

The 911 2.4

1972-1973



In 1972 engine capacity was enlarged to 2341cc by using a longer stroke. The 911 2.4 benefited from the many improvements that had been made since the 1964 911. The 2.4 therefore is one of the best 'classical' 911's. The 2.4's were also very fast. The E developed 165 bhp, and the S 190 bhp, while these cars weighed only 1050 kg's.

The 1971 2.4 was also known as the E-series, the 1972 2.4 as F-series. The E-series had a very distinct feature. It had an oil tank between the right door and the wheel, and an external flap, like the one for the gas filler on the left front fender, but this arrangement was discarded after this one year because people tended to put fuel in the oil tank by mistake--with disastrous results.



In this picture on the left the external flap for the oil tank is clearly visible. New for the 2.4's was a small under-bumper "chin" spoiler, aiding high-speed stability as well as appearance was. The result of aerodynamic work by Porsche engineers, it reduced front-end lift by 40%.

In 1972 this spoiler was standard on the 'S' and optional on the 'E' and 'T'. The spoiler became so popular that it was included on all models after 1973 as this 1974 yellow 'T' on the top of this page.

Had all models in 1971 featured Fuchs wheels as standard, in 1972 and 1973 the 'T' got 5,5Jx15 steel wheels and only the 'S' had 6Jx15 Fuchs alloy wheels. In 1972 the 'E' got 6Jx15 steel wheels, but in 1973 a new 6Jx15 alloy wheel was introduced. This wheel was produced by ATS and was standard on the 'E'.

The 911 2.7

1973-1977



In 1973 it had already been 10 years since the 911 was first introduced, and the spirit of the 911 was as alive as ever. This year brought some major innovations, like the characteristic shock-absorbing bumpers, the 'ducktail' and 'wale-tail' and a completely galvanized body. In the same year one of the most influential models in the 911 history was introduced: the Carrera RS. Although in 1973 the 'E', 'T' and 'S' had a 2.4 engine, the RS had a tuned engine with a bigger bore, making for 2681cc of displacement. A year later the new models (G-series) would be equipped with a detuned version of this 2.7 engine.

The Carrera RS



In 1973 Porsche wanted to enter the GT competition. For that purpose the 911 Carrera RS was designed as a racing-car. To homologate the car for the Group 4 GT class Porsche planned to sell 500 because rules required a minimum 500 be built. The price wasn't set too high to ensure they were sold.

They needn't have worried however: the RS was a big hit. In total 1636 were ultimately produced. With that the RS was reclassified as a Group 3 series-production GT, for which it was required that at least 1000 were built.

As a homologation-special the RS was

much lightened (thin-gauge body steel for instance) and weighed less than 1000 kg's, about 150 kg's lighter than a stock 'S'. The first cars all had these thinner steels bodies, but because Porsche never expected the car to sell in such large numbers the supply wasn't sufficient, so that the last 300 cars had to be built using the normal-weight body parts.

The chassis was upgraded with gas-pressurized Bilstein shocks, super-stiff sway bars, and aluminium wheels measuring an inch wider at the rear than a roadgoing 'S'.

Outside, RS 2.7s were unmistakable. Most were finished in white, and Zuffenhausen designers played up the return of a production based Carrera by putting an outsize version of the traditional name script (in blue, red, black or green) above the rocker panels. Rear fenders were further flared to suit the wider wheels (with centers in the same color as the carrera-script). But the most prominent feature of the RS was a prominent rear spoiler molded into the engine cover.

Aptly nicknamed "ducktail", it kept the rear firmly planted at speed by reducing lift from 145 to just 42 kg's. It also improved airflow through the engine-cover grille and moved the effective center of pressure about six inches rearward as another aid to stability.



The RSR 3.0



In 1974 an even wilder 911 was built: the Carrera RSR 3.0. This car was built for homologation as a 2.7 'evolution'. Only 109 were produced. The RSR 3.0 had 20 bhp more power, but weighed 180 kg more than the 2.7 because the thin-gauge body steel of the first RS's had run out, so that normal steel had to be used. The heavier 'whale-tail', a

bulkier front spoiler with large rectangular air intake, and even wider wheels than the 2.7 (9 inch rear, 8 inch front) also added extra weight. This extra weight explains why the RSR 3.0 wasn't much quicker than the RS 2.7, but because of the wider tires it did have better roadholding than the 2.7.

Of all 109 RSR 3.0's 60 were finished as roadgoing RS models.

Besides the RSR 3.0 some more civilized models were offered in 1974: the base 911, a 911 'S' and the 911 Carrera. With the new Carrera, the 'S' became the middle model and equivalent to the former 'E' in trim and performance. The Carrera had the new 'black-look' as standard: window frames, wipers, doorhandles and on the Targa the rollbar, were black and the rings around the headlights were painted in the color of the body. The 'chrome-look' was however still



available as an option. In 1977 all Targa's got the black-look as standard, while previously only the Carrera Targa's had featured this 'black-look'.

Regardless of tuning, all '74-model 911s wore the new front and rear bumpers mandated by American law. While most other car-manufacturers designed hideous constructions to meet regulation (like the plastic nose on the MG-B for example), Porsche came up with an elegant solution. The bumper was 'pulled out' and mounted on aluminium tubes that collapsed when struck at 7 km/h or above and thus had to be replaced. Still they did protect the body much better than the previous models, and at low speeds the headlights weren't damaged, as American law required.



Accordian-pleat rubber boots neatly filled the gaps between body and bumpers, which were overlaid in color-keyed plastic with black rubber inserts. The new bumpers were placed higher on the car and therefore the side-indicators had to move from the fender to the bumper. American cars had two units placed next to each other, while European cars had only one unit at each corner of the bumper.

In the same year (1974) the 911 featured new seats with integrated headrests, and a full-width taillight lens bearing the Porsche name.

In 1975 the H-series Carrera gained a deeper front spoiler and a (optional) IROC-style rear spoiler. The 911 'S' was visually unchanged, but the base

911 disappeared. The same year a special limited-edition Silver Anniversary 'S' appeared. Each wore diamond-silver metallic paint, custom interior trim of woven silver-and-black tweed, and a numbered dash plaque with Ferry Porsche's signature. Only 1500 were built.

In 1976 (I-series) another limited-edition 911, the 'Signatur 911 S' was sold with black and beige interior, the Carrera 3-spook steering wheel, and platina metallic paint and wheels in the same color.

In 1975 the Turbo was introduced. This car featured a new 3.0 litre engine with a turbo-charger (see the 'turbo' section). A year later (1976) the Carrera 3.0 was equipped with the same engine, but without the turbo, still delivering 200 bhp. Besides the more powerful engine the Carrera 3.0 also had wider wheels arches. The 1977 J-series was the last model to use 2.7 engine.

Wheels

In 1974 the 911 was for some markets equipped with steel wheels, while for other markets the car wore the new ATS (cookie-cutter) wheels. The Carrera had black Fuchs wheels. The steels wheels can be seen on the yellow targa in the picture above. In the same picture: the 'S' with ATS wheels and the Carrera on Fuchs wheels.

The 911 SC

1977-1983



Porsche had already used the 3.0 (Turbo) engine without the turbo-charger in the 1975 Carrera 3.0, but in 1977 the 2.7 engine was definitely put aside. The new SC used the 3.0 litre unit, because it had better reliability and more potential for future tuning than the 2.7 engine.

Had all the previous years a choice of different 911 models been available, in 1978 only two models were available: the SC and the Turbo.

What 'SC' actually stands for is still a point of discussion, but Super Carrera sounds reasonable to me.

The SC was even more luxurious than the Carrera 3.0 of the years before. The engine however didn't deliver as much power as the Carrera 3.0's engine (20 bhp less), but because more torque was available at lower revs the car was nicer to drive. A new Sport Group package option added the well-known waletail and front air dam. The black Fuchs wheels were also part of this package. Also optional were red and blue 'Martini'-stripes, referring to the victories of the Porsche

racing cars (option M42).The sportomatic option was finally dropped. The standard cars had ATS wheels (6Jx15) and were delivered with the 'black-look', although some models were delivered with chrome parts, like the one in the picture above. I think this was optional, but I can't find evidence of that. Anybody knows?



Because of all the luxury the 911 gained some more weight and now tipped the scales at 1160 kg's. Porsche made plans to replace the 911 with the 928, but the 911 SC still sold 50% better than the 928 and therefore Porsche revised it's strategy and decided to inject new life into the 911. In 1980 all models except the ones for the american market (enviromental laws) gained power and now delivered 204 bhp. The same year the

911 was offered in America as a limited edition model 'The weissach Edition 911', seen in the picture above. This model featured special paint, a leather interior and a 'wale-tail', other features were comparable with the Sport Group package. The wheels were painted 'platinum' metallic on all 'weissach' models.

Cabriolet

In 1981 a concept car was presented at the Frankfurt motorshow. This concept car was a cabriolet version of the 911 and featured four-wheel drive. In 1982 the 911 SC cabriolet went on sale (the first cabriolet since the 356).The cabriolet was based on the Targa's bodywork and was said to need very little extra reinforcements. Since it's introduction the cabriolet slowly gained market share at the expense of the Targa.

The SC had some minor changes during the period it was sold. In 1980, the same year the power was increased to 204 bhp, side-indicators were added behind the front wheel. That year the 911 was equiped with a controversial black and white 'checker' interior. In 1981 the spoiler for the 'Sport'-version was modified (the Weissach-version in the image above still has the older model). The air-inlet grille was now the same as on the 'Turbo' running



across the whole length of the spoiler. The room beneath the spoiler was still bigger than on the Turbo's spoiler. In 1982 this design was no longer used and the 'Sport'-version got the Turbo's spoiler as seen on this 1982 model. The silver rim of the Fuchs wheels was now polished (also in this image).

Model Year	Model Type	Production
1964-67	911 (2.0)	10723
1965-69	912	32867
1967-69	911S (2.0)	5056
1968-69	911T (2.0)	6318
1968	911 L (2.0)	11610
1969	911 E (2.0)	2826
1970-71	911 T-2.2	15082
1970-71	911 E-2.2	4927
1970-71	911 S-2.2	4691
1972-73	911 T-2.4	16933
1972-73	911 E-2.4	4406
1972-73	911 S-2.4	5094
1973	911 Carrera RS 2.7	1590
1974	911 Carrera RS 3.0	109
1976-77	911 2.7	17260
1974-77	911 S 2.7	17124
1974-75	911 Carrera 2.7	3353
1974-77	911 (930) Turbo (3.0)	3227
1975	912 E	2092
1976-77	911 Carrera 3.0	3691
1978-89	911 Turbo (3.3)	17425
1980	911 SC	57972
1986-89	911 Carrera (3.2)	49629
1984	911 SC RS	20
1987-88	959	283
1989-1994	911 (964) Carrera 4	20364
1990-1994	911 (964) Carrera 2	35318
1991-1992	911 (965) Turbo	3808
1991-1992	911 (964) Carrera RS	2398
1992	911 (964) Turbo S	80
1993-1995	911 Turbo 3.6	5323
1996-1997	911 (993) Carrera	42340
1996	911 (993) Carrera RS	1014
1996-1998	911 (993) Turbo	6314

The Porsche 911

1963-1968

We've already discussed the beginnings of the 911, so let's get down to the car itself. The 911 is a rear wheel drive, rear engine automobile. Rear engine meaning the engine is *behind* the rear axle. Its engine is a horizontally opposed 6 cylinder. Horizontally opposed pistons lay "flat", hence the name "flat-6." The first actual 911 models are considered 1965. In 1965 and 1966, the 911 came in only one form. It had a 1991cc engine, which produced 130 horsepower at 6,100 rpm. They used Solex carburetors, and had a compression ratio of 9.0:1. This car's top speed was about 130 mph.



In 1966, a new option was offered, the Targa. A 911 Targa had a vinyl covered top that was removable and could be stored in the trunk. The top locked between the windshield and the brushed stainless steel roll bar behind it. The Targa had a soft rear window, much like a convertible.

In 1967, the 911 model remained unchanged, but was joined by the [911 S](#). By 1968, more options were added to the Porsche--like a sunroof and the Sportomatic gearbox. This gearbox was like a normal 4 speed transmission, except there was no clutch pedal. The clutch was controlled by two microswitches at the base of the shifter. All the driver had to do was touch the shift knob, and the transmission would go into neutral, awaiting the next gear to be selected.

The Porsche 911 T

1968-1973

The 911T was added to the line up in 1968 as the "Touring" form of the 911. The 911T had the 2.0 liter engine, but with only 110 horsepower. The T was the "base" model, costing 10% less than its more powerful brother, the 911S. As of 1969, the 911T got the 2" lengthening in its wheelbase as did the other 911s. It retained its Weber carburetor while the other 911s received Mechanical FI.



The 1972 911T

1970 brought on the first engine displacement increase, to 2.2L. (2,195cc). That upped the output to 125 horsepower. For both '70 and '71, the engine had Zenith carbs, and kept the same compression ratio of 8.6:1.

Until 1972, all 911T models had a different transmission than the 911S and 911E. In 1972, the 911s received 2.4Liters (2,341cc) and the 911T output 140 hp at 5,600 rpm. Part of this power came from the addition of mechanical FI, something other 911s had for years. Compression was lowered to 7.5:1. All the 911 models shared the same 915/12 transmission.



The 1973 911T Targa

1973 was the last year for the 911T, and there were two different model distinctions, an "early" and a "late". The early 911T was the same as the 1972 model. The late 911T was offering CIS (K-Jetronic) fuel injection. Power remained at 140 hp. As for all the 911T years, you could get either Coupe or Targa.

The 911 E

1969-1973



The 911E entered the line-up in 1969 as the middle range model, between the 911T and 911S. The 911E originally had a 2 liter, 140 horsepower engine with Mechanical Fuel Injection. Its compression was 9.1:1. The 2.2 L engine came in 1970 and brought 15 more horsepower with it, now outputting 155 hp at 6,200 rpm. In 1972 and '73, the 911E received the 2.4L. with 165hp, and the 915 transmission.

The Porsche 911 2.7

1974-1977



Notice the new changes!

The entire 911 line was changed in 1974, with the base 911 having a new 2.7L flat-6. It put out about 150 horsepower. Major changes from 1973 included big, heavy duty bumpers, the engine, and reinforcements in the body, such as the beams within the doors. The models to choose from at this time included the 911, the 911 Carrera, and the 911S. The base 911 was only available in America for 1974; from 1975 to 1977, the least expensive model in North America was the 911S. The 911 2.7 was available to the rest of the world, though, until 1978 when the 911SC became the only non-turbo 911 produced.

The 911 Carrera

1974-1977

1974 brought about many changes in the 911s. The lineup now consisted of the 911 2.7, the 911 Carrera, and the 911S. The 911 Carrera had a 2.7L engine producing 175 horsepower. The body was very different from previous Porsche 911s. Improvements included reinforced doors and heavy duty bumpers that could withstand a strong impact. The Carrera sported the new whaletail (RS wing), instead of the "ducktail" of the previous 1973 Carrera RS. Often you will see the script "Carrera" written across the lower portion of the 911's side.



A 1977 Carrera 3.0

In 1975, new emissions laws caused Porsche to redesign the exhaust system, and when the dust cleared, the Carrera only output 165 hp. In 1976, North America didn't receive the Carrera anymore, because it was replaced by the Turbo Carrera (930). The rest of the world still had the Carrera, but it was now the "Carrera 3.0". The Carrera 3.0, or "Carrera 3", had 200 horsepower coming from a 2,997cc engine. This car tends to be a sought after car in North America and was produced from 1976-77. In 1978, the 911 SC replaced it.

The 911 SC

1978-1983



A 1979 SC Targa

The 911 SC came along in 1978, as the 911S and 911 Carrera disappeared. The 911 SC was available for all markets. It held a 3.0 liter engine, producing 180 horsepower. It remained pretty much the same over its lifespan, with different options taken and added here and there. In 1980, a special edition [911 Weissach](#) came out to boost sales. However, the 1983 911SC carried the biggest change in the 911's history, it became convertible!

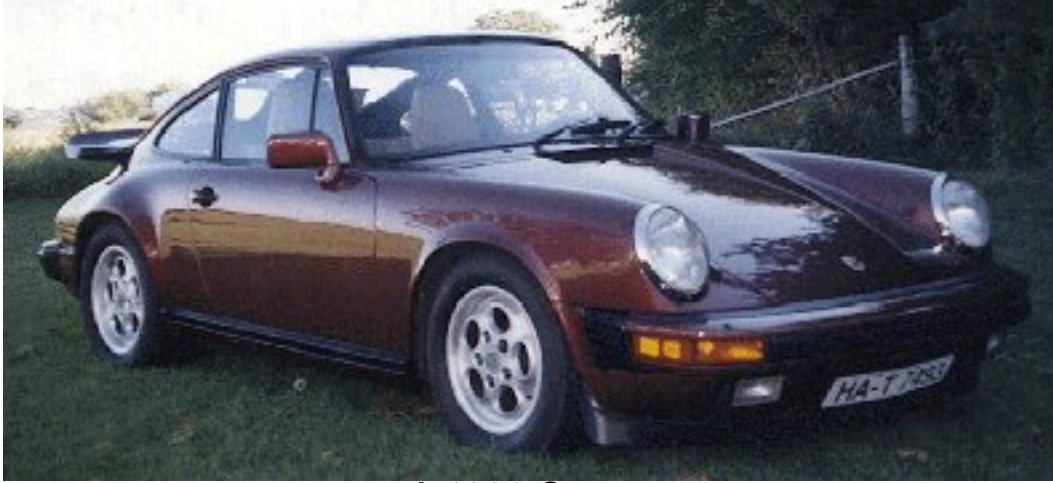


The 1983 SC Cabrio

It was called the 911SC Cabriolet, and was the first convertible Porsche since the 356. This became an extremely popular car, and was heralded as the fastest convertible in the world. They were sold out more than a year in advance. The Cabriolet led Porsche into 1984, where the [911 Carrera](#) took over.

The 911 Carrera

1984-1989



A 1986 Carrera

These 911s are some of the best ever produced. They consistently are complemented on how well they're built and drive. By 1984, the 911SC was gone, and the Cabriolet had been introduced one year earlier. The Carrera now carried a 3.2 Liter engine, producing 202 hp. This car was the first to have DME fuel and ignition. The brakes were upgraded with a bigger booster and larger rotors. The heating system was upgraded, too, with two extra blowers. An option for 1984 included the Turbo look body, which included turbo metal, brakes, and wheels. In 1985, this option could be used on Coupes, Targas, or Cabriolets, and with or without the whaletail or front spoilers. So pretty much any combination could be had in 1985. Occasionally, Porsche would make a [911 Slant-Nose](#), which looked like the racing 935. These were made up through the late 80's. Porsche also changed the oil cooler in 1985 to a finned, radiator type cooler. To provide the extra air needed, the opening in the bumper was enlarged.



1989 Carrera Targa

In 1986, not much changed, the Cabriolet offered an electric top. Boge double tube, low pressure gas shocks were standard equipment. The sway bars and rear torsion bars were increased in size. A completely new transmission was applied in 1987; type G 50. The clutch was enlarged to cope with the larger engine. Hydraulic master and slave cylinders now activated the clutch. Power was at 217 horses. 1988 didn't bring much change either. A support brace was added between the transmission and the left heat exchanger to reduce the noise of the G 50 transmission. Also in 1988, a special edition [911 Carrera Clubsport](#) was offered, as well as a limited number of [Anniversary Carreras](#). 1989 brought about the last year for the classic 911, as the Carrera 4 was already out, and an all new 911 Carrera 2 was being readied for 1990.

The Porsche 911 Carrera 2

1990-1994

It's hard to believe, but this version of the 911 appeared 7 years ago! In 1989, the 911 line was redesigned for the first time in over 15 years. The 1990 911 Carrera was renamed "Carrera 2", to distinguish it from the 4 wheel drive "Carrera 4", which had appeared a year earlier. Visual changes included a restyled body with integrated bumpers and new alloy wheels. Also new was a electronically movable rear spoiler, which sits flush with the deck until about 45 mph.



The major reworking came underneath the skin. The engine was totally redone, and now displaced 3.6 liters, up from the previous 3.2 liters. Output of the powerplant was 247 horsepower. Still a flat-6, of course. This new engine brought the 911 to new levels of performance. It can go from 0-60mph in a factory stated 5.5 seconds, and top out at 162 mph. The engine can be coupled with two types of transmissions; the five-speed manual, or 4 speed Tiptronic.

The Tiptronic transmission is an automatic, with the usual PRND321 selections, but it can be used as a manual shifter, too. While the car is in the "Drive" position, you can push the stick horizontally to the right into a second slot, which is parallel to the "regular" slot. The shifter sits in the slot, with the ability to be moved "up" one position, or "down" one position. When you "tip" the stick forward, the car will upshift, and when you "tip" it back towards you, it'll downshift.



So, in essence, you can plant your foot on the gas, and when you're ready to shift, tip it forward. Without having a clutch to operate, you can treat it like an automatic, but shift when you want! If, for some reason, you don't shift it at redline, the computer will do it for you. Also, if you try to downshift it at a speed where the engine will redline in the lower gear, the computer will again interrupt.



The Carrera could be had in Coupe, Cabriolet, or Targa form. From 1990-1994, a few Carrera 2 derivatives were offered. In 1992, a limited edition [911 America Roadster](#) was offered. It was a wide-bodied Cabrio. In 1993 and 1994, an [911 RS America](#) was offered. This was a lightweight version of the C2. Finally, in 1994, the [911 Speedster](#) was available as the 50's era 356 Speedster.

The Porsche 930

The most refined use of turbocharging the world has seen.



The Porsche 930 made history. It was the first production car to make practical use of a turbocharger. First of all, let me answer the obvious question: "What's a 930?" Well, when you hear "930," it's a reference to the factory "type" number given to production vehicles.

For instance, when the original 911 was introduced in the sixties, it was called a "911", but often referred to as "type 901". In this case, "type 930" designates a 911 with a turbocharged engine. So you might see a turbocharged Porsche referred to as 930 or 911 Turbo--these designations mean the exact same thing.



1977 Turbo Carrera

For the 1976 production year, a new model, called the "Turbo Carrera" was available (type 930, but officially titled "Turbo Carrera"). The car was a 911, but a very special one. It was turbocharged. This new model had the 3.0 liter engine, modified suspension, fender flares, and the most well-known trademark of all, the whaletail. It developed 234 hp and 246 lb-ft torque. It could go from 0-60 in 6.7 seconds, and cruise to 156 mph. The car was fast, powerful, and extremely tail-happy.

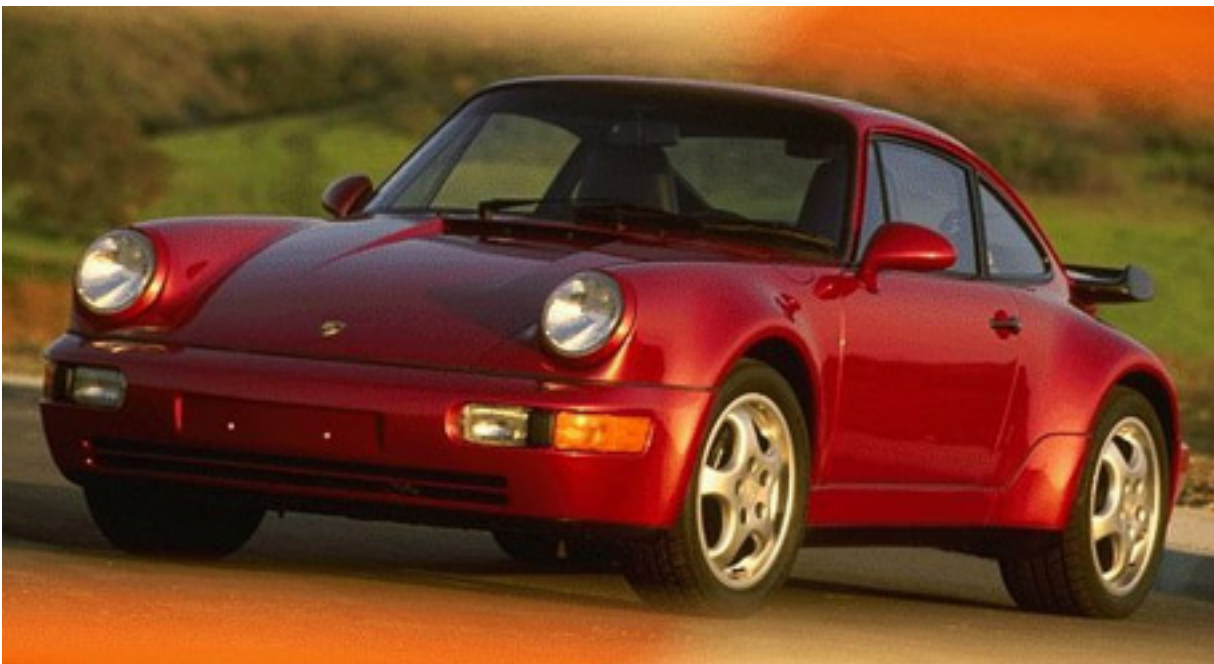
However, the 1976/77 Turbo Carrera was simply an intro to the "big" 930, of the 1978 model. In 2 years of further development, the car was upgraded into a 3.3 liter, intercooled, turbocharged monster that could go from 0-60 in 4.9 seconds, and allow the speedo needle to soar past the 165 mark. The 930 was now just titled "Turbo" on the rear deck lid. Sadly, 1979 was the last year for the 930 in America. The 930 was discontinued in the US due mainly to emissions requirements. There are grey market 930's running all over the states, though.



After a 7 year absence, the Turbo finally returned in 1986. It was virtually the same model, sporting the 4 speed gearbox and a very nervous rear end. Yet by 1989, the car had a 5 speed box, 285 horsepower, a better suspension, better brakes, and wider tires. Performance was down from the Euro version due to strict emissions laws. It was unfortunately slower than the

1978-79 model. In 1990, no 911 Turbo showed up in the brochures. Sales were down, prices were up, and the 930 was, I guess, impractical.

But the engineers were busily at work. They were preparing the 1991 911 Turbo (No longer designated type 930), a car rolling on the 964 chassis, but with a 3.3 liter engine, instead of the 3.6 of the Carrera. They worked wonders with the exhaust system, and even with all the required emissions crap, the '91 Turbo arrived as the fastest and safest 911 yet.



Beautiful 1992 911 Carrera 2 Turbo

Each year, we thought that the 911 Turbo was at its peak. Not yet so, because for 1993, the engine size was increased to 3.6 liters, and more power, more speed, and better handling was set forth. It now had 360 horsepower and 383 lb-ft torque. It had dual exhaust, better brakes

(how???), and totally redone engine components. The 911 Turbo 3.6 (below), as it was now called, showed the world how much Porsche could improve on something already thought to be perfect.



The first displacement upgrade for the Turbo in 15 years

The Turbo 3.6 led the way for 2 years, and was discontinued by 1995. At Geneva in 1995, Porsche introduced the 1996 911 Turbo. It had the updated 993 body style with flared fenders and a new, melted-look whaletail. The engine was of 993 variety, but this time with *twin* turbochargers!

Early Porsche 911 Frequently Asked Questions

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Q0. What does this FAQ cover?

This FAQ was originally written to fill the need for, well, a FAQ on Porsche's 911 model. Though it contains information for many of the later 911s and derivatives, it concentrates on the earlier models. Eventually, I'd like to bisect this FAQ and give the late-model half to someone who is better qualified to answer those questions. In the mean time, this FAQ covers the following:

1. Background

Q1.1. What's a 911?

Q1.2. What are the differences between the various 911s?

Q1.3. Okay, so how do I tell the difference between them?

Q1.4. But, Porsches are known for performance; how do the models differ?

Q1.5. What should the VIN or engine number look like for my car?

Q1.6. Why did the early 911s have two batteries?

2. Purchase

Q2.1. Which 911 Should I Get?

Q2.2. I want to buy a 911. For what should I look?

Q2.3. Does anyone have a checklist for potential 911 buyers?

3. Upkeep, Repair, and Parts

Q3.1. What are the classic problems / areas to check on 911s?

Q3.2. So, what's wrong with the 2.7 liter 911s?

Q3.3. Where can I get new and used parts for my 911?

Q3.4. At what pressure and temperature ranges should my 911 operate?

Q3.5. Where can I find a car seat for the rear seats of my 911?

Q3.6. Any other places I can look for 911 info?

Q1.1. What's a 911?

Yikes. Okay, in 1963 Porsche announced the 901, a car based on the venerable 356 model. The car was renamed 911 because Peugeot had a copyright on all 3-digit car model numbers with a zero in the middle. The 911 has gone on to become, arguably, the most popular car ever produced by Porsche.

The 911 engine is an air cooled (or oil cooled) six cylinder opposed design (%). The cylinders bolt onto the crankcase such that displacement increases are often achieved by replacing the pistons and cylendars.

The body of the car was designed by Ferdinand "Butzi" Porsche (Ferry's son) while the engine was designed by Ferdinand Piech (Dr. Porsche's nephew).

(%) It is not a boxer design. A boxer engine has not only a 180 degree layout, but has a flat crankshaft arranged so that the matching pistons are at top-dead-center at the same time (so that the pistons move, alternately, toward or away from each other).

Q1.2. What are the differences between the various 911s?

There's *lots* of differences:

Numerous of body styles

Coupe. 4 seats (well, 2 and a couple postage stamps) and a hard roof. You know. . . a

COUPE

Targa. Like a coupe, but with a roll bar and a removable top. The earlier targas had soft rear windows, but the later ones had glass.

Cabriolet. A full-on convertible.

Speedster. A version of convertible, but with a short windshield and a fiberglass tonneau (the 356 speedster was different, but we're talking about 911s here).

Several trim and tune options.

T, E, S. The early years (the latest any of these were produced was 1977) cars in touring, injected and super (also fuel injected) states of tune.

Carrera. For the earlier cars, this was the quickest standard customer car. After 1983, the Carrera was the standard customer car.

SC. This was the standard car (there was also the turbo for some of these years) between 1978 and 1983.

H, N. Rare models: 911RS Homologation (20 made in 1973) and a Euro model in 1976.

L. The one-year replacement for the 911S in the US.

R, RS, RSR. 911 in race trim. These cars are always rare and expensive.

Turbo. This one is, well, turbo charged.

Model Year Differences.

And, finally, there are the various changes over the different model years. Major Eras Include (the names are, partly, my own):

1964-1968 short wheel base (SWB, 2211 mm to be exact). In contrast, the long wheel base (LWB) is 2268 mm long.

1968-1973 early power. These 2.0, 2.2, and 2.4 liter 911s (my personal favorites) saw either mechanical fuel injection or carburetors (actually, in 73.5, the 911 T was electronically fuel injected).

1974-1977 middle-year 911s. These cars had the 2.7 liter engines that had a notoriously short life span. This is the beginning of the crash bumpers (with the accordion sections at the edges) and K-Jetronic fuel injection.

1978-1983 911SC. These 3.0 liter SCs are powerful, luxurious, and nearly bullet-proof.

1984-1989 Motronic Carreras. Like the 911SC, but with a 3.2 liter engine and Motronic fuel injection.

1989-1994 964 (original 911 Carrera 2/4). These cars have the one-piece, all body color bumpers and the engine cover that raises at 50 MPH to form a wing.

1994-today 993 (today's 911)

Note: Years given are model year. The model years start in August or September of the previous year (example 1972 model year starts in September of 1971). Much of the research for this document has been clouded by research materials not specifying whether they discussed calendar year or model year.

More specific differences are given in table 1, below.

Q1.3. Okay, so how do I tell the difference between them?

Well, you asked for it. . .

Short Wheel Base 1964-1968

1968 and earlier cars have a shorter wheelbase than the 911s built in 1969 and after (recognition hint: the torsion bar tubes are right next to the SWB cars' rear wheel well -- there's a gap in the LWB cars). Other accoutrements of the SWB cars are:

glass lens covered headlights,

exterior door handles that opened via an exposed push-button (rather than the flying-buttress protection or trigger of later years),

no side marker reflectors,

Hella 128 fog lights mounted through the bottom half of the front bumper,

a vertical structural strip running under the rear engine grille,

sunroof models during these years had a drain slot above the rain gutter above the back side windows,

And, in the interior:

chrome instrument bezels with green lettering,

ceiling-mounted rear-view mirror (1968 was as well, but it was break-away type)

a one piece under-dash knee guard,

pleated door pockets, and

push-buttons to open the doors from the inside.

Until 1971, non-S models had silver painted slotted steel wheels; S models had Fuchs alloy wheels. 911s before the 1967 model year had the '911' designation diagonally across the lower right corner of the engine cover and the PORSCHE script in one piece (well, actually it was two pieces, but it looked like one) on the bottom.

1964 2.0 liter

There were four 901 prototypes produced (serial numbers 13326, 13327, 13328, and 13330).

Porsche went on to build 125 first year (1964) 901 cars.

RECOGNITION TIPS:

The 1964 cars have no rocker-panel trim and no model designation on the engine lid or on the dash. Supporting clues are that 1966 and earlier 911s have wooden dash trim and open A-frame window cranks.

1965 2.0 liter

RECOGNITION TIPS:

These cars look nearly identical to the 1966 cars. The things that separate these cars from the 1966s is in the interior. The 1965 cars have no wrap-around knee guard, aluminum backing on the wood dash trim, or rubber shift boot (I think they were leather). Both years are similar in that they have the rocker panel trim (this is not found on the 1964 cars), wooden dash trim, and open A-frame window cranks.

OPTIONS:

A four speed transmission became standard mid-model year. Sunroof, tinted windshield, enamel porsche crest on wheels, chrome plated steel wheels, gasoline heater (LHD models only), ambient temperature gauge, driver's side vanity mirror on sun visor, recaro or ferrari seats (actually, both are made by recaro), leather seats headrests

1966 2.0 liter

Weber carbs replace Solex mid-model year. S model introduced mid- model year. Fuchs wheels introduced. Targa (with soft rear window) introduced. 911 introduced in US.

RECOGNITION TIPS:

These cars look nearly identical to the 1965 cars. The things that separate these cars from the 1966s is in the interior (see the 1965 description). Of course, if the car is an 'S' model, it has to be a 1966 or later. US models have all chrome vertical bumper guards (standard equipment) -- 911S bumper guards are all rubber.

OPTIONS:

sunroof, tinted windshield, enamel porsche crest on wheels, chrome plated steel wheels, gasoline heater (standard on S-models) (LHD models only), ambient temperature gauge, driver's side vanity mirror on sun visor, recaro or ferrari seats (actually, both are made by recaro) leather seats, headrests

1967 2.0 liter

Only 4 prototypes and 19 'production' 911Rs were made.

RECOGNITION TIPS:

The window cranks on 1967 cars are of the covered A-frame type but had a hard plastic knob. US Models have chrome vertical bumper guards with a rubber strip (standard) -- 911S bumper guards are all rubber. The bases for the switches on the dash go from black to chrome and the dash is matte black (S model had basket weave vinyl).

OPTIONS:

Rear window wiper optional from this model year on (on Targas, too?), tinted windshield, rear-window defroster (vertical wires), sunroof, sportomatic (introduced in 1967), enamel porsche crest on steel wheels, chrome plated steel wheels, Fuchs alloys on non-S models, 100 liter fuel tank, gasoline heater (standard on S-models) (LHD models only), ambient temperature gauge, leather covered steering wheel (standard on S-models), driver's side vanity mirror on sun visor, leather seats, headrests, recaro sport seats (available in leather, vinyl, vinyl with with corduroy, or vinyl with hound's tooth inserts).

Early Power 1968-1973

Side marker reflectors appear in 1968 (tacked-on side reflector) -- in 1969 and later, the reflectors are incorporated into the turn indicators. 1968 and later 911s have the model designation mounted

horizontally centered on the engine cover (the hood?). The covered headlight is replaced with a rim bezel over a sealed beam headlight (US) or a lens covering bulbs (non-US). Inside, the window cranks are one-piece with a soft vinyl knob. The door pockets under the arm rests are vinyl-covered hard cardboard. 1969 is the first year of long wheelbase 911s; these came with flared fender arches; also, the targas come with glass rear windows. The 911s between 1969 and 1973 used a 2 battery system. From 1970 on, the doors opened via trigger-type door handles. The under-dash knee guard is a two-piece (with room for the ash tray in between) unit during this time period. 1969 and later, the rear-view mirror is mounted to the windshield.

1968 (A Model) 2.0 Liter

A very few targas had glass rear windows at the end of the model year.

RECOGNITION TIPS:

Matte black wiper arms. US Models have chrome vertical bumper guards with a rubber strip (standard) -- 911S bumper guards are all rubber. S Models have chrome vertical bumper guards with a rubber strip. Knobs on the dash are now rubber covered. 1968 US models only, 911s had tacked-on rectangular side reflectors in front and back. Two-piece dash pad (1968 only). Matte black dash (S and L models had basket weave or elephant hide vinyl). Rear-view mirror is break-away and ceiling-mounted.

OPTIONS:

sunroof, Sportomatic transmission (1968-1971), tinted windshield, rear- window defroster (vertical wires), a chrome bar (optionally with leather rubber covering), connecting the top of the rear vertical bumper guards (where bumper guards exist), a 3-piece stainless steel muffler skirt (hanging below the rear of the car), enamel porsche crest on steel wheels, chrome plated steel wheels, Fuchs alloys on non-S models, 100 liter fuel tank, gasoline heater (LHD models only), ambient temperature gauge, leather covered steering wheel (standard on S-models), leather seats, headrests, recaro sport seats (available in leather, vinyl, vinyl with corduroy, or vinyl with hound's tooth inserts) are available on non-US cars.

1969 (B Model) 2.0 Liter

All new forced air ventilation system. Heated rear window standard. Targa had glass rear window.

911T came in an normal and 'Lux' configurations. 911T has all chrome bumper guards (rubber strip is an option); 911E and S have all rubber bumper guards. After 1968, side marker reflectors were incorporated into the turn-signal indicator.

RECOGNITION TIPS:

First year of long wheelbase 911s; these came with flared fender arches. Dash was basket weave vinyl (1969-1971). If it's a LWB car with push- button outside door handles, it's a 1969.

OPTIONS:

Hydropneumatic struts on S model, Hella 169 fog lights (not available in US), sunroof, tinted windshield, Sportomatic transmission (1968-1971), aluminum wheel arch mouldings (E and S models), sportomatic, 5 speed (T and E models), rear-window defroster (horizontal wires), a chrome bar (optionally with leather rubber covering), connecting the top of the rear vertical bumper guards (where bumper guards exist), a 3-piece stainless steel muffler skirt (hanging below the rear of the car), 10-spoke cast magnesium wheel (on T model only), chrome plated steel wheels, 100 liter gas tank (non-US models only), gasoline heater (LHD models only), electric antenna, leather seats, headrests, vinyl and leather door coverings, vinyl or leather (or cloth?) sport seats, electric windows

1970 (C Model) 2.2 Liter

Underfloor areas galvanized with PVC undercoat. 911T has all chrome bumper guards (rubber strip is an option); 911E and S have all rubber bumper guards.

RECOGNITION TIPS:

First year of trigger-type door handles. '2.2' sticker in the back window. Dash was basket weave vinyl (1969-1971). 1967-1970 glove boxes used a key lock which was mounted over the glove box, but offset toward the center of the car.

OPTIONS:

Hella 169 fog lights (not available in US), Limited slip differential optional, sunroof, Sportomatic transmission (1968-1971), tinted windshield, aluminum wheel arch mouldings (E and S models), rear-window defroster (horizontal wires), a chrome bar (optionally with leather rubber covering) connecting the top of the rear vertical bumper guards (where bumper guards exist), a 3-piece stainless steel muffler skirt (hanging below the rear of the car), 10-spoke cast magnesium wheel (on T model only), chrome plated steel wheels, 100 liter gas tank (non-US models only), gasoline

heater (LHD models only), Bosch hydro-dynamic struts (on T and S models only), electric antenna, leather seats, headrests, vinyl and leather door coverings, vinyl or leather (or cloth?) sport seats, electric windows

1971 2.2 liter

911T has all chrome bumper guards (rubber strip is an option); 911E and S have all rubber bumper guards.

RECOGNITION TIPS:

Dash was basket weave vinyl (1969-1971). In 1971, the glove box lock was mounted in a twist knob that appeared centered over the glove box.

OPTIONS:

Hella 169 fog lights (not available in US), tinted windshield, Sportomatic transmission (1968-1971), heated windshield (this year only), sunroof, aluminum wheel arch mouldings (E and S models), rear-window defroster (horizontal wires), a 3-piece stainless steel muffler skirt (hanging below the rear of the car), 10-spoke cast magnesium wheel (on T model only), chrome plated steel wheels, gasoline heater (LHD models only), electric antenna, leather seats, headrests, vinyl and leather door coverings, vinyl or leather (or cloth?) sport seats (standard on S model), electric windows.

1972 2.4 liter

Stroked to get 2.4 liters; compression lowered to run on regular gas. Dry oil sump made of stainless steel. The 901 transmission was replaced, starting in 1972, with the stronger 915 transmission. One result of this is that these cars now use the conventional H shift pattern (drat!). Silver painted slotted steel wheels standard on T model. Seat belts retract in US.

RECOGNITION TIPS:

Matte black engine grille, PORSCHE letters, seat recliner bars, and (on targa models) targa script.

1972-only had oil filler flap below right-side C-pillar. '2.4' badge on engine grille. Rectangular side mirrors. Dash was leather grain vinyl (1972-1973) with no model designation.

OPTIONS:

Front spoiler optional, Sportomatic on E and T models, 5 speed on all cars in US and on T models in UK, Larger fuel tank (with space saver spare), 6Jx15 alloys, Hella 169 fog lights (not available in

US or on E or S), tinted windshield, aluminum wheel arch mouldings (all models), rear-window defroster (horizontal wires), sunroof, a 3-piece stainless steel muffler skirt (hanging below the rear of the car), 10-spoke cast magnesium wheel (on T model only), gasoline heater (LHD models only), electric antenna, leather seats, headrests, vinyl or leather door coverings, vinyl or leather (or cloth?) sport seats, electric windows

1973

Better oil cooler, stronger main bearings. Large fuel tank standard (electric compressor provided for the little-bitty tire that fits around the fuel tank). Front air dam standard on all models. 911 T and E available in standard and Lux versions. Targa available mid-year in UK. Silver painted slotted steel wheels standard on T model. E model used cookie-cutter wheels as standard. Seat belts retract in US. This year only, Porsche produced the 2.7 liter Carrera RennSport or Carrera RS -- this was available in four versions. The RS Sport and the RS Touring (RST) were the main customer Carreras. Moreover, the many of the early RSs were made in lightweight form making them extra fast (and extremely valuable). More esoteric RSs were the twenty RSH, or Homologation, models and the 2.8 liter RS Racer (RSR).

RECOGNITION TIPS:

Matte black engine and horn grille, PORSCHE letters, and (on targa models) targa script. Bumper guards on US models are made entirely of rubber. Rectangular side mirrors. Carrera had 'ducktail' rear wing. Dash was leather grain vinyl (1972-1973) with no model designation.

OPTIONS:

Fuchs alloys on T model, Hella 169 fog lights (not available in US or on E or S), sunroof, tinted windshield, aluminum wheel arch mouldings (all models except Carrera), rear-window defroster (horizontal wires), a 3-piece stainless steel muffler skirt (hanging below the rear of the car), gasoline heater (LHD models only), leather seats, headrests

Middle Years 1974-1977

Shock absorber bumpers, seats have fixed headrest. Along with the fat bumpers, the trunk (front of the car) goes from curved-over to flat where it hits the bumper. The main-line cars all have 2.7 liter displacements with CIS fuel injection.

1974 (G Model) 2.7 liter

Carrera available only in Coupe and Targa versions (no Sport, Touring, or Racing versions).

RECOGNITION TIPS:

Carrera 2.7 had 'ducktail' rear spoiler (but shock absorber bumpers). The bumper guards on US-model 1974 cars were only about 3.5 inches wide. Newer cars have 7 inch wide bumper guards. Note that the 1974 cars do *NOT* have thermal reactors (non-US cars never had them); these things generate a lot of heat and, therefore, heat-related problems.

OPTIONS:

5-speed transmission (US -- this was standard in UK) or 4-speed Sportomatic

1975 2.7 liter

There was a silver anniversary edition of the 911 with silver cloth in seats and doors and black leather trim.

RECOGNITION TIPS:

Black targa roll bar.

1976 2.7 liter

Carrera comes in regular and sport trim. Entire body covered in zinc for rust protection. 5-bladed engine fan (rather than 11). Five speed transmission standard in US and UK.

RECOGNITION TIPS:

External mirror painted body color. Headlight washer is of the stick-up variety between 1976 and 1979.

OPTIONS:

sportomatic transmission, Koni adjustable or Bilstein gas/oil shocks (S Model), external oil cooler, forged alloy wheels, sport seats, electric sunroof, electric windows, air conditioning

1977

Cars fitted with extra air pump, twin thermal reactors and exhaust recirculation. Improved gear box.

RECOGNITION TIPS:

Headlight washer is of the stick-up variety between 1976 and 1979.

OPTIONS:

sportomatic transmission, 5-speed transmission, center console

911SC and Later 1978 on

The fenders were flaired more dramatically from 1978-on. The rear badge of the 1978-1983 cars had, of course, the '911SC' designation. Between 1984 and 1988, the badge on the engine lid indicated the then-current model name, "Carrera". From 1980-on, the headlight washers were mounted flush with the front bumper. The cabriolet body type was offered for the first time in 1983.

1978

5-speed standard. SC comes in standard and sport configurations.

RECOGNITION TIPS:

Headlight washer is of the stick-up variety between 1976 and 1979.

OPTIONS:

air conditioning, power windows, last year of the Sportomatic transmission

1979

SC horsepower increased mid-model year to 188.

RECOGNITION TIPS:

SC now has black window frames, electric windows. Headlight washer is of the stick-up variety between 1976 and 1979.

OPTIONS:

air conditioning

1980

SC now has air conditioning and electric windows standard. The 911SC Weissach edition was available in 1980. Flush-mount headlight washers start in 1980.

1981

SC was given a higher compression ratio for 1981. The SC still comes in standard and sports configurations.

RECOGNITION TIPS:

Indicator side marking lights.

OPTIONS:

sports seats, berber cloth upholstery, leather upholstery

1982

1983

The Cabriolet was offered for the first time in 1983. This is the last year of the 911SC.

1984

RECOGNITION TIPS:

The easiest key is that the post 1983 cars had the name 'Carrera' on the engine lid rather than '911 SC'. These cars used the 'old' non-electric seats. Fog lamps in front spoiler.

OPTIONS:

air conditioning

1985

RECOGNITION TIPS:

First year of the electric driver-side seat.

OPTIONS:

Electric passenger-side seat.

1986

More effective air flow due to redesign of the ventilation system.

1987

New transmission with a hydraulic clutch is standard.

RECOGNITION TIPS:

The black "PORSCHE" script on the rear reflector is dropped this year in favor of clear script.

Halogen headlights (rather than sealed beam) are now fitted on US cars.

1988

959 available in sport and comfort trim. 911 Speedster . . 217n 195n . .

OPTIONS:

limited-slip differential (possibly turbo only), 16 inch wheels (possibly carrera only), alarm system (possibly carrera only), 7" wide front tires (carrera only), 8" wide rear tires (carrera only)

1989

RECOGNITION TIPS:

Aside from the "Carrera 4" script on the back of the engine lid (the Carrera 2 came by in 1990), this is the first year of the new smooth, body- colored bumpers. This is also the first year for standard dual airbags and ABS.

1990

OPTIONS:

electrically adjustable seats

1991-1993

1994 993 (first year for ROW)

RECOGNITION TIPS:

This is the first year of the 993. This car stands-out with sloped headlights, a larger engine cover/movable rear wing, and a handle- like fixed wing (with integrated third brake light) over the back engine cover.

OPTIONS:

Available in Speedster configuration.

1995 993 (first year USA)

OPTIONS:

Tiptronic

Q1.4. But, Porsches are known for performance; how do the models differ in performance?<- ->

Check this out.

Note: 0-60 times are subject to the talents (and the desire not to damage the car) of the driver. For this reason, the times will vary from source to source. This table has used several different sources (some of which do not match). Don't take the 0-60 times too seriously.

Table 1. 911 Models by Year and Type

Yr	Model/Disp	tion	60	power	trq	spd	wt	price
64	911 2.0	Solex	8.3	130	120	130	2380	
65	911 2.0	Solex	8.3	130	128	130	2380	2.5 7.9 16.0
66	911 2.0	carb	8.3	130	128	130	2207	2.5 7.9 16.0
66	911S 2.0	carb	8.0	160	132	140	2207	4.0 10.2 18.5
67	911 2.0	Weber	8.3	130	128	130	.	2.5 7.9 16
67	911S 2.0	Weber	8.0	160	132	140	2314	4.0 10.2 18.5
67	911R 2.0	Weber	.	210	.	.	1810	

68 911 2.0 . 8.3 130 128 130 2207 3.7 6.2 10.0
68 911T 2.0 Weber . 110 113 124 2185 4.5 6.4 8.1
68 911L 2.0 . 10.6 130 128 131 2314 5.3 8.8 12.5
68 911E 2.0 MFI 8.4 130 128 131 2185
68 911S 2.0 (q) MFI 8.0 160 131 140 2132 4.0 10.2 18.5

69 911T 2.0 Weber 10.2 110 116 125 2250 3.5 7.8 16.0
69 911E 2.0 MFI 8.4 140 129 134 . 6.5 10.2 15.5
69 911S 2.0 MFI 8.0 170 134 170 2250 4.7 7.6 11.0

70 911T 2.2 carb 9.5x 125 130 127 2250 3.5 7.9 16.0
70 911E 2.2 MFI 7.6 155 141 137 . 6.0 9.0 15.0
70 911S 2.2 MFI 7.0x 180 147 138 2250 4.0 10.4 19.5

71 911T 2.2 (r) 9.5x 125 130 127 . 3.5 7.9 16.0
71 911E 2.2 MFI 7.6 155 141 137 . 6.0 9.0 15.0
71 911S 2.2 MFI 7.0x 180 147 138 . 4.0 10.4 19.5
71 911 racing MFI . 270 . . .

72 911T 2.4 (a) 9.5 130u 145u 127 . 3.0 9.1 24.5
72 911E 2.4 MFI 7.9x 165 152 138 . 4.0 9.8 22.0
72 911S 2.4 MFI 6.6x 190 159 144 . 6.2 17.6 28.5
72 911RSR 2.8 MFI . 275-308 . . .

73 911T 2.4 (b) 9.5 130u 148 127 2250 3.0 9.1 24.5
73 911E 2.4 MFI 7.9x 165 152 138 2303 4.0 9.8 22.0
73 911S 2.4 MFI 6.6x 190 159 144 2303 6.2 17.6 28.5
73 Carrera 2.7 RS MFI 5.8x 210 187 143 2145 59.0 71.1 88.5
73 RSR 2.8 MFI . 308 . . 2145
73 RSR 3.0 MFI . 315-330 . . .

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Yr| Model/Disp |tion | 60 | power |trq |spd| wt | price |

74 911 2.7 K-Jet 7.9 150 175 130 2303 4.8 11.1 19.9
74 911S 2.7 K-Jet 6.1 175 175 140 2303 4.4 10.7 20.0
74 Carrera 2.7 (c) 8.5 175c 175c 131 2303 10.0 17.7 49.5
74 RS 3.0 . . 230 201 . .
74 RSR uk 3.0 . . 315-330 . . .
74 RSR Turbo 2.1 . . 480 . . .

75 911 2.7 K-Jet 7.9 150 175 130 2303 4.8 11.1 19.9
75 911S 2.7 K-Jet 6.1 160d 166d 140 2303 4.4 10.7 20.0
75 Carrera 2.7 K-Jet 8.5 165e 166e 131 2303 8.5 16.1 22.9
75 930 3.0 . 5.8 260 253 152 .

76 911 2.7 k-jet 7.2 165 175 135 . 4.8 11.1 19.9
76 911N (q)

76 911S 2.7 k-jet 7.5A 165 175 144A 2470 4.4 10.7 20.0

76 Carrera 3.0 k-jet 6.1 200 188 140 .

76 930 3.0 . 5.8 245g 253 152 2630 16.5 20.4 29.6

76 934 3.0 (f) . 485-540 . 200 2464

76 935 2.8 . . 580 . . .

77 911 2.7 . 7.2 165 175 135 . 4.8 11.1 19.9

77 911S 2.7 . 7.5A 165 175 144A. 4.4 10.7 20.0

77 Carrera 3.0 . 6.1 200 188 140 . 12.0 13.7 15.9

77 930 3.0 . 5.8 245g 253 152 . 15.5 23.2 30.0

77 934

77 935 2.8 . . 370-590 . . .

78 911SC 3.0 k-jet 7.0 180 175v 140 2560 8.5 13.5 23.5

78 930 3.3 . 5.6 265h 291h 155 . 16.9 22.3 29.5

78 935 2.86-3.2 . . 590-900 . 227 2255

78 936 2.1 MFI . 580 . . .

79 911SC 3.0 k-jet 7.0 180 175v 140 2560 8.0 13.9 20.0

79 930 3.3 . 5.6 265h 291h 155 2870 18.5 26.5 42.5

79 935

79 936 2.1 MFI . 580 . . .

80 911SC 3.0 k-jet 7.0x 180 180v 140 2760 8.5 14.7 27.5

80 930 3.3 . . (j) 304 . . 21.9 23.4 24.9

80 935 3.2 . . 740 . . .

81 911SC 3.0 k-jet 7.0 180t 180t 140 2760 8.7 15.8 24.0

81 930 3.3 . . (j) 304 . 2860 19.3 24.5 27.8
81 935 3.2 . . 760 . . .
81 936 2.7 MFI . 600 . . .
82 911SC 3.0 k-jet 7.0 180t 180t 140 2760 10.0 16.5 23.0
82 930 3.3 . . (j) 304 . 2860 18.9 27.2 37.5
82 956 2.7 MFI . 620 . . .
83 911SC 3.0 k-jet 7.0 180t 180t 140 2760 10.0 17.1 30.0
83 930 3.3 . . (j) 304 . 2860 21.0 27.6 33.0
83 911 SC RS 3.0 . . 255 . . .
83 956 2.7 d-mot . 620 . . .

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| |induc-|0 to| Horse | |top| | |
Yr| Model/Disp |tion | 60 | power |trq |spd| wt | price |
-----+-----+-----+-----+-----+-----+-----+-----

84 Carrera 3.2 mot 5.6 207k 192k 149 2760 21.0 25.2 30.0
84 930 3.3 (q) . . 300 . . 2860 22.5 30.5 43.5
84 911 SC RS . 5.0 . . 159 .
84 962 2.8 . . 650 . . .

85 Carrera 3.2 mot 5.6 207k 192k 149 2760 14.5 21.3 36.5
85 930 3.3 (q) . . 300 . . 2860 26.0 31.7 39.9
85 959
85 962 3.2 . . 700 . . .

86 Carrera 3.2 mot 5.3 207k 192k 149 2760 14.3 22.5 34.0

86 930 3.3 . . 282m 287 . . 24.5 34.2 34.2

86 959

86 961

87 Carrera 3.2 mot 5.3 217n 195n 149 2670 16.9 25.5 45.9

87 930 3.3 . 5.4 286p 287 162 2940 27.0 36.6 48.9

87 959

88 Carrera 3.2 LE-jet 5.3 217n 195n 149 2770 17.5 26.6 40.0

88 911 Club Sport . 5.3 217n 195n 154 2550

88 911 Turbo k-jet 5.0 282w 289w 155 3055 28.9 43.1 64.9

88 959 Sport 2.9 . . 450 . 197 .

89 Carrera 3.2 . 5.3 217n 195n 149 . 25.9 30.5 40.0

89 911 Club Sport . 5.3 217n 195n 154 2550

89 964 (C4) 3.6 . . 250 229 . . 29.0 34.9 43.5

89 911 Turbo k-jet 5.0 282w 289w 155 3055 39.0 50.9 65.0

90 964 (C2) 3.6 . 5.7 250 229 161 3031 28.0 35.9 52.0

90 964 (C4) 3.6 . 5.8 250 229 161 3320 30.0 37.7 50.0

90 Turbo 3.3 . 5.1 300 . 159 3055

91 964 (C2) 3.6 . 5.7 250 229 161 . 32.0 41.0 55.0

91 964 (C4) 3.6 . 5.8 250 229 161 3197 37.9 43.5 53.0

91 C2 Turbo . 5.0 320 . 168 3274 51.9 60.7 69.0

92 964 (C2) 3.6 . 5.7 250 229 161 3197 38.0 45.0 53.0

92 964 (C4) 3.6 . 5.8 250 229 161 . 43.0 46.8 55.8

92 RS America . . 250 229 . .

92 962 (C2) RS . . 260 240 . .

92 Turbo . 5.0 320 332 168 . 58.7 70.8 85.0

92 Turbo S . 4.6 381 361 180 .

93 964 (C2) 3.6 . 5.7 250 229 161 . 43.0 49.9 61.5

93 964 (C4) 3.6 . 5.8 250 229 161 . 48.9 51.9 55.0

93 RS America . . 250 229 . . 38.5 43.3 51.5

93 C2 Turbo . 4.8 360 384 175 .

94 993 (s) . 5.4 . . 168 .

94 930 3.6 84.9 90.0 98.5

95 993 (C2) . 5.3 270 . 168 3065 53.7 61.0 69.3

95 993 (C4) . . 270 . . 3065

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| |induc-|0 to| Horse | |top| | |

Yr| Model/Disp |tion | 60 | power |trq |spd| wt | price |

-----+-----+-----+-----+-----+-----+-----+-----+-----

Key:

carbureted (multiple or unknown types)

Zen Zenith 40TIN Carburetors

Web Weber 40 IDT Carburetors

Sol Solex 40 PI Carburetors

MFI Bosch Mechanical fuel injection

k-jet Bosch K Jetronic fuel injection (same as CIS)

mot Bosch Motronic fuel injection

Model/Disp Model / Displacement (in Liters)

0 to 60 0 to 60 MPH in Seconds

Horsepower Horsepower (DIN)

trq Torque in Pounds Feet

top spd Top speed in Miles per hour

weight Weight in Pounds

price 1995 asking prices in thousand US dollars (rounded off)

taken from July 1995 and January 1995 issues of the
Porsche Market Letter (thanks Phil!). Note: speedsters
and cabrios were prices separately and will cost more
than the prices shown.

Notes:

a US models have MFI (w/140 HP); UK models have Solex or Zenith
Carbs (w/130 HP)

b Early models have MFI, 73 1/2 models have CIS.

c 210 HP, 188 lb. ft. Torque in ROW, UK models have mfi; US models
have ?

d 49-state us models have 165 HP, California has 160, ROW has 175 HP;
ROW has 175 lb. ft. of Torque.

e 210 HP, 188 lb. ft. of Torque for ROW

f k-jet (non-us) or mech (us)

g 245 HP in US & Japan; 260 HP elsewhere

h 265 HP in US and Japan, 300 HP elsewhere; 304 lb. ft. in ROW

j Not available in US, 265 HP in Japan, 300 HP elsewhere

k 207 HP in US and Japan, 231 HP elsewhere; 192 lb. ft. in US and Japan, 209 lb. ft. elsewhere.

m 282 HP in US, 300 HP in ROW; 195 lb. ft. in US, 209 lb. ft. in ROW

n 217 HP in US, 231 HP in ROW

p 286 HP in US, 300 HP in ROW

q European Model

r Weber/Zenith

s Rest Of World Model

t 180 HP in US and Japan, 204 HP elsewhere; 195 lb. ft. Torque in ROW

u 140 HP, 148 lb. ft. Torque in ROW

v 195 lb. ft. Torque in ROW

w 282 HP in US, 300 in ROW; 287 lb. ft. Torque in US, 319 lb. ft. in ROW

x Time is a 0-62 MPH (0-100 KPH)

A 0-60 is 7.5 seconds for US version, 6.1 for ROW. Top speed is 144 MPH for US version 142 for ROW.

Q1.5. What should the VIN or engine number look like for my car? <- ->

Well, I'm not going to go into that here 'cause it's long and there are so many other books that do it

completely. For VINs, check out Bruce Anderson's "Porsche 911 Performance Handbook" or "Guide to Purchase & DIY Restoration of the Porsche 911". For both VINs and engine numbers, consult Brett Johnson's Restorer's guides or "The Used 911 Story" (for US cars only).

Q1.6. Why did the early 911s have two batteries? <- ->

As per Pete Albrecht:

Very early cars also had cast iron (NOT LEAD!) weights in the outer corners of the front bumpers for the same reason.

[Tobias] Aichele's book, ["Porsche 911: Forever Young", Beeman Jorgensen, 1995] recounts the tests run with various configurations (originally lead weights for testing only). In tests supervised by Helmuth Bott, with the weights in the outer corners of the bumpers, the steering had an appreciably higher self-centering moment. Moving the weights to the center of the bumpers worsened the handling characteristics again. "The inescapable conclusion was that the handling problem was not only caused by the weight distribution, but was also sensitive to the car's polar moment of inertia. Helmuth Bott draws an analogy: "These laws of physics are even used by ice skaters, when they spread their arms to slow their rotation or pull them in to turn faster."...

"Bott took a front bumper to the Bodenmueller foundry, located across the street from Porsche, and had sand molds of the bumper tips made. These molds provided iron castings weighing 24 lbs which were cemented into the bumpers with a particularly tough adhesive and also clamped by the bumper's mounts." ..."Helmuth Bott recalls that "We didn't want to publicize this solution with its reinforced bumpers, but we were happy to have found a bolt-on remedy."

The bumper weight idea is an extension of the idea of mounting the batteries as far toward the corners of the car as possible.

Peter Albrecht, PLAlbrecht@aol.com, "Why twin batteries",
951019125859_48727898@mail06.mail.aol.com

On the other hand, Derek Cahill suggests:

[...] There is a LARGE amount of oil in a 911 engine, and in order to get it moving on a cold morning, using the best technology of 1967, two batteries were needed (there

was no such thing as a battery with 800 CCA's readily available back then, so two 400-450's did the same job) to provide the necessary power to start the car.

Derek Cahill, "Re: Twin Batteries why",

Pine.3.89.9510192013.A27106-0100000@freenet3.scri.fsu.edu

Q2.1. Which 911 Should I Get? <- ->

The standard answer is "get the newest 911 you can afford". Unfortunately, it's more complicated than that. I had occasion to meet Joe Rusz, Senior Editor at Road & Track (gratuitous name dropping, here); his answer to this question was simply "if you can afford it, get one with Motronic Fuel Injection" (those'd be the ones built in 84 and after).

You really have to decide for yourself what you want. Many feel that one exception to the 'newest you can afford' rule is the middle year cars (1974 through 1977) due to their short engine life span (circa 50K miles). Others (like myself) prefer the early mechanically injected cars (light and sparcely appointed with quick, torquey engines) over the newer 911SC (with their air conditioning, electric windows, and bullet-proof engine).

Hopefully, the information in this document will help you decide.

Q2.2. I want to buy a 911. How should I go

about it? <- ->

There's lots of stuff.

DECIDE WHY YOU WANT THE CAR. Decide whether you want an old show car, a race car, a daily driver, or whatever. This should help you settle on which types of 911 are best for you.

HOMEWORK. Get some books and research the different cars (check out the references at the end of this FAQ). When it comes to information, some is good, more is better, and too much is just enough. Figure out which years, models, and features of 911 are in your list.

Once you decide on a car type, find out what can go wrong with them and how much it can cost to fix them.

PRICES. Check out the usual sources for prices and availability:

The Porsche Market Letter, (619) 727-4856, 1 yr subscription \$55

Panorama (the newsletter to the Porsche Club of America),

PRODUCTION

Model	Production	Years built
911 SC Coupe	36953	1977-1983
911 SC Targa	19687	1977-1983
911 SC Cabrio	1871	1982-1983

TECHNICAL DATA

Engine	SOCH flat-six
Bore x stroke	95 X 74,4 mm.
Displacement	2994 cc.
Compression ratio	8,5 : 1
Maximum power	180 hp. @ 5500 rpm.
Maximum torque	27,7 kgm. @ 4200 rpm.
Transmission	5 speed manual
Body/frame	Unit steel
Brake system	4 vented discs
Suspensions	Front : McPherson struts, lower arms, torsion bars, tube shocks, anti-roll bar. Rear : semitrailing arms, torsion bars, tube shocks, anti-roll bar.
Steering type	Rack & pinion, turns lock to lock 3 : 1
Wheels	Fron : 6 j x 16. Rear: 7 j x 16.
Tyres	Fron : 205/55 VR 16. Rear: 225/50 VR 16.
Weight	1160 kg.
Fuel capacity	62 liters.
Weight distribution (front-rear)	41-59 %
Performances	Maximum speed: 225 km/h. Top acceleration (0-100 km/h): 7,0 sec. Top acceleration (0-160 km/h): 15,4 sec. Top acceleration (0-1000 m.): 26,0 sec.

The Complete History of 911



911s from different years. Can you recognise them?
(from near to far: 964RS, 911RS 2.7, 911 Club Sport)

Development



The root of 911 can be traced back to well before the WWII when Ferdinand Porsche created Volkswagen Beetle. However, let us skip such lengthy history and jump to Porsche 356, the predecessor of 911.

356 was the first car carrying the name "Porsche". Based on the Beetle's drive train, further finished with a drag-free body and Porsche's own chassis, it became the most beloved sports car in the 50s accompanied with Jaguar XK120. Despite of frequent updating, its upgradability finally ran out in the 60s because of its

VW origin. As a result, Ferry Porsche started working on the drawing board again to create a new sports car.

'As early as 1956 we started with the plans for a new model,' recalled Ferry Porsche. 'It was to be a comfortable touring car but, unlike the 356, parts from the large-series cars were not utilised as these were no longer suitable for further development.'

'Various models were designed, even some with a notchback with the aim of creating a true four-seater. But finally it remained a sports car in concept, with 2+2 packaging. We didn't want to allow the Porsche shape, which had become world famous in the meantime, to disappear. As a power unit, a 6-cylinder engine was chosen. But then it occurred to me, remembering our motorsport activities, that front engines were not competitive enough on a long term basis, and so we kept to the rear engine.'

Early project name was "Type 7", it was soon renamed to "901". However, as Peugeot objected to the use of its traditional three figures designation with a zero in the middle, Porsche simply changed the name to 911.

The project was handled by body engineer Erwin Komenda. Ing Hans Tomala was responsible for engine development. Ferry's nephew, Ferdinand Piech (now VW's boss), joined at the final stage as chief of engine development. On the other hand, Ferry Porsche's own son, Butzi (who is a stylist rather than an engineer, now heads Porsche Design), designed the shape which later became one of the most memorable icon in automotive history.



Ferry Porsche (1909-98) -
The father of 911. He died in
the same year as his brainchild.



A popular photo - Ferry Porsche
and 911



Butzi Porsche styled the 911

Ferry himself, although without designing the car by himself, made every important decision, such as the general layout, the use of overhead camshaft and ruling out Komenda's "4-seater" concept. Remember, he was a very good engineer who designed 356, so his decisions were usually correct. Managing the whole project, he certainly deserved to be called "the father of 911".

Of course, there were many problems occurred during the development. However, we skip that and would rather show you the final result, the 911 which was unveiled in the 1963 Frankfurt motor show:

Technical Highlight of the Original 911 (1963)



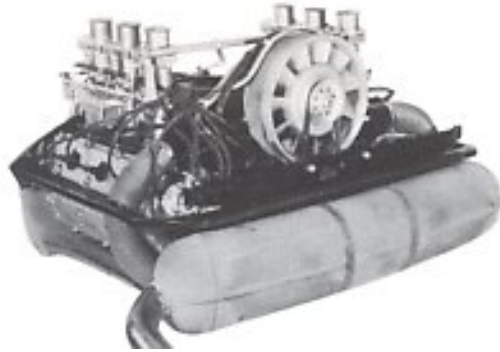
Styling :

911 preserved the general shape of 356, but with slightly better aerodynamics - 0.381 vs 0.40. Butzi Porsche did not created a very handsome shape. However, it was undoubtedly a very unique design that everyone can easily recognise.

Chassis :

Chassis structure was conventional steel monocoque (Galvanised steel was not arrived until 1971). Surprisingly, it was 2.4 in narrower than the 356, but the wheelbase and overall length are 5 in and 6 in longer respectively, thus enabled considerably more interior space.

Given the rear-engined layout, weight was inevitably biased towards the rear end - 40 : 60 distribution between front and rear wheels. Porsche claimed this could free up the steering weighting without the use of servo, thus avoided any artificial feeling.

Engine :

The flat-six air-cooled engine employed single overhead camshaft per bank instead of pushrod of the 356. Power jumped dramatically to 130 hp from merely 2 litres, still very impressive by nowadays' standard. Note that dry sump lubrication was opted for the benefit of motor racing.

Sufficient space was preserved for future enlargement to 2.7 litres, however, it was eventually sketched to 3.8 litres!

'Had I known, at that time, that the unit could actually be stretched to 3.3 litres and still be completely reliable, even in racing form, I would almost certainly have decided that it was unnecessarily large and heavy, and would have asked the designers to scale it down', said Ferry Porsche, 'Now I am glad I didn't!'

Gearbox :

Of course was Porsche's patented synchromesh unit, with 5 speed.

Suspensions :

Disappointingly, Porsche placed luggage space in prior to suspensions, therefore it adopted space-saving MacPherson struts in the front, with the aid of lower wishbones. In the rear, again the space problem led to the use of semi-trailing arms. However, it was still a big improvement over 356's swinging-axles.

The Complete History of 911

Early Handling Problems and Solutions



The rear-bias was always a problem to 911's handling. Any tail-heavy cars have a tendency to oversteer. If such oversteer is not adequately suppressed, lost of control may occur. Although there were some racing car being more tail-heavy and more powerful yet had fabulous handling, say, the 1000 hp 917 Can-Am race car which carried near 70% weight at the rear, the production 911 lacked their racing-spec aerodynamic aid as well as racing tyres - the original 911 rode on 165 tyres with 4.5 in rims only !

To solve the problem, the suspension setup, that is, toe-in, camber, castor etc, should be accurately tuned to optimise the handling ability. However, in production line, such strict tolerances were found to be impossible to be implemented. Therefore the following corrective actions were taken :

1. The earliest makeshift solution was to add weight to the front end. Two 11 kg cast iron weights were added to the bumper of those 911s with unsatisfactory handling found, officially called "bumper reinforcement" because it was nothing to proud of. In fact many drivers of these 911 even didn't know about it !
2. Later, facility was added to adjust the upper location of the MacPherson strut, making it possible to adjust both castor and camber to the very close tolerances. As a result, "bumper reinforcement" was dropped.
3. In 1969, wheelbase was extended by 2.3 inches by moving the rear axle rearward. At nearly the same time, wider tyres were adopted, wheel rims widened to 5.5 in and then 6 in. These changes effectively improved its handling a lot.
4. In the following years, tyres were continuously widened, from 165 of the original car to 205 front and 245 rear of the 993. Turbo 993 even adopted 225 and 285 tyres. (note that rear

tyres were wider than front) Lost of rear end became very difficult as a result.



5. Aerodynamic also improved. In 1972, "Duck tail" rear spoiler was introduced in the 911 RS 2.7. It reduced the rear aerodynamic lift by as much as 75%, thus greatly improved high speed stability. One year later, an even bigger "whale tail" rear spoiler appeared in the RS 3.0, then spreaded to all other production 911s in later years, completely eliminated rear lift.




In its 34 years' history, Porsche progressively reduced the oversteer manner and eventually built mild understeer into the 911. The car became better controlled, easier to drive quickly but some found less fun than the earlier 911s. However, compare with 996, any 911s still had far more oversteer as well as the fun of challenge.

The Complete History of **911**

Evolutions - All 911s in 34 years

(All the details are based on European models)

Year	Model	Description
1964	911	 <p>History started here - the original 2-litre car. No one would have estimated its success in the following 34 years. Spec ; Report</p>
1965	912	<p>Since 911 was well dearer than the 356, it was no way to replace the latter. As a result, Porsche created a cheaper version named 912 by installing 356's 1600 flat-4 engine. Nevertheless, this car never achieved much sales success.</p>
1967	911 Targa	 <p>Targa is Porsche's word. In our language is "removable hard top". The early Targa had soft rear window instead of the glass one shown in this '68 model.</p>

1967	911 S	<p>Porsche started to differentiate 911 into 3 versions with different character - 911 was the normal version (to be renamed to 911 L later and then 911 E), 911 S was the sport version with 160 hp (due to higher compression ratio and larger valves), alloy wheels and vent. brake discs....</p> <p>Spec</p>
1968	911 T	<p>....while the 911 T was the cheapest version replacing 912. Engine detuned to 110 hp with cheaper parts used. Of course, like the 912, fewer equipments and 4-speed manual contributed to the keener price.</p>
1970	911 T 911 E 911 S	 <p>The series of capacity increment started in this year. Bored out to 2.2 litres, power of 911T, 911E and 911S were raised to 125, 155, 180 hp respectively. They became more powerful, flexible as well as quieter. Spec</p>
1972	911 T 911 E 911 S	 <p>To cope with tougher emission regulations at no cost of performance, the engine was enlarged again. Stroked to 2.4 litres raised power slightly to 130, 165, 190 hp respectively. Spec</p>
1973	911 Carrera RS 2.7	 <p>RS stands for Renn Sport. Many journalists regard it as the best 911 of all, mainly because of crispest handling. Porsche made this special edition for GT racing, therefore everything was lightweight. 2.7 litres pumped out 210 hp, enabling the 1-ton RS to out-perform many supercars.</p>

Ducktail rear spoiler as well as the name "Carrera" were used for the first time. [Spec](#) ; [More details](#)

1974

911
911 S
911 Carrera



The production 911 also got the 2.7 engine. The 911, now replaced 911T as the basic model, boosting 150 hp (re-rated to 165 hp later). Sport version 911S had 175 hp. The Carrera was basically a RS 2.7 but with more effective whaletail spoiler instead of ducktail and without as much weight-saving treatment. However, the biggest external change to these cars was the US-required 5-mph bumpers, which was successfully styled to make them looked more aggressive.

1974

911 Carrera
RS 3.0



Again, to homologate Group 3 GT racing, Porsche built 106 units 911 RS 3.0. I believed I saw one of them in HK. It was evolved from the RS 2.7, with the engine bored out to a full 3 litres and capable of 230 hp. Wider rear fenders and whaletail spoiler added exotic appeal. As it was heavier and had larger frontal area than the 2.7 RS, it was actually no quicker. [Spec](#)

When



1975

911 Turbo 3.0

(Type 930)

Porsche assigned a new project number, 930, to a new 911, all insiders knew that it must be a revolutionary variant. Yes, it was the first turbocharged 911, one of the pioneers of turbocharging technology. It wasn't the first turbo road car, however, it was the first to succeed without unacceptable turbo lag and fuel consumption. Power and torque increased dramatically to 260 hp and 254 lbft, thus enable remarkable in-gear acceleration as well as top speed. However, thanks to more weight and full equipment, it was actually slower than the Carrera RS in the hands of good drivers. [Spec](#) ; [More details](#)

1975

912E

After 6 years of absence, 912 was back with a 2-litre flat-4 pushrod engine came from Volkswagen. Again, it failed to be popular.

1976

911 Carrera 3.0



This one replaced the 2.7 litres Carrera. The 2994 c.c. engine was derived from the turbo 3.0, with the greener Bosch K-Jetronic mechanical injection, it output 200 hp or 10 less than the 2.7 unit. However, fuel economy and torque curve were improved. [Spec](#)

1978

911 SC



When 928 and 924 had been launched, Porsche's director Dr. Fuhrmann planned to reduce the production scale of 911. As a result, all 911s were replaced by a single model, 911SC, whose 3-litre engine was detuned to 180 hp probably intended to prevent it from having a higher top speed than the 928 (which was supposed to be the successor of 911). Although raised to 188 hp in '80 and 204 hp in '81, it was still relatively unremarkable.

That was the darkest period in 911's 34 years history. Fuhrmann obviously intended to sacrifice 911 to rescue his less-popular, overweight and expensive 928. Luckily, Ferry Porsche was still in favour of his brainchild so that he replaced Fuhrmann with American Peter Schutz. Since then the 911 resumed proper development. [Spec](#)

1978

911 Turbo 3.3



(Type 930)



The 3-litre 930 turbo, though fast, did not impress journalists as much as this 3.3 version. With 300 more c.c. and an intercooler, it output a full 300 hp ! Capable to do 0-60 in at most 5.3 sec and top 160 mph. In terms

of acceleration, no rivals could beat it until 1985. No wonder it could be produced until 1990 without any major modifications.

Like the turbo 3.0, no 5-speed gearbox was capable to cope with its massive torque so that 4-speeder was used instead. The fifth ratio eventually came in 1989, thus cut 0-60 to a mere 4.9 sec. [Spec](#) ; [More details](#)

1982	<h2 style="text-align: center;">911 Cabriolet</h2>	<p>Under Schutz's leadership, the first new 911 arrived. It was a cabriolet version of 911SC, also being the first Cabriolet version of 911....</p>
1983	<h2 style="text-align: center;">911 Carrera</h2>	<div style="text-align: center;">  </div> <p>.... however, the real new life started in here - the '83 Carrera was as exciting as the 911SC boring. Although now being the basic 911, Carrera's 231 hp 3.2 engine deserved the "Carrera" name - it could do 0-60 in 5.4 sec and top 150 mph ! Advanced Motronic management system accounted for the higher 10.3:1 compression ratio, hence higher efficiency. Spec</p>
1985	<h2 style="text-align: center;">911 Carrera Turbo-Look</h2>	<p>While Dr. Fuhrmann preferred his tailor-made narrow-body 911 turbo, many customers liked this wide-body "turbo-look" Carrera. It did not offer better handling, just added 50 kg extra and more drag. You may call it a "poor" man's 911 Turbo, or a "fool"-man 911 Turbo is also appropriate.</p>
1986	<h2 style="text-align: center;">911 turbo SE</h2> <p style="text-align: center;">(Type 930)</p>	<div style="text-align: center;">  </div> <p>This could be the most beautiful 911 to somebody - incorporated a 935-style "slant nose" with pop-up headlamps. Prepared by Porsche's "Special Requirement Department" for those asked for more power than the regular 911 turbo, the SE had 330 hp, 344 lbft and 170 mph top speed. Bigger turbo boost, larger intercooler and freer exhaust accounted for the power rise, but the deletion of recirculating valve (because no space left) deteriorated turbo lag. Believe or not, it was 80% more expensive than the regular turbo.</p>

1987

911 Carrera Club Sport



By deleting equipment, rear seat and sound insulation weighing about 100 kg, Porsche created a faster and crisper Carrera named "Club Sport" or simply CS. Keen drivers liked it very much. Autocar recorded 0-60 in 5.2 sec, a couple of tenth quicker than the regular Carrera. The test car weighed 1182 kg.

1989

911 Speedster





Inspired by 356 Speedster, the 911 also got Speedster's treatment - a cut-down windshield and a beautiful hood cover. Based on the 3.2 Carrera body but the "Turbo-Look" body was also available later. Not as water tight as Cabriolet though.

1989

911 Carrera 4 (Type 964)



Again, a new project no. indicates this was a great step forward. The 964 Carrera 4 not only improved greatly on aerodynamics (via smooth bumper and auto rear spoiler) and engine flexibility, it also introduced the first ever 4-wheel drive system in 911, which transformed it into an understeerer ! Not everybody liked it though. New 3.6-litre engine output 250 hp with the help of twin sparks per cylinder and high compression ratio, offsetting the dramatic weight increase of 250 kg. [Spec](#) ; [More details](#)

1990	<h2>911 Carrera 2</h2> <p>(Type 964)</p>	 <p>Carrera 2 was the rear-wheel drive version of Carrera 4 with virtually no change in appearance. Without burdening by the 100 kg 4wd system, it became quicker and, more importantly, resumed the oversteer character that many enthusiasts buy 911 for. Spec ; More details</p>
1990	<h2>Tiptronic</h2>	<p>From 1990, Tiptronic transmission, a Porsche-patented automatic transmission with manual override mode, became available in nearly all 911 versions. Very popular in big cities. More details</p>
1991	<h2>911 turbo 3.3</h2> <p>(Type 964)</p>	<p>Turbo was finally applied to the 964 body. Disappointingly, engine was still the 3.3 unit although with larger turbo and intercooler to boost 20 more horsepower from the previous 300 hp. As a result, 0-60 mph was cut down to 4.7 sec. Spec</p>
1992	<h2>911 Carrera RS</h2> <p>(Type 964)</p>	<p>Not the best RS. Basically a stripped-out Carrera 2. 50 kg lighter, 40 mm lower ride height, stiffer suspension set up (therefore harsher), brakes came from Turbo. Engine remapped to 260 hp.</p>
1992	<h2>911 turbo S</h2> <p>(Type 964)</p>	 <p>Before the launch of the 3.6-litre turbo, Porsche's racing department created a 3.3 turbo which was even quicker than the 3.6 turbo, that was the 911 turbo S. Through racing treatment (thinner glass, no much equipment, no rear seats, composite door / bonnet / engine lid, stiffer suspensions, lower ride height, extra cooling ducts at rear fenders, hotter cam and breathing, higher boost pressure etc.), it had specifications to amaze: 381 hp, 361 lbft and 1280 kg dry weight, or 190 kg lighter than a standard turbo. According to Paul Frere, it was quite difficult to drive and he preferred the Carrera RS. Only 81 cars were made</p>

to special orders.

1993

911 RS 3.8

(Type 964)



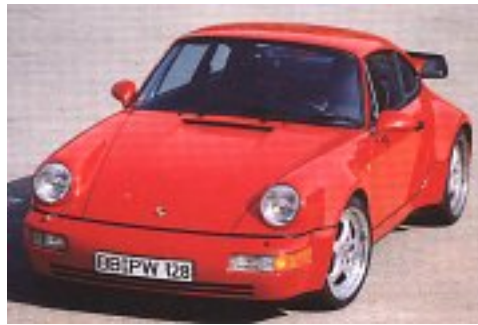
Soon after the introduction of the 3.6 litres RS, Porsche decided to fully participate in German, FIA and Le Mans GT

racing series. As a result, an even more racy RS was born. Externally it differed from the 3.6 by wider Turbo-look body shell and biplane adjustable rear spoiler. Aluminium doors reduced kerb weight by 10 kg. The bore was enlarged to 102 mm (remember the original 911 2.0 was 80 mm?) thus displaced 3746 c.c. and pumped out a full 300 hp in road trim. Cylinder wall became so thin that the engine would not be enlarged anymore. Harsh ride not suitable for road use. RSR was the racing version installed with roll cage. A total of 100 RS plus RSR were made by Weissach.

1993

911 turbo 3.6

(Type 964)



After 14 years of service, the 3.3 turbo engine was finally replaced by a 3.6 unit based on the Carrera 2/4's unit but with conventional single spark. Higher boost pressure and extra

displacement resulted in 360 hp and more important, 383 lbft of torque. Now 0-60 took 4.5 sec. However, it seemed to be merely a stop-gap design without much breakthrough made - for instance, still without electronic boost control. [Spec](#)

1993

911 Speedster

(Type 964)



Again, the Speedster came very late. This one based on 964 Carrera 2, which was to be replaced in the same year. Cut-down windscreen, hood cover, no

rear seats ... very familiar, though no Turbo-Look available this time. As the new 993 was far more popular than 964, the Speedster died after less than 1,000 built.

1993

911 Carrera 911 Carrera 4

(Type 993)



Project 993 introduced the biggest ever (also final) make-over to the 911 - the most radical was changing the rear suspensions from

semi-trailing arms to multi-link, in addition to wider tracks, improved handling as well as ride a lot. The body received the first major facelift since the first 911, introducing smoother-looking body (if not reflected in drag coefficient), wider wheel arches, raised front bonnet (for more luggage space), reduced slope of windscreen etc., making it look more modern and stylish. Better paint and fit and finish as well. 3.6 engine tuned to 272 hp and 243 lbft by lightweight pistons and con-rods, further up to 285 hp and 251 lbft in 1996 by introduction of Varioram variable intake manifold (first seen in 993 RS 3.8). 6-speed manual instead of 5, Tiptronic also got an extra gear, plus optional Tiptronic S with finger tip control on steering wheel. Carrera 4 used a simplified 4wd system, some regarded it even better to drive (and feel) than the 2wd. 993 was a great success in terms of sales as well as reaction from motor journalists. [Spec](#) ; [More details](#)

1994

911 turbo

(Type 993)



No previous turbos followed so close to the development of the Carrera as this one. Twin-turbo gave this 3.6-litre unit 408 hp as well as far lighter turbo lag. Electronic boost control, larger intercooler and 6-speed box also played important roles. With Carrera 4's 4wd system as compulsory, it was nearly as fast as the mighty 959, although it lacked the sharp steering feel as the Carrera. Huge grip and brake. The most accelerative production car then. [Spec](#)

1995

911 Carrera RS

(Type 993)



911 RS was always a great driver's car, the last one was with no exception. Still using the 3.8-litre 300 hp 964 RS 3.8 engine but added with Varioram to boost low to mid range torque. The 993 basis provided far better handling. Compare with 993 Carrera, it got 18-in wheels instead of 16-in, front tower bar to stiffen sus geometry, adjustable anti-roll bar, Turbo-size brakes and carried 100 kg less weight (thanks to stripped-out cabin, aluminium bonnet and thinner glass). The most satisfying 911 since the original 911 RS 2.7. Club Sport and RSR versions got usual racing treatment including roll cage, aggressive front spoiler and biplane rear wing. [Spec](#)

1995



911 GT2

(Type 993)



As the FIA GT championship was established, Porsche entered a trio to take on different class: 911GT1 (actually a race-developed car with little relationship to 911) targeted at the highest GT1 category, 911GT2 aimed at GT2 class while 911 RSR raced in the lowest category GT3.

911 GT2 was basically a stripped-out (1290 kg) and slightly more powerful (430hp) 911 turbo. The 200 kg weight reduction was achieved by taking away the 4wd system, all equipment and most sound insulation, plus rear seats and used thinner glass. Higher boost led to 22 hp more power. Aggressive front spoiler, biplane rear wing and replaceable wheel arch flares differed it from the regular Turbo. Only 50 road cars were built. [Spec](#)

<p>1996</p>	<p>911 Targa (Type 993)</p>	 <p>A 993 Carrera incorporated slidable "glass house" roof developed in conjunction with Mercedes. It added 30 kg but provided open-air fun combined with perfect refinement.</p>
<p>1996</p>	<p>911 Carrera 4S (Type 993)</p>	<p>Turbo-Look version of the 993. Wide body, big wheels and brakes all came from the Turbo, although small movable rear wing remained as the Carrera's.</p>
<p>1997</p>	<p>911 Carrera (Type 996)</p>	<p>Finally, the real 911 retired after 34 years of service. Its successor, 996, was a completely new car linked closely with the Boxster. 996 borrows the great name "911" for marketing advantage.</p>
<p>1998</p>	<p>911 Turbo S (Type 993)</p>	 <p>Before the 996 turbo appear in 2000, Porsche relied on the 993 turbo as its performance flagship. However, Porsche also launched an uprated 993 turbo for the US market in 1997, and then an even more powerful European version in Jan 1998, pumping out 424 hp and 450 hp respectively. Further finished with biplane rear wing and 959-like side air intakes. If you cannot distinguish it from other modified 911s, look at the unique yellow brake calipers. This was the fastest REAL 911, also the final version. Spec</p>

1998

END

In April 1998, the last Porsche 911 rolled out from Zuffenhausen factory. Since 1963, a total of 401,232 units were produced, among which 32,335 cars were Turbo, 69,137 were the last generation - 993.



Bye Bye !!

NOTE: Some less significant models are not included in this table, such as various Targa, Cabriolet and Turbo-Look. Racing models are also excluded, such as 911 SC/RS, various RSR and "Cup". All models shown here are European versions.

Specifications of selected models

Model	911 2.0	911 S 2.0	911 E 2.2
Year	1964	1967	1970
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl	Flat-6, sohc, 2v/cyl.	Flat-6, sohc, 2v/cyl.
Engine Capacity	1991 c.c.	1991 c.c.	2195 c.c.
bore x stroke	80 x 66 mm	80 x 66 mm	84 x 66 mm
Power	130 hp	160 hp	155 hp
Torque	129 lbft	132 lbft	141 lbft
Gearbox	5M	5M	5M
Top speed	130 mph*	138 mph**	137 mph***
0-60 (0-62.5) mph	8.3 sec*	(6.8 sec**)	7.6 sec***
0-100 (0-99.5) mph	24.3 sec*	(17.7 sec**)	N/A
Weight	1040 kg	1050 kg	1020 kg

* Tested by Motor

** Tested by Paul Frere

*** Tested by Autosport

Model	911 S 2.4	911 Carrera RS 2.7	911 Carrera RS 3.0
Year	1972	1973	1974
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl	Flat-6, sohc, 2v/cyl.	Flat-6, sohc, 2v/cyl.
Engine Capacity	2341 c.c.	2687 c.c.	2994 c.c.
Bore x stroke	84 x 70.4 mm	90 x 70.4 mm	95 x 70.4 mm
Power	190 hp	210 hp	210 hp
Torque	159 lbft	188 lbft	203 lbft
Gearbox	5M	5M	5M
Top speed	144 mph*	149 mph*	148 mph*
0-60 (0-62.5) mph	(6.6 sec*)	5.5 sec*	(5.5 sec*)
0-100 (0-99.5) mph	(15.7 sec*)	13.0 sec*	13.7 sec*
Weight	1050 kg	975 kg	1063 kg

* Tested by Paul Frere

Model	911 Carrera 3.0	911 SC	911 Carrera
Year	1976	1978	1983
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, K-Jetronic	Flat-6, sohc, 2v/cyl, K-Jetronic	Flat-6, sohc, 2v/cyl, Motronic
Engine Capacity	2994 c.c.	2994 c.c.	3164 c.c.
Bore x stroke	95 x 70.4 mm	95 x 70.4 mm	95 x 74.4 mm
Power	200 hp	180 hp	231 hp
Torque	188 lbft	195 lbft	210 lbft
Gearbox	5M	5M	5M
Top speed	146 mph**	141 mph*	150 mph*
0-60 (0-62.5) mph	(6.1 sec**)	6.5 sec*	5.4 sec*
0-100 (0-99.5) mph	(15.0 sec**)	N/A	(13.9 sec**)
Weight	1120 kg	1232 kg	1210 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

Model	911 Turbo 3.0	911 Turbo 3.3	964 Turbo 3.3
Year	1975	1978 / 1983 / 1989	1991

Layout	Rear-engined, Rwd.	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, turbo, K-Jetronic.	Flat-6, sohc, 2v/cyl, turbo, intercooler, K-Jetronic / KE-Jetronic	Flat-6, sohc, 2v/cyl, turbo, intercooler, KE-Jetronic
Engine Capacity	2994 c.c.	3299 c.c.	3299 c.c.
Bore x stroke	95 x 70.4 mm	97 x 74.4 mm	97 x 74.4 mm
Power	260 hp	300 hp	320 hp
Torque	254 lbft	303 / 318 / 317 lbft	332 lbft
Gearbox	4M	4M / 4M / 5M	5M
Top speed	153 mph*	162** / 162* / 158* mph	167 mph*
0-60 (0-62.5) mph	6.1 sec*	5.3** / 5.1* / 4.9* sec	4.7 sec*
0-100 (0-99.5) mph	N/A	('89: 12.0 sec***)	(11.1 sec#)
Weight	1205 kg	1385 kg	1470 kg

* Tested by Autocar

** Tested by Motor

*** Tested by Auto, Motor und Sport

Tested by Automobil Revue

Model	964 Carrera 4	964 Carrera 2	964 Turbo 3.6
Year	1989	1990	1992
Layout	Rear-engined, 4wd.	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, Motronic, twin-spark, 2-stage resonance intake	Flat-6, sohc, 2v/cyl, Motronic, twin-spark, 2-stage resonance intake	Flat-6, sohc, 2v/cyl, turbo, intercooler, KE-Jetronic
Engine Capacity	3600 c.c.	3600 c.c.	3600 c.c.
Bore x stroke	100 x 76.4 mm	100 x 76.4 mm	100 x 76.4 mm
Power	250 hp	250 hp	360 hp
Torque	228 lbft	228 lbft	383 lbft
Gearbox	5M	5M	5M
Top speed	161 mph**	164 mph**	179 mph**
0-60 (0-62.5) mph	5.2 sec*	5.1 sec*	4.5 sec*
0-100 (0-99.5) mph	(13.2 sec**)	(12.9 sec**)	(9.5 sec**)
Weight	1460 kg	1380 kg	1470 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

Model	993 Carrera	993 RS
Year	1993 (1995)	1995
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, twin-spark, Motronic, 2-stage resonance intake, (Varioram)	Flat-6, sohc, 2v/cyl, twin-spark, Motronic, Varioram
Engine Capacity	3600 c.c.	3746 c.c.
Bore x stroke	100 x 76.4 mm	102 x 76.4 mm
Power	272 hp (285 hp)	300 hp
Torque	243 lbft (251 lbft)	262 lbft
Gearbox	6M	6M
Top speed	166 mph**	172 mph**
0-60 (0-62.5) mph	5.2 sec*	5.0 sec*
0-100 (0-99.5) mph	12.9 sec*	N/A
Weight	1370 kg	1270 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

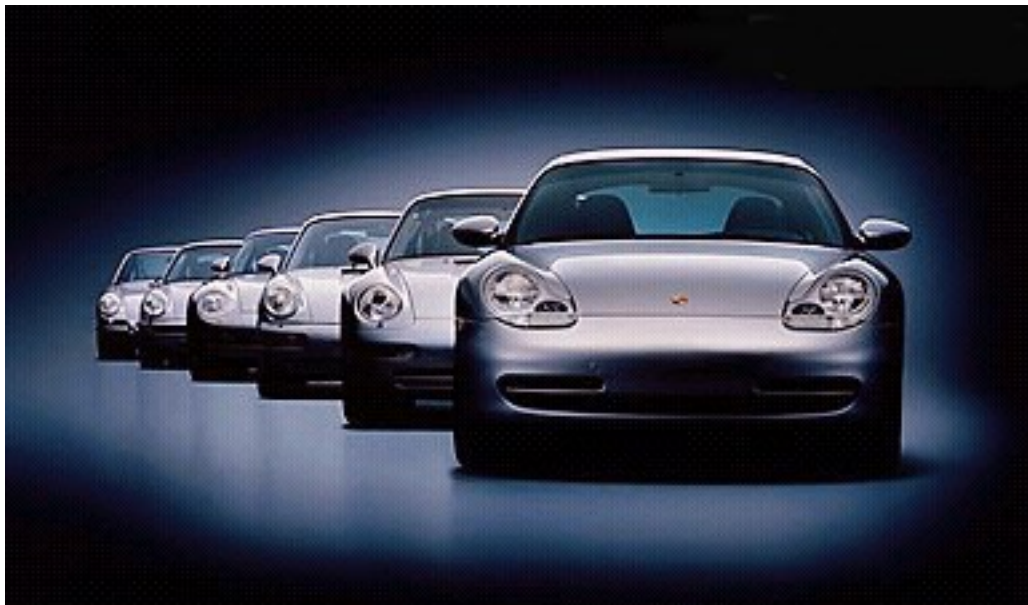
Model	993 Turbo	993 GT2	993 Turbo S
Year	1994	1995	1998
Layout	Rear-engined, 4wd.	Rear-engined, Rwd.	Rear-engined, 4wd.
Engine	Flat-6, sohc, 2v/cyl, twin-turbo, intercooler, Motronic.	Flat-6, sohc, 2v/cyl, twin-turbo, intercooler, Motronic.	Flat-6, sohc, 2v/cyl, twin-turbo, intercooler, Motronic.
Engine Capacity	3600 c.c.	3600 c.c.	3600 c.c.
Bore x stroke	100 x 76.4 mm	100 x 76.4 mm	100 x 76.4 mm
Power	408 hp	430 hp	450 hp
Torque	398 lbft	398 lbft	430 lbft
Gearbox	6M	6M	5M
Top speed	181 mph**	184 mph**	est. 186 mph
0-60 (0-62.5) mph	3.7 sec* (4.3 sec**)	(4.0 sec**)	3.9 sec*
0-100 (0-99.5) mph	9.2 sec* (9.5 sec**)	(8.4 sec**)	8.9 sec*
Weight	1507 kg	1290 kg	1456 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

The Complete Story of **911**

The Most Memorable 911s in 34 years



Well, 996 is out of our scope.

Choosing the most memorable 911 from the long list of its family members is really a headache. Performance chasers must choose the Turbo, or even its hotter derivatives such as Turbo S, SE, GT2 etc. Traditional keen drivers might choose one of the various RS or Club Sport, but the standard Carreras also had their advantages in providing the best combination of practicality and performance. Here, base on the general comments from car testers and with my own opinion, four 911s were chosen:

911 Carrera **RS** 2.7 (1973)

Best handling of all



As Porsche gradually built more and more understeer and put more and more weight into the 911, many hard-core 911 fans regard the RS 2.7 of 1973 as the best 911 ever made. Yes, which 911 had crisper handling? Which one had more uncorrupted steering feel? Which one sang more beautiful than that 2.7 engine? There were many modern 911s ran faster and handled more secure, but which of them offered so much driving fun? No, the Carrera RS 2.7 remains to be the ultimate driving machine among all 911 family members.

RS 2.7 was so successful because of its racing nature - it was designed to dominate the Group 3 GT racing, and it did. Most effort was spent into 3 aspects - weight reduction, engine and downforce.

Weight: 960-975 kg kerb weight made it to be the lightest 911 of all, thus improved acceleration as well as sharpness of handling. Any means could save weight were adopted: thinner body panels, hollow doors, thinner safety glass, lighter buckets, no rear seats, no sound-deadening material and of course no equipment at all.

Engine: the 2.7 engine was one of the first road cars to use Nikasil-coated cylinder, which allowed the bore to grow from 84 to 90 mm while maintaining cylinder wall thickness (hence strength and reliability). Nikasil also reduced friction, thus enabling the 2.7 engine to produce a high specific output of 78 hp / litre. This record was not matched by any naturally aspirated 911 until 20 years later. (911 SC/RS was not included as it was more a racing model)



Downforce: for the first time, the 911 was available with a rear spoiler. This "ducktail" spoiler reduced the rear aerodynamic lift by as much as 75% at high speed.

As a result, the RS is quick even by today's standard - it could sprint from rest to 60 mph in merely 5.5 seconds and top 150 mph. However, its biggest strength was always in corners. A dozen years ago I saw an illegal supercar street racing in a twisty countryside road (in front of my house). The white RS 2.7 was not really the leader, but it was leading a Carrera 3.2, a Turbo 3.3 and even a Countach QV! believe or not!

Porsche built a total of 1,036 lightweight RS 2.7, with another 564 finished in fully-equipped form. Today, many of those RS are still racing in classic car races.

Model	911 Carrera RS 2.7
Year	1973
Layout	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl.
Engine Capacity	2687 c.c.
Bore x stroke	90 x 70.4 mm
Power	210 hp / 6,300 rpm
Torque	188 lbft / 5,100 rpm
Gearbox	5M
Top speed	149 mph*
0-60 (0-62.5) mph	5.5 sec*
0-100 (0-99.5) mph	13.0 sec*
Weight	960-975 kg

* Tested by Paul Frere

911 Turbo (1975-89)

Turbocharging revolution



Before 1975, the fastest 911s were all badged "Carrera". The 911 RS 2.7 and RS 3.0, though rarely known as "Carrera", actually had "Carrera" in its official name. Since 1975, another word was used instead: TURBO. With the introduction of turbocharging in the 911 family, all Carreras suddenly became "second class" models because the 911 Turbo was considerably faster and dearer.

The most memorable aspect of the Turbo was speed, the second was also speed, the third was still speed. The first Turbo 3.0 might not be as quick as the hottest RS in acceleration, simply because it was fully loaded with luxury items that most drivers wanted. However, the Type 930 turbocharged engine provided 260 horsepower to enable a RS-beating 153 mph maximum speed and, more important, a lot of mid-range torque for superior in-gear acceleration. In other words, it's an accessible performance car.

The Turbo was one of the first turbocharged road cars - after the awful Chevrolet Corvair and the race-purpose BMW 2002 turbo - and obviously the first one to be regarded as successful. Benefited by the experience of the 917 turbo racing car, Porsche's engineers designed a recirculating valve in the turbo system of the Type 930 engine, hence largely reduced turbo lag.

That doesn't mean the early 911 Turbo easy to drive. Being a rear-engined sports car with so much torque acting to the rear wheels, the Turbo always needed respect from its drivers. Thankfully, the wider rubbers and wider tracks generated tremendous grip and overcame any tail-happy tendency most of the time.



In 1978, the 3.3 litres version added with intercooler even pushed the Turbo to the league of supercars. Taking just 5.3 seconds for 0-60, it beat all supercars including the contemporary Lamborghini Countach LP500 and Ferrari 512BB. It kept the title of "most accelerative production car" until the appearance of Countach QV in 1985. Top speed, however, was bounded to 160 mph, once again saying the 911 Turbo was the most accessible rather than the most spectacular. It's the most practical and comfortable supercar as well, thanks to spacious cabin, good driving position, comfortable leather seats, remarkable visibility and abundance of equipment.



Turbo 3.3 output 300 hp. Higher rear wing housed the intercooler.

The biggest weakness of the early Turbo was, apart from over-the-edge handling, relatively weak brakes. The 3.3 improved that to 4-piston aluminium calipers front and rear, with ventilated discs. Since then, braking became another strong element besides speed.

Thanks to improved ignition and fuel injection, the 3.3 Turbo got 15 lbft extra torque in 1983. As a result, 0-60 reduced to 5.1 sec. In 1989, the long-awaited 5-speed gearbox replaced the old 4-speeder, reducing 0-60 to 4.9 sec. However, these were just minor update. The Turbo 3.3 survived for 13 years without major make-over.

Model	911 Turbo 3.0	911 Turbo 3.3
Year	1975	1978 / 1983 / 1989
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, turbo, K-Jetronic.	Flat-6, sohc, 2v/cyl, turbo, intercooler, K-Jetronic / KE-Jetronic
Engine Capacity	2994 c.c.	3299 c.c.
Bore x stroke	95 x 70.4 mm	97 x 74.4 mm
Power	260 hp	300 hp
Torque	254 lbft	303 / 318 / 317 lbft
Gearbox	4M	4M / 4M / 5M
Top speed	153 mph*	162** / 162* / 158* mph
0-60 (0-62.5) mph	6.1 sec*	5.3** / 5.1* / 4.9* sec
0-100 (0-99.5) mph	N/A	('89: 12.0 sec***)
Weight	1205 kg	1385 kg

* Tested by Autocar

** Tested by Motor

*** Tested by Auto, Motor und Sport

964 Carrera 4 (1989-93)

Radical rethinking



Claimed to be 87% new, believed that or not, the type 964 Carrera 4 was definitely the most radically re-engineered 911 up to then. It had new front and rear suspensions, modern aerodynamics, an advanced electronic 4-wheel drive system and a heavily revised engine. Compare with the previous Carrera 3.2, the 964 seemed like a revolution rather than evolution.

The monocoque chassis was basically unaltered, so was the general body shape that characterised 911 for a quarter of a century. However, the smooth, body-integrated and body-coloured front and rear bumpers indicated the great effort spent to aerodynamics. Instead of the predecessor's 0.42, the 964 achieved a remarkable drag coefficient of 0.32 while generating virtually no lift at high speed. Apart from bumpers, the flat undertrays which sealed front suspension, engine and transmission tunnel also played an important role to reduce drag and lift, so did the automatically raised rear spoiler which replaced a fixed wing. The little spoiler normally acted as ventilation for the engine and recessed smoothly on the engine lid. It raised at above 50 mph and dropped down (for the benefit of engine cooling) at under 6 mph. The movement was quite spectacular to look at.



Rear spoiler rest at low speed ...



... raised at above 50 mph

The flat-six engine received so much modifications that it was given a new name, M64 series. Its major mission was to comply with stricter emission regulations, cope with the considerable weight increase of the 964 without compromising performance. Moreover, it was designed to be a "world engine" - suitable for all markets without any modifications. To achieve 250 hp and 228 lbft output (up from Carrera 3.2's 231 hp and 210 lbft) even in the presence of catalytic converter, it was bored and stroked to 3.6 litres and employed a very high compression ratio of 11.3:1 which was made possible by twin-spark per cylinder and knock sensor. Advancer Motronic program worked in associate with ignition and sequential fuel injection. A 2-stage resonance intake manifold was introduced to improve mid to high speed power.

That enabled the Carrera 4 to sprint to 60 mph in 5.2 sec, slightly quicker than its predecessor. That was very respectable, considering the car weighed an astonishing 250 kg more. It topped 161 mph, which actually matched the contemporary 911 Turbo 3.3, thanks to superior aerodynamics.

For the first time, the 911 received a proper MacPherson strut suspension with concentric coil spring instead of torsion bar. As earlier we have mentioned, the original 911 chose torsion bar in order to give more luggage room at the front. However, as Carrera 4 had the 4WD system already engaged a lot of space, there was no reason to maintain the torsion bar setup. At the rear, a revision of geometry to the semi-trailing arms, plus addition of rubber bushing to pivot joints, enabled a passive rear-wheel steer (inspired by 928's Weissach axle) to counter the oversteering. The new trailing arm was also made in cast aluminium instead of iron.

However, the biggest technology breakthrough must be the intelligent 4-wheel drive, which was simplified from 959. It normally transferred 69% torque to the rear axle, but in case of slide, the electronic control could send more to the wheels which had most traction. Active rear LSD also keep oversteer tightly in check. It was so effective that, accompany with the changes in suspension geometry, many 911 traditionalists criticised it as an understeerer ! In fact, not every motor journalists were convinced that the new-found traction and security of handling justified the lost of involvement. Many regarded it as the most boring 911 after the SC.

The launch of rear-wheel drive version Carrera 2 relieved some pressure from Porsche, but there was still something to be desired. Like the Carrera 4, it rode quite hard and was not all that beautiful. The RS and RS 3.8 were even harsher to live with.



Speedster



RS 3.8

So, what made it one of "the most memorable 911s" ? Radical rethinking. Without a reform like this, the 911 would have never kept alive and popular in its last 10 years, and its successor 993 would have been either unsuccessful or non-existent.

Model	964 Carrera 4	964 Carrera 2
Year	1989	1990
Layout	Rear-engined, 4wd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, Motronic, twin-spark, 2-stage resonance intake	Flat-6, sohc, 2v/cyl, Motronic, twin-spark, 2-stage resonance intake
Engine Capacity	3600 c.c.	3600 c.c.
Bore x stroke	100 x 76.4 mm	100 x 76.4 mm

Power	250 hp	250 hp
Torque	228 lbft	228 lbft
Gearbox	5M	5M
Top speed	161 mph**	164 mph**
0-60 (0-62.5) mph	5.2 sec*	5.1 sec*
0-100 (0-99.5) mph	(13.2 sec**)	(12.9 sec**)
Weight	1460 kg	1380 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

993 Carrera (1993-98)

Almost Perfect !



No one would have expected the already radical 964 would receive even more radical changes after serving for just 4 years, especially if one used to the rhythm of the car's development. Now, we know Porsche's decision was right - the 993 was not only a refined and modernised sports car, it also delivered a lot more driving fun than its predecessor, bringing the company a revival in sales after the slump in late 80s and early 90s. The mission of 964 was finally fulfilled by the 993.

The success of 993 was partially due to the failure of another car, the still-born 989 sports saloon which was cancelled at the last stage of development, after 150 million Deutschmarks spent. Without wasting the investment, Porsche transferred the car's advanced multi-link rear suspension to the new 911. That was a double-wishbones-based, 5-link design with aluminium links and mounted on an aluminium subframe which attached to the body via rubber bushings. The result was vast improvement of wheel control, ride comfort and quietness compare with the semi-trailing arm used by all previous 911s. It also enabled passive rear-wheel steering.

The tracks front and rear were widened by 25 and 70 mm respectively, accompanied with quicker steering ratio, ensured a handling to beat the contemporary Ferrari 348 and Honda NSX. In other words, the Carrera became the best handling production sports car.



The most obvious change in exterior was the overall shape - for the first time, 911's ugly "frog's eyes" headlamps were tilted to coincide smoothly with the body, just like the 959. The front bonnet was raised to enlarge luggage space, although that deteriorated aerodynamic drag by one point to 0.33. Both the front and rear fenders were widened to accommodate the increased tracks, but unlike any previous Turbo or Turbo-Look, the fenders integrated smoothly with the body. That said, the body shell was nearly all-new, although the roof rails and roof panel were obviously

unaltered. Chassis strength was increased by 20% without any gain in weight. Overall speaking, the body looked stylish and modern, with high quality painting resulting from the new paint shop and improved fit and finish. The latter must thanks to the introduction of Japanese-style production method by new boss Wendelin Wiedeking.

Least effort was spent to the M64 engine because it was still competitive. Only lighter pistons, lighter con-rods and larger catalyst / silencer were employed to boost an extra 22 hp to 272 hp. Torque were improved from 228 lbft to 243 lbft. On the other hand, magnesium and plastic were extensively used in various parts thus making the engine 6 kg lighter than 964's.

Because the Carrera weighed more or less the same as its predecessor while its frontal area as well as drag coefficient were inferior, it performed just marginally quicker than 964 Carrera 2 (according to Auto, Motor und Sport's measurement). The difference between new and old Carrera 4 was more apparent, thanks to a simpler viscous-coupling 4WD system which weighed half (50 kg instead of 100 kg) and generated less frictional loss.

In 1996, Varioram variable intake system, first seen in the 993 RS of the previous year, was added to all 993 engines. Based on the existing 2-stage resonance intake system, it added a 2-stage long and short manifold system to create a 3-stage device to boost torque across the whole rev range. In addition to larger valves, it output 285 hp and 251 lbft. At mid-range, there was as much as 29 lbft extra torque available.



Therefore, the 993 offered great handling while providing refinement of a modern car. It would have been described as PERFECT, if not facing Ferrari's newer F355. Anyway, it is still certainly the most perfect 911 of all.

The 1995 Carrera RS was even better. Employing a 300 hp 3.8-litre version of M64, with kerb weight reduced to 1270 kg by usual measures, further enhanced with sportier suspensions and brakes etc., it was praised as the best handling 911 after the original RS 2.7.



Rear suspension

Model	993 Carrera	993 RS
Year	1993 (1995)	1995
Layout	Rear-engined, Rwd.	Rear-engined, Rwd.
Engine	Flat-6, sohc, 2v/cyl, twin-spark, Motronic, 2-stage resonance intake, (Varioram)	Flat-6, sohc, 2v/cyl, twin-spark, Motronic, Varioram
Engine Capacity	3600 c.c.	3746 c.c.
Bore x stroke	100 x 76.4 mm	102 x 76.4 mm
Power	272 hp (285 hp)	300 hp
Torque	243 lbft (251 lbft)	262 lbft
Gearbox	6M	6M
Top speed	166 mph**	172 mph**
0-60 (0-62.5) mph	5.2 sec*	5.0 sec*
0-100 (0-99.5) mph	12.9 sec*	N/A
Weight	1370 kg	1270 kg

* Tested by Autocar

** Tested by Auto, Motor und Sport

Technical Highlight of 911

The long-live 901 engine

From 2.0 to 3.8: the power of Nikasil

It is hard to believe an engine could be enlarged so much without even altering the distance between bore centres. The biggest difficulty faced by engineers was how to squeeze more capacity out of the unchanged dimensions. According to the original calculation - although Porsche had already built in considerable potential for development into the original design - it was expected to be stretched to maximum 2.7 litres only. Anything larger than 2.7 litres required a bore so large that the cylinder wall would have become too thin to be reliable. As the 911 was designed with endurance GT racing very much in mind, and admitted, strong reliability was always one of the core values of Porsche's philosophy, it seemed that the Type 901 engine would have never grown to more than 2.7 litres.



However, a breakthrough was made in the '73 Carrera RS 2.7. It introduced Nikasil technology to get rid of the original Biral cylinder, hence allowing the bore to be grown from the original 2.0-litre unit's 80 mm to as much as 95 mm while still had a sufficiently thick cylinder wall. To understand that, we must have a little bit explanation to the original cylinder design.

Since the first 911, it used so-called "Biral" cylinders, which is basically a cast iron cylinder liner with aluminium air-cooling fins casting around. Why not all-aluminium? because the pistons were also cast aluminium. It is commonly known that the contact between two aluminium surfaces always result in higher friction and wear than the contact between aluminium and iron. Therefore an all-aluminium engine without special treatment is always infeasible. Biral cylinders were employed to solve this problem.

As the Biral cylinder has two layers of different materials made in casting, the cylinder wall is inherently thicker than a pure aluminium cylinder yet doesn't provide superior mechanical strength. Instead of cast iron liner, Nikasil treatment coats a layer of Nickel-silicon carbide, usually by electrolytic deposition, to the inner surface of aluminium cylinders. Since Nikasil layer generates even less friction than cast iron liner, revability and power are both enhanced. Moreover, it is only a few hundreds of a millimetre thick, therefore the bore can be enlarged significantly. Porsche had already tried this technology in the 917 racing car successfully before applying to the 911 RS 2.7.

This was only the beginning. In fact, the Nikasil gave the engine a second phase of life, enabling the bore to be increased to 102 mm (thus displaced 3746 c.c.) eventually. Of course, the stroke was also increased from the 2.7 RS's 70.4 mm to the 3.8 RS's 76.4 mm, thus involving some revisions to crankshaft and con-rods. The magnesium crankcase used since the 2.2-litre had to be changed back to the heavier aluminium one for the advantage of strength.

The production 2.7-litre unit once discarded the Nikasil treatment and in favour of a cheaper arrangement - pure aluminium cylinders matched with iron-coated aluminium pistons, which was just a reversal pair of the original Biral cylinder / aluminium piston. However, as Nikasil had superior power advantage, it was adopted again since the 3-litre engine appeared.

Pioneering Turbocharging



Although turbocharging had been appeared in Chevrolet Corvair and BMW 2002 turbo in the late 60s, Porsche 911 Turbo was unquestionably the first to cure the turbo lag problem and made turbocharging practical for road use.

The advantage of turbocharging is obvious - instead of wasting thermal energy through exhaust, we can make use of such energy to increase engine power. By directing exhaust gas to rotate a turbine, which drives another turbine to pump air into the combustion chambers at a pressure higher than normal atmosphere, a small capacity engine can deliver power comparable with much bigger opponents. As a result, engine size and weight can be much reduced, thus leads to better acceleration, handling and braking, though fuel consumption is not necessarily better.

Problems

However, no matter the Corvair or the 2002, they failed to make turbocharging practical for road use. The main obstacle was turbo lag. Before low inertia turbine appeared, turbines were very heavy, thus could not start spinning until about 3,500 rpm crank speed. As a result, low-speed output remained weak. Besides, since the contemporary turbocharging required compression ratio to be decreased to about 6.5:1 in order to avoid overheat to cylinder head, the pre-charged output would be even weaker than a normally-aspirated engine of the same capacity !

Turbo lag can cause trouble in daily driving. Before the turbo intervenes, the car performs like an ordinary sedan. Open full throttle and raise the engine speed, suddenly the power surge at 3,500 rpm and the car becomes a wild beast. On wet surfaces or tight bends this might result in wheel spin or even lost of control.

Besides, turbo lag ruins the refinement of a car very much. Floor the throttle cannot result in instant power rise expected by the driver - all reaction will appear several seconds later, no matter acceleration or releasing throttle. You can imagine how difficult to drive fast in city or twisted roads.

Porsche's Breakthrough

Like BMW, Porsche started developing turbo for the purpose of motor racing. In the early 70s, in order to fight with the 8-litre Chevy in Can-Am, Porsche created the mighty 1000 hp turbocharged, flat-12 engined 917 racer, which soon dominated the whole world. Successful experience led to the application of turbocharging to 911 Carrera RSR Turbo GT racer, which finished 2nd in LeMans. So far, Porsche made turbocharging became the dominating force in GT racing.

Next step was to transform turbocharging for road use. As we have learned, turbo lag was the biggest difficulty preventing turbocharging technology from being practical. To solve this, Porsche's engineers designed a mechanism allowing the turbine to "pre-spin" before boosting. The secret was a recirculating pipe and valve: before the exhaust gas attains enough pressure for driving the turbine, a recirculating path is established between the fresh-air-charging turbine's inlet and outlet, thus the turbine can spin freely without slow down by boost pressure. When the exhaust gas becomes sufficient to turbocharge, a valve will close the recirculating path, then the already-spinning turbine will be able to charge fresh air into the engine quickly. Therefore turbo lag is greatly reduced while power transition becomes smoother.

Turbo 3.0

This technology was first introduced to the Turbo 3.0 of 1975. The Type 930/50 engine was derived from the RS 3.0, with compression ratio reduced to 6.5:1 rather than 8.5:1, a KKK turbocharger generated boost pressure up to 0.8 bar (governed by a mechanical waste gate). Like the RS, it employed forged pistons, but the fuel supply was changed to cleaner (if less powerful) Bosch K-Jetronic mechanical injection while electronic ignition was first introduced. Power and torque jumped to 260 hp at 5500 rpm and 254 lbft at 4000 rpm respectively, compare with the RS's 230 hp at 6200rpm and 203 lbft at 5000 rpm. The turbo engine was lazier to rev but performed a lot stronger since middle rev, hence providing superior performance in an effortless way.

Introduction of intercooler

The 3.3-litre version of the turbocharged engine, Type 930/66, superseded the Turbo 3.0 in 1978. It raised output to 300 hp and 303 lbft. The increased power thanks to the use of intercooler between the compressor and the engine, which was located under the rear spoiler. It reduced the air temperature for 50-60°C, thus not only improved the volumetric efficiency (in other words, the intake air became of higher density) but also allowed the compression ratio to be raised to 7.0:1.



In 1983, the 3.3 Turbo was upgraded to Type 930/66, which employed a more sophisticated KE-Jectronic electronic injection and improved ignition. The result was increased torque to 318 lbft although peak power remained unchanged.

The introduction of turbocharger lifted the 911 into the league of supercars. Between 1978 and 85, the 3.3 Turbo was the fastest accelerating production car in the world, beating all expensive opponents from Ferrari and Lamborghini.

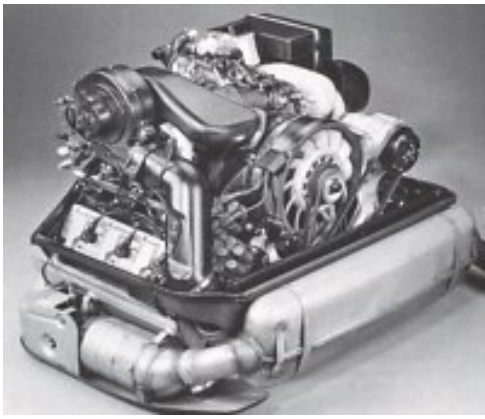
The M64 series: pushing to the limit

When the M64/01 engine appeared in the 964 Carrera 4 in 1989, its origin was already 25 years old. The distance between bore centres was never changed, but Porsche managed to increase the bore to 100 mm and the stroke to 76.4 mm (once again employed Nikasil treatment). That resulted in a displacement of exactly 3600 c.c.. Power and torque increased from 231 hp / 210 lbft to 250 hp / 228 lbft, even though now the catalytic converter was standard and emission regulations had been tightened.



Apart from the increase of capacity, most power came from the higher compression ratio, which was 11.3:1 compared with the previous 10.3:1. This was made possible by the introduction of twin-spark per cylinder and knock sensor. The former alone contributed to 10 hp and 3% reduction in consumption, thanks to more efficient burning. The latter was attached to each bank of cylinder and detected the shock wave resulting from knock. From the crankshaft angle, the advanced Motronic engine management system calculated in which cylinder the knock took place, and then retarded ignition in that cylinder. Therefore, the increase of compression was achieved without requiring higher Octane fuel.

The M64/01 engine also introduced a new "resonance" variable intake system which boost mid to high rev efficiency. Each bank of cylinders was fed by a common plenum chambers through separate pipes. The two plenum chambers were interconnected by two pipes of different diameters. One of the pipes can be closed by a valve controlled by engine management system. The firing order was arranged such that the cylinders breathed alternately from each chamber, creating pressure wave between them. If the frequency of pressure wave matched the rev, it could help filling the cylinders, thus improved breathing efficiency. As the frequency depended on the cross-sectional area of the interconnecting pipes, by closing one of them at below 5,400 rpm, the area as well as frequency reduced, thus enhanced mid-rev output. At above 5,500 rpm, the valve opened and increased high-speed efficiency.



Other changes included:

- 2.2 kg lighter crankshaft;
- Plastic intake manifold;
- increase valve overlapping, higher lift;
- quieter, all-new timing chain tensioners;
- drilled and sodium-filled intake valves, which were lighter and increase rev by 200 rpm;
- ceramic exhaust port liners, which reduce head temperature by 40°C and made sodium-cooled exhaust valves unnecessary.

M64/05 engine for 993

Modified from the M64/01 engine, with the following changes:



- Lightened con-rods from 632 g to 520 g per piece;
- Lightened pistons from 657 g to 602 g per piece;
- 10 g lighter valves;
- Redesigned cam box;
- Enlarged intake port;
- Freer exhaust system by means of larger silencer and catalyst;
- 98 RON fuel instead of 95 RON;
- Reinforced crankshaft thus made vibration damper unnecessary;

Overall speaking, the engine was 6 kg lighter than the predecessor and rev higher, thus generated more horsepower and torque - 272 hp and 243 lbft.

M64/21 engine with Varioram

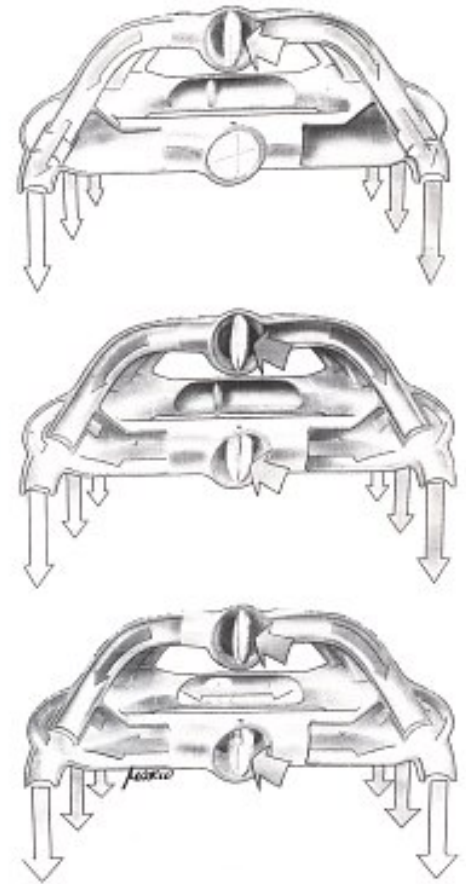
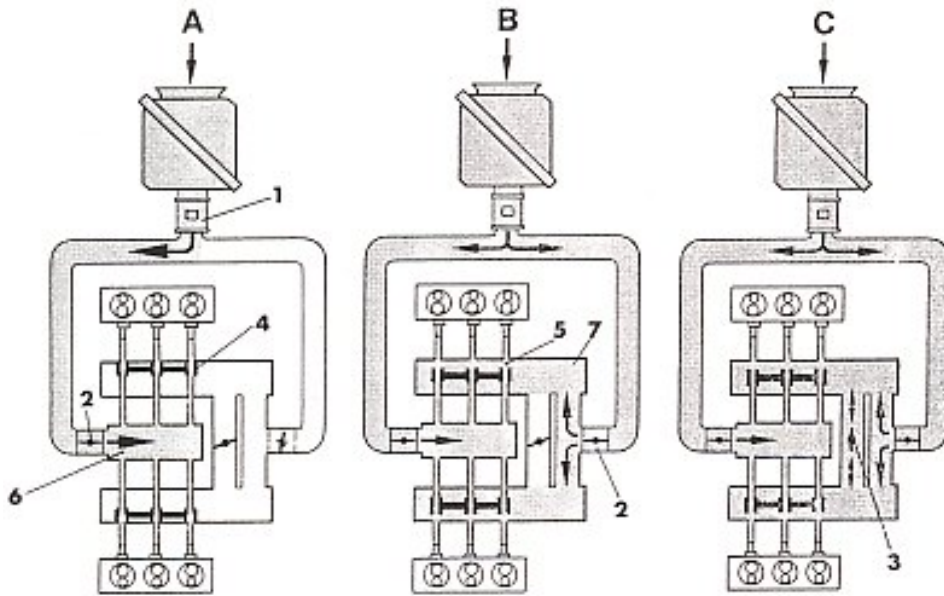
The 993 engine was updated in 1995, mainly with the introduction of Varioram. It was a 3-stage variable intake system based on the existing 2-stage resonance intake. The space-engaging system can be seen easily above the engine (see picture).



The system added six long pipes for low-speed breathing, as longer intake manifolds always lead to lower frequency of air mass thus serve better for low rev cylinder filling. Below 5,000 rpm, only the long intake manifolds were used for breathing, thus resulted in higher torque at such rev. Between 5,000 and 5,800 rpm, the original resonance intake system with short pipes also intervened, but one of the interconnected pipes was closed so to provide better mid-range output. At above 5,800 rpm, both interconnected pipes of the resonance system were opened thus resulted in higher resonance frequency, and of course better filling at such rev.

Besides, the M64/21 engine also employed slightly larger valves. The output was raised to 285 hp and 251 lbft.

Illustration to Varioram



Below 5,000 rpm (left A and top right) : long pipes; resonance intake disabled.

5,000-5,800 rpm (left B and middle right) : long pipes plus short-pipe resonance intake, with one of the interconnected pipes of the resonance intake closed.

Above 5,800 rpm (left C and bottom right): long pipes plus short-pipe resonance intake, with both interconnected pipes of the resonance intake opened.

M64/60 - welcome twin-turbo

Ignoring minor revisions, the last new engine for the 911 was the M64/60 twin-turbo engine used in the 911 Turbo of 1994. This is not the first turbo based on the 3.6-litre M64 engine - it was the 3.6 single turbo which served the 964 Turbo of 1993. However, unlike its predecessor, it was an advanced design (if not ground-breaking) rather than a stop-gap design, employing a sophisticated engine management system including electronic boost control. In other words, the waste gate was governed by computer, allowing different max. boost pressure for different rev. For instance, a maximum 0.94 bar was available for 3,500 rpm, 0.6 bar for 5,200 rpm and 0.75 bar for 6,500 rpm. This made the engine extremely responsive and linear.

The advanced engine management enabled a rather high 8.0:1 compression ratio to be realised. Unlike Porsche 959, the twin-turbo of the 911 was arranged operated in parallel rather than sequentially. More accurately speaking, each turbocharger was driven by exhaust gas from one bank of cylinders, with individual waste gate. The pressurised fresh air from the two turbines combined together and served all six cylinders. Due to the advanced boost control and 750 c.c. more displacement, the 911 engine actually felt more responsive and linear than the sequential-turbo 959. In torque, the 911 also beat the 7 years older 959: 398 lbft of torque versus 369 lbft, no wonder 4-wheel-drive was compulsory in this Turbo. Ultimate power, however, was less impressive. It was not until the final form, Turbo S, that the 911 can level the 959's 450 hp output.

To cope with the new found output, the twin-turbo got reinforced con-rods and hollow valves cooled by natrium. Like the 3.6 single-turbo, it had single-spark instead of the naturally aspirated engine's twin-spark for simplicity.