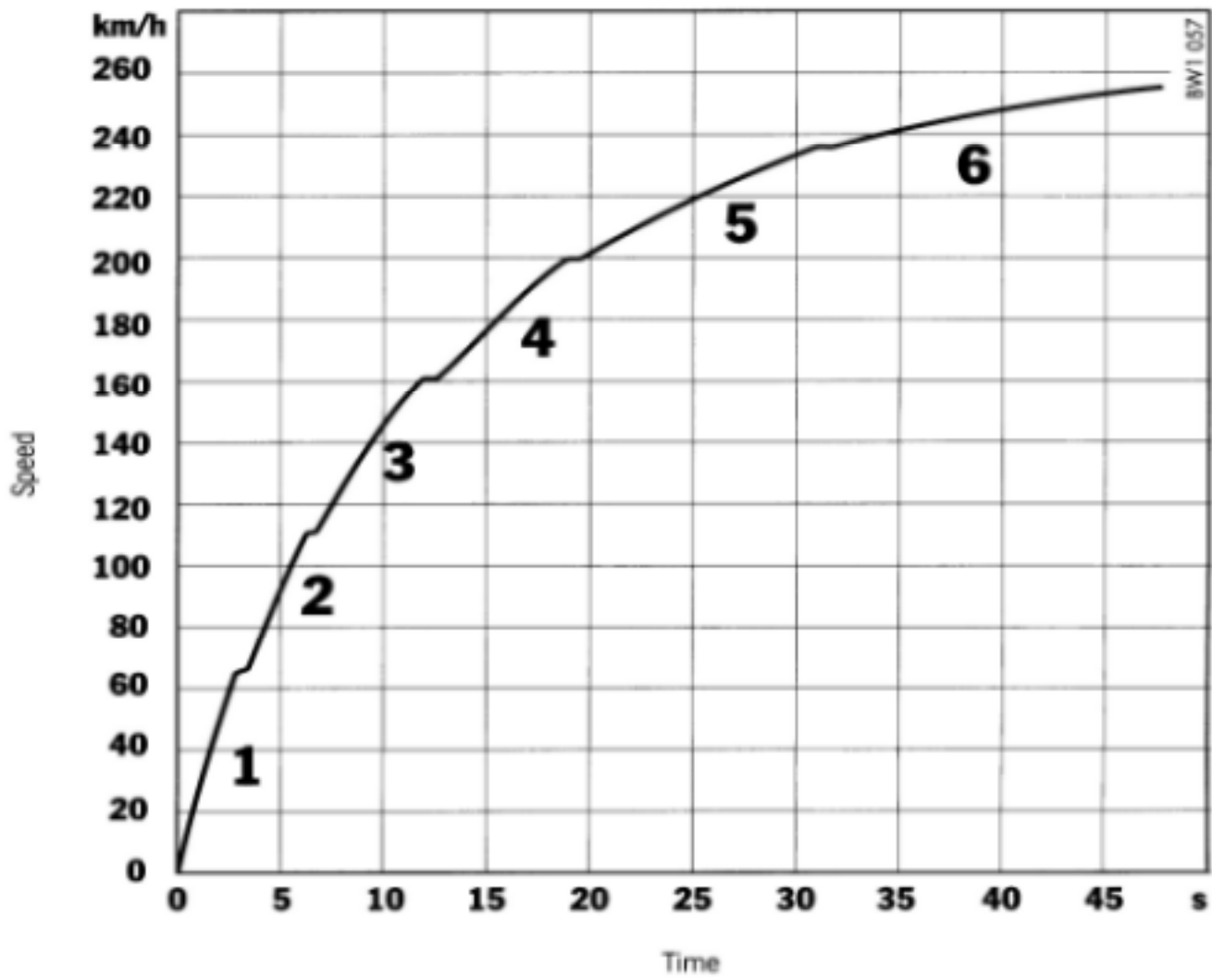
Engine oil quantity	l (imp. gal.)	Approx. 10.25 (2.22) Change quantity 8.25 (1.79)	
Manual transmission with differential	l (imp. gal.)	2.7 (0.59)	
Automatic transmission with torque converter	l (imp. gal.)	Approx. 9.5 (2.06)	
Differential	l (imp. gal.)	0.8 (0.17)	
Transmission oil specification		Manual transmission	Tiptronic
		SAE 90 GL5	
Specification for differential transmission oil (Tiptronic)			GL5 SAE 75 W 90 or GL5 SAE 90
Fuel tank	l (imp. gal.)	Approx. 65 (14.1) actual volume 10 (2.2) reserve	
		Approx. 64.0 (13.87) refill volume	
Coolant:	l (imp. gal.)	22.5 (4.88)	
Brake fluid reservoir	l (imp. gal.)	Approx. 0.45 (0.097)	
Tank for windscreen washer and headlight cleaning system	l (imp. gal.)	Approx. 2.5/6.5 (0.54/1.41)	
Power-assisted steering	l (imp. gal.)	1.27 (0.28) Pentosin CHF 11 S	

**Performance data**

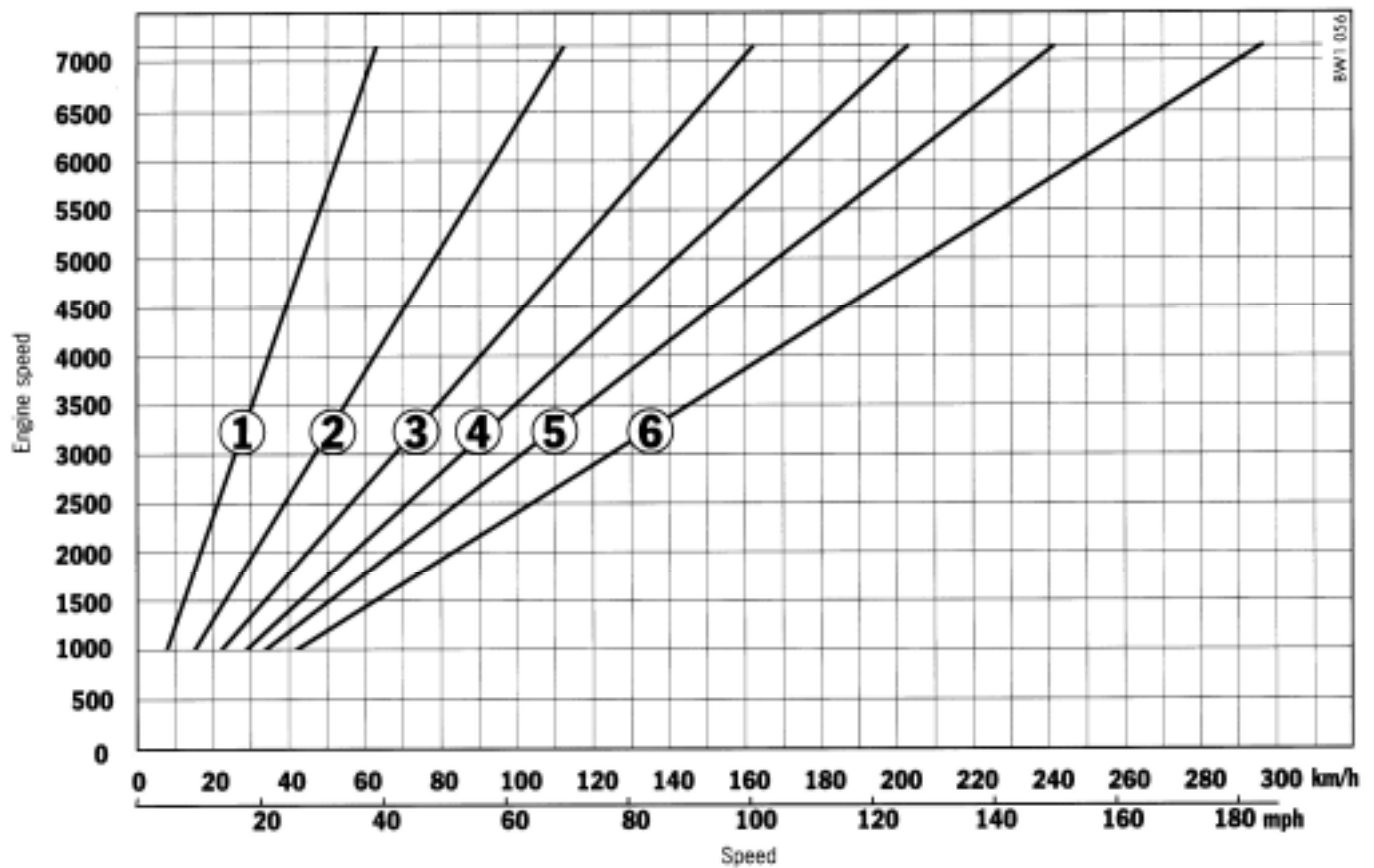
Top speed		Manual transmission	Tiptronic
	km/h	280	275
	mph	173.9	170.8
Acceleration	0 - 100 km/h	5.2 s	6.0 s
Acceleration	0 - 160 km/h	11.5 s	13.0 s
Acceleration	0 - 200 km/h	18.3 s	20.4 s
Kilometre from standing start		24.2 s	25.3 s
1/4 mile from standing start		13.5 s	
Elasticity			
80 - 120 km/h	5th gear	7.1 s	6.9 s
	6th gear	8.9 s	9.7 s
100 - 200 km/h	5th gear	17.3 s	18.3 s
	6th gear	23.4 s	28.5 s
<b>Climbing performance</b>		1st gear	
		2nd gear	
		3rd gear	
		4th gear	
		5th gear	
		6th gear	
<b>Specific power</b>	kg/kW	6.0 ... 6.3	6.2 ... 6.5
	kg/HP	4.4 ... 4.6	4.6 ... 4.8



**Acceleration diagram** Manual transmission

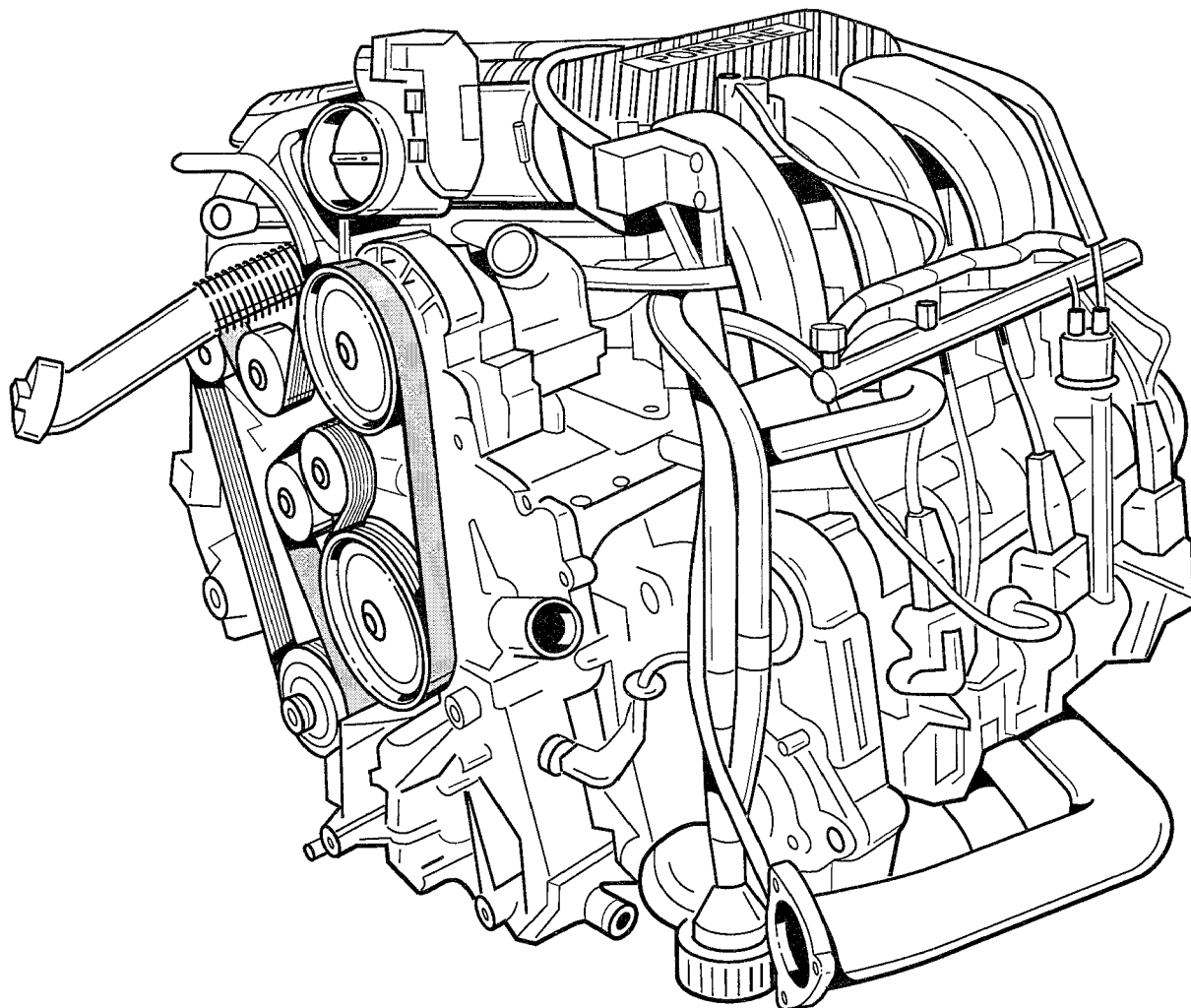


**Transmission diagram** Manual transmission



## **Power unit (as of model year 02)**

### **Engine M96/03**



## Engine

### Engine

Engine type	M96/03	
No. of cylinders	6	
Bore	96 (3.78)	mm (in.)
Stroke	82.8 (3.26)	mm (in.)
Cubic capacity	3596 (219.3)	cm <sup>3</sup> (cu. in.)
Compression ratio	11.3 : 1	
Max. engine power as per 80/1269/EEC	235 (320)	kW (HP)
Net power as per SAE J1349	320	HP
At engine speed	6800	rpm
Max. torque as per 80/1269/EEC	370 (37.7)	Nm (kpm)
Net torque as per SAE J1349	273	ftlb.
At engine speed	4250	rpm
Max. litre output	65.4 (89) 89	kW/l (HP/l) HP/l
Rpm limitation by fuel cutoff and E-gas at	7300	rpm
idle speed	670 ± 40	rpm without air-conditioning
Engine weight as per DIN 70020 A, kg	Manual transmission 203.7 (449.06)	Automatic transmission 194 (427.67)

\* including ZMS (double-mass flywheel)

## Engine design

### Engine design

Type	6-cylinder aluminium opposed-cylinder engine, water cooled
Crankcase	Vertically split light alloy cylinder housing with separate crankshaft bearing housing
Crankshaft	Forged, supported by 7 bearings
Crankshaft bearings	Plain bearings, Ø 63 mm, sub groove
Connecting rods	Forged, l = 142 mm
Con-rod bearings	Plain bearings

**Engine design**

Piston	Pressed light alloy
Cylinder	Lokasil oil running surface
Cylinder head	3-part light alloy head
Valve arrangement	2 inlet valves suspended in parallel V arrangement 2 exhaust valves suspended in parallel V arrangement
Valve diameter	Inlet 40.2 Outlet 34.5
Valve travel	Inlet 11.0 mm (large valve lift) 3.6 mm (smaller valve lift) Outlet 11.0 mm
Valve control	Inlet: via switchable flat-base tappets Outlet: via flat-base tappets
Camshaft	From the crankshaft via a tooth-type chain to the intermediate shaft, and from there to the inlet and exhaust camshafts via one roller-type chain each.
Camshaft adjustment	Porsche VarioCam Plus with 42° adjustment (vane adjuster and valve travel adjustment)
Valve clearance	Hydraulic valve clearance compensation
Valve timing in late position with 1 mm valve travel and zero clearance large valve travel	Inlet opens at 9° after TDC Inlet closes at 61° after BDC Outlet opens at 50° before BDC Outlet closes at 4° before TDC
Valve timing in late position with 1 mm valve travel and zero clearance small valve travel	Inlet opens at 39° after TDC Inlet closes at 19° after BDC Outlet opens at 50° before BDC Outlet closes at 4° before TDC
Intake system Shifting rpm	2-stage tuned-intake system (plastic) 2700/5100

**Engine cooling****Engine cooling**

Water cooling; 2 radiators ahead of the front wheels.  
(Additional radiator for Tiptronic vehicles)  
Two electric fans, controlled in two stages

## Engine lubrication

### Engine lubrication

Type	Integrated dry sump lubrication
Oil cooling	Via oil-water heat exchanger
Oil filter	On pressure side behind oil pump
Oil pressure at n = 5000 rpm	Approx. 6.5 bar at 90° C
Oil pressure indicator	Oil pressure indicator light plus instrument
Oil consumption	Max. 0.5/1000km

## Engine control

### Engine control

Engine control module	Bosch ME 7.8
Ignition	DME, individual spark coils, knock control
Firing order	1-6-2-4-3-5
Ignition timing control	Via DME (ECM)
Spark plugs	Bosch FGR 6 KQC Beru 14 - FGR 6 KQU
Electrode gap mm (in)	1.6 ± 0.2 (0.06 ± 0.008)
E-gas	Electronic throttle actuator control via DME
European version	Euro-III-On Board Diagnosis (EOBD)
USA version	On-Board Diagnosis II (OBDII)

## Electrical system

### Electrical system

Radio interference suppression	ECE-R 10 and 95 / 54 / EC
Nominal voltage V	12
Battery capacity Ah/A	80/380
Starting motor KW	1.7
Rated generator output W	1680

**Exhaust system**

## Exhaust system/Emission control system

Exhaust system	2-pipe, 3-way catalytic converter exhaust system 2 rear mufflers
EURO II	Oxygen sensor closed-loop control with 2 pre-catalytic converter probes 3-way catalytic converter system each with a catalytic converter left + right. (RoW)
EURO III	Additional secondary air system and post catalytic control (4 probes) EOBD
USA LEV	Oxygen sensor closed-loop control + post catalytic converter control 3-way catalytic converter system, each with 1 cascade catalytic converter - left + right. (with two metal substrates) Secondary air system OBD II + ORVR

# Model Year 2002 on

## Engine Data

Engine type	<b>M 96/03</b>
Type	Horizontally opposed engine, water-cooled
Number of cylinders	6
Bore	96 mm (3.78 in.)
Stroke	82.8 mm (3.26 in.)
Cubic capacity	3596 cm <sup>3</sup> (219.5 cu.in.)
Compression ratio	11.3 : 1
Engine output as per EU at crankshaft speed	235 kW (320 HP) 6800 rpm
Torque as per EU at crankshaft speed	370 Nm (274 ftlb.) 4250 rpm
Engine oil consumption	up to 1.5 l/1000 km
Maximum permitted engine speed	7300 rpm
Generator	1680 W/120 A
Firing order	1 - 6 - 2 - 4 - 3 - 5
Engine control	Stationary high-voltage distribution, sequential fuel injection, cylinder-selective knock control, stereo oxygen sensing, diagnostic system, 4 overhead camshafts, Porsche VarioCam Plus, hydraulic valve clearance compensation

## Transmission

Gear ratios	Manual transmission	Tiptronic S
1st gear	3.82 : 1	3.60 : 1
2nd gear	2.20 : 1	2.19 : 1
3rd gear	1.52 : 1	1.41 : 1
4th gear	1.22 : 1	1.00 : 1
5th gear	1.02 : 1	0.83 : 1
6th gear	0.84 : 1	
Reverse gear		
1st gear	3.55 : 1	3.17 : 1
2nd gear		1.93 : 1
Final drive ratio	3.44 : 1	3.37 : 1

## Fuel Consumption

determined according to the new Directive 93/116/EU

	Engine type	City (l/100 km)	Highway (l/100 km)	Total (l/100 km)	Target value CO <sub>2</sub> (g/km)
<b>911 Carrera manual transmission</b>	M 96/03	16.1	8.1	11.1	269
<b>911 Carrera Tiptronic S</b>	M 96/03	16.9	8.1	11.3	274
<b>911 Carrera 4 manual transmission</b>	M 96/03	16.3	8.3	11.3	274
<b>911 Carrera 4 Tiptronic S</b>	M 96/03	18.1	8.7	11.9	289

## Tyres, Rims, Tracks

		Tyres	Rim	Rim offset	Track
<b>Summer tyres</b>	Front	205/50 ZR 17	7 J x 17 H2	50 mm	1465 mm
	Rear	255/40 ZR 17	9 J x 17 H2	55 mm	1500 mm
or	Front	225/40 ZR 18	8 J x 18 H2	50/52 mm	1465/1461 mm
	Rear	285/30 ZR 18	10 J x 18 H2	65 mm	1480 mm
<b>Winter tyres</b>	Front	205/50 R 17 89 T M+S	7 J x 17 H2	50 mm	1455 mm
	Rear	255/40 R 17 94 T M+S <sup>1)</sup>	9 J x 17 H2	55 mm	1500 mm
or	Front	225/40 R 18 88 H M+S	7.5 J x 18 H2	50 mm	1465 mm
		225/40 R 18 88 H M+S	8 J x 18 H2	50/52 mm	1465/1461 mm
	Rear	265/35 R 18 93 H M+S <sup>1)</sup>	10 J x 18 H2	65 mm	1480 mm

The load capacity coefficient (e.g. "89") and maximum speed code letter (e.g. "T") for permitted top speed are minimum requirements.

When fitting new tyres or changing tyres, always observe the instructions in the chapter "Tyres and tyre care".

### Tyre and rim sizes

The authorisation of tyre and rim sizes is granted on the basis of extensive testing.

Your Official Porsche Centre will be pleased to advise you about the current authorisation status.

Refitting with sizes not authorised by Porsche may have a dangerous effect on driving stability.

### Snow chains

Snow chain clearance can be guaranteed only with the tyre + rim combination marked <sup>1)</sup>.

Can be mounted only on the rear wheels; maximum speed 50 km/h (30 mph).

Use only Porsche authorised fine-link cross-type or edge chains.

## Spare wheel

### 911 Carrera

High-pressure tyre T 105/95 R 17 on 3.5 J x 17 rim.

### 911 Carrera 4

Collapsible spare tyre 165/70 R 16 92 P on 5.5 J x 16 rim.

Maximum speed 80 km/h (50 mph).

Always observe the instructions in the chapter "Spare wheel".

## Tyre Filling Pressure for Cold Tyres

### Summer and winter tyres

Front	17-inch wheels	2.5 bar (36 psi)
	18-inch wheels	2.5 bar (36 psi)
Rear	17-inch wheels	2.5 bar (36 psi)
	18-inch wheels	3.0 bar (44 psi)

### Spare wheel of 911 Carrera

Front and rear 4.2 bar (60 psi)

### Collapsible spare wheel of 911 Carrera 4

Front and rear 2.5 bar (36 psi)

These tyre filling pressures apply only to the tyre makes and types approved by Porsche. Please always observe the instructions in the chapter "Tyres and tyre care".



## Capacities

Use only fluids and fuels authorised by Porsche. Your Official Porsche Centre will be pleased to advise you. Your Porsche has been designed so that it is not necessary to mix any additives with oils or fuels.

Engine	Oil change quantity without oil filter approx. 8.50 litres Oil change quantity with oil filter approx. 8.75 litres Reference indication is the level on the oil dipstick. Also refer to the chapter "Engine oils"
Coolant	Approx. 22.5 litres
Manual transmission and differential	Approx. 2.7 litres
Tiptronic S	Approx. 9 litres ATF
Differential with Tiptronic S	Approx. 1.25 litres
Fuel tank	Refill volume approx. 64 litres, including approx. 10 litres reserve
Fuel quality	The engine is designed to provide optimum performance and fuel consumption if <b>unleaded premium fuel with 98 RON/88 MON</b> is used. If unleaded premium fuels with octane numbers of <b>at least 95 RON / 85 MON</b> are used, the engine's knock control automatically adapts the ignition timing.
Power steering	Approx. 1.27 litres hydraulic fluid Pentosin CHF 11 S
Brake fluid	Approx. 0.45 litre; use only Original Porsche brake fluid
Windscreen washer	Approx. 3 litres without headlight washer Approx. 5.7 litres with headlight washer

## Weights – 911 Carrera

Coupe	Manual transmission	Tiptronic S
Empty weight (depending on equipment) per DIN 70020	1345 kg to 1480 kg	1400 kg to 1535 kg
per 70/156/EEC <sup>1)</sup>	1420 kg to 1555 kg	1475 kg to 1610 kg
Maximum gross weight	1790 kg	1845 kg
Maximum axle load, front <sup>2)</sup>	775 kg	775 kg
Maximum axle load, rear <sup>2)</sup>	1180 kg	1180 kg
Maximum useful load, Roof Transport System <sup>3)</sup>	75 kg	75 kg

Cabriolet	Manual transmission	Tiptronic S
Empty weight (depending on equipment) per DIN 70020	1425 kg to 1540 kg	1480 kg to 1595 kg
per 70/156/EEC <sup>1)</sup>	1500 kg to 1615 kg	1555 kg to 1670 kg
Maximum gross weight	1855 kg	1910 kg
Maximum axle load, front <sup>2)</sup>	775 kg	775 kg
Maximum axle load, rear <sup>2)</sup>	1180 kg	1180 kg
Maximum useful load, Roof Transport System <sup>3)</sup>	75 kg	75 kg

<sup>1)</sup> Empty weight includes 75 kg driver and baggage share.

<sup>2)</sup> The maximum gross weight must not be exceeded.

Note: If additional accessories are installed, the useful load will be correspondingly less.

<sup>3)</sup> Use only Original Porsche Roof Transport System.

## Weights – 911 Targa

	Manual transmission	Tiptronic S
Empty weight (depending on equipment) per DIN 70020	1415 kg to 1530 kg	1470 kg to 1585 kg
per 70/156/EEC <sup>1)</sup>	1490 kg to 1605 kg	1545 kg to 1660 kg
Maximum gross weight	1845 kg	1900 kg
Maximum axle load, front <sup>2)</sup>	775 kg	775 kg
Maximum axle load, rear <sup>2)</sup>	1180 kg	1180 kg
Maximum useful load, Roof Transport System <sup>3)</sup>	75 kg	75 kg

<sup>1)</sup> Empty weight includes 75 kg driver and baggage share.

<sup>2)</sup> The maximum gross weight must not be exceeded.

Note: If additional accessories are installed, the useful load will be correspondingly less.

<sup>3)</sup> Use only Original Porsche Roof Transport System.

## Weights – 911 Carrera 4

Coupé	Manual transmission	Tiptronic S
Empty weight (depending on equipment) per DIN 70020	1405 kg to 1540 kg	1460 kg to 1595 kg
per 70/156/EEC <sup>1)</sup>	1480 kg to 1615 kg	1535 kg to 1670 kg
Maximum gross weight	1850 kg	1905 kg
Maximum axle load, front <sup>2)</sup>	825 kg	825 kg
Maximum axle load, rear <sup>2)</sup>	1180 kg	1180 kg
Maximum useful load, Roof Transport System <sup>3)</sup>	75 kg	75 kg

Cabriolet	Manual transmission	Tiptronic S
Empty weight (depending on equipment) per DIN 70020	1485 kg to 1600 kg	1540 kg to 1655 kg
per 70/156/EEC <sup>1)</sup>	1560 kg to 1675 kg	1615 kg to 1730 kg
Maximum gross weight	1915 kg	1970 kg
Maximum axle load, front <sup>2)</sup>	825 kg	825 kg
Maximum axle load, rear <sup>2)</sup>	1180 kg	1180 kg
Maximum useful load, Roof Transport System <sup>3)</sup>	75 kg	75 kg

<sup>1)</sup> Empty weight includes 75 kg driver and baggage share.

<sup>2)</sup> The maximum gross weight must not be exceeded.

Note: If additional accessories are installed, the useful load will be correspondingly less.

<sup>3)</sup> Use only Original Porsche Roof Transport System.

## Driving Performance <sup>1)</sup>

### Coupé

Top speed  
Acceleration 0 – 100 km/h (62 mph)

### Manual transmission

285 km/h (177 mph)  
5.0 seconds

### Tiptronic S

280 km/h (174 mph)  
5.5 seconds

### Cabriolet, Targa

Top speed  
Acceleration 0 – 100 km/h (62 mph)

### Manual transmission

285 km/h (177 mph)  
5.2 seconds

### Tiptronic S

280 km/h (174 mph)  
5.7 seconds

<sup>1)</sup> At DIN empty weight and half load, without performance-inhibiting extra equipment (e.g. special tyres)

## Dimensions

Length		4430 mm
Width		1770 mm
Height		1305 mm
Wheelbase		2350 mm
Ground clearance		100 mm
Turning circle		10.6 m
Overhang angle	front	12.0°
	rear	14.5°
Ramp angle		13.0°

### Sport-type running gear 10 mm lower

Ground clearance		90 mm
Overhang angle	front	11.0°
	rear	14.0°
Ramp angle		12.0°

## Diagrams

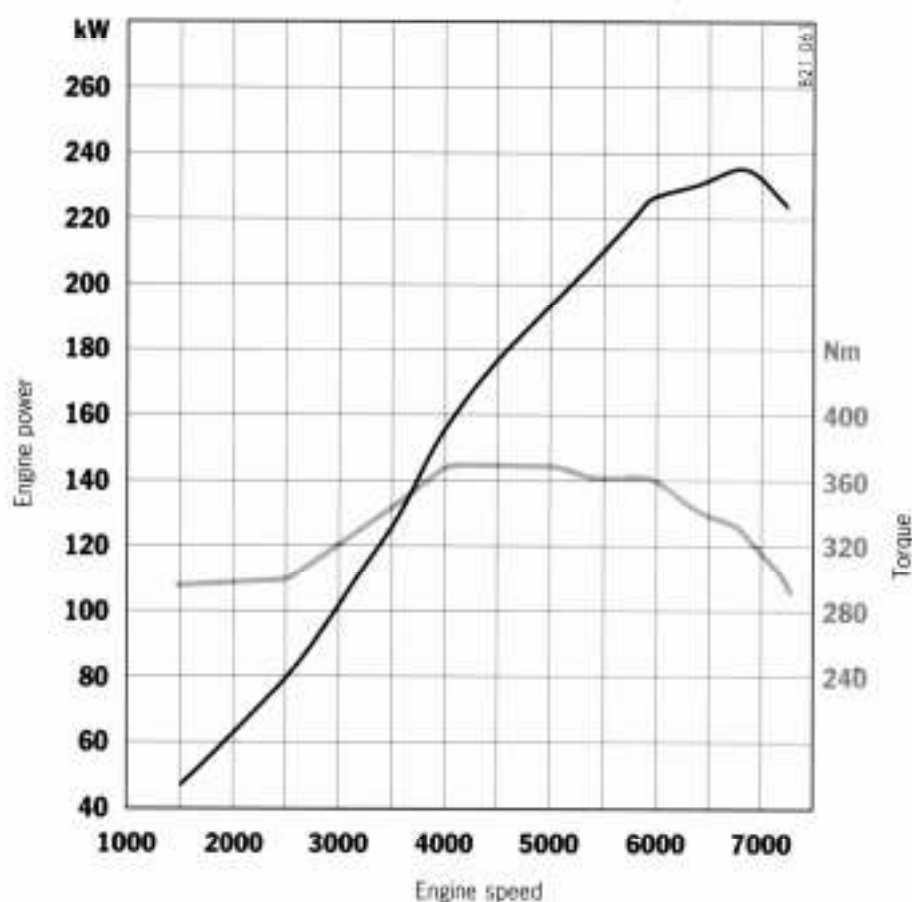
### Acceleration diagram

Values have been determined at DIN empty weight and with a 50 % load without additional equipment.

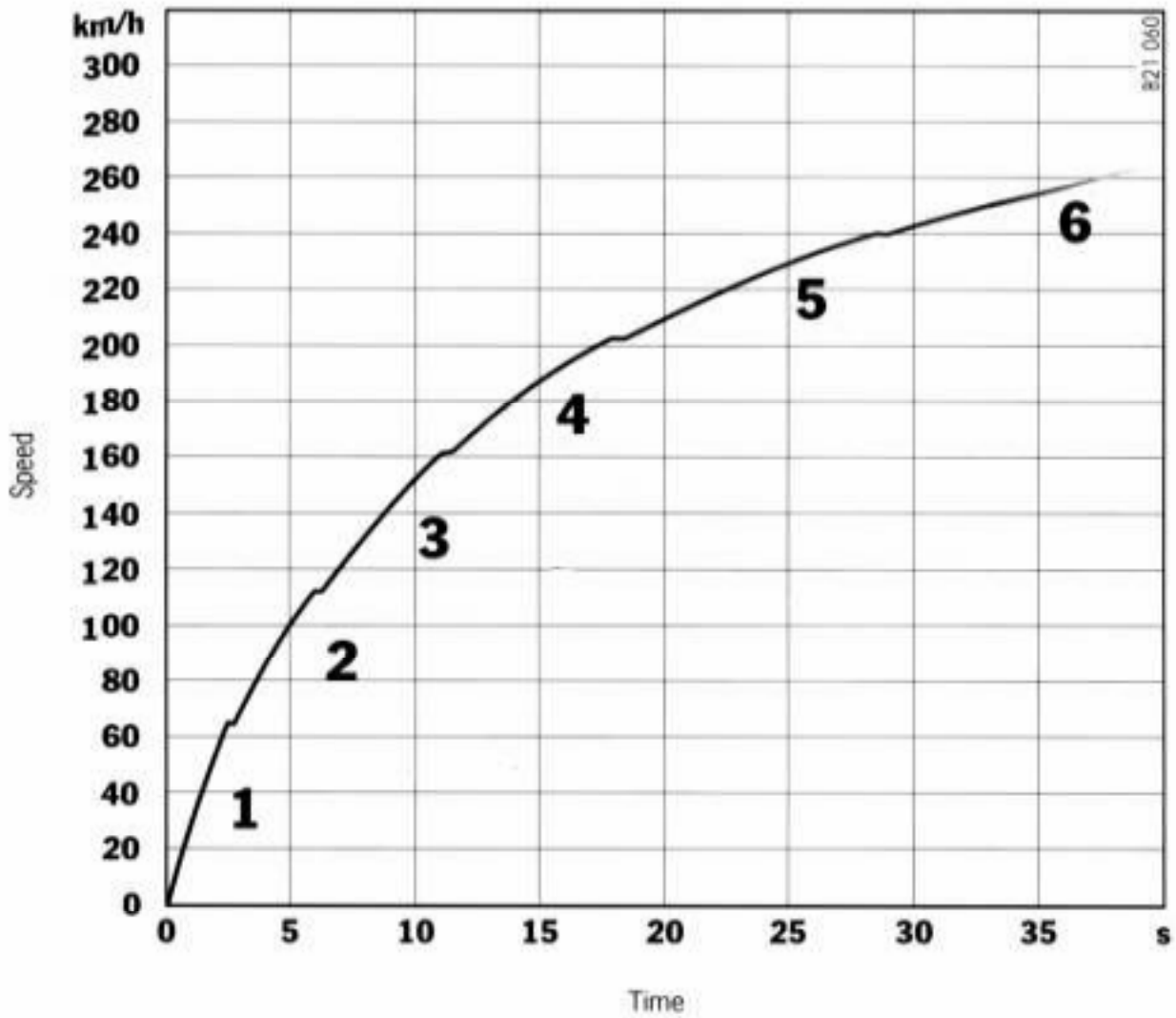
### Transmission diagram

The transmission diagram is based on standard values on the basis of a mean effective scrub radius. Changes of the scrub radius, the tyre tolerance, wear and tear, deviating country equipment and tyre slip have not been taken into account.

Engine diagram at full power



Acceleration diagram Manual transmission



Transmission diagram Manual transmission

