Thirty years of the Porsche 911 Turbo

911 Turbo 3.3 Coupé 1 - 1992

One of the cars on display at the Paris Motor Show back in 1974 in particular aroused huge attention right from the start, through its exceptional looks and visible features: The biggest eye-catcher was a large rear wing on the engine lid, perforated by ventilation slots and framed by a thick rubber “lip". And what lurked beneath this big rear spoiler made even the most experienced Porsche driver gasp for breath: A three-litre six-cylinder horizontally-opposed power unit with a turbocharger, 260 bhp maximum output, a top speed of 250 km/h or 155 mph, and the bite of thoroughbred racing machine. And that, basically, was what it was: The Porsche 911 Turbo was not only the fastest road-going German sports car, but also the forerunner to a genuine turbo boom.

911 Carrera RSR Turbo 2.1 'Martini' racing car - 1974

And, most definitely, it was also a bold step into the future. While turbocharged engines were no longer that unusual in motorsport, only one manufacturer had attempted to introduce such an engine in a road-going car so far – and had suffered big problems in the process. The reason, quite simply, was that the high power provided by the turbocharger generally meant a significant reduction in engine life, making the engine very sensitive and making the car challenging – if not to say, difficult – to drive. In a nutshell, therefore, the turbo engine was regarded as hard – or even impossible – to handle.

The basic concept: a racing car for the road

Porsche's engineers, however, proved superior in their know-how and practical implementation of the concept: The original plan was to build a small series of Gran Turismo sports cars derived from motor racing and now legal for road use. Back then the GT regulations called for a production volume of 400 units. But since Porsche saw no way to sell that many cars to racing drivers, the Company decided to make the competition model street-legal, making only a few concessions to motoring comfort. The turbocharged engine was of course the heart of the new car from the very beginning: First, Porsche had already gained experience with this technology in the 12-cylinder 917/10 and 917/30 race cars developing maximum output of up to 1100 bhp. Second, the general feeling was that the 911 power unit originally introduced in 1963 with 130 bhp no longer offered adequate potential for a further increase in power and victory on the race

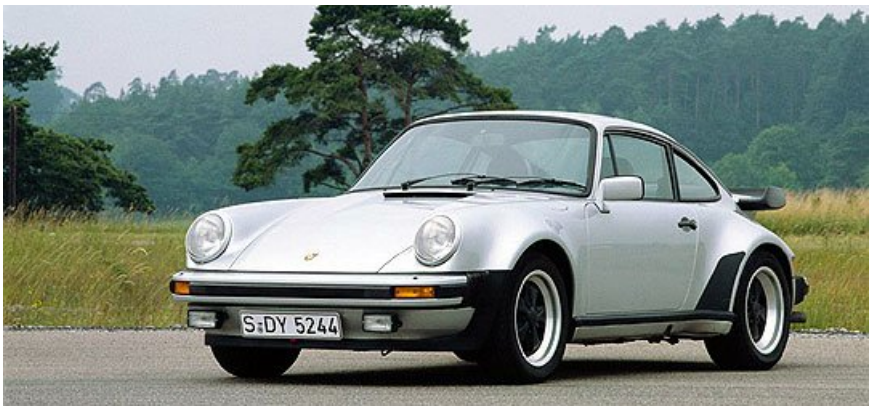
track, without enjoying the benefits of turbocharging. Accordingly, while the normally aspirated power unit of the RSR 3.0 upgraded for motorsport in 1974 developed maximum output of 330 bhp, the 911 Carrera RSR 2.1 raced in the same year developed 500 bhp with the help of a turbocharger.

911 Turbo 3.0 Coupé - 1975 / Porsche 911 Turbo 3.3 Coupé - 1986

With the minimum weight for GT racing cars being increased in spring 1974, Porsche saw the opportunity to build not a racing car in disguise, but rather a luxury high-performance sports car as the foundation for the racing version. So from March 1974 to the introduction of the new model in October of the same year, the new concept was converted into reality for the flagship within the Porsche range (fully homologated for the road, of course). To overcome the disadvantages of the turbocharged power unit such as inadequate power and acceleration at low engine speeds, Porsche introduced a concept of turbocharger pressure control by means of an exhaust gas bypass valve previously only seen in motorsport. Benefitting from this sophisticated management concept, Porsche's engineers were able to suitably modify the dimensions of the turbocharger to build up more pressure at low engine speeds and thus develop extra torque in the process. To keep this more than ample power under control, Porsche's engineers used their extensive experience in motorsport also for the brakes, fitting the car with inner vented disc brakes, complete with aluminium brake calipers, originally featured in the Porsche 917 racing car.

Instead of 400 cars, the objective Porsche now set itself was to build 1,000 units of the 911 Turbo 3.0. But this forecast soon proved completely inadequate, production of the 911 Turbo 3.0 featuring amenities widely recognised as luxurious at the time such as electric window lifts and a stereo cassette radio amounting to 2,876 units by 1977.

1977: the Porsche Turbo breaks the magic mark of 300 bhp



911 Turbo 3.3 Coupé - 1980/1

With deliveries of the Porsche 911 Turbo starting in spring 1975, nobody really believed that a car of this calibre might ever require even more power. But they were wrong! In 1977 Porsche introduced the 911 Turbo 3.3 powered by an even larger engine now, with the help of an intercooler, developing that magic figure of 300 bhp. Code-named the 930 model series, this sports car remains a legend to this day. Porsche's next major breakthrough came in 1982, in a process of ongoing development: Thoroughly optimising the fuel supply system, Porsche's engineers were able to significantly reduce fuel consumption while maintaining the same high level of power: Instead of 20 litres in city traffic (14.1 mpg Imp), fuel consumption was now just 15.5 litres (18.2 mpg Imp), the corresponding improvement at a steady speed of 120 km/h or 75 mph being 11.8 litres (23.9 mpg Imp) instead of 15.3 litres (18.5 mpg Imp) so far.

In 1987 the Coupé version was joined by a Targa and a Convertible. At an initial price of DM 152,000, customers received one of the fastest open cars in the world coming as a no-cost option with electrical operation of the roof. Just one year later, five-speed transmission replaced the former four-speed gearbox, close gear increments serving to keep turbocharger pressure even more consistent while shifting gears and improving acceleration from a standstill to 100 km/h by 0.2 seconds to 5.2 seconds.

By 1989 the Porsche Turbo became the fastest best seller in the German market, with sales amounting to almost 21,000 units hardly modified in their exterior design and appearance.

Targa (left) (Mj. 1987) und 911 Turbo 3.3. Cabriolet (right)

Following a break in production of two years, Porsche presented a new 911 Turbo in 1991: The 3.3-litre power unit now developed maximum output of 320 bhp, the new car being based on the 911 model series code-named the 964 within the Company and by the connoisseur. When Porsche modified this model in 1993, power was increased in the process, the 911 Turbo 3.6 now developing maximum output of 360 bhp.

Porsche 911 Turbo 3.6 Imsa Supercar (1993), driven by Hans Joachim Stuck (Winner of the Imsa Supercar Championship) / 911 Turbo 3.6 Coupé 2 - 1993

1995: enhanced fuel economy setting a new standard in the sports car segment

Entering the 1994 model year, the 964 model series was replaced by the 993. But the new Turbo in the 911 model range took a bit more time coming, the next Turbo generation entering the market in 1995 and immediately setting a new standard once again: The power unit of this 911 Turbo based on the air-cooled 3.6-litre engine of the 911 Carrera and featuring two turbochargers developed maximum output of 408 bhp at 5750 rpm. Acceleration from 0 – 100 km/h came in 4.3 seconds, top speed was 293 km/h or 182 mph. The exhaust system featured two metal-based catalytic converters and four oxygen sensors. A significant contribution to superior environmental protection typical of Porsche to this very day was made by the on-board diagnosis system II (OBD II). Fitted worldwide in all 911 Turbos, this sophisticated system permanently supervises all components relevant to exhaust emissions, immediately detecting any defects and activating a warning light in the cockpit. As a result, the 993-series Turbo was lauded the world over for its particularly clean exhaust emissions.

911 Turbo 3.6 Coupé - 1996

Yet another outstanding innovation was all-wheel drive (carried over from the 911 Carrera 4) in the interest of optimised driving behaviour, traction and stability on the road. In the same process Porsche's engineers re-designed both the front and rear end, adapting the side-sills to the wider wheel arches. The single-piece front end now came with even larger air scoops, yet another new development being the rear spoiler fixed in position. Air resistance was optimised by the air flow lip at the bottom of the front air dam and by improved flow conditions throughout the front end of the car as a whole, lift forces being reduced in the process to virtually zero both front and rear. Production of this version of the 911 Turbo amounted to 6,314 units.

Entering the year 2000: more power, greater economy

The current Porsche 911 Turbo (the 996 model series) – again featuring four-wheel drive and bi-turbo technology – is not only one of the fastest and most powerful sports cars in the world, but also won the title of the “World's Cleanest Car" when introduced in February 2000. The abbreviation “LEV", used above all in the USA, stands for “Low Emission Vehicle" – and Porsche's extra-clean Turbo fulfils this strict emission standard in the same way as it complies with the EU 3 or D4 standards. Fuel consumption, in turn, has been reduced once again from the former model already widely lauded for its fuel economy by another 18 per cent to 12.9 litres/100 km (21.9 mpg Imp) in the composite EU cycle. And exhaust emissions are down by an equally impressive 13 per cent.

Improvements of this kind are made possible by four-valve technology, water cooling and, in particular, VarioCam Plus serving to adjust the camshafts and vary valve lift as required. Indeed, it is fair to say that VarioCam Plus combines two engine concepts in one, serving to reduce fuel consumption and exhaust emissions and improve motoring refinement all in one.

911 Turbo - 2004

Turbo Power for a Record Winner

Scoring no less than 16 overall wins in the 24 Hours of Le Mans, Porsche holds an unparalleled record in this great event. And most of these wins were scored with turbocharged power units, most of which once again were close relatives to the six-cylinder 911. In the toughest long-distance race in the world, two 911 GT1s brought home a one-two victory against keen competition in 1998, powered by engines with approximately 600 bhp, but in principle based on the same standards and configuration as the current 911 Turbo.

By the time of this most recent success in Le Mans, the Porsche 917/10 and 917/30 raced back in 1972 and, respectively, 1973 were already a legend. These racing prototypes with mighty 12-cylinder power units displacing up to 5.4 litres and developing up to 1100 horsepower, were basically the forefathers of the 911 Turbo engine in terms of their turbocharger technology. Another forerunner was to be admired on the starting grid in 1974, when the 911 Carrera RSR Turbo, a GT racing car, truly hit the headlines in Le Mans. Maximum output of the turbocharged 2.1-litre six-cylinder at the time was 450 bhp, this avantgarde car just

barely missing victory and crossing the finish line in second place.

Starting in 1976, Porsche raced the unforgotten 935 race model, a special turbocharged version of the 911. And right from the start, this new car won the French round-the-clock marathon in an impressive display of power and performance. Indeed, the 935 was so light that lead weights had to be packed into the car in order to reach the prescribed minimum weight limit of 970 kg or 2139 lb. The 2.8-litre power unit developed maximum output of 590 bhp at 7900 rpm, top speed of the Porsche 935 back in 1976 being 336 km/h or 208 mph on the straight in Le Mans, with acceleration from 0 – 200 km/h in a remarkable 8.2 seconds. From 1976 – 1979 these extra-low and dynamic relatives of the 911 were unbeatable in the Manufacturer's World Championship, bringing home no less than four titles in a row. And apart from many other victories, the Porsche 935 also won the 24 Hours of Daytona (USA) each year from 1978 – 1983. “Baby" was another member of the 935 model family: Reflecting the rules and regulations of the German Motor Racing Championship very popular at the time, a 1.4-litre power unit developing 370 bhp was raced twice in 1977. Without carrying any additional weight, this special version of the 935 weighed in at 710 kilos or 1566 lb. The other extreme was “Moby Dick" in 1978, another special version of the Porsche 935 built uncompromisingly by Norbert Singer, Porsche's Chief Racing Engineer, for high speeds in Le Mans. And indeed, the maximum speed recorded in this case was 366 km/h or 227 mph. For the first time in the history of the 911, the engine came with water-cooled cylinder heads featuring four valves per cylinder. Maximum output of the turbocharged 3.2-litre six-cylinder with four overhead camshafts was 845 bhp.

Racing at Brands Hatch

From 1982 – 1994 the Porsche 956/962 C set the standard in Le Mans, scoring no less than 7 overall victories. Again, their turbocharged power units were developed on the basis of the 911 engine.

One-two victory in the Paris-Dakar Rally

Racing the 959 in the long-distance Paris-Dakar Rally in 1986, Porsche scored yet another one-two victory. Two turbochargers in register configuration gave the engine of this special model maximum output of 400 bhp conveyed to the ground by trendsetting, electronically controlled all-wheel drive. On account of the special transmission ratio chosen in this case, top speed was limited to 210 km/h or 130 mph. Also referred to as the “Mega-911", the Porsche 959 finished first, second and sixth in the 1986 Paris-Dakar Rally, a limited special series of this very special car being homologated and sold for road use.

Moving on to the '90s, Porsche was highly successful in a number of international GT series with the 911 GT2, a car named after its particular class in racing. Driven by private teams, these very special versions of the 911 developed up to 600 turbocharged horsepower. Then the first 911 GT1 was developed for the top GT class, with four works entries in 1996, before it was replaced by a new version of the 911 GT1 in 1998, Porsche's first racing car with a carbon-fibre monocoque chassis. Both models featured 3.2-litre six-cylinder power units with two exhaust gas turbochargers, with the engine block and cylinder heads made of aluminium.

Text & Photos: Porsche

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