



PORSCHE



Product Information

911 Carrera / 911 Carrera S

Preface

After more than six successful years, the first water-cooled 911 Carrera Coupé is being succeeded by the new 911 Carrera. A daunting challenge by any measure, which the new 911 Carrera meets with a wealth of technical, design and stylistic innovations. For the first time since the introduction of the water-cooled engine, there is now an S model with even greater power. This brochure provides detailed information on the many innovations of the new 911 Carrera and 911 Carrera S. It also looks at the cars' strategic competitors.

The aim of this publication is to provide the international Porsche sales organisation with the ability to advise customers in an extremely competent manner concerning the two new 911 vehicles. We have therefore taken particular care to supply extensive background information which encompasses not only the description of the technical conversion but also the related advantages of the product. Thus, the present Product Information includes all information tailored to the customers' or prospects' needs and purchasing motives. This knowledge naturally should be used selectively when offering professional technical advice.

Dr. Ing. h.c. F. Porsche
Aktiengesellschaft

Marketing & Sales Training

Content

1	Overview	1
1.1	Overview of whole vehicle	1
1.2	Development objectives	4
1.3	Main differences between the 911 Carrera MY 05 and 911 Carrera MY 04	5
1.4	Differences between the 911 Carrera and 911 Carrera S	6
1.5	Exterior design	7
1.6	Interior design	9
2	Engines	11
2.1	Engine family	11
2.2	3.6 litre engine	11
2.3	3.8 litre engine	13
3	Gearbox	24
3.1	Manual gearbox	24
3.2	Tiptronic S	26
4	Chassis and transmission	30
4.1	Front axle	30
4.2	Steering system	30
4.3	Rear axle	32
4.4	Brake system	33
4.5	Porsche Active Suspension Management	36
4.6	Porsche Stability Management	40
4.7	Wheels and tires	42
4.8	Tire pressure monitoring system	43
4.9	Sport Chrono Package Plus	45
5	Body	49
5.1	Body-in-white	49
5.2	Doors/lids	50
5.3	Front end	51
5.4	Rear end	51
5.5	Bumper system	52
5.6	Tank	52
5.7	Luggage compartment	53
5.8	Electric steel sliding/tilting roof	53
5.9	Roof transport system	54
6	Aerodynamics	55

Content

7	Interior	60
7.1	Material design	60
7.2	Leather interior	60
7.3	Steering wheels	60
7.4	Pedals	62
7.5	Storage bins and transport concept	62
7.6	Front seats	64
7.7	Rear seat system	67
8	Heating/air conditioning	68
8.1	Glazing	69
9	Electrics	70
9.1	Main headlight	70
9.2	Bi-Xenon-main headlight incl. headlight washer system	71
9.3	Front fog lights	72
9.4	Rear light unit	72
9.5	Failure check	72
9.6	Front wiper system	73
9.7	Rear wiper system	73
9.8	Door mirrors/interior mirror	73
9.9	ParkAssist	74
9.10	HomeLink	74
9.11	Instruments	75
9.12	Ignition lock with one-key system	75
9.13	Cruise control	76
9.14	Power windows	76
9.15	Interior lighting	77
9.16	Safety and exit lighting	77
9.17	Networking	77
10	Safety and security	78
10.1	Anti-theft protection	78
10.2	Active safety	78
10.3	Passive safety	79
11	Environment	81
11.1	Materials/recycling	81
11.2	Noise/acoustics	81

Content

12	Audio and communication	83
12.1	Basic equipment, PCM, incl. Sound Package Plus	83
12.2	Navigation	83
12.3	Integrated aerial system	84
12.4	Telephone modul	84
12.5	Telephone preparation	84
12.6	Bose Surround Sound system	84
12.7	CD autochanger	85
13	Equipment	86
13.1	Standard equipment	86
13.2	Individual equipment	91
14	Colors	94
14.1	Exterior colors	94
14.2	Interior colors	94
15	Maintenance costs	95
16	Technical data	96
17	General information on main competitors	101
17.1	Competitor Comparison	102
17.2	Main product advantages of 911 Carrera and Carrera S Coupé	109
17.3	Overview of unique selling points	115



Fig. 1: Porsche 911 Carrera

1 Overview

1.1 Overview of whole vehicle

For the first time since the introduction of the water-cooled engine, the 911 Carrera has a stable mate, the 911 Carrera S, with enhanced displacement and performance. Both models have the same body width, but differ in their engines, chassis and exterior and interior details. The new 911 Carrera offers significantly better driving dynamics than its predecessor, setting new standards in the sports car segment. The 911 Carrera and especially the 911 Carrera S offer considerably better performance without sacrificing comfort or practicality.

Drive

The 911 Carrera is driven by the tried and tested, powerful 3.6 litre engine whose output has been increased by 4 kW/5 hp to 239 kW/325 hp through careful fine-tuning. The 911 Carrera S has a newly developed 3.8 litre engine producing 261 kW/355 hp and, like the basic model, transmits this power to the road via a newly developed 6-speed manual gearbox whose shift throw has been reduced by 15%.

Exterior/interior

The exterior has been completely redesigned, giving the new 911 Carrera an even more dynamic look. The track has been widened in comparison with the previous model and the mid-section has been made narrower. Some of the most striking features of the new exterior include the new headlights with additional lightings on the front end, a

more pronounced wing, a new double-arm door mirror, an aerodynamically optimised rear spoiler and a clearly defined joint style, particularly on the rear end.

The interior has also been redesigned and enhanced ergonomically, while retaining typical 911 and Porsche design features. For example, new materials have been used that give a high quality look. Thorax airbags have been placed in the side seat padding of the newly developed seats as part of the revised Porsche Side Impact Protection System (POSIP). Among other things, adaptive sports seats are available as an option. This means that the side padding of the seat cushion and the backrest can be individually adjusted to the respective driver using two controls. A multi-function steering wheel that can be used to control the various functions of PCM is available for the first time for the new 911 Carrera. The 911 Carrera S is fitted with a sports steering wheel as

standard; this, together with additional components in an aluminium-look finish, makes it look very different from the basic model. A leather interior with discreetly trimmed decorative seams in a wide range of colors is available as an option and conveys a feeling of particular quality. The lowered seat position, height-adjustable steering wheel and deep-set pedals have improved the ergonomics of the new 911 Carrera, particularly for the taller driver.

Chassis

Both the 911 Carrera and the Carrera S feature an enhanced chassis and considerably wider track. Both also use a new generation of tires with an enlarged rolling circumference that have improved performance considerably. The 911 Carrera is fitted with 18-in wheels as standard. The S model has more striking 19-in wheels and is equipped with an electronically controlled damper adjustment system, Porsche Active Suspension Management (PASM) as standard. This system allows the ride height to be lowered by 0.39 in and resolves the eternal conflict between the desire for comfort in everyday use and sporty performance in racing use. It automatically adjusts the shock absorption capability to the respective driving situation. A button in the center console allows the driver to select a sporty shock absorption setup.

Completely new for the new 911 Carrera is the Sport Chrono Package Plus. This option includes an analogue stopwatch, a Sport button for activating Sport mode, a performance display in PCM and an individual memory. Sport mode can be activated using a button in the center console and offers, among other



Fig. 2: 911 Carrera S

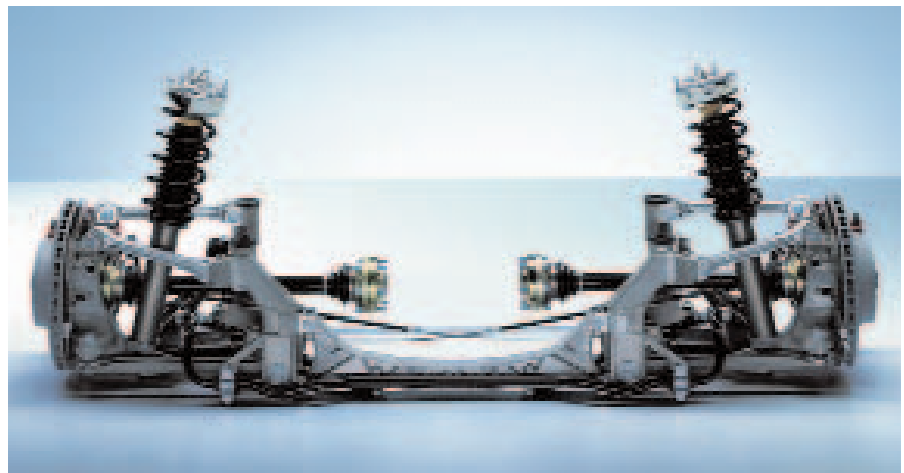


Fig. 3: Rear axle, PASM chassis



Fig. 4: PCM

things, a rigid PASM setup, PSM functions optimised for racing use, a more progressive accelerator pedal characteristic and suppression of upshift in manual tiptronic mode. The result is increased performance and agility and faster lap times.

The new steering system with variable steering ratio rack and pinion is extremely sensitive and precise and, together with the new chassis, ensures incredibly precise driving behavior. The 911 Carrera S is fitted with a power-booster brake system because of the higher engine output. In combination with the now standard Porsche Stability Management (PSM), the chassis thus sets new standards in active driving safety.

Audio and communication

The 911 Carrera has Porsche Communication Management (PCM) as standard, with modular enhancements available as options. Also available on request is a new DVD navigation module with a separate navigation drive in the luggage compartment. This enables constant navigation guidance within an entire continent. A multi-function steering wheel with controls for various audio and communication scopes is offered as an optional extra for increased comfort.

The new 911 Carrera with the Sound Package Plus offers a superior sound experience as standard and sufficient volume reserves for all driving conditions.

The sound experience can be further enhanced on request with the new Bose Surround Sound system. This is the first time that a surround sound system has been offered in the 911 Carrera. Thirteen loudspeakers and a 7-channel digital amplifier built into the digital MOST bus ensure a sound experience never before heard in the sports car segment.

1.2 Development objectives

The development objectives in a complete revision of a Porsche model series are traditionally very ambitious, particularly when it comes to the revamped version of the most successful Porsche ever, the 911 Carrera. The main objectives in the development of the new 911 Carrera were:

- To come up with a new design for the interior and exterior with an emphasis on night-time design, while retaining typical design features
- To improve the design of the passenger compartment, particularly for taller drivers and front-seat passengers
- To maintain Porsche's considerable competitive edge in the areas of driving performance, driving dynamics, braking power and active safety, while achieving a constant level of comfort
- To offer an additional S model with even greater performance thanks to a new engine and new chassis technology and with a significantly higher equipment level than the basic model
- To deliver the attractive, typical Porsche sound
- To substantially improve aerodynamic resistance and lift coefficients
- To compensate for the extra weight caused by the inclusion of additional standard equipment and enhanced safety measures through the consistent use of light-weight construction concepts
- To significantly improve the cost of ownership

The successful implementation of these ambitious objectives is visible for all to see in the new 911 Carrera. We have listed the main differences in comparison with the previous model below for the purpose of clarification.

**1.3 Main differences
between the
911 Carrera MY 05 (1997)
and
911 Carrera MY 04 (1996)**

Area	Detail	911 Carrera MY 05 (1997)	911 Carrera MY 04 (1996)
Exterior	Tailpipes	2 individual tailpipes (new design)	2 individual tailpipes
	Glazing	Hydrophobic side windows (front)	Conventional side windows
	Wheels	18-in Carrera III wheel FA: 8J x 18 ET 57 RA: 10J x 18 ET 58	17-in Carrera II wheel FA: 7J x 17 ET 50 RA: 9J x 17 ET 55
	Tires	FA: 235/40 ZR 18 RA: 265/40 ZR 18	FA: 205/50 ZR 17 RA: 255/40 ZR 17
	Spare tire	Tire sealing compound and compressor	High-pressure spare wheel in the luggage compartment
	Exterior lighting	Automatic coming home/leaving home lights as standard	Not available
Engine	Engine	6-cylinder opposed-cylinder engine 3.6 litre with 325 bhp 370 Nm at 4,250 rpm	6-cylinder opposed-cylinder engine 3.6 litre with 320 bhp 370 Nm at 4,250 rpm
Chassis	Track	FA: 58,50 in RA: 60,39 in	FA: 57,67 in RA: 59,05 in
Aerodynamics	Drag	C_d : 0.28	C_d : 0.30
	Underbody lining	Full lining	Partial lining
Interior	Night-time design	White LED lighting throughout	Yellow LED lighting
	Colors	Standard colors: Black, Stone Grey, Sand Beige, See Blue, Palm Green	Standard colors: Black, Graphite Grey, Savanna, Metropole Blue
Safety	Vehicle stability system	PSM as standard (reworked)	PSM optional
	Airbags	Front airbags as well as head and thorax airbags	Front and side airbags
Electronics	PCM	Standard (without navigation)	Optional
	Audio	Sound Package Plus with 9 loudspeakers	CDR 23 with 4 loudspeakers

1.4 Differences between the 911 Carrera and 911 Carrera S

The table below shows the differences between the 911 Carrera and 911 Carrera S.

Area	Detail	911 Carrera (MY 05)	911 Carrera S (MY 05)
Exterior	Tailpipes	2 individual tailpipes	2 dual tailpipes
	Model logo	Titanium-colored	Silver-colored
	Headlights	Halogen without automatic range adjustment	Bi-Xenon with automatic range adjustment and headlight washer system
	Wheels	18-in Carrera III wheel FA: 8J x 18 ET 57 RA: 10J x 18 ET 58	19-in Carrera S wheel FA: 8J x 19 ET 57 RA: 11J x 19 ET 67
	Tires	FA: 235/40 ZR 18 RA: 265/40 ZR 18	FA: 235/35 ZR 19 RA: 295/30 ZR 19
Engine	Engine	6-cylinder opposed-cylinder engine 3.6 litre with 325 hp 273 ftlb at 4,250 rpm	6-cylinder opposed-cylinder engine 3.8 litre with 355 hp 295 ftlb at 4,600 rpm
	Air filter	"Porsche 3.6" inscription	"Porsche 3.8" inscription
	Intake system	Plastic + aluminium intake pipe	Plastic + plastic intake pipe + silver structural paint
Chassis	Chassis	Standard chassis	Porsche Active Suspension Management (PASM)
	Brakes	Standard brake system	Power-boosted brake system with brake diameter of 12.99 in
	Brake calipers	Anodised black	Painted red
Interior	Design details	Painted Volcano Grey	Painted Volcano Grey, accentuating details in aluminium-look finish
	Dials	Black	Aluminium-look finish
	Steering wheel	3-spoke steering wheel, leather	3-spoke sports steering wheel, leather
	Shift lever	Cap with gearshift pattern in black	Cap with gearshift pattern in silver
	Scuff plates	With Carrera logo	With Carrera S logo

1.5 Exterior design

The basic foundation for the current success of the 911 series was laid over 6 years ago with the first water-cooled 911 Carrera using the internal development code 996. The design features for which Porsche and in particular the 911 Carrera are known have been refined and enhanced in the development of the new generation 911 Carrera. The design philosophy is built around clarity, exhilaration and maximum precision of execution; attributes reflected in the overall appearance and each individual detail.

The new 911 Carrera is like an athlete who has kept training and whose form has improved over the years. Its powerful appearance is characterised by taut surfaces and striking, well-defined musculature. The functional components with their clear form provide a stirring counterpoint. The silhouette of the vehicle is largely unchanged, however the body

boasts many new features and differs considerably from the previous model.

The front view of the vehicle is dominated by the new, redesigned headlight module, the air inlets and the new contour of the front hood. The oval shape of the main headlights in particular defines the face of the new Carrera. Their deeper and wider position makes the front end look shorter, yet wider and more powerful. The clear glass technology employed allows a direct view of the sophisticated lighting component design and the precise alignment of the inner surfaces. The front lights with a combination of indicator light, fog light and marker light clearly split up the front. The same attention to detail has been exercised for the reflectors and housing. The separation of the main headlights and the front lights is an attractive detail with a high recognition value: the marker light illuminates to the extreme front and side of the headlight when it is dark. The striking cooling-air openings with their smart design complete the face:

undeniably new and yet undeniably Porsche 911 Carrera.

The side view is dominated by the muscular shape of the fenders. This shape is further emphasised by the narrower, more rigid doors. The door sill detail, which is continued to the front and rear ends, makes the side of the vehicle look both streamlined and stable at the same time. The wheel cutouts provide space for wheels with larger rolling circumferences: 18-in wheels on the basic model and 19-in wheels on the 911 Carrera S. The 18-in Carrera III wheel is executed as a classic five-spoke wheel and with its defined, strong contours echoes the styling features of the body. The 19-in Carrera S wheel is a completely new design and provides an exciting contrast to the lines of the vehicle. Two further 19-in wheels are available as an option for the 911 Carrera/S. The 19-in Carrera Classic wheel is an extremely elegant five-spoke wheel with narrow spokes that provide a good view of the brakes. The



Fig. 5: 911 Carrera S

19-in SportDesign wheel is Porsche's new interpretation of a multi-spoke wheel and conveys a feeling of racing flair with its delicate spokes.

The dynamism of the roof contour has been further increased through a sturdier C-pillar. A new seal design with narrower cross sections permits exposed glass edges at the front and rear window and emphasises the clear lines of the window. The new side window seal also has a precise design and adds yet another facet to the typical 911 contour of the rear side window. The new door mirror continues the design concept of the Carrera GT mirror, but has a horizontal double arm. It is a true highlight, both in terms of design and execution. The new door handle with its curved design is not only ergonomically perfect, but also perfectly executed.

These individual measures combine to produce a side view with a number of new features in comparison with the previous model.

The rear view of the 911 Carrera is dominated by the flared fenders and the dynamic appearance of the rear lights. This dynamism has been further enhanced by the rear section seams which start at the wheel housing and climb towards the rear. The rear section also features taut surfaces and all of the busy details have been removed to emphasise the functional elements. The raised rear lid seam between the lights lends to the rear added impact. The rear lights feature a new, brilliant look and a clean division between the red and silver/grey area. As with the front lights, the brilliance has also been increased for the night-time design, i.e. when the lights are switched on in the dark.

There is a slight groove where the rear window joins the roof line and then a definite gap where it joins the rear end. The wide design joint between the rear end and the rear window produces a clearly defined edge which underlines the power of the rear section and provides a clear view of the rear mounted opposed-cylin-

der engine concept of the 911 Carrera. The downward pointing, more pronounced air openings in the rear spoiler further reinforce this effect. The raised brake light continues the theme, thereby fitting seamlessly into the design.

The new, optional rear wiper which is now attached directly to the rear window rather than the rear center section is much more unobtrusive than before. The new wiper arm has been worked out down to the last detail and the use of an aerodynamic wiper blade has permitted a significant decrease in its height.

The rear is finished by the tailpipes, which also serve as a distinguishing feature. The two individual tailpipes of the 911 Carrera fit seamlessly with the styling features of the vehicle, while the two dual tailpipes of the 911 Carrera S are an outward sign of the increased power of the 3.8 litre engine. A number of measures have been implemented in the engine compartment to heighten the visual fascination of the engine.



Fig. 6: 911 Carrera



Fig. 7: 911 Carrera S engine compartment



Fig. 8: Interior of the 911 Carrera

The engine variant is now indicated by a silver plate on the air filter housing. The exhaust system in the 3.8 litre engine of the 911 Carrera S is also painted silver to further differentiate it from the basic model.

1.6 Interior design

The interior has been redesigned under the premise of enhancing, optimising and accentuating the positive. The cockpit of the new 911 Carrera features solid and powerful shapes, however its sympathetic lines mean that it is not at all overpowering. The quality of the interior with regard to seam quality, upholstery technique, seams and surface structure has been improved in comparison with the previous model. The percentage of soft paint surfaces has been reduced and more components based on slush technology used to further improve the impression of quality. Each detail clearly reflects the new design philosophy: clarity, exhilaration and precision.

The interior of the S model differs in the use of the sports steering wheel as well as accents in an aluminium-look finish.

The instruments, which have the similar essential layout, have been made clearer and easier to read. The interior night-time design, with its white LED lighting, raises the quality of the interior to a new level and illuminates all of the controls and displays to great effect.

The design of the new steering wheel is reminiscent of elements of the Carrera GT with clear, geometric shapes. In addition to fore-and-aft adjustment, the steering wheel now also features height adjustment. The sports steering wheel of the S model also draws from this

concept but appears even sportier thanks to its round shapes and smaller rim diameter with integrated thumb rest.

The center console has been redeveloped and matched to the styling features of the new interior. The number of seams has been significantly reduced in the process and the design of the controls for PCM, air conditioning and all other switches standardised. All switches have been adapted to the ergonomic requirements of a sports car and have little ridges to prevent the finger slipping. The redesign of the interior has permitted the realisation of a new, practical storage bin under the air conditioning control panel and a significantly larger glove compartment. The redeveloped cup holder is now integrated behind the decorative dashboard trim.

The shift lever has been ergonomically improved and given a sportier design. It is now spherical, a detail inspired by motor-racing practice. The cover of the storage bin in the center console behind the shift lever has been made longer and more padded so that the center arm rest is now more comfortable.

The door-trim panels have also been made more rigid and fitted with one unit comprising door opener and power window switches. The controls for the windows have been made more intuitive in that the direction of operation of the switches now matches the window movement. The switches for the seat memory, the optional fully electric seats and the adaptive sports seats have also been integrated in the door-trim panels.



Fig. 9: Shift lever

2 Engines

2.1 Engine family

Ever since the introduction of the 911 SC, the standard offering for 911 Carrera models with a naturally aspirated engine has been restricted to one displacement variant and one output variant (with the exception of RS and GT models). This offering has been extended in some cases by power kits with the same displacement available via Exclusive or since 2002 as an individual option (I-No.).

The new 911 Carrera and 911 Carrera S see the introduction of two output variants with different displacements being offered as standard for model year 2005. The basic 911 Carrera with 3.6 litre displacement developing output of 239 kW (325 hp) and the 911 Carrera S with 3.8 litre displacement developing output of 261 kW (355 hp).

The 3.6 litre engine of the new 911 Carrera largely corresponds to the 3.6 litre engine of the 911 Carrera from model year 2004. The original output has been increased from 235 kW (320 hp) to 239 kW (325 hp) and LEV certification achieved by fine-tuning the components. The weight reduction measures implemented have reduced the total weight of the engine to 444.45 lbs from 449.08 lbs (996).

The 3.8 litre engine of the 911 Carrera S is essentially based on the 3.6 litre engine of the 911 Carrera. Thanks to increased displacement as well as adjustment and tuning of the components involved, the new 3.8 litre engine produces an output of 261 kW (355 hp). This engine also has LEV certification.

As well as the model designation on the rear lid, the two engine variants of the 911 Carrera and 911 Carrera S can be identified by their different tailpipes. The 911 Carrera has two individual tailpipes and 911 Carrera S two dual tailpipes.

2.2 3.6 litre engine (911 Carrera)

The 3.6 litre engine in the 911 Carrera largely corresponds to the 3.6 litre engine in the 911 Carrera MY 04 with the following features (see also the Product Information Porsche 911 Carrera MY 02, Chapter 2):

- 6-cylinder opposed-cylinder engine
- Aluminium engine block and cylinder head
- Fuel injection (sequential; multipoint)
- Water cooling
- Cylinder-specific knock control
- Four-valve technology
- 2 three-way catalytic converters

- Continuous camshaft adjustment with vane adjuster and “VarioCam Plus” valve lift control
- Stereo lambda control circuits
- Individual ignition coils, static high-voltage ignition system
- Hydraulic valve clearance compensation
- Integrated dry sump lubrication
- Two-stage resonance intake system
- Electronic engine management system (Motronic ME7.8)
- Idle compensation device
- Electronic accelerator pedal
- On-Board Diagnosis system for monitoring the exhaust emission control system (OBD II)
- Hot film air flow sensor

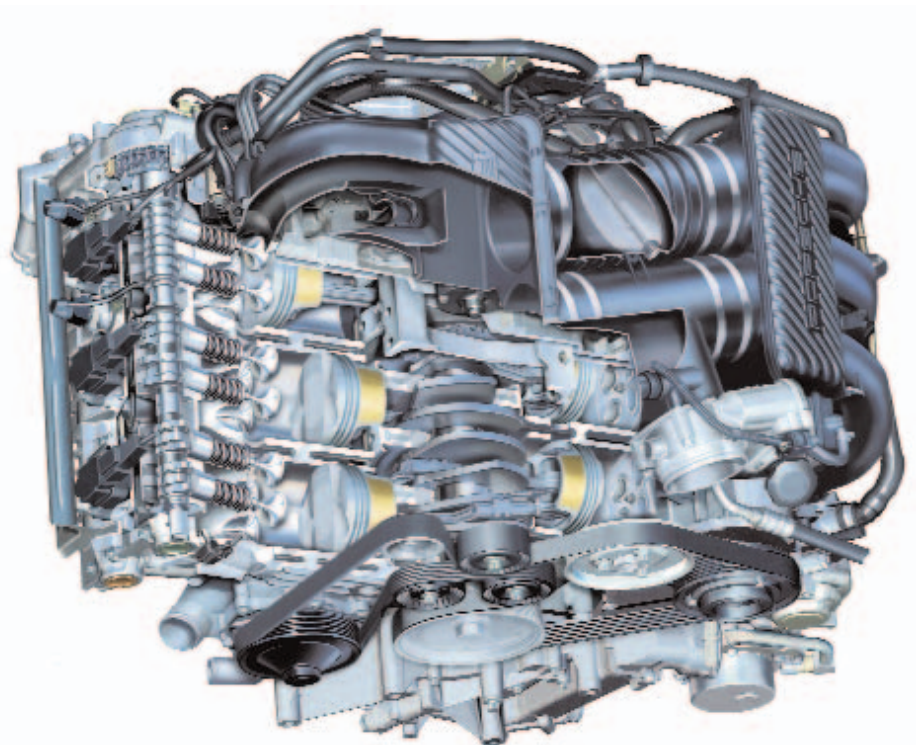


Fig. 10: Section of the 3.6 litre engine

2.2.1 Changes to the 3.6 litre engine

The main changes in the 3.6 litre engine in comparison with the previous model have been to the following scopes and data:

bold = change	911 Carrera MY 04	New 911 Carrera MY 05
Max. output at 6800 rpm	235 kW (320 hp)	239 kW (325 hp)
Engine weight	449.08 lbs	444.45 lbs
Exhaust emission standard	LEV	LEV
Vacuum pump	Sucking jet pump	Mechanical vacuum pump
Water pump		Increase in flow rate of approx. 13 % due to higher performance requirements; at nominal speed
Air filter		Air filter upper part and scoop new (incl. engine compartment design)
Manifold	Standard manifold	Light-weight manifold
Catalytic converter	Cascade catalytic convertor	Cascade catalytic convertor lighter in weight
Silencer		Lighter in weight with improved flow rate
Tailpipes		New design
The following changes are not engine-specific and accordingly apply to the new 3.6 litre and 3.8 litre engine, see also section 2.3 "3.8 litre engine"		
Air flow concept for the front radiator	Open, air is directed downwards in front of the front wheel housings	Closed, air is directed to the front wheel housings
Fan control for the radiator	Two-stage	Continuous
Engine compartment scavenging blower	Operation depends on water and engine compartment temperature	Operation depends on water, engine compartment, ambient and intake air temperature
Rear spoiler activation	Dependent on vehicle speed	Dependent on vehicle speed and engine compartment temperature
Motronic	ME 7.8	ME 7.8 with enhanced computing and memory capacity (incl. Sport Chrono function)
Oil change	12,000 miles	20,000 miles
Air filter change	24,000 miles	40,000 miles
Spark plug change	48,000 miles	60,000 miles
Poly V-belt change	48,000 miles	60,000 miles

For a description of the changes see [section 2.3 "3.8 litre engine"](#).

2.2.2 Output

Optimisation of the air filter and the exhaust system (in particular the silencer) has allowed the gas cycle to be improved even further and the output in comparison with the 3.6 litre engine from MY 04 increased from 235 kW (320 hp) to 239 kW (325 hp). The maximum torque remains unchanged at 273 ftlb.

2.3 3.8 litre engine (911 Carrera S)

The 3.8 litre engine has its 6-cylinder opposed-cylinder design with outstanding balancing of masses and rigid camshaft/crankshaft drive to thank for its minimal vibration (for which Porsche is known) and typical sports car sound.

An increase in displacement and extensive fine-tuning work, particularly on the gas cycle, has resulted in a maximum output of 261 kW (355 hp) and a maximum torque of 295 ftlb. The high specific torque of the 911 Carrera S at 77.14 ftlb/l (911 Carrera: 75.92 ftlb/l) and the balanced torque curve of the 3.8 litre engine, which is considerably above the values of the 3.6 litre engine across the rpm range, facilitate better performance and superior flexibility.

A reduction in weight of 4.63 lbs in comparison with the 3.6 litre engine from MY 04 has been achieved by optimising a number of different components.



Fig. 11: 3.8 litre engine

Technical data for the
new 3.8 litre and 3.6 litre engines

		911 Carrera MY 05	911 Carrera S MY 05
Design		6-cylinder opposed-cylinder engine	6-cylinder opposed-cylinder engine
		Integrated dry sump lubrication	Integrated dry sump lubrication
Valves		4 valves/cylinder	4 valves/cylinder
Displacement	cu. in.	219.4	233.3
Bore/stroke	in	3.78 / 3.26	3.90 / 3.26
Engine weight (DIN 70020 A)		444.45 lbs	444.45 lbs
Max. output	kW (hp)	239 (325)	261 (355)
at engine speed	rpm	6,800	6,600
Max. torque	ftlb	273	295
at engine speed	rpm	4,250	4,600
Max. engine speed	rpm	7,300	7,300
Rpm limitation		Electronic throttle and fuel cut-off	Electronic throttle and fuel cut-off
Specific output	kW/l (hp/l)	66.5 (90.4)	68.3 (92.9)
Specific torque	ftlb/l	75.92	77.14
Compression ratio		11.3	11.8
Engine cooling		Water cross flow	Water cross flow
Engine control		ME 7.8	ME 7.8
Fuel/air mixture		Sequential multipoint fuel injection	Sequential multipoint fuel injection
Fuel type		Super Plus unleaded, 98 RON	Super Plus unleaded, 98 RON
Ignition		Ignition with digital mapping, cylinder-specific knock control, static high-voltage ignition system with individual ignition coils	Ignition with digital mapping, cylinder-specific knock control, static high-voltage ignition system with individual ignition coils
Valve control		VarioCam Plus	VarioCam Plus
Generator	W	2,100	2,100
Battery	Ah	70	70
Secondary air pump		Electrical	Electrical
Water pump		Increase in flow rate of approx. 13% due to the higher performance requirements of the 3.8 litre engine	Increase in flow rate of approx. 13% due to the higher performance requirements of the 3.8 litre engine
Radiator module		Radiator module with high- performance network (highly efficient cooling pipes and ribs)	Radiator module with high- performance network (highly efficient cooling pipes and ribs)
Crankshaft drive		Pulley	Vibration balancer
Air filter		Without switchable resonator with "PORSCHE 3.6" logo	With switchable Helmholtz resonator with "PORSCHE 3.8" logo
Manifold		Standard header	High-performance header
Exhaust system		Two-pipe catalytic converter exhaust system with two silencers	Two-pipe catalytic converter exhaust system with two silencers
Catalytic converter		Cascade catalytic converter	Cascade catalytic converter
Tailpipes		Two individual tailpipes	Two dual tailpipes

Power output and torque 911 Carrera and Carrera S

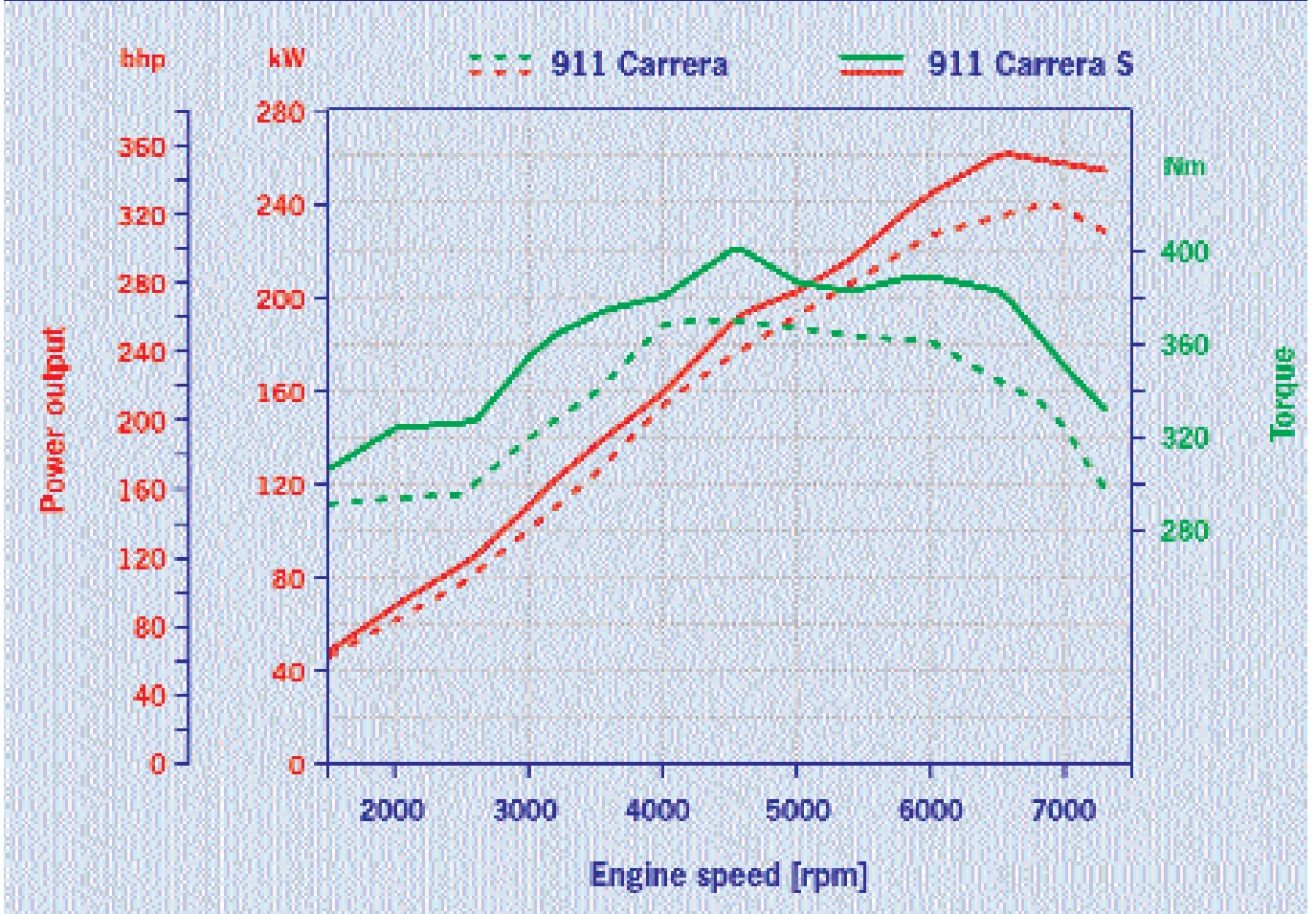


Fig. 12: Output and torque

2.3.1 Basic engine

The 3.8 litre displacement of the new 911 Carrera S has been achieved on the basis of the proven 3.6 litre engine by increasing the bore diameter from 3.78 in to 3.90 in while retaining the stroke of 3.26 in. The aerodynamic pump losses resulting from the increased internal air movement of the 3.8 litre engine have been reduced by increasing the circulation cross sections of the crankcase from the 3.6 litre engine and optimally matching them to the new basic requirements. This guarantees that the gases in the crank chamber will pulse with low losses, despite the larger displacement of the 3.8 litre engine, and further increases the overall performance of the engine, particularly in the upper rpm range.

2.3.2 Vibration balancer

The higher gas forces of the 3.8 litre engine result in higher crankshaft torsional vibrations than with the 3.6 litre engine due to transmission of these forces across the pistons and the crankshaft drive (rod and crankshaft). To reduce these torsional vibrations, the 3.8 litre engine is equipped with a vibration balancer attached to the crankshaft. Vibration balancers are generally manufactured from cast iron. This increases the weight of the component and reduces revving ability and spontaneity. A vibration balancer made from aluminium is used to counteract these drawbacks. The use of aluminium reduces the weight of the component without affecting its operation. The vibration balancer has enabled the torsional vibrations in the entire rev range to be brought below the level of the 3.6 litre engine and pronounced resonance

peaks to be avoided. An additional advantage is the harmonious and full sound it gives the 3.8 litre engine. The weight saving in comparison with a conventional cast-iron balancer is approx. 3.5 lbs.

2.3.3 Vacuum pump

The new 3.6 litre and 3.8 litre engines both use a mechanical vacuum pump with a tandem design instead of a conventional sucking jet pump to provide the vacuum for the brake booster and for activation of the switching elements on the engine and gearbox side (e.g. the resonance flap of the intake system).

This pump consists of an inner rotor pump for oil extraction combined with a vane-type pump for vacuum generation ('tandem' refers to the combination of these two pumps). The pump is screwed to the cylinder head 4-6 from the outside and is driven via the exhaust camshaft. Use of the mechanical vacuum pump permits an emissions-reducing timing strategy for complying with the demanding LEV emission legislation.

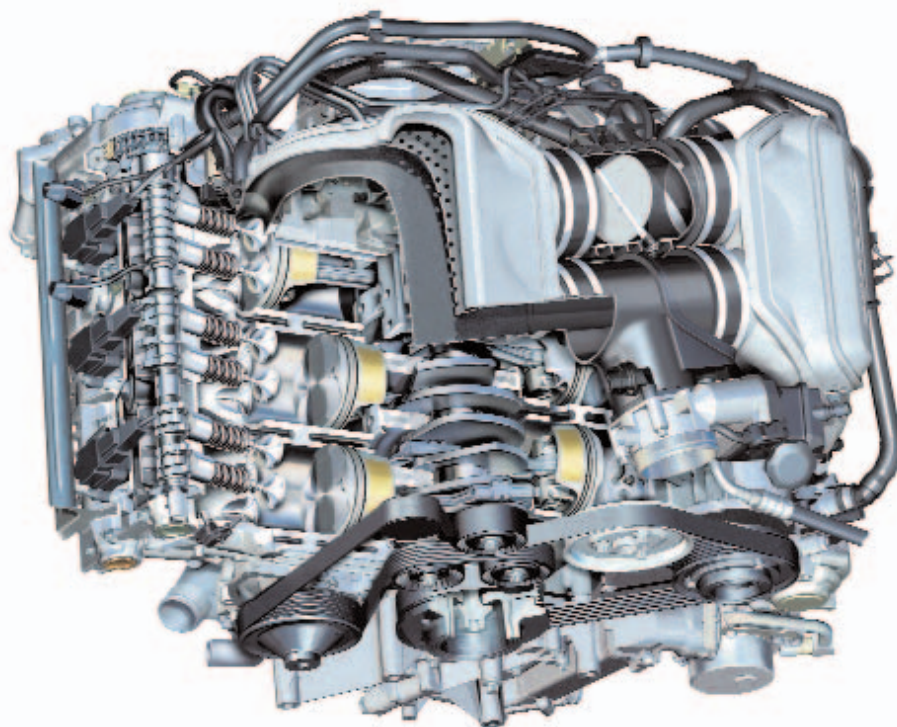


Fig. 13: Section of the 3.8 litre engine



Fig. 14: 911 Carrera

2.3.4 Cooling

Like the existing 3.6 litre engine, the new 3.8 litre engine uses proven cross-flow cylinder head cooling. This cooling concept was first used on the 911 Carrera in model year 1998 and guarantees efficient and even distribution of coolant to all cylinders. The coolant is supplied through channels integrated in the engine block like in racing cars, i.e. there are no external lines or hoses and therefore no leaks or blockages.

Like the existing 911 Carrera models, the new 911 Carrera and 911 Carrera S with manual gearbox also use two radiator modules. These are located ahead of the front wheels, as on the previous models. On vehicles with Tiptronic S, an additional third radiator is used to facilitate cooling of the automatic transmission oil via an additional oil-water heat exchanger in the common water circuit.

The new 3.8 litre engine has a higher cooling requirement than the 3.6 litre engine because of its higher engine output. This requirement has been

addressed through the use of a more powerful water pump (approx. 13% more power) for both engines and, for the 3.8 litre engine, a larger oil-water heat exchanger with 2 additional cooling gills which can be made even more efficient through the use of turbulators. At the same time, various dethrottling measures have been implemented in the cooling system to minimise pressure losses caused by the larger coolant stream.

Fine-tuning has improved the radiator core and increased the efficiency of the intake and exhaust channels in the body. All of these measures combined have resulted in an improvement in cooling efficiency of approx. 10%.

As well as increasing cooling efficiency, the redesign of the intake and exhaust channels has also reduced the rise in temperature caused in the luggage compartment through the use of a closed air flow concept. The exhaust air flow from the radiators is no longer directed to the exhaust openings on the front end via the luggage compartment wall; instead it is now directed to the front wheel housings via gills using a closed exhaust system. The wall of the exhaust system and

the wall of the luggage compartment create an air gap which has a heat-insulating effect.

An infinite fan control for the radiators has been introduced with the 3.6 litre and 3.8 litre engines of the new 911 Carrera and 911 Carrera S. This new feature permits infinite control of the fan speed as a function of the coolant temperature and the system pressure in the air conditioning system instead of two-stage control. It has the advantage of requiring less current and therefore creates less of a load on the vehicle electrical system.

With staged control, when a temperature threshold was exceeded the next fan speed had to cover all of the allocated temperature range. With infinite control, the fan speed can be continuously adjusted to the actual requirement. This means that the fan speeds can often be reduced, thereby decreasing noise and vibrations.

2.3.5 Oil supply

Both the new 3.8 litre engine and the 3.6 litre engine feature the familiar integrated dry sump lubrication system. Similar in concept to classic dry sump lubrication, with integrated dry sump lubrication there is no external oil tank. It combines the advantage of dry sump lubrication – a reliable oil supply even with high lateral and longitudinal acceleration – with a significant reduction in oil quantity and system weight.

Like the 3.6 litre engine, the new 3.8 litre engine also has a total of 3 oil pumps. In addition to an oil pressure pump in the crankcase, two additional oil return pumps in the cylinder heads guarantee the oil supply even with high longitudinal and lateral acceleration. As described in section 2.3.3, one of the oil return pumps is executed as a tandem pump.

As on the 911 Carrera MY 04, defoaming of the extracted oil is performed using cylindrical containers, so-called swirl pots, in which the air is separated off in a type of centrifuge and guided to the crankcase. Defoaming the oil ensures reliable lubrication and therefore long-lasting operation of the crankshaft and control drive as well as the hydraulic control elements.

2.3.6 Oil spray collector

The crankcase ventilation system has been revised to take account of the increased requirements of the 3.8 litre engine. It consists of two pre-collectors which are screwed directly to the tapping points at the cylinder head and a main collector which is positioned centrally on the crankcase beneath the intake system.

The oil-laden air from the crankcase is first routed to the two pre-collectors via the cylinder heads. A first rough oil separation is performed there by means of integrated discs to reduce the oil content of the ventilation gases. The oil content of the clean gas is then reduced in the main collector. The filtration efficiency of the main collector has been significantly increased. The cleaned ventilation gases are then routed behind the throttle to the intake system.

2.3.7 Oil level measurement

Following on from positive experiences with electrical oil level measurement and a changeover in measuring habits away from manual measurement via the oil dipstick to electrical oil level measurement, the new engines do not have an oil dipstick.

A 'map compensation' feature has been introduced for the new 3.6 litre and 3.8 litre engines to speed up the oil level measurement process in certain operating states, thereby improving measurement convenience. Previously all of the engine oil had to return to the oil pan after the engine was shut off before the oil level could be measured.

With map compensation, the actual measured oil level in the oil pan is compensated to take account of the oil temperature and the length of time the engine has been off. The oil that has not yet returned to the oil pan and/or the temperature-related change in volume is electronically calculated and the real oil level displayed as quickly as possible in the instrument cluster.

2.3.8 Cylinder head and camshaft control

As on the 3.6 litre engine, the cylinder head on the 3.8 litre engine is also in three parts. It consists of the cylinder head with 4 valves per cylinder, the cam follower housing with switchable hydraulic tappets and the cylinder head cover. The inlet channels and valve seat inserts have a flow-optimised design and play an important role in achieving the high specific output and torque values.

The valve-timing diagram has also been revised to improve gas exchange. While a modified exhaust camshaft from the 3.6 litre engine is used, the timing and the lifting curve of the inlet camshaft have been optimised for the 3.8 litre engine while retaining the same maximum lift. In addition to high torque and output values, this also facilitates higher torques at lower speeds as can be seen from a comparison of the torque curves.

The new 3.6 litre and 3.8 litre engines also use the familiar VarioCam Plus camshaft adjustment system. It features

the familiar 'vane adjuster' and 'switchable hydraulic tappet' control elements for adjusting the timing of the intake valves and switching the maximum valve lift of the intake valves between 0.14 in and 0.43 in on the basis of a map respectively.

2.3.9 Air filter

The design of the air filter in the new 911 Carrera (3.6 litre) and 911 Carrera S (3.8 litre) is essentially the same as in the 911 Carrera MY 04. The redesigned scoop and air filter upper part with integrated "PORSCHE 3.6" or "PORSCHE 3.8" logo and the rerouted lines and hoses are important elements in upgrading the look of the engine compartment design.

The air filter of the 3.8 litre engine differs from that of the 3.6 litre engine through an active on-demand resonance reservoir integrated in the upper part of the air filter. This reservoir is activated via a vacuum-controlled flap as a function of engine speed and using temperature compensation. The flap operates in

the temperature range between 32 ° and 86 ° Fahrenheit, opening between approx. 4,600 and 4,800 rpm and closing between approx. 6,000 and 6,250 rpm. Opening and closing the resonance reservoir produces an improvement in the intake noise of the 3.8 litre engine, particularly in combination with the specific intake system of the 3.8 litre engine.

The sound opening of the air filters for the new Carrera engines has been modified to largely prevent the possibility of hot air intake from the engine compartment even under critical engine operating conditions (e.g. high ambient air temperature).

The sound opening on the existing Carrera engines consists of large-pore openings in the lower part of the air filter. On the new Carrera engines these have been replaced by a large-area opening with an insert of polyamide fabric which is virtually impervious to air. This measure largely prevents hot air intake from the engine compartment and gives the typical Porsche intake sound in the passenger compartment.

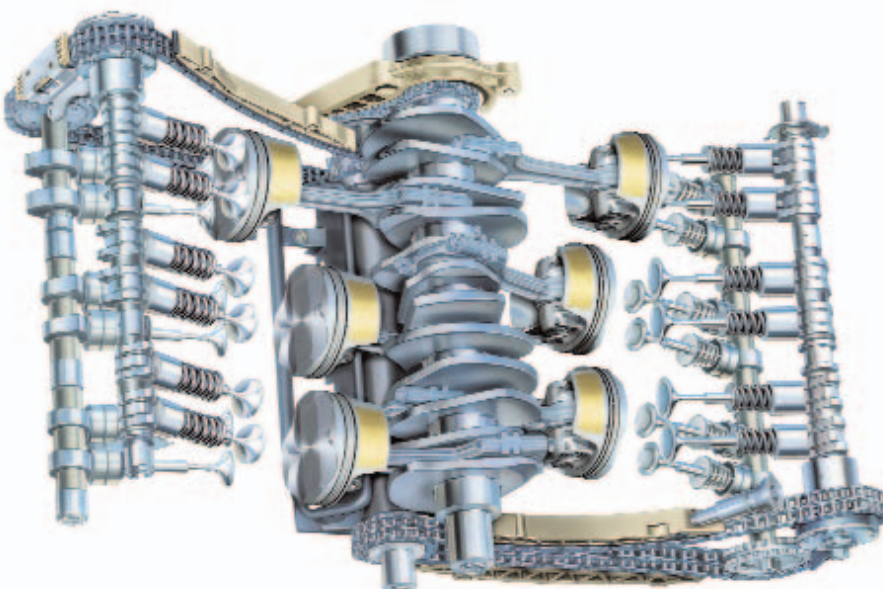


Fig. 15: Crankshaft drive for 3.8 litre engine

2.3.10 Intake system

The 3.8 litre engine of the 911 Carrera S has a completely redesigned intake system. It differs from that of the 3.6 litre engine in the following ways:

- Made entirely of plastic (3.6 litre engine: unchanged with approx. 2.36 in intake pipe supports made of aluminium)
- New design
- Suction distributor on left and right with half-shell design painted with silver structural paint
- Volume optimised to the resonance chambers
- Adapted intake pipe lengths and diameters
- Lower flow resistances thanks to the harmonious curve of the intake pipes
- Flow-optimised distributor pipe
- Dethrottling of the distributor pipe (middle section) by means of double-shell design

The intake system of the 3.8 litre engine is made entirely of plastic and is therefore approx. 2.65 lbs lighter than the intake system of the 3.6 litre engine with approx. 2.36 in intake pipe supports made of aluminium (carried over from the 3.6 litre engine from MY 04). The omission of the separation points and the additional aluminium intake pipe supports has been enabled through the use of a new shape and improved mounting possibility.

The dimensions of the intake system have also been redesigned to take into account the increased output and torque and therefore the higher air throughput of the 3.8 litre engine. The same essential intake system design with distributor pipe, switchable resonance tube, lateral reservoirs and individual intake pipes as is used in the 3.6 litre engine has been retained.

Intake pipes with a constant cross section have been used to achieve the specific output and torque characteristics of the 3.8 litre engine. In contrast, conical intake pipes are used for the 3.6 litre engine.

As with the familiar 3.6 litre engine of the 911 Carrera MY 04, the resonance intake system of both the 3.6 litre engine of the new 911 Carrera and the 3.8 litre engine of the 911 Carrera S is designed in two stages with a switchable resonance flap in the transverse resonance tube between the suction distributors.

This switchable, two-stage resonance intake system can be used to adjust the air oscillations in the intake system to the respective engine speeds and the better volumetric efficiency of the engine ensures high torques even at low rpms, an even torque curve and high maximum output. This is achieved by having the resonance flap closed at full throttle between 2,600 rpm and 5,100 rpm, but open at lower and higher speeds. Temperature compensation similar to that performed when activating the air filter flap is also employed here.

The intake system is complemented by additional resonance chambers integrated in the two suction distributors.

These chambers muffle the resonance noises of the 3.8 litre engine in the rev range between 5,000 rpm and 6,000 rpm and make a significant contribution to the harmonious and powerful sound of the 3.8 litre engine when the throttle is fully open. The resonance chambers are connected with the respective intake reservoirs via a multitude of circular openings whose cross section and number have been matched to requirements.

2.3.11 Exhaust system

The design of the exhaust system in the new 911 Carrera S (3.8 litre) and 911 Carrera (3.6 litre) largely corresponds to that of the 911 Carrera (3.6 litre) MY 04, with two separate exhaust tracts including manifold, catalytic converter and silencer.

The use of thin-wall technology for the pipes, catalytic converters and silencers has permitted a reduction in weight of approx. 12.1 lbs in comparison with MY 04. The exhaust system has also been executed in stainless steel, which increases its service life.

The 3.6 litre Carrera engine from MY 04 complied with the European Euro3/D4 emission classification as well as the American LEV emission classification. The new 3.6 litre and 3.8 litre engines also now comply with the stricter EU4 emission standard. This has been achieved through the use of a two-stage catalytic converter and, additionally for the 3.8 litre engine, a high-performance manifold.



Fig. 16: Exhaust system

Compared to the standard manifold of the 3.6 litre engine, the new high-performance manifold of the 3.8 litre engine permits better mixing and hence better preconditioning of the raw emissions before they are passed on to the catalytic converter.

To ensure compliance with country-specific noise regulations, three different silencer variants are used on both the 3.8 litre engine and the 3.6 litre engine (as with MY 04) .

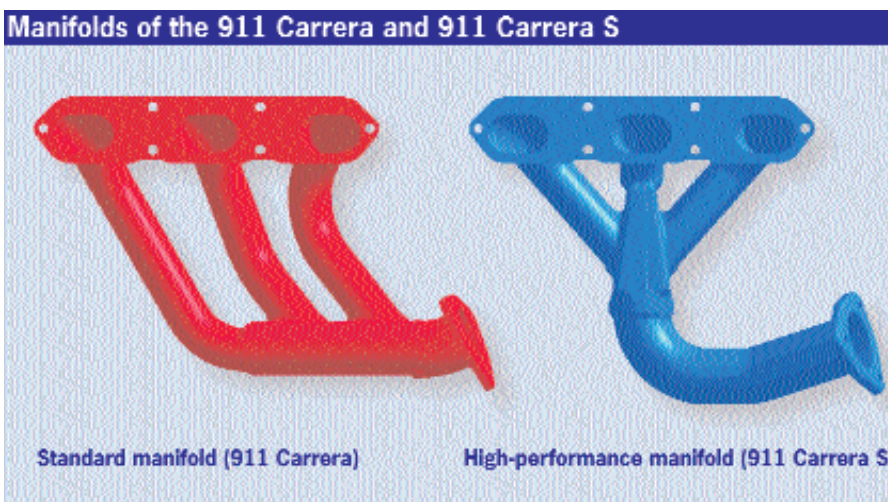


Fig. 17: Comparison of standard and high-performance manifolds

The exhaust system of the new 3.6 litre 911 Carrera is finished off by two individual tailpipes with a redesigned shape. As well as being an integral part of the exhaust system, they also serve to differentiate the 911 Carrera from the new 911 Carrera S, which has dual tailpipes.



Fig. 18: 911 Carrera and 911 Carrera S tailpipes

Overview of exhaust systems for the 911 Carrera and 911 Carrera S

	3.6 litre engine	3.8 litre engine
Manifold	Standard manifold	High-performance manifold
Catalytic converter	Cascade catalytic converter	Cascade catalytic converter
Silencer	Interior designed for 3.6 litre engine	Interior designed for 3.8 litre engine
Tailpipes	Two single tailpipes	Two dual tailpipes

2.3.12 Ignition and injection

The new 911 Carrera and 911 Carrera S models feature the well-known static high-voltage ignition system with individual ignition coils which offers the following advantages:

- High level of ignition safety
- Minimum electromagnetic interference with other electronic components
- No requirement for ignition cables and distributor ignition

New injection valves with modified injection angles are used to help reduce pollutants and to ensure compliance with the emission classification (LEV/EU 4).

2.3.13 Engine management

Like the 911 Carrera MY 04, the new 911 Carrera and 911 Carrera S are equipped with the familiar engine management system Motronic ME 7.8. Innovations here include increased computing power and greater memory capacity. These enhancements are required on both models to facilitate the enhanced OBD II scopes.

As well as offering the familiar functions, Motronic ME 7.8 also processes and controls the following functions for the new 911 Carrera and Carrera S models:

- Sport Chrono Package Plus (optional)
- Variable control of radiator fans

OBD

The familiar On-Board Diagnostics system (OBD II) is also used on the 911 Carrera and 911 Carrera S models. This system is designed to warn drivers anywhere in the world, via an appropriate signal in the instrument cluster,

of any emission- or engine-related faults. Each system is fully compliant with all national legislation.

The On-Board Diagnostic system used for the new 911 Carrera and 911 Carrera S models for model year 05 is an enhancement of the old system.

The additional functions required specifically for California include:

- More complex sensor diagnostics:
The operating range and plausibility of emission-related sensor signals such as ambient pressure, oil temperature, ambient temperature, etc. must be verified.

- Larger number of fault paths:
Each fault type of a signal fault must be stored in a separate fault path.

- Enhanced field monitoring of the vehicle fleet:
The function and fault management systems of the diagnostics system must be tested every year on standard production vehicles and documented.

2.3.14 Sport Chrono functions of the engine

A Sport Chrono Package Plus that helps to significantly increase driving pleasure and performance is available as an option for the new 911 Carrera and Carrera S. A detailed description of the entire functions of the Sport Chrono Package Plus can be found in the section "Chassis".

The Sport Chrono system even affects the engine, by implementing the following features:

- More sporty load cycle behavior
- More abrupt high speed cut-off
- More dynamic acceleration pedal characteristic

The Sport Chrono function lends a sportier feel to the transitions between traction and overrun as well as between overrun and traction. This means that injection and ignition are switched on and off more directly when accelerating and particularly when decelerating, resulting in a more spontaneous and dynamic load cycle.

To increase driving comfort a 'gentler' cut-off is generally used when accelerating and reaching the speed limiter setting. In the process the throttle is continuously closed when approaching the limit range for speed.

The Sport Chrono function facilitates additional acceleration potential through the use of an abrupt high-speed cut-off by switching off individual cylinders (injection and ignition) in a rotating fashion just shortly before the speed limit. The perceptible limit of acceleration lets the driver know if an upshift is executed too late. This allows the driver to learn how to identify the optimum shift point with more accuracy and use the full potential of the engine for acceleration.

When the Sport Chrono button is pressed, the abrupt cut-off is active in 1st to 5th gears for the manual gearbox (without Sport Chrono function only in 1st and 2nd gears) and in the manual gate "M" for Tiptronic transmission.

The electronic accelerator pedal (electronic throttle) has been used on the 911 Carrera models since MY 01. With this system, the accelerator pedal position is converted into electrical signals via potentiometers and forwarded as a control signal to the electromechanical throttle via the Motronic control unit. The “conversion” between accelerator pedal angle and throttle angle is performed in the Motronic control unit. Sensitivity and hence driveability in the lower speed and load range are factors here, as is even transmission across the entire pedal or throttle travel.

When the Sport Chrono button is active, a more dynamic accelerator pedal characteristic produces a more spontaneous engine response, underpinning the sporty character. This is achieved via a steeper rise for the electronic throttle characteristic by means of a shorter “conversion” between accelerator pedal and throttle angle. This means that the throttle is opened further or faster with the same accelerator pedal travel and selected Sport Chrono function (with Tiptronic S only in the manual “M” position).

2.3.15 Fuel system

The fuel tank in the new models is also ventilated via an active charcoal canister. This is rinsed during driving, controlled by the Motronic system. The tank ventilation system fulfils the respective requirements worldwide with regard to preventing fuel vapour emissions. The release of fuel vapours into the environment has been further reduced for both the plastic safety tank and the plastic line system. The new fuel delivery unit integrated in the tank is designed to allow the fuel volume stored in the tank to be

used without misfires, even in dynamic driving situations (some misfiring may occur with residual fuel quantities).

2.3.16 Cost of ownership

A reduction in maintenance costs has been achieved through the introduction of extended change intervals for oil, air filters, spark plugs and V-belts, the rerouting of the water lines and the use of quick couplings throughout the cooling system pipework.

Maintenance intervals:

The change intervals have been extended as follows:

- Oil change
from 12,000 miles to 20,000 miles
- Air filter change
from 24,000 miles to 40,000 miles
(modified filter element)
- Spark plugs
from 36,000 miles to 60,000 miles
(modified spark plug type)
- Poly V-belt
from 48,000 miles to 80,000 miles

Repair costs:

The new line layouts for the radiator in the front end and the reworking of the radiator connections have reduced the sensitivity of the new 911 Carrera and 911 Carrera S to damage and hence reduced repair costs. Furthermore the use of quick couplings throughout the cooling system pipework has reduced the amount of repair work required in the event of damage, again resulting in lower repair costs. Finally the new shape of the headlight design makes it less sensitive to damage.

3 Gearbox

3.1 Manual gearbox

Gearbox type

The new 911 Carrera and 911 Carrera S, like the 911 Carrera MY 04, feature a 6-speed manual gearbox as standard. In fact both new models use the same, new gearbox. The new 6-speed manual gearbox was necessary to facilitate the increase in torque capacity and to compensate the larger wheels. The clutch system in the two models is different.

Gearbox structure

The new 6-speed manual gearbox uses the traditional design elements of a manual gearbox in its fundamental structure. A new feature is the use of a gear set shell made of thin-cast aluminium. This shell-like lining around the gear sets reduces the oil dilution and drag losses and increases the efficiency of the gearbox. This and other minute improvements have a favourable effect on thermodynamics and fuel consumption.

Transmission ratios

The new models have the same ratio spread as the 911 Carrera MY 04. However the larger wheels and 5% larger rolling circumference (rear) on the new models mean that the individual gear transmission levels have had to be reduced by this percentage. This design results in a sporty setup for the new models and enables high performance with optimum exploitation of the engine torque and the maximum output. The performance potential of the Carrera S, particularly when accelerating and lugging, is emphasised through the use of the same transmission ratios as on the 911 Carrera.

Shift lever ratio

A shift throw reduction of 15% has been achieved on the new 911 Carrera models with the same ergonomics by moving the deflection point on the shift lever. Nonetheless, the shifting forces have been kept constant or reduced thanks to extensive development work to optimise friction in the shift transmission compo-

nents within and outside of the gearbox. Additionally the play in the shift module of the gearbox has been reduced, resulting in a more precise gearshifting gate.

Synchronisation

In contrast to the existing manual gearbox in the 911 Carrera MY 04 which uses brass synchronisation rings, the new 6-speed manual gearbox uses steel synchronisation rings with a higher load-carrying capacity in all gears. For the first time at Porsche the rings for first, second and third gear have been given a wear-resistant carbon coating.

Synchronisation itself is performed three times in 1st and 2nd gear (911 Carrera MY 04: twice), twice in 3rd gear (911 Carrera MY 04: once) and once in 4th to 6th gear (likewise for the 911 Carrera MY 04). These multiple synchronisations improve overall synchronisation which facilitates the realisation of the 15% reduction in shift throw with the same or reduced shifting forces.

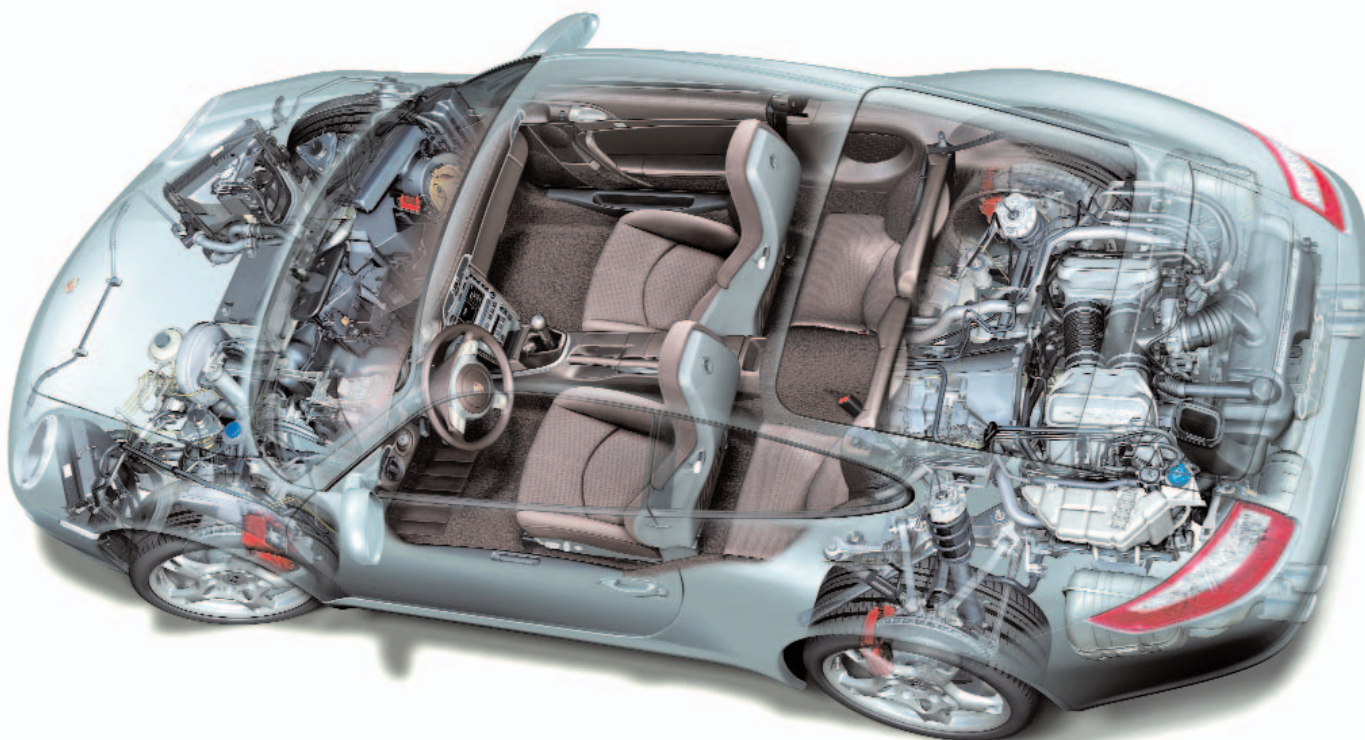


Fig. 19: Ghost view of the 911 Carrera S



Fig. 20: Gearshift knob of the 911 Carrera

Dual-mass flywheel

The proven dual-mass flywheel with its traditional design has been adopted for the new 911 Carrera and 911 Carrera S models.

Clutch on the 911 Carrera

The new 911 Carrera with 3.6 litre engine uses the familiar single-plate dry clutch with lead-free clutch lining.

Clutch on the 911 Carrera S

The 911 Carrera S with 3.8 litre engine has been upgraded with a self-correcting X-Tend clutch. The X-Tend clutch constantly registers the decrease in pad thickness and compensates the difference in distance caused by pad wear by rotating an adjusting ring. This has the advantage of halving the growth in force that increases over the operating period until the limit for wear is reached in comparison with a conventional clutch.

Gear shifting

The proven cable-operated gearshift with two pull-push cables is used in the new 911 Carrera and 911 Carrera S also. This ensures a vibration-free gearshift knob and smooth shift operations combined with low weight.

3.2 Tiptronic S

3.2.1 Basics

The new 911 Carrera and 911 Carrera S use the tried-and-tested 5-speed Tiptronic gearbox from the 911 Carrera MY 04. The torque and performance potential of this gearbox covers even the higher requirements of the new engines. The shift pressures have been increased to adapt to the transmission of the higher torques, in particular those of the 3.8 litre engine. An improvement in shifting comfort has been achieved through the fine-tuning of oil pressure build-up during the course of shifting.

Overview of changes in comparison with Tiptronic S from MY 04:

- New ATF light-running oil resulting in longer oil change interval
- Modified plates resulting in improvement in shifting comfort
- Modified torque converter characteristic curve
- Abolition of rpm limitation in “P” and “N”
- Adaptation of the ratios to produce a ratio spread identical with MY 04
- Suppression of upshift with ‘PSM OFF’ and selector lever in the manual gate
- Additional Sport Chrono function resulting in shorter shifting times
- Extension of the oil change interval from 96,000 miles to 120,000 miles

As a model improvement, all Tiptronic gearboxes in the 911 series for MY 05 use a new ATF light-running oil as well as modified plates. The modified plates improve shifting comfort and the light-running oil reduces friction losses in the gearbox. The new ATF light-running oil also enables the oil change intervals



Fig. 21: Tiptronic S selector lever

to be extended from 96,000 miles to 120,000 miles.

Improved acceleration values with more spontaneous revving of the engine are achieved through a modified converter characteristic curve with a higher standstill rpm.

Ratios

The vehicle ratio spread (gearbox, wheel/tires) of the 911 Carrera MY 04 has been retained for the new models to ensure attractive performance and high driving dynamics. However the transmission ratio has had to be adjusted since the dynamic tire rolling circumference of the new 911 Carrera and 911 Carrera S was increased by 5% (to facilitate a 19-in wheel). This adjustment was achieved by reducing the spur pinion ratio by 5%. This sporty ratio spread enables the new models with Tiptronic S gearbox to reach their top speed in the highest gear.

Electro-hydraulic control

The existing gearshift strategies of Tiptronic S will be largely adopted for the new 911 Carrera and 911 Carrera S. These will be complemented by the new special function Sport Chrono as well as modified shifting functions for when the PSM function is OFF.

The automatic program provides the familiar programs which are activated automatically or via the corresponding driving strategy:

- Warm-up program for rapid heating of the engine, gearbox and catalytic converters
- Basic gearshift program for economical driving
- Sport program for sporty driving

The shift points are continuously adjusted between the basic gearshift program and the sport program to match the driving strategy. The additional sport gearshift program for rapid downshifts is activated in response to rapid throttle movements, even without kickdown.

The automatic program is also influenced by the following special functions:

- Suppression of upshifts during rapid throttle lift, for example before a corner
- Earlier downshifts when braking depending on the driving speed and deceleration
- Adjustment of the shift points due to incline detection. Here gradients or ascents are identified by comparing the actual and desired acceleration.

- Adjustment of the shift points as a function of the topographical elevation
- Suppression of upshift in corners depending on the driving speed and lateral acceleration

Despite all of the functions listed above, there will be driving situations in which it makes sense to be able to manually override the automatic program via the one-touch switches on the steering wheel. This function is also integrated, i.e. pressing one of the switches on the steering wheel will execute the corresponding function even if the selector lever is in position "P". The selected gear is maintained for at least 8 seconds. The holding time is extended depending on the driving conditions (overrun and lateral acceleration). The system then automatically switches back to automatic mode. Kickdown

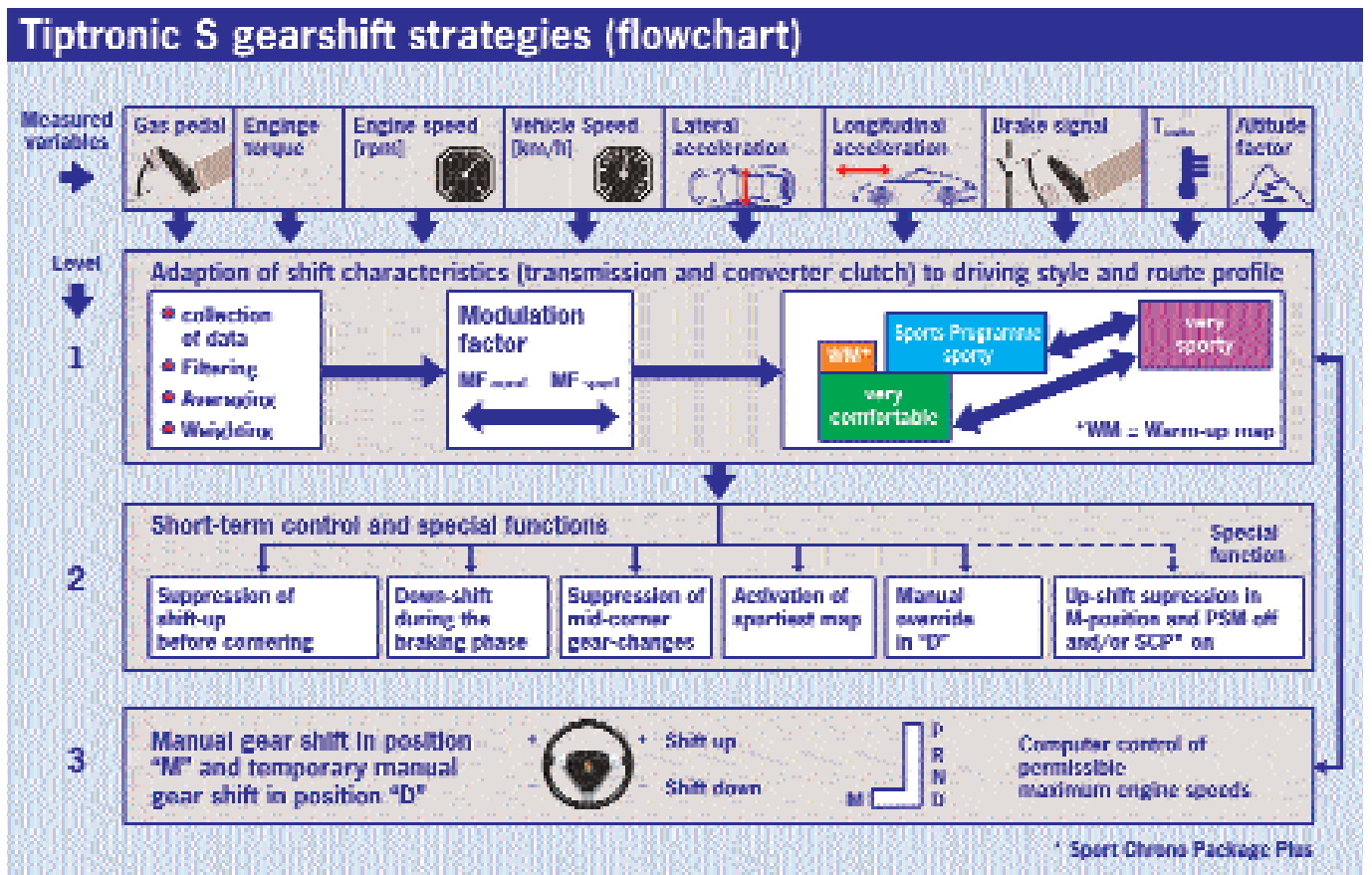


Fig. 22: Tiptronic S gearshift strategies



Fig. 23: Tiptronic rocker

results in an immediate return to the automatic program.

The selector lever must be moved to position M if the driver wishes to select the gears. The gears are changed using the one-touch switches on the steering wheel. In this case the permissible shifting speeds are monitored and the gearshift only executed if the engine speed limits are adhered to. Exceeding the engine speed limit will result in an automatic upshift if PSM is switched on.

PSM OFF

The new 911 Carrera and 911 Carrera S are equipped with an upshift suppresser that can be used when PSM is off and the selector lever is in the M position to emphasise the sporty character of the Tiptronic S. Upshifts are prevented when the engine speed limit is reached in the "M" position, allowing the engine to run in the range of the speed limiter. A detailed description can be found in the section "Sport Chrono function".

Reving

This function initiates revving for downshifts in overrun state through automatic operation of the accelerator to reduce

shifting times, improve shifting comfort and to actively prevent the rear wheels locking. Examples of downshifts in overrun state include automatic downshifts when braking or downshifts activated manually via the one-touch switches on the steering wheel.

The function EDTC (engine drag torque control) also stops the rear wheels locking as part of PSM, however it does so in response to detection of impermissibly high rear-wheel slip. The revving function via Tiptronic S on the other hand proactively prevents locking of the rear wheels with downshifts in overrun state.

Full-throttle startup

With full-throttle startups, the torque converter lockup clutch is closed in first gear to produce higher acceleration potential, thereby reducing the slip. A further improvement in acceleration when shifting from first to second gear has been produced by increasing the rpm of the shift point (from approx. 5,800 rpm to 6,300 rpm), thereby realising a higher shifting speed (7,200 rpm instead of 6,900 rpm) and a shorter shifting time.

Cruise control (optional)

A further new function of Tiptronic S for the new 911 Carrera and Carrera S is automatic downshifting when travelling downhill with the cruise control function selected. Previously, acceleration of the vehicle could occur in high gears when travelling downhill (without manual downshifting by the driver) despite a cruise control function being selected. The new downshift function in cruise control mode ensures a constant speed, even when travelling downhill.



Fig. 24: Center console

3.2.2 Sport Chrono function

The Sport Chrono Package Plus is offered as an option on the new 911 Carrera and Carrera S. This package increases sporty driving pleasure and performance, particularly on circuits. A detailed description of all functions can be found in section 4 “Chassis”.

Shift position “D”

The special functions of Tiptronic S with Sport Chrono Package Plus include the following functions in automatic mode:

- **Boosted basic gear-changing map**
The upshift and downshift speeds are higher. For example, upshifts only occur over approx. 3,000 rpm.
- **System downshifts**
System downshifts are executed with significantly less deceleration and at higher speeds than in “normal mode”.
- **Shifting quality**
Markedly sporty shift operations
- **Shifting times**
Shorter shifting times

These functions convey greater agility and a sportier shift response. Boosting the basic gear-changing map results in an increase in the shifting speed level with the Sport Chrono function. The shift points are then adjusted between this boosted basic gear-changing map and the sport gear-changing map. System downshifts are initiated with lower acceleration and higher speeds (in comparison with when the Sport Chrono switch is off) to increase agility.

Shift position “M”

The special functions in manual one-touch mode are complemented by the following function:

- **Suppression of upshift**

No automatic upshifting when the engine speed limit is reached.

This function enables extreme drivers to drive more easily in the drift in this position (particularly on ice and snow). Undesired upshifting ahead of bends is suppressed.

Automatic upshifts upon reaching the engine speed limit are prevented in the shift position “M”. This function allows the driver to operate the engine in the range of the engine speed limiter for the first time, even on vehicles with Tiptronic. This reinforces the sporty character of the Sport Chrono function. Suppression of upshift is only active in one-touch mode in the shift position “M”, not in the shift position “D”, i.e. not in one-touch mode for temporary override.

Suppression of upshifts at the engine speed limit can be cancelled by means of a kickdown. If the engine speed limit is reached (e.g. during an overtaking manoeuvre in the M position), an upshift can be executed even without pressing

the switches on the steering wheel by means of a kickdown. The engine can then continue accelerating to the next gear. Important: this is the only function where a kickdown results in an upshift rather than a downshift. It turns the kickdown switch into an intelligent “kick” switch.

4 Chassis and transmission

The chassis of the new 911 Carrera corresponds to that of the previous model from a design point of view. The main objective when it came to tuning the chassis was a further increase in performance. The revised chassis tuning gives the new 911 Carrera much sportier performance than the previous model, without affecting the superior driving comfort.

The dramatically increased performance of the new tire generation in particular means that the new 911 Carrera can transmit significantly higher forces to the road in longitudinal and transverse direction. This results in increased requirements for the chassis as a whole and particularly for the axle components.

In addition to the basic chassis, the following chassis option is available for the 911 Carrera:

- PASM chassis (−0.39 in):
Porsche Active Suspension Management, standard on the 911 Carrera S

For details see section 4.5

4.1 Front axle

The front axle concept for the new 911 Carrera has been largely retained from the previous model. However some components of the front axle have been redeveloped to take account of the increased performance and to further increase crash safety. As part of this redevelopment, the track of the front axle has been increased by 1.18 in in comparison with the previous model. This measure, together with the larger and wider tires, helps to further reduce

the tendency of the body to tilt, particularly when the vehicle's performance is exploited to the full, thereby improving support against transverse forces. This permits higher lateral acceleration.

The following modifications have been made:

- Front-axle cross member:
The front-axle cross member has been newly developed for the 911 Carrera. The design has been completely revised based on crash requirements, particularly in an offset crash. At the same time, the cross member has been widened by 0.59 in on each side. This has allowed the axle attachment points to be moved out by 0.83 in to widen the track.
- Pivot bearing:
The design of the front-axle pivot bearing has been modified to optimise the supply of cool air to the brake. This measure, together with an enlarged brake air deflector which clips into the cross member, has resulted in an improvement in brake cooling. The front-axle pivot bearing in the new 911 Carrera is now cast as a hollow instead of a solid to reduce weight.
- Wheel bearing:
Reinforced wheel bearings with a larger diameter are used in order to reliably transmit the increased forces generated by the higher performance. They offer the major advantage of firmer wheel guidance in the transverse direction and therefore contribute to the extremely precise driving behavior.

- Trailing link/control arm mount:

The previous conventional rubber-bonded bushing which connected the trailing link and control arm has been replaced by a hydraulic bushing to increase driving comfort. This bushing links the conventional damping system with a fluid damping system. The hydraulic fluid can flow through the bushing from one chamber to the other via a channel for effective damping. This ensures that high-frequency vibrations are suppressed more effectively and therefore fewer disruptive vibrations are transmitted to the steering. Steering precision remains at the highest level.

4.2 Steering system

The new 911 Carrera uses hydraulically-assisted rack-and-pinion steering with variable steering ratio. The idea behind using this steering system has been to increase the agility of the vehicle, particularly on routes with a lot of corners, while at the same time retaining the high level of driving stability at very high speeds. The ratio around the center position, i.e. for small movements of the steering wheel, remains similar to that of the previous 911 Carrera model. As a result the vehicle remains very smooth, particularly at high speeds, and does not react skittishly if the driver unintentionally turns too acutely to avoid something on the road. The steering ratio becomes increasingly more direct with steering wheel movements of more than approx. 30° (up to 13.8:1 for a steering wheel revolution of more than three-quarters). This is realised by means of a rack with variable tooth pitch. The steering wheel revolutions from stop to stop have thus been reduced from 2.98 on the previous 911 Carrera to 2.62 on the new model.

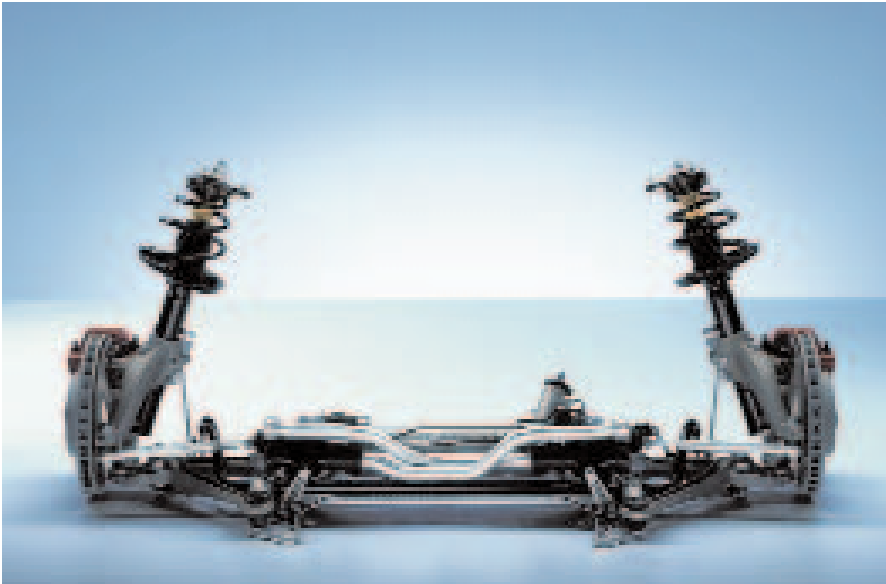


Fig. 25: Front axle

This results in significantly greater agility when driving on routes with a lot of curves and particularly in tight corners. It also improves handling when turning in city traffic since the steering response is much more spontaneous. Parking is also easier since the greater the steering wheel angle relative to the steering, the harder the wheels turn. The turning circle of 35.8 ft is also similar to the previous model (34.8 ft), despite the larger wheels.

A further new feature is manual steering wheel height adjustment. In addition to the existing 1.57 in reach adjustment, the steering wheel is now also height-adjustable by 1.57 in (measured in extended state). This provides the driver with considerably more options for adjusting the steering wheel according to their specific requirements, thereby ensuring an optimum seat position and a better view of the instruments. The lever for locking the selected position is located underneath the steering column.

The steering wheel lock (steering lock) has been changed from mechanical to electric. It is a component in the networked immobiliser system and offers

increased anti-theft protection. It has also increased convenience since the electric steering wheel lock detects whether the steering cable is strained when the wheel is locked. When the ignition key is turned in the lock, the strain is detected and reported to the driver via a text message (“Unlock steering”) in the display in the instrument cluster. The driver can then respond by turning the steering wheel slightly to release the strain. This prevents the ignition key “sticking” when turned in the lock with locked steering.

All rotating components of the steering system (including the upper and lower steering shaft) are now made from aluminium to optimise weight. The adjustment mechanism also comprises magnesium and aluminium die-cast parts. This consistent use of light-weight construction techniques has allowed the overall weight of the steering system to be kept to a minimum, despite the additional adjustment mechanism.

To facilitate the wider track of the new 911 Carrera, each of the tie rods has been lengthened by 0.59 in.

4.3 Rear axle

The existing LSA multi-link rear axle (Light, Stable, Agile) from the previous 911 Carrera model has been enhanced for the new 911 Carrera. The LSA concept makes a vital contribution to exemplary driving stability, particularly when accelerating and braking as well as changing lanes sharply and changing the load in corners. As with the front axle, the track at the rear axle has been widened by 2.13 in (on equal wheel size) to improve the handling of the vehicle and the rigidity of individual axle components has been increased. This, together with the new generation tire, has enabled higher lateral accelerations overall to be achieved. It has also increased tire comfort at the rear axle.

A reworked kinematic mechanism (with displacement of the axle attachment points) has significantly reduced vehicle deflection when accelerating (starting pitch compensation increased by 25%) and therefore further improved driving behavior. The main objective of re-designing the rear axle components was to increase transverse rigidity while at the same time reducing weight through the consistent use of light-weight construction techniques.

The following component modifications have been made:

- Subframe (axle-side section):

The subframe, based as before on an aluminium frame structure, has been newly developed for the new 911 Carrera and made more rigid, particularly in the transverse direction.

This redesign has coincidentally resulted in a weight reduction of 10% (approx. 2.2 lbs). The attachment points of the upper control arm have also been moved up a further 0.39 in and



Fig. 26: Chassis of the 911 Carrera

the attachment points of the lower control arm moved down a further 0.20 in (enlarged camber basis). This provides increased rigidity against transverse forces, which are introduced into the vehicle via the wheels.

- Wheel carrier:

The aluminium wheel carrier has also been newly developed. The two main objectives here were to increase rigidity and reduce weight. The objective of weight reduction was achieved by making the wheel carrier hollow instead of solid as was previously the case. This is done using permanent mould casting with a sand core and results in a weight saving of 10%. The relocation of the stabiliser attachment points from the suspension strut to the wheel carrier has increased the transmission ratio of the stabiliser. The stabiliser responds more directly as a result, which more effectively reduces the tendency of the vehicle to tilt when cornering.

- Suspension strut and support bearing:

To reduce weight, the steel suspension strut has been replaced by a light-weight suspension strut with a single-pipe aluminium damper. This new strut



offers a considerable weight saving of approx. 70% in comparison with the previous single-pipe damper made of steel.

The main way in which tire comfort has been improved is through the use of new support bearings with optimised shock absorption characteristics. These new bearings are around 45% lighter than the traditional steel and rubber supporting bearings of the previous model.

Detailed information on the rear axle concept can be found in the Product Information for the 911 Carrera MY 02.

4.4 Brake system

4.4.1 911 Carrera

The new 911 Carrera uses the same outstanding brake system as the previous model, albeit with some improvements.

Black anodised 4-piston monobloc fixed calipers at the four wheels sandwich the perforated and internally ventilated brake discs in the familiar way. Minute optimisations have been carried out with the objective of further improving both brake response and brake cooling. The boosting factor of the brake booster has been increased by 17% in comparison with the previous model. This means that less force has to be applied when braking and more a spontaneous brake response is produced than was previously the case. Brake ventilation has been improved in comparison with the previous model through a new front-axle wheel carrier design, a 30% larger brake air deflector and an optimised underbody lining.

The end result is a very stable brake system with a spontaneous response and low operating forces, whose performance significantly surpasses the vehicle acceleration, i.e. the maximum braking power is a multiple of the maximum drive power.

The dimensions of the Carrera brake can be found in the table on page 35. Further information on the brake system of the 911 Carrera can be found in the Product Information for the 911 Carrera MY 02.

4.4.2 911 Carrera S

Due to its increased performance, the Carrera S uses a brake system with extra power boosting. It is based on the brake system of the current 911 Turbo.

This brake system offers an enhanced pedal feel with a more precise working point than the basic model. This has mainly been achieved by enlarging the diameter of the brake master cylinder from 0.94 in to 1.00 in. As on the basic model, the boosting factor of the brake booster has been increased by 17% to ensure a spontaneous braking response on the Carrera S model also.

The 911 Carrera S model has larger, reinforced 4-piston monobloc fixed calipers at the front and rear axle. They are painted red to distinguish them from the calipers on the basic model. The internally ventilated and perforated brake discs have also been enlarged, to 12.99 in x 1.34 in (diameter x width) at the front axle and 12.99 in x 1.10 in at the rear axle. The use of larger brake pads in comparison with the basic model increases the effective total brake pad surface by approx. 24% at the front axle and 30% at the rear axle, which benefits braking power, fading stability and the service life of the brake pads.

The brake system is perfectly matched to the Carrera S in every regard and thereby contributes to the excellent performance of the S model.

The dimensions of the Carrera S brake can be found in the table on page 35.

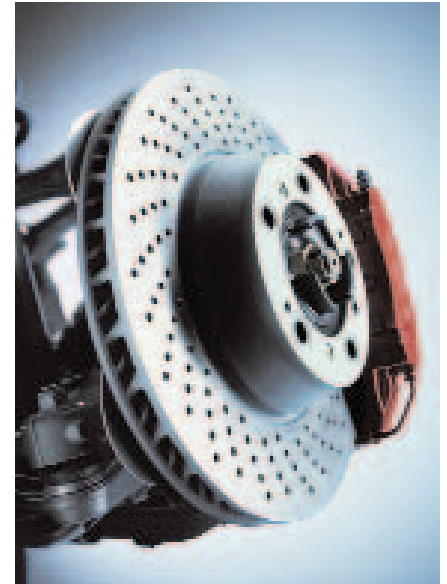


Fig. 27: Brake system of the 911 Carrera S

4.4.3 Porsche Ceramic Composite Brake (PCCB)

The Porsche Ceramic Composite Brake (PCCB) is now available as an option (I-No.) for the first time for the 911 Carrera and Carrera S.

The PCCB offers a further increase in performance in comparison with the standard brake system of the 911 Carrera S.

The main advantages of the PCCB are:

- Faster response
- Very high fading stability thanks to consistently high friction values
- Large safety reserves, even under extreme loads
- Approx. 50% reduction in the rotating mass and unsprung weight compared to grey cast iron brake discs of the same type and size
- Long service life of brake components

The PCCB is the result of years of experience on the part of Porsche as a technological leader in the field of brake systems and is based on carbon fibre-reinforced ceramic brake discs with inner cooling ducts with an optimised shape as well as specially matched brake pads made from a composite material. The ceramic brake discs are manufactured by silicating specially treated carbon fibres in a vacuum process at around 1,700 degrees Celsius.

The new Carrera is the first vehicle to use the new optimised ceramic brake discs. The most important changes concern the shape of the inner cooling ducts and the material composition:

The familiar evolutive shape of the inner cooling ducts has been modified to

increase the ventilation effect of the rotating disc. This results in higher air throughput and better brake cooling than with evolutive cooling ducts. The inherent rigidity of the disc has been increased through a larger number of cooling ducts. This significantly reduces the disc deformation caused by high pad contact forces. Finally abrasion resistance, particularly under high loads, has been significantly increased by optimising the fibre reinforcement in the friction surface of the brake discs.

For the customer these improvements mean increased performance, increased braking comfort and a much longer service life of the brake system.

The brake package comprising ceramic discs with 13.78 in diameter at all four wheels and composite brake pads, together with the yellow 6-piston aluminium monobloc fixed calipers at the front axle and 4-piston aluminium monobloc fixed calipers at the rear axle, ensures high and, above all, constant friction values – whether the brake system is hot or cold. This provides a good foundation for a short braking distance under very high loads.

The PCCB sets definite standards in the areas of weight, fading stability and responsiveness. The ceramic disc is perforated and internally ventilated like conventional grey cast iron brake discs, but weighs approx. 50% less than a grey cast iron disc of the same design and size. Since this weight reduction refers to the unsprung weight, as well as having a positive effect on weight and consumption it actually improves driving behavior with regard to handling, road holding and comfort.

The PCCB retains its excellent fading stability even under extreme loads to offer a high level of safety, particularly when braking from high speeds. The new brake system also exhibits excellent characteristics in relation to braking response with considerably reduced pedal force requirement.

A further decisive advantage of the PCCB is its long service life. Abrasion of the ceramic brake disc is exceptionally low due to the disc's extreme surface hardness in comparison with a grey cast iron brake disc. The new brake pads also have a long service life. However wear on the components of the brake system, particularly pads and brake discs, is very much dependent on how the vehicle is driven and the conditions of use and cannot therefore be expressed in the form of a guaranteed mileage.

As a result of its great fading stability and particularly its very low weight, the PCCB is ideal for use at high temperatures and even for driving on the circuit. It is on the circuit or as a result of similar extreme driving that wear on the brake, and in particular on the brake pads, will increase sharply. After an intensive weekend on the race track, as in the case of high-performance steel brakes, the brakes will need to be checked by a technician and worn components may need to be replaced.

As a technical innovation, the PCCB offers a high level of quality, safety and driving pleasure, even under extreme driving conditions, thanks to its characteristics of reducing the unsprung weight, its consistently high friction values and its low wear.

Dimensions Brake Systems	Disc diameter x width (in)	Pad area per brake pad (sq. in.)
911 Carrera		
Front axle:	12.52 x 1.10	9.85
Rear axle:	11.77 x 0.94	7.60
911 Carrera S		
Front axle:	12.99 x 1.34	12.17
Rear axle:	12.99 x 1.10	9.85
PCCB		
Front axle:	13.78 x 1.34	17.36
Rear axle:	13.78 x 1.10	9.85

4.4.4 Parking brake

The parking brake for both models retains the essentials of the design from the previous model.

4.5 Porsche Active Suspension Management (PASM)

The new 911 Carrera is the first vehicle in the 911 series to offer a chassis with actively adjustable dampers. The PASM chassis is standard on the 911 Carrera S and can be ordered as an option on the 911 Carrera. The newly developed, variable damping system “Porsche Active Suspension Management” helps to do justice to the demands for a modern sports car chassis. It has achieved its objective of retaining the comfort level of the basic chassis while simultaneously increasing the performance. In addition to the dynamic functionality, the driver can also choose between two programs (with corresponding gearchanging maps (Tiptronic S)): “Normal” and “Sport”. These programs are selected via a button in the center console.

The function light in the button comes on with the Sport setting. At the same time a damper icon appears in the instrument cluster display together with the text “PASM Sport”. When the normal program is activated, the damper icon appears accompanied by the text “PASM Normal”. The text and icon remain visible for 4 seconds and then automatically disappear.

PASM combines two chassis: one with equal measures of sportiness and comfort and one entirely dedicated to sportiness.

Normal mode (the basic setting when the vehicle starts) provides the same excellent comfort as the standard chassis, while Sport mode activates absolute sportiness and agility. In conjunction with specially developed software modules, the PASM ensures



Fig. 28: PASM button

excellent performance and even greater driving safety in extreme situations.

The PASM chassis is 0.39 in lower than the standard Carrera chassis.

The PASM system comprises the following components:

- Four map-controlled dampers with continuously adjustable damping force (each with one bypass valve)
- PASM control unit
- Two acceleration sensors for detecting vertical movement of the body (one at the damper dome at the front right and one at the rear left). Further signals such as lateral acceleration, steering angle, travel speed, brake pressure, engine torque, etc. are read in via the CAN bus.
- One button for selecting the program (Normal or Sport)

Comparison of PASM characteristics

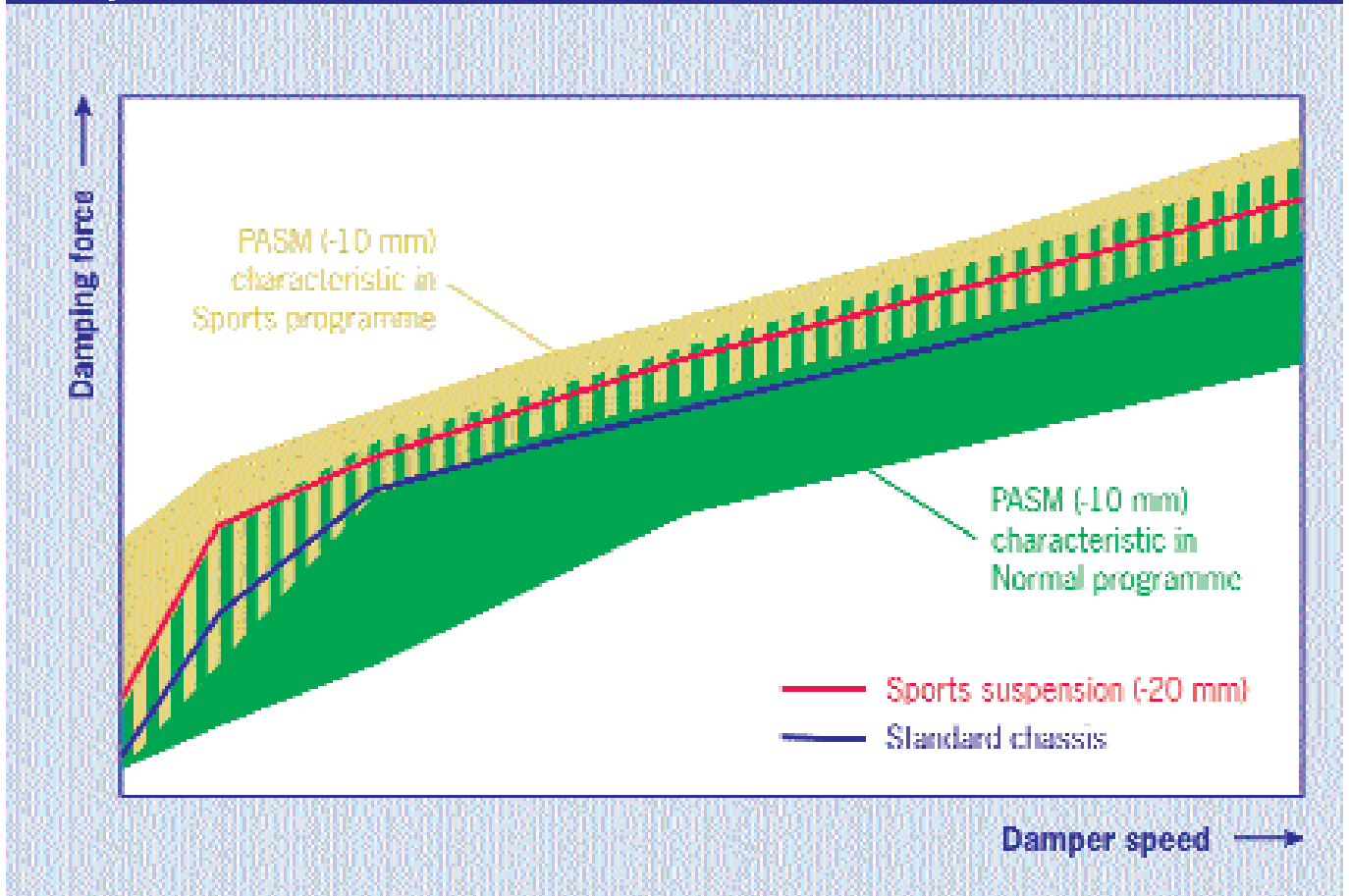


Fig. 29: Damper characteristics of different chassis

How PASM works:

PASM selects the required damper hardness for each individual wheel from a precisely coordinated map in both the Normal and the Sport program. The possible damper settings range from comfortable to decidedly sporty. Both programs, which overlap slightly in some areas, are additionally superimposed with five special software modules to provide the optimum damper settings for every driving condition.

The system automatically selects the appropriate damper hardness based on the PASM programme selected and the driving condition identified. The Normal program offers comfortable settings with comparatively low damper forces. Special control algorithms in the PASM software modules enable the chassis to offer greater active driving safety in

extreme driving situations, even with the Normal programme. To increase driving safety at higher speeds, the dampers are automatically switched to a harder damper setting as speed increases. The dampers switch to a hard characteristic when Sport mode is activated. This offers superior agility and excellent steering precision on uneven surfaces. If the system detects an uneven driving surface in Sport mode, it switches to a softer characteristic in milliseconds to improve contact with the road surface. PASM selects the optimum damper setting for this softer characteristic from the Sport map. Since extremely hard damping is not always the ideal solution in every driving condition (softer damping may prevent bouncing and shifting of the vehicle depending on the driving surface), the intentional overlap between the Normal and Sport maps allows a

noticeably soft setting to be selected even in the Sport map if necessary. The customer gets an active sports chassis which automatically responds to the actual road surface and switches from a hard, sporty damping setting to a comfortable range as necessary. PASM switches back to the original characteristic as soon as the driving situation allows.

PASM contains five software modules which are superimposed over Normal and Sport mode:

- Lane-change module:
The damper forces at both axles are immediately increased in response to rapid steering movements, for example sudden evasive manoeuvres. This reduces body tilt and instability, thereby significantly improving vehicle control even in extreme situations.
- Vertical-control module:
In the Normal program, the damper force is increased as soon as the vertical movement of the body, for example when driving over uneven surfaces, rises over a specific threshold value. This prevents body instability and therefore unresponsive driving behavior. In the Sport program, the damping is slightly reduced automatically to improve contact between the road and the wheels as body movements increase. This also results in a noticeable increase in comfort.
- Lateral-acceleration module:
If specific, speed-dependent thresholds for lateral acceleration are exceeded when cornering in the Normal program, the damper force is increased by different, defined amounts for each side of the vehicle. This prevents vehicle instability and significantly increases driving precision. In the event of large vertical movements and high lateral acceleration coinciding, the higher of the vertical-control and lateral-acceleration damping values is set. This happens if, for example, the damping in the Sport program was previously decreased by the vertical-control module.

- Brake module:
PASM switches to harder damping at the start of a braking operation to reduce vehicle nose-dive when braking (brake driving). The advantage of this is that it enables higher brake forces to be transmitted to the road faster. It switches back to a softer setting (this setting is different for the front and rear axle) after a specific amount of time. The result is improved road contact, and thus a shorter braking distance, particularly when braking on uneven surfaces.
- Load-change module:
The damper characteristics for the front and rear axle are individually switched when accelerating heavily, releasing the throttle or changing lanes. In Normal mode, the dampers are briefly switched to a harder damping setting in these driving conditions. This avoids excessive lifting or diving at the front of the vehicle ("pitching"). In Sport mode, a softer damper characteristic is briefly selected if necessary to improve traction when accelerating, particularly on uneven surfaces.

Principle of the PASM map-controlled damper:

Conventional shock absorbers cannot actively adapt to changing driving conditions. As such, the damper design always represents a compromise between comfort, sportiness and loading state. Neither can they take into consideration the individual driving style. Unlike conventional dampers, the PASM map-controlled damper also has an electrically actuated hydraulic bypass valve.

The damping effect is provided by the oil in the damper flowing through an opening when the vehicle moves. The smaller

the opening cross section, the harder the damping.

With the PASM damper, the oil can flow through a bypass valve as well as through the fixed opening in the main piston. The flow can be increased or reduced by opening and closing the valve via a slide, producing continuous adjustment of the damper force.

In the event of a system failure, the valve automatically closes. PASM is then in the hardest damper setting and thus the safest mode from a driving dynamics point of view (fail-safe principle).

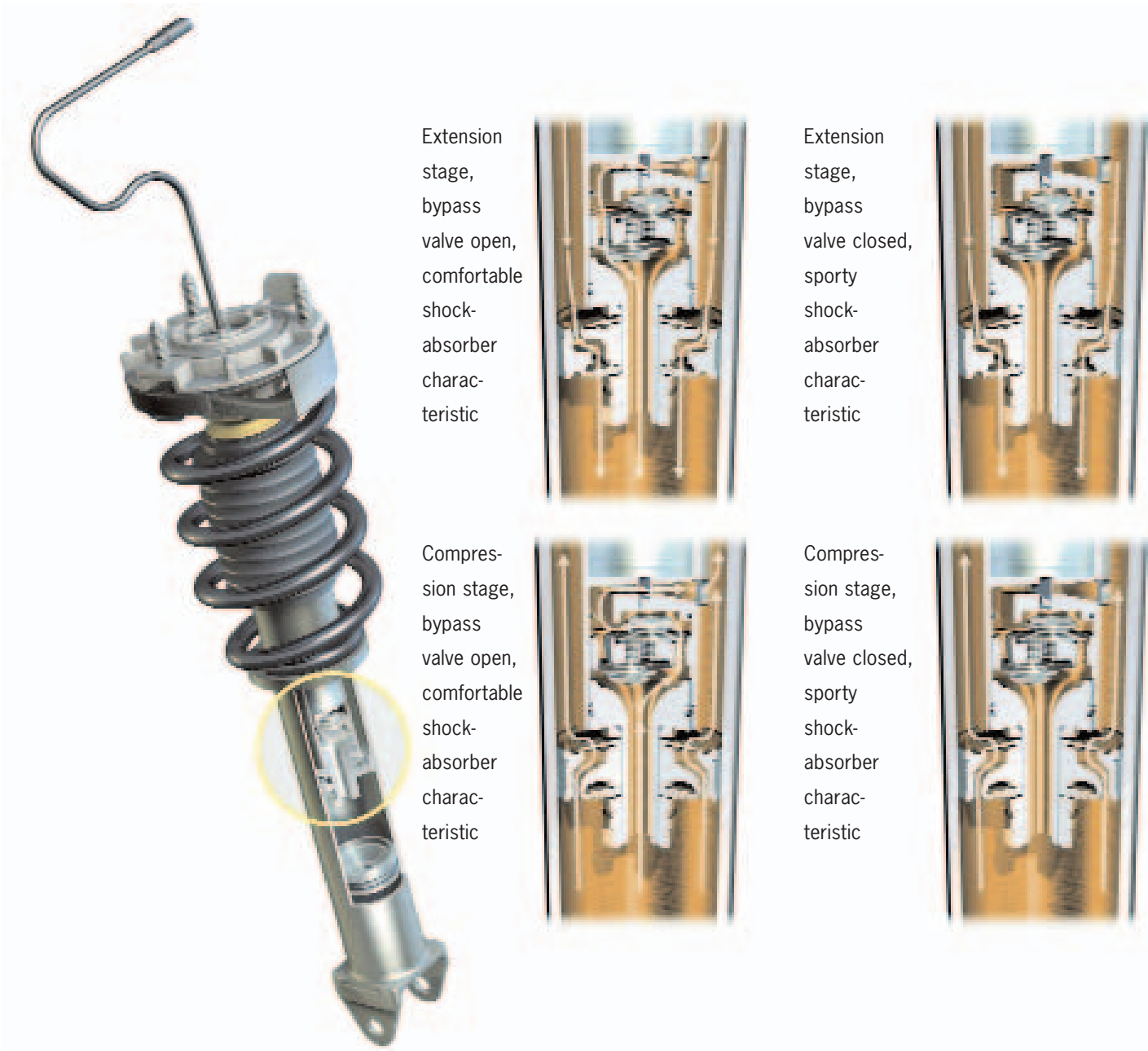


Fig. 30: How the PASM dampers work

4.7 Porsche Stability Management (PSM)

Porsche Stability Management is now standard equipment on the 911 Carrera. It includes the familiar functions ABS (anti-blocking system), ASR (anti-slip regulation), EDTC (engine drag torque control) and ABD (automatic brake differential). It offers very high active driving safety in manoeuvres involving extreme longitudinal and lateral acceleration without affecting the typical Porsche agility and driving pleasure.

A special Sport mode is available for the first time in PSM as part of the optional Sport Chrono Package Plus. This Sport mode facilitates a sportier drive and increases driving pleasure by allowing the driver to switch characteristics or functions in PSM via the Sport button.

The objectives in the development of PSM for the new 911 Carrera were as follows:

The new PSM helps to reduce braking distance, thereby securing Porsche's position as a leader in the field of brake technology. The driver is to be allowed more freedom before PSM intervenes than on the previous 911 Carrera, in particular when PSM is switched off. To this end the system, which is still activated by pressing the brake, should only intervene in real emergency situations.

Control comfort has been noticeably increased and the PSM system weight reduced at the same time. The steering angle sensor previously mounted on the steering system of the 911 Carrera has been replaced by the one from the Cayenne for the sake of standardisation (Porsche carry over parts concept). The new steering angle sensor is located in the steering column module. The ABS

wheel speeds are now determined using a multipole seal directly at the wheel bearings instead of conventional impulse rotors.

PSM can be switched off via a button in the center console (PSM Off button) to increase driving pleasure. As before, ABD remains active when PSM is switched off to ensure outstanding traction when accelerating out of corners and on surfaces with different friction values. The system switch-off is indicated to the driver via the PSM function light in the instrument cluster and the indicator light in the PSM button. A gong also sounds and the text "PSM OFF" appears in the multi-function display in the instrument cluster. The lights go out and the text message "PSM ON" appears when PSM is switched back on. The text messages are displayed for 10 seconds, however they can be acknowledged before this using the on-board computer lever.



Fig. 31: PSM button

More agile setup/modified intervention thresholds:

PSM in the new 911 Carrera offers more individual freedom than before thanks to the further development of its function logic. PSM deliberately waits until the last moment to intervene, particularly at low speeds of up to around 43.75 mph (70 km/h), enabling more agile driving behavior in tight corners. Even when switched off the driver is afforded more freedom than was previously the case.

A new feature is that when PSM is deactivated, control interventions by the system will only be executed when heavy pressure is applied to the brake pedal. To do this, ABS control must be active at one front wheel at least. This affords the sporty driver more scope since gentle pressure on the brake pedal will not result in PSM intervention; the driver can therefore brake into corners without the system intervening. Drivers tend to apply more pressure to the brake in emergency situations which means that PSM can provide assistance when it is needed.

Reduction of braking distances:

A reduction in braking distance has been achieved through the higher control quality of the PSM and the optimised ABS setup in combination with the new tires. The valves used in the previous PSM to regulate pressure in the ABS system were conventional switching valves which enabled regulation in defined, although not very precise, pressure stages. The new continuously adjustable linear solenoid valves used allow virtually infinite and thus more precise regulation of the brake pressure. The result is a significant reduction in braking distance.

Increase in comfort:

Control comfort has been noticeably improved. PSM interventions with the new system are noticeably smoother and more harmonious thanks to enhanced control algorithms. Brake pedal pulsation with ABS has been reduced through the use of the new linear solenoid valves. PSM control noises have also been significantly reduced in comparison with the previous PSM.

Reduction in weight:

The introduction of the new PSM has permitted a significant reduction in the system weight. As a result, the hydraulic pre-charge pump including bracket and hydraulic connecting line is no longer required. The new PSM pump can now ensure the dynamics required for the entire system (brake pressure build-up for PSM interventions) on its own without pre-charging, which has allowed the system weight to be reduced by 25% (6.6 lbs).

Limits of PSM:

While PSM is designed to maintain driving stability and offer a significant improvement in driving safety, it is by no

means capable of changing the laws of physics: in other words, the driver alone is solely responsible for all manoeuvres, even when using PSM.

4.8 Wheels and tires

4.8.1 Wheels

The wheels of the new 911 Carrera have been redesigned and made larger. The larger wheel/tire dimensions have been specially developed to further increase performance. The wheels have been designed to appear flush with the car's skin.

For the first time, all 911 Carrera wheels have been manufactured using the flow-forming process. This is a light-weight construction technology which reduces weight by rolling out the rim well.

The 911 Carrera has an 18-in wheel as standard (previous model: 17-in) with a size of 8J x 18 at the front axle and 10J x 18 at the rear axle. The 18-in Carrera III wheel with its 5-spoke design has been chosen for its timeless appearance.

A 19-in wheel is also being offered for the first time for the 911 Carrera. The 19-in Carrera S wheel is standard on the 911 Carrera S and available as an option on the 911 Carrera. It has a size of 8J x 19 at the front axle and 11J x 19 at the rear axle. Its appearance is characterised by 5 very striking spokes which split into 2 narrow ribs at the end.

Two further 19-in design variants are offered as an option for the 911 Carrera and 911 Carrera S. They have a size of 8J x 19 at the front axle and 11J x 19 at the rear axle:

The 19-in SportDesign wheel is characterised by 15 fine-mesh spokes. The delicate styling delivers a striking race-car look.



Fig. 32: 18-in Carrera III wheel



Fig. 33: 19-in Carrera S wheel



Fig. 34: 19-in SportDesign wheel



Fig. 35: 19-in CarreraClassic wheel

The 19-in Carrera Classic wheel has narrow spokes to provide a good view of the brake. This deliberately reveals the technology for all to see.

4.8.2 Tires

A new tire generation with larger rolling circumferences has been developed for the 911 Carrera to complement the new wheels. The main objective in the redevelopment of the tires has been to achieve a significant improvement in performance in relation to traction during acceleration, braking and lateral acceleration – in short to address the sportier orientation of the new 911 Carrera. The tire circumference has been increased by 2.5% at the front axle and 5% at the rear axle. The larger rolling circumference increases the side-wall height/tire width ratio in comparison with the previous 911 Carrera model to guarantee an appropriate level of comfort despite the larger wheels. The tire width at

the rear axle has also increased to 11.61 in with the 19-in tire.

The new 18-in summer tire performs the function of the comfortable tire (standard on the 911 Carrera). It offers a high level of sporty handling with very good driving comfort.

The 19-in summer tire (standard on the 911 Carrera S) is the sporty and agile tire. It offers a substantial increase in performance.

The new tires have permitted a noticeable increase in the amount of force that can be transmitted both in the longitudinal and transverse direction. This results in a high level of agility and, at the same time, driving safety. The combination of PASM, PSM and the new tires reduces the braking distance significantly.

Overview of wheel and tire dimensions

Tires/wheels; summer
911 Carrera
<u>Front axle</u> 235/40 ZR 18 on 8 J x 18 ET 57
<u>Rear axle</u> 265/40 ZR 18 on 10 J x 18 ET 58
911 Carrera S
<u>Front axle</u> 235/35 ZR 19 on 8 J x 19 ET 57 (I-No. for Carrera)
<u>Rear axle</u> 295/30 ZR 19 on 11 J x 19 ET 71 (I-No. for Carrera)

4.8.3 Puncture repair systems

The 911 Carrera does not have either a spare wheel or a jack. It has tire sealing compound and an electrical compressor instead as standard.

The introduction of the tire sealing compound means that most damage can be handled without having to go to the trouble of changing the damaged tire on the spot. Small punctures such as caused by a nail or screw can be temporarily repaired by filling them with the tire sealing compound, thereby enabling the vehicle to be driven at a reduced speed (up to max. 50 mph) to the nearest Porsche Center without damaging the wheel in question or the vehicle.

The omission of the spare wheel and jack has permitted in a reduction in weight of around 22 lbs.

4.9 Tire pressure monitoring system (TPMS)

A tire pressure monitoring system (TPMS) will be available as an option (I-No.) on the new 911 Carrera as of MY06.

The TPMS offers a significant improvement in safety by continuously monitoring the air pressure of each tire. The system warns the driver of creeping (normal reduction in pressure caused by diffusion) or sudden pressure loss in the tires. This can frequently prevent burst tires and the accidents they cause. It also does away with the need for regular air pressure checks at the petrol station. Two further advantages: having the correct air pressure cuts down on tire wear (a deficiency in pressure of 4.4 psi can reduce the service life of tires by up to 25%) and improves fuel economy. In the case of 19-in wheels, the loading state can be selected in the TPMS menu to do justice to the required pressures.

Operating principle:

The vehicle is equipped with wheel sensors on the inside of each wheel for recording the pressure and temperature. The sensors are roughly the same size as a box of matches and are attached to the wheel via a special tire valve. A small lithium battery integrated in the electronic component provides the power supply. This battery has been specially developed for this application and has a typical service life of approx. 7 years. The workshop technicians can check the residual life of the battery using a tester and then decide whether it makes sense to change the wheel electronics containing the battery at the same time as they are changing the tire. The pressure and temperature are normally measured roughly every 3 seconds by the sensors and, if minor pressure variations are discovered, are

transmitted around once a minute to a receiver allocated to the wheel which then forwards the information to the control unit. The system responds to a rapid pressure loss of more than 2.9 psi per minute by immediately switching to high-speed mode, in which measurements are taken and transmitted once a second.

Basic configuration:

The TPMS menu is selected via the on-board computer lever. The system must first be informed of the type of tires currently fitted on the vehicle via the "Settings" menu option. This option provides a choice of summer or winter tires together with the relevant tire dimensions. The basic configuration only has to be entered once after a wheel or tire change and is then saved. For reasons of safety, the TPMS menu can only be called up when the car is stationary.

Actual-pressure display:

The actual pressures (without temperature compensation) of each individual wheel are shown in the display as soon as the tire pressure monitoring system has completed its learning phase. This information is displayed while the vehicle is both stationary and moving. It provides the driver with information on the current actual pressure in the tire. The display is not intended to be used to correct the tire pressure since tire pressure changes as a function of the tire temperature.

Display for setting the correct tire pressure:

When the vehicle is stationary, the driver can display the desired pressure (referred to 68°F) for the front and rear axles for newly selected tires via the "Pressure Info" option in the TPMS menu. If the wheels have already been



Fig. 36: Tire pressure monitoring system display

entered in the system, it displays the temperature-compensated differential tire pressures for each wheel position instead. The values displayed specify the deviations from the desired pressures referred to 68°F.

The advantage of the temperature-compensated differential pressure display is that the tires can be filled to the correct pressure even when warm thanks to the temperature compensation function. Specification of the differential pressure values also solves the problem of inaccurate pressure gauge readings on tire inflation devices in petrol stations.

Low tire pressure warnings:

Two different display levels are used to inform the driver of a low tire pressure level: the first level is the "gentle" warning, the second the "stern" warning. Both displays can be confirmed. The warning lamp with the TPMS icon remains in the instrument cluster as a reminder until the cause of the problem has been eliminated. The warning message is displayed once more the next time the ignition is switched on.

"Gentle" warning:

A "gentle" warning in white text is output if the deviation in air pressure is more than 2.9 psi, but not above 5.8 psi. It is first displayed for 10 seconds after the ignition is switched off and thereafter every time the vehicle is started.

Driving safety is still guaranteed. The air pressure should, however, be corrected at the next opportunity (e.g. the next refuelling stop).

It must always be topped up by the value displayed in the tire pressure monitoring system. The warning in the display automatically disappears as soon as the pressure corresponds to the desired pressure once more.

"Stern" warning (puncture):

A "stern" warning in red text is output if the deviation in air pressure is more than 5.8 psi or the pressure is falling by more than 2.9 psi per minute.

This warning appears as soon as the respective values are exceeded, whether the vehicle is stationary or moving.

Driving safety is no longer guaranteed. The driver should stop immediately to inspect the tire in question. The decision as to whether to continue slowly to the next workshop or repair the tire on the

spot using the tire sealing compound is left to the driver.

4.10 Sport Chrono Package Plus

The Sport Chrono Package Plus is available in the new 911 Carrera. The option includes:

- an analog stopwatch
- sporty mode for engine, transmission (Tiptronic S) and chassis tuning as well as the Sport button for activating it
- a performance display in the PCM as well as
- an individual memory.

The Sport Chrono Package Plus offers the customer a complete package which increases driving pleasure by improving lap times and the agility of the vehicle.



Fig. 37: Sport Chrono Package Plus – analog stopwatch

4.10.1 Analog stopwatch

The analog stopwatch is a visual indication that the vehicle is fitted with the Sport Chrono Package Plus.

It is swivel mounted on the dashboard (for use by the driver/passenger) and provides an analog display of the hours, minutes and seconds which have elapsed since timing started. Seconds, tenths of seconds and hundredths of seconds can be read off the integrated display. A digital display runs in parallel in the instrument cluster. The stopwatch is activated by selecting the Chrono menu in the instrument cluster (by pressing the on-board computer lever).

Recording of lap times can be initiated by starting the stopwatch and ended by stopping it. The lap times can be stored for subsequent evaluation.

4.10.2 Sport button function/ Sport mode

The driver can select a sportier setup by pressing the Sport button in the center console. A certain amount of comfort is sacrificed in this mode for the sake of sportiness. The word “Sport” appears in the instrument cluster display as soon as the Sport button is activated.

A modified program is utilized for the following systems in the “Sport” setting:

- Accelerator pedal characteristics
- High-speed cut-off
- Dash pot (load change damping)
- PSM (Porsche Stability Management)
- PASM (Porsche Active Suspension Management) (optional for 911 Carrera)
- Tiptronic S (optional)

A number of adjustments are made in Motronic when the Sport function is activated. The electronic throttle characteristic is switched to a steeper setting (only in manual mode with Tiptronic S). This produces a faster throttle response to accelerator pedal movements to subjectively increase the spontaneity of the engine.

When the Sport Chrono button is pressed, the abrupt cut-off (cf. section 2.3.14) is active in 1st to 5th gears for the manual gearbox (without Sport Chrono function only in 1st and 2nd gears) and in the manual setting for Tiptronic transmission.

The so-called dash pot is executed less smoothly and with less emphasis on comfort. This means that the throttle closes faster when released. The result is a heightened, “racing-like” engine dynamic.

Sport mode allows the extreme driver

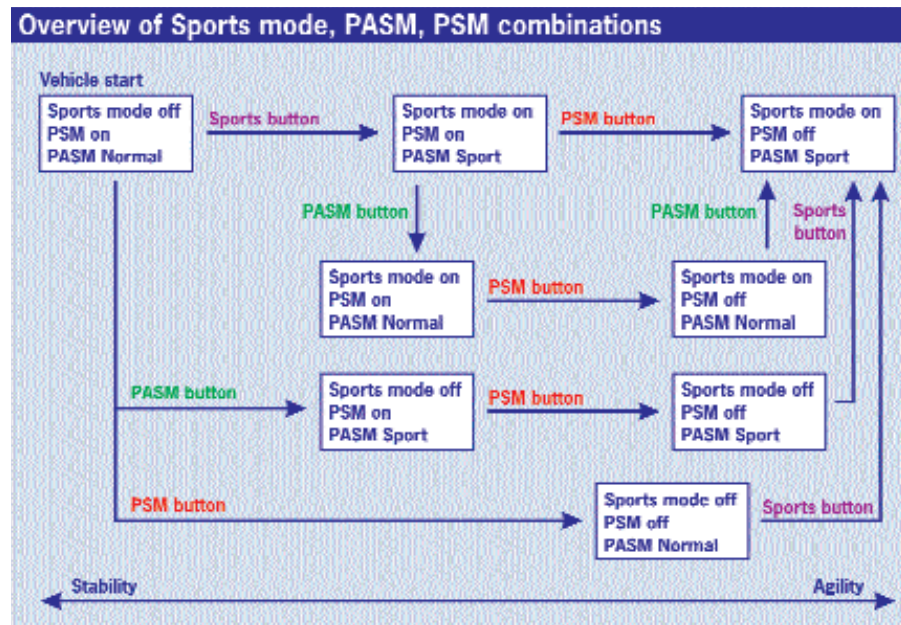


Fig. 38: Combination options with Sport mode, PASM, PSM

to deliberately direct PSM interventions away from driving stability and more towards agility and driving dynamics, without having to sacrifice PSM support in emergency situations.

In addition PASM is automatically switched to its sport setting. This results in harder damping and therefore more spontaneity when steering into corners. Body movements are noticeably reduced, improving road contact. Agility and driving pleasure, particularly on circuits, are also increased and overall driving stability in extreme driving situations improved.

A sportier basic map is selected for the Tiptronic S transmission in D mode. Automatic upshifts when the maximum rpm is reached are prevented in Manual mode (other than with a kickdown) which improves driveability, particularly when breaking ahead of corners. This means that the driver can decide whether and when to shift up a gear. Shifting times when shifting up and down are reduced at the same time, which makes for noticeably sharper gear changes. Automatic downshifts when braking in

D position are executed with more emphasis on sportiness and less emphasis on smoothness and comfort, thereby increasing vehicle agility when braking.

	PSM on	PSM off
Sport mode off	PSM is active, basic condition when vehicle starts	PSM is deactivated, but can be re-activated by applying the brakes, PSM intervention is permitted if the ABS control threshold is exceeded at either front wheel
Sport mode on	PSM is active, with the following Sport functions: <ul style="list-style-type: none"> • More longitudinal dynamism thanks to later intervention of ASR • More lateral dynamism thanks to later intervention of PSM • Greater agility when braking into corners thanks to later intervention of ABS • Slightly reduced load-change compensation for dynamism when steering into corners 	PSM is deactivated, but will be re-activated if the brakes are applied with <u>force</u> , PSM intervention is permitted if the ABS control threshold is exceeded at both front wheels; the overall effect is one of increased sportiness <ul style="list-style-type: none"> • Even more agility when braking into corners thanks to a less stability-oriented ABS setup which allows greater deceleration when cornering • Significantly reduced load-change compensation for more dynamism when steering into corners

Fig. 39: Increasing vehicle agility using PSM and Sport mode

An increase in the minimum triggering level for ASR in Sport mode affords the vehicle more longitudinal dynamism when accelerating out of corners. As a result greater slip is permissible at the drive wheels during throttling and noticeable rear drift, particularly on surfaces with low coefficient values, is permissible without jeopardising driving safety. The thresholds for PSM intervention have also been increased. This enables a greater deviation between the desired and actual direction of movement of the vehicle before PSM intervenes. This makes the vehicle more agile in manoeuvres involving extreme lateral acceleration. Increasing the ABS intervention thresholds permits more neutral braking into corners. In addition, PSM permits more engine drag torque when lifting the throttle. The result is a more distinctive load change so that the vehicle can be positioned more easily in corners, thereby permitting more dynamic steering. The driver can increase vehicle agility even more by switching off PSM when Sport mode is active.

The ABS setup has been made even sportier, a refinement that is particularly noticeable when braking into corners.

The new, less stability-oriented ABS setup permits more agile behavior combined with higher braking deceleration when cornering.

Load-change responses are also moderated less so that the vehicle can be “steered” more using the accelerator pedal. ABD is retained in its customary form for optimum traction.

In line with Porsche's safety philosophy, PSM remains available in the background even in combination with Sport mode and can be activated by pressing the brake pedal. When Sport mode is active and PSM is switched off, greater force must be applied to the brake pedal to activate it (see Fig. 39). This allows the driver to move the vehicle with far greater overall agility in extreme driving situations than when PSM is switched off and Sport mode is not active.

4.10.3 Performance display in PCM

The Sport Chrono Package Plus includes the addition of a “performance display” in the PCM display system. This performance display and the stopwatch can be used to record the fastest lap times or route times and archive them for subsequent analysis. They also allow the driver to race against a stored fastest reference lap. The comparison of the reference lap and the current lap is performed in real time based on the route section currently being driven. The color-coded representation used for the real-time analysis (red, yellow, green) shows the driver's time profile in comparison with the reference lap, even under sporty driving conditions. It is recommended to use the lap time function on closed tracks only. The laps can be displayed in the form of a bar chart.

The performance display provides the following options:

- Recording the time profile for any route section
- Driving against a pre-recorded reference lap with real-time analysis
- Displaying the lap currently being driven
- Displaying the remaining range and the resulting remaining number of laps
- Evaluating and managing recorded routes

The display is operated in the familiar way via the PCM operating panel.



Fig. 40: PCM

4.10.4 Individual memory

The individual memory allows extended vehicle settings to be made via PCM. These settings are individually assigned to the respective ignition key. Each time the key is inserted in the ignition lock, the stored settings are automatically activated via PCM. The following individual options are available:

- Daytime running lights on/off
- Comfort lighting duration adjustable from 10 seconds to 120 seconds
- Rear wiper automatically on/off (this allows the driver to select whether the rear wiper should execute one wipe cycle when reverse gear is engaged if a wipe cycle was executed on the windshield within the preceding 40 seconds)
- Automatic climate control: save basic setting (e.g. 73°F, fan set to maximum output and defrost on)
- Unlocking opens all doors or just the driver's door
- Autolock: off, on upon ignition or active after moving off

All settings can be made in the “Individual Memory” menu, which is called up via “Set” in the PCM main menu.

5 Body

5.1 Body-in-white

The purpose of redesigning the body-in-white of the new 911 Carrera was to increase torsional and flexural rigidity in comparison with the previous 911 and also to further improve crash safety in a frontal or offset crash (frontal crash with head-on collision on one side of the vehicle). The designers also managed to enlarge the passenger compartment without changing the exterior dimensions.

These improvements were achieved with four main changes:

- Use of the spot welding/bonding method
- Redesigning of the joint areas (A-pillar, roof frame connection)
- Use of a new bulkhead cross member made of boron steel
- Optimisation of the upper load path for transmission of forces in frontal and side impacts

The Porsche body-in-white is still executed as a light-weight design with high-strength and maximum strength steels.

This concept ensures excellent passive safety.

The spot welding/bonding method used to join the side sections and the floor assembly has further increased the torsional and flexural rigidity of the body-in-white (torsional values increased by 8% while flexural rigidity rose by 40%). The redesigned joint areas (A-pillar joints, connection for the roof frame tube) have also contributed to these excellent results.

The bulkhead cross member in the front of the vehicle has been completely re-engineered and is now made of boron steel. This has allowed the cross section to be adapted to the package conditions and matched to the available footwell space and at the same time the rigidity increased. The increased rigidity of the

cross member and the improved anchorage have significantly reduced footwell intrusion in the event of a crash. The reduction in the cross section has also allowed the anchorage for the pedals as well as pedals themselves to be moved forwards by 0.39 in. This provides taller drivers with more legroom and allows them to find an optimum seat position.

The seat anchorage has been lowered by 0.39 in as part of the redesign of the body-in-white. This results in a lower seat position, which lowers the center of gravity of the vehicle and provides more headroom for taller passengers.

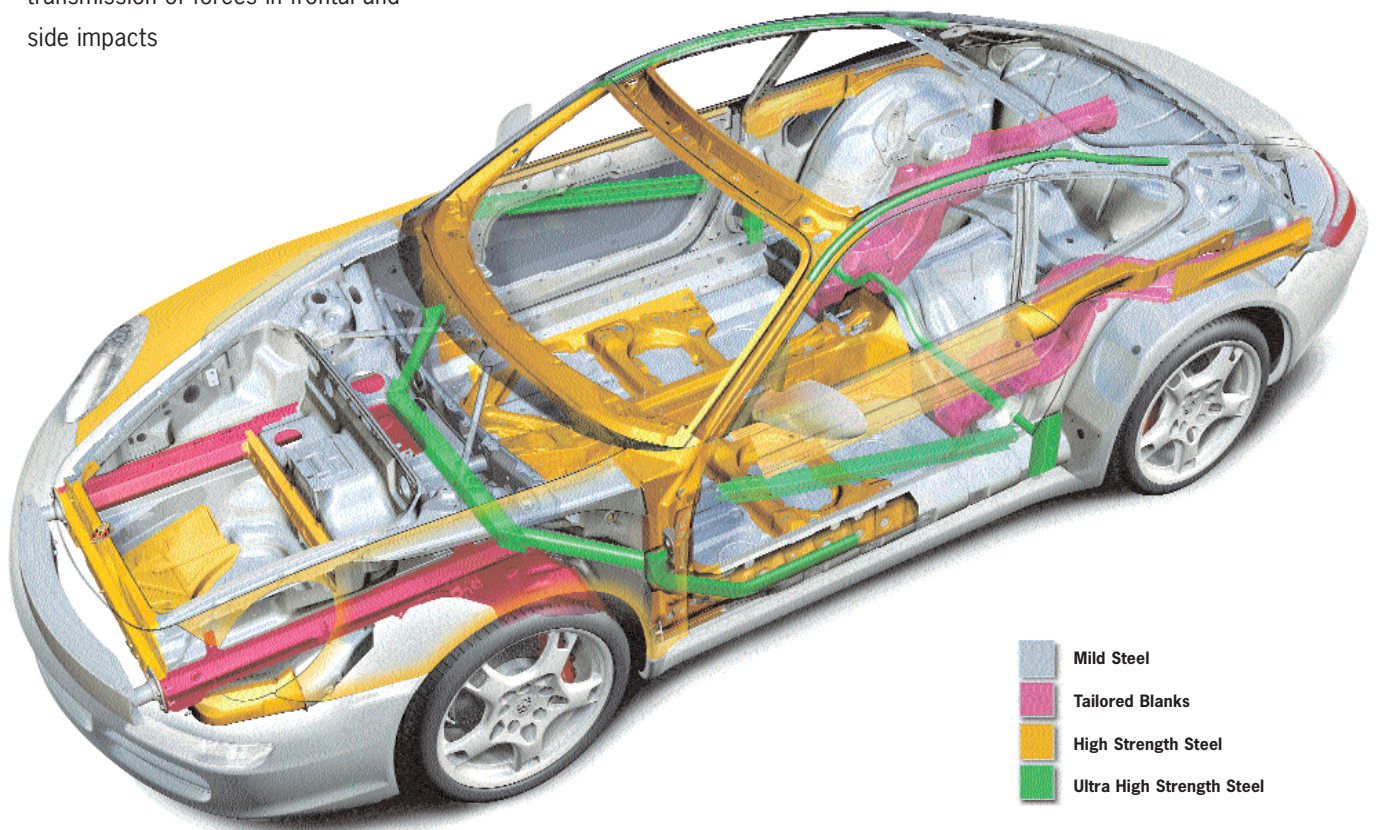


Fig. 41: Body-in-white structure of the 911 Carrera S

5.2 Doors/lids

The doors have been redesigned in the following areas with the objective of further improving crash safety: additional profile sheets made from high-strength steel have been integrated in the upper area of the door frame to provide specific reinforcement for offset crashes (where only one side of the vehicle front makes contact with an obstacle). This has significantly increased the rigidity of the doors in the longitudinal direction. This means that in the event of a head-on collision the high crash energy can be very effectively transmitted from the front of the vehicle to the rear of the vehicle via the so-called upper load path above the doors.

The door handles of the 911 Carrera have been newly developed. They now have a curved design and as before are matched to the exterior color so that they fit in well with the vehicle design. The door arrester has been equipped with an additional, third index position for more precise positioning of the doors during opening.

The luggage compartment lid of the new 911 Carrera has been constructed as an aluminium shell to reduce weight. This has resulted in a weight saving of 13.2 lbs, or a reduction of 40%.



Fig. 43: Side-impact protection



Fig. 42: Rear spoiler

As on the previous 911 Carrera the rear lid is still made from sheet steel however its styling has been adapted to the new body shape. The integrated rear spoiler has also been restyled and as before is executed as a double-shell plastic construction. The spoiler extends at 75 mph to reduce lift coefficients at the rear axle, thereby increasing driving stability. Since aerodynamic forces are rather less important at low speeds, it retracts at speeds below 37.5 mph as a function of the engine compartment temperature to show off the classic lines of the 911 to their best advantage.

The thresholds for extension and retraction are now also dependent on the engine compartment temperature and are shown in the table below.

Engine compartment temperature	Spoiler action	911 Carrera MY 05	911 Carrera MY 04
Engine compartment "cold" < 130 °F	Spoiler extended	75 mph	75 mph
	Spoiler retracted	37.5 mph	37.5 mph
Engine compartment "warm" > 140 °F	Spoiler extended	50 mph	75 mph
	Spoiler retracted	19 mph	37.5 mph

5.3 Front end

The front end of the new 911 Carrera has been completely redesigned.

In addition to a new design which ensures optimum aerodynamic and thermodynamic conditions at the front of the vehicle, the following changes have also been made:

- Integration of additional lighting (fog light/marker light/indicator light)
- Integration of the headlight washer system
- New fastening concept for the licence plate (that needs no holes in the trim)
- Introduction of the zero-joints concept

The fog light, marker light and indicator light have been grouped together into a one-piece light module for each side of the vehicle. The module clips into the front end using a simple mechanism which requires no screws. The unit can be easily removed, for example to replace a defective bulb, using a release card (shaped like a credit card) supplied in the tool kit which is inserted between the light module and the front end.

The headlight washer system was previously integrated in the headlight module. The new round headlight design has no space for the headlight washer system, therefore it is integrated directly in the front end.



Fig. 44: Front of the 911 Carrera S

5.4 Rear end

The rear end, like the front end, has also been redesigned to take account of aerodynamic and thermodynamic requirements.

The following changes have been made to the rear end:

- Optimised integration of parking sensors (vehicles equipped with ParkAssist)
- Restyling in the area of the tailpipes of the exhaust system
- Introduction of a zero-joints concept as for the front end



Fig. 45: Rear of the 911 Carrera S

5.5 Bumper system

The proven bumper system has been retained from the previous model and adapted to the new vehicle contours. The area of the impact elements on the front bumper has undergone substantial modification. The objective of this modification was to increase protection for the body-in-white in the front of the vehicle at low impact speeds. This is important for a favourable insurance classification.

Improvement in this area has been achieved through the use of new, energy-absorbing impact elements with a stroke of 1.97 in. These impact elements now consist of two tubes, one inserted into the other, instead of just one tube as was previously the case. At the same time they are now secured to the front body cross member using three threaded connections instead of two, making them less sensitive to oblique impact.

The outer, thicker-walled tube is equipped with specially defined impressions. In a crash, the inner tube is pushed into the outer one. In doing so it must “push past” the impressions which form a star-shaped narrowing. This process reduces energy and therefore also minimises intrusion into body parts and overall deformation of the front of the vehicle.

This avoids damage to the body-in-white up to speeds of 5 mph, regardless of the direction of impact. In the case of central impact, the body-in-white can usually escape damage even at speeds of up to 6–7.5 mph.

Operating principle of the impact elements

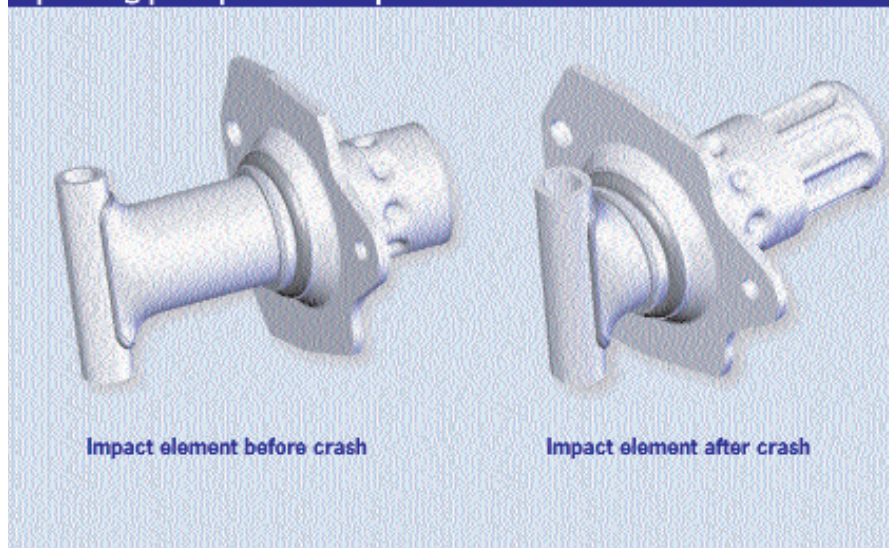


Fig. 46: How the impact elements work

5.6 Tank

The tank meets all country-specific requirements and is the same on the 911 Carrera and Carrera S (the fuel pump delivery capacity is 20% higher for the new models than for the predecessors because of the higher engine output).

The usable refill volume of the tank is 16.9 gal. As before, the tank is filled via a filler neck over the right-hand front wheel.

Apart from some small details, the tank has been taken directly from the previous 911 Carrera. The optimisations to the tank system have been born of years of experience. Accordingly the current model does not include a fresh air line for the active carbon filter.

5.7 Luggage compartment

The omission of the spare wheel, which was previously housed near the bulkhead, and the new bulkhead cross member in the body-in-white have facilitated a redesign of the luggage compartment. As a result the luggage compartment volume has been increased to approx. 4.77 cu ft (basic equipment).

The new 911 Carrera is – as its predecessor – equipped with a trunk entrapment device inside the front luggage compartment.

A new trim concept has been developed to enhance the appearance of the luggage compartment. In addition to new, large-area trims on the inside of the luggage compartment, it also includes full trim on the areas around the luggage compartment up to the lower frame of the windscreen (cross panel, side section and radiator tank trim).

The trim on the inside of the luggage compartment gives it a clear structure and makes it feel extremely tidy. For example, the audio amplifier, the tire sealing compound and compressor and

the tool bag (including lug wrench and towing eye) are hidden behind a vertical trim mounted diagonally in front of the rear wall of the luggage compartment. Integrated on the trim is a special holder which may keep a warning triangle handy for use in an emergency. A first aid kit could be left on the right-hand side on the bulkhead. Additionally the vehicles are fitted with an additional full trim (to hide the charcoal filter and to protect optional electronic components, for example DVD navigation drive or audio amplifier) which runs across the entire width of the luggage compartment above the tank.

The new wing flange and radiator tank cover ensures that all screws and metal edges which were previously visible are now neatly covered. The choice of material for the trim ensures a feeling of quality. The plastics used are particularly scratch-resistant.

5.8 Electric steel sliding/tilting roof

The electric sliding/tilting roof on the new 911 Carrera has been retained from the previous 911 Carrera. It is characterised by a low height and a quiet running noise when opening. The opening dimension automatically set with “one-touch opening” has been slightly adapted to optimise the auditory impression (approx. –0.39 in). The sliding/tilting roof can be opened to its full size if desired.



Fig. 47: Luggage compartment



Fig. 48: Sliding roof

5.9 Roof transport system (optional)

The new 911 Carrera also features the familiar roof transport system (RTS). It is characterised by its elegant design which echoes the lines of the vehicle as a whole, can be locked to protect against theft and can carry a maximum load of 165 lbs.

Various add-on modules such as ski or bike racks, surfboard holders or a roof box can be mounted on the basic transport system.



Fig. 49: Roof transport system

6 Aerodynamics

During development of the new vehicle it became obvious that further enhancement of the aerodynamic properties of the 911 Carrera was required. The objective in doing so was to take account of the increased performance by reducing the aerodynamic lift and at the same time further reducing the drag coefficient (despite the higher cooling air requirement for brake and engine cooling).

The result was a significant improvement in aerodynamic coefficients in comparison with the previous model. The drag coefficient was reduced to $c_d = 0.28$ (Carrera S 0.29; previous model 0.30)

and the lift coefficients at the front and rear axle were each reduced by 0.01 to $c_{LF} = 0.05$ and $c_{LR} = 0.02$ respectively. These values cannot be matched by any of our international competitors.

The main challenges facing the aerodynamics engineers of the new 911 Carrera were:

- The larger frontal area, caused by flared wheel housings and wider tires in particular
- The lower lift coefficients and hence the increased wheel load

- The higher cooling air requirement of the 3.8 litre engine of the 911 Carrera S in particular
- The higher cooling air requirement of the brakes due to the increase in performance
- The more efficient cooling of the gearbox, and of the 6-speed manual gearbox in particular, due to the higher engine output

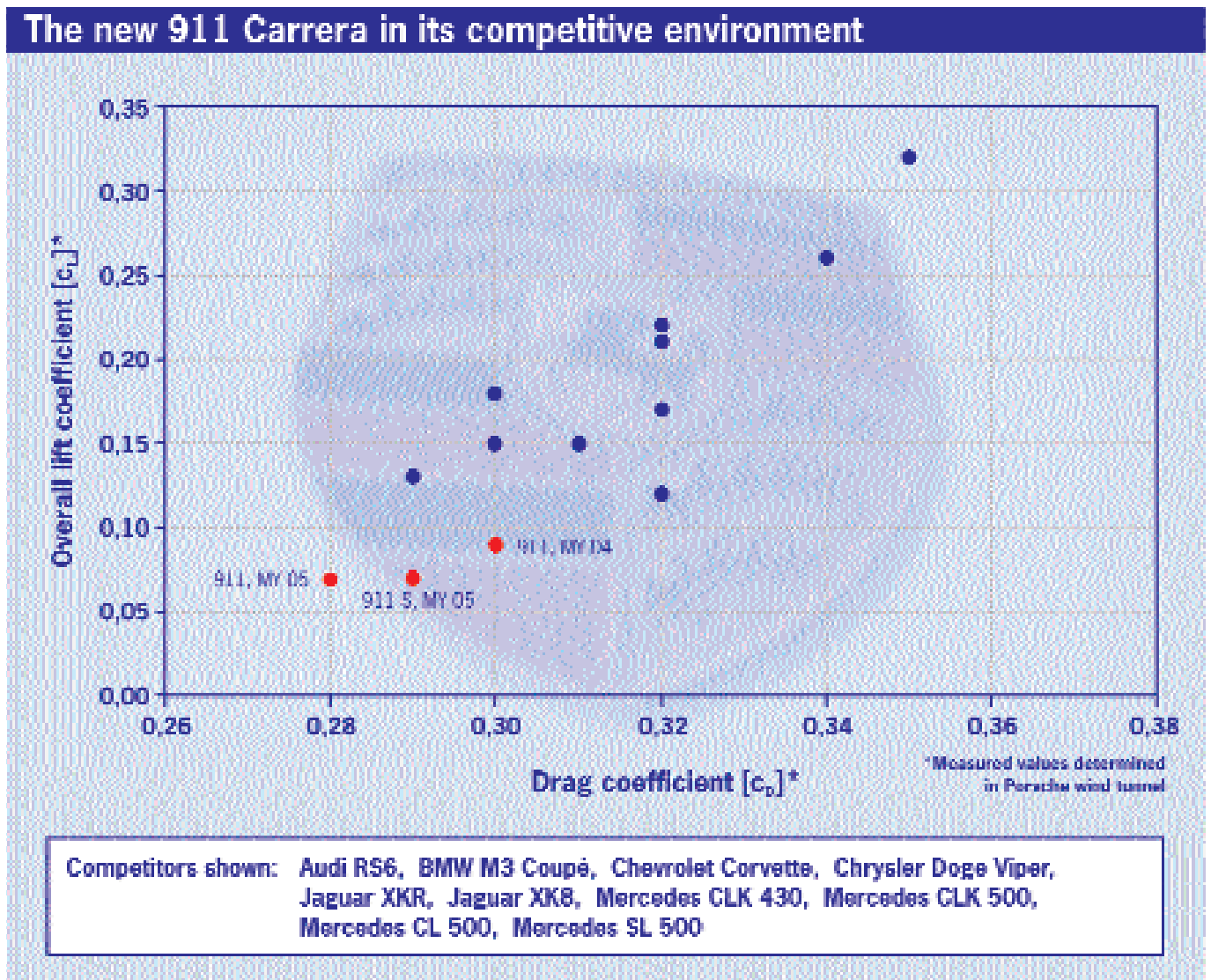


Fig. 50: Aerodynamics: How the 911 Carrera compares

Optimisation of the outer skin

The main starting points when it came to optimising the outer skin, apart from the front and rear of the vehicle, were the fenders and front side sections. Particular attention had to be paid to aerodynamic integration of the flared wheel housings.

The sweep and the radii of the front apron have been optimised to produce an aerodynamically efficient air flow at the front end and significantly better prerequisites for cooling air flow without affecting the styling of the outline. The lateral openings on the front apron required to supply cool air to the radiators have also been carefully optimised and integrated in the front end concept.

The lateral front apron radii and wheel houses are designed to shield the front wheels from the air flow in an optimum manner and to provide much greater wheel housing ventilation. These measures reduce drag and, by providing greater wheel housing ventilation, also reduce lift at the front axle.

The shape of the A-pillar has also been optimised in terms of flow characteristics and is now more vaulted. This reduces resistance and cuts down on wind noises at high speeds for noticeably more comfort on long journeys. The door mirror has been redesigned and is now connected to the mirror triangle via a new double arm. The mirror housing and the air duct at the mirror and the side windows have been optimised for minimum resistance and maximum protection against drops of water landing on the mirror glass and the side windows. In addition, a new hydrophobic surface coating which virtually eliminates soiling of the side windows is being used

for the first time on the front side windows to keep them free of dirt.

In the rear area, the flared wheel housings and the rear spoiler as well as the rear and rear center sections have been optimised. As on the front, the radii of the rear side sections have been designed to produce an aerodynamically efficient air flow at the rear wheels and the rear end, which improves resistance and reduces lift at the rear axle.

The redesigned rear spoiler has a carefully optimised edge that produces a defined air flow breakaway when the spoiler is extended. In combination with the optimised extension height of the rear spoiler, this ensures that the rear spoiler functions at the optimum aerodynamic operating point and that the desired rear axle lift with the optimum resistance advantage is achieved. On top of this, slotted openings have been integrated in the upper shell of the rear spoiler and, in combination with the underlying engine compartment scavenging blower, optimised to ensure adequate cooling and ventilation of the engine compartment at all times.

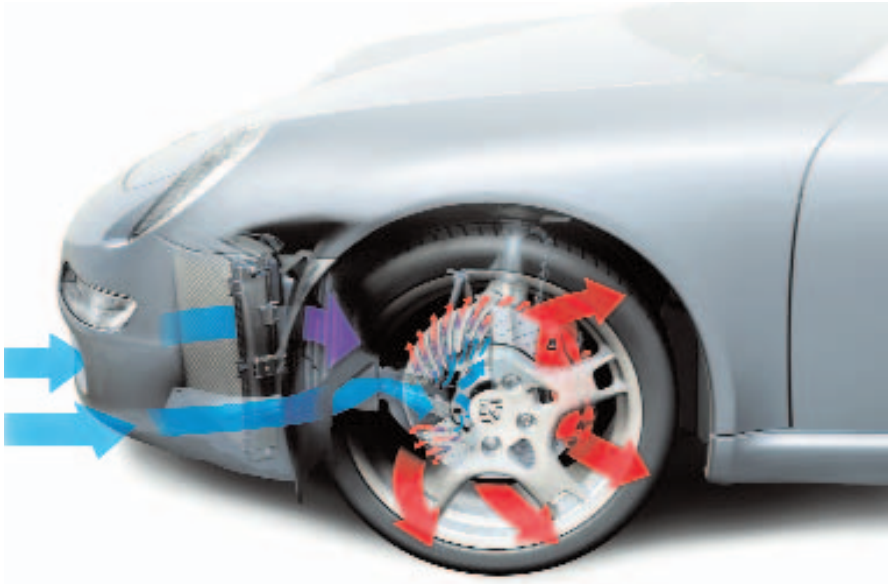


Fig. 51: Cooling-air guidance

Optimisation of the cooling-air guide

The main objective when designing the cooling-air guide is to ensure the necessary cooling air requirement for the engine and brakes in all operating states of the engine. The general idea is to achieve a flow with as little resistance as possible to minimise the effect of the cooling-air flow on the resistance coefficient of the vehicle as a whole. The effect of the flow on the lifting forces must also be minimised or used as cleverly as possible to achieve the objectives for lifting forces and lift balance.

The higher output of the 3.8 litre engine of the 911 Carrera S results in more engine waste heat, increasing the cooling air requirement by approx. 20%. In addition to using larger and more efficient radiators, the optimised cooling-air guide is a significant factor in the increased cooling performance. As on the previous model, the new cooling-air guide is completely closed to avoid leakages. At the same time, targeted guidance of the cooling air ensures an optimum air flow for the radiators. When designing the cooling-air guidance, particular attention was paid to keeping the

air ducts short and the deflection as low as possible. The exhaust air flow from the radiators is therefore now expelled laterally into the wheel housing liners instead of vertically downwards in front of the front wheels. This reduces flow loss for the cooling-air guidance system while lateral expulsion of the air reduces the lift at the front axle.

Another benefit of lateral expulsion is that it results in much less dust being raised when the radiator fan is running on dusty surfaces. Ventilation flaps have been inserted into the corners of the square fan frames to further increase air throughput during journeys. These ventilation flaps open above speeds of approx. 45 mph to facilitate an additional flow of cool air.

All in all and despite the increased cooling-air throughput, the new resistance-optimised air routing concept has enabled the air flow resistance to be limited to approx. 1.5% of the total resistance – an extremely low level in comparison with the competition. Requirement-driven supply of cool air has enabled significantly smaller air inlet openings in the front end in comparison

with the competition, which fits in well with stylistic requirements.

The improved driving performance has also resulted in increased requirements for brake cooling. An optimised brake air deflector has been developed for the 911 Carrera which ensures more efficient deflection of the air routed through the brake air ducts on the underbody to the brake discs and significantly better brake cooling as a result of the higher air throughput.

Underbody lining

The underbody panels have been enlarged by approx. 50% to counteract the increased drag caused by the larger frontal area as well as the higher cooling air requirement. As a result, the air routed over the underbody is now much less prone to turbulence and loss. This significantly reduces drag and lift.

The new underbody panels are shown in Fig. 52. The underbody panels from the previous model have been extended and optimised to the aerodynamic requirements of the new vehicle. The underbody lining at the front has been extended to the front side members to compensate for the aerodynamic drawbacks of the new brake air deflector.

The smoother underbody means that air hitting the rear of the vehicle is less prone to deceleration and turbulence. This means that there is a greater air flow mass available to the cooling-air openings located in the underbody, which permits extremely efficient engine cooling from the point of view of aerodynamics and thermodynamics.

Three openings have been integrated in the panels to ensure ventilation of the transmission. Part of the air flowing along the underbody is routed upwards through these openings in the direction of the transmission and used to cool the transmission. The air is directed and channelled between the transmission and the panels so that a large section of the transmission housing is hit by cool air from the underbody.

A further opening has also been added to route cool air to the transmission differential via an air duct.

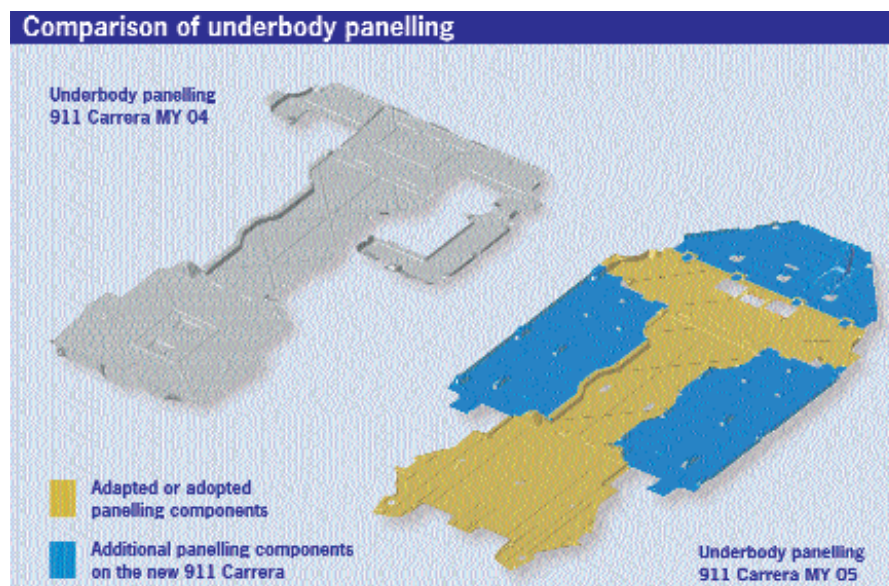


Fig. 52: Underbody lining

Add-on parts

Add-on parts such as wheel spoilers help to achieve aerodynamic objectives and therefore must be carefully optimised. The flared wheel housings and wider tires mean that the wheel spoilers for the front and rear wheels have had to be redesigned and optimised. The optimised wheel spoilers shield the wheels from the air flow in an effective manner and encourage the air coming from the front and the underbody to flow past the tires aerodynamically. This guarantees a low-resistance air flow around the wheels and reduces the overall drag coefficient. In addition, the optimised wheel spoilers and further add-on parts on the underbody influence the lifting forces in such a way as to achieve the desired aerodynamic lift balance.

New to the 911 Carrera is a front spoiler on the front lower part which further reduces lift at the front axle as well as aerodynamic panels on the trailing link and control arm at the rear axle which also help to achieve the aerodynamic objectives for lift and resistance.

Conclusion

The excellent aerodynamic coefficients achieved have further strengthened the position of the new 911 in its segment. On top of this drag ($c_d \times A$) has actually been reduced in comparison with the previous model, despite a larger frontal area. The optimised aerodynamics of the new 911 therefore help to improve driving dynamics, performance and fuel economy.

Data on aerodynamics

	C_d	C_{LF}	C_{LR}	A_x [m ²]	$C_d \times A_x$ [m ²]
911 Carrera (MY 04)	0.30	0.06	0.03	1.95	0.59
911 Carrera manual (MY 05)	0.28	0.05	0.02	2.00	0.56
911 Carrera S manual (MY 05)	0.29	0.05	0.02	2.00	0.58

Aerodynamic lifting forces**at 178 mph:**

MY 04: FA/RA = 92/46 lbs

MY 05: FA/RA = 79/31 lbs

Delta in %:

FA/HA -15/-30%

Air throughput (radiator)**in comparison with previous model:**

+20%

7 Interior

7.1 Material design

Particular attention has been paid in the new 911 Carrera to improving the quality of the materials used in the interior. Accordingly the amount of soft paint has been reduced and more components based on slush technology with improved surface quality and appearance used. The range of interior colors for the new 911 Carrera has also been extended to include four new colors (Sand Beige, Palm Green, Stone Grey and Sea Blue) in addition to Black.

On both models the following components are upholstered in grained-look leather as standard: shift lever, steering wheel rim, handbrake lever grip, lid of the storage bin in the center console, lid of the door storage bin and door handle. The center section of the seats as well as the side padding and headrests of the front seats are upholstered in leather.

The roofliner is in Alcantara in the respective standard color.

7.2 Leather interior

(available on the 911 Carrera and 911 Carrera S as an option)

A leather interior is available as an option in the standard colors Black, Sand Beige, Palm Green, Stone Grey and Sea Blue. The new colors Terracotta and Cocoa are available in special leather. The familiar colors of Dark Grey and Brown are available in natural leather.

If a leather interior is ordered, all leather parts will have a smooth finish. The high



Fig. 53: Interior of the 911 Carrera S

quality of the leather interior is further emphasised with additional decorative seams, for example in the area of the dashboard and the door-trim panel.

The leather interior includes the standard upholstered items plus the following components:

A-pillar/windscreen frame trim, B-pillar trim, C-pillar trim, rear wall lining, front of the dashboard incl. integrated airbag cover, upper part of the dashboard incl. instrument cluster cover, steering wheel rim, door trims, front of the door handle, lid of the door storage bin, lid of the storage bin in the center console, shift/handbrake lever, center section of the front seats, sides of the front seats, center section of the rear seats, sides of the rear seats.

7.3 Steering wheels

A new generation of steering wheels with a sporty 3-spoke design has been developed for the 911 Carrera. This design with its distinct styling is in harmony with the completely redesigned interior.

All versions of the steering wheel are equipped with a fullsize integrated airbag and the rims are upholstered in moulded leather as standard.

An optional multi-function steering wheel is being offered for the first time in addition to the optional sports steering wheel (standard on the Carrera S).

All steering wheels have been designed with ergonomics in mind. Nonetheless the light-weight construction techniques for which Porsche is known have not been ignored: the substructure of the steering wheel is now executed as a composite frame made of magnesium. This has enabled a reduction in weight of 10% in comparison with the old steel and aluminium construction.



Fig. 54: Steering wheel in the 911 Carrera

7.3.1 Basic steering wheel

The basic steering wheel offers good handling thanks to a diameter of just 14.78 in. Clearly defined shapes and accents in silver and grey give a high-quality appearance.

The cover of the lower vertical spoke is painted Volcano Grey and frames the impact absorber at its two lower edges in a V-shape. The covers of the two horizontal spokes are painted with an aluminium-look finish to provide an optical contrast.

As before, the Tiptronic version has integrated rocker switches on either side of the impact absorber.



Fig. 55: Carrera S sports steering wheel

7.3.2 Sports steering wheel

The Carrera S is fitted with a sports steering wheel as standard. This steering wheel is also available on the 911 Carrera as an option.

The main differences between the sports steering wheel and the basic steering wheel are the highly contoured rim and the round impact absorber (the impact absorber on the basic steering wheel is triangular).

These are combined with a smaller diameter of 14.58 in that emphasises the sporty styling.

The ergonomically shaped finger plates on the steering wheel rim ensure a good grip on the steering wheel even when the car is driven more aggressively.

7.3.3 Multi-function steering wheel (option)

The multi-function steering wheel is based on the basic steering wheel. Unlike the basic steering wheel, however, it has four function buttons and two function rollers evenly divided between the left-hand and right-hand spokes.

These controls allow the driver to operate essential audio, telephone and navigation functions without having to take their hands off the wheel. This means less distraction and better concentration on what is happening on the road.

The black function buttons are embedded in bezels painted with an aluminium-look finish. This clearly emphasises the controls, both visually and functionally. They are also ergonomically arranged to ensure the driver can easily operate them using their left or right thumb.



Fig. 56: Glove compartment



Fig. 57: Cup holder

7.4 Pedals

Individual components of the pedals have been redesigned. For example, the sporty look of the pedals has been emphasised by the new pedal caps that consist of a rubber insert and a stainless steel frame.

Another advantage of the redesign is that it provided an opportunity to reposition the pedals towards the front of the vehicle, enabling the taller driver to find a more comfortable sitting position. This repositioning of the pedals was made possible mainly through the new bulkhead cross member in the body-in-white. This allowed the brake and accelerator pedals to be moved forward by 0.39 in and the clutch pedal by 0.59 in.

The accelerator pedal box is new. It was redesigned with the aim of reducing the number of individual components. The main reason for doing this is that it enabled the module weight to be reduced by 60% (approx. 1.3 lbs).

7.5 Storage bins and transport concept

The new 911 Carrera has a storage concept that offers a multitude of storage possibilities.

Glove compartment:

The glove compartment on the passenger side is particularly spacious in comparison with the previous model, having been increased from 5 to approx. 6.5 litres (11.8 in (W) x 8.5 in (D) x 4 in (H)). It contains a compartment for two CDs and a holder for a pen. The glove compartment is opened via a hinged handle with an aluminium-look paint finish in the center of the door and can be locked to protect against theft.

Cup holder:

The newly developed cup holder for the driver and passenger is discreetly integrated in the dashboard above the glove compartment. It is hidden behind a hinged cover that allows the compartment to be elegantly closed when the cup holder is in use. Each cup holder can hold a container with a diameter of up to 2.9 in and can be individually used if required. When in use, the left holder sits in front of the central air vent in the dashboard, the right holder in front of the passenger's air vent. This permits extremely efficient heating or cooling of beverages.



Fig. 58: Storage bin in the center console

Center console:

In the front part of the center console is a small, open storage tray that can be used for holding keys or other small items.

There are also further storage compartments in the rear part of the center console. Here, underneath an upholstered cover that doubles as an arm rest, is a large compartment with approx.

1.5 litres of storage space (7.1 in (L) x 4.1 in (W) x 3.2 in (H)). Integrated in this compartment are a 12 volt socket and a coin holder. The compartment is now locked via the central locking system, which means that the old lock is no longer needed. Behind the large compartment is a small, open compartment. As before, the center console also contains an ashtray with cigarette lighter.

Sockets:

As well as the cigarette lighter, which can be used as a socket, and the 12 volt socket in the large compartment in the center console, the new 911 Carrera also features an additional 12 volt socket on the side of the center console in the passenger's footwell.

Doors:

The door-trim panels house large storage pockets (11.8 in (L) x 3.7 in (W) x 4.7 in (H)) fitted with lids. These lids, with their comfortable padding, double as arm rests. For maximum ergonomics, the designers made particularly sure that the door and center console arm rests were the same height.

As in the previous model, the door sill on the passenger side features a long, open pocket.

There is a map pocket integrated in the backrests of the sports seats. The compartments in the center console and the sill pocket are lined with a removable rubber mat. This prevents rattling noises and further improves the impression of quality.

As in the predecessor, there is considerable storage space to the rear of the rear seats. This can be extended even further by folding down the rear seats.

7.6 Front seats

The seat system in a 911 has to fulfil special requirements in terms of driving behavior and package. Added to this is the fact that safety and weight requirements have also evolved since the predecessor. In order to meet these requirements without compromise, the front seat system has been redesigned from the ground up. It is distinguished by the following innovations:

- Considerable improvement in comfort on short and long journeys
- Improvement of the lateral support
- Lowered seat position with more headroom
- Improved ease of access to the storage area in the rear and ease of entry
- Consistent implementation of lightweight construction techniques
- Option via Tequipment to integrate LATCH (UCRA) child seats
- Further improvements in passenger protection through:
 - integration of additional thorax airbag for each front seat
 - higher backrests with improved headrests

Comfort

It is a fact that average body size across the world is getting bigger. To take account of this fact the front seats were designed for larger people, particularly in relation to the width of the shoulder area and the seat cushions. This was done using a slimmer seat frame with the same outer contour. The slimmer frame meant that the available interior seat dimensions were increased which allowed the use of foam that is approx. 20% thicker than in the predecessor.

The main influencing factors for relaxed driving are the level of shock absorption and the level of support offered by the seat.

Following extensive testing of damping behavior in the vehicle, Porsche has developed a patented damping/vibration system for its seats.

Lateral support

Lateral support for occupants is very important, particularly with high lateral acceleration. A seat with good lateral support will stabilise the driver, for example when cornering at high speeds, without the need for any additional effort on the driver's part. This is a prerequisite for precision control in extreme driving situations. Lateral support in the new seats is provided by the higher side pieces. The side piece cushions are further reinforced by the contour of the frame. The lateral support offered by the sports seats is even greater than that offered by the standard seats. Lastly the adaptive sports seat system even offers a facility for individually adjusting the side pieces of the seat cushion and the backrest to the respective driver.



Fig. 59: Seats in the 911 Carrera

Lowered seat position with more headroom

The aim with any sports car is to have as low a sitting position as possible in the vehicle. The advantages of this are enhanced dynamic performance thanks to a lower overall center of gravity and a subjectively more comfortable response to acceleration.

The lower seat position was achieved by means of two measures: firstly a change in the body-in-white allowed the seats to be installed lower in the vehicle and secondly the seat itself was made shallower. The combined effect of these measures for the customer is a sitting position that is approx. 0.39 in lower. The result is considerably better headroom, particularly for people with a long upper body.

Improved ease of access to the storage area in the rear and ease of entry

Ease of access to the storage area behind the front seats and ease of entry have been improved by means of two measures: firstly the backrests can be swivelled forward another 19°. Moving the swivelling axis of the backrest forward creates more space when the backrest is folded down, making it easier to climb into the rear.

Secondly the backrest swivel mechanism is now smoother, even under load. This means the backrests can be unlatched without much force, even if braced by a load.

Light-weight construction

The overall weight of the vehicle has a direct influence on performance and fuel economy. The consistent use of light-weight construction techniques in the new seat system has facilitated a reduction in weight despite the higher strength requirements. As a result, the new seat system is approx. 13.2 lbs lighter than a predecessor seat equipped with comparable functions.

Occupant protection

In-seat thorax airbag

The revised Porsche Side Impact Protection System (POSIP) includes three airbags for each front seat. In addition to the front airbag and the head airbag integrated in the door-trim panel, there is an additional thorax airbag integrated in the outer side piece of the front seats. The thorax airbag has a volume of approx. 8 litres.

Higher backrests with improved headrests

The increase in body size already mentioned in the section on "Comfort" has been taken into account with a 1.97 in increase in backrest height. This ensures that the backrest with integrated headrest provides protection for the entire body, no matter the size.

The gap between the back of the head and the headrest has been reduced by tilting the backrest mounts towards the occupant. This reduces the occupants' risk of whiplash in the event of a rear-end collision.

7.6.1 Seat adjustment

Standard seat

The standard seats in the new 911 Carrera can be adjusted in six directions. The backrest recline is adjusted electrically, while the length and height are adjusted mechanically. Height adjustment is performed using a newly developed stepper mechanism located between the seat and the sill.



Fig. 60: Fully electric seat

Fully electric seat

With the fully electric seats, all seat settings can be adjusted electrically via controls on the sill side of the seat cushion. Electric seats can be adjusted in 12 directions. They offer the same adjustment options as the standard seats, plus adjustment of the seat cushion incline. The mechanism for adjusting the seat cushion incline is not linked to the backrest recline.

This means that the backrest recline does not change when the seat cushion incline is adjusted (therefore the backrest does not have to be readjusted).

A further feature of the fully electric seat system is the pneumatic four-way lumbar support. This support is provided via inflatable air cushions whose fill level is recorded by displacement pick ups. This means that the lumbar support setting, like all other seat settings and the driver's door mirror setting, can be saved and called up using the memory function (driver's side only).



Fig. 61: Sports seat

Sports seat

A sports seat is offered as an option to allow the customer to add a sporty character to the vehicle should they wish (Carrera S: optional at no extra charge). It is based on the six-way standard seat and offers improved lateral support. This is achieved with higher side pieces in the seat cushions and backrest as well as extended support in the shoulder area. Other features of the sports seat include firmer padding and a sportier design.

Adaptive sports seat

The adaptive sports seat represents a further step towards an individually adjustable sports seat. It combines the advantages of the fully electric 12-way seat with the increased lateral support and design of the sports seat. It also offers four-way side piece adjustment so that the interior dimensions of the seat cushion and backrest can be enlarged or reduced independently of each other.

Unlike static sports seats, adaptation enables the seat to be co-ordinated to the driver, clothing and driving style (cruising or sporty).

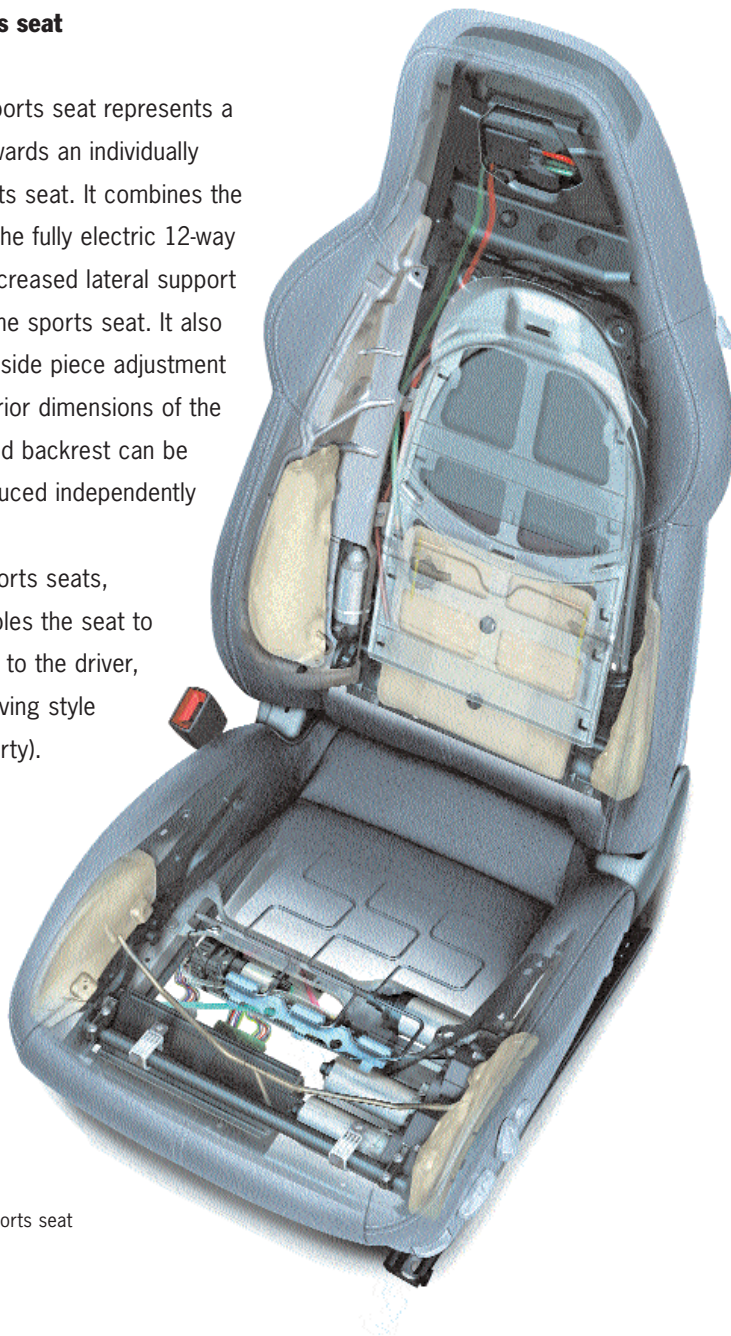


Fig. 62: Adaptive sports seat

7.7 Rear seat system

The look and feel of the new interior has been continued throughout the vehicle, from the front seats to the padding of the new rear seats. From a structural point of view, however, the proven rear seat substructure of the previous model has been retained.



Fig. 63: Adaptive sports seat controls

Overview of adjustment options

Attribute Seats	Standard seats	Fully electric seats	Sports seats	Adaptive sports seats
Longitudinal adjustment	manual	electric	manual	electric
Height adjustment	manual	electric	manual	electric
Backrest recline adjustment	electric	electric	electric	electric
Seat recline adjustment	n/a	electric	n/a	electric
Seat belt height adjustment	manual	manual	manual	manual
Adjustable lumbar support (with memory function)	n/a	electric pneumatic	n/a	electric pneumatic
Side piece adjustment	n/a	n/a	n/a	electric pneumatic
Memory scope	n/a	electric seat settings, lumbar support, driver's door mirror	n/a	electric seat settings, lumbar support, driver's door mirror

8 Heating /air conditioning

Like the previous model before it, the 911 Carrera features automatic climate control with combined interior air filter (active carbon and pollen) as standard. The automatic climate control used in the new 911 Carrera is a further development of the old system. It was revised to ensure more even and more comfortable ventilation of the passenger area.

The new air conditioning system

- ensures more even ventilation of the passenger area
- is considerably less prone to drafts
- is considerably quieter
- offers increased functionality

It differs visually from the predecessor generation through the new climate control interface in the center console.

The main changes to the control interface are:

- Integration of the interior temperature sensors (previously in the dashboard on the passenger's side)
- Integration of the switches for heating the driver's and passenger's seats (previously in the center console)
- Integration of the button for heating the rear window (previously located beside the operating unit)
- Introduction of switches for adjusting the temperature and fan power (previously plus and minus buttons)



Fig. 64: Control panel for the air conditioning system

- Labelling of the button for switching the air conditioning compressor on and off with "ECO" (a symbol of a snowflake was previously used)

The integration of the switches for seat and rear window heating in the air conditioning control interface has resulted in a logical overall concept in the new 911 Carrera. All of the heating functions in the vehicle are now together in a single unit.

Improvements in more detail:

The entire air conduction system has been reworked to make it more efficient. The redesigned air distribution system with larger, more uniform pipe cross sections and optimised lateral distribution for the left- and right-hand sides of the vehicle in particular ensure more homogeneous air conditioning for the passenger compartment.

The new design of the air routing system ensures the availability of a greater volume of air. This means that with the same air throughput, the same level of ventilation as before can be achieved by reducing the power of the fan. This results in fewer drafts and less flow noise.

The redesigned passenger vents in the dashboard permit a higher degree of individualisation for the driver and passen-

ger. The increased vertical and horizontal adjustment range of the vents and the separate left/right knurled wheel for the center vent permit a more individual air setting than was previously possible.

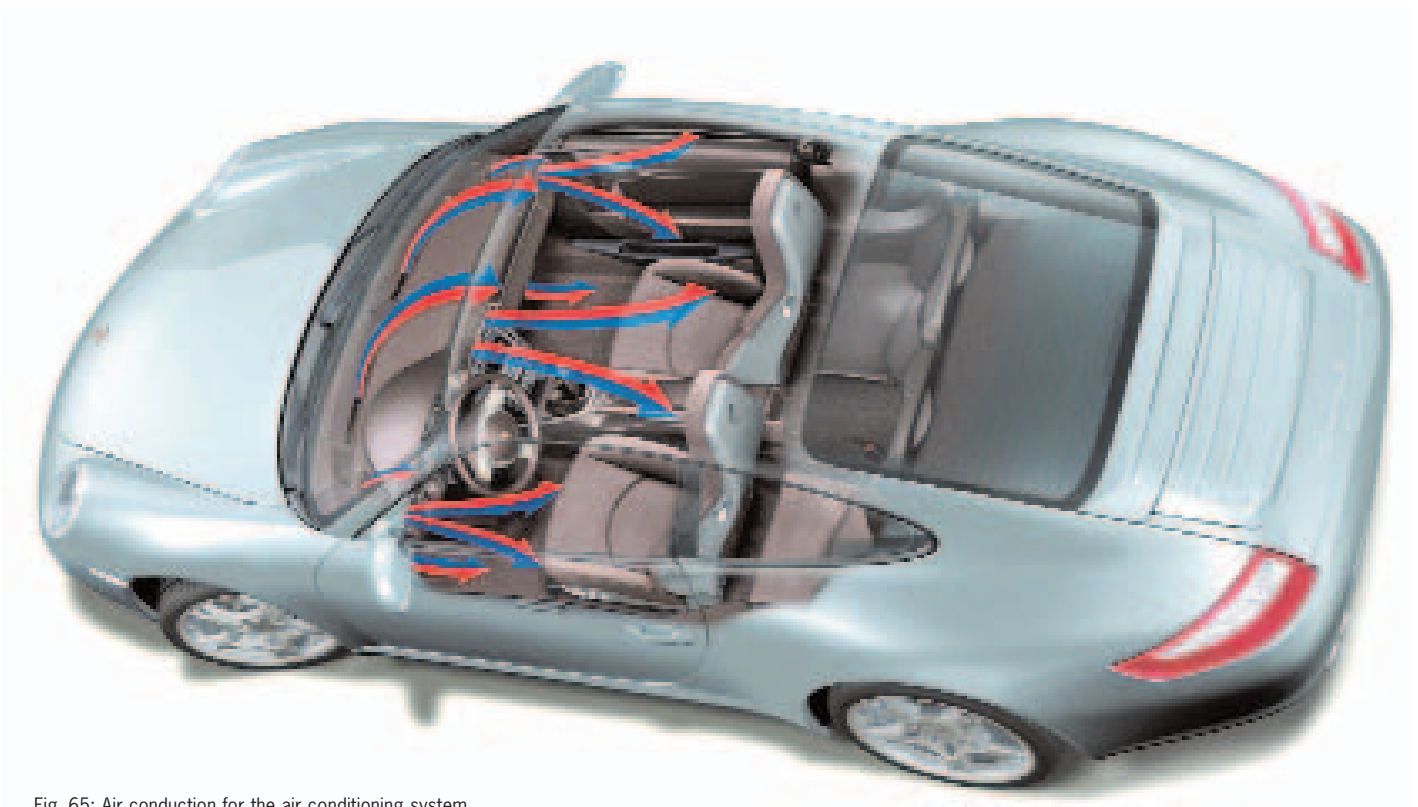


Fig. 65: Air conduction for the air conditioning system

8.1 Glazing

The 911 Carrera offers a special new feature in the area of glazing: it is now fitted with hydrophobic side windows (front). These windows are much less susceptible to soiling than conventional windows. This substantially improves the transparency of the windows and therefore the overall view in the rain and in winter weather conditions (when de-icing salt may be used).

Another new feature is the revised glazing concept.

The amount of rubber visible around the windows has been reduced through the use of thinner seals. This technique results in aesthetically pleasing glass edges at the front and rear windows that emphasise the clean lines of the vehicle as a whole.

The new roof frame seal (transition between the window and body in side profile), manufactured using a two-component spray technique, also adds to

the impression of quality. The seal is manufactured by spraying a soft rubber profile directly onto a rigid guide rail. This technique is especially suited to producing curve radii.

9 Electrics

9.1 Main headlight

The main headlight has been completely redesigned as part of the development of the new exterior design. The new design has the marker light, fog light and indicator light housed in a separate module. This has enabled the main headlight to be made more compact and rendered in a typical Porsche oval shape. The separation of the light modules has also allowed the realisation of a typical night-time design that identifies the new 911 Carrera as a Porsche at first glance and further differentiates it from the Boxster series.

The main headlight of the 911 Carrera is an important feature of the new face of the 911 Carrera. It represents the marriage of innovative design and tradition and helps to define the character of the new 911 Carrera. As on the previous model, the main headlight is fitted with a clear plastic cover and projects its volumous flux onto the road using a projector module and free-form reflector.

The new main headlight on the 911 Carrera uses halogen technology as standard. The dipped beam is emitted from an H7 long-life bulb (12V/55W) while the high beam is provided by an H9 bulb (12V/65W). The range and road illumination properties of both these beams have been adapted to the high performance of the 911 Carrera. There is also an additional reflector around the dipped beam module. It is illuminated by a portion of the dipped beam and serves to brighten the surroundings.

The option of using the dipped beam as so-called daytime running lights (in com-



Fig. 66: Halogen headlight

bination with the optional Sport Chrono Package Plus) is also new.

The H7 projection system offers the following advantages for dipped beam:

- Highly volumous fluxlight
- Considerably more light in the extreme range of the light/dark limit
- More defined light/dark limit resulting in less dazzle for other road users
- Homogenous illumination of the entire lane
- Broader lateral illumination than with the 911 Carrera MY 04 resulting in greater safety, particularly when driving around tight corners
- Reduction of dazzle for passers-by through the imposition of an upper restriction for the light/dark limit at the outer edge of the road. This restriction is higher than on the previous model (EU models). The result is a broader range at the outer edge of the road, however as the light is below the point of sight of passers-by it does not cause dazzling

- Longer dipped beam range than offered by competitors (almost 76,5 yard). This is due to the high installation position of the headlight above the road and the arrangement of the lighting components

The high beam emitted by the H9 bulb provides good range, which is particularly important when driving at high speeds.

The front light complements the design of the main headlight and fits elegantly into the design of the front end of the new 911 Carrera. It houses the marker light, fog light and indicator light. Like the main headlight, the front light is also fitted with clear glass and free-form reflectors. The housing is secured using invisible screws. The front light can be quickly and easily removed for maintenance using the release card enclosed with the information folder.

The indicator lights have been moved from the main headlight (previous model) and are now integrated in the front lights at the outer edges. This improves the visibility of the signal when the indicator light is on. The indicator light area has also been enlarged, which increases traffic safety.

Like the indicator lights, the marker lights have also been moved from the main headlight (911 Carrera MY 04) and are now located at the inner edge of the front lights. The gap between the marker lights and the dipped beam in the main headlight constitutes a new night-time design appropriate to the 911 (four-light look). A blue bulb (12V/5W, "blue vision") ensures that the light spectrum of the marker light is very similar to that of the main headlight, creating a uniform night-time design.

9.2 Bi-Xenon-main headlight incl. headlight washer system (optional on the 911 Carrera, standard on the 911 Carrera S)

The Bi-Xenon headlight is standard on the 911 Carrera S. In addition to the automatic-dynamic range adjustment mechanism, the gas discharge light system also includes the headlight washer system. The Bi-Xenon main headlight is similar in structure to the halogen version, the only difference being that the gas discharge lamp replaces the halogen bulb of the dipped beam at the top (the gas discharge lamp assumes the function of both the dipped beam and the high beam). The free-form reflector with halogen bulb (H11/55 W, long-life) mounted at the bottom of the main headlight is connected as an auxiliary main-beam headlamp. It is designed as a spot for better long-range illumination of the road.

The Bi-Xenon system offers the following additional advantages in comparison with the halogen headlight for dipped beam:

- Very high luminous flux
- High color temperature for good color perception

Like the halogen headlight, the Bi-Xenon headlight can also be used for daytime running lights.

The headlight washer system has been moved from the new main headlight and integrated in the front end (standard with the Bi-Xenon main headlight). It uses a chrome-colored cylinder that, when the system is activated, extends 3,27 in with the pressure of the spray water. The position of the spray jet has been further optimised in comparison with the



Fig. 67: Bi-Xenon headlight

previous model and is now located in front of the headlight. As a result the water spray now moves with the direction of movement of the vehicle. This means that instead of deflecting the spray water, the air flow can now in fact be used to increase its speed of delivery.

9.3 Front fog lights

The front fog lights have been separated from the main headlight module to enable them to be positioned considerably closer to the road surface. The improved lateral illumination and lower position help the driver to find their bearings more easily in foggy driving conditions.

9.4 Rear light unit

The new rear light unit is elegantly integrated in the rear of the vehicle. Red and smoked glass-colored function areas ensure a homogenous and highly refined appearance. The brilliance of the lights is reinforced by the horizontal stripe design of the lens and the metallised housing surface. The height of the rear light has been reduced in comparison with the previous model and the light itself made more compact so as not to interrupt the new, redesigned lines of the vehicle rear. The rear light unit combines the rear fog light, indicator light, reversing light, reflector, brake light and tail light in one housing.

Particular attention has also been paid to the new night-time design of the 911 Carrera when it comes to the rear view. The tail light, always very narrow on previous models, now extends across all three tail light chambers and so continues the night-time look. The bulbs in the rear lights are designed for long life to help reduce the cost of ownership. On left-hand drive vehicles, the rear fog light is located on the outer left side of the redesigned rear light (on the right side on right-hand drive vehicles).



Fig. 68: Rear light



Fig. 69: Center high-mounted brake light

The center high-mounted brake light is executed using LED technology and has been adapted to the new design of the rear lid. The wide rib in which the brake light is housed acts as an additional design element for the air inlet on the rear lid and so blends in seamlessly with the styling of the rear area. As on the previous model, there is a second brake light unit integrated in the rear spoiler to ensure visibility when the rear spoiler is extended.

The new LED technology has a number of clear advantages in terms of service life and response time. The response time of conventional bulbs is around 100 ms. LEDs respond after around 0.1 ms. This difference translates to a distance of almost 10 ft at a speed of 65 mph. Earlier indication of an intention to brake means more time for other drivers to react. LEDs also have a considerably longer service life (generally in excess of 10,000 hours) than conventional bulbs that need to be replaced after only 200–1,000 hours.

9.5 Failure check

Most exterior lights are equipped with a failure checking facility. In the event of a problem (e.g. bulb failure), a message is displayed in the instrument cluster for the following lights: dipped beam, high beam, marker light, indicator light, brake light, rear fog light, reversing light.

9.6 Front wiper system

The front wiper system features two wiping speeds and an interval setting controlled by a rain sensor.

The rain sensor is integrated in the foot of the interior mirror. When it rains, the wiping speed is automatically and continuously selected to suit the conditions. The sensitivity of the rain sensor is adjusted via the potentiometer in the steering column stalk. Having the wiper controlled via the vehicle electrical system control unit means that additional information is available for automatic regulation of the wiping speed and for error diagnosis. For example, the control unit can tell from data transmitted by the sun-position sensor in the automatic climate control system that it is night and can then regulate the wiper mode more sensitively if the rain sensor is activated. The wiping speed for the wipe/wash function is also variably controlled. The wiper function is automatically set to level 2 at speeds above 68 mph to provide the driver with a clear view as quickly as possible.

9.7 Rear wiper system (optional)

A flat aerodynamic wiper blade is being used for the first time for the rear wiper of the 911 Carrera. The low height of this new rear wiper blade and its connection via a twin wiper arm mean that the rear wiper now offers the wind a smaller frontal area. The wiper arm is now mounted directly on the rear window rather than on the wind trim, which enables it to blend in more seamlessly with the lines of the vehicle.

The rear wiper is activated by pressing the upper right steering column stalk.

Interval wiping commences when the lever is engaged. Like the front wiper system, the rear wiper control unit is also connected to the vehicle network. It is automatically switched off at speeds above 119 mph. The main reason for this is that the rear window does not get wet at these speeds and the rear wiper would be wiping a dry surface. It is also to prevent the aerodynamics of the vehicle being unnecessarily influenced by the wiping operation.

9.8 Door mirrors / interior mirror

9.8.1 Door mirrors

The door mirrors have been redesigned and represent an important element in the new exterior design. The connection to the mirror triangle is now executed using a double-strut concept, enabling a more delicate design with a double-arm mirror. The mirror housing has been redesigned and the mirror glass placed deeper in the housing. This provides better protection for the mirror against turbulence, the resultant soiling and possible vibrations at high speeds.

Both door mirrors are electrically heated and adjustable and, in the case of fully electric sports seats or adaptive sports seats, include a memory function. A self dimming feature is available as an option for both door mirrors and the interior mirror.



Fig. 70: Door mirror



Fig. 71: Interior mirror with rain sensor

9.8.2 Interior mirror

The interior mirror has been redesigned to reflect the changes in the interior design. The LED orientation light has been moved from the interior light module to the foot of the new interior mirror to avoid possible reflections and to provide better distribution of light. This is also a more discreet location. A self dimming feature is available for the interior mirror in combination with the door mirrors.



Fig. 72: ParkAssist sensors

9.9 ParkAssist (optional)

The 911 Carrera uses the smallest parking sensors on the market at the moment. They are inserted from the back into a bracket attached to the rear apron and clipped into place. This solution means that the old securing ring, which was visible from the outside, is no longer required. This further improves the homogeneous appearance of the rear apron.

9.10 HomeLink (freely programmable garage door opener)

For the first time the 911 Carrera is equipped with an integrated garage door opener, HomeLink.

HomeLink replaces up to three hand-held transmitters with a single system that is permanently installed in the vehicle and operated from the vehicle interior. It can be programmed to the frequencies of most normal hand-held transmitters used to actuate garage door and gate systems. It can also be used to control lighting and alarm systems once these are equipped with the appropriate radio receivers.

Two control units manage the entire system. The vehicle electrical system control unit reads in the three control buttons and the status LEDs and, as the master control unit, integrates the system in the vehicle network. The advantage of integration in the vehicle network is that it enables direct activation of the acknowledgement display for successful / unsuccessful learning and straightforward error diagnosis that can be performed using the Porsche system tester.

The HomeLink control unit is accommodated in the front end in the vicinity of the luggage compartment lock. It includes the radio module and controls the coding for the different country variants on the basis of the information provided by the vehicle electrical system control unit.



Fig. 73: instruments

9.11 Instruments

The instrument layout in the 911 Carrera was reworked during the redesign of the interior and all of the instruments, like the rest of the interior, are now illuminated with white light. The five individual instruments are now spaced further apart in the new instrument cluster. This enlarges the display area and thus improves readability. The dials in the S model are aluminium-colored while the dials in the basic model are finished in black. There are permanent digital indicators for total mileage, trip mileage, time, exterior temperature and, centered underneath the rev counter, current speed.

The voltmeter has been replaced by the oil temperature indicator in the left-hand round instrument. The warning lights, which were previously located underneath the round instruments, have been incorporated into the dials so that they are more directly in the driver's field of vision. The dot matrix display is still integrated in the center round instrument underneath the rev counter and now displays additional functions such as the tire pressure monitoring menu or the stopwatch from the Sport Chrono Package Plus. It is operated using the newly developed combined steering

column stalk with upgraded haptic. Also integrated in the right-hand steering column stalk are the interval switch for the front window wiper as well as the control for the rear window wiper. A one-touch function has been included in the left-hand combined steering column stalk for the indicator light. The lower steering column stalk for the optional cruise control has been redesigned to make it more intuitive.



Fig. 74: Vehicle key

9.12 Ignition lock with one-key system

The ignition key of the 911 Carrera has been both redesigned and ergonomically optimised. The buttons for unlocking the vehicle and the luggage compartment lid retain their function, but are now finished in robust ABS plastic for greater stability and a more comfortable feel. The remote control transmitter has had its range increased by approx. 50% so that it can be used from distances of up to 50 ft regardless of direction.

The 911 Carrera has an electronic ignition lock and an electromechanical steering column lock for increased anti-theft protection. Individual components cannot be replaced without the use of special testers and access codes belonging to the vehicle.

Once the key is inserted in the ignition, the data is read out via an inductive radio link. It is encrypted and transmitted to the driving authorisation control system, where it is evaluated. Following a positive result

- the power supply for Porsche Communication Management (PCM) is released,

- communication is established with the electromechanical steering column lock and another exchange of encrypted data takes place with the driving authorisation system. The steering column is unlocked if the key is positively identified. If the steering wheel is strained, a warning is displayed in the instrument cluster and the driver is asked to move the steering wheel so that the strain can be released and the steering wheel unlocked.

When the ignition key is turned clockwise, communication is established with the engine control unit (Motronic) and the key is identified once more. If the key is positively identified, the immobiliser is deactivated, the ignition switched on and the engine functions released.

Once the initial resistance is overcome with the key, the starter is activated and the engine starts. In order for this to happen, the clutch pedal must be depressed (interlock) in vehicles with manual gearbox or the brake pedal depressed and the selector lever set to "P" or "N" in vehicles with Tiptronic S. The key returns to its initial position once the starter is actuated. In vehicles with Tiptronic S, the brake pedal must be depressed in order to engage a gear (shift lock) and the selector lever set to the "P" to remove the key (key lock).

9.13 Cruise control

The controls for the cruise control system in the new 911 have been optimised. The new control lever now has 4 controls instead of 3. The command for "Interrupt" is executed by pressing the lever downwards. The command for "Resume" is executed by pressing the lever upwards. The command for

"Decelerate" is the same as the command for "Accelerate", the only difference being that the driver pulls the lever forward to slow down and pushes the lever forward to speed up.

On top of that cruise control can now be used in first gear and offers an extended speed range of (19 to 150 mph) for the new 911 Carrera (previous model: 25 to 130 mph).

Tiptronic S:

The new cruise control system offers the option of downshifts in vehicles with Tiptronic.

To maintain the desired speed when driving downhill, the cruise control system can initiate up to three downshifts to better utilise the braking effect of the engine. A downshift can also be performed to implement downhill deceleration requested by the driver by means of one-touch downshift or the "Decelerate" command if satisfactory deceleration were not possible in a higher gear.



Fig. 75: Power window operating unit

9.14 Power windows

The motor and electronics for the power windows are now located in the dry zone in the door, instead of in the wet zone as on the previous model. This means that the mechanism and the power window motor can be quickly and easily accessed by releasing just a few screws on the door-trim panel, making the system easier to maintain.

The door control unit is now connected to the CAN bus. This has resulted in a considerable improvement in both anti-pinch protection and thermal overload protection. A connection to the vehicle network means that the door control unit can now avail of more information for vehicle diagnosis.

The controls for the power windows are now located in the door-trim panels along with the memory buttons for the optional fully electric seats.

9.15 Interior lighting

The interior lighting in the 911 Carrera is based closely on the concept used in the previous model. New are the white LEDs for instruments and controls, which offer better illuminating power than the yellow LEDs used in the previous model. This has improved the readability of the instruments, particularly at dawn and dusk. The white color of the new LEDs is also substantially more comfortable for the human eye due to its composition. Another advantage is that it makes yellow and red warning symbols and lights stand out more. Lastly it gives the interior a higher-quality appearance and creates a more pleasant ambience.

9.16 Safety and exit lighting

The addition of automatic coming home lighting to the exit lighting represents yet another major increase in convenience. Automatic coming home lighting is pre-selected via the light switch. When the door is opened or the vehicle is unlocked using remote control, the front fog lights, tail lights and licence plate lights come on for 30 seconds to illuminate the surroundings. In vehicles with the Sport Chrono Package Plus, the duration for which the lights stay on can be changed in the "Individual Setting/Light" menu option.

The sun-position sensor in the automatic climate control system monitors the ambient brightness to prevent the lights being switched on unnecessarily.

9.17 Networking

Electronic networking in the 911 Carrera allows data and electrical information to

be exchanged between various control units throughout the vehicle. This is realised with the aid of the internal high-speed network, the so-called CAN-BUS (Controller Area Network), and the fibre-optic network, the so-called MOST-BUS (Media Orientated System Transport).

In the 911 Carrera, up to 29 control units can be exchanging up to 2 MB of data per minute via the CAN bus at any time. Approx. 2,500 different signals have been defined to this end.

Networking reduces the number of connections required so that the total length of cabling required can be kept significantly shorter.

Most of the network connections can be found in the following areas:

- In the area of engine management for high-speed information exchange.
- In the area of co-ordination of networked control engineering. Thus a PSM braking operation, for example, involves the control units for the brakes (PSM), engine, tire pressure monitoring system and Tiptronic S.
- In the area of audio/communication for the joint transmission of digital audio and control data via the MOST-BUS.
- The use of network connections has enabled a reduction in weight of approx. 11 lbs in the new 911 Carrera, even though functionality has been extended.

All safety- and driving-related information is transmitted via the CAN BUS, while the large data volumes for audio/navigation are transmitted via the optical MOST-BUS.

10 Safety and security

10.1 Anti-theft protection

The 911 Carrera is protected by an anti-theft alarm system with interior surveillance as standard. The anti-theft protection system is essentially the same as in the previous model, however it does have some new features which are described in brief below:

Interior surveillance is now executed using a radar sensor instead of an infrared sensor. The advantage of the radar sensor is that it is insensitive to reflections from particularly bright interior leathers. This means that interior leathers in colors to sample can be used without any problem.

The alarm contact for the storage bin in the center console is no longer required since the bin is now linked in to the central locking system.

As well as unlocking via remote control, the car can also be unlocked via the door lock cylinder. This mechanically opens the driver's door. It does not, however, deactivate the anti-theft alarm system, just interior surveillance and the door contact on the driver's side. If the ignition key is not inserted and successfully identified using the transponder housed in the key within 15 seconds, the alarm will be triggered. If the door on the new 911 Carrera is not opened within 20 seconds of being manually unlocked, it is automatically locked again and all alarm contacts and interior surveillance activated.

10.2 Active safety

The 911 Carrera and 911 Carrera S offer a very high level of active safety. Two of the most important contributing factors here are the engines with their outstanding power and torque and the high-performance braking system. With plentiful reserves of acceleration and torque on tap, it is easy to overtake or merge into a stream of traffic, and the brakes ensure rapid and consistent deceleration in an emergency.

The chassis on both models ensure superior agility and combine high lateral acceleration with good driving stability. The PASM chassis standard on the S model proves that maximum comfort and maximum performance do not have to be mutually exclusive. The PASM chassis offers clear advantages when it comes to driving stability through automatic activation of different damper characteristics depending on the driving style and road surface. For example, the dampers are switched to a more stable shock absorption setting even in normal mode to increase active driving safety at top speed. This reduces the tendency of the body to tilt when changing lanes or performing evasive manoeuvres and considerably improves the driver's control over the vehicle.

PSM, standard on the 911 Carrera, offers a major improvement in stability, even on the most treacherous road surfaces or at the limits of the car's driving dynamics. The continued development of PSM has resulted in an improved control quality and therefore a shorter braking distance, while retaining all of the known benefits of the system. In addition the control comfort has been increased through smoother interventions and the control noises reduced.

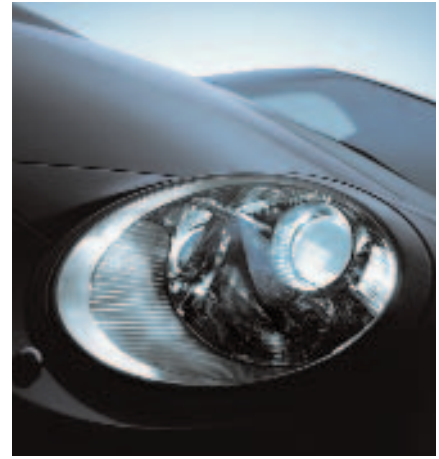


Fig. 76: Bi-Xenon main headlight switched on

The operating concept of the new 911 Carrera has been optimised throughout to ensure reliable operation of all functions in any given driving situation. This, together with an excellent panorama view for a sports car, is an important contribution to active driving safety.

The new headlights with their improved road illumination and the resultant improved view for the driver, particularly at high speeds, also contribute to active driving safety.

The following points in particular, which are of major significance for high active safety, have been further improved on the new 911 Carrera and Carrera S:

- Safe behavior during lane changes, even at high speeds
- Very good acceleration potential and driving stability
- High potential lateral acceleration
- Agile, direct and targeted steering
- Short braking distances
- High level of braking stability during cornering and straight-ahead driving
- PSM control system to assist the driver when exploiting the vehicle's performance to the full

10.3 Passive safety

The new 911 Carrera does not just comply with the relevant standards on passive vehicle safety in all countries of sale, it actually significantly exceeds upon the limits prescribed in legislation for frontal, oblique, side and rear impact as well as overturning.

To guarantee this, the structure of the body-in-white and doors has been further optimised in comparison with the previous model.

In order to satisfy the increased requirements for frontal impact, a new bulk-head cross member made of high-strength steel has been used in the front of the vehicle. The purpose of the bulk-head cross member is to absorb the forces introduced by the front side member structures. The more rigid design of the cross member reduces footwell intrusion in the event of a crash to provide better foot and leg protection for the passengers.

Reinforcement of the overall vehicle structure has been mainly achieved through the use of the spot welding/bonding method and through the revised joint design.

The window slot reinforcement of the doors has also been optimised. This reinforcement transfers the forces introduced to the rear of the vehicle via the upper door load path and a support on the side section. This has further improved the deformation behavior and the integrity of the passenger cell (important for protecting passengers).

In addition to the 3-point automatic belts on all seats (with belt tensioners and belt-force limiters in front), the 911 is fitted with six airbags as standard. This includes two new fullsize front airbags and the improved POSIP

(Porsche Side Impact Protection) system which now comprises a thorax airbag integrated in the side of the backrest of the front seats and a new head airbag in the door.

10.3.1 Seat belts

The seat belts for the new 911 Carrera have been retained from the previous model. The belts for the driver and front passenger are equipped with pyrotechnic belt tensioners and belt-force limiters. As on the previous 911 Carrera Coupé, the belt height is adjusted at the B-pillar to ensure an optimum seat belt fit.

Rear passengers are also provided with 3-point automatic belts.

10.3.2 Front airbags

The 911 Carrera is fitted with fullsize airbags for the driver and front passenger as standard.

In addition to the crash sensor integrated in the airbag control unit on the center tunnel, there are two sensors in the front of the vehicle mounted near the headlights for detecting the point and direction of impact. This enables earlier and more accurate sensing of crashes, particularly complex impact scenarios such as offset crashes.

This has the major advantage of further reducing passenger injuries in a crash.

As on the previous model, the passenger airbag is housed in the upper area of the dashboard. The airbag flap, which used to be visible, has now been integrated in the dashboard to produce a more homogenous styling effect. In combination with the leather interior,

decorative seams hint at the styling of the airbag.



Fig. 77: Vehicle with airbags

10.3.3 Side airbags

The new 911 Carrera is the first car on the market to use the new generation of the standard Porsche Side Impact Protection System (POSIP). It now comprises two airbags per side: one thorax airbag and one head airbag.

A specially adapted thorax airbag is now integrated in both the driver's and passenger's seat to provide optimum protection for the upper body in a side impact. In the event of a crash the airbag, which has a volume of approx. 8 litres, is inflated by a gas generator based on hybrid technology.

In addition to the thorax airbags, there is also a separate head airbag in each door. With a volume of approx. 8 litres as well, this airbag offers effective head protection. In the event of a side impact it unfolds from the upper section of the door-trim panel in the shape of a flat cushion. Like the thorax airbag, the head airbag is also inflated using a hybrid generator.

The sensors for detecting a side impact and thus for activating the side airbags are located in the airbag control unit on the center tunnel and in the area of the side sills (new on the 911 Carrera).

offer even better head support in crashes.

10.3.4 Passive safety in the passenger compartment

The seat belts on all seats and the standard front and side airbags offer passengers excellent protection in a crash.

This protection is further enhanced by a safety-oriented passenger compartment design. Energy-absorbing structures in the dashboard and, for example, the pillar linings reduce the injuries suffered by passengers in the event of a crash.

The front-seat headrests in the new 911 Carrera have been increased in height by 1.97 in and moved closer to the head to reduce the risk and/or the effects of whiplash. As a result they now

11 Environment

Environmental protection has a long tradition at Porsche. All Porsche sports cars comply with current exhaust emission regulations, and even with some that have not yet been passed into legislation. This is particularly true of the cars in the top performance class, such as the 911 Turbo, 911 GT3, 911 GT2, Carrera GT and Cayenne.

11.1 Materials / recycling

Material selection plays an important role in the environmental compatibility of a vehicle. Environmental compatibility is assessed by examining the entire life cycle of the vehicle from provision of the raw materials through production and utilisation to recycling of the end-of-life vehicle.

Light-weight construction techniques contribute to environmental compatibility by reducing fuel consumption during the utilisation phase. Light-weight construction is realised on the 911 Carrera through a high percentage of high-strength (which means less material can be used) sheet steels, aluminium cast alloys and plastics. The luggage compartment lid, engine block, cylinder heads, pistons, transmission housing, suspension control arms, front and rear axle components, wheels, brake calipers and oil cooler are all examples of where aluminium has been used in the body, engine, gearbox and chassis to reduce weight. The intake module and valve hood of the 911 Carrera S have been made of plastic instead of metal.

Porsche vehicles are extremely durable. Even older vehicles have such a high residual value that they are rarely

recycled. Nonetheless, once they have reached the end of their life they can be adequately recycled using conventional methods to comply with all current statutory requirements. The same applies to the 911 Carrera, 85% of which can currently be recycled.

The EU guideline on end-of-life vehicles requires that vehicle manufacturers use more recycling material to expand the corresponding markets. This particularly applies to plastics, which in recent years account for an ever increasing percentage of vehicle weight. Pure types of production waste or faulty batches do not necessarily have to be disposed of as waste. They can be reprocessed and used as plastic recyclate in the manufacture of new parts. Bearing in mind the strict quality requirements of the Porsche developers, recyclates fulfil the same technical requirements as new material. Examples of parts made of 100% plastic recyclate are wheel housing liners, various covers, spoilers, covers and housings.

11.2 Noise / acoustics

The Porsche 911 Carrera should be recognisable not only from its design and technology, but also the typical Porsche, load-related sound of both the exterior noise and interior noise. This goal has of course been brought into line with statutory requirements. Porsche engineers have managed to comply with all worldwide noise regulations.

The increased size of the wheels results in a tendency to produce more tire noise. This problem was addressed in an early phase of development and led to Porsche engineers working with the tire manufacturers to minimise tire noise

through a favourable profile design and rubber mixture. Support bearings with so-called Celasto inserts were also used. These inserts are made of foamed PUR (polyurethane) and offer advantages in the area of acoustics and chassis tuning. Among other things, they permit a further reduction in tire noise.

Reducing wind and tire noises has allowed greater emphasis to be placed on the engine sound. The 911 Carrera delivers a typical Porsche sound in every driving situation without polluting the environment with excessive noise. To optimise the sound in the passenger compartment, the 3.8 litre engine uses a controlled Helmholtz resonator within the air filter housing as well as a large air filter opening covered with polyamide fabric. Undesired noises can also be insulated by adjusting the volume of the Helmholtz resonator according to the engine speed.

The insulation (for the passenger compartment) has been developed to optimise the typical Porsche interior sound while retaining the interior noise level. The absorbing effect of the components has been improved without fundamentally impairing the insulating effect through the selective use of new insulating materials. One of the goals in adjusting the passenger compartment sound has been to reduce background noise in the higher frequency range and to greater emphasise the sporty, load-related exhaust and intake noises between 300 and 600 Hz.

Polyester nonwoven stampings have replaced the old polyurethane moulded foam parts and cotton fibre nonwoven absorbers. As a unitary system the new components are now 100% recyclable. The absorbing effect vis-à-vis the

passenger compartment has also been optimised through a new floor carpet composition with nonwoven fabric reinforcement.

Light-weight construction techniques have facilitated a reduction of 11 lbs in the total weight of the insulation. Over 80% of the insulation components in the 911 Carrera Coupé have been fundamentally modified.

12 Audio and communication

12.1 Basic equipment, PCM incl. Sound Package Plus

Porsche Communication Management (PCM) is standard in the 911 Carrera. It has been given a facelift to fit in with the overall design of the new interior and features white LED lighting with one-touch buttons. The navigation system is now available as an additional module on request. The decision to split these two modules and accommodate the DVD navigation drive in the luggage compartment was made so that the CD drive of PCM could be designed exclusively for audio CD drives. This means that the driver no longer has to make the tedious switch between audio and navigation CDs.

Various functions of PCM are supported by the new, optional multi-function steering wheel. Among other things, this multi-function steering wheel has a screen key that can be assigned different PCM functions. These functions are programmed in the Set menu of PCM.

Also standard in the new 911 Carrera is Porsche Sound Package Plus. With its 9 loudspeakers and external analogue amplifier, it offers a superior sound experience and plentiful sound reserves for all driving conditions. This is further reinforced by considerably larger loudspeaker grilles.



Fig. 78: PCM with multi-function steering wheel

The following loudspeakers are used:

Loudspeakers

- Dashboard:
 - 2x 0.75 in high-frequency loudspeakers
 - 1x 2.76 in mid-frequency loudspeaker
- Door:
 - 2x 3.94 in mid-frequency loudspeakers
 - 2x 7.87 in low-frequency speakers
- Rear:
 - 2x 3.94 in mid-range loudspeakers

The loudspeakers are powered by a 4 x 25 watts amplifier integrated in PCM as well as an external analogue amplifier accommodated in the luggage compartment. The external amplifier supplies the power for the low-frequency loudspeakers (2 x 70 watts) and the mid-frequency loudspeakers in the dashboard (40 watts). Filter stages in the analogue amplifiers match the audio characteristics to the special interior acoustics of the 911 Carrera.

12.2 Navigation

The navigation module has also been thoroughly revised in the course of development of the new PCM. The new navigation module includes a DVD navigation drive in the luggage compartment. For the first time it can provide constant navigation guidance within an entire continent (e.g. western Europe or USA/Canada) since all data can be stored on one DVD. The generous memory depth of the DVD means that the full digitisation depth of the underlying map can now be accessed. The DVD drive has much faster data access times than the CD drive. This allows for faster identification of navigation routes and faster map refresh rates. Furthermore the digital map now has considerably more zoom levels for greater magnification of the map material.

12.3 Integrated aerial system

The aerial diversity system available as an option in combination with PCM on the previous model is standard on the 911 Carrera. The aerials are located in the radiator tank and in the windscreen and guarantee very good reception.

12.4 Telephone module

The handsfree system of the telephone module has been matched to the interior of the new 911 Carrera and the speech quality further improved. The microphone has been moved from the instrument cluster to the steering column, thereby focussing the directional characteristic more on the driver.

The console for the passive receiver (optional) has been redesigned and directed more towards the driver's seat for more convenient operation.

12.5 Telephone preparation (optional)

For the new 911 Carrera a mobile phone preparation is available. Included are aerials, power supply, microphone, VDA-interface and mounting console. A mobile phone adapter console is necessary.

12.6 Bose Surround Sound system (digital, optional)

The completely re-engineered Bose Surround Sound system writes another page in the living history of Bose sound systems in Porsche vehicles. This confirms the position of Porsche and Bose as leaders in their respective industries. This is the first time that a Surround Sound system has been offered in a 911 Carrera. Thirteen loudspeakers and a 7-channel digital amplifier integrated in the digital MOST bus ensure a sound experience never before experienced in the sports car segment.

The Bose Surround Sound system contains the following components:

Loudspeakers

- Dashboard:
 - 2x 0.19 in neodym high-frequency loudspeakers ("soft-dome spherical cap")
 - 1x 2.76 in neodym mid-frequency loudspeaker
- Door:
 - 2x 3.15 in neodym mid-frequency loudspeaker
 - 2x 7.87 in neodym low-frequency loudspeakers
- Rear:
 - 2x 0.19 in neodym high-frequency loudspeakers ("soft-dome spherical cap")
 - 2x 3.15 in neodym mid-frequency loudspeakers
- Rear shelf:
 - 1x active subwoofer with 2x 5.12 in low-frequency loudspeakers (bass reflex system)

Audio electronics

- 7-channel MOST digital amplifier with 5x 25 watts linear amplifiers and 1x 100 watts switching amplifier
- Additionally 1x 100 watts switching amplifier integrated in the active subwoofer
- External microphone (housed in the steering column cover) for detecting background noise in the passenger compartment

Signal processing

- Center fill and surround stage
- Centerpoint signal processing technology
- Active electronic equalisation
- Dynamic loudness function
- Bose AudioPilot

Functionality

The following settings must be made in the sound menu of the PCM:

- Adjustment of the sound using base and treble setting
- Adjustment of the sound focus using fader and balance
- Activation of AudioPilot
- Activation of Surround Sound (Bose Centerpoint technology)

Center fill and surround stage

The additional center fill loudspeaker in the center of the dashboard is activated using data from the left- and right-hand channel via a special signal processing system (surround stage). This ensures an optimum and balanced sound for all passengers.

Centerpoint

signal processing technology

The Centerpoint system is a surround decoder specially developed for the limited auditory environment in vehicles. The algorithm used by this proprietary Bose technology delivers an exclusive sound experience with exhilarating Surround Sound pleasure. The technology also converts conventional audio sources such as CDs, or even stereo recordings, into five separate audio channels.

Active electronic equalisation

In order to achieve a high-fidelity sound experience, Bose active electronic equalisation exactly adapts acoustic reproduction to the specific acoustics of the vehicle interior. The reproduction of all frequencies is adapted so as to ensure that all passengers enjoy the same superior sound quality, regardless of where they are sitting.

Dynamic loudness function

The dynamic loudness function enables the bass tones to be amplified at low volume levels. This compensates for the reduced sensitivity of the human sense of hearing in the bass range. This process functions much more precisely than conventional loudness control systems. The base tones are amplified in such a way that there is no audible change.

Bose AudioPilot

The AudioPilot automatically controls the sound and volume as a function of background noises in the passenger compartment such as wind, tire noise and conversation. This functionality ensures a constant acoustic impact in all driving conditions, which means that the driver does not have to continuously readjust the sound. The background noises are recorded by a special microphone in the steering column cover and processed. A considerable improvement in comparison with the system in the previous model has been achieved through the use of additional information (speed, etc.) in the control algorithm. As a result, the volume control is now much more robust and almost all unwanted fluctuations in volume have been eliminated.

Surround Sound

(Bose Centerpoint technology)

Bose Automotive Surround Sound can be switched on at the touch of a button. This system uses additional independent audio channels in the front and rear of the vehicle to produce a lifelike and high-fidelity 360° sound experience. The BOSE-patented signal processing system increases the stereo sound of stereo recordings, resulting in a much more refined sound experience. The intensity of the surround effect can be precisely set in the Sound-Set menu (from -12 to +9).

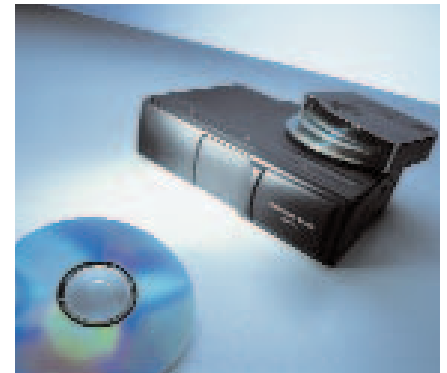


Fig. 79: CDC-4 CD autochanger

12.7 CD autochanger (6-disc)

The CDC-4 CD autochanger module was retained from the previous model and is available as an option. The 911 Carrera is fitted with a CD autochanger preparation comprising a prelaidd fibre-optic cable (MOST) and a cable for the power supply in the luggage compartment as standard, so that a CD autochanger can be easily retrofitted.

13 Equipment

13.1 Standard equipment

S = Standard O = Option	911 Carrera	911 Carrera S
Engine:		
6-cylinder horizontally opposed aluminium engine, 3.6 l displacement, maximum output 239 kW (325 hp), maximum torque 273 ftlb @ 4,250 rpm 2 tailpipes with brushed finish	S	
6-cylinder horizontally opposed aluminium engine, 3.8 l displacement, maximum output 261 kW (355 hp), maximum torque 295 ftlb @ 4,600 rpm 2 dual tailpipes with brushed finish		S
Engine technology: <ul style="list-style-type: none"> • Aluminium engine block and cylinder head • Water cooling • Four-valve technology • Camshaft adjustment with "VarioCam Plus" valve lift control • Hydraulic valve clearance compensation • Integrated dry sump lubrication • Electronic engine management system (Motronic ME 7.8) • Electronic accelerator pedal (E-gas) • Hot film mass air flow sensor • Fuel injection (sequential; multipoint) • Cylinder-specific knock control • 2 three-way catalytic converters • Stereo lambda control circuits • Individual ignition coils, static high-voltage ignition system • Multi-stage resonance intake system • Idle compensation device • On-Board Diagnosis system for monitoring the exhaust emission control system 	S	S
Transmission:		
Six-speed manual gearbox with dual-mass flywheel	S	
Six-speed manual gearbox with dual-mass flywheel and X-Tend clutch for 3.8 litre engine		S
Chassis:		
8J x 18 Carrera III light-alloy wheels (flow-forming) with 235/40 ZR 18 tires at the front, 10J x 18 Carrera III light-alloy wheels (flow-forming) with 265/40 ZR 18 tires at the back	S	
8J x 19 Carrera S light-alloy wheels (flow-forming) with 235/35 ZR 19 tires at the front, 11J x 19 Carrera S light-alloy wheels (flow-forming) with 295/30 ZR 19 tires at the rear,	O	S
Tire sealing compound and electrical compressor	S	S
Power steering with variable steering ratio	S	S
Strut suspension (McPherson, Porsche-optimised) at the front	S	S
Multi-link LSA rear axle at the rear	S	S
Porsche Stability Management (PSM) with ABS, ASR and ABD	S	S
Porsche Active Suspension Management (PASM) incl. 0.39 in lowering	O	S

S = Standard O = Option	911 Carrera	911 Carrera S
Brake system:		
4-piston monobloc fixed caliper brakes front and rear	S	S
Internally ventilated and perforated brake discs front and rear	S	S
Power-booster brake system (911 Turbo) with brake disc diameter of 12.99 in		S
ABS (8.0) (integrated in PSM)	S	S
Brake pad wear monitor at each brake pad	S	S
Brake calipers anodised black	S	
Brake calipers painted red		S
Body:		
2+2-seater coupé	S	S
Sheet steel hot dip galvanised on both sides	S	S
Automatically extending rear spoiler	S	S
Front end with integrated cooling-air openings	S	S
Titanium-colored logo on rear lid	S	
Silver-colored logo on rear lid		S
Luggage compartment lid in aluminium	S	S
Curved door handles	S	S
Door stops with 3 index positions	S	S
Front side windows with hydrophobic coating	S	S
Underbody panels	S	S
Electric tilting/sliding roof	S	S
Electrics:		
Power windows with one-touch operation and short-stroke lowering	S	S
Windscreen washer system with 2 wiping speeds, rain sensor interval setting and heated dual nozzles	S	S
Heated door mirror (double-arm), electrically adjustable, aspherical on driver's side	S	S
Heated rear screen	S	S
Porsche Communication Management (PCM) Information system comprising 5.8-in screen, 12-button keypad, dual-tuner radio with integrated audio CD drive, aerial diversity and on-board computer with parallel display in the dot matrix instrument cluster	S	S
Sound Package Plus with CD tray in the glove compartment	S	S
Standardised white lighting concept for the interior with continuous dimming	S	S
Footwell lighting	S	S
Central locking with remote control incl. luggage compartment release	S	S
Electric luggage and engine compartment release	S	S
Alarm system with radar interior surveillance	S	S
HomeLink	S	S
CD autochanger preparation	S	S

S = Standard O = Option	911 Carrera	911 Carrera S
Light system:		
Modular clear-glass main headlights (projection beam headlights, lens-free)	S	
Bi-Xenon headlights	O	S
Separate additional lights in the front end with parking light, indicator light and front fog light	S	S
Rear fog light on driver's side	S	S
Center high-mounted brake light in LED technology	S	S
Automatic coming home lights	S	S
Instruments:		
5 dial-type instruments integrated in the cockpit	S	S
Instrument cluster with central rev counter and multi-function display	S	S
Displays for oil pressure, oil temperature, coolant temperature and tank capacity	S	S
On-board computer	S	S
Permanent indication of total mileage, trip mileage, time, outside temperature and speed	S	S
Cruise Control	S	S
Passive safety:		
Porsche Side Impact Protection System (POSIP) comprising: <ul style="list-style-type: none"> • head airbags integrated in the door-trim panels • thorax airbags integrated in the side pieces of the front seats • side-impact protection in the doors 	S	S
Deformable front and rear end with integrated light-alloy bumpers	S	S
3-point automatic belts front and rear, seat buckle on seat and height adjustment in the front	S	S
Belt tensioners and belt-force limiters in the front	S	S
Passive restraint system, driver and passenger airbag, preparation for child seat detection	S	S
Preparation for LATCH (UCRA) child seat mounting (passenger airbag is automatically deactivated if Porsche child seats are used)	S	S
Immobiliser (transponder system), safe locking system, alarm system and interior surveillance	S	S
Air conditioning:		
Automatic air conditioning with integrated active carbon filter and automatic recirculation function when the windscreen washer system is activated	S	S
Green-tinted heat insulating glass	S	S
Windscreen with grey top tint	S	S

S = Standard O = Option		911 Carrera	911 Carrera S
Interior equipment:			
Driver and passenger seat with electrical backrest adjustment and manual length and height adjustment		S	S
Extended headrests integrated in front seats		S	S
Front seats partially upholstered in leather (center section, side pieces/head rest)		S	S
Standard equipment on the 911 Carrera/S in standard colors (data in brackets for 911 Carrera only)		S	S
<u>Standard colors:</u>	Black, Stone Grey, Sand Beige, Sea Blue, Palm Green.		
<u>Covered in grained leather in interior color:</u>	steering wheel rim, door handle, lid of the door storage bin, extension of the door storage bin lid, lid of the storage bin in the center console, shift/handbrake lever or Tiptronic selector/handbrake lever		
<u>Painted in an aluminium-look finish:</u>	Tiptronic S switches and steering wheel spoke bezels (left/right), glove compartment handle, door opener, shift/selector lever trim, cover of the automatic gate, air vent adjusters.		
<u>In Volcano Grey:</u>	instrument cluster rings, (decorative dashboard trim incl. cup holder cover), (side vents), (decorative shift/selector lever trim), lower part of the handbrake lever, Y-shaped cover of the standard steering wheel.		
<u>Plastic parts</u>	painted in soft paint in interior color.		
Standard equipment on the Carrera S in standard colors			S
<u>Additionally painted in an aluminium-look finish:</u>	decorative dashboard trim incl. cup holder cover, side vents, decorative shift/selector lever trim, dials		
Individually folding rear seats		S	S
Additional storage behind rear seats		S	S
3-spoke leather steering wheel with manual height and reach adjustment		S	
3-spoke leather sports steering wheel with manual height and reach adjustment			S
Plastic parts painted in soft paint in interior color		S	S
Steering wheel rim, shift lever, handbrake lever grip and door handle covered in leather		S	
Interior parts	painted in Volcano Grey (air vents, decorative dashboard trim, decorative shift/selector lever trim)	S	
Interior parts	painted in an aluminium-look finish (air vents, decorative dashboard trim, gearshift pattern on shift lever, decorative shift/selector lever trim, instrument cluster dials)		S
Roofliner in Alcantara		S	S
Lockable, large glove compartment		S	S
Storage bins in the doors		S	S
Front center console with 3 storage compartments (including one locked by central locking)		S	S
Cup holder located above the glove compartment (integrated behind the decorative dashboard trim)		S	S
Illuminated vanity mirrors in the sun visors (driver and passenger)		S	S
Scuff plates with Carrera logo		S	
Scuff plates with Carrera S logo			S
Various interior parts painted Volcano Grey		S	S
Discreetly trimmed seams in a wide range of colors		S	S

13.2 Individual equipment

S = Standard O = Option W = Available at no extra cost		911 Carrera	911 Carrera S
I-No.	Description		
Exterior			
Code	Metallic paint	0	0
Code	Special colors	0	0
Code	Colors to sample	0	0
P74	Bi-Xenon headlights	0	S
498	No model designation	W	W
635	ParkAssist (rear)	0	0
425	Rear window wiper	0	0
P12	Automatically dimming interior/door mirrors	0	0
549	Coupé roof transport system	0	0
Engine, transmission and chassis			
249	Tiptronic S	0	0
450	Porsche Ceramic Composite Brake (PCCB)	0	0
475	Porsche Active Suspension Management (PASM)	0	S
640	Sport Chrono Package Plus	0	0
X54	Chrome-plated stainless steel tailpipes for 911 Carrera	0	
X54	Chrome-plated stainless steel tailpipes for 911 Carrera S		0
XLF	Sports exhaust system (incl. sports tailpipes)	0	0
Wheels			
403	19-in Carrera S wheel	0	S
405	19-in CarreraClassic wheel	0	0
407	19-in SportDesign wheel	0	0
446	Wheel hub cover with full-color Porsche crest	0	0
XD9	Painted wheel spokes	0	0
482	Tire pressure monitoring system (RDK)	0	0
Interior			
XFD	Sand Beige dials	0	0
XFE	Terracotta dials	0	0
XFF	Natural Brown dials	0	0
XFG	Guards Red dials	0	0
XFH	Speed Yellow dials	0	0
XFJ	Carrara White dials	0	0

S = Standard O = Option W = Available at no extra cost		911 Carrera	911 Carrera S
I-No.	Description		
Interior			
XFC	Black dials	S	0
P15	Fully electric seats	0	0
P77	Sports seats	0	0
P01	Adaptive sports seats	0	0
342	Seat heating	0	0
XSH	Silver Grey seat belts	0	0
XSX	Guards Red seat belts	0	0
XSX	Speed Yellow seat belts	0	0
XXZ	Aluminium footrests	0	0
509	Fire extinguisher	0	0
Leather			
Code	Leather seat system	0	0
982	Gathered leather seat system	0	0
Code	Leather interior in standard color	0	0
Code	Leather interior in special color	0	0
998	Leather interior in natural leather	0	0
Code	Leather interior in color to sample	0	0
E31	Interior pack comprising leather dashboard	0	0
E30	Interior pack comprising leather door-trim panel	0	0
459	3-spoke steering wheel in smooth leather	0	0
435	3-spoke sports steering wheel in leather	0	S
460	3-spoke sports steering wheel in smooth leather	0	0
XPA	3-spoke upholstered sports steering wheel in smooth leather	0	0
431	3-spoke multi-function steering wheel in smooth leather	0	0
XNG	Leather instrument cluster frame	0	0
XTV	Interior pack comprising leather door-trim panel	0	0
XSC	Porsche crest on headrests	0	0
XMZ	Leather rear center console	0	0
XMA	Leather roofliner	0	0
XMP	Leather sun visors	0	0
XTG	Leather interior sill trim	0	0
XX1	Floor mats with leather trim	0	0
Wood			
801	"Makassar" interior package, dark (matt satin finish)	0	0
802	"Sycamore" interior package, light (matt satin finish)	0	0
451	3-spoke "Makassar" multi-function steering wheel, dark (matt satin finish)	0	0
452	3-spoke "Sycamore" multi-function steering wheel, light (matt satin finish)	0	0

S = Standard O = Option W = Available at no extra cost		911 Carrera	911 Carrera S
I-No.	Description		
Wood			
E33	"Makassar" dashboard package, dark (matt satin finish)	0	0
XTT	"Makassar" door panel package, dark (matt satin finish)	0	0
XJT	"Makassar" rear center console package, dark (matt satin finish)	0	0
E34	"Sycamore" dashboard package, light (matt satin finish)	0	0
XTU	"Sycamore" door panel package, light (matt satin finish)	0	0
XJU	"Sycamore" rear center console package, light (matt satin finish)	0	0
Carbon			
803	Carbon interior package	0	0
453	3-spoke carbon multi-function steering wheel	0	0
E35	Carbon dashboard package	0	0
XTL	Carbon door panel package	0	0
XMJ	Carbon rear center console	0	0
X69	Carbon sill covers	0	0
Aluminium-look finish / stainless steel			
E36	Aluminium-look dashboard package	0	0
XTW	Aluminium-look door panel package	0	0
XPV	3-spoke aluminium-look multi-function steering wheel	0	0
XCL	Aluminium-look instrument cluster frame	0	0
XCK	Aluminium-look rear center console	0	0
X70	Stainless steel sill covers	0	0
Audio and communication			
670	Navigation module for PCM	0	0
666	Telephone module for PCM	0	0
668	Passive receiver for telephone module	0	0
618	Telephone preparation	0	0
680	Bose Surround Sound system	0	0
692	CDC-4 CD autochanger (six-disc)	0	0
461	Rod antenna	0	0

14 Colors

14.1 Exterior colors

Solid colors (standard equipment)

Black
Guards Red
Carrara White
Speed Yellow

Metallic colors (optional)

Basalt Black Metallic
Lapis Blue Metallic
Arctic Silver Metallic
Seal Grey Metallic
Dark Teal Metallic
Atlas Grey Metallic
Carmon Red Metallic
Midnight Blue Metallic

Special colors (optional)

Forest Green Metallic
Cobalt Blue Metallic
GT Silver Metallic
Dark Olive Metallic
Slate Grey Metallic

14.2 Interior colors

Standard colors

Black
Stone Grey
Sand Beige
Palm Green
Sea Blue

Special colors (optional only

in combination with leather interior)

Terracotta
Cocoa

Natural leather (optional only

in combination with leather interior)

Natural Dark Grey
Natural Brown

15 Maintenance costs (cost of ownership)

From the very outset of development of the new 911 Carrera, particular attention was paid to keeping the maintenance costs as low as possible and to setting the standard once again in the sports car segment.

Maintenance

Despite the growing amount of equipment and technical components in its vehicles, Porsche has succeeded in continuously reducing both the frequency and scope of maintenance through design measures and the consistent application of cutting-edge technology.

The service intervals (oil change intervals) for the new 911 Carrera have been increased from 12,000 miles for the previous model to 20,000 miles. This means fewer visits to the workshop for the customer and a remarkable reduction in regular maintenance costs.

Maintenance must be carried out at least every 2 years whether or not the mileage thresholds for regular maintenance are reached. Unlike vehicles that are fitted with a maintenance interval computer, both the Carrera and the Carrera S must be brought to the Porsche workshop after 20,000 miles for their first regular service regardless of how the car has been driven.

For example, the alternator, steering servo pump and air conditioning in vehicles with the current 911 Carrera engines are driven by a single, self-adjusting belt that only has to be changed every 60,000 miles (previously

48,000 miles). The use of individual ignition coils means that the only part of the ignition system that requires maintenance is the spark plugs – and these only have to be changed every 60,000 miles (previously 48,000 miles) or every 4 years. The timing chains for the camshaft and intermediate shaft are totally maintenance-free, the transmission oil change interval for Tiptronic S has been increased from 96,000 miles to 120,000 miles.

Repair

A range of individual measures were introduced for the new 911 Carrera to reduce its sensitivity to minor damage and hence repair costs.

The most extensive optimisation was carried out at the front of the vehicle. For example, new impact elements in the front bumper protect the body-in-white from extensive and costly damage in minor impacts. The front end can be quickly and easily replaced thanks to its simple fixtures (clips). The new headlight design is also less sensitive to damage than before. The use of special line layouts for the radiator in the front end and quick couplings for radiator connections throughout the cooling system pipework has reduced the amount of repair work required and hence the repair costs.

16 Technical data

	Unit	911 Carrera MY 05 (997)	911 Carrera S MY 05 (997)	911 Carrera MY 04 (996)
Engine				
Number of cylinders		6	6	6
Valves/cylinder		4	4	4
Effective displacement	cu. in.	219.4	233.3	219.4
Bore x stroke	in	3.78 x 3.26	3.90 x 3.26	3.78 x 3.26
Output	kW/hp	239 / 325	261 / 355	235 / 320
at engine speed	rpm	6,800	6,600	6,800
Max. torque	ftlb	273	295	273
at engine speed	rpm	4,250	4,600	4,250
Compression		11.3 : 1	11.8 : 1	11.3 : 1
Volumetric efficiency	kW/l HP/CI	66.5 1.48	68.3 1.52	65.4 1.46
Engine management/ mixture preparation		Digital engine electronics ME 7.8	Digital engine electronics ME 7.8	Digital engine electronics ME 7.8
Fuel type (RON 95 can be used but will reduce performance)		Super plus unleaded, RON 98	Super plus unleaded, RON 98	Super plus unleaded, RON 98
Generator	W	2,100	2,100	1,680
Starter	kW	1.7	1.7	1.7
Battery capacity	Ah	70	70	70
Idle speed	rpm	670 ±40	670 ±40	670 ±40
Maximum engine speed	rpm	7,300	7,300	7,300
Transmission				
Manual gearbox				
Transmission ratio	1 st gear	3.91	3.91	3.82
	2 nd gear	2.32	2.32	2.20
	3 rd gear	1.61	1.61	1.52
	4 th gear	1.28	1.28	1.22
	5 th gear	1.08	1.08	1.02
	6 th gear	0.88	0.88	0.84
Reverse gear		3.59	3.59	3.55
Final drive ratio		3.44	3.44	3.44
Clutch diameter	in	9.45	9.45	9.45
Tiptronic S				
Transmission ratio	1 st gear	3.60	3.60	3.60
	2 nd gear	2.19	2.19	2.19
	3 rd gear	1.41	1.41	1.41
	4 th gear	1.00	1.00	1.00
	5 th gear	0.83	0.83	0.83
Reverse gears		3.17 / 1.93	3.17 / 1.93	3.17 / 1.93
Final drive ratio x intermediate ratio		3.56	3.56	3.37

	Unit	911 Carrera MY 05 (997)	911 Carrera S MY 05 (997)	911 Carrera MY 04 (996)
Chassis				
Front axle		Spring strut axle, wheels suspended individually on wishbones with trailing links and suspension struts (McPherson design, optimised by Porsche), one conical spring per wheel with internal double-acting hydraulic twin-tube gas-filled shock absorbers.	PASM chassis: Spring strut axle, wheels suspended individually on wishbones with trailing links and suspension struts (McPherson design, optimised by Porsche), one conical spring per wheel with internal double-acting hydraulic twin-tube gas-filled shock absorbers.	Spring strut axle, wheels suspended individually on wishbones with trailing links and suspension struts (McPherson design, optimised by Porsche), one conical spring per wheel with internal double-acting hydraulic twin-tube gas-filled shock absorbers.
Toe-in	min	+ 5 ± 5	+ 5 ± 5	+ 5 ± 5
Camber	min	-15 ± 15	-25 ± 15	-15 ± 15
Coasting	degrees	+8° 15' ± 30'	+8° 25' ± 30'	+8° ± 30'
Rear axle		Multi-link suspension, wheels supported individually on 5 control arms, one cylindrical coil spring per wheel with coaxial internal double-acting hydraulic single-tube gas-filled shock absorbers.	PASM chassis: Multi-link suspension, wheels supported individually on 5 control arms, one cylindrical coil spring per wheel with coaxial internal double-acting hydraulic single-tube gas-filled shock absorbers.	Multi-link suspension, wheels supported individually on 5 control arms, one cylindrical coil spring per wheel with coaxial internal double-acting hydraulic single-tube gas-filled shock absorbers.
Toe-in per wheel	min	+ 10 ± 5	+ 10 ± 5	+ 10 ± 5
Camber	degrees	-1° 30' ± 15'	-1° 30' ± 15'	-1° 10' ± 15'
Steering				
Steering ratio		17.1 : 1 (center position) bis 13.8 : 1 (variable)	17.1 : 1 (center position) bis 13.8 : 1 (variable)	16.9 : 1
Steering wheel revolutions from lock to lock		2.62	2.62	2.98
Steering wheel diameter	in	14.78	14.58	14.78
Brakes				
Brakes		Foot-operated, hydraulic-mechanical transmission, 2-circuit brake system, 4-piston aluminium monobloc brake calipers at FA and RA	Foot-operated, hydraulic-mechanical transmission, 2-circuit brake system, 4-piston aluminium monobloc brake calipers at FA and RA	Foot-operated, hydraulic-mechanical transmission, 2-circuit brake system, 4-piston aluminium monobloc brake calipers at FA and RA
ABS		Bosch ABS 8.0 (integrated in PSM)	Bosch ABS 8.0 (integrated in PSM)	Bosch ABS 5.7
Brake discs, FA		Internally ventilated and perforated	Internally ventilated and perforated	Internally ventilated and perforated
	Diameter	in	12.52	12.99
	Thickness	in	1.10	1.34
Brake discs, RA		Internally ventilated and perforated	Internally ventilated and perforated	Internally ventilated and perforated
	Diameter	in	11.77	12.99
	Thickness	in	0.94	1.10

		Unit	911 Carrera MY 05 (997)	911 Carrera S MY 05 (997)	911 Carrera MY 04 (996)
Wheels/tires					
Standard:	Wheels, front		8 J x 18 ET 57	8 J x 19 ET 57	7 J x 17 ET 50
	rear		10 J x 18 ET 58	11 J x 19 ET 67	9 J x 17 ET 55
	Tires, front		235/40 ZR 18	235/35 ZR 19	205/50 ZR 17
	rear		265/40 ZR 18	295/30 ZR 19	255/40 ZR 17
Optional:	Wheels, front		8 J x 19 ET 57	8 J x 19 ET 57	8 J x 18 ET 50/52
	rear		11 J x 19 ET 67	11 J x 19 ET 67	10 J x 18 ET 65
	Tires, front		235/35 ZR 19	235/35 ZR 19	225/40 ZR 18
	rear		295/30 ZR 19	295/30 ZR 19	285/30 ZR 18
Winter wheels 1:	Wheels, front		8 J x 18 ET 57	8 J x 18 ET 57	7 J x 17 ET 50
	rear		10 J x 18 ET 58	10 J x 18 ET 58	9 J x 17 ET 55
	Tires, front		235/40 R 18	235/40 R 18	205/50 R 17 89H
	rear		265/40 R 18	265/40 R 18	255/40 R 17 94H
Winter wheels 2:	Wheels, front		8 J x 19 ET 57	8 J x 19 ET 57	8 J x 18 ET 52/52
	rear		11 J x 19 ET 67	11 J x 19 ET 67	10 J x 18 ET 65
	Tires, front		235/35 R 19	235/35 R 19	225/40 R 18 88H
	rear		295/30 R 19	295/30 R 19	285/30 R 18 93H
Air pressure 18-in	Partially/ fully loaded front	psi	36.26 / 36.26	36.26 / 36.26	36.26 / 36.26
	rear	psi	43.51 / 43.51	43.51 / 43.51	43.51 / 43.51
Air pressure 19-in	Partially/ fully loaded front	psi	33.36 / 36.26	33.36 / 36.26	not available
	rear	psi	39.16 / 43.51	39.16 / 43.51	not available
Weights (dependent on equipment)					
Unladen weight (DIN)	Manual gearbox	lbs	3,075	3,131	3,020
	Tiptronic	lbs	3,164	3,219	3,142
Unladen weight (EU) (DIN + 165 lbs driver)	Manual gearbox	lbs	3,240	3,269	3,186
	Tiptronic	lbs	3,329	3,384	3,307
Front/rear distribution	Manual gearbox	%	38 : 62	38 : 62	37 : 63
	Tiptronic	%	37 : 63	37 : 63	36 : 64
Permissible total weight	Manual gearbox	lbs	3,990	4,012	3,946
	Tiptronic	lbs	4,090	4,112	4,067
Permissible axle load,	front	lbs	1,709	1,709	1,709
Permissible axle load,	rear	lbs	2,601	2,601	2,601
Max. payload		lbs	915	882	926
Max. permissible roof load with original Porsche roof transport system		lbs	165	165	165

		Unit	911 Carrera MY 05 (997)	911 Carrera S MY 05 (997)	911 Carrera MY 04 (996)
Performance					
Top speed	Manual gearbox	mph	177	182	177
	Tiptronic S	mph	174	177	174
Acceleration 0–62 mph	Manual gearbox	s	5.0	4.8	5.0
	Tiptronic S	s	5.5	5.3	5.5
Acceleration 0–100 mph	Manual gearbox	s	11.0	10.7	11.0
	Tiptronic S	s	12.0	11.6	12.0
Acceleration 0–1,000 m	Manual gearbox	s	23.8	23.4	23.8
	Tiptronic S	s	24.6	24.3	24.6
Acceleration 0– ¹ / ₄ mile	Manual gearbox	s	13.1	13.0	13.1
	Tiptronic S	s	13.6	13.5	13.6
Flexibility (50–75 mph)	Manual gearbox	s	6.5	6.1	6.5
	Tiptronic S	s	6.7	6.2	7.2
Fuel economy (Values in brackets: Tiptronic S)*					
Typ. manufacturer's specs. to 80/1268/EU in current version	Urban	l/100 km	16.1 (16.5)	17.1 (17.9)	16.1 (16.9)
	Extra-urban	l/100 km	8.1 (8.1)	8.4 (8.4)	8.1 (8.1)
	Total	l/100 km	11.0 (11.2)	11.5 (11.7)	11.1 (11.3)
CO ₂ emissions		g/km	266 (270)	277 (283)	269
Exterior dimensions					
Length	USA	in	175.63	175.63	175.79
Width		in	71.18	71.18	69.69
with door mirrors		in	76.26	76.26	75.98
Height		in	51.57	–	51.38
Height with PASM		in	51.18	51.18	–
Wheelbase		in	92.52	92.52	92.52
Track at front (DIN unladen)	18-in	in	58.50	58.50	57.68
	19-in	in	58.50	58.50	–
Track at rear (DIN unladen)	18-in	in	60.39	60.39	58.27
	19-in	in	59.69	59.69	–
Drag coefficient		c _d	0.28	0.29	0.30
Frontal area A		m ²	2.00	2.00	1.94
Drag		c _d x m ²	0.56	0.58	0.58
Turning circle		ft	35.76	35.76	34.78
Approach angle (DIN unladen)	Basic	degrees	12.0	–	12.5
	PASM	degrees	11.5	11.5	–
Departure angle (DIN unladen)	Basic	degrees	15.0	–	14.0
	PASM	degrees	14.5	13.5	

*US values not available at copy deadline

		Unit	911 Carrera MY 05 (997)	911 Carrera S MY 05 (997)	911 Carrera MY 04 (996)
Exterior dimensions (continued)					
Ramp breakover angle (DIN unladen)	Basic	degrees	13.5	–	13.5
	PASM	degrees	12.5	12.5	–
Ground clearance (DIN unladen, center axle)	Basic	in	4.17	–	4.33
	PASM	in	3.78	3.78	–
Interior dimensions					
Interior length ¹⁾	Driver's side	in	66.61	66.61	66.14
	Passenger side	in	61.81	61.81	61.81
Shoulder room, front		in	51.50	51.50	51.50
Elbow room, front		in	53.35	53.35	53.39
Effective headroom, front	without sliding roof	in	38.35	38.35	38.39
	with sliding roof	in	38.03	38.03	38.03
Luggage compartment volume	front	cu. ft.	4.77	4.77	4.59
	rear with rear seats folded	cu. ft.	7.24	7.24	7.06
Tank capacity (refill capacity)		gal.	16.9	16.9	16.9

¹⁾ Driver's side: From depressed clutch pedal to hip point of rear seat
Passenger side: From heel point in front of firewall to hip point of rear seat

17 General information on main competitors

Competition is becoming fiercer not only across the market in general, but also in the niches traditionally occupied by Porsche. To provide the necessary foundation for argument against the competition the following sections present an overview of key data and information on competitors, individual comparisons with key competitors and an overview of the unique selling points of the 911 Carrera.

17.1 Competitor Comparison

Criterion (figures in brackets for optional automatic transmissions)	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera S Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
1. Concept							
Body	Coupé	Coupé	Roadster	Coupé	Coupé	Coupé	Coupé
Engine position/Drive	Rear/rear	Rear/rear	Front/rear	Front/rear	Front/rear	Front/rear	Front/rear
Seats/doors	2+2/2	2+2/2	2/2	2+2/2	5/2	2+2/2	2+2/2
2. Engine							
Type/valves	Opposed-cylinder Otto engine, 24 valves, two overhead camshafts per cylinder bank. Continuous camshaft adjustment and VarioCam Plus valve lift control, switchable intake manifold. Aluminium cylinder head and engine block.	Opposed-cylinder Otto engine, 24 valves, two overhead camshafts per cylinder bank. Continuous camshaft adjustment and VarioCam Plus valve lift control, switchable intake manifold. Aluminium cylinder head and engine block.	V-type Otto engine, cylinder angle 90°, 24 valves, one overhead camshaft per cylinder bank. Two-stage camshaft adjustment, two-stage resonance intake manifold. Crankcase, oil pan, cylinder head and pistons made of aluminium.	V-type Otto engine, 32 valves, two overhead camshafts per cylinder bank. Valvetronic, variable valve control of the intake and outlet camshafts (double Vanos), fully variable intake system. Alloy cylinder block, alloy engine block.	In-line Otto engine, 24 valves, two overhead camshafts. Variable valve control of the intake and outlet camshafts (M double Vanos). Aluminium cylinder head, grey cast iron engine block.	V-type Otto engine, cylinder angle 90°, 32 valves, two overhead camshafts per cylinder bank. Variable intake camshaft adjustment, supercharging. Alloy cylinder block, alloy engine block.	V-type Otto engine, 32 valves, cylinder angle 90°, two chain-driven overhead camshafts per cylinder bank. Intake camshafts continuously adjustable. Crankcase and cylinder heads made from aluminium-silicon alloy.
Cylinders/displacement	6/3,596 ccm	6/3,824 ccm	8/4,966 ccm	8/4,398 ccm	6/3,246 ccm	8/4,196 ccm	8/4,244 ccm
Engine power output in kw/hp at stated revs	239/325 @ 6,800	261/355 @ 6,600	225/306 @ 5,600	245/333 @ 6,100	252/343 @ 7,900	291/395 @ 6,100	287/390 @ 7,000
Max. torque in Nm at stated revs	370 @ 4,250	400 @ 4,600	460 @ 2,700 – 4,250	450 @ 3,600	365 @ 4,900	541 @ 3,500	451 @ 4,500
Compression	11.3 : 1	11.8 : 1	10.1 : 1	10.0 : 1	11.5 : 1	9.1 : 1	11.1 : 1
Fuel type	Super plus, RON 98	Super plus, RON 98	Super, RON 95	RON 91 – 98 approved	Super plus, RON 98	Super, RON 95	Super, RON 95
Volumetric efficiency (kW/l)	66.5	68.3	45.3	55.7	77.6	69.4	67.6
Power-to-weight ratio (kg/kW)	5.8	5.4	7.9	6.6	5.9	5.7	5.5
Ignition	Single-plug ignition	Single-plug ignition	Phase-displaced dual ignition	Single-plug ignition	Single-plug ignition	Single-plug ignition	Single-plug ignition
Engine lubrication	Integrated dry sump lubrication	Integrated dry sump lubrication	Forced-feed	Forced-feed	Forced-feed	Forced-feed	Dry sump lubrication system with four oil pumps
Emission classification:	EU4	EU4	EU4	EU4	EU3	EU3	EU4
CO₂-emissions* in g/km	266	277	304	283	287	304	430
Fuel consumption* (average) in accordance with 80/1268/EEC	11.0	11.5	12.7	11.7	11.9	12.4	18.6
Acceleration 0–62 mph	5.0 (5.5)	4.8 (5.3)	6.3	5.6 (5.8)	5.2	5.4	4.9
Maximum speed in mph	177 (174)	182 (177)	156 (limited)	156 (limited)	156 (limited)	156 (limited)	177

* provisional data only

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera S Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
3. Transmission							
Manual transmission	6-speed	6-speed	Not available	6-speed Sequential manual transmission: SMG II, optional	6-speed Sequential manual transmission: SMG II, optional	Not available	6-speed Sequential manual transmission: Cambiocorsa, optional
Automatic transmission	Optional 5-speed Tiptronic S, manual intervention possible via paddle switches on the steering wheel	Optional 5-speed Tiptronic S, manual intervention possible via paddle switches on the steering wheel	7-speed automatic transmission, manual intervention possible	Optional 6-speed automatic transmission with Steptronic	Not available	6-speed automatic transmission	Not available
4. Chassis/all-wheel drive							
Front axle	Strut suspension, wheels suspended individually on wishbones with trailing links and suspension struts (McPherson type, Porsche-optimised)	Strut suspension, wheels suspended individually on wishbones with trailing links and suspension struts (McPherson type, Porsche-optimised)	Multi-link axle	Double-joint strut suspension with wishbone and tension strut	Double-joint strut suspension with aluminium wishbones	Independent wheel suspension with double wishbones plus trailing links	Double wishbone in forged aluminium,
Rear axle	Multi-link suspension (LSA system), wheels suspended individually on five control arms	Multi-link suspension (LSA system), wheels suspended individually on five control arms	Aluminium multi-link suspension	Aluminium integral axle	Light-weight central link axle	Independent wheel suspension with double wishbones plus trailing links	Double wishbone in forged aluminium
Springs/Dampers/Stabilisers	Front axle: One offset conical spring per wheel with internal double-acting hydraulic twin-tube gas-filled shock absorbers; rear axle: one concentric per wheel with coaxial internal double-acting hydraulic single-tube gas-filled shock absorbers, tube-type stabilisers at front and rear	As for 911 Carrera, but incl. PASM chassis: With two programmes: "Sport" and "Normal" as well as five modules: vertical acceleration, lateral acceleration, lane-change, load-change, and braking module	Active Body Control (ABC) with hydraulically controlled actuating cylinders ("plunger pistons"), passive gas-filled shock absorbers and coil springs; 2 damper maps – "Sport" and "Comfort", stabilisers at front and rear	Optional: active stabilisers (hydraulic actuators with electronic sensor-controlled pressure-regulating valves) (Dynamic Drive)	Stabilisers at front and rear	Coaxial coil springs and trailing links at front and rear, "CATS" electronic damper adjustment	All-round shock absorbers with pre-set and anti-dive function, coil springs, lateral stabilisers; additional stabiliser for track control at rear

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera S Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
Steering	Rack-and-pinion power steering with servo assistance and variable transmission	Rack-and-pinion power steering with servo assistance and variable transmission	Parametric rack-and-pinion power steering (speed-dependent servo assistance)	Rack-and-pinion power steering with variable transmission	Rack-and-pinion power steering	Power steering with variable transmission ratio	Rack-and-pinion power steering with variable transmission
Servotronic	Not available	Not available	Standard	Active steering with speed-dependent variable steering transmission ratio optional	Not available	Standard	Not available
Turning circle (in ft)	35.76	35.76	36.09	39.37	36.09	36.09	39.37
Driving dynamics control/system for improving traction	Porsche Stability Management 8.0 including ABS, ASR, MSR, ABD without charging pump (weight reduction) optional: sports chassis optional: PASM	Porsche Stability Management 8.0 including ABS, ASR, MSR, ABD without charging pump (weight reduction) optional: sports chassis optional: PASM	ESP, ASR, ABC	Dynamic Stability Control (DSC) incl. ABS, DBC and DTC (Dynamic Traction Control); CBC (Cornering Brake Control); optional: Dynamic Drive	Automatic Stability Control + Traction (ASC+T), Dynamic Stability Control (DSC), self-locking RA differential (multi-plate clutch)	Dynamic Stability Control (DSC), Traction Control (TC/ASC)	Maserati Stability Program (MSP) incl. ABS, ASR, MSR and EBD (electronic brake-force distribution), self-locking asymmetric RA differential from ZF (25% load, 45% overrun) optional automatic damping monitoring with continuous regulation and acceleration sensors at each wheel (skyhook system)
Brake system	Internally ventilated, perforated brake discs front: 318 x 28 mm rear: 299 x 24 mm 4-piston aluminium monobloc brake calipers. ABS 8.0 optional: Porsche Ceramic Composite Brake (PCCB).	Internally ventilated, perforated brake discs front: 330 x 34 mm rear: 330 x 28 mm 4-piston aluminium monobloc brake calipers. ABS 8.0 optional: Porsche Ceramic Composite Brake (PCCB).	Internally ventilated, perforated brake discs front: 330 mm rear: 300 mm 4-piston fixed calipers at the front, 1-piston floating calipers at the rear. Electro-hydraulic brake system with ABS, Sensotronic Brake Control (SBC) and Brake Assist System (BAS).	Internally ventilated, lightweight brake discs front: 348 mm rear: 345 mm 1-piston floating calipers all round. Cornering Brake Control (CBC).	Internally ventilated, perforated brake discs front: 325 mm rear: 328 mm 1-piston floating calipers all round. Compound Brake, Cornering Brake Control (CBC), Dynamic Brake Control (DBC).	Brembo brake system with internally ventilated discs all round front: 355 mm rear: 330 mm 4-piston aluminium brake calipers. 4-channel ABS, brake assist.	Brembo brake system with internally ventilated discs front: 330 x 32 mm rear: 310 x 28 mm 4-piston alloy brake calipers all round. 4-channel ABS Bosch 5.3, electronically controlled brake force distribution (EBD).
Wheel size	FA 8 J x 18 ET 57 RA 10 J x 18 ET 58	8 J x 19 ET 57 11 J x 19 ET 67	8,5 J x 17 ET 35 8,5 J x 17 ET 35	8 J x 18 8 J x 18	8 J x 18 9 J x 18	8 J x 18 9 J x 18	8 J x 18 9,5 J x 18
Tire size	FA 235/40 ZR 18 RA 265/40 ZR 18	235/35 ZR 19 295/30 ZR 19	255/45 R 17 255/45 R 17	245/45 R 18 W 245/45 R 18 W	225/45 ZR 18 255/40 ZR 18	245/45 R 18 255/45 R 18	235/40 ZR 18 265/35 ZR 18
Tire pressure monitoring (RDK)	Optional	Optional	Optional	Standard	Standard	Not available	Not available

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
5. Exterior							
Exterior colors	4 solid colors, optional: 8 metallic and 5 special colors	4 solid colors, optional: 8 metallic and 5 special colors	3 solid colors, optional: 9 metallic and 2 special colors	2 solid colors, optional: 8 metallic colors	4 solid colors, optional: 7 metallic colors and colors to sample	4 solid colors, optional: 11 metallic colors	4 solid and 12 metallic colors, optional: other colors
Roof system	Optional: electric, continuously adjustable tilting roof, one-touch operation	Optional: electric, continuously adjustable tilting roof, one-touch operation	Electro-hydraulic folding roof, painted in same color as car, remote-control; optional panoramic folding roof	Glass panoramic tilting roof optional	Electric glass slide/tilt sunroof with integrated wind deflector and suspended sun-screen liner	Not available	Not available
Glazing/sun-screening	Compound glass all round	Compound glass all round	Heat-absorbing glass all round, windscreen with shade band	Green heat-absorbing glass all round	Green heat-absorbing glass all round, top tinted or air-conditioning comfort front windscreen optional	Heat-absorbing glass	Heat-absorbing glass
Parking aid	ParkAssist with acoustic distance warning at rear optional	ParkAssist with acoustic distance warning at rear optional	Parktronic with visual display and acoustic alarm for front and rear optional	Park Distance Control with visual and acoustic alarm optional	Park Distance Control with acoustic distance alarm at rear optional	Park Distance Control with acoustic distance alarm at rear optional	Rear acoustic parking sensors optional
Key system	Vehicle key with integrated remote control	Vehicle key with integrated remote control	Remote control; Keyless Go optional	Remote control with self-charging key	Remote control with self-charging key	Remote control	Remote control
6. Interior							
Interior colors	5 interior colors, 2 special leather and 2 natural leather colors optional	5 interior colors, 2 special leather and 2 natural leather colors optional	5 interior colors + optional design combinations	4 upholstery and 3 interior trim colors	Anthracite + 6 optional colors (subject to additional charge)	6 interior colors and 2 2-color combinations	Choice of 10 colors 13 thread colors 5 carpet colors
Material design	Seats and selected components in leather; high-quality slush surfaces	Seats and selected components in leather; high-quality slush surfaces	Seats, steering wheel and selector lever in leather	Seats, steering wheel, gear lever bellows, hand-brake handle and bellows in leather	Upholstery in fabric/leather, steering wheel, gearshift knob and hand-brake handle in leather	Seats, door trims and top surface of dashboard leather, dashboard, gearshift knob and shift gate in bird's eye maple or walnut wood	Seats, door trims, rear side walls, center console, dashboard and rear shelf in leather, frame and switches on center console plastic
Seats	Leather seats with mechanical longitudinal and height adjustment and electric backrest adjustment; optional fully electric seats with memory on driver's side, incl. lumbar support; adaptive sports seats	Leather seats with mechanical longitudinal and height adjustment and electric backrest adjustment; optional fully electric seats with memory on driver's side, incl. lumbar support; adaptive sports seats	Heated, electrically adjustable integral-belt seats with memory, optional ventilated comfort seats and dynamic multi-contour backrests	Electrically adjustable leather seats with memory for driver; lumbar support and sports seats optional	Electrically adjustable fabric/leather sports seats with memory for driver; full-leather seats, backrest width adjustment and lumbar supports optional	Leather seats with 12-position electrical adjustment and electric lumbar support	Electrically adjustable leather seats with integrated headrest, lumbar support and memory function for driver
Heated seats	Optional	Optional	Standard optional: heated steering wheel	Standard optional: heated steering wheel	Optional	Optional	Optional

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera S Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
7. Heated seats							
Air-conditioning system	Fully automatic air conditioning system with interior filter, solar sensor	Fully automatic air conditioning system with interior filter, solar sensor	Automatic climate control with dust filter and use of residual engine heat, separate right/left temperature control	Automatic climate control	Automatic climate control incl. microfilter, automatic recirculation control and solar sensor	Automatic climate control with recirculation function	Automatic climate control
8. Electrics, audio & communications							
Standard lights	Halogen main headlights with H7 bulb for dipped beam and H9 for main beam, projection module with 2.76 in glass lens	Bi-Xenon headlights incl. dynamic range adjustment and headlight washer system, projection module with 2.76 in glass lens	Xenon headlights with daytime running lights assistant, headlight washer system and range adjustment	Bi-Xenon with dynamic range adjustment and headlight washer system	Halogen headlights with range adjustment	Xenon headlights with aut. range adjustment and headlight washer system	Halogen H1 headlights
Headlights featuring gas discharge technology	Bi-Xenon optional	Bi-Xenon standard	Xenon standard, Bi-Xenon optional	Bi-Xenon standard	Bi-Xenon standard	Xenon standard	Xenon optional
Theft protection	Alarm system with interior surveillance	Alarm system with interior surveillance	Alarm system with tow-away protection; interior surveillance optional	Alarm system with remote control optional	Alarm system with interior protection, tilt alarm optional	Anti-theft alarm system	Anti-theft alarm system
Rain sensor	Optional	Optional	Standard	Standard	Optional	Standard	Not available
Multi-function steering wheel	Optional	Optional	Standard	Standard	Standard	Standard	Not available
Audio/Radio	PCM with CD radio and sound package incl. CD tray standard	PCM with CD radio and sound package incl. CD tray standard	Radio/cassette with 8 speakers standard	CD-radio with hifi speaker system standard	Optional	Audio system with 6 speakers and CD auto-changer standard	Hifi system with radio/CD integrated into Info Center with 5.8" color monitor
Sound systems	Standard sound system with 3-channel analogue amplifier; 280 W total output, 9 speakers. Optional: Bose Surround Sound system with 13 speakers and 325 W total output.	Standard sound system with 3-channel analogue amplifier; 280 W total output, 9 speakers. Optional: Bose Surround Sound system with 13 speakers and 325 W total output.	Optional: Bose sound system with 8 high-power speakers, 1 TSM switching amplifier, 6 linear amplifiers, 7 channels for customised equalisation	Optional: LOGIC7 professional hifi system, including 13 speakers	Hifi speaker system (10 speakers, each with 15 W), optional: harman/kardon hifi speaker system (10 speakers and amplifiers with output of 4 x 28 W)	Optional: premium sound system with 9 speakers, amplifier and DSP	Optional: "Auditorium 200" hifi system with 8 speakers and 200 W RMS amplifier

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
CD autochanger	Optional: 6-disc CD autochanger preparation standard	Optional: 6-disc CD autochanger preparation standard	Optional, in storage compartment behind driver's seat	Optional: 6-disc changer in glove compartment	Optional: 6-disc	6-disc	Optional: 5-disc in luggage compartment
Navigation system	DVD navigation module for PCM optional	DVD navigation module for PCM optional	Operating and display system incl. Navi Comand APS optional (CD navigation)	Optional: incl. 8.8-in color monitor and BMW Professional radio, additionally optional: analogue TV receiver	2 navigation systems optional, DVD navigation	Integrated DVD navigation system (Alpine) optional	Optional
Telephone	Telephone module for PCM, passive receiver optional	Telephone module for PCM, passive receiver optional	Aerial and cabling standard; car telephone, mobile telephone incl. hands-free facility or mobile telephone preparation optional	Telephone preparation (aerial and cabling), car telephone with cordless receiver and mobile phone preparation with Bluetooth interface optional	Telephone preparation (aerial and cabling), car telephone with cordless receiver and mobile phone preparation with Bluetooth interface optional	Integrated dual band telephone incl. hands-free facility optional	Telephone incl. hands-free facility optional
9. Safety							
Driver/front passenger airbag	Standard (two-stage)	Standard (two-stage)	Standard (two-stage)	Standard	Standard	Standard (two-stage)	Standard
Side airbags front/rear	Thorax airbags in the side pieces of the seats/ not available	Thorax airbags in the side pieces of the seats/ not available	Head/thorax sidebags	Standard/not available	Standard/optional	Standard/not available	Standard/not available
Curtain/window airbags	Head airbag in upper door panel area standard	Head airbag in upper door panel area standard	Head/thorax sidebags	Head airbags front and rear	Head airbags	Not available	Not available
Side impact protection	Standard	Standard	Standard	Standard	Standard	Standard	Standard
Belt-force limiters front/rear	Standard/not available	Standard/not available	Standard/standard	Standard/standard	Standard/not available	Not known	Standard/standard
Belt tensioners front	Standard	Standard	Standard	Standard	Standard	Standard	Standard

Criterion	Porsche 911 Carrera Coupé (MY 05)	Porsche 911 Carrera S Coupé (MY 05)	Mercedes-Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé
10. Dimensions and weights							
Wheelbase (in)	92,52	92,52	100,79	109,45	107,52	101,89	104,72
Exterior dimensions (l x w x h in in)	174.29 x 71.18 x 51.58	174.29 x 71.18 x 51.81	178.54 x 71.46 x 51.10	189.76 x 73.03 x 54.06	176.85 x 70.08 x 54.45	187.40 x 79.33 x 51.02	178.07 x 71.73 x 51.38
Weight (DIN, empty, lbs)	3,075	3,131	3,902	3,560	3,296	3,660	3,461
Weight (EC, empty, lbs)	3,241	3,296	4,067	3,726	3,461	3,825	3,627
Maximum permissible weight (lbs)	3,990	4,012	4,718	4,552	4,409	4,652	4,541
Max. load (lbs)	915	882	816	992	1,113	992	1,080
Aerodynamics (C _d x A)	0.28 x 2.0 = 0.56	0.29 x 2.0 = 0.58	0.29 x 2.0 = 0.58	0.29 x 2.15 = 0.62	0.33 x 2.0 = 0.66	0.34 x 2.05 = 0.70	0.34 x 2.0 = 0.68
Tank capacity (reserve)	16.9 (2.6)	16.9 (2.6)	21.1 (2.6)	18.5	16.6	19.8	23.2
Range (m)	364	354	394	374	331	378	296
Luggage compartment capacity in (cu. ft.)	4.77 + 7.24 in interior when rear seat backrests folded down	4.77 + 7.24 in interior when rear seat backrests folded down	11.19/8.30 (with open roof)	15.89	18.16	14.48	11.12
Storage space	Additional interior transport capacity (7.24 cu.ft.) thanks to 2+2 concept, tailor-made luggage systems and roof transport system optionally available	Additional interior transport capacity (7.24 cu.ft.) thanks to 2+2 concept, tailor-made luggage systems and roof transport system optionally available	Luggage compartment capacity highly restricted when roof open; interior storage facility with retaining straps behind the seats	Large luggage compartment, additional transport capacity afforded by rear bench, but no RTS	Large luggage compartment, additional transport capacity afforded by rear bench	Relatively large luggage compartment, additional transport capacity in interior, RTS and luggage compartment rack optionally available	Large luggage compartment, additional transport capacity in interior; tailor-made luggage set available, no RTS

Note: Information on competitor vehicles has been taken from brochures and press reports (correct as per 12/2003) and its accuracy cannot be guaranteed; EU models

17.2 Main product advantages of 911 Carrera and Carrera S Coupé

Note: The following tables offer a comparison of EU-specification models for the German market. Information on strategic competitors was obtained from sales literature and press reports as well as retail outlets and dealerships. While every effort has been made when preparing this information, no guarantee can be given as to its accuracy.

17.2.1 Main advantages of Porsche 911 Carrera /S compared with MB SL 500



Fig. 80: Mercedes Benz SL 500

Criterion	Advantages of 911 Carrera compared with Mercedes Benz SL 500
	911 Carrera and 911 Carrera S
Motor	<ul style="list-style-type: none"> • Opposed-cylinder engine concept for a low center of gravity • Rear engine for good agility and traction • Higher output • Better specific power • Higher volumetric efficiency • Higher torque • Integrated dry sump lubrication • Better fuel economy • Better acceleration from 0–62 mph • Higher top speed
Transmission	<ul style="list-style-type: none"> • Manual gearbox available • Tiptronic S with rocker buttons on the steering wheel

Criterion	<u>Advantages of 911 Carrera compared with Mercedes Benz SL 500</u>
	911 Carrera and 911 Carrera S
Chassis	<ul style="list-style-type: none"> • Wider wheels on the driving axle for better traction
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Larger rim diameter for a sportier look, more agile driving behavior and better brake ventilation • PCCB optional • Sports chassis with mechanical rear differential lock optional • Sport Chrono Pack Plus for greater agility and driving pleasure optional • Larger brake system for better braking performance
Exterior	<ul style="list-style-type: none"> • Larger number of special colors for customisation (5 as opposed to 2)
Interior	<ul style="list-style-type: none"> • Additional transport capacity in the interior thanks to the 2+2 concept • Additional offering of 2 special leather colors and 2 natural leather colors
Electrics, audio and communication	<ul style="list-style-type: none"> • Interior surveillance standard • PCM with CD radio and Sound Package Plus • Bose Surround Sound system (optional) • DVD navigation optional (as opposed to CD on SL) • Sport Chrono Package Plus with Sport button, performance display, individual memory and stopwatch optional
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Bi-Xenon headlights standard
Dimensions and weights	<ul style="list-style-type: none"> • More agile cornering behavior through a shorter wheelbase • Better visibility through smaller exterior dimensions and a more favourable body shape • More agile driving behavior through substantially reduced weight (911 Carrera: 3,075 lbs; 911 Carrera S: 3,131 lbs; SL 500: 3,902 lbs [unladen weight to DIN]) • Payload of Carrera Coupé (MY05) increased by 99 lbs • Payload of Carrera S Coupé (MY05) increased by 66 lbs
Cost	<ul style="list-style-type: none"> • Longer maintenance intervals (20,000 miles instead of 12,000 miles) • Lower average total maintenance costs • Lower average tax • Lower average fuel costs • Lower insurance classifications • Lower average insurance costs • Lower average maintenance costs

**17.2.2 Main advantages of
Porsche 911 Carrera /S
compared
with BMW 645 Ci**



Fig. 81: BMW 645 Ci

Criterion	Advantages of 911 Carrera compared with BMW 645 Ci
911 Carrera and 911 Carrera S	
<p>Engine</p> <p><u>A further advantage of 911 Carrera S:</u></p>	<ul style="list-style-type: none"> • Opposed-cylinder engine concept for a low center of gravity • Rear engine for good agility and traction • Better specific power • Higher volumetric efficiency • Higher torque • Integrated dry sump lubrication • Better fuel economy • Better acceleration from 0–62 mph • Higher top speed <p>• Higher output</p>
<p>Chassis/all-wheel drive</p> <p><u>A further advantage of 911 Carrera S:</u></p>	<ul style="list-style-type: none"> • Wider wheels on the driving axle for better traction • Variable chassis damping (PASM) optional • PCCB optional • Sports chassis with mechanical rear differential lock optional <p>• Larger rim diameter for a sportier look, more agile driving behavior and better brake ventilation</p> <p>• Variable chassis damping (PASM) standard</p> <p>• Sports chassis with mechanical rear differential lock available as an option at no extra charge</p>
<p>Exterior</p>	<ul style="list-style-type: none"> • Larger number of standard and special colors
<p>Interior</p>	<ul style="list-style-type: none"> • Additional offering of 2 special leather colors and 2 natural leather colors • Offering of sports seats with seat-width adjustment
<p>Electrics, audio and communication</p>	<ul style="list-style-type: none"> • Sport Chrono Package Plus with performance display, individual memory and stopwatch optional
<p>Dimensions and weights</p>	<ul style="list-style-type: none"> • More agile cornering behavior through a shorter wheelbase • Better visibility through smaller exterior dimensions <p>More agile driving behavior through substantially reduced weight (911 Carrera: 3,075 lbs; 911 Carrera S: 3,131 lbs; 645 Ci: 3,560 lbs [unladen weight to DIN])</p>

**17.2.3 Main advantages of
Porsche 911 Carrera /S
compared
with BMW M3**



Fig. 82: BMW M3

Criterion	<u>Advantages of 911 Carrera compared with BMW M3</u>
	911 Carrera and 911 Carrera S
Engine	<ul style="list-style-type: none"> • Opposed-cylinder engine concept for a low center of gravity • Rear engine for good agility and traction • Better specific power • Higher torque at lower engine speed • Integrated dry sump lubrication • Better fuel economy • Better acceleration from 0–62 mph • Higher top speed
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Higher output
Chassis/all-wheel drive	<ul style="list-style-type: none"> • Wider wheels on the driving axle for better traction • Variable chassis damping (PASM) optional • PCCB optional • Sport Chrono Pack Plus for greater agility and driving pleasure optional
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Larger rim diameter for a sportier look, more agile driving behavior and better brake ventilation • Variable chassis damping (PASM) standard
Exterior	<ul style="list-style-type: none"> • Larger number of metallic paints and offering of special paints
Interior	<ul style="list-style-type: none"> • Offering of 2 natural leather colors
Electrics, audio and communication	<ul style="list-style-type: none"> • PCM with CD radio and sound package incl. CD tray standard • Bose Surround Sound system optional • Sport Chrono Package Plus with performance display, individual memory and stopwatch optional • Alarm system with interior surveillance standard
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Bi-Xenon headlights standard
Dimensions and weights	<ul style="list-style-type: none"> • More agile cornering behavior through a substantially shorter wheelbase • More agile driving behavior through reduced weight (911 Carrera: 3,075 lbs; 911 Carrera S: 3,131 lbs; M3: 3,296 lbs [unladen weight to DIN]) • Marginally longer range through larger tank capacity and better fuel economy
Cost	<ul style="list-style-type: none"> • Longer maintenance intervals (20,000 miles instead of 15,000 miles) • Considerably faster maintenance times • Lower average fuel costs • Lower insurance classifications • Lower average insurance costs • Lower average maintenance costs

**17.2.4 Main advantages of
Porsche 911 Carrera /S
compared with
Jaguar XKR**



Fig. 83: Jaguar XKR

Criterion	Advantages of 911 Carrera compared with Jaguar XKR
	911 Carrera and 911 Carrera S
Engine	<ul style="list-style-type: none"> • Opposed-cylinder engine concept for a low center of gravity • Rear engine for good agility and traction • Higher torque • Integrated dry sump lubrication • Better fuel economy • Better acceleration from 0–62 mph • Higher top speed
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Better specific power
Transmission	<ul style="list-style-type: none"> • Manual gearbox available • Tiptronic S with rocker buttons on the steering wheel
Chassis/all-wheel drive	<ul style="list-style-type: none"> • Wider wheels on the driving axle for better traction • PCCB optional • Sports chassis with mechanical rear differential lock optional • Sport Chrono Pack Plus for greater agility and driving pleasure optional
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Larger rim diameter for a sportier look, more agile driving behavior and better brake ventilation
Exterior	<ul style="list-style-type: none"> • Slide/tilt sunroof available • Offering of 5 special colors
Interior	<ul style="list-style-type: none"> • Offering of 2 natural leather colors
Electrics, audio and communication	<ul style="list-style-type: none"> • Bi-Xenon optional • PCM standard • Interior surveillance standard • Bose Surround Sound system optional • Mobile phone preparation optional • Sport Chrono Package Plus with performance display, individual memory and stopwatch optional
<u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Bi-Xenon headlights standard
Safety	<ul style="list-style-type: none"> • Window airbags standard • Tire pressure monitoring system optional
Dimensions and weights	<ul style="list-style-type: none"> • More agile cornering behavior through a shorter wheelbase • Better visibility through smaller exterior dimensions • More agile driving behavior through significantly lower weight ($\Delta > 600$ lbs)

**17.2.5 Main advantages of
Porsche 911 Carrera /S
compared with
Maserati Coupé**



Fig. 84: Maserati Coupé

Criterion	Advantages of 911 Carrera compared with Maserati Coupé
	911 Carrera and 911 Carrera S
Engine <u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Opposed-cylinder engine concept for a low center of gravity • Rear engine for good agility and traction • Substantially better fuel economy • Better specific power • Higher volumetric efficiency • Higher top speed
Chassis/all-wheel drive <u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Smaller turning circle • PCCB optional • Sports chassis with mechanical rear differential lock optional • Wider wheels on the rear axle for better traction • Larger brake system • Larger rim diameter for a sportier look, more agile driving behavior and better brake ventilation • Sports chassis with mechanical rear differential lock available as an option at no extra charge
Exterior	<ul style="list-style-type: none"> • Electric slide/tilt sunroof optional
Interior	<ul style="list-style-type: none"> • Offering of sports seats with seat-width adjustment
Electrics, audio and communication <u>A further advantage of 911 Carrera S:</u>	<ul style="list-style-type: none"> • Bi-Xenon headlights optional • Interior surveillance standard • Bose Surround Sound system optional • Mobile phone preparation optional • Sport Chrono Package Plus with performance display, individual memory and stopwatch optional • Bi-Xenon headlights standard
Safety	<ul style="list-style-type: none"> • Tire pressure monitoring system optional
Dimensions and weights	<ul style="list-style-type: none"> • More agile cornering behavior through a shorter wheelbase • Better visibility through smaller exterior dimensions • More agile driving behavior through lower weight

17.3 Overview of unique selling points

Features	Competitors								Customer benefits
	911 Carrera S (MY 05)	911 Carrera (MY 05)	911 Carrera (MY 04)	Mercedes Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé	
Vehicle concept									
2+2 or 4 seats	+	+	+	-	+	++	+	+	High practicality
Drive									
Design, number of cylinders	6-cylinder opposed cylinder engine	6-cylinder opposed cylinder engine	6-cylinder opposed cylinder engine	V8	V8	R6	V8	V8	Minimum vibration, lower center of gravity for high driving performance
Rear or mid engine	+	+	+	-	-	-	-	-	Very good traction through greater weight on the driving axle
Integrated dry sump lubrication	+	+	+	0	0	0	0	++	Ensures that the engine is lubricated even with extreme lateral and longitudinal acceleration
Fuel consumption	++	++	++	0	++	+	+	--	Low consumption with correspondingly low running costs
Manual gearbox	++	++	++	n.a.	++	++	n.a.	++	High agility, low fuel consumption
Automatic transmission/automatic manual gearbox	+	+	0	+	++	++	0	+	Choice of automatic and manual shifting mode, including on the steering wheel
Chassis									
Standard chassis	++	+	+	0	+	++	+	0	Perfect compromise between practicality and driving performance
Wide wheel/tire combination	++	+	0	0	0	0	+	+	Excellent lateral and longitudinal acceleration potential
Driving dynamics control/system for improving traction	++	++ ₁	+	++	++	+	+	+	PSM, PASM
Turning circle	+	+	++	0	0	0	0	-	High practicality
Sports program (Sport Chrono function)	++ ₁	++ ₁	-	-	+ ₁	+ ₁	-	+	Increased driving pleasure
Brake system									
Multi-piston fixed-caliper brake system	++	+	+	+	0	+	++	+	Excellent braking performance incl. driving safety
Ceramic brake system (PCCB)	++ ₁	++ ₁	0	0	0	0	0	0	Excellent load potential for demanding braking situations
Interior									
Sports seats with seat-width adjustment	++ ₁	++ ₁	0	++ ₁	0	++ ₁	0	0	Individual adjustment to the respective driver

Features				Competitors					Customer benefits
	911 Carrera S (MY 05)	911 Carrera (MY 05)	911 Carrera (MY 04)	Mercedes Benz SL 500	BMW 645 Ci	BMW M3 Coupé	Jaguar XKR Coupé	Maserati Coupé	
Exterior									
Rear lid with automatically extending spoiler	++	++	++	0	0	0	0	0	Combination of design and aerodynamic measures to optimise driving stability and safety, particularly at high speeds
Aerodynamics	++	++	+	0	0	0	-	-	Good aerodynamics encourage high top speeds, low fuel consumption and safe driving behavior
Customisation with special colors	++	++	++	+	0	+	0	+	
Overview									
Driving performance/dynamics	++	+	+	--	-	0	0	+	Excellent lateral and longitudinal acceleration potential, top speed
Top speed	++	+	+	0	0	0	0	+	
Power-to-weight ratio	++	+	+	--	-	0	+	++	Low weight per power unit for good acceleration potential
Compact vehicle dimensions	++	++	++	+	-	+	-	+	Great agility and handling
Cost of ownership									
Total cost of maintenance	++	++	+	+	+	0	0	--	Low fixed and running costs incl. low liability and comprehensive insurance classification, vehicle tax and fuel costs

++ = very good

+ = good

0 = equal

- = worse

-- = much worse than the competition

n.a. = not available

1 = option

The evaluation – especially regarding the competitors – was made based on technical data, official sales literature and press information. No responsibility is accepted for the correctness of this information.

Publisher's data

Confidential!

This training material is intended solely for internal use within the Porsche sales organization.

Country-specific changes as well as changes to product features are possible up to the launch and over the service life of the vehicle.

Date: February 2004.

© Dr. Ing. h.c. F. Porsche
Aktiengesellschaft
Department VO4
Marketing & Sales Training
Porschestr. 15–19
71634 Ludwigsburg

Printed in Germany.
Errors and alterations excepted.



STR 001 102 05