Wind power

Its performance may be nothing too remarkable today, yet there are few, if any, automotive sensations to beat full-boost, second-gear acceleration in a 930-model Porsche 911 Turbo. Put it this way: it's a machine that you just *have* to own at some time in your motoring life

Text by Chris Horton; photography by Antony Fraser

There must today be few people who haven't experienced the undeniably rather appealing sensation of being propelled by a turbocharged internal-combustion engine. Whether it's in a now not-so-humble VW Golf TDI, or even a modern commuter railway train, that initially vaguely disquieting feeling of being pulled – or pushed – along by some seemingly omnipotent force is something we've come to take for granted.

But it wasn't always like that. Before the mid-1970s' advent of the first Porsche 911 Turbo paved the way for an entire generation of high-performance cars with forced induction (and some fairly mundane ones, too), there was only one way of substantially improving a given engine's power output. You increased its cubic capacity, and you bolted on all manner of fancy carburettors and exhaust systems. And quite often you rendered it more or less unusable.

But suddenly here was a way of gaining up to a third more power – and, crucially, more torque – merely by the addition of what amounted to an exhaust-driven compressor to pump more air into the combustion chambers. (You had to add quite a bit more fuel, too, of course, but that was always the relatively easy part.) And because you were by definition using a waste product to drive it, the whole process was in energy terms more or less free, *gratis* and for nothing. No wonder that turbocharging was such an attractive concept.

Today it's Porsche – with a little help from BMW and its more or less contemporary 2002 Turbo – that is justifiably credited with first introducing turbocharging to the mass-production car market, and then with making it fashionable – and practicable – enough to be adopted by most of the mainstream motor industry at some time during the last 35 years. (Although the first genuine volume-production turbocharged car was actually, and famously, the Chevrolet Corvair Monza Spyder, way back in 1962.) Yet it could so easily have been a total disaster.

In the early 1970s Porsche had proved that both the principle and the technology of turbocharging, which itself could trace its origins back as far as 1905, were both sound and highly effective. By 1972 the company's 917-based Can-Am racing cars, said to have been inspired partly by the turbocharged BMW saloon that had convincingly won the 1969 European Touring Car Championship, were developing over 1000bhp from their blown flat-12s, crushing the opposition as dramatically and effectively as the atomic bomb had ended the Second World War.

For the company's road-car development engineers it was manna from heaven. Even today, with the standard-issue 911 Carrera engine pushing 4.0 litres, we're accustomed to the notion that it will continue to become ever larger,

Even Porsches don't get much more evocative than this, the 1987 3.3-litre belonging to Guy Langley. Colour is Diamond Blue metallic. Even by this fairly late stage in 930 production, though, gearbox is still a four-speeder

ever more powerful (and now ever more fuel-efficient, too), but more than a third of a century ago it was a rather different story. Already a power unit that originally had a capacity of just 2.0 litres had been enlarged to first 2.2 and then 2.4 litres, and while the forthcoming 2.7 would undoubtedly be a major step forward (as proved fully to be the case, of course) there was a limit to what even that would be capable of.

How better, then, to move the now nearly 10-year-old 911 on to a new level of performance (and desirability) than by turbocharging? It would mean reworking both the chassis and the engine – enlarging the latter's capacity still further, and certainly strengthening it – but that would soon be necessary in any case, and the resulting car, intended from the start as a high-profile flagship model (and with lots of valuable spin-offs in the world of motorsport), would be an ideal way of reminding would-be buyers what an innovative and exciting machine even the bog-standard, naturally aspirated 911 still was.

While all this was going on, however, the world itself had been changing no less dramatically. A design *Studie* of what would later become the 911 Turbo first appeared at the Paris motor show in the early autumn of 1973, to a predictably enthusiastic reception, but within just a few weeks Israel and Egypt were at war in the Sinai desert. The oil-producing Arab states in the region, retaliating against US support for Israel, announced not only a 70 per cent rise in the price of crude oil, but also a substantial cut in production levels. Many western governments reacted to the resulting shortage by imposing drastically reduced speed limits – if not fuel rationing – and suddenly the idea of what would later become a 260bhp, 150mph and typically 15mpg sports car – if you were lucky – seemed about as sensible as an indoor barbecue.

But Porsche, then under the direction of Dr Ernst Fuhrmann, held its nerve (rather ironically in view of Dr Fuhrmann's subsequent plan to kill off the entire 911 range in favour of the 928), and pressed on with development of the 911 Turbo regardless. The production car, based around the 'H'-programme, 1975-model 911 coupé, and with an all-new, 3.0-litre, flat-six engine and KKK turbocharger, was finally launched in October 1974 – it was one of the undoubted stars of that year's London motor show; a welcome diversion from the no less bleak world events of that autumn – and sales, boosted (no pun intended) by near-ecstatic press coverage, immediately vindicated Fuhrmann's faith in it. A genuine automotive legend had been born.

Like so many legends, however, that original 911 Turbo – code-numbered 930 within Porsche itself – was in many senses something of a disappointment, and certainly when seen from a modern perspective. Don't get us wrong. It was, and remains, a wonderful car; a real classic. It looked fantastic, with its wide, bulging wheelarches and huge trademark rear wing. In a straight line it could be undeniably and (for the time) awesomely quick, too: 0–62mph in six seconds (according to the UK's weekly *Motor* magazine), and a maximum speed of 155mph.

But it was very expensive – half as much again as a Carrera 3.0 – it was for a number of reasons (not least the obstructive 915 gearbox, the barely adequate brakes, and the almost non-existent off-boost throttle response) difficult to drive quickly in real-world conditions, it was terrifyingly thirsty and, if the truth be told, never really that much faster than a Carrera 2.7 RS. (And recent economic history has shown which of the two machines would have made the better buy. Here's a clue: it wasn't the 911 Turbo.) You couldn't even buy a Turbo with right-hand drive until the autumn of 1975.

That hardly seemed to matter at the time, though. Demand was strong from the outset, and three full model years would pass before Porsche felt the need to offer even the slightest improvement upon the basic recipe. This, in August 1977, and for the 1978 model year, brought not only a larger (3.3-litre) engine and an air-to-air intercooler, raising power and torque from their original 260bhp and 343Nm to 300bhp and 412Nm, respectively, and making the car usefully more flexible in the mid-range (and slightly more economical, too), but also much better brakes derived from those used in the 917 race cars. If they didn't stop a hard-driven 911 Turbo, then probably nothing would.

But then it began to seem as if the 911 Turbo might be halted in its tracks by something altogether more final. During the 1970s the US authorities were imposing ever-stricter exhaust-emissions requirements on car manufacturers, and it was no surprise that the Porsche, designed from the start with ultimate performance in mind rather than the environment, was struggling to meet them. Add to this the fact that Dr Fuhrmann's plan to scrap the 911 range in its entirety was by now gaining momentum, with the 928 taking over as the flagship model, and again it's not much of a surprise that sales of the 911 Turbo in both the United States and Japan ceased at the end of the 1979 model year. It just wasn't worth the expense to keep it there.

This inevitably slowed the usual tide of improvements and updates for the rather less

BEST BUYS; PRICES, TOO

The later the 930 you can find and/or afford, the better. The early cars have a certain appeal – as early models of any classic often do – but technically they're not as good as the later ones, they've had that bit longer to corrode and develop other problems, and at the end of the day they're unlikely to be usefully cheaper. They certainly won't be any cheaper to run.

The watershed dates – for us, anyway – would be the 1978-season introduction of both the 3.3-litre engine and 917-style brakes (in both respects a huge improvement over the 3.0-litre), and then the autumn 1983 updates that mirrored those found in the Carrera 3.2. Don't get too hung up about the five-speed gearbox, though. It was available for only the final year of the 930's life, making it pretty rare, and although in theory it's a better unit than the four-speed 915, in practical terms there's less to choose between them than in the 3.2.

As for prices, in very general terms you should expect to pay around £18,000 to £22,000 for a good 930 (of any age; another reason why a later car will always give better value for money), and perhaps £25,000 or more for a particularly special car. As ever, avoid an apparently cheap 930 crying out for even relatively minor attention; it could easily turn into a money pit, and even then may fail to deliver much in the way of fun and satisfaction.

demanding Europe and Rest of the World (RoW) markets, and for another three model years – 1980, 1981 and 1982 – the 911 Turbo saw only minor changes and upgrades, themselves mirrored on the contemporary 911SC, and thus representing only a relatively small cost to the company. Indeed, it would be the start of the 1983 model year before the engine again benefited from any kind of attention, and even this brought just a modest increase in torque rather than any major technical advances.

By the middle of the 1980s, of course, it was all change again (Dr Fuhrmann had retired in 1982, taking with him his controversial plans for a 928-led *coup d'état*), and while the 928 would remain in production until as recently as the mid-1990s, the 911 in general had by then regained its (many say rightful) place at the top of the Porsche dynasty. In 1986 the 911 Turbo, which thanks largely to tighter European emissions legislation had by now cleaned up its act sufficiently, was reintroduced to the US, and there was an immediate sense that the 930 was once again at the front of the company's corporate thinking. Better late than never, you might say.

Thereafter developments followed thick and fast. Well, relatively thick and relatively fast, anyway. In the spring of 1987 (for the 1988 model year) the previously coupé-only Turbo finally became available in both Targa and full Cabriolet form (the naturally aspirated 911 had been available as a Cabrio since the 1983 model year, and as a Targa since the beginning of 1967), and the final major development, for the 1989 model year, at last gave it the significantly better G50 transmission it had needed for many years.

The G50, first seen in the 911 Carrera 3.2 for the 1987 model year, offered not only a hydraulically actuated clutch and a much-improved shift, but also five forward gears in place of the by now positively antediluvian four to be found (somewhere, sometimes...) in the previous 915 gearbox. This, together with the engine upgrades that had taken place over the years, went at least some of the way toward ridding the 930 of its enduring reputation for turbo lag that was measurable almost in minutes rather than mere split-seconds. The car also benefited from improved suspension for flatter cornering, and reduced front–rear pitching under acceleration and braking.

By now, though, the end really was in sight for the 930. The new naturally aspirated 964-model 911 Carrera 4 was launched in August 1989, with the rear-drive C2 following in October, and it was no secret that a turbocharged model was under development – even if the new 3.6-litre Turbo, the 965 in Weissach-speak, didn't appear until 1991. As a result of all these factors the 930 was discontinued in September 1989, bringing to an end a production run that spanned almost 15 years and some 23,217 cars, and which sealed for ever Porsche's reputation for building genuine supercars if not for the masses, then most certainly for real-world enthusiasts.

Should you buy a 930-model 911 Turbo? Maybe. But then possibly not. It is by just about anyone's standards a momentous machine to drive, but at the same time it is also something of an acquired taste – and most definitely a responsibility, too. Flooring the throttle in second or third gear, and perhaps (eventually...) feeling like little more than a passenger in the proceedings, a stowaway in some fast military jet or even a missile, is quite simply addictive.

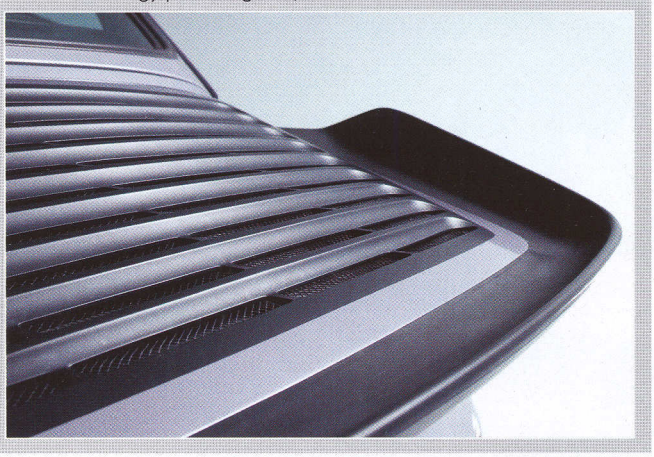
But that huge performance is by its very nature nowhere near as accessible as it is in the naturally aspirated cars. It places a big extra burden on much of the running gear (and especially the brakes, which are marginal at the best of times in the pre-1978 models). It also uses vast amounts of fuel (10–12mpg is by no means uncommon in a hard-driven 930; with commensurate maintenance and insurance costs), and the plain fact is that unless you are prepared to commit yourself fully to the cause, a good 3.2 will be just as enjoyable, and ultimately a far more rewarding long-term experience.

In the short to medium term, though, there may well be nothing to beat a 930. It is, as we suggested at the beginning of this story, one of those classic, milestone Porsches that you need to own – that you *must* own – at least once in your life. And even if you do eventually decide that it's not quite the car for you, then you'll have had an awful lot of fun making your mind up.

FROM WHALETAIL TO TEATRAY: THE AERODYNAMICS OF THE 930 TURBO

One of the defining features of the 911 Turbo has always been its trademark rear wing. We covered the subject of 911 rear wings in general in some detail in the July 2001 edition of *911 & Porsche World* (*A trick of the tail*, pages 74–82; call 020 8655 6400 for back issues), but suffice it to say here that the 930-model Turbo came with at least three different types during its 15-year life.

First was the whaletail, derived from the rear wing first seen on the 1974 Carrera 3.0 RS, and so called because with its upturned side and rear edges in flexible back rubber it (vaguely) resembled the blunt end of, well, a whale. The earliest models had both a full-width intake grille just below the rear window and a smaller secondary intake ahead of the trailing edge, but such was the heat generated in the cramped engine compartment, particularly in traffic, that this was enlarged for 1976.



The most obvious change, though, came for 1978, when the whaletail was replaced by what soon became known as the teatray rear wing (right). This had both a pronounced lip – again in flexible back rubber – round its side and rear edges, a single large intake grille on its upper surface, and not least a substantial box-section immediately below it to make space for the air-to-air intercooler now fitted as standard, too. This layout continued through to 1989.

WHAT CAME WHEN: THE 930 TURBO TIMELINE

OCTOBER 1973
Design *Studie* for what would later become the 911 Turbo is exhibited at the Paris motor show

OCTOBER 1974
The production 1975-model 911 Turbo is unveiled at the London motor show

FEBRUARY 1975
911 Turbo production starts: 3.0-litre engine, 260bhp (245bhp for US models), 343Nm and 15-inch wheels (16-inch rims optional); 80-litre fuel tank; four-speed gearbox; whaletail rear wing with small additional vent

AUTUMN 1975 (1976 MODEL YEAR)
First right-hand-drive UK-specification cars available. New six-year anti-corrosion warranty. Maximum boost increased from 0.8 to 1.0 bar, but power and torque remain the same. Still 15-inch wheels, but 16s optional (with lower final-drive ratio). Still with whaletail rear wing, but additional vent is now slightly larger

AUTUMN 1976 (1977 MODEL YEAR)
Boost gauge fitted for the first time, inset in rev-counter, but power and torque as before. Seven-inch brake servo fitted to LHD cars; clutch-pedal effort reduced by helper spring. Revised synchromesh, strengthened final drive, 16-inch wheels now standard (with same final-drive ratio as when an option). One-piece front anti-roll bar and two-piece spring plates allow ride-height adjustment. New centre console as per contemporary 911SC. Limited-edition Martini car exhibited at the London motor show

AUTUMN 1977 (1978 MODEL YEAR)
New 3.3-litre engine with air-to-air intercooler (and many internal improvements and updates) raises power to 300bhp (260bhp in US) and torque to 412Nm (395Nm in US). New clutch with a rubber cushion at its centre pushes engine 30mm to the rear, and needs a larger bellhousing. New 917-style four-piston calipers and larger, cross-drilled discs significantly improve braking performance. Larger eight-inch servo now fitted to RHD cars; teatray-style rear wing with additional box-section beneath it to provide space for intercooler

AUTUMN 1978 (1979 MODEL YEAR)
Power and torque as for previous season; no other major changes

AUTUMN 1979 (1980 MODEL YEAR)
930 is discontinued in US and Japan. Other models retain the same power and torque as before, but gain twin exhaust tailpipes and a new brass-tube oil-cooler

AUTUMN 1980 (1981 MODEL YEAR)
Power and torque remain as before, but alternator now has a slightly higher output

AUTUMN 1981 (1982 MODEL YEAR)
Power and torque as before, and although still not available in US, 930 goes on sale in Canada. Fuchs wheels gain highly polished rims in order to accentuate their black-anodised centres

AUTUMN 1982 (1983 MODEL YEAR)
Still no major changes, although the new 930/66 engine with revised exhaust system and modified K-Jetronic injection raises torque (for Rest of the World models only; ie not Canada) from 412Nm to 432Nm

AUTUMN 1983 (1984 MODEL YEAR)
Power and torque as previous year, but engine gains oil-pressure-fed timing-chain tensioners as per newly introduced Carrera 3.2. Other changes minor: locking wheel nuts, brake-pad wear indicators, slightly reduced alternator output

AUTUMN 1984 (1985 MODEL YEAR)
Power and torque as previous year; otherwise only minor changes (and those once again as per Carrera 3.2): 85-litre fuel tank, four-spoke steering wheel, shorter gear lever, larger brake master cylinder, thicker front and rear anti-roll bars, central-locking now fitted as standard

AUTUMN 1985 (1986 MODEL YEAR)
Newly cleaned-up 930 is reintroduced to US market, with DME engine management, LE-Jetronic injection and catalytic converter, 282bhp and 390Nm; Canada and RoW models get new engine, too, but with same (higher) power and torque figures as previous year. Dashboard is restyled, with larger face-level vents. Rear wheels are now 9.0J x 16 inches with 245/45 tyres, but fronts still 7.0J x 16

AUTUMN 1986 (1987 MODEL YEAR)
Power and torque figures as before for all markets. Rear reflector panel now has integral fog-lights, and 'Porsche' script. Headlight beam is now adjustable from dash; minor changes to brake discs and gear ratios. Anti-corrosion warranty extended from six to 10 years. Car now available in Targa and Cabriolet forms, too

AUTUMN 1987 (1988 MODEL YEAR)
Power and torque again as before for all markets; passenger-door mirror and eight-speaker sound system standard in all markets

AUTUMN 1988 (1989 MODEL YEAR)
Power and torque remain unchanged, but gearbox is now five-speed G50 with hydraulic clutch, similar to that fitted to Carrera 3.2 from 1987 season. Final-drive ratio is now 3.444:1. Larger-diameter anti-roll bars and torsion-bar rear springs; firmer suspension dampers, too

SEPTEMBER 1989
930 Turbo production finally ceases in order to make way for the new naturally aspirated 964-model 911 Carrera and then, in September 1990, the new 3.6 Turbo (type-numbered 965)

The original so-called whaletail rear wing was superseded by this 'teatray'-style item for the 1978 model year and beyond. Box-section beneath it provided space for the air-to-air intercooler that came when the engine was enlarged from 3.0 to 3.3 litres. This also marked the change to the much-improved 917-derived braking system

CHECKPOINTS

Body structure

Structurally the 930 was always based closely on the contemporary naturally aspirated 911 – which means first the Carrera 2.7 (1974–77) and the Carrera 3.0 (1976–77), then the 911SC (1978–83), and ultimately the Carrera 3.2 (from 1983 to the end of production in 1989). In all cases the Turbo has substantially wider front and rear wings, and first a so-called whaletail and then a teatray rear spoiler (see previous spread), but this apart the two cars are effectively virtually the same.

The only other significant dates as far as the body is concerned are the beginning of right-hand-drive production in September 1975, the simultaneous introduction of a six-year anti-corrosion warranty, and then in 1986 (for the 1987 season) an extension of this warranty to a full 10 years thanks to a totally 'galvanised' body.

Not surprisingly, though, the Turbo's main enemies today are the combined effects of rust (upon which said warranty had only a limited effect) and previous and possibly poorly repaired accident damage (which often starts and then accelerates the corrosion process in the first place). And, given both the Turbo's infamously digital throttle response and its much wider than standard front and rear wings, accident damage of some sort is by no means uncommon.

And while legend has it that many 930s will have slid off the road backwards, in truth it's the front end that's just as likely – if not even more so – to have been the first part of the car to hit something solid and unyielding. The pre-1978 models are seriously under-braked, and even in the very last cars it's easy to lock up the front wheels and then *understeer* into trouble.

Start your examination of any potential purchase, then – backed up by a professional inspection if necessary – with the front wings, outer and inner. The former are attacked from both above and below, and you should pay close attention to the area round each headlamp, the wheelarch edges, the lower rear corners behind the wheels, and the flange where each wing meets the edge of the front compartment.

Have a good look now down inside the luggage compartment. Lift out the carpet in its entirety and check both the inner wings, and more crucially still the lower front section, behind the front bumper. This, as we've suggested, is often the first part of the car to be involved in an accident (look for signs of replacement panels or inexpert panel-beating), and can also suffer from water leaking in past the bonnet seal, and even acid attack by electrolyte from the battery.

You need to look under the front of the car, too, again partly for tell-tale signs of previous impacts, but also for rust in the box-section crossmember supporting the fuel tank. And although it's rare, don't ignore the possibility of rust in the tank itself: it's usually obvious from the stains and the smell (and in which case you need to be aware of the potential fire hazard). New tanks cost about £800, plus fitting.

Inspect the length of each sill member (the body-coloured outer sections are just cosmetic covers; make sure that somehow you get the measure of what may – or may not – be behind them), and ideally use the car's own jack, plugged into the single socket provided on each side, to lift each pair of wheels clear of the ground. This should reveal any weakness in these areas.

Lift out as much of the interior carpet as possible. This will also allow you to inspect the floorpans from above, which although not usually a problem don't appreciate constant contact with damp trim (itself usually the result of a leaking sunroof, or perished Targa or Cabriolet roof seals). It's also worth looking at the two jacking points per side – one at each end of each sill – provided for use with a workshop lift. Corrosion isn't a major issue, but it's possible a carelessly placed jacking beam has damaged the metalwork.

The next areas to inspect are first the two 'B'-posts – the door-catch panels, basically – and then the so-called kidney bowl at the base of each of these posts. The former suffer from the effects of mud being thrown forward from the rear wheels, and then holding moisture against the steel like a poultice. The latter, which are essentially strengthening membranes shaped like, well, kidney bowls, are among the most difficult areas to repair in the entire car. The obvious warning signs are rust holes round the door catches themselves, or where the panels run down to meet the sills, but even an otherwise good-looking car can be hiding problems here – especially if repairs have already been tried.

After that it's reasonably plain sailing. Chipped, dull and generally scabby paint (red in particular fades badly) shouldn't put you off an otherwise sound car, but may cost a lot to put right – and if you don't bother you might never enjoy the car as much as you should. Exterior trim – door handles, window seals, mirrors, rubbing strips and so on – is all relatively easy to replace, and you can often make a big difference to a car's appearance (as well as to its subsequent saleability) by what might be termed 'overhauling' both front and rear bumpers. The main body-coloured sections are aluminium, and respond well to stripping, shot-blasting and then repainting, and although they're not particularly cheap the so-called 'bellows' at each corner of the car are available.

Likewise both the 'smile' – the black rubber strip between the front bumper and the bonnet – and the black-plastic lower front spoiler. That's often damaged by contact with kerbs, but again is both easy and cheap enough to replace.

As far as the later Targa and Cabriolet variants are concerned, it's obviously sensible to ensure that both roof structures function correctly. The Targa's simple lift-out panel sits on generous rubber seals under its front and rear edges, and these can be damaged by careless handling, but they're neither difficult nor impossibly expensive to replace. Reckon on about £500 for the parts.

The Cabriolet's roof is a full folding affair, with three layers of

fabric on a light-alloy framework, and with electric operation as befitted the car's status. Move it through its operating cycle at least once, at the same time listening for signs of distress from the motor and mechanism. This can be expensive to put right. Make sure that both the hood material and that of the matching tonneau cover are undamaged, and not too faded.

The hood's plastic rear 'window' may be past its best, but it was secured by a zip to make it removable for added ventilation, and this makes it easy to fit a new one. Some hoods had an optional heated window in glass, and clearly this should be suffering from no such problems.

Engine and transmission

Only last June *911 & Porsche World*'s Paul Davies wrote a detailed profile of the 930 engine in its various forms (pages 100–105), and naturally we would urge anyone seriously looking for one of these great cars to buy a copy – if you don't have one already, that is. Call 020 8655 6400, or alternatively go to www.chpltd.com/shop.

Suffice it to say here that it has come to be widely regarded as one of the toughest air-cooled units Porsche has ever built. Regular oil and filter changes (using fully synthetic Mobil 1 to resist the much higher operating temperatures the unit can generate, especially in the turbo itself) are essential, but should at the same time see the engine through to well over 100,000 miles. Oil pressure should be at least 4.0 bar (56–58psi) with the motor hot and running at 5000rpm.

Incidentally, you should always allow the engine to idle for a few minutes before switching off after a fast run. Neglect this precaution (which is far less important in modern-generation Turbos such as the 996) and there's a real danger of running the turbine bearings dry. The blower itself can usually be overhauled, but you'll probably be looking at a bill for around £1000 for that alone, so it's best avoided if possible.

Specific 930 problems include excessive wear of the valve guides, particularly on the hotter exhaust side; listen for a characteristic rattle at 2000rpm. And pre-1984 engines, without the oil-pressure-fed timing-chain tensioners that at this point were simultaneously fitted to the naturally aspirated Carrera 3.2 power unit, can be noisy in this area, too. Needless to say the later-type tensioners should be an early upgrade if you buy any car thus affected.

The biggest problems, though, are blowing cylinder-head-to-barrel joints (which have no gasket, as such, just machined metal faces), and oil leaks from the joints between the six barrels and the crankcase. These are caused – as in the naturally aspirated engines – primarily by breakage of one or more of the four cylinder-head studs per barrel, but the higher pressures in the Turbo's combustion chambers will tend to exacerbate the problem. Oil leaks will be obvious enough, and the blowing head joints (and there's unlikely to be just one) will make themselves known by a characteristic chuffing sound, like a holed exhaust, when the engine's under load.

An engine in this state will generally consider to run astonishingly well, but fitting the new and uprated studs that should cure the problem once and for all will mean not only removing the motor from the car, but also stripping down the entire top end on the affected side (and you'd be mad not to do both sides, even if only one was affected). But the crankcase ends of the broken studs are often completely seized into the aluminium alloy, and can then be removed only by a specialist process known as spark erosion.

The crankcase itself, bearing a casting number prefixed with '930', and shared with both the Carrera 3.0 and 911SC, is made from a far tougher aluminium alloy than the 2.7 and earlier engines, and leaks from here are virtually unheard of. The bottom end in general is remarkably strong, in fact, and you'll have to try quite hard to break it.

Transmissions – manual only – will most likely be the four-speed type 915 or, for the 1989 model year alone, the much-improved G50 that did so much for the Carrera 3.2 from 1987. The 915 shift is famously vague and obstructive, with sometimes slow and noisy synchromesh, but the gearbox itself is strong and reliable, even when seemingly on its last legs, and is unlikely ever to fail completely. Parts are widely available, too, it's easy to work on, and it also benefits enormously from regular oil changes. (Many 911 owners with these earlier units swear by US-made Swepco lubricants, and they'll improve a G50, too.)

Clutches lead a predictably hard existence, but you should still see at least 50,000 miles unless you consistently abuse it. The most obvious sign of impending problems (other than slip, judder, or dragging, when it doesn't fully disengage) is an increasingly heavy pedal, but this may also be the result of a stiff cable (915 transmission), or failing seals in the G50's hydraulically actuated system.

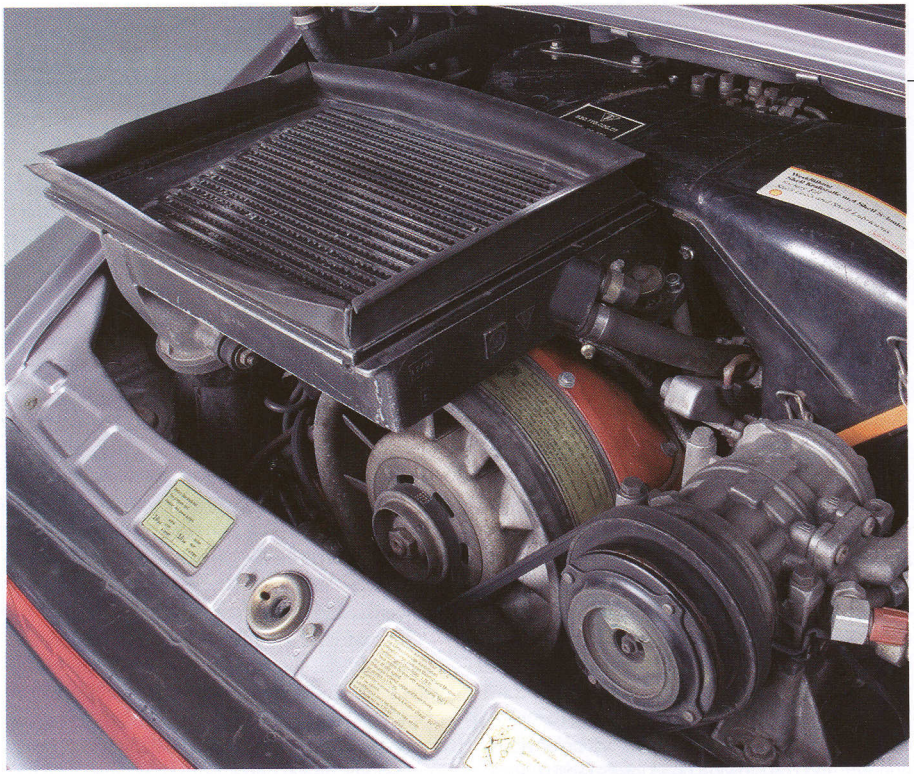
Suspension, steering and brakes

Given their origins it's no surprise that both the suspension and steering of the 930 are simple, tough and reliable. Worn dampers and sagging torsion-bar springs aren't uncommon these days, but neither is a particularly difficult issue to address. A set of new dampers should cost no more than around £500 – say £750 fitted – and will often transform the car; and a good specialist will often be able to restore the ride height simply by adjusting the aforementioned springs.

Knocks and bangs from underneath on a rough surface are likely to be caused either by worn bushes (the anti-roll-bar mounts are the most

"Because you were by definition using a waste product to drive it, the process was in energy terms free, *gratis* and for nothing. No wonder that turbocharging was such an attractive concept"

Guy Langley's left-hand-drive 1987 3.3, originally sold new in Saudi Arabia, is currently for sale - and as good as it looks, too: yours for just £19,000. Call Langley on 07966 800553, or e-mail him at glangley_uk@yahoo.co.uk



930 Turbo was always seen as the flagship of the 911 range, and so interiors had every imaginable luxury of the time: leather, air-con, electric windows, and often a sliding-steel sunroof. Optional wood trim in this car sounds ghastly, but actually works surprisingly well

IS IT REALLY WHAT YOU THINK IT IS?

Apart from the Targa and then the Cabriolet derivatives, both of which were available from the autumn of 1986, the only significant variations on the 930 Turbo theme were first the 1977-model Martini cars (below), and then, from the early 1980s, what became known as the Slant-Nose models.

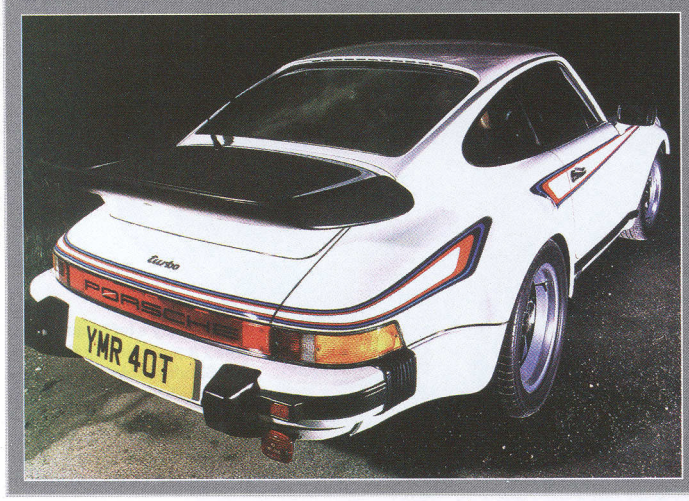
The former stemmed from a single white 911 Turbo built for the British motor show in October 1976, and featuring the distinctive light-blue, dark-blue and red stripes of the Italian drinks manufacturer (and which company was, of course, Porsche's major race sponsor during the 1970s).

In truth, though, the 'production' Martini Turbo wasn't really a different car at all, but simply a mechanically and structurally standard 1977-model 930 that, if painted Grand Prix White, was optionally available with some rather extrovert stick-on stripes. Somewhat confusingly, the same stripes were also available on the contemporary narrow-bodied, naturally aspirated 911s, too – but again only in conjunction with Grand Prix White paint.

The Slant-Nose, as it became widely known colloquially, first appeared in mid-1981 as a special order only. It was based on an otherwise standard contemporary 911 Turbo, with the required conversion work carried out by the so-called 'special wishes' department at Zuffenhausen.

Its major distinguishing feature, inspired by the highly successful 935 race cars, was a pair of flattened-out front wings (in steel; only after-market conversions have GRP panels), their profile now matching that of the front bonnet, and often (but by no means always) incorporating a series of louvres above each front wheel. These were designed primarily to allow high-pressure air to vent from inside the wheelarches at high speed. Early cars had their headlamps set into the deep front airdam, but from 1982 these began to be replaced by 944-style pop-up lights set into the front wings, and this became the standard layout for the 1985 model year.

The Slant-Nose's aggressive, race-bred looks were further emphasised by wide, body-coloured sill extensions, still wider rear wings to accommodate 9.0J x 16-inch wheels and 245-section tyres, and not least a flamboyant, heavily stylised air intake on the forward section of each rear wheelarch.



In 1985 the Slant-Nose became a special limited edition under Porsche's then brand-new *Exclusiv* programme. The result, from early 1986 here in the UK, was the Turbo with Sport Equipment, otherwise known as the Turbo SE, and in the United States – from March 1987 – the 930S.

If the mainstream 911 Turbo had always been the top-of-the-range flagship, then the SE had to be that little bit more special – not least because at £74,000 it was nearly twice the price (£39,299) of a standard 930. As a result it featured an even more luxurious interior as standard, with air-conditioning, and special Recaro seats that were both electrically adjustable and electrically heated, a special squared-off version of the instrument panel, and a leather-trimmed steering wheel.

It was slightly more powerful than the standard Turbo, too, with 330bhp at 5500rpm, but with the same maximum torque (431Nm, at 4000rpm) as the mainstream model. This increased power came from a combination of higher-lift cams, a freer-flowing exhaust system, higher boost pressure, and not least a larger intercooler. There was also a larger oil-cooler.

It's worth noting, incidentally, that while not strictly relevant to this story, there were famously a number of naturally aspirated 911s whose apparent similarity to the 930 can cause confusion at best – and at worst might even allow them to be passed off as the more expensive Turbo model.

Essentially the Carrera 3.2 was available from 1984 to 1989 in all three of its configurations (coupé, Targa and full Cabriolet) with the wider body of the 911 Turbo, together with its suspension and running gear – but not, of course, its engine. In our recent 3.2 buyers' guide we referred to the result as 'a Turbo-bodied 3.2, or a naturally aspirated 3.2-litre Turbo'. And as a result, we suggested, 'it offered the best or the worst of both worlds'. The issue is further clouded by the fact that, although only about eight were built, even the Slant-Nose was available with a normally aspirated Carrera 3.2 engine.

This means that you need to check any 930's chassis number, or Vehicle Identification Number, to make sure it really is what it purports to be. In cars built from the 1975 to 1980 model years inclusive these will be 10-digit numbers beginning, logically enough, with '930'; a naturally aspirated 911 will start with '911'. (Although 1980-model cars, the last to use old-style chassis numbers before the 1981 launch of the VIN system, have numbers that start 93A.) From 1981 onwards, however, the 930, like all other Porsches, uses the now familiar 17-character VIN system with a mixture of letters and digits.

In all cases the relevant numbers can be found on a small aluminium plate riveted to the right-hand inner wing inside the front compartment – although you'll have to pull back part of the loose-fitting carpet in order to see it. To its left should be a small self-adhesive label showing both the paint code and its name. Again, though, the Turbo is immediately identifiable by '9' and '3' at the sixth and seventh characters, respectively, where either a 911SC or a Carrera 3.2 (whether standard-bodied, Turbo-Look or even Slant-Nose) would have '9' and '1'. If in doubt, though, do seek expert advice.

FURTHER INFORMATION

Turbo-specific further reading is thin on the ground – thinner still if it's genuinely useful stuff you're after, without the inevitable hyperbole.

As usual, though, we have no hesitation in recommending Peter Morgan's *Original Porsche 911*, which although covering the entire air-cooled Turbo range from 1974 right the way through to 1998 in just a single chapter, is still a mine of useful information. It's available from our own books department (www.chpltd.com/shop) for just £24.99 plus postage.

We'd also recommend two of Peter Morgan's well-known *Ultimate Buyers' Guides* – one on the 911SC from 1977 to 1983, and the other on the Carrera 3.2 from 1983 to 1989. Neither of these handy A5-sized books (£8.95 apiece plus postage from the above web address) contains specific information about the 930, as such, but such was always its overall similarity to these naturally aspirated cars of the period that you'll glean a lot of useful general knowledge about it.

After that, dare we suggest, you need the June 2006 issue of *911 & Porsche World*, for Paul Davies' excellent analysis of the 930 Turbo's engine, and then this writer's Carrera 3.2 buyers' guide from the February 2007 edition (*The missing link*, pages 86–93), which again will give you plenty of invaluable background.

Independent specialist Russell Lewis, himself an enthusiastic and hugely knowledgeable 930 owner, at RSR Engineering in Grayshott, Surrey (01428 602911) and, not for the first (or last) time, Autofarm in Oxfordshire (01865 331234; www.autofarm.co.uk). Also JZ Machtech in Kings Langley, Hertfordshire (01923 269788; www.jzmachtech.com), Tognola Engineering in Datchet (01753 545053), and finally, for spares, Porscheshop in Halesowen (0121-585 6088; www.porscheshop.co.uk).

likely culprits; they're neither difficult nor expensive to renew) or sloppy dampers again.

The non-assisted steering can feel heavy by modern standards (and, thanks to its revised geometry, even compared to the 911SC and Carrera 3.2), but it shouldn't require super-human strength, even at parking speeds. If it does, suspect overly wide tyres, steering-rack or wheel-alignment problems (the latter perhaps the result of accident damage or kerbing a wheel, and also leading to rapid tyre wear), or maybe just an excessively small after-market steering wheel.

The Turbo had as standard the uprated tie-rod ends that became a popular modification on the naturally aspirated cars, with conventional steel ball-joints instead of rubber bushes, and this endows the steering with much more feel and precision. Even these joints can wear out, though, so be suspicious if there seems to be excessive looseness in the steering. Again they're cheap and easy to replace. Wheel bearings, too, can become noisy (a low rumble that increases in pitch with road speed), but again they're no more difficult to renew than in the 'lesser' 911s, particularly at the front – although the rears require a little more in the way of engineering.

If the 930 has one major problem in the running-gear department, though, it's the brakes. Earlier cars retained essentially the same system as the Carrera 2.7, with relatively small aluminium front calipers and cast-iron rear calipers, and frankly they were always marginal for a car with this performance, even when it was brand-new. Factor in 30 years of wear and tear, together with our modern expectations, and you've a recipe for disappointment, if not disaster. There wasn't even a servo until 1977 (1978 for right-hand-drive cars, and thus the first of the 3.3-litre models).

The 917-derived brakes fitted from 1978 on were a big improvement, but they're still not in the same league as modern systems, requiring a fairly hard shove to produce any significant effect, and they certainly never benefited from now commonplace refinements such as ABS.

It's crucial, then, to make sure that any 930 you buy has the best brakes possible – or to carry out a major overhaul yourself. Check the discs for the usual maladies: scoring, cracking (particularly round the cross-drillings), the blueing that comes from overheating, and the juddering pedal that suggests they've warped. Pads should have a good thickness of friction material left on them, and the fluid (and ideally all the hydraulic seals, too) should be changed every 24,000 miles or two years. Braided flexible hoses are a good idea, too, helping to reduce 'ballooning' under heavy braking and thus stiffen up the pedal.

Wheels and tyres

The standard 930 began life on Fuchs forged-alloy wheels, 7.0J x 15 at the front, 8.0J x 15 at the rear, and with 185/70 and 215/60 tyres. Sixteen-inch rims were optional from the start – with a slightly lower final-drive ratio to compensate for any change in gearing, and thus a reduction in standing-start acceleration – and these became standard equipment for 1977. In all cases the wheels' offset is increased to fill out the wheelarches with the aid of modest spacers.

A year later rear tyre pressures were raised from 2.4 bar to fully 3.0 bar in order to compensate for the slight rearward repositioning of the engine, which placed another 30kg over the rear wheels. By 1987 the standard rims were still 16 inches in diameter, but at the rear were now 9.0J items; the fronts were still 7.0J.

Check the wheels for scuffing, kerbing and corrosion – Fuchs rims can be expensive to have refurbished correctly, especially with colour-coded centres – and make sure the tyres are suitable in terms of size, make, tread pattern, and not least speed rating ('V' or 'Z', basically). They should also have at least 5.0mm of tread front and rear, or you'll be looking at buying a new set almost immediately. Uneven wear would suggest possible suspension-alignment issues, or maybe that the car has been driven hard on trackdays.

It's rare to see a 930 with anything other than the standard-style Fuchs rims, but you should obviously make sure (or seek advice on the matter) that any non-standard wheel (and especially if it's an after-market unit) is suitable. A good independent such as Russell Lewis at RSR Engineering should be able to advise (Russell is himself the enthusiastic owner of a 930), or you may be able to get help from a good wheel-and-tyre vendor such as Jasmine Porschalink in Lancashire (01282 697171). It's rare, too, that non-standard wheels will add anything to the car (and certainly not to its resale value), and so you might want to budget for a set more in keeping with both its age and character.

Wheel-balance problems, evident in steering-wheel shake, shouldn't be a major issue, but don't accept the vendor's possibly glib suggestion that it's just a weight that's fallen off. He may well be right, of course, but it may be because the wheel is bent – in which case the only effective answer is (for Fuchs rims, anyway) an expensive and possibly hard-to-find second-hand item.

No 930 ever came with a spare wheel, as such, but rather a collapsible so-called space-saver. Check that it's stowed in the front compartment, together with the battery-powered compressor to inflate it, and also that the car still has its basic toolkit – including the jack and wheel-nut wrench.

Interior and trim

You'll find few, if any issues inside the 930's cabin that you won't encounter in any of its naturally aspirated contemporaries.

Particular problems include the top of the dashboard, which cracks after prolonged exposure to sunlight, loose and/or water-softened door trims and pockets (look at the door check-straps, too; they can seize and/or break) and wobbly lower centre consoles. Carpets, seats and headlining can be quite scruffy by now – some of the cars are well over 25 years old – but can be replaced (at a cost) with second-hand items from another model or, if you don't mind the loss of your own car's originality, retrimmed in the materials of your choice. Given the interior decor of some of the earlier cars – tartan door cards and seat inlays spring to mind – this might even be said to improve them.

Make sure the electric windows (and sunroof, if fitted) work correctly, and try to assess the condition of the automatic heater control, down between the front seats. It's not the most reliable of units (but check the integrity of the sensor between the sunvisors; it's easily knocked and damaged), difficult (and expensive) to buy new, and scarce on the second-hand market. You might even find it has been replaced by the red-handled heat-control lever found in the earlier cars, and you could well end up doing the same.