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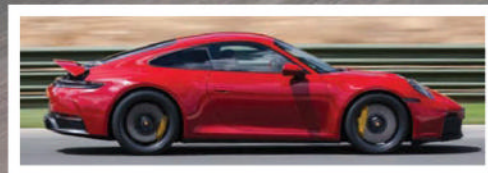
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This special edition of *911 & Porsche World* charts design and development of the 911 Turbo (930), now celebrating its fiftieth year as a production model following the prototype's grand unveiling in 1973. Across successive generations of force-fed 911s, power, style and road presence has been redefined time and again, setting the benchmark for what a sports car should be. Today, all but a handful of new 911s are turbocharged, but Porsche hasn't rested in its laurels, instead making use of innovative new ways of refining power from its boosted boxer engines, as demonstrated by the controversial new 911 Carrera GTS, a second-generation 992 boasting a hybrid motor for the turbocharger itself, a move

designed to refine the drive and all but eliminate lag, something the 930 was recognised for delivering until a massive thud in the back propelled the car into the horizon. Well, you don't earn a reputation for being a *widowmaker* for nothing.

Across the following pages, we explore various generations of 911 Turbo, getting behind the wheel of standout models for fresh appraisal. Was the 993 Turbo really best of the air-cooled breed? Was the 964 Turbo as good as *Bad Boys* made out? Let's find out.



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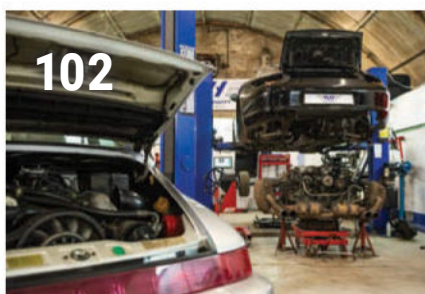
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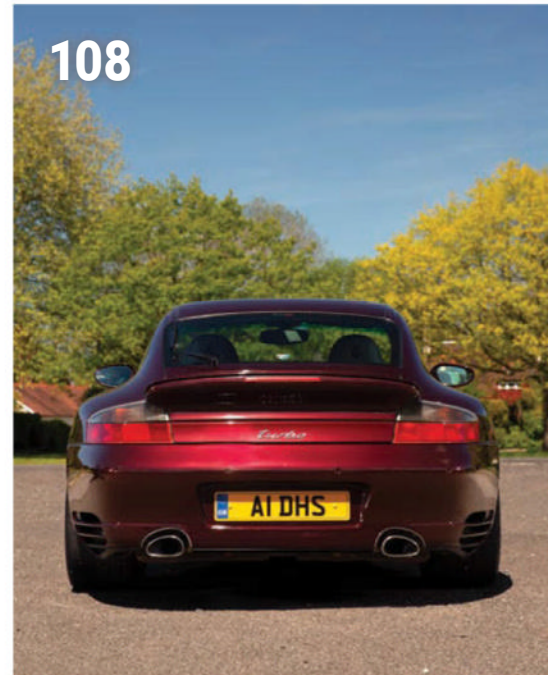
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50 YEARS OF 911 TURBO

SPEEDY SACRILEGE

Porsche's decision to do the unthinkable and turn the 911 over to hybrid power has been analysed, criticised and scrutinised ever since the decision was first announced. We finally have the chance to find out whether the move was inspired or insane...

Words **James Fossdyke** Photography **Rossen Gargolov**







Naturally, Porsche is adamant the new 911 Carrera GTS is an improvement on the previous-generation version of the same model, but with a fifty-kilogram increase in weight and an automatic gearbox as standard, marque enthusiasts might take some convincing of the car's merits. Although the manufacturer likes to promote the idea the new GTS is merely a facelift of the first-generation 992 Carrera GTS, changes under the newer 911's skin are more dramatic than the German company's nonchalance might suggest. First, there's the T-Hybrid powertrain, combining an all-new 3.6-litre turbocharged flat-six with an electric motor living inside the eight-speed PDK semi-automatic gearbox. There's an electrically assisted turbocharger, too. It's all designed to be as light and efficient as possible, reducing overall weight — the electric motor does the work of the alternator *and* starter motor, as well as powering the air-conditioning compressor, meaning there's no auxiliary belt. New solid roller cam followers serve to reduce frictional losses.

The small motor integrated into the turbocharger helps to spool the unit

ahead of time, reducing lag and thereby improving responsiveness. And what a response it is. The entire system works together to produce up to 533bhp and 450lb-ft torque, while the gearbox snaps through ratios to ensure there's barely a break in delivery. Output might amount to only sixty more ponies than that of the outgoing GTS, but it feels way meatier and much more visceral. So visceral, in fact, you don't really notice the hybrid system working away in the background. Or, at least, you wouldn't, were it not for the green indicator gauge whirring away in the instrument display. Incidentally, the motor spooling the turbocharger acts as a generator when off boost, feeding power back into the 1.9kWh battery (at up to 11kW).

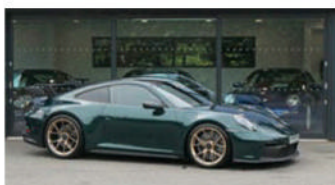
It's all very clever stuff, but it feels more like a sledgehammer than a precision instrument. Our test car was a Carrera 4 GTS and therefore all-wheel-drive, which makes quite a difference to accessibility of the available power. Factory figures suggest the rear-wheel-drive car is equally rapid, but comes with permanent fear pushing too hard on the exit of a corner will cause the tail to swing out. This is fine on a track — fun, even — but the all-wheel-drive GTS feels much more secure. You can push it at almost any moment, safe in the

knowledge the fourby system will do its best to counteract your yobbish side. The car will simply grip and go. Perhaps, in the hands of an expert, the rear-drive car is the faster and more exciting option, but if getting ready to tackle a wet country lane, we'd be dashing for keys of the all-pawed Porsche.

It's decidedly rear-biased, meaning it has more or less the balance of the rear-drive 911, and it isn't significantly heavier. The difference is fifty kilos, which is enough to push this Porsche car past the 1.6-tonne mark. Then again, the

Above The GTS's 3.6-litre flat-six delivers a triumphant 194mph





911 GT3 (992)

Jet Green Metallic • Black 918 Bucket Seats
PDK Gearbox • 20/21" Centre Lock Wheels
Carbon Roof/Upper Mirror Sections
Porsche Ceramic Composite Brakes
Front Axle Lift • 5,542 miles • 2022 (22)

£174,995



911 Carrera 2 (993)

Riviera Blue • Black Leather Sports Seats
Manual Gearbox • 18" Fuchs Wheels
Electric Sunroof • Body-Coloured Seat
Backs • Blaupunkt Bremen DAB Radio
86,515 miles • 1994 (M)

£89,995



911 Carrera 3.0

Minerva Blue • Tartan Seats
Sportomatic Gearbox • 15" Fuchs Wheels
Electric Sunroof • Original Radio
Previously Sold & Serviced by Paragon
33,984 miles • 1976 (P)

£89,995



911 Carrera 2 GTS (991.2)

GT Silver • Black Half-Leather Sports Seats
PDK Gearbox • 20" GTS Centre Lock
Wheels • Switchable Sports Exhaust
Sport Chrono • Previously Sold & Serviced
by Paragon • 8,889 miles • 2017 (17)

£84,995



911 GT3 (996.2)

Atlas Grey • Black Leather Sports Seats
18" GT3 Wheels • Air Conditioning
Cruise Control • Bi-Xenon Headlights
Previously Sold & Serviced by Paragon
38,697 miles • 2003 (53)

£82,995



911 Turbo (991)

Basalt Black • Bordeaux Red Leather
Sports Seats • PDK Gearbox • 20" Turbo
III Wheels • Sport Chrono • Previously
Sold & Serviced by Paragon • 22,883
miles • 2014 (14)

£79,995



911 Carrera 2 GTS (991.2)

Jet Black Metallic • Black Leather Sports
Seats • PDK Gearbox • 20" GTS Centre
Lock Wheels • Touchscreen Satellite
Navigation • Sport Chrono • Switchable
Sports Exhaust • 25,807 miles • 2017 (17)

£79,995



911 Carrera 2 GTS (997.2)

Platinum Silver • Black Half-Leather Sports
Seats • Manual Gearbox • 19" GTS Centre
Lock Wheels • Bose Sound System
Electric Sunroof • Switchable Sports
Exhaust • 42,712 miles • 2011 (11)

£76,995



Cayman GT4 (981)

Jet Black Metallic • Black 918 Bucket
Seats • 20" GT4 Wheels • Touchscreen
Satellite Navigation • Clubsport Package
Switchable Sports Exhaust • Sport
Chrono • 20,341 miles • 2016 (65)

£69,995



911 Carrera 4 GTS (997.2)

Meteor Grey • Black Half-Leather Sports
Seats • PDK Gearbox • 19" GTS Centre
Lock Wheels • Switchable Sports Exhaust
Previously Sold & Serviced by Paragon
41,420 miles • 2012 (12)

£67,995



911 Carrera 4 S Targa (997.2)

Carrara White • Black Leather Sports
Seats • PDK Gearbox • 19" Carrera S II
Wheels • Touchscreen Satellite Navigation
Sport Chrono • Heated Seats
43,039 miles • 2010 (10)

£49,995



Boxster S (981)

Carrara White • Black Leather Sports
Seats • PDK Gearbox • 19" Carrera S
Wheels • Touchscreen Satellite Navigation
Sport Chrono • Bose Sound System
18,292 miles • 2012 (62)

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extra bulk is only the weight of an Irish wolfhound. Not a drastic change, all told. It means the new Carrera 4 GTS is really no less agile than its rear-wheel-drive sibling, with the same razor-sharp nose streaking into the apex of a corner like a ballistic missile. It's almost to the point where however fast you think you can corner, the GTS will go in a little faster. And in the case of the Carrera 4 GTS, you can get on the power nice and early.

You can't do so without the assistance of clever engineering, though. Yes, the GTS's hybrid system grabs all the headlines, but the chassis is equally impressive, arguably more so. Standard 911 Carrera models already get Porsche Active Suspension Management (PASM), but the GTS gets a sportier set-up with firmer springs, revised dampers

and model-specific anti-roll bars, a configuration designed to cope with the extra weight of the hybrid system. Additionally, the GTS models get an extra helper spring on each rear corner, a change Porsche says promotes more contact with the road. In the case of the GTS Coupe and Cabriolet models (but not the Targa), ride height is lowered ten millimetres (when compared with the new 911 Carrera).

Furthermore, Porsche has uprated the optional ceramic brake kit, providing even greater stopping power by way of new ten-piston front calipers loaded with discs ten millimetres larger in diameter than what came before. At the back, discs have grown by twenty millimetres. The wheels have grown, too, with wider tyres wrapped around the 11.5-inch-

wide Anthracite-finished alloys. This is helpful because those rear tyres also do some of the steering as standard, which is a change from specification of the previous GTS.

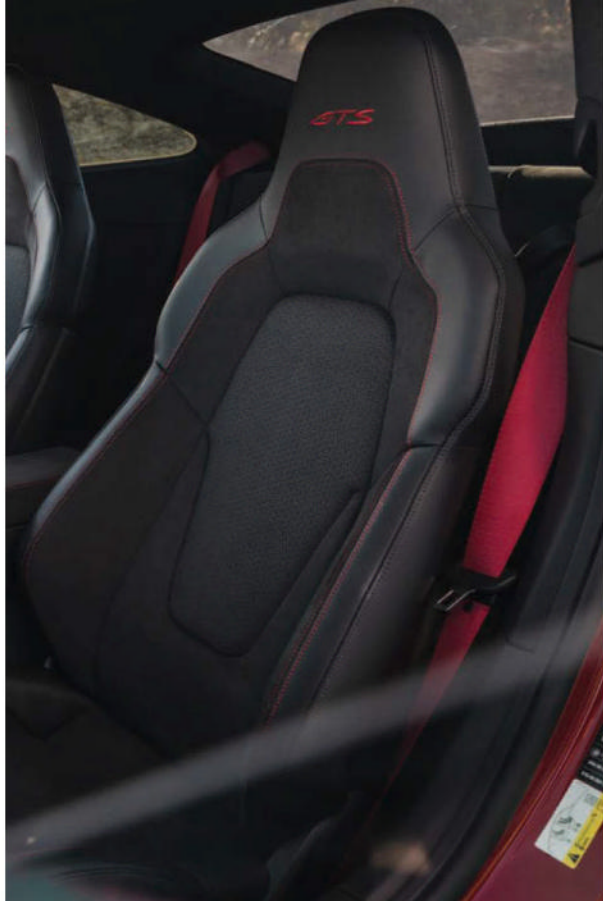
The result of all this, combined with the standard Sport Chrono Package (including launch control), is a car considerably faster than its predecessor. From a standing start, both the new Carrera GTS and the Carrera 4 GTS will get to 62mph in three seconds flat, which is four-tenths faster than the earlier model. Flat-out, the two will both reach 194mph. Perhaps the best demonstration of the difference between the new and old cars is in their Nürburgring lap time, where the new GTS monsters its predecessor. Plenty will say laps of the Nordschleife mean little

Above Though the GTS uses T-Hybrid technology, most drivers won't be aware it is at play

TECH SPEC

Model	911 (992 Gen II) Carrera 4 GTS
Price	From £139,100
Powertrain	3.6-litre turbocharged flat-six petrol with 40kW electric motor housed in eight-speed semi-automatic transmission
Economy	25.4-26.9mpg
CO ₂ emissions	239-251g/km
Top speed	194mph
Power	534bhp at 7,500rpm
Torque	457lb ft at 2,000rpm
0-62mph	3.0 seconds
Weight	1,645kg (DIN)
Length	4,553mm
Wheelbase	2,450mm





Above Thanks to colour-coded stitching and non-standard materials, such as Alcantara and Race Tex, GTS interiors have long been a highlight of the 911 range

to showroom customers, but a time of 7:16.934 is incredible — it's almost nine seconds quicker than the best lap time achieved by the first-generation 992 Carrera GTS, and less than four seconds slower than the 918 Spyder on the same benchmark test.

Get the new GTS on a track, and it's easy to see how that impressive 'Ring time was achieved. Yes, acceleration and straight-line speed are impressive, but the way this 911 corners is even more striking. Perhaps this is the

way it should be in a GTS, but as a result, Porsche is going to have to have to make the next GT3 better than ever — not

its stiffness and its comparatively low weight, but our test car was aided by something called active roll stabilisation,

which is part of the Porsche Dynamic Chassis Control (PDCC) system. It won't be available on customer cars until November, and it'll be an optional extra when it does

THERE'S A NEW TOUCHSCREEN WITH MORE CONNECTIVITY FEATURES THAN THAT OF THIS 911'S PREDECESSOR

only is the GTS's turn-in spectacular, but balance in corners is unbelievable. And it feels 'adjustable' when you're going through the bend. You can tuck in, rotate the car, push it out at the other side, all of it eminently controllable and composed.

The steering is brilliantly judged, and the fact you can feel rear-wheel steering tucking the car into the corner at low speed, as well as trying to keep it stable at high speed, is testament to how much feedback this 911 gives you. There's feel through the brake pedal, too, even if you go for the ceramic system, which is traditionally less easy to modulate than its steel counterpart. We had no problem at all. The power in these anchors is spectacular, particularly on big stops into hairpin bends. We got plenty of heat into the tyres and brakes, though, particularly on the technical Ascari circuit.

More impressive than all of the above, however, is the body control on show. This Coupe version of the GTS is the one you want for track use, thanks to

arrive, but it works brilliantly, keeping the body almost completely flat through even the fastest corners. With the sportiest suspension setting activated, this add-on is utterly spectacular, providing even greater stability through every phase of a bend.

Naturally, this comes with a trade-off. As with the old GTS, the ride is stiffer than that of the standard Carrera, even in the softer suspension settings. We have a suspicion the ride is better than before — the old GTS was a bit too stiff for UK road use — but considering the fact we only had the chance to drive on this new 911 at a track and on surrounding (smooth) Spanish roads, we can't say for certain (yet). Even so, we found it jigglier than the stock Carrera, and the sport mode delivers a notably firm ride on the public highway. It's best to leave it for circuit use.

As a trackday car, then, the new GTS makes a lot of sense, providing you can cope with the new look. Yep, Porsche





has installed clever aero devices to the GTS's front bumper, effectively channelling cooling air to the brakes and powertrain only when required, thereby reducing drag, but the black plastic vents are a challenging aesthetic. Otherwise, the image is broadly similar to that of the old GTS, with dark alloys and black lettering, all of which suit the dark Carmine Red paintwork of our test car rather nicely.

BLINK AND MISS

Inside, the tweaks are equally minor. Like the standard Carrera, the new GTS Coupe has no rear seats as standard, but they can be added as a no-cost option. Not that anyone larger than a child will be remotely comfortable back there. Up front, though, Porsche has wrapped pretty much everything in its Race-Tex microfibre upholstery, and there's a new digital instrument display replacing the old half-and-half system. We liked the analogue rev counter, but the newer setup is designed to avoid the steering wheel preventing you from seeing the outermost 'dials' on the digital display.

Equipment is more or less the same as before, with dual-zone climate control, a reversing camera and part-leather, part-Race-Tex upholstery as standard. There's a clever new touchscreen with more connectivity features than that of this 911's predecessor. Porsche is also now including a drive mode switch as standard on all cars, but those with the Sport Chrono Package (standard

on the GTS) get a red Sport Response button and a more premium dial, which goes some way toward demonstrating the fastidious attention to interior engineering evident on the second-generation 992. Just as well, because the GTS is getting more expensive. Little more than twelve months ago, you could get your hands on a first-generation 992 Carrera GTS for less than £120,000. The new arrival starts at £132,600. And if you want the Carrera 4 GTS, you're looking at a price tag nudging £140,000. Yes, it's a lot of money, but this is a hell of a lot of car. And when the stock Carrera is barely under £100,000, few customers are going to be too worried about the price hike. The bigger barriers to buying the new GTS are the lack of manual

gearbox, the looks and the inclusion of hybrid technology. While the first two of those are genuine concerns, you'll barely notice the hybrid system's electrification, at least not in terms of engagement and sound. What you *will* notice is the impact on performance, which is stellar. Yes, perhaps the Coupe is a bit too firm for UK road use, but if track days are your thing, you're going to absolutely love this 911. Choosing between the Carrera 4 GTS and the rear-drive model will come down to taste — the latter is more wayward, while the all-wheel-drive car is more stable in wet weather. Both will be fantastically good fun, and it's no surprise to see the new GTS wipe the floor with its predecessor at the Nürburgring. ●

Above and below
Challenging aesthetic includes not only 'goofy' bumper intakes, but also an announcement the powertrain makes use of hybrid tech





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THE BULLETIN

News from the world of Porsche

EXCLUSIVE ANNIVERSARY MODEL TO MARK FIFTY YEARS OF 911 TURBO

To commemorate the fiftieth anniversary of the 911 Turbo, Porsche is launching an exclusive anniversary model in the form of the 992 Turbo 50 Years. The interior and exterior evoke historic 911 Turbo models, complemented by timelessly elegant and contemporary styling elements. An optional Heritage Design Package further refines the aesthetic of the anniversary model. Porsche has limited the 911 Turbo 50 Years, which is based on the 992 Turbo S, to 1,974 units in honour of the year in which the series 911 Turbo (930) made its debut.

When introduced in 1974, the 930 shifted the boundaries of what was possible from a road-legal sports car. It brought the benchmark turbocharging technology from the 917/10 and 917/30 race cars into a production sports car, affording it superior performance combined with a unique design and unprecedented day-to-day usability from a car of its ilk. The 911 Turbo 50 Years anniversary model pays tribute to and reinterprets this heritage. For example, standard side vinyl graphics are a nod to the historic livery of the RSR Turbo presented at the Frankfurt Motor Show in 1973, itself a forerunner of the 911 Turbo. It features the current Porsche Turbo-exclusive colour Turbonite, which here makes its first appearance on a 911. Turbonite is also used on inlays in the rear engine cover, the fuel tank cap and in the Porsche crest. It is also being used as a contrasting colour in the identifying model logo.

Another historical reference is the use of Anthracite Grey on the rear wing blade, rear apron, mirror base and air intake trims. A badge on the rear engine cover grille features a turbocharger icon and the years 1974–2024. When a door is open, an LED arrangement



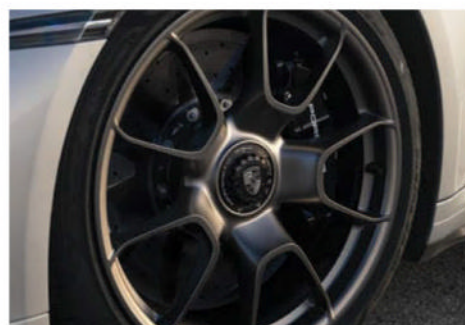
projects the image of a turbocharger onto the ground. Incidentally, the 911 Turbo 50 Years comes with the 911 Turbo S Exclusive Design wheels in Turbonite as standard.

SPEED AND STYLE

The interior of the 911 Turbo 50 Years is also redolent of Turbo history. As an exclusive tribute to the early 930, iconic McKenzie tartan adorns the centre panels of the seat covers and the interior door panels. Additional contrasts in Turbonite further differentiate the car from the regular 992 Turbo S series-production model. These Turbonite accents include the seat belts, controls, decorative stitching, trim strips (with decorative inlays in black leather) and the Porsche crest on the GT sports steering wheel. An illuminated Turbo 50 logo, meanwhile, features on the door kick plates, which are finished in black brushed aluminium.

The logo is embroidered into the headrests of the Adaptive Sports Seats Plus. There is also a Turbo 50 logo on the back of the left rear seat. Above the glove compartment is an anniversary plaque in aluminium, which bears both the Turbo 50 logo and the individual limited-edition number of the car. The A-pillar, sun visors and roof lining are upholstered in perforated Race-Tex. An analogue Porsche Design 'Subsecond' clock features a special Turbo 50 design and adorns the dashboard.

The historically inspired, optionally available 50 Years of Turbo Heritage Design Package complements the anniversary model with numerous additional exclusive design and equipment features harking back to the 911





Turbo models of the 1970s. The base colour of the Heritage Design Package is Aventurine Green Metallic. Alternatively, standard 911 colours and Paint to Sample programme colours are also available. One component of the Heritage Design Package is a high-quality decorative graphic in white (satin finish) consisting of three elements: the lollipop with individually selectable car numbers between zero and ninety-nine, the 50 Years of Turbo logo and Porsche script. Those who prefer a minimalistic look can dispense with some or all of the graphic elements.

The historic Porsche crest (1964 edition) is used on the front bonnet, as well as on the centre caps of the Sport Classic wheels, painted in Brilliant Silver and white (satin finish). The Turbo 50 and Porsche logos on the rear are finished in Gold. Inside this edition of the car, additional leather and extra tartan make themselves known — the dashboard trim, glovebox and seat backrest inlays are covered with the striking fabric. The historic Porsche crest is mounted on the steering wheel, while the centre console storage compartment bears the Porsche Exclusive Manufaktur logo



embossed in leather. The dials in the instrument cluster and the Sport Chrono clock in the Heritage Design Package are finished in green, a nod to the 356 and 911s of yesteryear.

The 911 Turbo 50 Years is based on the 992 Turbo S, which has been in production since 2019. The model's 3.7-litre boxer engine with variable turbine geometry (VTG) twin turbocharging delivers close to 650PS and 800Nm of torque. With kerb weight of 1,640 kilograms, the result is a power-to-weight ratio of 2.52 kg/PS. The 911 Turbo 50 needs just 2.7 seconds to complete the sprint from rest to 100km/h (62mph) and hits 200km/h in a mere 8.9 seconds. Power is transmitted to the wheels by an eight-speed dual-clutch PDK semi-automatic transmission and active all-wheel-drive Porsche Traction Management (PTM) with Porsche Torque Vectoring Plus (PTV Plus), including an electronically controlled rear differential lock with fully variable torque distribution. A sports exhaust system with black

tailpipes comes as standard. The ten-millimetre-lower Porsche Active Suspension Management (PASM) sports suspension and lift system on the front axle are also included as standard, as are the LED matrix headlights, including

Porsche Dynamic Light System Plus. The brake calipers are black, but are part of a Porsche Ceramic Composite Brake (PCCB) system.

Exclusively for the owners of the 911 Turbo 50 Years, Porsche Design Timepieces is releasing a special wristwatch as an homage to the anniversary model. The 911 Turbo 50 Years chronograph is equipped with the COSC-certified Porsche Design WERK 01.200 movement with flyback function. Like the car, the watch is limited to 1,974 units and combines classic design with modern technology. Its black dial with elements in Turbonite is a perfect likeness of the clock on the car's dashboard. The strap, made of black vehicle leather with decorative stitching in Turbonite, features a folding clasp. Orders are now open. Contact your nearest Porsche Centre.

MCKENZIE TARTAN ADORNS THE CENTRE PANELS OF THE SEAT COVERS AND THE INTERIOR DOOR PANELS



COUPLE HEAD TO ALL 238 RNLI LIFEBOAT STATIONS IN THEIR 991 CABRIOLET

As we were sending this issue of *911 & Porsche World* to press, a married couple in a 991 are attempting to travel around the coast of the UK and Ireland in 911 hours, visiting all 238 lifeboat stations of the Royal National Lifeboat Institution (RNLI) in a bid to raise money for the charity, which saves lives at sea.

Londoners, Belinda and James Richardson, started their mammoth 8,500-mile journey at Morecambe Lifeboat Station in Lancashire and hope to finish at Peel Lifeboat Station on the Isle of Man at 9:11am on Monday 30th September. The couple are taking on the challenge (for a second time) in recognition of the RNLI's two-hundredth anniversary year. To date, they have raised £83,000 for the charity and are now hoping to raise enough money to fund a D-class inshore lifeboat, recognised for being the workhorse of the RNLI.

James and Belinda's challenge will see them visit every lifeboat station, covering the coast of Ireland, Shetland, Orkney, Outer and Inner Hebrides, the Isle of Man, Isles of Scilly, Isle of Wight, Alderney, Guernsey and Jersey, as well



as the whole of mainland UK. "We live on the Thames are fortunate to have four nearby RNLI lifeboat stations. I've always wanted a Porsche, and when James and I saw an episode of the BBC series, *Saving Lives At Sea*, we decided to drive around Britain and call into a few lifeboat stations on the way. We followed the same route our current challenge is taking us and made it to the finish line with seven minutes left on the clock. We're now aiming for a personal best of at least eight minutes ahead of our target."

The D-class inshore lifeboat Belinda and James are funding will be named *911 Challenge* and will be part of the RNLI's relief fleet, meaning it could be used to save lives at sea anywhere around the coast of the UK and Ireland. Similarities between the 911 and the D-class are part of the couple's inspiration behind the project — both models were launched in 1963, both have their engines at the rear, and Belinda and James' 991 is finished in a similar colour to that of an RNLI lifeboat.

"We are hugely grateful to Belinda and James for taking on this huge challenge and look forward to welcoming them at all of our lifeboat stations around the coast," says Jayne George, the RNLI's Director of Fundraising. "We are only able to save lives at sea thanks to the generous

support of people taking on challenges like this. We are honoured Belinda and James have decided to raise even more

THEY ARE HOPING TO RAISE ENOUGH MONEY TO FUND A D-CLASS INSHORE LIFEBOAT, THE RNLI'S WORKHORSE

money for the RNLI than they already have, with the specific focus of funding a brand-new D-class inshore lifeboat. In 2023 alone, D-class lifeboats saved ninety-six lives and helped 2,028 other people in difficulty. Belinda and James, not to mention their Porsche 911, will help continue this lifesaving legacy."

911 & Porsche World readers keen to contribute to the cause are encouraged to visit rnli-911challenge.co.uk, where they can find out when Belinda and James are passing through each town and make a donation to this hugely worthwhile effort. Regular progress reports can be found on Instagram at [@rnli_911_challenge](https://www.instagram.com/rnli_911_challenge).



'Brightling'



Despite its 10.95mm height, the Trident C60 Pro 300 'Lumière' leaps from your wrist. (Just like it jumped off this page.) Its brightness results from proudly protruding indices and the logo they encircle. Featuring facets finely machined to tolerances of 0.03mm, these mini-monoliths are super-legible in daylight. But it's the Globolight®, the unique luminous ceramic from which they're hewn, that produces their astounding, super-brilliance at night. And inspired this timepiece's name. The light show doesn't end there. Carved from titanium, the 41mm case incorporates a second sapphire crystal displaying its super-accurate movement. But it's not the back of this beautiful tool watch you're buying into. Is it?

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ESSENTIALS

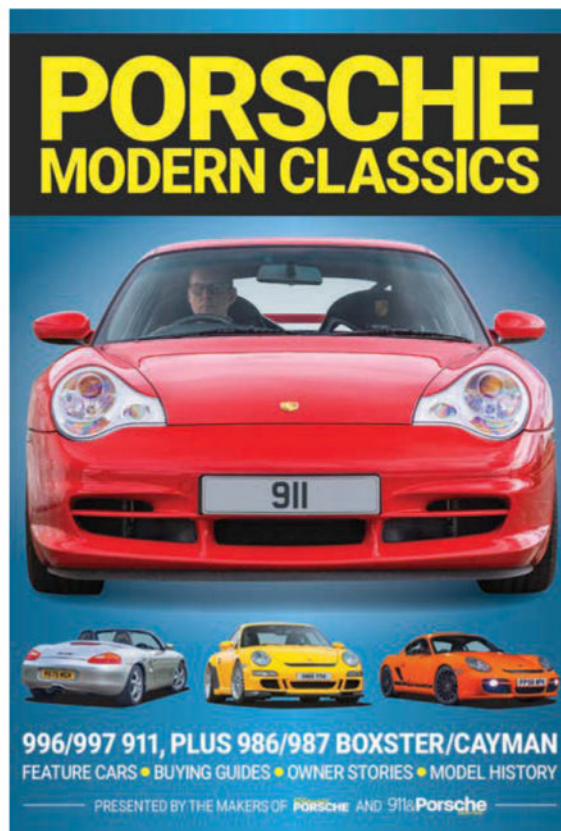
Hot new products for you and your Porsche...

NEW PORSCHE MODERN CLASSICS BOOKAZINE

New from the team behind 911 & Porsche World magazine comes this 164-page celebration of the 996- and 997-generation 911s and their Boxster/Cayman 986/987 counterparts. We chart the design and evolution of this hugely popular range of Porsches, going on to examine the long-lasting impact these cars have had on all subsequent Porsche products, not to mention the sports car world as a whole. Along the way, we get behind the wheel of standout models, delve into owner stories, explore ground-breaking engineering and show you what to look out for when on the hunt for an early water-cooled 911 or Boxster/Cayman to call your own. Essential reading for marque enthusiasts, this beautifully presented bookazine comes hot on the heels of our successful *Porsche Air-Cooled Classics* title and can be ordered at the link below.

Price: £9.99

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LAPLAND ICE DRIVING EXPERIENCE PACKAGES

There are many extremes in life — ice driving is certainly one of them. Ice driving in a supercar on a three-thousand-acre frozen lake in Swedish Lapland? That's another level of extreme. Lapland Ice Driving defines adventure, offering thirteen circuits (five of them taking the form of full-size F1 tracks, including Silverstone Circuit) on which you can reach speeds of up to 200km/h. Imagine drifting in complete safety across a frozen lake for up to eight hours each day, accompanied by your own professional in-car instructor. Imagine being in control of a Lamborghini Huracan, a Ferrari 296 GTB or, of course, a 911. Perhaps a 992 GT3? Tailor your perfect ice driving package at the Lapland Ice Driving website.

Price: Varies

lapland-ice-driving.com or call 01473 280262



NEW IRMLER WHEELS FOR 964/CARRERA 3.2

A leading light in Germany's historic motorsport scene, Irmeler Racing produces high-quality, individual sports car components not only suitable for demanding active sport drivers, but also capable of thrilling collectors looking for something unique. Enter the brand's new range of wheels suitable for air-cooled 911s. Kicking off proceedings is this fantastic-looking wheel for the Carrera 3.2 and 964. Named IRM-GTR12, this seventeen-inch 'pepperpot' is manufactured with modern CNC machines for precision and low weight. Analysis with special dynamic calculation software, followed by extensive bench testing to check wheel loads and stability, ensures peace of mind for buyers, who can choose from a wide variety of width and offsets — IRM-GTR12 widths range from seven inches all the way to ten and a half, thereby suiting 'staggered' fitment. The choice of offsets span ET8 through ET55. As you'd expect, each wheel features a 5x130 stud pattern and can be ordered in a range of colours to suit the host 911. Irmeler Racing is no stranger to wheel design and manufacturing, and the IRM-GTR12 looks set to be a big hit.

Price: 9x17-inch ET42 €1,499, 11x17-inch ET28 €1,640

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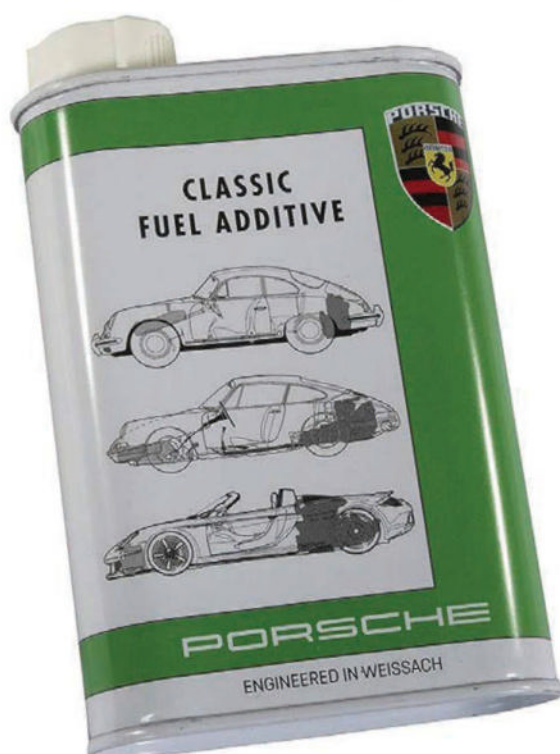


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True strength comes from within, particularly when it comes to classic Porsches — it is extremely important to keep an eye on what is happening to the mechanical components of these valuable cars. For example, when not used on a regular basis, such as during winter storage, the condition of fuel is something to be considered. Enter Porsche Classic's fuel additive, forming a protective layer between metal and petrol, thereby protecting the tank and fuel system against corrosion and harmful deposits. The specially formulated additive even shields areas not covered by fuel, including the air zone within the fuel tank. Special molecules in the additive form a corrosion protection layer throughout the fuel system, thus ensuring condensation already formed in the fuel system is bonded by the chemical elements and does not cause any damage. Additionally, the additive dissolves already formed deposits and adhesions, proved by the results of several long-term tests in collaboration with the Porsche Development Centre in Weissach. A number of experiments to determine the compatibility of Porsche Classic's fuel additive with materials used to manufacture new Porsche Classic Genuine Parts was also successfully carried out. The 300ml of additive supplied in the container is sufficient for fuel tanks ranging from fifty to ninety litres and remains effective in stationary vehicles for up to seven months. Look for part number 00004420602 (the US variant is listed under 00004420622).

Price: £16.14 / \$21.48

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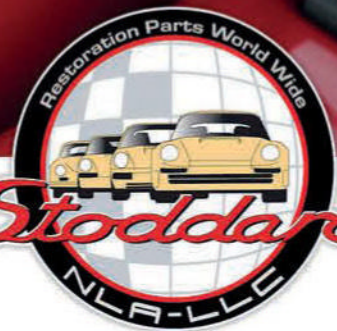
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Price: Varies

techart.de or tech-9.co.uk



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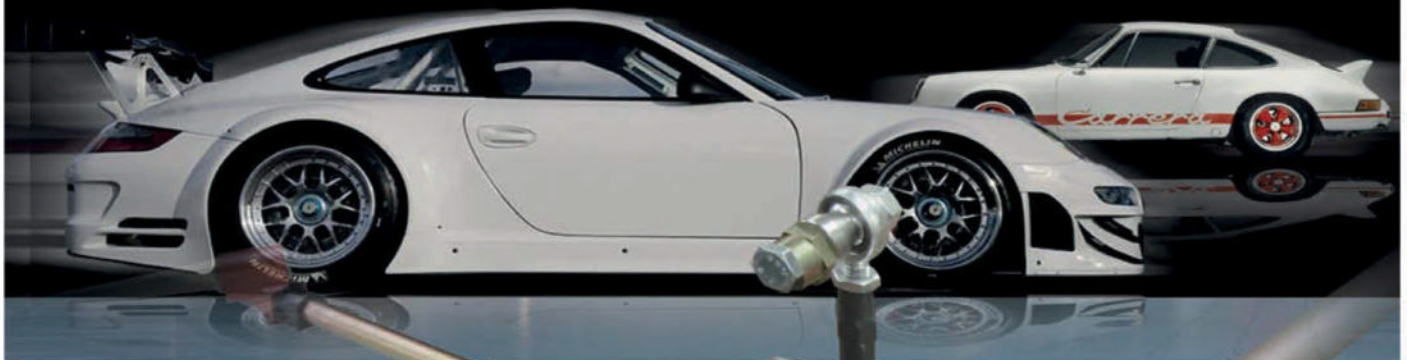
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Tom Vagi is founder of Seacoast Specialist Cars, a New Hampshire-based independent Porsche specialist carrying out repair, maintenance, servicing, sales and restoration. He is a Master Technician, lifelong Porsche enthusiast and Technical Chair for the local chapter of PCA. Visit sscarsnh.com



Twenty five years ago, I was working at a Mercedes-Benz/BMW dealership in Southern Connecticut. Considering I was from a small town in northern New York, Connecticut was a car enthusiast's mecca. I was fully immersed in Mercedes products, but another brand stood out: Porsche. Back then, sitting at the top of my bucket list was the 993 Turbo. I'd only read about the model, never seen one in the metal. One day, the dealership took a 993 Turbo in on trade. I can vividly remember staying late after work just to look at this 911. Nobody was allowed to take it on test drives. I hit the road in many expensive cars (S600s, SL600s, BMW Z8s and so on) with customers during this time, but this 993 Turbo was reserved for only the most serious of buyers. As a twenty-three-year-old certified car nut, the closest comparison I can think of is running into your favourite superhero at the shopping mall. It was unbelievable.

When Editor Furr mentioned this issue centred on the fiftieth anniversary of the 911 Turbo, many thoughts crossed my mind, but they can be distilled down to what every kid who has a poster of a Porsche on their wall thinks about the brand: just mention the 911 Turbo in any of its forms and the conversation suddenly

becomes serious. A mythical creature, like a dragon. From the 930 to the 992 GT2 RS, all 911 Turbos are amazing. The top, bar none. We all feel an emotional pull to these cars, but what's most important is their significance in our world.

The 911 Turbo has always represented top-of-the-line for Porsche products. Even within the rarefied air of GT cars, where the GT2 RS remains the wildest example of the breed, Turbos reign supreme. They are always at the limit of automotive achievement, a showcase of what Porsche can do. And we love them for it.

As we all know, the story began with the 930 back in 1974. Up until this point in time, Porsche had always made very logical — almost sensible — sports cars. Sure, they were fast, but they were also practical. They were simply and efficiently designed, as well as being built very well indeed. These were sensible cars built by sensible engineers and sensible designers. Then the 930 came along, changing the world's view of Porsche. From the savage power delivery to the wide hips, the *widowmaker* remains unmistakably unique.

Each subsequent Turbo car Porsche created was not just marginally better than its normally aspirated counterpart, it was much faster and often better looking. Take the 930, for instance. When introduced in 1975, the 911 S was making

a mere 173 horsepower. The Turbo? 256, representing a forty-eight percent increase in output. So much power, in fact, the Turbo body was born, a style we all promptly fell in love with — while the wide hips of the 930 were an engineering necessity to try to keep all of the extra horsepower and torque planted to the road, the great look, especially when joined by the 911 Turbo's giant rear spoiler (needed to house the intercooler), blended together to make the 911 look mean, but somehow professional. This was serious business.

Even through the SC and Carrera 3.2 years of the 911, the Turbo remained leagues ahead, certainly in terms of power and looks. In fact, the aesthetic of the 930 was so desirable, Porsche added the availability of the M491 Turbo Look package to those who weren't able to acquire the real deal. As time went on, and when the 964 Turbo finally got an engine of its own (the force-fed version of the 3.6-litre M64 flat-six), the performance gap between Turbo and non-Turbo was maintained, delivering approximately forty-two percent more power than the standard models, only now with much better suspension and a chassis allowing all that power to be used more comfortably. While the Will Smith movie, *Bad Boys*, certainly didn't hurt the popularity of the 964 Turbo, it did just fine on its own.

If previous Turbos hadn't already set the bar, the 993 Turbo certainly did. With around four hundred horsepower and permanent all-wheel drive (a first for the 911 Turbo), this ballistic air-cooled monster boasted a sub-four-second zero-to-sixty sprint time. In today's sports car world, this is quick, but thirty years ago? It was more or less unheard of for a production car. And the looks! Well, put it this way, there were a lot of posters. As an aside, the *Kills Bugs Fast* poster hangs in my office as I write these words.

When the water-cooled 911 arrived, the power race continued, thereby keeping the 911 Turbo at the top of dream drive lists penned by Porsche enthusiasts. From the 996 Turbo to the 992 Turbo S, the lineage is unmistakable.

Sometimes, it's not a bad thing to meet your heroes. As I discovered on that special day twenty-five years ago, they may be even better in person. Long live the 911 Turbo. It's an automotive reminder you gotta have goals. ●



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1969 Porsche 912 Coupe 5-Speed #17690

This 1969 Porsche 912 Coupe 5-Speed featured with matching numbers. Finished in its factory color Sand Beige (6807) exterior perfectly complemented by a tan interior. Equipped with 5-speed manual transmission, flat-four engine, and Solex dual carburetors. This 912 is a great find that has been cherished by the same owner since 1989 and is mechanically sound.

For \$56,500



1995 993 Carrera Cabriolet #16885

This 1995 Porsche 993 Carrera Cabriolet that is finished in Blue Turquoise complemented with a Marble Gray interior. Equipped with a Tiptronic transmission, 6-cylinder engine, four vented disc brakes, VDO instrumentation and dual exhaust outlets. This extremely attractive 993 Carrera Cabriolet that is ready to be enjoyed and is mechanically sound.

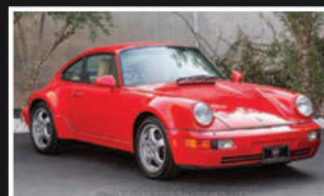
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1973.5 Porsche 911T Targa #17274

This 1973.5 Porsche 911T Targa featured with matching numbers and finished in its special order factory color Gemini Metallic Blue (335) and a Black interior. Equipped with a 5-speed manual transaxle and a fuel-injected 2.4-liter Flat-six engine. If you're in the market for a classic car with timeless style look no further than this Long-hood 911 that is mechanically sound.

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1994 964 Carrera 4 Widebody 5-Speed #17572

This 1994 Porsche 964 Carrera 4 Widebody Coupe 5-Speed featured with merely 36,698 miles on the odometer. Finished in its factory color Guards Red (G1) combined with a tan interior. This particular model is one of only 267 Widebody "Turbo-Look" examples ever produced. This limited-production factory Widebody air-cooled 964 that is mechanically sound.

For \$169,950



1989 Porsche Carrera Cabriolet #17471

This 1989 Porsche Carrera Cabriolet featured with matching numbers. Finished in its factory special order color Silver Metallic and a Cashmere Beige interior. Equipped with a 5-speed G50 manual transmission and a 3.2-liter air-cooled flat-six engine. This air-cooled Porsche Carrera is a great find that is mechanically sound.

For \$48,500



1990 Porsche 928GT 5-Speed #16534

Presenting this 1990 Porsche 928GT 5-speed featured with 45,197 miles on the odometer and finished in its factory color Slate Grey Metallic complemented with a Grey interior. Equipped with a 5-speed manual transmission and a V8 engine. An extremely sought-after and well-equipped 928GT 5-speed that is mechanically sound.

For \$49,950



1964 Porsche 356C Coupe #17527

This 1964 Porsche 356C Coupe featured with matching numbers that is finished in silver with a black interior. Equipped with an air-cooled 1.6L Flat-four engine, paired with a 4-speed manual transmission for an exhilarating driving experience. A Reutter-bodied 356 Coupe is a great find that deserves a place in your collection and is mechanically sound.

For \$63,500



1985 Porsche Carrera Coupe #17534

This 1985 Porsche Carrera Coupe featured with matching numbers. Finished in its factory color Grand Prix White (908) with a Black interior. Equipped with a 915 5-speed manual transaxle, an air-cooled 3.2-liter flat-six and single exhaust outlet. This is an excellent opportunity to acquire a highly desirable air-cooled Carrera 3.2 Coupe that is mechanically sound.

For \$59,950



1966 Porsche 912 3 Gauge Coupe #16872

This 1966 Porsche 912 3 Gauge Coupe featured with matching numbers and finished in Signal Red gracefully complemented with a matching color interior. This Karmann-built body Porsche is equipped with a manual transmission, flat-four engine, Solex dual carburetors, four-wheel disc brakes, VDO instrumentation and single exhaust outlet. An extremely collectible 912 3 Gauge Coupe that is ready to be cherished and is also mechanically sound.

For \$46,500



1986 Carrera Super Sport Cab Turbo-Look M491 #17610

An exceptionally rare 1986 Porsche Carrera Super Sport Cabriolet M491 "Turbo-look" Right-Hand-Drive featured with matching numbers and 28,400 miles on the odometer. Finished in its factory color Silver complemented with a sleek Black interior. This particular Porsche Super Sport Cabriolet M491 is a standout among its peers, as it is one of only 26 ever produced. An excellent opportunity to acquire such an exclusive Super Sport Cabriolet that is mechanically sound.

For \$119,950



1989 Porsche Carrera Coupe #17105

This 1989 Porsche Carrera Coupe featured with matching numbers and finished in its factory color Black Schwarz (700) combined with the same color interior. Comes with a 5-speed G50 manual transmission, a 3.2-liter air-cooled flat-six engine, four-wheel disc brakes, single exhaust outlet and VDO instrumentation. If you're in search of a classic Porsche then look no further than this highly collectible air-cooled Porsche Carrera that is mechanically sound.

For \$86,500



1974 914 2.0 LE Can Am Creamsicle #16963

Presenting this limited-edition 1974 Porsche 914 2.0 LE Can Am Creamsicle featured with 2 tops and finished in its factory color Light Ivory and Phoenix Red complemented with a Brown interior. This Creamsicle is equipped with a 5-speed manual transmission, fuel-injected 2.0L flat-four engine, and a 50th-anniversary tool kit. An excellent opportunity to acquire an exclusive 914 Limited production Creamsicle that is mechanically sound.

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KARL MEYER

Arrival of the second-generation 992 has brought fresh excitement to the 911 scene, not least what this means for the next round of GT Porsches, but why is our favourite manufacturer producing many more cars than it can sell? And what does this mean for values?

Karl Meyer is a UK-based independent Porsche buyer advising OPCs and independent specialists. Buying everything from 986s to Carrera GTs, his is a trusted name in the space of moving off-market and premium Porsches. If buying, selling or part exchanging, call Karl first. Visit theporschebuyer.com



Regular readers of my contributions to this magazine will know exactly what to expect. Each month, across a few hundred words, I don't pull any punches, giving you access to quality information, secrets and insights many operators in the Porsche marketplace trade seldom wish to expose to the car-buying public. My aim is to equip the Porsche enthusiast community with a competitive advantage, enabling buyers and sellers to make safe, educated decisions. This month, I want to answer a wider spread of queries than usual — September presented me with a big data dump, providing controversial industry insight I've wrestled with putting into words.

Let's jump straight into the big topic of 992 GT3 RS sales. With some thirty cars currently available on the UK market, there's plenty to choose from. Average days in stock is more than sixty — last quarter, I calculated an average depreciation of two thousand pounds a week. A year into the product's lifecycle, this hit is half-normal, but with the 992 GT3 RS demanding the highest price tag ever commanded by the badge in dealer showrooms, not to mention a

change of government and observers waiting to see what the outcome and impact of the forthcoming US election will be, dealers are twitchy. The corporate model is to reduce the amount of stock held if it goes 'over age', but the mind-bender for me is this: consider prices starting at £239,000 and then ask yourself when you've ever seen RS prices at parity to list within a year? Never, for a generation, at least. In fact, the first-generation 991 GT3 RS (now nine years old) is commanding £140,000. This model was £155,000 new. This is a concern to those of us who monitor this stuff.

Why? Historically, we predict (with data) RS prices will bottom out at list. Not so anymore. In August, a Weissach-kitted 992 GT3 RS transacted publicly at £271,000, including fees. And whilst I think that was a lucky anomaly, I moved the same model, just days later, for just under £300,000. This is pertinent because I'm convinced there needs to be fifty grand between a Weissach car and standard. These sale prices suggest we will see non-Weissach Rennsports below list price soon enough.

What's selling well? My team thinks the 992 Carrera GTS is a bargain at £100,000. Apparently, so do you. These 911s fund well,

which is significant. Having been hovering between £140,000 and £165,000, the 992 GTS is a brilliant 911, feels brand-new and is now better value than ever. 981s are also doing very well.

Many of you are looking for the next no-brainer. Prices of normally aspirated Caymans and Boxsters seem crystallised and could represent depreciation-free motoring for between six and twelve months, if you buy smart. This leads into what's selling. Generally speaking, in the current climate, the only thing to make a 911 depreciate is a new 911. With the second-generation 992 now on sale, we expect a small but significant book drop (up to thirteen percent) on the second-gen 991 and the first-gen 992. Due to the fact the wider market is not the best right now, many of you have correctly asked if you should hold off until spring 2025. For the two models I've just namechecked, I say no. Sell now — the aforementioned book drop has not yet occurred, but it will.

And so, to my moment of controversy. I had the joy of placing one of our private clients into one of the first second-generation 992 Carreras to land in the UK. A lovely entry-level offering from Porsche. I wondered if, with a few options added, the car would kiss £100,000. I was speechless when the price amounted to £133,000. Why is this seemingly superficial number so significant? I fondly recall arrival of the 991 in 2012. At the time, the Porsche Centre I was working for had an Ipanema Blue 997 Turbo S Cabriolet in stock (incidentally, I want one, so let me know if you have one to sell). Due to this unhelpful overlap, Porsche kindly offered a huge contribution (£18,000, if I recall correctly) to help get the 997 moved. Bear in mind, we didn't do discounts. Today, I'm nervous to share with you the fact I know the number of unsold first-generation 992s currently in stock. Unlike that lone 997 drop-top in 2012, the number is not singular. I also know the number of new 992s arriving unallocated. It is high. This is so unlike our brand. Why is Porsche making more cars than it is selling? From what I observe, it is trying to increase both volume and price simultaneously. And when has that ever worked in the history of retail? Are we looking at a by-product of Porsche AG chasing bigger global markets? Time will tell. More next month. ●



50 YEARS OF 911 TURBO



TURBO BOOST

Former Porsche chief, Ernst Fuhrmann, saw no reason to avoid turbocharging the 911. The result of his thinking was a giant among sports cars, deliberately laid out by an inexperienced engineer...

Words **Karl Ludvigsen and Dan Furr** Photography **Simon Jessop**

A significant Porsche placing is buried in 1975's record books: at the 24 Hours of Le Mans, a turbocharged 911 coupe finished fifteenth overall, slowed by a stop for a change of front brake discs. It was a Swiss effort, the car prepared at Yverdon (near Lausanne) for Porsche Club Romand by Guido Habertür and driven by Claude Haldi and Peter Zbinden, the pair joined by Frenchman, Bernard Béguin. The event's big news was Cosworth DFV engines locking out the podium — the Porsche's distant finish may have lacked lustre, but this 911 was

different to the other cars doing battle at Circuit de la Sarthe insofar it was more or less a standard production car.

While the Martini Turbo RSRs were tearing up tracks in 1974, Weissach was putting the finishing touches on a sports car soon to be hailed as one of the finest in the world. This was the 911 Turbo (930), the quietest and most luxurious high-performance car Porsche had ever offered. The bold determination of Porsche's management — led with bulldog tenacity by engineering wizard, Ernst Fuhrmann — took the Turbo through to production against colossal odds. A team with less resolve and less conviction in the correctness of its approach would have given up at many stations along the way. Even so, more than once, the Porsche men were tempted to write off the two-million-dollar development cost of the 930 and give it up as an idea for which the time had not yet come.

In early 1974, when it became clear a turbocharged 911 would work as a production car, the topic of retail price became critical. This was a subject of long and bitter debate. Ideas ranged

all the way from a stripped, bargain-basement 911 Turbo offered for \$15,000 (the original concept) to a deluxe model, complete with all possible comforts, for \$25,000. This was a knotty issue for the sales department at Ludwigsburg, which would be responsible for selling the four hundred 911 Turbos required in 1975 if the model was to be accepted as a Group 4 Grand Touring car under then new racing regulations. Indeed, this was a key question for sales chief, Lars Schmidt. "If we wanted to sell four

have been. Specifically, it weighed 456 pounds, seventy pounds more than the contemporary 2.7-litre flat-six.

Working in Porsche's production design department under veteran engine designer, Robert Binder, the young Herbert Ampferer was tapped to plan the turbocharged engine's configuration. A mechanical engineer who came to Porsche from Steyr-Daimler-Puch in Austria, Ampferer cut his teeth on the intricacies of Volkswagen's post-Beetle EA266 project, including the model's

complex under-floor machinery. When Ampferer began to outline packaging of the many components a turbocharged production Porsche would need, he

FROM INLET PORTS TO EXHAUST PIPES, THE INDUCTION AND EXHAUST SYSTEM OF THIS TURBOCHARGED PORSCHE WAS NEW

hundred turbocharged 911s at what would be a much higher price than the normally aspirated 911s of the day, we would have to equip this new Porsche with every luxury," related project engineer, Hans Mezger. Schmidt told him "the 911 Turbo would need to be more comfortable than any existing 911 and have many more options."

This course was heartily seconded by Ernst Fuhrmann. He too felt Porsche would do well to look at the highest price and luxury levels for the 911 Turbo. He believed such an approach would be ideally suited to the unique combination of silence and performance such a car offered, but this would mean 911 prices the likes of which only the Carrera RS 3.0 had previously commanded.

The heart of the 930 was its extraordinary engine. A masterpiece of shrewd packaging (as it had to be), it lived in the cramped rear bay of the coupe, the only body style in which the Turbo was initially offered. Bulky though the complete force-fed flat-six appeared to be, it was smaller and lighter than any normally aspirated engine capable of the same quiet power and torque would

worked to a pattern supplied by the company's motorsport engineers.

"We gave our schematic of what was required," said Mezger. "In principle, this was how we approached the design and packaging of the 917 race car. Of course, there were a few changes to be made to the 911 Turbo's engine as the project progressed." He was chiefly referring to the method of boost pressure relief, of which we will come to shortly.

Mezger and his colleagues were situated close to the offices and workshops of the production engineers designing the 930. "Unavoidably, we were involved in every stage of the car's development," he continued. "The production team came to us to understand what they could get away with. We'd answer the questions being asked. At Ernst Fuhrmann's insistence, we had to ensure all the experience we'd gained from motorsport was transferred into this new production Porsche. The connection between the two teams was therefore very close."

At the outset, the engineers auditioned the basic 2.7-litre flat-six, as well as a three-litre unit, for use in the 930. By

Facing page Rindt Vehicle Design restoration was laid up in a barn for fifteen years, hidden beneath dust sheets, carpet and pots of paint



March 1974, they settled on the bigger-capacity boxer for one principle reason: it gave the engine better low-speed throttle response and improved the transition between its unassisted and forced operating states. The engine's dimensions were the same as those of the Carrera 3.0's powerplant, but its basic elements were significantly different. It had the same aluminium crankcase, with wider-spaced cylinder studs to permit large bores. Slightly crowned, the three-ring pistons gave compression ratio of 6.5:1. Porsche tried a 7.5:1 ratio, but rejected it because too much piston trouble was experienced. Even at lower compression, the crown had to be extra-heavy to withstand the high heat and pressure loadings encouraged by forced induction.

THICK AND FAST

Extra wall thickness was also a feature of the 930's cylinder heads. They had smaller inlet ports — down eleven millimetres in diameter (to thirty-two millimetres) — to maintain good torque in unassisted operating conditions. As is the case with recent race engines, the camshafts were carried in four forty-nine-millimetre bearings apiece, as opposed to the three bearings used in other production Porsche sixes. Sodium cooled the exhaust valves.

The engine was given better cooling at low speed, plus a faster running speed for the alternator, achieved by making the crankshaft vee-belt pulley larger and the pulley on the blower smaller, resulting

in drive ratio increased by twenty-eight percent to 1.67:1. This suited the relatively moderate speed range of the turbocharged engine, which reached its peak power at 5,500rpm, but could rev to a 6,800rpm redline. In addition to the engine's own oil cooler, the Turbo was fitted with a thermostatically controlled cooling coil, which was mounted under the right front fender, like those used on production Carreras. An ignition system new to production Porsches was also installed. Instead of breaker points, it used magnetic triggering inside a Bosch distributor to signal a solid-state thyristor controlling the flow of current through a transformer.

From inlet ports to exhaust pipes, the entire induction and exhaust system of this turbocharged Porsche was new. At its heart was the Kühnle, Kopp & Kausch (KKK) Type 3 LDZ turbocharger. It was mounted at the left-rear of the engine, with its exhaust-turbine side inboard. This, the heaviest part of the installation, was attached to the rear of the crankcase by a steel bracket. On their way from the exhaust manifolds to turbine, hot gases merged from two pipes into one at the left-front of the engine, in the same manner as on low-emissions flat-sixes designed for the American market in 1975.

On the induction side, several twists in Ampferer's installation differed from the system exhibited at the Paris Motor Show in 1973. One was an upside-down airflow metering unit used to assist the K-Jetronic injection system. Another

was a sophisticated variation of the throttle-operated pressure-relief valve successful in Porsche's turbocharged race cars. Commonly referred to as a blow-off valve, this equipment was located at the top of the engine, close to the injection metering unit, and installed in an aluminium housing joining together the air pipes leading to and from the compressor.

Boost was supplied at maximum pressure of 0.8 atmosphere (11.5psi) to the throttle at entry to the manifold. Ampferer knew longer inlet pipes — like

Above and below
Even today, the 911 Turbo commands serious road presence



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those used on Porsche's motorsport machines — would give better mid-range performance, but there was no room for them in the 930's packed engine compartment. This was one amenity he had to give up in order to meet the Turbo's packaging requirements.

During testing, race engineer, Heinz Dorsch, sometimes encountered overheating of the boost-controlling wastegate, which led to failure of its control diaphragm. When this happened, the wastegate remained closed and the boost pressure soared to heights wrecking the engine. The same thing could happen if the wastegate stuck, which Turbo owners were to find was not unusual. To prevent mechanical damage in this situation, the inlet pipe above the throttle was given a pressure-sensitive switch. Set between 16psi and 20psi, it automatically turned off the electric fuel pumps if boost rose to such levels. How much boost and power should the production 911 Turbo have, though? This was a question not answered by engineering logic alone. From a technical standpoint, the 930 could have up to 280 horsepower. Test cars with this output certainly had impressive punch, but many at Porsche felt this presented too much risk to the inexperienced driver. Specifically, boost came in with a surge so sudden, the rear wheels could spin all too easily on a wet

or icy surface and in a way few drivers would expect or be able to anticipate. Porsche decided to cut back peak output in favour of unleashing the Turbo's power

being produced. From 2,500rpm up, the boost curve shot skyward. At 4,500rpm, peak 11.5psi was reached and the wastegate opened. Earlier, at 4,000rpm, the torque curve reached its peak. On European 930s, the value at that point was 253lb-ft. Peak horsepower at 5,500rpm was 260bhp. The engine could rev

Above Light Green Metallic suits the 930 perfectly, but was seldom picked by buyers when the model was new

ANOTHER COMPONENT ORIGINALLY PLANNED FOR THE 930, BUT NOT USED IN ITS INITIAL PRODUCTION FORM, WAS THE Laterally DRILLED BRAKE DISC

more smoothly and progressively.

In the original engine's final tune, a small inlet scroll was provided for the turbocharger, thereby ensuring full-throttle boost came into effect very early. At 1,500rpm, useful pressure was already

to 6,500rpm, but in doing so, power fell to 240bhp. American-market Turbos featured a thermal reactor in the exhaust pipe, upstream of the inlet to the turbocharger's turbine. This reactor had one pleasing effect on performance: it





Above Interior is largely original, now benefiting from a deep clean, colour-matching and reconditioning

Below and facing page Engine has been oversized to 3.4 litres and makes use of a raft of upgrades

brought the turbocharger into action at a speed near 300rpm lower than without the reactor in place. It reduced engine output appreciably, though. By SAE net rating (crank horsepower net of any ancillary devices needed to make the engine run), peak power was trimmed to 234bhp at 5,500rpm. Maximum torque was reduced to 246lb-ft at 4,500rpm, which was 500rpm higher than the European 930.

A new transaxle was designed as part of the Type 930 development programme, as much for future racing Turbo models as for the production car.

The result was a transmission with four speeds instead of five. Its differential had four pinions (instead of two) and the part of the housing containing the transmission was now of high-silicon aluminium alloy instead of magnesium. The complete transaxle housing, deeply finned for stiffness, was now of this stronger metal.

Two sets of final-drive gears were provided. A 4.22:1 ratio was used with the 60-section rear tyres fitted in the United States until 1977, while a 4.00:1 ratio was matched to smaller-diameter, 50-section Pirelli P7 rubber. Signals to

the speedometer were sent by a reed switch (in the differential housing) opened and closed by a rotating disc with magnetic inserts. Due to the fact the transmission was so robust, Ampferer was able to give the 930 a more rugged clutch, which took the form of a 240mm (9.5-inch) single-disc Fichtel & Sachs part. In addition to the need for stronger gears, another reason for the use of a transmission of only four speeds was to keep the transaxle short enough to make room for a special drive to the clutch capable of absorbing oscillations generated by the crankshaft of the powerful force-fed flat-six. This was implemented in the next model year.

Another component originally planned for the 930, but not used in its initial production form, was the laterally drilled brake disc. In fact, cross-drilled discs were shown and publicised at the car's 1974 introduction, but weren't fitted to the first series-built Turbos. Instead, braking equipment at launch was like that of the Carrera 2.7, with radially ventilated discs and calipers of aluminium at the front, paired with cast iron anchors at the rear.

Changes in suspension geometry at both front and rear ensured camber angles wouldn't move toward the positive, reducing cornering power through normal wheel travel. And, at its front end, the Turbo was the first Porsche to have the aluminium-alloy crossmember carrying the front-suspension mounts of all 911s from the 1976 model year.

Rear torsion bar diameter was up from





twenty-three millimetres to twenty-six (the size used in the Carrera RS and RSR), while both front and rear anti-roll bars measured eighteen millimetres. The front bar was placed high and connected to the suspension arms by links, like those of the F-series 911 and earlier. Bilstein dampers of a new design and with stiffer settings were also part of the Turbo package.

THE WHEEL DEAL

Fifteen-inch forged aluminium wheels were chosen for the Turbo, with rim widths of seven inches at the front and eight at the rear. "In looking at the rim widths," said test chief, Peter Falk, "it may perhaps be noted that for its power, the production 911 Turbo has relatively narrow wheels. This was intentional, for we feel the extra-wide tyres so fancied today are not defensible, owing to their dangerous aquaplaning behaviour." Dunlop tyres of 185/70 (front) and 215/60 (rear) profiles were standard equipment for the Turbo at its point of introduction in Europe. These black circles were also used for the 1976 model year (the 930's first season in America) because they held the car at the correct level for its bumpers to be at the height legally required in the United States. This wasn't the case with Pirelli's then new low-profile P7, initially optional,

then standard on European Turbos. These were worn in 205/50 and 225/50 sections at front and rear respectively. With these Pirellis, the 930 was able to lap the Weissach skid pad faster than any other production Porsche, generating a lateral g figure of 0.91. The value with the Dunlops was 0.88 g.

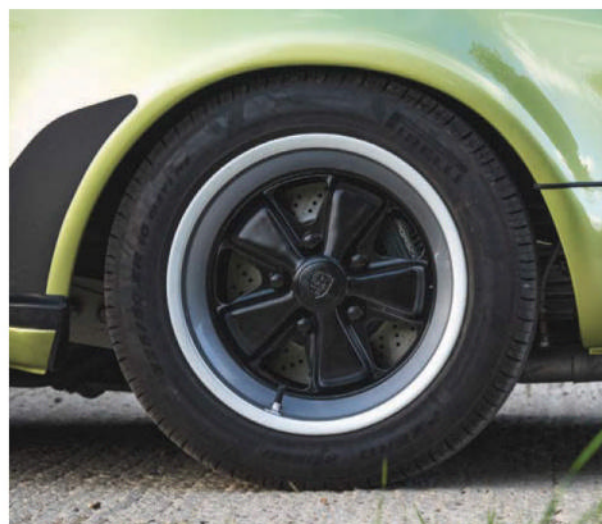
The combination of flared wheel arches and the high gloss of metallic paint accounted for much of the 911 Turbo's stunning visual appeal. Its body boasted other external identification points, though. Among these were spray nozzles for high-pressure headlight cleaners and a separate grille in the rear of the dominating rear spoiler, admitting air to the intercooler. This left the main grille open to accept the air-conditioning condenser (standard on American models) and to let warm air escape through the smaller rear grille when the car came to rest, thereby ensuring the engine compartment and fuel system didn't become overheated. Years later, Ampferer confirmed the provision of air-conditioning was a late starter in the 930 project. "At first, I was told not to worry about air-conditioning, a rear wiper and so on. It was thought only a few hundred 911 Turbos would be manufactured. Though they were to be generously equipped, it was felt air-con wasn't worth worrying about." As history tells us,

Porsche did a swift about-turn when the 930 promised to be wildly popular.

Leather keynoted the Turbo's interior trim. European cars used plaid cloth extensively, primarily for seat inserts, door cards and the rear compartment. American 930s featured plaid or leather in any combination the buyer desired, all at no extra cost. Most buyers, however, elected an all-leather interior. Deep cut-pile carpeting covered the floors and surfaces of the rear compartment. *Turbo* script was carved into the pile on the back of the left-rear seat to ensure it was visible when the seat was folded down.

Behind the 930's three-spoke steering

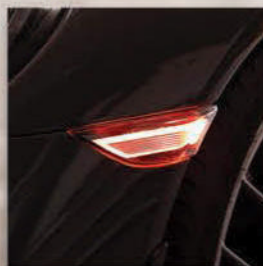
Above Rindt Vehicle Design director, Trevor Ward, tells us this is one of his favourite restoration projects to date





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wheel, the model's dashboard was like that of its normally aspirated siblings, but a boost-pressure gauge was missing. This is equipment one would expect from a car with an image so closely keyed to the snail-shaped bhp booster under its rear deck. Although proposed, such a gauge was rejected by Ernst Fuhrmann because he felt anyone who had paid such a premium for the privilege of driving a turbocharged 911 would be unpleasantly surprised to find out how seldom the needle indicated boost in normal driving conditions. In another U-turn, however, a boost gauge formed part of the tachometer for the 1977 model year.

Equipped to the nines as it was, the Turbo was no lightweight. In fact, it was the heaviest 911 yet. Without fuel and air-conditioning, European 930s scaled 2,515 pounds at the kerb. The American version weighed 120 pounds more. The true American base weight was even higher because air-conditioning was standard. Weight was distributed sixty-one percent to the rear, an increase from the standard 911 because the turbocharged engine's additional seventy pounds were hung rearward of the back wheels.

In keeping with the philosophy Porsche decided upon for this car, the Turbo's price was substantial — when the 930 was shown in Paris in the

autumn of 1974, a figure of DM65,000 was hinted at. By January 1975, asking price of DM65,800 (\$27,400) was confirmed. Motoring journalists pulled out all their superlatives to hail the

finest driving machine you can buy. Few, if any, cars have impressed us so much." *Car and Driver* called it "a Panzer among Porsches, a street racer guaranteeing you a place at the top of the pecking

order in a way not even a Ferrari or Lamborghini can achieve." *Road & Track* hailed it as "the car every Porsche fanatic would mortgage his soul to Stuttgart to own."

And what of the example on these pages? Some of you will recognise the car from its star turn at the recent Salon Prive event at Blenheim Palace, where this gorgeous green machine wowed

Above The new owner sensibly decided to keep the car's looks true to standard specification

Below A warm welcome and plenty of smiles to the mile

EVEN WITHOUT THE EXCELLENT UPGRADES APPLIED TO OUR STAR CAR, THE 911 TURBO WAS A SIGNIFICANT TECHNICAL ACHIEVEMENT

impact of the model. *Autocar* referred to it as "an outstandingly exciting motor car adding yet another classic to the achievements of this remarkable German manufacturer." *Motor* said it was "the





Above and below
Fifty years young, the 930 set the a high watermark for road-going sports cars

showgoers as part of a selection of air-cooled Porsches in attendance from the stable of Windsor-based independent Porsche restoration and sales specialist, Rindt Vehicle Design. Rindt director, Trevor Ward, first viewed the car eighteen months ago. Back then, it was part of a large collection of classics owned by a self-confessed hoarder with a penchant for old Lancias and Land Rovers. As Trevor describes, the Porsche was covered in old dust sheets and strips of carpet, it was in a state of suspended animation and paint pots had taken up residence on its roof, but he recognised the likelihood a gem was underneath and was delighted to be proved right when the car was liberated from slumber.

A right-hand drive 930 manufactured in 1979, this pretty Porsche had suffered

paint damage, but was in remarkably original condition, helped by lack of use for more than fifteen years. Light Green Metallic is certainly a stunning colour, but seldom seen due to only a handful of classic 911 Turbos leaving the factory in this shade. Fortunately, the Rindt Vehicle Design customer Trevor and company founder, Brian Richardson, had in mind for the car confirmed a desire maintain originality, encouraging sympathetic restoration and continued exhibition of the shimmering green shade by way of professional respray at Rindt's Maidenhead workshops, where all stages of vehicle restoration are carried out, from bodywork repairs to interior trimming. Not that this particular Porsche required a great deal of the latter – the interior is mostly original, although now benefits from leather colour-matching and reconditioning. Even the factory 'teddy bear' carpet was in excellent condition, requiring little more than cleaning. This treatment is in stark contrast to that afforded to the force-fed flat-six, which along with the four-speed transmission, was fully rebuilt and treated to a raft of upgrades.

Chief among the changes are Carillo connecting rods, an aluminium crankshaft pulley, Mahle pistons and barrels increasing displacement to 3.4 litres, ARP fasteners, a billet aluminium sump plate, a new clutch, a new turbocharger, a Tial wastegate and blow-off valve, an electronic boost controller, a high-output Wosp alternator, a conversion from continuous fuel injection (CIS) to electronic fuel injection

(EFI), distributor-less coil-on plug ignition, a Haltech Elite 750 ECU with custom aluminium heatsink, Siemens 650cc injectors, a billet aluminium injector housing, a billet turbocharger scavenge pump with cam sync, modified inlet ports, custom fuel lines, a Sytec fuel pressure regulator, uprated air-conditioning and an AEM air filter. All told, the changes contribute to output of 303bhp, a figure to be ramped up when the engine is adequately run-in.

TOP OF THE CLASS

Trevor confirms this is one of his favourite Rindt Vehicle Design restorations, which are recognised for ranging from mild to wild. Make no mistake, even without the excellent upgrades applied to our star car, the 911 Turbo was a significant technical achievement and offered supercar performance from a reliable, roomy coupe. An instant classic was born. The 930 was by no means the first turbocharged production sports car, but for fourteen fruitful years, and with various upgrades along the way (not least an increase in displacement to 3.3 litres and successive hikes in horsepower), it was the model Porsche's rivals strived to beat.

As for the requirement to manufacture four hundred examples, total 930 production reached more than twenty-one thousand units, such was the fascination and awe this turbocharged 911 garnered during its time on assembly lines. It continues to do so today, fifty years after model launch. ●



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50 YEARS OF 911 TURBO



BAD BOY

We head to Essex and get behind the wheel of an immaculate 964 Turbo. They don't make 'em like they used to...

Words **Steve Bennett** Photography **Dan Sherwood**

Remember the buddy cop flick, *Bad Boys*? Any Porsche enthusiast surely can. The star of the film? Some would say Will Smith. Then again, perhaps Martin Lawrence, given Smith was a couple of years away from going global with *Independence Day*. Whatever. As we all know, the real star of the movie was a black 964 Turbo 3.6.

Yeah, yeah.

The likelihood of a Miami police detective fighting crime from the wheel of a Porsche — 964 Turbo or otherwise — is as realistic as

those other two Miami based super-sleuths, Crockett and Tubbs, busting crims from the confines of a Ferrari Testarossa. Hey, it's the movies, so who really cares? As long as there have been cops and robbers on the big screen, there has been an excuse for automotive eye candy and action. In fact, there's a whole book dedicated to the subject of Porsche in the movies (imaginatively named *Porsche in the Movies* and available on Amazon). That's one whole book more than any other marque can boast. Probably. As Tom Cruise uttered of the 928 in *Risky Business*, Porsche — there is no substitute.

I digress. The *Bad Boys* 964 Turbo 3.6 rocks, and though this might not be the last word in cinematic art and culture (the film scored a measly two-star review on Rotten Tomatoes), the movie's money shot features the Porsche out-running a massive explosion in hot pursuit of a Shelby Cobra 427. It's an epic scene and a fitting homage to the 964 Turbo, itself the 'bad boy' of the air-cooled 911 Turbo era. Really? Badder than the 930? Oh, yes. Badder than the 993 Turbo? Certainly. Let me explain.

For starters, the 964 Turbo should never really have been built. It should

have been something else, that something else being rather more sophisticated, with four-wheel drive, twin turbochargers and all sorts of other 959-esque stuff. That something else was codenamed 965, and there is more about it elsewhere in this celebratory issue of *911 & Porsche World*. Suffice to say, despite the project being stillborn, it diverted funds from development of the 964 in all its forms. Long story

got what was essentially an all-new 3.6-litre flat-six with twin-plug heads, the 964 Turbo had to make do and mend with an updated version of the 930's 3.3-litre boxer, which generated twenty horses more than before, bringing output up to an admittedly not-too-shabby 320bhp. This was achieved with the aid of a larger KKK turbocharger, a larger intercooler, Bosch K-Jetronic fuel injection and a revised air intake system.

As was the case with the last of the classic 911 Turbos, the 964 Turbo got the five-speed Getrag G50 gearbox, which finally put a stop to the archaic four-speed Type 915 quirkiness.

WITHOUT HAVING TO DO MUCH TO THE MAIN BODY SHELL, PORSCHE USED THE FRONT AND REAR APRONS TO DRAMATIC AERODYNAMIC EFFECT

short, when it came to the 964 Turbo, rather like a note left from an outgoing government to new incumbents, there was no money left in the kitty.

Put simply, rather more was expected of the 964 Turbo. Indeed, more had been mooted. Even by the standards of 1990, the new 911 Turbo for the new decade looked pretty basic when compared to the opposition. Fittingly, the ultimate 911 of 1990 was announced in the news pages of the very first issue of this magazine. "911 Turbo for the nineties," was how we introduced the 964 Turbo.

Following hottish on the heels of the normally aspirated 964 Carrera 2 and Carrera 4, the Turbo featured the same aero front and rear bumper treatment, as well as the same side skirts, plus 959-inspired Cup five-spoke wheels, which looked strikingly modern compared with the Fuchs of old. Big, too. At seventeen inches, they seemed huge. Aero-style wing mirrors also looked very up-to-date when compared to the 'flags' of yore. Ultimately, however, there was a feeling the 964 Turbo wasn't much of a leap forward over the 930 it replaced, despite the 964 range being launched with a flagship four-wheel drive variant.

Whereas the normally aspirated 964

Porsche had spun virtue from necessity.

That said, like the old four-speed unit, the 964 Turbo's G50 was saddled with intergalactic ratios to help it sneak through Swiss noise limits and to help fuel economy in the USA. Second gear was good for 79mph, 112mph was achievable in third and 148mph could be reached in fourth. A max of 169mph was possible in top.

RACING LINE

Like its 964 siblings, the Turbo got coil spring suspension in each corner, comprising MacPherson struts at the front, with aluminium transverse links and semi-trailing arms at the rear. The 930's 917-inspired alloy four-piston brake calipers were carried over.

In fairness, the modernising of the 911's front and rear bumpers deserves more than just a throwaway reference. Without having to do much to the main body shell, Porsche used the front and rear aprons to dramatic aerodynamic effect, but unlike the 964 Carrera 2 and Carrera 4, the 964 Turbo didn't get a retractable rear spoiler, thereby remaining faithful to the 930's defining 'tea tray'. This was, in retrospect, the correct decision, but at the time, rather

Facing page The 964 Turbo was last of the rear-drive 911 Turbos



accentuated the 964 Turbo's connection with the 930, rather than the rest of the 964 line-up.

There was, then, a feeling the 964 Turbo was something of an afterthought, certainly when compared with the base 964s, which were perceived to be a great leap forward in sophistication and modernity from the G-series they replaced. The motoring press were largely lukewarm to the new arrival—the 964's increased track, wheel and tyre size had increased grip, but at the expense of finesse. "It's a double handful in corners, pitching and twisting as though it longs to visit a ditch," wrote *Autocar and Motor*. "A disobedient thrusting animal trying to break its leash or, if it doesn't get its way, its own neck."

We've previously observed how some of the 964's suspension- and tyre-related noise issues accelerated development and introduction of the 993. Porsche engineer, Ulrich Bez, was no fan of the 964's relatively unsophisticated MacPherson strut setup, a mood reflected in the 964 Turbo's reception. "The ride is stiff and road noise rolls through the cabin," complained *Car & Driver*. "The rigid body registers each tar strip with a loud pong worthy of a timpani drum." In fairness, US highways are often constructed of concrete and therefore feature expansion joints. Think the worst sections of the M25, but all the time. The 964's aforementioned MacPherson struts (with coil springs connected straight to the bodyshell) transmit shocks as much as they

absorb them, unlike the torsion bars of G-series 911s and the 930, which tend to dissipate knocks and bumps. Mix all this with seriously sized rubber and the 964 Turbo was quite the din maker.

An animal, then? Yep, and even more so in X33 specification, which afforded buyers 355bhp and 178mph by way of big boost, hand-finished cylinder heads and spikier cams. In 1992, the 964 Turbo S arrived to homologate the Turbo for motorsport duties. Stripped out (in typical Porsche style), this potent 911 weighed 180kg less than the standard

Turbo, tipping scales at 1,290kg, a result of all the usual sacrifices, such as electric windows and air-conditioning, as well as the appointment of thinner glass and fibreglass doors. A bigger turbocharger found itself strapped to the 3.3-litre flat-six, along with bigger valves and other tweaks liberating a total of 385bhp and 180mph. Serious stuff, but best exercised on track, where the Turbo S excelled in GT and IMSA racing. Homologation mission accomplished.

This was the final throw of the dice for the 930-derived 3.3-litre flat-six.

Above Once the 'great unloved' of the 911 world, the 964 is now a coveted model

Below Scribe Bennett shows off his legs for Snapper Sherwood's in-car action shots



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The screenshot shows the Elephant Racing website's 'Package Builder' interface. At the top, there's a navigation bar with links for 'Car Builds', 'Tech', 'Instructions', 'Newsletter', and 'Shopping Cart'. A banner indicates 'ORDERS OVER \$250 SHIP FREE WORLDWIDE'. The main header features the Elephant Racing logo and a search bar. Below the header, a row of car models is displayed: 911, 964, 993, 996/997, 991, Boxster/Cayman, 914, 944, and 356. The 'Package Builder' section is divided into three steps: 1. Select Year & Model (Year: 2004, Model: 996/997/986/987), 2. Select Your Package (Street Performance 2), and 3. Customize Package (Add, update, or remove parts using the tables below). The 'Add To Cart' button is prominent. The 'Suspension' and 'Brakes' sections display various components in a grid. A 'PACKAGE CHARACTERISTICS' table on the right shows 'RIDE COMFORT' at 41 and 'PERFORMANCE' at 63.

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Yep, the 964's 3.6-litre M64 was finally turbocharged, heralding the arrival of the 964 Turbo 3.6 in 1993. The M64 engine had proved itself as tough and durable propulsion in the Carrera Cup series, which is why Porsche was confident the engine could handle a turbocharger. Although it may sound simplistic, the forced induction system developed for the 3.3-litre engine was largely carried over, as was the Bosch K-Jetronic fuel injection system, despite a boardroom drive to go 'full Motronic' for improved economy, reduced emissions and to allow for the tweaking of overall ability. Still, with increased capacity and improved breathing, the 3.6-litre boost boy kicked out 360bhp and 384lb-ft torque, the latter a particularly noticeable increase over the 3.3-litre's 332lb-ft. Top speed rose to 175mph and the sprint to 60mph was now reached in 4.8 seconds. Cosmetically, the 3.6-litre Turbo's eighteen-inch Speedline split-rims were enough to make 911 fans go weak at the knees. A ride height reduction of twenty millimetres further enhanced the aesthetic. The 3.3-litre Turbo had always looked a bit tall on its seventeens.

Too little too late? Porsche was in a state of internal flux. The 993 was on its way and Wendelin Weideking's desire for modernisation, including water-cooling of the flat-six, were being openly debated and researched. As such, in 3.6-litre

form, barely 1,400 964 Turbos were built, adding to the 3,660 3.3-litre 964 Turbos assembled. That's a smidge over five thousand 964 Turbos from 1991 to very early 1994. Not a lot.

THE TRIMMERS HAVE RESTORED THE DEEP-BOLSTERED SPORTS SEATS TO NEARLY NEW CONDITION, WITH JUST THE RIGHT AMOUNT OF PATINA

Like the 964 in general, the 964 Turbo swiftly fell from any sort of grace it might have had, finding itself sandwiched between the 930 and the 993 Turbo. In terms of the former, the

964 Turbo wasn't much of an advance. Indeed, even in 1991, this 'modernised' 911 felt rather old-fashioned in a sports car arena featuring the Honda NSX and Ferrari 348 (although the Prancing

Horse had its own challenges, not least an evil chassis). All told, jump between a 930 and a standard 964 Turbo and you'd be hard-pushed to tell much of a difference.

The arrival of the 993 Carrera models, plus the 993 Turbo in 1995, really did for the 964 Turbo. The 993 Turbo was 'what could have been' had 964 Turbo development gone to plan. With its four-

Above The 964 was a radical rethinking of the 911 concept, but in the eyes of the motoring press, the 3.3-litre Turbo wasn't enough of a leap forward from the 930





Above and below Cambridge Concours keeps the car in a cosmetic condition much better than that of many Turbos with half the mileage

wheel drive, 400+bhp twin-turbocharged engine and six-speed gearbox, not to mention multi-link rear suspension, engine cradle and modern looks, this last hurrah for the air-cooled 911 Turbo was every bit as sophisticated as its specification suggests. Test a 964 Turbo and a 993 Turbo back-to-back and you immediately realise the leap forward was seismic.

That was then. As surely as night follows day, the 964 Turbo began its journey of rehabilitation and respect following a period when, frankly, you couldn't give 'em away. A little rough-

and-ready the 964 Turbo may have been, but for many marque enthusiasts, the penny began to drop. Bottom line, this was the last of the rear-drive 911 Turbos, which has got to count for something, right?! In today's classic Porsche marketplace, the 964 Turbo, with its old-school Turbo kudos, is well into three figures. And all that stuff about recalcitrant handling and noise? Well, some people actually enjoy getting into a fight, don't they? With the 964 Turbo, they get shouty into the bargain.

Our star car hasn't arrived quite as explosively as the *Bad Boys* movie

machine. In fact, this 3.3-litre 964 Turbo comes to us via our good friend, Simon Walters, head of Essex-based independent automotive detailing outfit, Cambridge Concours, who exhibited the car in the genteel surrounds of Rickinghall Village Green on the occasion of recent Porsche East show, which took place not long before this magazine went to print.

TURBO TRAVEL

As 964 Turbos go, this is a lovely example, complete with Speedline-style wheels, a nod to the later look. The Cambridge Concours crew is responsible for enhancing and maintaining the car's visual appeal and condition, keeping the largely original Midnight Blue metallic paint in tip-top shape through exhaustive paint correction, followed by protection with Simon's preferred Sutek paint protection film. Worth it? Well, you wouldn't believe this force-fed 911 has covered more than 140,000 miles. You wouldn't believe it from the interior, either, where Simon and his trimmers have restored the deep-bolstered Sports seats to nearly new condition, with just the right amount of patina.

This very car appeared in our pages back in 2002, when former owner of twenty years, Steve Burgess, took possession from Northway Porsche. Steve is on hand for a bit of a lowdown on his time with car, which is helpful in explaining why it feels so bloomin' rapid. "I part-exchanged my Carrera 3.2," he says, "meaning this car cost me just twenty-five grand." Read it and weep.





"I put it in for a top-end rebuild with Autostrasse and some extra power. You can never have too much, can you?!" Indeed not. How much extra, though? "It's got a bigger K27/28 turbocharger running one-bar boost, an uprated wastegate and a custom Hayward & Scott exhaust. On Bob Watson's rolling road, with a bit of tweaking, the car made 390bhp and spat flames out of the exhaust, which took paint off the rear apron." Anything else? "Bilstein dampers, Eibach springs and those wheels, which are actually Gemballa rims, but look like a set of Speedlines."

Steve took the car from a hundred thousand miles to its current figure, perversely using the Porsche largely as a winter hack, preferring to use his motorbike during summer. Again, this 911's exceptional condition proves Porsches want (and need) to be used. Current custodian is Karl Willet, son of Steve's mate, Kev Willet. Unfortunately, at the time of our photo shoot, Karl is on holiday, so it's dad who has delivered the 964 Turbo to Cambridge Concours, with Steve coming along for the ride. Our very own bad boys.

Kev says Karl's intention is to "just keep it and use it," even if a 964 Turbo doesn't quite fit in with "young family life". Maintenance, as was the case during the latter years of the Turbo's time with Steve, is taken care of by Nick Bentley, of Bentley Automotive in Halstead. From experience, we can also vouch for Nick's bodywork skills.

To driving impressions of the 964 Turbo, then. Out of necessity and

balance, these are an amalgam of prior experience of the standard machine and seat time in today's modded example. In this job of scribbling about Porsches, the opportunity to drive a 964 Turbo came along not that long ago, part of a 911 Turbo group test article I was penning. I confess, pitching the 964 Turbo against the rest (Turbos of the 930, 993, 996, 997 and 991 variety) was very exciting. As exciting as the contemporary road tests

Above Wheels are Gemballa items owing more than a passing nod to the 964 Turbo 3.6's iconic Speedline split-rims



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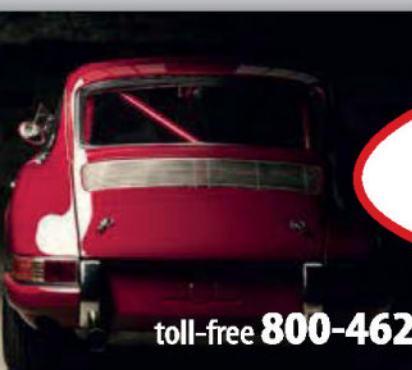
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Facing page A bigger turbocharger, a Hayward & Scott exhaust and an uprated wastegate contribute to output of almost 390bhp

mentioned earlier? Yes. I can certainly see why road testers of yesteryear might have been hanging on in a degree of wide-eyed terror.

On the North Yorkshire moors, where the group test took place, the 964 Turbo was much stiffer than the 930. Not 964 Carrera RS levels of stiff, but not far off. And as we've said, the 964 Turbo doesn't have quite the same sense of detachment from the road surface as G-series 911s, which are equipped with torsion bars. The big seventeen-inch wheels and fifty-profile tyres don't help matters.

In corners, the 964 Turbo is a natural understeerer, up until the point it isn't. It has to be bullied and worked to get to the apex, but get boost right and the car launches itself with characteristic rear-end squat and charges off with a guttural turbine surge. Be prepared to work very hard if corners are coming thick and fast. There's massive amounts of grip, but the 964 Turbo doesn't much like changing direction — a lift at the right moment might activate the tail. It's a bit like juggling chainsaws. The speck in the distance? It's a 993 Turbo, and you'll never catch it, but dwelling on this is to miss the point.

In the context of today's sports cars, the 964 Turbo feels super-retro, but in an endearing manner. It's got old-school Turbo twitches and tendencies. You absolutely know forced induction is at

play, influencing the whole demeanour of the car. Even in 1991, the 964 Turbo was a bit of an animal, something of a thug. Today, on the roads of Cambridgeshire? It's certainly different. Complemented by the snug feel of the lovely deep-bolstered Sports seat, the Turbo feels softer and altogether more compliant, a result of the winning combination of this particular Porsche's Bilstein

'Live fast, die young' would probably be a fitting rock 'n' roll epitaph for the 964 Turbo. And like those that did, its legend has only grown over the years. This is a reminder from the past as to how things used to be. Thrilling in small doses. It's Lemmy and Motorhead to the 993 Turbo's smooth and sophisticated Brian Ferry and Roxy Music.

And what of where we came in? Those

Bad Boys movies keep coming — Will Smith and Martin Lawrence are back with the 911 Turbo in *Bad Boys: Ride or Die*. I don't suppose Porsche needed any persuasion in fronting up a few new black

GET BOOST RIGHT AND THE CAR LAUNCHES ITSELF WITH REAR-END SQUAT AND CHARGES OFF WITH A GUTTURAL TURBINE SURGE

dampers and Eibach springs. You might be thinking this a tad unusual. After all, aftermarket suspension is generally stiffer by design. Perhaps this setup has mellowed over the years? Whatever, I'm really liking the confidence it brings to the party.

Given there's nothing fancy about this Turbo's forced induction system, save for the turbocharger being bigger and running more boost before dumping any excess, it's really quite docile, building gradually, but not furiously so as to catch you out in a vicious spike. This, I guess, is down to the unit's size — a smaller turbocharger would spin-up faster. Not that it would keep up, because when this bad boy lights up, you know about it. The noise is epic, although the flame-throwing exhaust has been tamed over the years. Pity.

911 Turbos for filming. I haven't seen the movie, but does a 992 capture the moment like the 964 Turbo 3.6 did in the first *Bad Boys* film? The latter is doubtless one of the all-time great movie cars. I guess only time will tell.

Oh, and before we return to Cambridge Concours and hand back the keys, we need to mention one staggering fact about the original *Bad Boys* film's star car: it sold for a remarkable \$1,300,000 back in 2019. ●



50 YEARS OF 911 TURBO



TURBO TRANSAXLES

Words **Dan Furr and Richard Gooding** Photography **Davy Lewis and Dan Sherwood**

The success Porsche experienced with launch of the original 911 Turbo encouraged much thinking in Zuffenhausen's corridors as the 1980s drew near. This would be the era of *turbo*, an abbreviation so emotive, it would appear on everything from sports cars to, er, cans of deodorant. With the 911 screaming through forced induction, however, there was real danger the rest of the Porsche product line was beginning to look pedestrian by comparison.

On account of a sharp decline in sales three years after model launch, bigwigs at Porsche were only too aware of the 924's shortcomings. Looking to

technologies deployed by the factory motorsport department at the track, turbocharging was thought to be the perfect answer to the 924's commerce crisis. Coded 931 and 923 for left and right-hand drive models respectively, the resulting 924 Turbo packed a 170bhp punch thanks to a new alloy cylinder head, reduced compression ratio of 7.5:1 and a K26 turbo offering boost pressure of up to 10.15psi. The most powerful two-litre car at the time of arrival, the 924 Turbo surprised many by giving the 180bhp 911 SC a run for its money.

The turbocharged transaxle's two-litre powerplant boasted increased oil flow and new forged pistons lubricated from below to help cooling. Platinum-tipped spark plugs were moved closer to the

inlet valves, themselves three millimetres larger than those on the cooking 924. Other additions included a secondary fuel pump to increase delivery pressure, a recalibrated Bosch K-Jetronic fuel injection system and a blow-off valve.

Often mistaken for an intercooler — the 924 Turbo doesn't make use of one — is the external oil cooler visible when the go-faster 924 is viewed head-on. The four horizontal vents between the headlights channel cool air in the direction of the part. Thanks to a torque bump of forty-eight percent to 180lb-ft at 3,500rpm, the 924 Turbo scampered to 62mph in just 7.8 seconds, running out of puff at 140mph, although as was the case with so many US-bound Porsches, anti-smog and emissions legislation zapped

Above The 924 Turbo has proved itself a popular platform for personalisation



Right Despite what the quartet of grilles in the nosecone might suggest, the 924 Turbo doesn't make use of an intercooler

power, leaving the model with 143bhp when it landed Stateside. On the road, European examples upped the standard car's critically acclaimed handling ante with the addition of uprated dampers and improved 49:51 weight distribution. A larger nine-inch brake servo added to the Turbo's specification, along with 911 hubs and 282mm front and 289mm rear brake discs slotted into 928 floating calipers. Interestingly, turbocharged 924s delivered to dealerships in North America were offered with the stiffer suspension and beefier brakes as a cost option billed as the M471 Sport Group package.

A 225mm clutch and Porsche's own G31 five-speed gearbox (installed ahead of the differential, as opposed to the standard 924's Audi-derived gearbox positioned behind it) were added to an impressive technical bonanza. Amazingly, even with this extra equipment, the 1,130kg 924 Turbo was

just fifty kilograms heavier than the normally aspirated model.

With a UK retail price of £13,629 in 1979, the 924 Turbo's initial reception was as hot as the car itself. *Motor Sport* described the special Porsche as "a new breed of supercar", noting the smoother engine note and refinement as hard to fault. Even so, the sudden push of power at 3,000rpm gave many new owners an unexpected need to learn how to tame the beast, with contemporary commentators unable to resist comparing lively handling under load as reminiscent of what they'd experienced behind the wheel of the early 911 Turbo. Warranty issues concerning blown turbochargers (failed seals and short component life due to the questionable lack of intercooler) didn't help Porsche's promotion of the tidy transaxle, but keen to promote the 924 Turbo as supremely reliable, an example was driven by

endurance racers, Rudi Lens and Gerhard Plattner, from New York to Vienna in thirty-one days. The pair also put a 924 Turbo through its paces at the Nardo proving ground in Italy, pounding the track for twenty-four hours at an average speed of 130mph. Reliability issues? What reliability issues?! Both outings proved hugely successful.

Second-generation (often referred to as Series 2) 924 Turbos arrived in time for the 1981 model year. A rise in compression ratio to 8.5:1 accompanied a smaller turbocharger running at higher boost pressure, resulting in quicker spool, a welcome hike in horsepower and increased torque. The turbocharged 924 now delivered 177bhp and 184.5lb-ft. It was faster than its predecessor, too, managing the benchmark dash from rest to 62mph in 7.5 seconds and achieving top speed of 143mph. In a welcome change to specification, Siemens-Hartig



digital ignition timing control made the car a more parsimonious Porsche, promoting fuel economy akin to that of more mundane cars in the Porsche product range. Indeed, at a constant speed of 56mph, the refreshed 924 Turbo would sip an imperial gallon of fuel every forty-two miles, although we suspect few owners drove (and today, drive) their nippy 924s quite so carefully.

Brushed aside for the 944 in 1982, the 924 Turbo can lay claim to an impressive build quota tallying a smidge over twelve thousand units, proving the idea a hot transaxle could fly on the road, at the track and straight out of dealer showrooms. Perhaps this more spirited 924 should have been Porsche's transaxle launch model? One thing's for certain: the 924 Turbo is currently the cheapest route into owning a Porsche packing forced induction.

ONWARD MARCH

How to continue the trend? In readiness for the 1986 model year, the 944 Turbo was launched with a turbocharged and intercooled incarnation of Porsche's trusted 2.5-litre eight-valve water-cooled inline-four. Ground-breaking in many ways, the model was the first car to make the same power with and without a catalyst fitted. Forged engine internals, ceramic cylinder head port liners (one of many upgrades thrown at the M44/51 engine to cope with the Turbo's increased operating temperatures, extra power and harder service life), an uprated transmission with altered final drive, a dedicated oil cooler for the gearbox, stiffer suspension, four-piston Brembo anchors borrowed from the same-age 911 Turbo and the option of

a limited-slip differential (as part of an M030 cost-option upgrade adding Koni dampers) formed part of the package. The most obvious difference from the standard 944, however, was the Turbo's appearance. The muscular haunches of the regular production car remained, but the Turbo was treated to improved aerodynamics, including model-specific bumpers — the front sporting the widest indicator lenses of any production car — and lower rear spoilers. Inside, the then new 'oval' dashboard reminded buyers just how dated the standard 944's design had become. Later, when looking to give its transaxle family of cars a shot in the arm, Porsche would carry Turbo styling over to the entire 944 range. By then, the original eight-valve Turbo had been replaced by a sixteen-valve version of the force-fed fun machine, introducing passenger and driver airbags as standard equipment — another world first.

The 944 boasted near 50:50 nose-to-tail weight distribution, thanks largely to the front-engine, rear-transaxle layout, which afforded the model superior handling. Sometimes referred to as the 951 (referencing its factory designation), the 944 Turbo finds performance through a collection of tasty upgrades. A K26 turbocharger does the heavy lifting, supported by an intercooler and water-cooled bearing housing, while sodium-filled valves and ceramic coated exhaust ports handle increased under-bonnet temperatures. Stronger gears and external oil coolers also play a supporting role, as do thicker anti-roll bars and firmer suspension. The model-specific styling package and standard sixteen-inch alloys are indicators this is no ordinary 944.

So far, so good, but Porsche didn't stop

there. 1988 saw the release of the Turbo S, an even faster 944 with 247bhp and 258lb-ft torque. Key upgrades include a different turbocharger (KKK K26-8), a limited-slip differential as standard, front brakes from the 928 S4, plus special Clubsport-style wheels.

The model also benefits from M030 suspension (an option on the original 944 Turbo) featuring adjustable Koni dampers, progressive-rate springs and stiffened front chassis rails. The Turbo S was initially only available with warm-toned Silver Rose paint and burgundy plaid upholstery, but this would soon change — Porsche produced the Turbo S in any colour from mid-1988. A year later, the S suffix disappeared, but the extensive upgrade list remained. Indeed, between 1989 and 1991, every 944 Turbo benefited from the engine, driveline and brake changes instigated by the Turbo S, although the M030 package was relegated back to the extras list. ●

Above and below
The 944 Turbo is an absolute each of a Porsche, presenting performance, pizzazz and practicality in equal measure



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50 YEARS OF 911 TURBO



CARRERA 3.2 SUPERSPORT

Words **Steve Bennett** Photography **Dan Sherwood**

The Carrera 3.2 Supersport is, in many respects, the ultimate G-series 911. Yes, really, we're saying this in an issue of *911 & Porsche*

World dedicated to celebrating fifty years of 911 Turbo, a bloodline starting with the 930. Oh, and let's not forget 2024 is also the G-series 911's fiftieth anniversary. Who doesn't like a Porsche-themed celebration?! Not that we're going to cover the history of the G-series in this article, suffice to say the prolific line of 911s running from 1974 to 1989 really is the epicentre of the air-cooled Porsche scene — there's a G-series for all tastes and all budgets. The Supersport saved one of the best until last, arriving

within the Carrera 3.2 model range, first as an option and then, within a year, a model in its own right. It's amazing Porsche waited so long.

Maybe the company's marketing team felt a Turbo clone would serve to confuse showroom visitors and devalue the real thing? Perhaps they concluded the excess-all-areas decade of the 1980s was exactly the right time to cash in on the Turbo look? Whatever their thought process, the Supersport was a hit. 964 aside, the widebody option (usually in S form) has been a mainstay of the 911 line-up ever since.

The Carrera 3.2 Supersport is rather more than a 911 pretending to be a Turbo. I mean, Porsche really could just have left it as a 930 lookalike, but as

well as the defining widebody, tea tray rear wing and extended front spoiler, the SE and Supersport models also got the Turbo's uprated suspension and brakes, which in the case of the SE, meant stiffer rear torsions bars, softer rear anti-roll bar and ride height dropped from 108mm to 94mm. The Supersport, meanwhile, benefits from 917-derived alloy finned four-pot calipers and big vented (and drilled) discs. All very exotic. Oh, and of course, there was the not-so-small matter of sixteen-inch Fuchs wheels (known in today's parlance as 7x9s) filling out the wide arches.

Granted, all of this added weight, taking the base Carrera 3.2 from 1,210kg to 1,260kg and blunting performance. For the Supersport, top speed dipped

Above When sales of the 930 paused in the USA, buyers continued to demand a more aggressive-looking 911 than the period's standard G-series, giving rise to the 'Turbo Look' Carrera 3.2 Supersport



below 150mph and the sprint to 60mph from rest was — depending on who you want to believe — either fractionally more or fractionally less than six seconds. It's unlikely anyone would really notice which of the two is correct. More telling, despite being seventy horsepower shy of the Turbo's near 300bhp, ultimate performance wasn't really too far off that of the 930. Plus, in terms of drivability, the 3.2-litre flattie had the benefit of being a little more user-friendly.

Unlike the contemporary 911 Turbo, the Supersport had a five-speed gearbox, which from the 1987 model year, meant the desirable Getrag G50 transmission. All Turbos up until 1989 were equipped the four-speed Type 915 gearbox and its associated never-ending ratios, which saw fourth strictly as an overdrive, leaving second and third as the cogs of choice for rapid progress. No matter what anyone says, from this perspective, the 911 Turbo was, frankly, a bit odd.

The Supersport, while cheaper than the 930, was no cut-price option. It added nearly ten grand to the price of the Carrera 3.2 and was approximately four thousand quid shy of the 911 Turbo (£36,500 versus £40,500, or thereabouts). That's a fair wedge over base specification. Also, it has to be asked: what's an additional £4,000 when you're already considering spend in excess of £36,000? This was where purists and grizzled hacks raised questions over a Supersport buyer's Porsche credentials and, probably, the size of their genitals.

That was then, this is now. Times and attitudes have changed, as has the Supersport's place in the Porsche market. Today, this flavour of air-cooled 911 is regarded as not so much the great pretender, but a Carrera 3.2 with very much its own place, character and identity. To drive, it really is quite different to the narrow-body Carrera

3.2. Lower, stiffer and with a wider track, plus substantial boots and rubber, the Supersport is undoubtedly a more physical experience. Getting the nose tucked into a corner requires hefty heave on the wheel. Mid-corner grip is huge, as is traction out of bends, when the rear squats and the nose lifts. It's all a bit more hardcore than a standard 3.2.

As for performance, the Supersport certainly isn't lacking, and with the huge grip available, you can use more of it, more of the time. Then there are the brakes, which are mighty, certainly when compared to those of a standard Carrera 3.2. Let's not forget, in a comparable 911 Turbo, there would be a 915 to wrestle with, as well as a turbocharger to keep on the boil. In contrast, the G50 slices through gears and the normally aspirated engine is always ready to deliver its 230bhp. You can drive the Supersport very hard and in rather more conventional manner. ●

Right New, the Supersport was only four thousand pounds cheaper than the Turbo, but delivered a simpler driving experience with reduced maintenance costs



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FOR DETAILS

TAYCAN TURBO GT

Words **Dan Furr and Dave Humphreys** Photography **Daniel Wollstein**

We had to do it. Taycan Turbo. Yes, we're well aware there will be those among you getting ready

to send angry emails pointing out how an electric vehicle can't be turbocharged. You're right, of course, but as far as Porsche is concerned, *Turbo* has long been a marketing tool, rather than a strict reference to the nuts and bolts beneath the bonnet of the host vehicle. Almost all new 911s, for example, are now turbocharged, but that doesn't mean they all carry a *Turbo* badge. Porsche's marketing team (who, if you're keeping an eye on the brand's social media channels, appear to be making bizarre decisions regarding consumer relations, presumably in a bid to shift the vast swathes of unsold Taycans to an unsuspecting youth market) reckoned the brand's customers were familiar with what *Turbo* represents in terms of model hierarchy and, like it or not, felt it was appropriate to continue the same approach for the Taycan family of cars, despite the fact *Turbo*-badged Porsche EVs lack, er, turbochargers. Then again, as we mentioned at the top of this article taking a brief look at the 930's influence across the wider Porsche product range, *Turbo* has been used to boost (geddit?!) the appeal of a wide range of products over the years, not always within the automotive sphere. Go figure.

Much the same as the original Cayenne, the Taycan represented the start of a new chapter in the Porsche story. While many marque purists dislike both models, it's impossible to ignore the impact and success each has had. Transitioning to electric power is no easy task, as many other car makers have discovered (the hard way). From the outset, Porsche set its engineers ambitious targets to create an EV that not only had day-to-day usability, but delivered the kind of performance and driving pleasure the company is renowned for imbuing in its sports cars.

It's safe to say the Taycan team nailed the brief. In the intervening years since model launch, Porsche has sold almost 150,000 examples of this all-electric sports machine, with the UK ranking as one of the model's top four markets. Progress happens fast in the world of electric cars, however, and Porsche can't afford to stand still — not only are we now in an age of a substantially updated Taycan with improvements to battery and range, but Porsche has also added new range-topper: Taycan Turbo GT.

No car buyer would refer to any of the fourteen Taycan variants currently on sale as 'slow', but the Turbo GT's performance is on a whole other level. It needed to be, because putting those two letters onto the back of any Porsche is a big deal. As the first electric model from the Stuttgart concern to receive them, it had to be special.

In the hands of factory development driver, Lars Kern, the Taycan Turbo GT set a class record lap time of 7:07.55 minutes at the Nürburgring Nordschleife. This was an incredible twenty-six seconds faster than the time Kern recorded using a Taycan Turbo S Sport in 2022. Not only is this the record for a series-production electric car, but it is also the fastest four-door of any powertrain type around the Nürburgring. Period. Following the Turbo GT's lap record, Kern proved the car's mettle in the USA by setting an electric series-production car lap record at Laguna Seca, completing the sprint in 1:27.87 minutes. Both records were set using a Taycan Turbo GT fitted with Weissach performance package, which shaves weight, increases top speed and improves already wild acceleration. ●

Below The Taycan Turbo demonstrates how Porsche now uses *Turbo* as a marketing tool to denote product hierarchy, rather than to suggest the host vehicle is turbocharged





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<p>911 (997) "2S" 3.8 pdk (59 - 2009) Arctic silver with black leather 32,000 miles £45,000</p>	<p>911 (997) "4S" 3.8 pdk (61 - 2011) Basalt black with black leather 63,000 miles £45,000</p>	<p>911 (997) "2S" 3.8 pdk (61 - 2011) Platinum silver with black leather 58,000 miles £44,000</p>	<p>911 Turbo (996) 3.6 (04 - 2004) Arctic silver with black leather 54,000 miles £42,000</p>
<p>911 (997) "2S" 3.8 cab pdk (10 - 2010) Carrera white with black leather 44,000 miles £42,000</p>	<p>718 Boxster 2.0 pdk (68 - 2019) Crayon grey with black leather/ alcantara. 29,000 miles £39,000</p>	<p>Macan "GTS" 3.0 v6 pdk (18 - 2018) Pearl white with black leather/ alcantara. 45,000 miles £36,000</p>	<p>911 (997) 3.6 (60 - 2010) Platinum silver with black leather 72,000 miles £36,000</p>
<p>Boxster "S" 3.4 pdk (65 - 2015) Basalt black with black leather 43,000 miles £36,000</p>	<p>Macan "GTS" 3.0 v6 pdk (17 - 2017) Volcano grey with black leather/ alcantara. 46,000 miles £36,000</p>	<p>Macan 3.0 "S" pdk (19 - 2019) Dark blue with black leather 62,000 miles £35,000</p>	<p>911 (997) "4S" 3.8 (56 - 2006) Arctic silver with black leather 67,000 miles £35,000</p>
<p>Cayman "S" 3.4 pdk (64 - 2014) Sapphire blue with black leather 50,000 miles £34,000</p>	<p>Cayman 2.7 pdk (14 - 2014) Yellow with black leather/alcantara 35,000 miles £32,000</p>	<p>Cayman "S" 3.4 pdk (63 - 2013) Agate grey with black leather 56,000 miles £32,000</p>	<p>Macan 3.0 "S" pdk (67 - 2017) Rhodium silver with black leather 49,000 miles £32,000</p>
<p>Cayman "S" 3.4 pdk (14 - 2014) Black with black leather 53,000 miles £32,000</p>	<p>Cayman 2.9 pdk (62 - 2012) White with black leather 18,000 miles £30,000</p>	<p>Boxster 2.7 pdk (64 - 2014) Black with sand leather 48,000 miles £28,000</p>	<p>Boxster "S" Black Ed 3.4 pdk (11 - 2011) Black with black leather 58,000 miles £25,000</p>
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50 YEARS OF 911 TURBO



THE FINAL CUT

The 993 Turbo can trace its origins back to the 959 and the stillborn 969. It's a quantum leap over the 964 Turbo and a nod to the 911's 996 Turbo future. We endure a wet and windy day in Wales in order to drive one of the best examples of what turned out to be the last air-cooled 911 Turbo...

Words **Steve Bennett** Photography **Gregory Owain**

Without wishing to get ahead of ourselves, there is a defining moment in our test of the 993

Turbo you see on these pages. It's an observation worth opening this article with, primarily because — somewhat bucking expectation — it's got nothing to do with the model's prodigious power or dynamics. It has, in fact, got everything to do with the clichéd old tag a 911 Turbo of any generation gets lumbered with: that of being the everyday supercar.

Being an everyday anything isn't particularly exciting. It's not meant to be, but sometimes it's exactly what's required. Right now, I'm very glad I'm in a 993 Turbo and not one of its Italian contemporaries, such as the Ferrari F355 or, even more ridiculously, a Lamborghini of the same vintage. Why? Well, our convoy of cars, photographer and camera equipment is in a spot of bother on a single-track lane in deepest Monmouthshire and the only way forward is to go backwards. For about half a mile.

It's tricky, but made manageable by the 911's compact dimensions and its fantastic visibility, plus ease of clutch and throttle, where the aforementioned Italians would be a nightmare on all levels, as if reversing blind into a black hole. At least one of them would expire in a fug of a whiffy clutch, too. Such things can really ruin your day. And your wallet. That's the boring 'everyday supercar' bit out of the way, then? Not quite. Great visibility and compact dimensions are equally as important when travelling forward. Again, any 911 (Turbo or otherwise) is testimony to this fundamental. What we're really here to

do is pay homage to near twenty-five years of the 993 Turbo and to ruminate on its place as the last of the air-cooled 911 Turbos on the occasion of the model's fiftieth anniversary.

To do so, we've been handed the keys to a magnificent 1997 993 Turbo in the model's launch colour of Arena Red. This particular Turbo is rocking an X50-specification engine, taking power from 402bhp to a boosted 431bhp. Thanks go out to owner and Porscheophile, Michael

discovery reads something like this: 993 Carrera 4 ("too slow"), 991 Carrera 4S X51 ("great car"), 992 Carrera 4S ("uninvolving, too wide and too boring with PDK"). He bought a Targa-bodied 997, too. This semi-open-top water-cooled 911 lives at his South African outpost. "With experience of these 911s under my belt, I realised what I wanted was a 993 with manual transmission, but faster and more of a driver's car than the Carrera 4, hence the Turbo, which in my

opinion, is the last of the great air-cooled Porsches." It's hard to argue with that statement.

And so, his search began. Perhaps inevitably, the path to 993 Turbo ownership

VERY MUCH A PRODUCT OF THE MANUFACTURER'S PAST AND A TEASER OF WHAT MIGHT HAVE BEEN

Campbell. We'll come to the other P-cars he's owned — in addition to various Ferraris, a Honda NSX, Aston Martin DB9 and Rolls-Royce Silver Shadows — in due course. First, however, we have to acknowledge him for being something of a star for even contemplating today's excursion in deepest Wales, where it's chucking down with rain and his immaculate 993 Turbo has been extricated from its air-conditioned, air chamber slumber in order for us to cover the car in filth.

Adding insult to injury, we have to commandeer Michael's Land Rover Discovery to assist with car-to-car tracking photos. Why? Well, I have to mention this, if only because you might find it entertaining and, perhaps, worthy of respect, but the sole means of transport for today's photographer, Greg Owain, is a thirty-four-year-old Peugeot 205 GT. That's right, a GT, not a GTI. It's a four door, too. When was the last time you saw one of those?!

Back to the plot (before I lose it). For Michael, the 993 Turbo is the culmination of a search for the perfect 911 to suit his needs. His journey of

led him to Jonathan Ostroff at Hexagon Classics, the sports car sales specialist synonymous with the 993 Turbo more than most. Michael judged this particular 911 to be "the best, most powerful, most original air-cooled 993 Turbo available in the UK at the time. It boasted low mileage and the rare X50 engine upgrade. Incidentally, at £165,000, it is my most expensive car purchase to date." Even so, that's half the price of a 993 Turbo S, which chucks out roughly the same power.

SAVOUR THE FLAVOUR

Pleased at the car's odometer displaying just forty-two thousand miles, Michael sealed the deal, but wasn't shy of adding to the scoreboard, pressing his new 911 into immediate service by using it for an organised twelve-day tour of Switzerland hosted by Porsche Driving Days UK (PDDUK), taking in twelve mountain passes along the way. The Turbo lived up to the model's reputation for fast thrills, plus supreme usability. Yes, we appreciate this is another nod to the 'everyday supercar' cliché, but it's hard to separate the admittedly overused label

Facing page Despite being a low-miler and sleeping in an air-conditioned air chamber, this fabulous Arena Red 993 Turbo came out to play in deepest Monmouthshire on a particularly damp day



from the 911 Turbo story. "It's difficult not to be in awe of the 993 Turbo," Michael shrugs. "I've owned more exciting cars, particularly Ferraris, but this 911 just feels so ahead of its time, which is remarkable when you consider it was the end of the air-cooled 911 Turbo line."

Did Porsche leave the best until last? In short, yes, but the 993 Turbo was very much a product of the manufacturer's past and a teaser of what might have been, had Porsche not run into financial difficulties in the early 1990s. The truth of the matter is that the 993 Turbo owes little to its immediate predecessor (the 964 Turbo, essentially a re-hashed 930) and much to the 959 (Porsche's undisputed technological tour de force). Confused? There is a missing link: the stillborn 969, fashioned as offspring of the 959, complete with a 370bhp 3.5-litre twin-turbocharged engine. Other engines were considered, including a variation of Porsche's ninety-degree IndyCar V8. Yes, seriously. Instead, factory engineers opted for a flat-six with water-cooled four-valve cylinder heads. A sophisticated four-wheel drive system was hooked up to an early form of PDK, although a manual six-speed gearbox was available as an option.

The 969 was due for a 1991 launch and would happily hold 185mph around the Nardò Ring. The sloped-back headlights of the 959 featured prominently, as did the 959's hoop-style rear wing. Sixteen prototypes were built. The 969 would have been the pinnacle

of the 911 range and, in all likelihood, another form of Turbo would have slotted neatly beneath it in the period's Porsche product hierarchy. Internal machinations at Porsche, however, not to mention rocketing development costs, killed the project — the 969 was too expensive to build, the technology needed to fully realise the car wasn't yet available and the expected price tag was considered too high, especially with a financial crisis looming large on Porsche's balance sheet. Additionally, the 969 would have launched straight

into the recession of the early 1990s. Ultimately, fifteen of the prototypes were crushed. The lone survivor resides in the Porsche Museum.

The 969's demise explains the rushed-to-market 964 Turbo, loaded with an evolution of the 930's 3.3-litre flat-six, which can be traced back to the three-litre unit powering the original 911 Turbo. Indeed, even at launch, the 964 Turbo was regarded as being a bit long in the tooth. Its reputation suffered accordingly, with values quickly on the floor. Only in recent years has the model

Above Of all the colours available for the 993 Turbo, Arena Red is a firm fan favourite, helped by enduring images of a period Porsche Cars Great Britain press mule finished in the same shade





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Above Though the 993 Turbo was widely praised on release, muted criticism came in response to what many saw as a lack of interior updating, thereby not presenting a cabin substantially different from that of the 964

Facing page Twin-turbocharged engine delivers little in the way of lag and is pictured here in rare X50 specification

seen something of a revival, being recognised as the last of the old-school, rear-drive, air-cooled 911 Turbos.

In trying to develop the 969 as a range-topping model alongside development of the 964,

Porsche massively overstretched itself, although showroom visitors and the wider community of marque enthusiasts were largely unaware of what might have

been. In Zuffenhausen, there was a certain despondency with the 964, which tallied with the model's slow sales figures. This meant the 993 had a lot of work to do, and explains why it appeared very quickly, the 964 lasting barely four

years in production. In response to frustrations concerning compromises inflicted on the 964, the 993 featured the first significant bodywork and styling changes to the 911 since its inception.

THE 993 TURBO WAS VIEWED MORE AS AN INTERCONTINENTAL SUPERCAR THAN A WIELDY B-ROAD ASSAULT WEAPON

The flattened front-end followed styling of the 928 and 968, haunches were muscular and the windscreen was moved forward by three millimetres in order to give more rake. The rear quarter windows were moved outward by seven

millimetres. Smoke and mirrors? Maybe, but these changes were effective in giving the 911 a more modern aesthetic. Engines were comprehensively overhauled versions of the M64 flat-six.

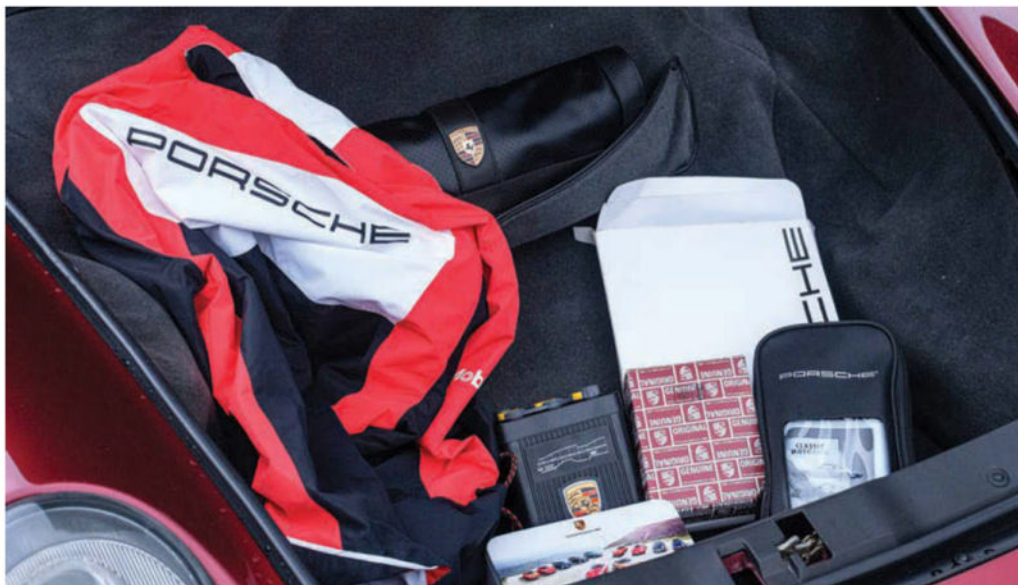
Talking of six, the Getrag G50 gearbox was developed into a six-speed.

Nobody had been excited by the 964's Macpherson strut suspension, least of all 993 project

leader and 911 campaigner, Ulrich Bez, who managed to persuade the powers-that-be to fund the development of a new parallel wishbone system, mounted on an aluminium subframe.

In September 1993, as per tradition, the 993 was launched at the Frankfurt Motor Show, where it was met with universal approval. If there was any disappointment, it related to the fact Porsche's development budget had run out in advance of interior upgrades. In time, the base 993 Carrera was joined by the Carrera 4, widebody S versions, a cabriolet, plus a new and novel sliding-glass-roof Targa, as well as GT and RS variants. Oh, and the mighty Turbo, the reason we're getting rained-on in Monmouthshire.

It took a couple of years to arrive, but the 993 Turbo made good on the relatively disappointing 964 Turbo. In one fell swoop, the newer force-fed 911 showed how things should be done and sent tidal waves of shock and awe throughout the supercar world, largely





on account of the model's mix of pace and usability. It was as if the 964 Turbo had never happened. Moreover, it seemed like the 993 Turbo was a direct descendent of the 959/969, which is exactly the case put forward here.

NO HALF MEASURES

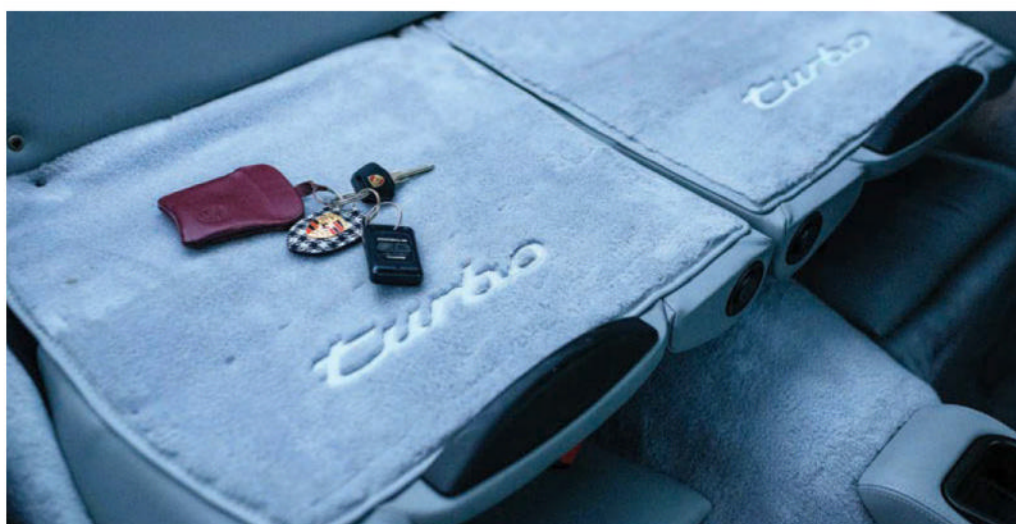
With not one, but two turbochargers strapped to the 3.6-litre M64, and with 402bhp on tap, the 993 Turbo could have been an absolute animal (that role was reserved for the GT2), but it wasn't and isn't. More significant was the way the available power was managed via super-advanced (for the time) electronics. The advantage of twin turbochargers — one on each bank of cylinders, with individual intercoolers — is how they could be kept relatively small and therefore spool-up quickly. The result was negligible lag, with boost cutting in smoothly at 2,000rpm. There was also oodles of torque, some 358lb-ft at 4,500rpm, and plenty on-hand before peak. Then, of course, there was the four-wheel drive system, which could deploy all power and torque in a manner rendering the competition (if, indeed, there was any)

irrelevant. Facts and figures? Top speed of 180mph and a Porsche-quoted sprint to 60mph from rest in 4.5 seconds, although most magazine test pilots managed to record numbers well under four seconds.

It might have looked wide in 1995, but today, the 993 Turbo looks positively Slim Jim, although at close to 1,500kg, it is carrying a bit of timber, it must be said. This we can live with — it's

important to keep in mind we now live in a world of 'supersize me' sports cars recognised for being uncomfortable, noncompliant and non-compatible on poorly maintained roads, like those in the UK. In its day, the 993 Turbo was viewed more as an intercontinental supercar than a wieldy B-road assault weapon. It was designed for the big drive, the serious journey. Michael's Swiss adventure is a perfect example of

Above Considered wide on launch in the mid-1990s, the 993 Turbo is positively tiny compared to the present-day 911 (Turbo or otherwise)



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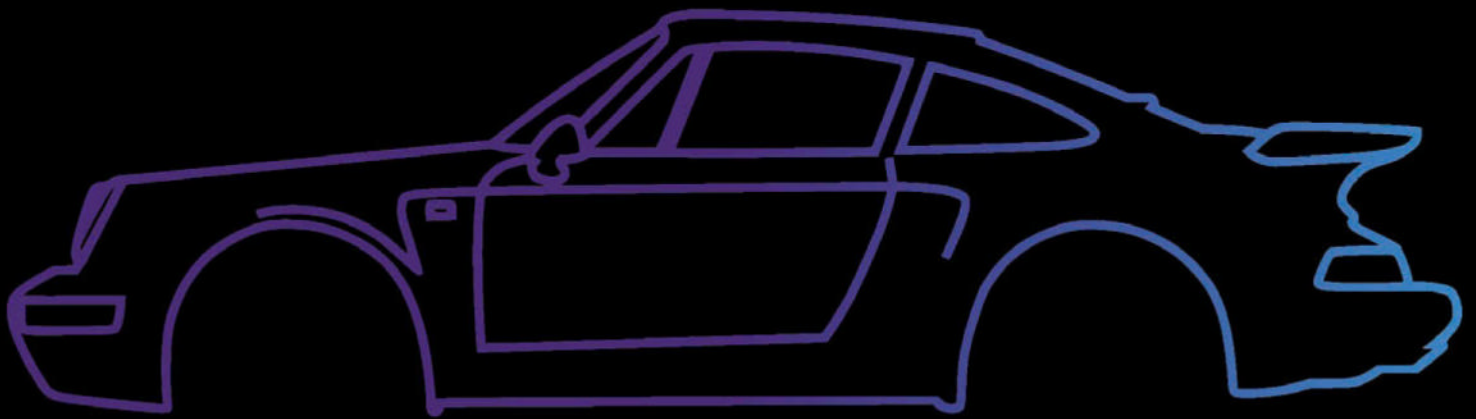
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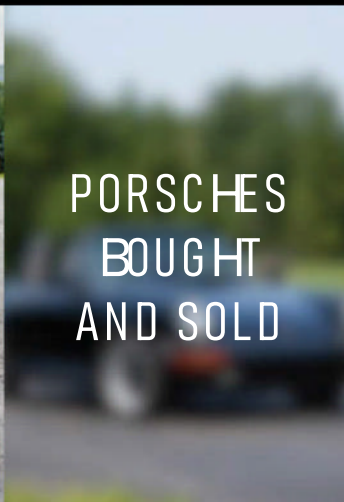
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Above One of the all-time great 911s in one of the best factory colours

the model showing off its capabilities. Think serious distance in muted comfort, followed by unleashing of the Turbo's talents in the high Alps. It would be a shame to confine this car to a future of coffee meets.

To today's little jaunt, then. We're in wet and muddy conditions playing perfectly to the 993 Turbo's skillset, culminating in a spot of going backward to eventually go forward, which is where we came in. Prior to this bit of excitement, Michael's Turbo proved itself to be absolutely and resolutely on-side at all times.

SAME AS ALWAYS

The interior is pure and familiar 911 layout, if slightly more luxurious over lesser 993s. Everything is instinctively where you know it to be. Even air-cooled 911 quirks, such as floor-mounted pedals and a gear lever requiring a slight twist of the shoulder to reach, are reassuringly familiar for getting in and getting on with things.

Sandwiched between the unsophisticated 964 Turbo and the revolution of the 996 Turbo, the 993 feels solidly built, especially when compared to the latter. It would be unfair to

contrast the driving experience with that of the water-cooled 996 Turbo, but the 964 Turbo? Believe me, it's night and day. You have to fight with the 964 Turbo, whereas the 993 Turbo can be guided, allowing the chassis to do the work, all the while maintaining almost improbable

with the 993, after which, Porsche's bean counters took charge of vehicle production costs and the 911 became a car of not quite so many parts. It had to happen, of course, but the 996 certainly doesn't exude the same quality.

My abiding memory of driving

Michael's 993 Turbo? It'll be speeding headlong into driving rain, wipers working hard, a rooster tail of spray in the rear-view mirror. In contrast, the cabin is inner calm

ALL THE CONTROLS, FROM THE MASSIVE BRAKES TO THE GEAR SHIFT, EXUDE A QUALITY FINISHING WITH THE 993

speed. Porsche got the 993 Turbo right. You don't just sense it, you outright know it. Porsche had refined the four-wheel drive system, too, to the extent you wouldn't really know it's there, even with its advanced viscous coupling sending all power to the rear under normal conditions and up to forty percent to the front when required. Today, when push comes to a helping hand and a tug from the front wheels, the transfer is seamless. Mostly, then, the 993 Turbo is a rear-drive cruise missile, with unweighted front wheels wriggling on the asphalt and in your hands, in that pure 911 way.

All the other controls, from the massive brakes to the well-oiled gear shift, exude a quality finishing

and sanctuary. For this 911, there is no such thing as bad weather. If their owners were prepared to venture out into such conditions, the 993 Turbo's contemporaries wouldn't see which way it went. It's why Michael has dabbled in Ferraris and the like, but has bowed to the inevitable. Once the Porsche bug bites, it rarely lets go.

I confess to feeling slightly guilty as we bid farewell. At our behest, Michael's really rather lovely — arguably one of the best — 993 Turbo is covered in a thick layer of Monmouthshire grime. I admire anyone prepared to use their Porsche in the manner to which it was conceived. This brings us back to the 911 Turbo's legendary usability. Everyday supercar? Resistance, clearly, is futile. ●

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50 YEARS OF 911 TURBO



BOOST OR BUST

Sequential turbocharging was just one of the 959's many innovations, but what is it and how does it work? In this article, we look back at the technology's origins and its influence on Porsche products to the present day...

Words **Shane O'Donoghue** Photography **Porsche Corporate Archives**

Although turbocharged cars from other manufacturers preceded the 930 (911 Turbo), Porsche's introduction of forced induction to its flagship model in 1974 is seen as a notable milestone for the automotive industry, not least because engineers in Stuttgart were dedicated to developing and refining the technology in an evolutionary process continuing today. The 930 was, in fact, conceived only to homologate the 935 race car, but despite its flaws (and price), the roadgoing boosted Porsche proved popular, becoming a mainstay of the company's product line.

Revealed to the public at the 1974 Paris Motor Show, the 930 went on sale in time for the 1975 model year. Its three-litre, air-cooled flat-six used a single turbocharger and initially produced 256bhp and 243lb-ft torque against a maximum of 207bhp for the 911 range's normally aspirated 2.7-litre boxer. Porsche increased capacity of the turbocharged engine to 3.3 litres for 1978, but perhaps of more significance to the success of the 930 was the introduction of an air-to-air intercooler. This sat under the model's now famous rear spoiler and cooled combustion air after it was compressed by the turbocharger, enabling output to be raised to a mighty-for-the-time 296bhp and 304lb-ft torque.

This was remarkably close to being the end of the 911 story. Ernst Fuhrmann (Porsche's Chairman of the Board for eight years until 1980) was thought to be planning to discontinue the 91 — along with its air-cooled boxer engines — in favour of the front-engined, water-cooled transaxle family of Porsche products.

Anecdotally, many of his colleagues were less than happy about this proposal, which came to nought when Fuhrmann was replaced by Peter Schutz in 1981. Schutz's intention? To develop the 911 further, indefinitely.

Helmuth Bott, an engineering whizz and Porsche's director of research and development, had already started planning the first open-topped version of the 911 (a prototype Cabriolet) before Fuhrmann's departure. The resulting

motorsport. This category, introduced in 1982 by the FIA, was designed to be a replacement for Group 4 and Group 5. Where Group A cars were largely based on mass-produced models, there was huge freedom in Group B, with no cap on turbocharger boost or technology. It was deemed to be the perfect showcase and proving ground for Porsche's most ambitious project yet, an extreme evolution of the 911. Two years later, at the 1983 Frankfurt Motor Show, Porsche

took the covers off its spectacular Gruppe B concept car and announced its intention to compete on the world rally stage, with tobacco company,

AT LOW SPEEDS, THE FLAT-SIX OPERATES IN 'SINGLE TURBO' MODE, WITH ALL AIR AND GAS FLOWING THROUGH THE LEFT-HAND TURBO

design study was displayed in public at the 1981 Frankfurt Motor Show and made use of a turbocharged 930 engine and a then new four-wheel-drive system. In truth, it wasn't a very sophisticated setup, borrowing a driveshaft from the 924 to bring drive to the front axle, plus a differential from the 924 Turbo to apportion power between the front wheels, but behind the system's existence was the influence of Manfred Bantle, an accomplished engineer, who had worked on design and development of the 928's clever 'Weissach' rear axle.

After the show, certainly as far as the technology previewed in Frankfurt was concerned, things were perceived to have gone quiet, but behind the scenes, work began on something rather more magnificent. Bott got the go ahead from Schutz, not only to put his design for a 911 Cabriolet (the first full Porsche drop-top since the demise of the 356) into production, but also to explore powertrain ideas in the Cabriolet concept further. A test mule was constructed to prove the concept of all-wheel drive, and the green light was given to develop a car capable of competing in Group B

Rothmans, serving as main sponsor.

To fit in with the car's exotic nature and the plan to compete with what would go on to become the 959, Porsche turned to its racing department for an engine, adopting a special 2.85-litre variant of the tried-and-tested flat-six. The same displacement was employed by the earlier 935 race car in 1976, taking the three-litre turbocharged boxer from the 930 as its basis. The FIA applied a multiplication factor of 1.4 to turbocharged engines, however, meaning in order to compete in the under-four-litre category, the engine's swept capacity was decreased by reducing the diameter of the bore.

Porsche struggled with head gasket issues in 1977 and considered developing an all-new race engine using water cooling. Group 5 rules prevented this, dictating how the air-cooled engine block, crankcase and cylinders from the road-going 911 had to be used to satisfy homologation requirements. Thankfully, a water-cooled cylinder head was permitted, which allowed for a complete redesign of the valve gear. Porsche took the opportunity to fit individual



camshafts for inlet and exhaust and four valves per cylinder, massively improving the breathing of the engine. Over time, the unit underwent a huge number of iterations in its motorsport setting before it was employed as the 959's beating heart. Nonetheless, the cooling concept was carried over, with water cooling

for the double overhead camshaft, four-valves-per-cylinder heads and air cooling for the aluminium crankcase and cylinder blocks.

A 95mm bore and 67mm stroke resulted in 2,849cc capacity, while expensive titanium connecting rods kept the reciprocating mass down. In recognition of the intention to put the 959 to work in a competition environment, both on rally stages and at Le Mans, a dry sump lubrication system was also used.

Back to the turbocharging. Some of Porsche's previous 2.85-litre race engines used single turbochargers, though most used two, one for each bank of cylinders, always spinning. This configuration is what's referred to as parallel turbocharging. It's great for producing a huge amount of boost at high engine speeds and loads, such as in competition applications. Porsche's experience with

the 930 and the model's extreme lag, however, convinced factory engineers the 959 needed far more sophistication. They reasoned a single small turbocharger would improve response at low engine speeds and loads, but would limit outright boost, while back pressure in the exhaust caused by this setup

DESPITE ITS GROUND-BREAKING DEVELOPMENT, SEQUENTIAL TURBOCHARGING DIDN'T APPEAR TO GO ANY FURTHER THAN THE 959

could negatively impact fuel economy. In contrast, a single large turbocharger would provide plenty of boost, but would result in more of the lag Porsche was trying to avoid. Enter the world's first sequential turbocharging system.

The 959's engine uses two turbochargers mounted on the back of the unit, one on each side. At low speeds, the flat-six operates in 'single turbo' mode, with all combustion air and exhaust gas flowing through the left-hand turbocharger. This is achieved by closing turbine cut-in and compressor cut-in valves on the second turbocharger, ensuring no gases can flow through it. Hence, all the exhaust gases from the right-hand cylinder bank flow to the left-

hand turbine through a transverse pipe. This quickly gets the turbocharger up to operating speed by way of a relatively small turbine.

The wastegate is also closed at this point and, when exhaust gas flow is registered as too great for the left-hand (primary) turbocharger, the excess is sent to the right-hand turbocharger. This is regulated by the turbine cut-in valve and has the effect of immediately accelerating the right-hand

turbocharger up to speed. At this stage, the compressor cut-in valve is still closed, despite air pressure building up on the right side.

The process is controlled via a relief valve until there's enough exhaust flow to fully supply both turbochargers. The relief valve then closes and the turbine cut-in valve opens fully, rapidly increasing air pressure downstream of the right-hand compressor. The compressor cut-in valve is opened and both turbochargers become fully operational. Porsche records shows how, in this setting, the turbochargers get an equal share of exhaust gas flow and overall boost pressure is managed by the wastegate. Peak boost pressure was

Above 959 exhibition cutaway highlighted just how much new tech went into the twin-turbo supercar

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Photo Credit: Larry Chen Photography



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reported to be 1.0bar. All this complexity was only possible because Porsche adopted advanced (for its day) electronic computing to control the system, though the basic premise of the idea is simple enough to comprehend.

Two air-to-air intercoolers fed cool air through the 959's intake vents, located ahead of the rear wheels, encouraging 450bhp at 6,500rpm and 369lb-ft torque at 5,500rpm. Those were heady figures for the mid-1980s and, if we're being honest, they're not too shabby today, enabling the 959's sprint to 62mph from rest in 3.7 seconds and top speed of 197mph. Of course, there was much more to come from that extraordinary engine, including its development for the ultra-rare 959 S, which used bigger turbochargers, sacrificing drivability in the name of outright power. 508bhp, in fact, enabling a romp all the way to 211mph. In the 961 track racer (a circuit dwelling variant of the 959), the engine was developed even further, knocking on the door of 680bhp.

As revered as the 959 is by marque enthusiasts (and collectors of appreciating classics) today, the all-pawed Porsche cost the company a fortune to develop and, despite its huge purchase price, Porsche lost money on every unit sold. Even so, the 959 is regarded as an invaluable investment in the development of Porsche technology, though it took a while for the model's exciting innovations to become

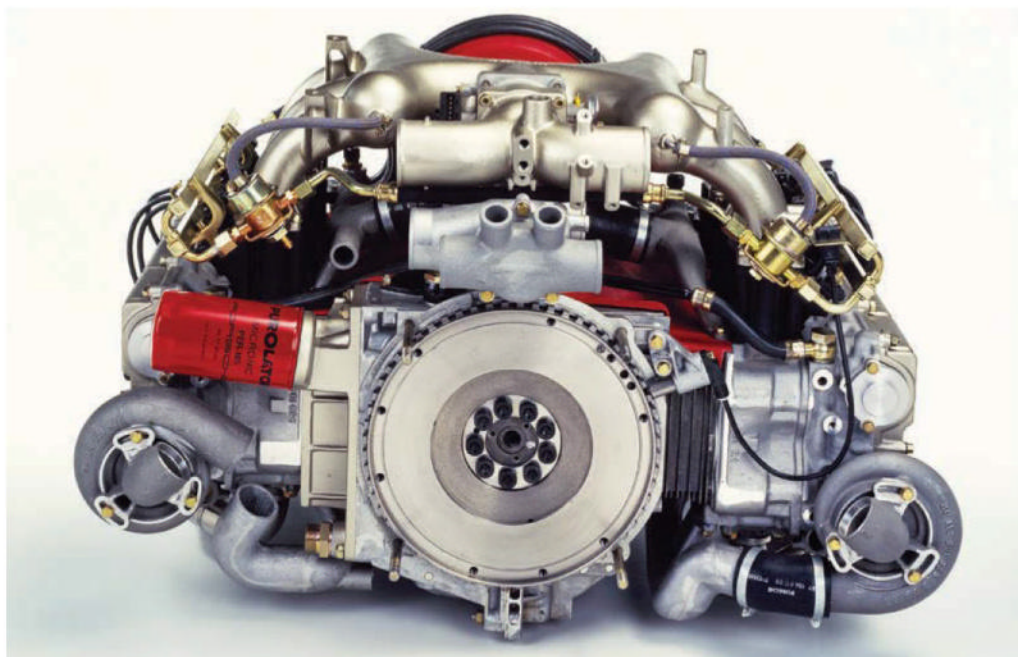
commonplace in the wider Porsche product portfolio. For example, the 964 was the next generation of 911 to launch after the 959's introduction, but the 964 Turbo continued to use the 930's single turbocharged engine as its basis. This came as disappointment to many, not only because it suggested a lack of time had been allocated to develop the 964's 3.6-litre M64 engine into something sufficiently different to the late 930's powerplant (though minor revisions were made to reduce lag, encourage smoother operation and add more power), but also because it signalled the end of

the 965 project — many will incorrectly refer to the 964 Turbo as 965, but this was, in fact, a separate model intended to become Porsche's range-topper by adopting the 959's basic powertrain, styling and chassis architecture, but at a more attainable price point.

The 3.6-litre 964 Turbo eventually arrived in 1993, and though the Carrera 4 was the first production 964 launched back in 1989, it wasn't until the launch of the twin-turbocharged, four-wheel drive 993 Turbo in 1995 that the 959's influence was truly felt in the 911 range. This was the first time a duo of

Above 965 was a stillborn model based around 959 styling, but intended to be offered at a much cheaper price point than the F40 baiter

Below 959's twin-turbocharged boxer



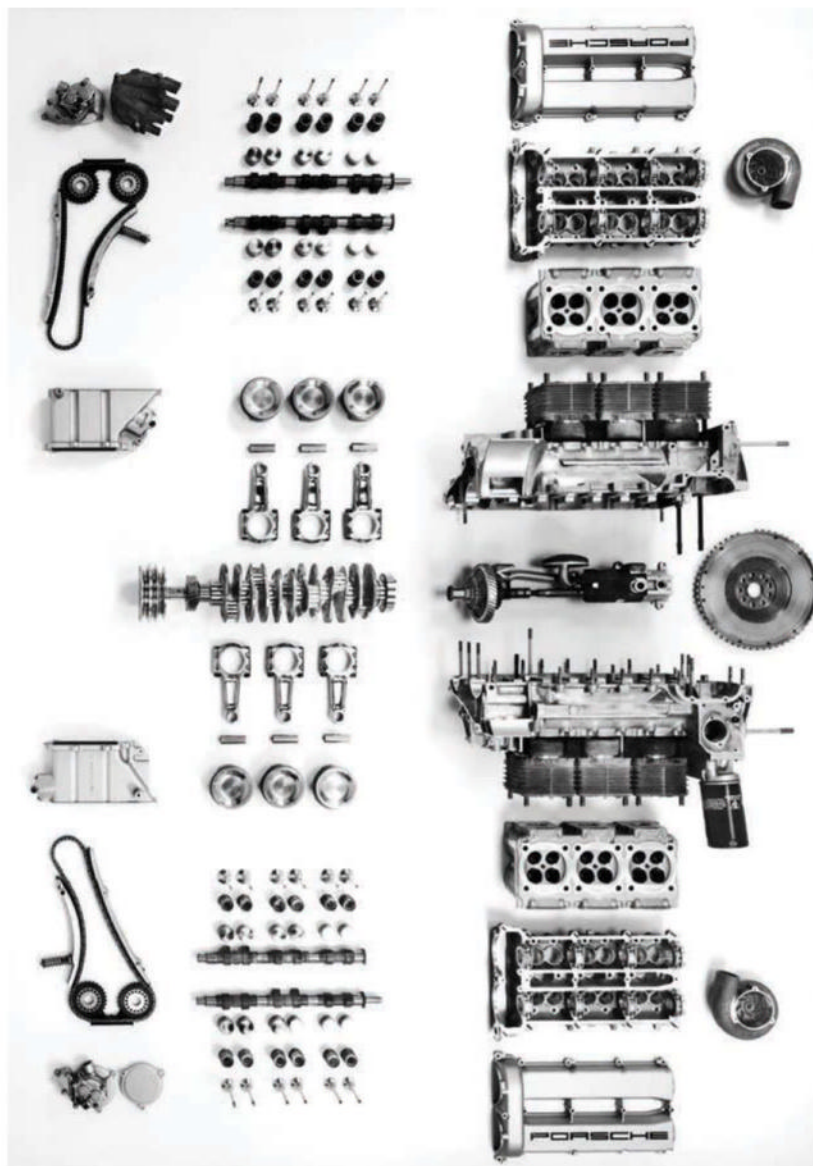


Above The all-wheel drive, twin-turbocharged 993 arrived a decade after the 959 and marked the first time the supercar's influence was fully realised in the 911

Right All the parts required to build your own 959 engine

turbochargers was used in the assembly of a production 911, but despite the rapid evolution of engine electronics in the intervening years, the 993 Turbo dispensed with the 959's complex sequential turbocharging system and instead featured two identical, relatively small turbochargers, compromising between low-speed response and top-end power. Boost pressure topped out at 0.8bar, enabling 402bhp and 398lb-ft torque. In fact, despite its ground-breaking development, sequential turbocharging didn't appear to go any further than the 959 in Porsche's world, even though it is commonly used by other manufacturers today. Undoubtedly, the technology's design educated Porsche's engineers, teaching them much about how to optimise boost pressure for a variety of conditions. These learnings unquestionably resulted in development of the Variable Turbine Geometry (VTG) turbocharger, which effectively does the work of a sequential turbocharging system, all within a single turbocharger.

At low exhaust gas speeds (low engine speeds and loads), vanes on the inlet to the turbine restrict the flow path to speed up gas flow. These vanes open up the flow path at higher speeds to make full use of the energy in the exhaust. And in case you were wondering, the 997 Turbo was the first Porsche to make use of this technology, which is still in use across the manufacturer's range to this day. ●





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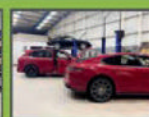
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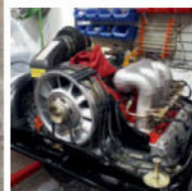


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50 YEARS OF 911 TURBO



KEEP YOUR COOL

Automotive engines aren't particularly efficient — a third of an engine's output is heat energy, which needs to be dissipated to air and away from the engine. Cooling is therefore vital. Let's examine intercoolers and how they work...

Words **Dan Furr** Photography **Design 911, CSF Race**

It's not just water in an engine that needs to be kept cool. Motor oil, charge air in forced induction applications, gearbox oil, differential oil and, in some cases, power steering fluid, all absorb heat as they work and therefore need to be cooled, but a number of variables affect the characteristics of cooling equipment.

Most cooling products, including water radiators, intercoolers and oil coolers, work in a similar way. The water, air or oil to be cooled (working fluid) is passed through a cooler, which is (or should be) situated where it receives

a constant flow of air as the vehicle moves forward. The working fluid passes through the core of the cooler and transfers its heat to the cooler itself. This heat is then dissipated to the surrounding air. Cooling airflow passes through the foil or fins of the cooler. The principle is fairly simple, but there are a number of factors to consider in order to produce a cooler capable of doing what it should.

On the subject of different coolers, another common type of cooler is a chargecooler. Its job is to cool charge air on a forced induction engine. Unlike an intercooler, which is an air-to-air heat exchanger, a chargecooler uses water to cool the charge air. Essentially, it consists of a tube for the charge air to pass through, which is within a water-filled tank. As the charge air passes through the tube, the heat is transferred from the air to the surrounding water. The water is then pumped back into the engine cooling system and cooled by the water radiator.

The size of the cooler affects its cooling properties, but it isn't necessarily a case of 'bigger is better'. The cooler

needs to be correctly sized for its application. It's more to do with the volume of the cooler and mass of the working fluid than the size of the cooler itself. An intercooler the size of an oil cooler, for example, wouldn't be any good, nor would an oil cooler the size of an intercooler. You see, it's all about the specific heat capacity of the working fluid, which relates to the amount of heat energy a kilogramme of that working fluid can transfer. The specific

has to fill a larger volume before any of the charge air enters the engine. There will also be a pressure drop across the intercooler, meaning the air coming out of the cooler will be at a lower pressure than that going in. This is directly related to the volume. In other words, a large intercooler will have a greater pressure drop than a small one, meaning the turbocharger will have to work harder to produce the same boost pressure entering the engine. Water radiators

and oil coolers also suffer from pressure drop. While the end result may not be as noticeable as increased turbocharger lag and lower

ALTHOUGH THE CAR MAY BE TRAVELLING AT 80MPH, THE SPEED AT WHICH AIR FLOWS THROUGH THE INTERCOOLER WILL BE CONSIDERABLY LESS

heat capacity of air is 1.01 kilojoules-per-kilogram. This means every kilo of air can transfer 1.01kJ of heat energy. Sticking with our example of intercoolers and oil coolers, oil has a specific heat capacity of 2.13kJ-per-kilogram. Oil is therefore twice as good at transferring heat than air.

These calculations are based on mass (kg). When you realise a single kilogram of oil equates to just 1.15 litres, and a single kilogram of air is 1,114 litres (yes, one thousand, one hundred and fourteen), you can see why an intercooler needs to be much larger than an oil cooler in order to have the same cooling potential. Also, we need to take into account how oil usually only needs to be cooled by between ten and fifteen degrees Celsius, whereas charge air is typically cooled by between fifty and sixty degrees Celsius.

The optimum size of a cooler is a compromise between different factors, the most common being space available in the engine bay in which installation is required. For intercoolers, we also have to consider the fact more volume means more lag — the turbocharger

boost pressures, it can be even more detrimental. The water pump or oil pump will have to work harder to force the fluid through the cooler, which can lead to cavitation, amounting to potentially fatal consequences for an engine.

HARD CORE

The core is made up of two main parts: the tubes the working fluid passes through and the foil (or fins), which the surrounding air flows through as the vehicle moves forward. The design and number of tubes used will have a huge effect on a cooler's characteristics. A core with four rows of fifty-millimetre tubes will have greater cooling potential than a single row core with a twenty-millimetre tube. The number and sizes of tubes used within a core depends on what application it is intended for.

A number of variables can be altered to give a core its particular properties. The first is the size of the tubes. A larger tube will flow more working fluid than a smaller one, but the pressure drop across the core will be greater than that of a smaller tube. To some extent, this can be counteracted by the use of multiple rows

Facing page Bigger doesn't automatically equate to better when it comes to intercooler design



of tubes. Two tubes will flow the same mass of working fluid at half the speed of a single tube of the same size. This results in a lesser pressure drop across the core. By increasing the number of rows, however, you also increase thickness of the cooler's core.

A thicker core will have a greater drag effect on aerodynamics. Additionally, the

speed air flows through the core itself will decrease. This can lead to problems getting the air through the cooler and out the other side, causing detrimental effects to the cooling.

Smaller tubes are structurally stronger than larger items. The lower height/width ratio of the tube means it is physically stronger and is therefore less susceptible to 'ballooning' under pressure. The downside to using multiple smaller tubes is that they are more fiddly and therefore more expensive to produce — there are at least twice the number of joints that need to be fused, which adds to the time taken for manufacturing. Also, multiple-row cores tend to be heavier than single-row cores.

You may think the more rows in a core, the better it is at cooling. To an extent, this is true, but there will come

a point when too many rows starts to have a detrimental effect. A four-row core with four twenty-millimetre tubes will have better cooling potential than a core with only three rows of the same

size tubes. The difference, though, will be a lot smaller than you'd imagine — the downsides extra rows bring outweigh the positive gains.

As soon as airflow enters the foil, it starts cooling the working fluid within the tubes. This effect is greatest at the first row nearest the front of the core, decreasing as the air works its way through the foil and out the other side. The additional fourth row at the back of the core therefore offers only a small amount of cooling advantage over its three-core equivalent. The disadvantages of having a thicker core, with slower and more restrictive air speed through the foil, and it being a heavier cooler overall, means it isn't worth adding the extra row.

Positioning is probably the most important aspect of any cooler's performance. Get it wrong and the cooler

just won't work. It's not simply a case of bolting the cooler to the front of the car and saying, "that's got loads of airflow and will surely therefore work brilliantly". Instead, you need to carefully consider

not just how much air can get to the cooler, but also how quickly the air can travel through it and out the other side, not to mention how much drag the cooler is

going to produce. Your car might make use of a large intercooler, for example, but behind a relatively small aperture, where it is sandwiched between the air-conditioning system and water radiator, resulting in heat soak. You also need to consider the speed at which airflow can pass through the cooler. Although the car may be travelling at 80mph, the speed at which the air flows through the intercooler will be considerably less due to the shrouding effect of the surrounding bodywork.

When positioning a cooler, you need to ensure the air can pass through it effectively. This doesn't mean as quickly as possible — air passing through a cooler too quickly simply won't have the time to cool the working fluid. Conversely, if the airflow is too slow, it won't be able to remove the

Above Rohler 992 Turbo (and Turbo S) intercooler with carbon-fibre guide, as supplied by the team at Design 911

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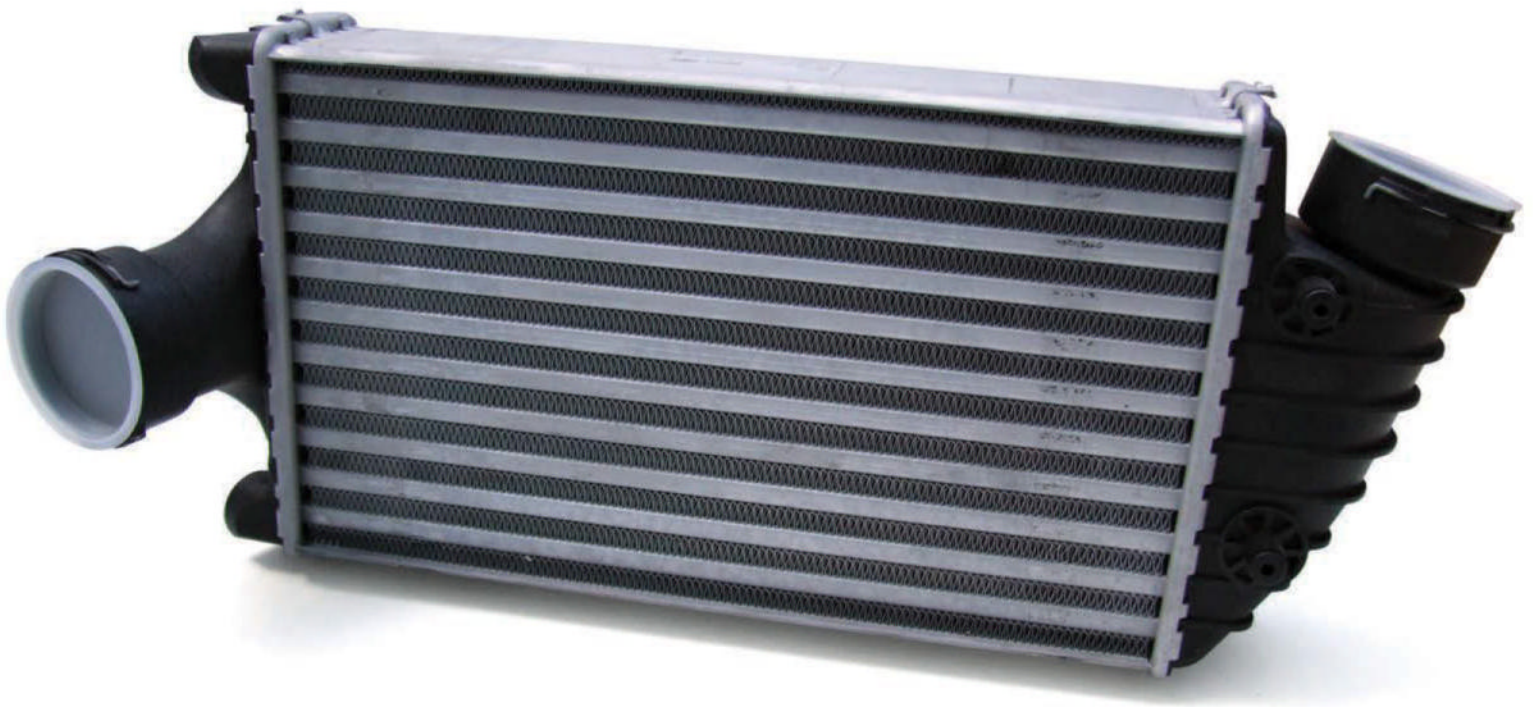


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heat quickly enough and the cooling properties will decrease. A compromise that has to be made when considering the position of cooling products is the ability to cool against the effect it will have on the aerodynamics of the car. This is not usually so important on modified road cars, but is critical in race cars. Ultimately, the nature of cooling products means they produce drag, which affects the car's aerodynamic properties. The positioning of the cooling products therefore needs to be carefully considered. The optimum position for a cooler is perpendicular to the airflow going through it, but this position also causes the most drag. Moving the cooler to a more acute angle will help, but will decrease the cooling effect.

Ducting can be used to channel airflow through the cooler at the optimum angle (regardless of where it is positioned), but this needs to be carefully calculated to ensure speed of the airflow is matched to what the cooler requires.

TUBE WORK

There are two types of tubes used within coolers: welded and extruded. Welded tubes are exactly what they say they are. They start life as a flat piece of aluminium, which is folded into a tube and then welded together. This makes welded tubes relatively cheap and easy to produce in a huge number of different sizes. The 'sacrificial material' (metal lost during the process of fusing the core

together) is all on the tube, not the foil. Welded tubes are 'clad' with a different grade of aluminium melting and fusing the core together at around 500-550°C, depending on the core in question.

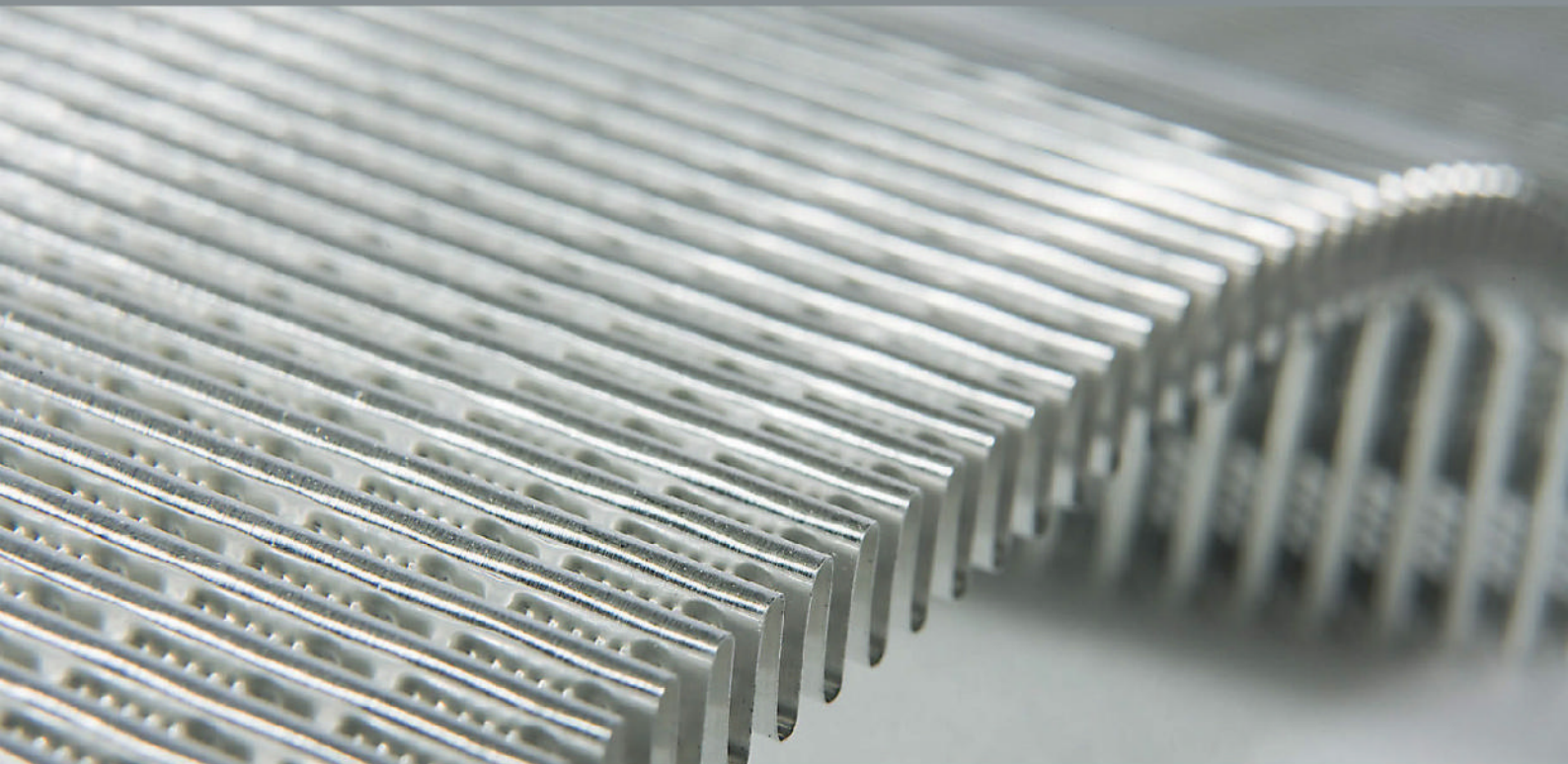
It's also possible to insert 'turbulators' within welded tubes. These are primarily designed for intercoolers, where the increase in surface area is needed to transfer the heat. Without turbulators,

an intercooler would need to be hugely long in order to exchange heat. The size simply wouldn't be practical. Fitting turbulators provides the same surface area for the cooler, but in a much smaller space. The turbulators also serve to increase the strength of the tube. When fused, turbulators act as supports within the tube and help prevent it ballooning under pressure.

Above OE Match intercooler for the 996 Turbo, available from Design 911

Below 930 intercooler makes itself known beneath the model's giant rear wing





Above and right
Both the height and pitch of the foil will have an effect on performance, as will the number of rows in an intercooler core

Extruded tube is much stronger than welded tube. Production involves forcing the aluminium through a specialist machine at high temperatures and high pressure. As a result, it is more expensive than welded tube and is only really used where the strength and ability to cope with high pressures is needed.

The pitch of the foil, or fins, within the core also has an effect on its cooling properties. Most applications use the same pitch foil, but some specific applications will require the pitch to be altered. By opening up the foil, the amount, the speed of air flowing through the cooler core is increased, thereby reducing drag, but the price you pay is that the cooling effect will decrease because there will physically be less fins to transfer heat from the core to the air flow. Of course, it is possible to increase the height of the foil and therefore increase the air flow through the core that way. The compromise in doing so is that you will have less tubes within the core for a given amount of space available. As a general rule, the more open the fins, the less restrictive the core is to air flow and the less drag it will produce. There will, however, be fewer fins, which will result in a much lesser cooling effect.

The more closely packed the fins are, the better the cooling properties, but the downside is that this will make the cooler more restrictive to airflow, and as a result will produce more drag. ●



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SWITCH TASKING

Owners of 987 Boxsters/Caymans or 997-generation 911s will be only too familiar with the frustration of unsightly climate control switches, which feature a rubberised coating prone to separation from the switch body. Back by popular demand is our guide to fixing the problem for less than thirty quid...

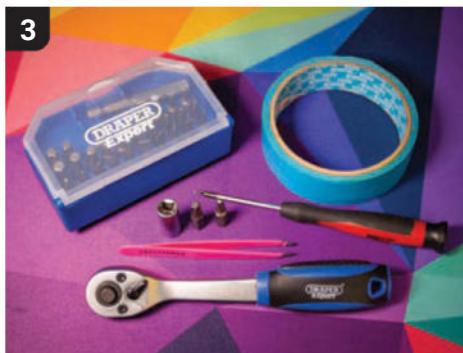
Words and photography **Dan Furr**



The factory blower speed and heater temperature switches are manufactured from plastic, but feature a rubberised coating, which wears over time and can easily scratch through contact with fingernails. Porsche doesn't sell the switches as standalone items, meaning the OEM solution is to replace the entire climate control unit at significant cost. No thanks.



These replacement climate control switches from Spyder Performance are painted black, meaning they aren't susceptible to the same damage as the OEM switches. The font is a little heavier than the original Porsche parts, but it's an acceptable compromise, especially when you consider these replacement switches can be bought for just £33 from bit.ly/spyderswitches.



For this job, you will need tweezers, detailing/masking tape, T20 and T25 torx bits, a small ratchet and a T6 screwdriver. You will also need a soft surface on which to place the climate unit.



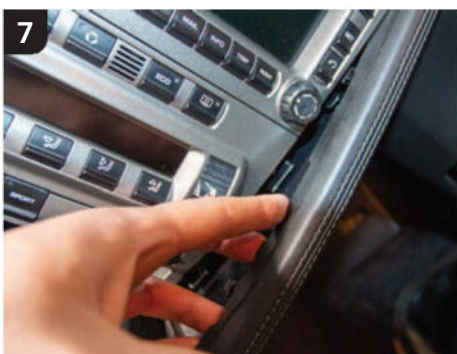
Starting in the driver's footwell, pull the seat back to provide access to the carpet panel at the back of the centre console. There is a T25 screw hidden in the carpet. Unscrew it.



With the torx screw undone, you can pull the carpet panel free. Note how the torx screw remains fixed in the carpet panel.



You should now see two T20 torx screws holding the centre console side trim panel in place. Remove both screws, top and bottom.



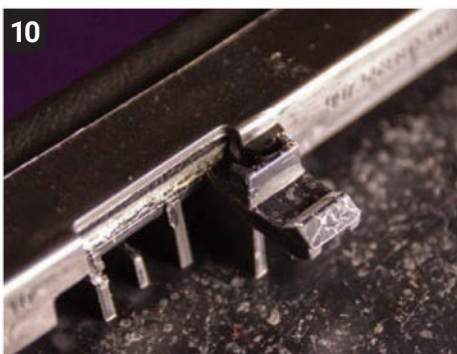
You will now be able to pull the side panel away from the centre console. The panel features three clips, which are easy to break. Work carefully, pulling the panel forward from the bottom.



The top clip is likely to be prove stubborn and is prone to snapping. Rather than applying extra force, angle the panel slightly upward and pull. This should enable you to remove it without causing damage.



This image shows one of the three metal fasteners holding the plastic clips in place.



As you can see, the plastic clips are thin and can therefore easily snap. Where the parts are broken, a buzzing or rattling noise can sometimes be heard emanating from the dashboard.



With the panel removed, repeat the process on the other side of the centre console.



Put all the parts safely to one side in readiness for reinstallation. You are now ready to remove the climate control panel.



The climate control panel is held in place by two clips, one on each side of the centre console. They're visible after side panel removal.



Push both clips with your fingers and the climate control panel will pull forward of the centre console. You might need to pull the gearstick back in order to provide the required space for removal.

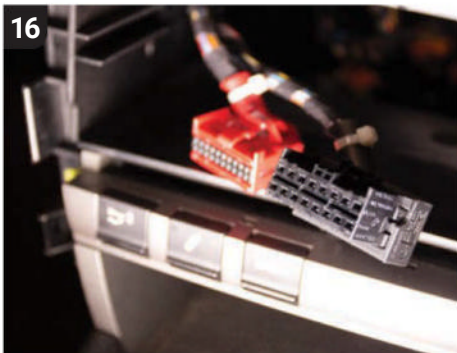
TECH: HOW TO

15



As you pull the climate control panel forward, you may feel resistance from the wiring plugs at the back of the unit.

16



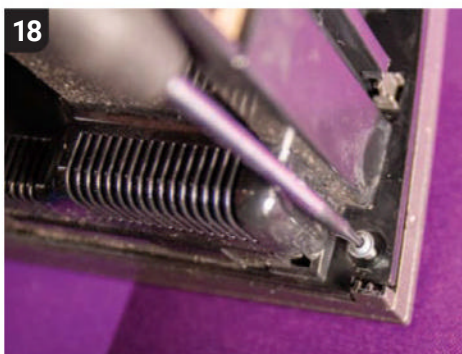
Carefully remove the plugs and pull the climate control panel free.

17



You're now ready to dismantle the climate control unit. Place it on a soft surface, such as a mouse mat or microfiber cloth, to avoid scratching the fascia.

18



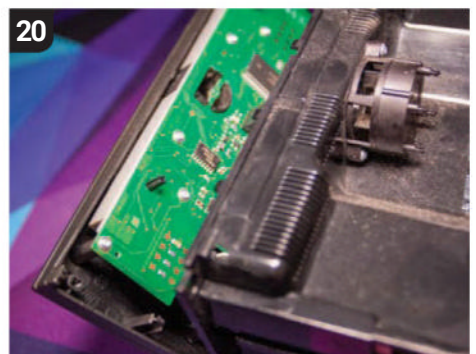
Take your T6 screwdriver and remove the four screws holding the climate control unit from the main body. There is a screw in each corner.

19



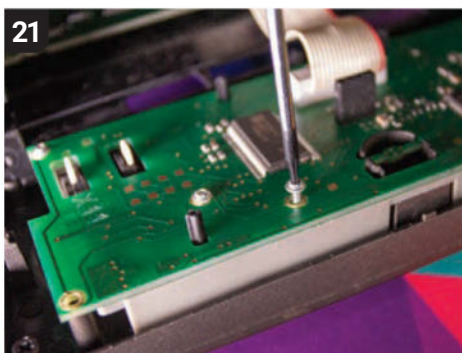
You can now separate the climate control panel from the main body. The circuit board will be attached by a wiring ribbon, so don't pull too hard.

20



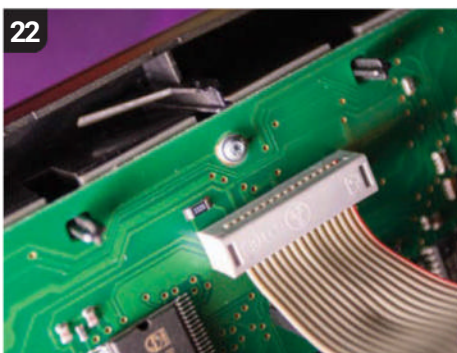
This is the view you should be presented with.

21



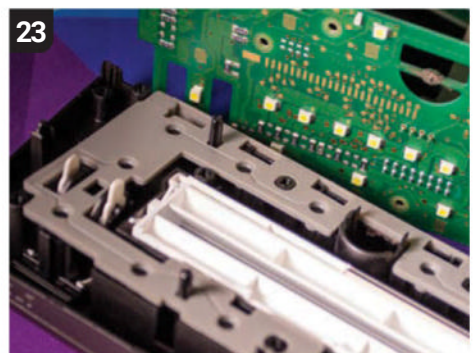
Use your T6 screwdriver to carefully remove the nine screws holding the climate control circuit board in place.

22



Eight of the screws will be easy to see, but one is hidden behind the wiring ribbon.

23



With all nine screws removed, you can pull the circuit board free.

24



Remove the rubber membrane revealed beneath the circuit board. Note which way up it goes prior to putting the part to one side.

25

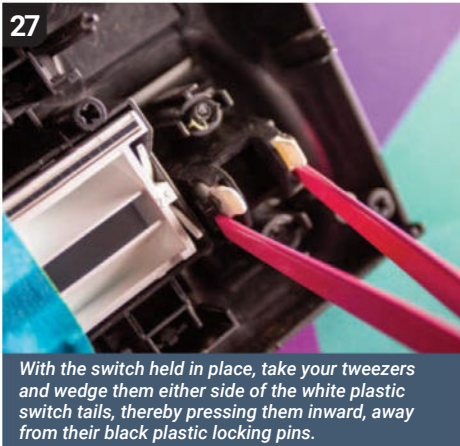


With the rubber membrane removed, tear off a piece of detailing/masking tape and use it to hold the climate control panel's screen in place, thereby protecting it from accidentally falling out of the unit.

26



You are now ready to remove the offending switches, one by one. Let's start with the temperature control switch. Push it all the way up and hold it in place.



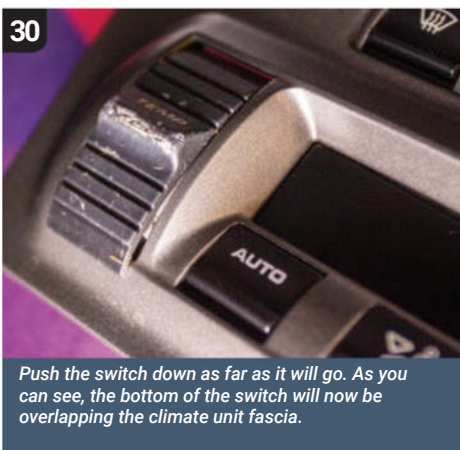
With the switch held in place, take your tweezers and wedge them either side of the white plastic switch tails, thereby pressing them inward, away from their black plastic locking pins.



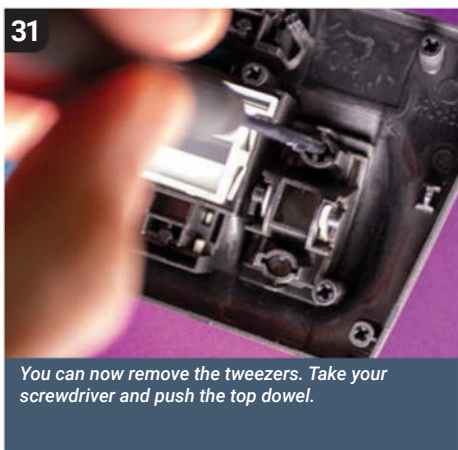
You can let go of the switch, but leave the tweezers in place. You'll see two black plastic dowels, one at the top of the switch, one at the bottom. Push the bottom dowel with your screwdriver.



The bottom of the switch will now be sitting proud of the climate unit fascia.



Push the switch down as far as it will go. As you can see, the bottom of the switch will now be overlapping the climate unit fascia.



You can now remove the tweezers. Take your screwdriver and push the top dowel.



The switch can now be pulled free from the climate control panel.



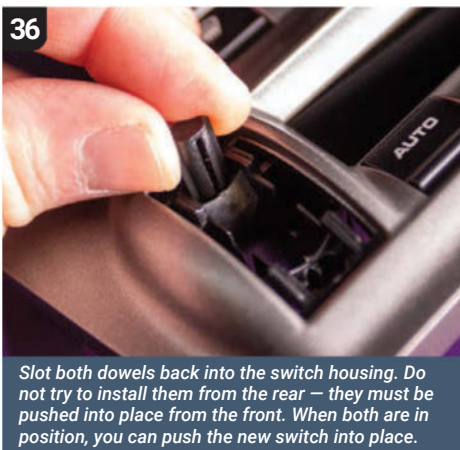
The dowels are loose in their housing, so be mindful of them dropping out as you remove the switch.



Old and new fan speed control switches side by side, but can you tell which is which?!



You're now ready to install the new switch. Looking through the switch housing, you'll note the dowels can only be fitted one way — notches in the housing correspond with grooves in each dowel.



Slot both dowels back into the switch housing. Do not try to install them from the rear — they must be pushed into place from the front. When both are in position, you can push the new switch into place.



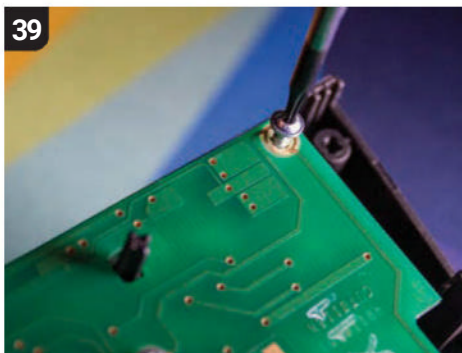
Repeat the process for the other switch. Remember, the temperature control switch goes on the left, while the fan control switch is on the right. Don't worry if the switches feel loose at this stage.



Place the climate control unit face down and remove the tape holding the screen in place. Carefully reinstate the removed rubber membrane.

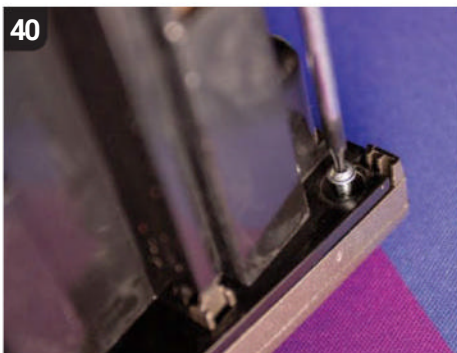
TECH: HOW TO

39



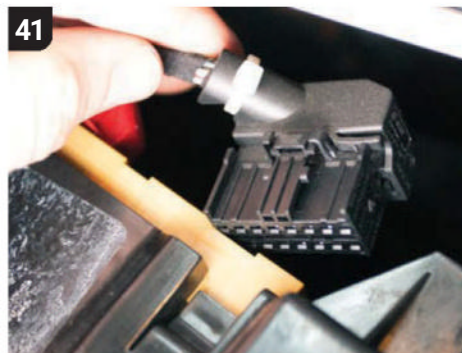
With the rubber membrane in place, refit the climate control panel circuit board.

40



With all nine circuit board screws fastened, reattach the climate control panel to the main housing by refitting the four previously removed screws. The new switches should now feel firmer when pushed.

41



With the climate control unit and housing back together as one, refit the two wiring plugs.

42



Part-push the climate control panel into place, switch on the ignition and test the new switches, as well as each of the unit's buttons, to make sure everything is working as it should.

43



If satisfied, push the climate control panel back into the centre console. You will hear it click into place.

44



Switch off the ignition and refit one of the centre console side panels. These will pop into place easily, but be mindful of the fragility of the clips talked about earlier – don't be heavy handed.

45



Remember to refit the T20 screws holding the side panel to the centre console.

46



Take your T25 torx bit and refit the carpet panel.

47



Repeat the process at the other side of the centre console. Congratulations! You've just made a massive difference to the look and feel of your Porsche's interior without breaking the bank.



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DAN FURR

997 C4S, 968 SPORT, 944 TURBO



After two years of seriously happy motoring in my 968 Sport, it's time for somebody else to enjoy this fantastic Porsche, which has just passed its annual MOT test with flying colours. Step right this way.



RICHARD ROBERTS

991 CARRERA GTS, 968 SPORT



My 991's recently replaced rear-view camera now only has a view in the center of the screen and the passenger window isn't closing. And central locking is now intermittent. Let's investigate.



JOHNNY TIPLER

986 BOXSTER S



Having sold my silver 987 S, I find myself back in a Boxster, but this isn't any old Boxster. You see, I've gone and bought back the very 986 Boxster S I doted on these pages for many years.



DAN SHERWOOD

996 GEN II GT3



With show season coming to an end, I'm beginning to think about preparing my Porsche for winter hibernation. I've already considered putting the car on a 'laid up' policy in advance of a return to action next year.



CHRIS WALLBANK

981 GTS, 981 BOXSTER S



I put the finishing touches to my twelve-day European road trip, only for both my cars to throw their toys out of the pram. Thankfully, RPM Specialist Cars came to the rescue and saved the day.



MOVING ON UP

911 & Porsche World editor, Dan Furr, prepares his 1994 968 Sport for sale in the interests of reducing the size of his car collection...



The time has come for me to have a clear-out. I'm currently in possession of fifteen cars, not limited to Porsches. Regular readers will know I'm the proud owner of a 997 Carrera 4S, a 944 Turbo and a 968 Sport, but I'm also the custodian of a Bentley, a Rolls-Royce, a Jaguar, a BMW, various classic Vauxhalls and much more besides. It was fun amassing this fleet, and I've had great fun driving and restoring these cars, but there are only so many hours in the day and I would prefer to concentrate my efforts on a handful of vehicles, rather than a lock-up full.

Last one in, first one out. Yep, my Slate Grey 1994 968 Sport is for the chop. One of only 306 units built, the car is essentially a 968 Clubsport with a few reinstated creature comforts for the UK market. These add-ons include an electric tailgate release mechanism, power windows, electric mirrors and cloth-trimmed 'tombstones' in place of the Clubsport's harsh bucket seats. My car benefits from a recent retrim in OEM Sport fabric, bringing the interior to

immaculate as-new condition. A major service, dry ice cleaning of the engine bay, refurbishment of the car's Cup 2 alloys, new Michelin PS4 tyres, new genuine light clusters, new brake hoses, a Cargraphic tailpipe and a K&N air filter are just some of the parts recently fitted. I've also replaced the odometer gears (a common 944/968 fault), installed a new LCD clock face and had the car's engine oil successfully analysed by professionals in the field. All work was documented in this magazine.

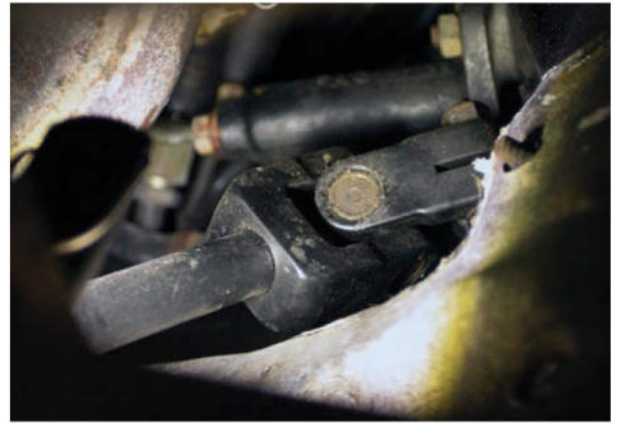
I wanted to ensure the car passed to its new owner with a full twelve-month MOT, but I detected slight movement in the steering, hence visiting the new workshops of Suffolk-based independent Porsche specialist, PIE Performance. Not long before I bought the car in 2022, the previous owner (in charge of this terrific transaxle since 1996) had the steering mechanism's two universal joints replaced. I sensed the bolt on the top UJ had come loose, but reasoned reaching it from under the car would be difficult. Lifting it on one of PIE Performance's new ramps, on the other hand, would make life much easier.

Above Saying goodbye is never easy, but Dan has made the decision to sell his beloved 968



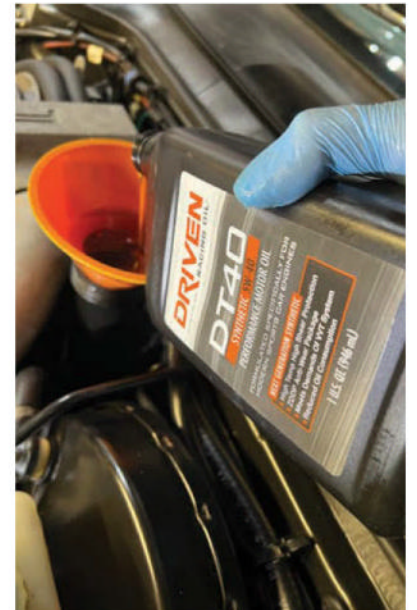
Top Graham and Brad confirm the top steering UJ bolt needs tightening

Right Treating the car to fresh oil after its successful date with the MOT tester



Technicians, Brad and Graham, examined the car's suspension and steering equipment. They soon confirmed my suspicion – the top universal joint's bolt needed to be tightened. Thirty seconds later, job done. With the fault fixed, the car was taken for its MOT, which it passed with

in acquiring the car for yourself. It's probably a good idea for me to provide you with a little extra information you might find useful. I'm the car's third owner. The previous owner maintained main dealer history, handing the reins to Porsche Centre Silverstone whenever there was work to be done.



A SET OF STAGGERED SPLIT RIMS MIRRORING THE LOOK OF THE FAMOUS SPEEDLINE SPLITTIES FITTED TO THE 964 TURBO 3.6 AND 968 TURBO RS

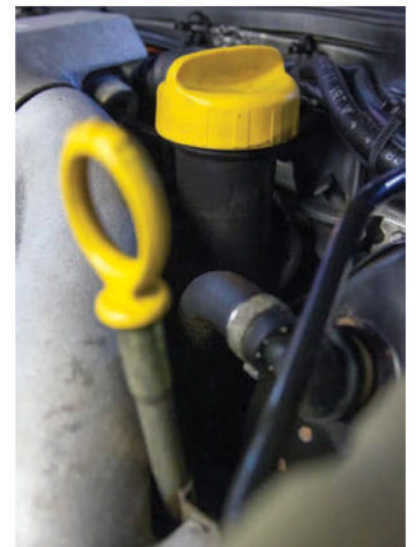
flying colours – no advisories recorded. Pleased with this result, and despite changing the engine oil in the relatively recent past, I whipped out a fresh K&N oil filter, bottles of Driven Racing Oil DT40 lubricant and proceeded to treat the pretty Porsche to an oil change.

The next job on my list is to reinstate the car's aforementioned restored Cup 2 wheels. I installed a set of staggered split rims mirroring the look of the famous Speedline splitties fitted to the 964 Turbo 3.6 and 968 Turbo RS models, but in a nod to the value of originality, this 968's factory (now fully restored) wheels and centre caps will be returned to their natural habitat. This Porsche will then be good to go to a new home.

Some of you may be interested

This amounted to regular servicing and annual health checks, with any required maintenance taken care of using genuine Porsche parts. The paintwork displays a few stone chips and other minor blemishes commensurate with a Porsche of this age, but it drives like a dream and is mechanically sound. As mentioned, the interior is like new.

The colour takes years off the 968's design, which I personally love. Torque is surprisingly potent, and the Variocam-equipped three-litre inline-four sings, whether idle or under load. This is a practical Porsche, too, as demonstrated by the amount of luggage I am able to fit beneath the rear hatch, which retains its load cover. Interested? Email me at porsche@fursfleet.com to discuss. ●





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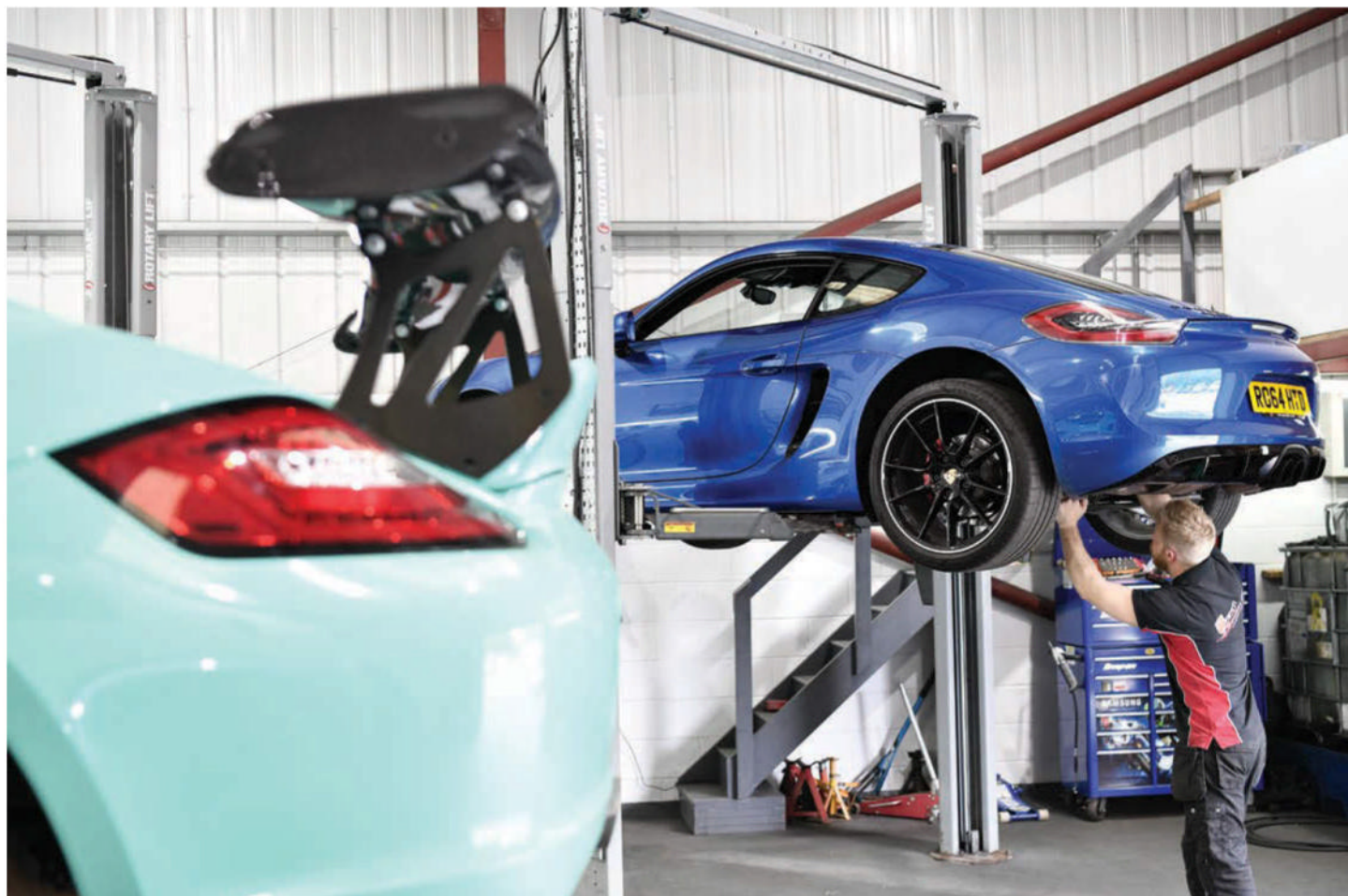

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DOUBLE TROUBLE

Chris Wallbank has been planning a twelve-day European road trip, taking in some of the continent's best driving roads. Naturally, while he is preparing for take-off, both his cars develop major faults in need of urgent attention...

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FOR DETAILS



This month was fairly expensive, to say the least – I was unfortunate enough to have fairly significant issues present themselves on both my 981 Cayman GTS and 981 Boxster S. The Cayman was suffering from the quite common Porsche Active Dynamic Mount (PADM) failure (passenger side), whilst the Boxster was suffering from an air-conditioning condenser leak, resulting in no cold air in the cabin whatsoever.

First up was the Cayman. I was well aware of PADM failure, chiefly as a result of reading numerous articles about the problem. This fault is only relevant to Porsches fitted with Sport Chrono from the 991-generation 911 (and therefore including the corresponding 981 models) and seems to have no particular trigger

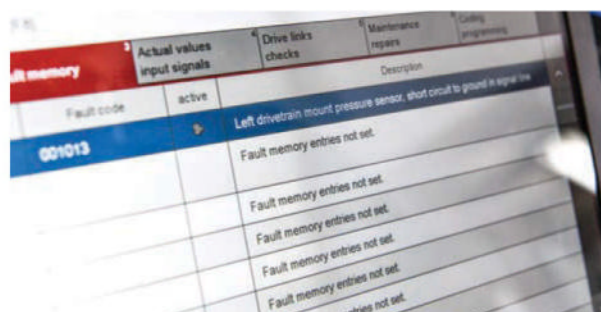
or cause. My car's PADM failure made itself known on the dashboard when I was travelling at a constant 40mph on my way back from the local supermarket.

Apparently, the root of the issue is an electrical fault within the sealed unit of the PADM mount, or so I'm led to believe. The long and short of it is this: unless your car is protected by a valid Porsche warranty, you need to cough up around £850 for the part. No replacements are available on the aftermarket.

I contacted my trusted friends at Knaresborough-based independent Porsche specialist, RPM Specialist Cars, for advice and assistance. It's fair to say company director, Andy Meeking, wasn't particularly surprised when I informed him of the message on my car's dashboard – RPM Specialist Cars has worked on a huge number of 991s and 981s, and is therefore familiar with

the intricacies of each model, including PADM problems. Andy advised me he had a single replacement mount in stock. This was a surprise, not least because Porsche has confirmed PADM mounts are subject to back order on account of hugely increased demand. The most frustrating thing about this failure, however, is the fact labour is only a very small part of the bill. The mount is, in fact, a fairly simple bolt-on, bolt-off affair,

Above Cayman GTS in 'what on earth have you done here, Chris' shocker





Above New air-con condensers for the black Boxster S

Right Replacing a PADM mount is a simple fix, but getting hold of new replacement Porsche parts is tricky in the current climate

with good access to the passenger-side item. With installation complete, all that's left is a clearing of the fault code and re-checking. In total, the entire job takes less than half the working day.

It's worth noting the design of PADM mounts was revised in late 2023, a move intended to reduce the likeliness of future failure, but only time will tell. Interestingly, the old part's label stated it was made in Great Britain, whereas the new mount was manufactured in Poland, but looked exactly the same.

Next was replacement of the Boxster's air-conditioning condensers. I have to say, the system has never really pumped out cold air, certainly not during my time in charge of the car. Curiously, its history file highlights a thorough going-over of the air-conditioning system and its component parts prior to my ownership. No fault or leak was detected.

I had the system re-gassed, which made cabin temperature a little cooler, but a couple of weeks back, the blowers were pumping out only hot air. With a twelve-day European road trip looming large on the horizon, this fault needed fixing without delay.

Luckily, the guys at RPM Specialist

Cars were able to offer me a cancelled slot in their work schedule. This meant the job could be taken care of before my road trip. Phew! Andy's team managed to diagnose the driver's side condenser as having a significant leak in its top

condensers were therefore replaced and the system was re-gassed. The difference was immediate — I don't think I've ever been so cold in a car! Labour was little more than a couple of hours, a big chunk of which is the fiddly job of

removing the front bumper. I decided to buy aftermarket condensers (tried and tested for quality by RPM Specialist Cars), a move saving me a pretty penny over

MY BOXSTER NOW FEELS LIKE NEW AND IS MORE THAN READY FOR ITS EXCITING EUROPEAN ADVENTURE

left corner, the result of stone impact damage. Like the PADM problem mentioned earlier, this complaint came as no big surprise — most of you will be aware of this risk with pretty much all Boxster, Cayman and modern 911 models, which feature exposed condensers behind their front bumper. All it takes is a few big stones to flick up and cause enough damage force a leak. It's reason enough to invest in aftermarket bumper grilles. You live and learn, right?!

My Boxster's air-conditioning condensers appeared to be the original factory units. Although the passenger side part didn't seem to have been compromised, Andy recommended replacing both condensers for good measure. This avoids another couple of hours labour further down the road, which makes complete sense. Both

use of genuine Porsche parts doing exactly the same job. My Boxster now feels like new and is more than ready for its exciting European adventure.

As always, thanks to Andy and the team at RPM Specialist Cars, who always go above and beyond in times of need. They also serve one of the best cups of Yorkshire tea around. Visit the website rpmspecialistcars.co.uk. ●



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Porsche Club
Great Britain





GIVES YOU WINGS

Porsche owners in need of a little lift should head over to marque specialist, William Hewitt, where the team will have your four-wheel friend flying high again in no time...

Words and photography **Dan Sherwood**

Located on the outskirts of a decommissioned Royal Air Force base in Egmore, North Norfolk, is the unassuming premises of independent Porsche specialist, William Hewitt. When driving past on the B1105 (the winding country road running from Fakenham to Wells-next-the-Sea), you could be forgiven for not noticing the company's presence — the only hint is the selection of predominantly Porsche sales cars scattered in front of Nissen huts. While the initial impression maybe somewhat less than salubrious, owners of Porsches in need of servicing or repair are advised to look beyond the façade and not be fooled into judging a book by its cover. This is because the firm operating from inside the furthest semi-cylindrical

corrugated tunnel is one with extensive experience of Porsche products and prides itself on offering only the highest standards of work, as well as a pleasing price tag.

Owned and operated by forty-six-year-old Porscheophile, Patrick O'Brien, William Hewitt has an enviable reputation within the eastern counties' Porsche scene — what the business lacks in visual pizzazz is more than made up for with knowledge, integrity and a no-nonsense attitude keeping customers happy and their pampered Porsches on the road without fault.

"Ever since I was a child, I've always loved tinkering with engines," Patrick remembers. "My identical twin brother, Daniel, and I grew up in the Norfolk countryside, where we obsessed with dismantling anything mechanical, seeing

how it worked and, where required, getting it working again." The pair started their journey into entrepreneurship and automotive repair at the age of eleven, when they accepted mopeds as payment from neighbours in exchange for doing household chores, such as mowing the lawn or chopping a store of winter firewood. A rusty cantilever toolbox, complete with a selection of equally corroded tools, was soon acquired at a car boot sale. Patrick can still remember the relatively Herculean effort required for his young frame to carry the weighty chest home. "We had a ramshackle shed in our back garden," he continues. "This became our makeshift workshop. We would collect old, broken-down motorbikes, take them back to the shed and fix them. Obviously, being just eleven years old, we didn't have any money for

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FOR DETAILS

Above William Hewitt operates out of a site of converted Nissen huts in north Norfolk

parts, meaning we made use of whatever we could lay our hands on."

Repairing a succession of small-capacity motorbikes gave Patrick and Daniel a good understanding of the complexities of a basic combustion engine and, just a few years later, they turned their oil-stained hands to repairing an Austin Mini they rescued from the ever-encroaching branches of a prickly privet hedge. Back then, a rusty, non-running Mini was worth practically nothing. To the boys, however, it

was a chance to apply their spanners to a vehicle considerably bigger than a bike, while also giving them a taste of getting behind the wheel and driving.

"We kept the Mini at an allotment near our home and, once it was back up and running, we had a blast driving it around the fields," Patrick recalls. "The Mini was soon joined by a resurrected Mk1 Golf and a Fiat 127. We amassed quite the collection, especially considering we were both too young to qualify for a driving licence." This grounding in automotive mechanics provided Patrick with an excellent starting point when he began studying Motor Vehicle Technology at Kings Lynn College after

leaving school at the age of sixteen. Following college life, he signed on to a modern apprenticeship Level 3 programme at a General Motors dealership in Holt.

"The apprenticeship was great. I learned a tremendous amount, not limited to engine building, diagnostics, transmission rebuilds and fault finding.

PATRICK PASSED ON HIS KNOWLEDGE AND SKILLS TO THE NEXT GENERATION, GUIDING A FURTHER THREE APPRENTICES THROUGH THEIR FORMATIVE YEARS

Daniel was also keen for a career in the motor trade, but ended up in the construction industry. When I graduated from the apprenticeship, I stayed on with the dealership for a further sixteen years, rising through the ranks as my experience grew. Incidentally, I attained the position of Gold Level Master Technician at the age of twenty-one, becoming the youngest person in the country to achieve the standard."

Throughout this time, Patrick passed on his knowledge and skills to the next generation, guiding a further three apprentices through their formative years at the dealership. By time of his thirty-third birthday, however, he felt the

time had come for change. "I'd always had an affinity with Porsche," he tells us. "Initially, like many teenage boys, my passion for the brand was born through the various posters hanging on my bedroom wall, each depicting a 911, but my love for the brand was truly cemented when I found myself working on a 993 Carrera with leaking oil pipes. I was very much impressed with the quality of engineering invested in a Porsche. Needless to say, when I saw a vacancy for a senior technician and sales executive

at a nearby independent Porsche specialist, I jumped at the chance."

His application was successful, leading to four years running the company's workshop and honing his craft on the intricacies of a wide range of Porsche products, becoming well-versed in the art of flat-six engine and gearbox rebuilding, as well as identifying problems and finding suitable solutions specific to the marque. Even so, somewhat inevitably, the urge to break out on his own was simply too strong to ignore.

"I spent months looking for suitable premises, which isn't easy in the north Norfolk countryside, before the

Below In addition to carrying out a wide range of repairs and upgrades on Porsche sports cars, the company also stocks and sells Porsches

Right William Hewitt boss, Patrick O'Brien





opportunity arose to take on an ex-military Nissen hut on the old RAF base at Egmore," says Patrick. "This was December 2015. Back then, I was looking at a bare shell previously used as a farmer's grain store." With the help of his builder brother, Patrick was able to convert the space into a fully functioning workshop, complete with an office and two ramps.

He opened the doors to his first customers on the 18th January 2016, a date of special importance to the O'Brien

household. "My grandfather's birthday," Patrick explains. "He played a huge role in both mine and Daniel's lives when we were growing up. Essentially, he helped raise us from the age of nine." An extremely hard worker recognised for training heavy horses to work the land, his influence remains strong in Patrick's personal and professional life — grandad's name, William Hewitt, lives on as the name of Patrick's successful Porsche business.

"The brand is, in fact, a tribute to both my grandfathers," Patrick says. "The

grandad on my father's side was Edmond O'Brien, a pilot in the RAF. This gave me the idea to incorporate elements from both grandparents into my company name and branding, using William's name and including a set of wings on the logo to represent Edmond and his love of flying. A spanner design set into the wings is the final flourish, which adds a

in Porsche, I offered my services to customers with any make or model of car. Often, you can't afford to be choosy when starting a new business. This is still very much part of the company ethos today insofar as I'm happy to help any and all customers I can, even though the bulk of the business is centred heavily around Porsche products."

A year into trading, Patrick enlisted the help of an additional experienced Porsche technician, with another two joining the ranks not long after. Over the years, the line-up at William

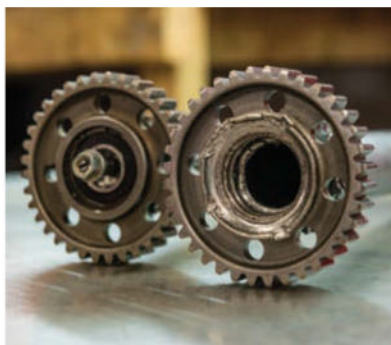
Above Whether cooled by water or air, your Porsche is well catered for by Patrick's team

THE DREADED M96/M97 INTERMEDIATE SHAFT BEARING, WHICH IS A CONCERN FOR MANY OWNERS OF 996- AND 997-GENERATION 911s

nod to what we do here, and also my own personal passion. All in, I felt it was a very fitting name and logo for the business."

Initially, the fledgling company was limited to Patrick, who was performing all tasks, from twirling of spanners to running the office and sweeping the floors, but as time passed, word of his services spread and he was rapidly overwhelmed with the volume of customers wanting work on their cars, necessitating the search for staff. "Back then, although wanting to specialise

Hewitt has changed and, alongside Patrick, the current employee roster includes Jim Newstead, an experienced technician with more than thirty-five years in the motor trade, and Matt Sims, who boasts a motorsport degree and was trained at a Porsche specialist, including working within the firm's in-house race team. Also seen in the workshop is Patrick's dad, Danny O'Brien, who, although retired, is often on-hand to offer advice, fit tyres and contribute to the general maintenance of the site. He also makes a banging cup of tea.



Above From simple tyre fitting to complete engine repairs, William Hewitt covers it all and has worked on various 911 & Porsche World staff cars over the years

As well as being home to the fab four, William Hewitt's humble headquarters now contains a quartet of two-post ramps, a dedicated engine assembly area, a tyre fitting machine, as well as calibrated Absolute Alignment geometry equipment and Porsche PIWIS 3 diagnostic tools and software. "We are capable and equipped to carry out work on any age or model of Porsche, from the earliest 356s right up to modern 992-generation 911s, as well as hybrid models, such as Panameras, Cayennes and Macans," Patrick reveals. "This includes all types of mechanical servicing and repair work, fault diagnostics and the installation of performance-related modifications. The only areas we don't cater for are

those specifically involving high voltage applications, such as full EV models, or where there is a fault with the electrical side of a hybrid system. These areas of concern require additional specialist tools and training in order to be carried out effectively and safely. On the rare occasion we have a customer in need of these services, we direct them to the nearest main dealer facility. Besides, any issues with many not-so-old Porsches are likely still covered by the manufacturer's warranty. In time, however, if we feel we are seeing increased demand for this kind of work, we will definitely look to invest in this area to satisfy customer requirements. Until then, we remain focused on addressing the needs of owners of

vehicles with internal combustion engines."

Like many service and repair outfits, William Hewitt also leaves body panel repairs, paint spraying and interior trimming to the professionals in those specific fields of automotive repair and restoration. "In the early days of the business, we carried out restoration work for a number of customers, but the cost and time involved in such complex and labour-intensive work meant, unfortunately, it just wasn't viable as a long-term business strategy," Patrick explains. One of the cars benefiting from restoration at his hand was an early 2.5-litre 944, which had spent the previous twelve years languishing in a barn. The interior of the barn had provided shelter from the worst of the elements, meaning the stylish transaxle avoided becoming a heavily corroded rot box, but its long stretch of immobility had taken a toll on the running gear and fuel system. The car had also been the victim of paintwork being keyed at some point in its life, meaning it required a full respray to bring back to its former glory.

"Luckily, the interior was spotless and, with a quick clean, it came up like new. In the end, I stripped the car and had the shell repainted before restoring the running gear, servicing and refreshing the engine and fuel system, as well as installing new brakes and having the wheels professionally refurbished. In the





end, the car was utterly immaculate." Although full restorations are now a thing of the past for William Hewitt, the firm promotes the idea refreshing certain areas of a car can make huge a difference to its longevity and visual appeal, as well as improving driving dynamics. It's service proving extremely popular. "Owners seem to be holding on to their cars for longer periods these days and are therefore keen to keep them in tip-top condition for the long-term. This means we regularly carry out suspension work, including installation of new arms and bushes and either standard or uprated springs and dampers. Complemented by a comprehensive overhaul of the car's geometry, it can totally transform how the host Porsche feels and responds on the road. Owners rarely realise how worn supporting suspension components are until they completely fail."

Currently, William Hewitt charges a flat rate of £65 per hour for labour, but this may be subject to future increase on account of the cost-of-living crisis forcing Patrick's hand. "I have always believed in fair pricing for my customers. They know they are getting the job done right and for a competitive price. We love Porsches, but don't believe people should be forced into paying through the nose to own and maintain one of these incredible machines. We want to be able

to keep as many Porsches on the road and being enjoyed as we can, and won't blindly replace parts or carry out work we don't deem to be absolutely essential. If we believe a part can be repaired to the right standard, rather than be replaced, we will always offer this as an option to our customers."

One of the issues Patrick and the team get asked about is the dreaded M96/M97 intermediate shaft bearing, which is a concern for many owners of 996- and 997-generation 911s, as well as their Boxster/Cayman counterparts. "Porsches of this vintage have a reputation concerning would-be buyers," Patrick relates. "While much of the problem is over-exaggerated, resulting damage of a failed IMS bearing is indeed catastrophic, requiring an extensive and expensive engine rebuild. Replacing the part as a preventative measure can provide years of stress-free motoring and is well worth considering if you aren't sure when your car's IMS bearing was last changed." This is sage advice and a route many people consider when buying a used Porsche powered by the affected engines. It's worth noting, however, not all IMS bearings are created equal, and there are a host of related parts you may want to replace at the same, thereby maximising cost-efficiency of the labour. "The early dual-row and single-row bearing types fitted to pre-2005

cars are the most likely to fail," Patrick reckons. "We recommend replacing them with an EPS roller bearing type bearing. We have found these to be the most reliable replacement part, but we advise it's not installed in isolation. Put simply, the gearbox needs to be removed in order to replace the IMS. In some cases, it makes sense to fit a new clutch and flywheel on manual models, or carry out a transmission service on Tiptronic models, as well as installing any other ancillaries requiring the engine and transmission to be removed for replacement. While this can obviously increase the cost of the job, it can save money in the long run."

These jobs keep the workshop busy, but William Hewitt also offers used Porsches for sale, each one hand-picked by Patrick and put through a rigorous inspection process before any outstanding servicing and maintenance is completed. Additionally, any parts Patrick deems not up to his own high standards are replaced before MOT. A comprehensive warranty is applied at the point of sale. "Our ethos has always been to provide customers with the kind of experience we would like to receive ourselves. No nonsense, open and honest at a fair price." In Norfolk and in need of Porsche pampering? Spread your wings and visit William Hewitt. You'll be pleased you did. ●

Above Engine work is at the core of William Hewitt's extensive menu of services

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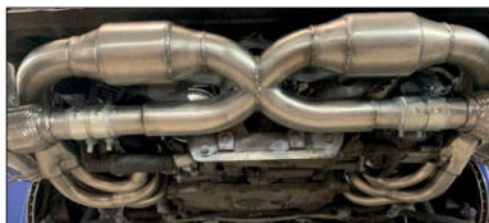
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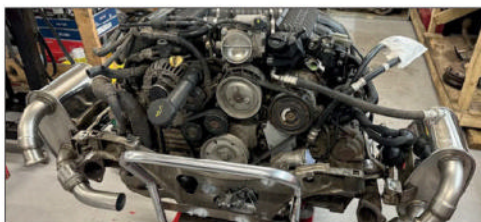
IMS

In the picture are the single and dual row IMS bearings as fitted to pre 2004 M96 engines, as well as the later M97 larger diameter bearing with the aftermarket EPS replacement bearings pictured behind. Picture 1 also shows the damage caused to the IMS shaft by bearing failure. EPS bearings use a roller bearing which has over 12 times the load capacity compared to the original ball bearing as fitted from factory.



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BORE SCORE

Pictured here is what is known as bore score, where the piston has worn into the cylinder wall. This will usually require a new cylinder sleeve and a new piston. Depending on damage across all cylinders will indicate whether just one, two or a full set of pistons and sleeves would be required.

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Porsche 997 Carrera 2S
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2005, 72,460 miles, Arctic Silver metallic paint Cocoa interior, 05 plate, 3.8 Tiptronic, full engine rebuild in 2020 by ourselves, new front and rear Brembo brake kits fitted



Porsche 997 C4S Cabriolet 3.8
£27,495

2007, 72,000 miles, manual, Black exterior, full Rhodamine leather interior, full service history, 4 owners from new, 2 keys, heated seats, nav phone, all coolant lines replaced front to rear, just had a major service and all gear oils changed, all three oil separators and aircon condenser replaced, beautiful condition



Porsche 996 Cab 3.6 Tiptronic
£13,495

2002, 101,000 miles, Silver exterior, full black ruffled leather interior, full service history, 10 owners, 2 keys, IMS bearing done, tyres and wheels refurbished, stainless steel exhausts, wind deflector

50 YEARS OF 911 TURBO

996 TURBO

When compared to earlier or later 911s making use of forced induction, the 996 Turbo represents one of the Porsche's scenes best buys...

Words Dan Furr Photography Tom Gidden



More than twenty-five years have passed since the 996 debuted, yet talk of the model's radical departure from previous 911 architecture fails to quell. Arguments for and against the first water-cooled Neunelfer rage on, but whichever side of the fence you find yourself sitting, there can be no doubt regarding the merits of the 996 Turbo, a model respected as one of the best production sports car of its era.

Equipped with four-wheel drive and a 3.6-litre, twin-turbocharged, dry sumped,

water-cooled flat-six, the 996 Turbo is no slouch, but where previous turbocharged 911s were considered aggressive, the 996 Turbo feels altogether more refined. Yes, you get 414bhp and 415lb-ft on tap, and anyone thinking about buying a 996 Turbo will almost certainly be aware of the fact this particular boosted Porsche makes use of a flat-six with a direct link to Porsche's GT1 racing programme, but with the arrival of the 911 GT3, the 996 Turbo felt more of a grand tourer in stock trim, even if it was capable of delivering monstrous pace.

Emphasising the 996 Turbo's superb cruising potential, the model was offered

with either a six-speed manual or a five-speed Tiptronic transmission. Both options proved popular, meaning it's worth holding out for your preferred spec – there are plenty of available examples to choose from. Those of you able to exercise patience may even be rewarded with the opportunity to buy a 996 Turbo kitted out with Porsche's desirable X50 performance package, comprising larger K24 turbochargers, updated ECU software, revised intercoolers and a strengthened gearbox. Introduced in 2002, the X50 option bumped power to 444bhp.

Eighteen months into Turbo production, 996 fans looking for a combination of a



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force-fed flat-six and open-air motoring were offered the 996 Turbo Cabriolet. The first model of its kind since the 964 Turbo Cabriolet in 1989, the newer 911 proved to be a big hit, encouraging Porsche to release the Turbo S in both coupe and cabriolet formats for the 996's final stint of production. More or less a 996 Turbo with an X50 performance package as standard, the Turbo S also featured upgraded audio gear, model-specific cabin trim and super-effective ceramic brakes.

Unlike earlier and later force-fed 911s, the 996 Turbo represents

something of a bargain on today's used car market, arguably as a result of negative press concerning the 996 Carrera's mechanical maladies. Tarring the Turbo with the same brush is a mistake, but one which has kept ownership of a 911 equipped with forced induction accessible to those working with a modest budget — a Tiptronic 996 Turbo Cabriolet can be yours for less than thirty grand. That's a huge amount of Porsche for the money.

Across the following pages, we highlight what you need to be aware of when shopping for a 996 Turbo.

IDENTITY AND SERVICE HISTORY

As ever, let's address the basics first. The 996 Turbo you're looking at should display a matching Vehicle Identification Number (VIN) on its V5 registration document and on the identification stamp located under the battery compartment cover. The VIN is also visible on the base of the windscreen (passenger side) and on the label stuck to the driver's door jamb.

Elsewhere on the V5 document, you'll see the engine number. Unless you've got the car on a ramp, this will be difficult to spot in the metal, but it's located on the bottom of the engine. You might be able to see it with the aid of a flashlight if the car is on the ground and you get on all fours.

Spend a couple of quid at mycarcheck.com, where you can download a history report outlining any insurance claims, change of registration number, recorded mileage and whether there's any outstanding finance on the car. You should also enter the vehicle's details into the DVLA's free-to-use MOT history database, which can be found at bit.ly/dvlamot. The service will return all test passes, failures and advisories registered as far back as electronic records are stored (which is helpful in identifying any ongoing mechanical or safety issues). If you have the V5 document number at your disposal, you can even see which test centre carried out the inspection.

Damage may have been inflicted upon any 996 Turbo driven in anger, so check panel gaps are straight. Look for signs of mismatched colour and don't be afraid to ask questions. You might be eyeballing a Porsche which has simply been tapped with a trolley in a parking lot, but then again, the car might have been stacked into a tyre wall at a race circuit. Either way, Porsche body repairs shouldn't be done on the cheap. Ask to see receipts relating to the work, if applicable. A paint thickness gauge will help you to determine if you're looking at quarters full of filler.

Full service history, ideally accompanied by invoices for any work undertaken, is desirable when buying any used 911. These cars should be maintained by specialists with depth of model knowledge. General service garages are not likely to know the ins and outs of the 996 Turbo's mechanicals. Moreover, servicing at a general garage is a clear indication the seller (or previous owners) has probably skimped on spend, meaning the car is unlikely to have been cared for correctly. Lack of Porsche Centre or trusted independent specialist stamps in the service book will likely cause you problems come resale time. It is far better for you to buy a 911 which has been looked after by businesses well-versed in the care of these cars.

Pay special attention to the most recent paperwork in the car's history file. This should indicate which jobs are imminent, affording you the opportunity to negotiate a lower purchase price. Additionally, take advantage of an online VIN decoder, which will provide you with a Porsche-specific build sheet in exchange for a small fee. This document will let you know exactly how the car left the factory, including standard model specification, whether it is a Turbo with X50 kit and/or was optioned with any individual equipment. Your nearest Porsche Centre may be prepared to provide the same information without charge.



EXTERIOR

"We've yet to see a 996 Turbo with heavy bodywork corrosion roll through PIE Performance's workshop doors," muses Chris Lansbury, owner of Suffolk-based independent Porsche servicing, maintenance and sales specialist, PIE Performance. "The metalwork on these cars was fully galvanised at the factory. With the exception of door catches on the earliest of 996 Turbos, rust is rare, but it's worth keeping an eye out for signs of accident damage and poorly executed repairs." To this end, he recommends checking the floor pan, as well as the exterior bodywork. A paint gauge depth reader may prove beneficial in determining whether factory paint remains, although any respray work should be documented in the car's history folder.

Headlamps can discolour. They can also attract surface imperfections through stone chips. Replacement lights are expensive, so consider purchasing a headlamp restoration kit as your first attempt to rectify the problem. Rear lenses can crack. The light clusters are sealed, meaning a full replacement is the only solution.

"If you're looking at a 996 Turbo Cabriolet," continues Chris, "check to make sure the roof fully retracts quickly and without signs of stuttering. Also, test the active rear spoiler, which should raise when the car hits 70mph, but can be manually activated. The part's rams and pump can wear over time. Most owners of affected Turbos don't realise the problem has occurred — you can't see the spoiler in the rear-view mirror." He also recommends buyers remove under-bonnet cowlings and check the bulkhead for signs of damage. "You shouldn't find anything untoward, even on the earliest of 996 Turbos."

ENGINE

The 996 Turbo was launched at the Geneva Motor Show in 1999 and available from 2000, replacing the air-cooled 993 Turbo. The water-cooled Turbo was related to its GT3 sibling by virtue of the hugely desirable (and largely indestructible) 'Mezger' dry-sump flat-six. This revered powerplant, which is by common consent a much stronger unit than the boxer used in the 996 Carrera and its derivatives, originated in the aluminium-cased flat-sixes powering the 911 Turbo (930), SC and the partly water-cooled 962 four-valve engine, with cylinder heads derived from the 959. It was then engineered — no expense spared — to serve as a 3.2-litre chain-cam twin-turbocharged powerhouse for the GT1-98, winner of the 24 Hours of Le Mans.

It was a bold (if somewhat pragmatic) move to shoehorn a 3.6-litre evolution of this particular six-cylinder engine into the rear quarters of the 996. "Providing oil changes have been carried out regularly and in accordance with manufacturer instruction, the 996 Turbo's engine is generally bulletproof," confirms Chris. "The main concern with these powerplants is the potential for over-revving at the hands of previous owners, where poor gear selection at speed causes the engine to exceed the constraints of the factory rev limiter. The only way to determine if this is the case with the 996 Turbo you're thinking about buying is to link the car's ECU to a genuine Porsche diagnostic interface and examine the provided data."

Service intervals are listed as being every 12,000 miles (minor), 24,000 miles (intermediate) and 36,000 miles (major). Check the car's paperwork to verify these jobs have been carried out in a timely fashion.

"It's not unusual for the 996 Turbo to drink a litre of oil every three thousand miles," Chris remarks, before citing alternators and starter motors as parts known to be problematic. The front radiators are also prone to failure thanks to the large open intake apertures situated in the front bumper. Combined with the Turbo's low ride height, the lack of effective grilles proves irresistible to debris and small stones flicked up from the road by vehicles ahead. These flying missiles can easily perforate



radiators and air-conditioning condensers, while moisture held by leaves and dirt sticking to the parts can cause corrosion to set in, resulting in an expensive repair bill. Fortunately, easy-to-install stainless steel mesh grilles for the 996 Turbo are available to purchase direct from aftermarket manufacturer, Zunsport (visit zunsport.com).

On the road, you'll ideally need an unrestricted Autobahn to really light up the blue touchpaper and head like a rocket ship for the vanishing point, but a 996 Turbo is perfectly good enough for a scenic point-and-squirt, as it were. The Turbo X50, with its short shift, goes amazingly well, of course. Although it eclipses the GT3 in power, the manner of delivery is far less dramatic — you won't necessarily sense the 'aliveness' of the rear-drive GT3. The Turbo X50 does have more to say for itself than a regular Turbo, though, which is relatively muffled. In fact, the X50 version can almost be construed as a lazy 911 on account of it having so much torque and grip, whereas the GT3 is nearly as fast, but you have to use the gears much more. A different animal, in other words. Ask it for a slug of grunt and it delivers with aplomb, prompting a glorious sensation of indomitability.



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TECH: BUYING GUIDE



INTERIOR

Aside from bolster wear caused by clumsy drivers climbing in and out of the cockpit, there shouldn't be damage to the hard-wearing upholstery, but have a good poke around to be on the safe side. While you're in the cabin, make sure you test every switch and electrical component. "The climate control system's display screen can fail, causing distorted readings through a loss of digits," says Chris. "Window regulators like to pack up without warning. The fix isn't expensive," he adds, "but a knock-on effect of poorly executed remedial work in this area is a compromised membrane behind the door card." The result is unwanted moisture released into the cabin. The repair can be as simple as re-attaching the door card membrane with silicone, or as involved as fitting a complete new membrane. If the latter, allow £100 for the cost of the part.



By today's standards, the 996 Turbo's in-car entertainment equipment is hugely outdated, although many buyers revere originality. With this in mind, it might be worth considering shelling out for a Porsche Classic Communication Management Plus (PCCM Plus) system, which is essentially an OEM-look double-DIN head unit packed with modern functionality, including satellite navigation, Bluetooth connectivity, DAB+ radio, Apple CarPlay and Android Auto. You'll need to budget around £1,200. This spend gives you not only the head unit, but also a complete fitting kit, although your local Porsche Centre or favoured independent specialist will be able to install the unit for a fee. Our advice? Keep hold of the original head unit and store it somewhere safe — the car's next owner may be a stickler for originality. It's useful to have factory equipment, such as the standard head unit, to include as part of future resale.



BRAKES, SUSPENSION AND STEERING

While Porsches enjoy being used regularly, adding miles contributes to the wear of steering, suspension and braking components. 996 Turbos used at the track are especially prone to deterioration in these areas. Check the car's history file to see when parts were last replaced. If no evidence of replacement bushes can be found, factor the cost into the price you're paying for the car.

You're unlikely to feel much of a difference by fitting one or two new bushes, so consider investing in a complete suspension kit, including fresh dampers, springs, bushes and professional four-wheel laser alignment. This might sound like overkill, but shock absorbers and bushes celebrating double-digit birthdays simply won't be performing at their best. You want your Porsche to feel tight in the twisties, don't you?!

Aftermarket suppliers offer a range of performance parts ensuring you don't have to dig deep at your local main dealer. Bilstein, KW, GAZ Shocks and Öhlins offer various damper solutions, while polyurethane bushes from Powerflex, springs from H&R or Eibach and braking equipment, including pads in a wide range of compounds to suit different driving styles, are available direct from EBC. All parts can be bought under one roof from independent Porsche parts retailer, Design 911. Visit the company's website at design911.co.uk.

The 996 Turbo's compliant ride, fluent steering, easy shift, awesome brakes, sure-footed fourby traction and huge grip around corners combine to provide an easy, almost languid ride. In standard or X50 guise, the 996 Turbo steers very nicely, and the front-drive constituent of the powertrain is not as dominant as it can feel in a Carrera 4 driveline.

Negotiating fast turns, the 996 Turbo bucks and heaves, just like a classic 911, and, to a degree, can be given its head without any wheel-wrestling.

DRIVING IMPRESSIONS

We asked regular *911 & Porsche World* contributor, Johnny Tipler, to sum up the 996 Turbo driving experience. "Sliding into the Turbo's cabin, the electrically adjustable seats quickly locate a favourable driving position," he says. "All the mechanisms, from steering and pedals to six-speed shift and switchgear levers, are precise and brilliantly designed. Steering is fluent into and out of corners. The ride is more relaxed than that of the GT3, as you'd expect. To put it another way, the chassis is less playful, though it's hugely competent, reassuring and confidence-inspiring on country belters. On back roads, of course, the Turbo's towering pace isn't so evident as much as the car's multifaceted ability." And of the 996 Turbo X50? "Hit a dualled section for a short distance, where you can floor the throttle with impunity, and you'll enjoy instantaneous turbocharger kick-in, the X50 squaring its shoulders and hurling



itself forward with the velocity of a howitzer shell. Haul it back down with those ultra-efficient brakes."

On a quick two-lane road, with the Turbo rev-counter reading 4,000rpm in sixth gear, the wow factor kicks in. "The car's power-assisted steering enables total accuracy of line through corners and effortless turn-in to tighter bends, facilitated by unshakable grip from the low-profile rubber and four-wheel-drive traction," Johnny continues. "It's the all-round competence of the Turbo that's the making of it: surfeits of power, finely honed handling and all-wheel drive competence, governed from the supremely comfortable and efficient 996 cockpit. Make no mistake, with or without the X50 beef-up, the 996 Turbo is a truly fabulous car. You forgive the massive road noise because of the performance and handling pleasure this Porsche returns. That's what this car is all about: high-speed touring. Given the dosh, if I was looking for a 911 right now, I would buy a 996 Turbo, no question. Head in the clouds? I don't think so. Four-wheel drive, huge top speed and the brilliant 'Mezger' engine amount to a rock solid investment. The Turbo is far more civilised than a GT3, a characteristic helping determine this to be possibly the safest 911 to swap for your cash right now. It's the unsung supercar hero, awesomely capable, robust and reliable. It's a trans-continental express par excellence. And that engine! What a legacy."

"Only the rear-drive 462bhp 996 GT2 and run-out Turbo S, which was fitted with the 450bhp-aiming X50 performance upgrade kit as standard, are more powerful examples of the 996," he concludes. "In other words, the Turbo is worth investigating if you seek a greater surge factor. And the availability of a full drop-top 996 Turbo is a no-brainer if you're a sun worshipper."



TRANSMISSION AND TUNING

The 996 Turbo's 'Mezger' engine is a strong unit capable of big miles without complaint if treated as the manufacturer intended, but clutches on 996 Turbos with manual transmission can take a pasting. "The slave cylinder can fail," Chris tells us. "It's a complaint you'll be able to detect through pedal creep." Despite this frustrating fault, he doesn't think it enough of a problem to favour Tiptronic over a manual transmission. "Turbos with manual gearboxes are in higher demand, as indicated by their higher values. If you've got enough cash to be able to buy a manual Turbo over Tiptronic, then do so. You'll be rewarded with a more engaging driving experience and you'll have made a far better investment."

The 996 Turbo's manual gearbox can feel on the notchy side, which might make you think a Turbo is less pleasant to use than a GT3, but settle in, 'work' the transmission and you'll find a 996 Turbo can be almost as much of a hooligan as a 996 GT3, but with a bit more all-wheel drive security in the mix.

What about modifying? "It sounds like a cliché, but unless you're preparing the car for track work, I'd recommend leaving everything in standard specification," advises Chris. "Replace worn parts with new components, of course, but the 996 Turbo is such a capable car in factory guise, there really is no need to change anything. That said, ensure alignment is configured for your driving style and the highways you intend to travel along. A 996 Turbo with compromised road manners is a 911 far from fulfilling its role as a capable sports car." ●



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DEALER SPOTLIGHT

Continuing our series looking at the cars currently available in Porsche dealerships, we head to New Hampshire and visit Seacoast Specialist Cars...

Words **Dan Furr** Photography **Tom Vagi**

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FOR DETAILS



Looking around the Seacoast Specialist Cars primary service area, it becomes immediately apparent Tom Vagi's team takes care of a wide variety of Porsches. At the back of the workshop, high aloft a ramp, is a 986 Boxster recently relieved of its flat-six. Head technician, Christopher Kustos, is busy rebuilding the drop-top's engine, which is perched on a stand near a black 944 Turbo trimmed in eye-popping Can-Can red leather. This is Tom's personal Porsche, showcased in these pages alongside his monthly guest column.

At the other end of the workshop, also riding high on a service ramp, is a stunning Shark Blue 992 Carrera GTS. The 986 and 992 might represent

bookends of our favourite sports car maker's modern era of manufacturing, but don't be fooled into thinking Seacoast Specialist Cars only serves owners of water-cooled Porsches — we note the presence of a 964 Carrera 2 Cabriolet and a classic 911 Turbo. "We work on Porsches of all ages, from early 356s to the latest products to roll out of Zuffenhausen," Tom explains. "It's true to say the bulk of our work focuses on the maintenance of 996-, 997- and 991-generation 911s in constant use, but as you can see, my team also has strong knowledge of Porsche's transaxle family of sports cars, as well as air-cooled classics, which we regularly restore."

It's easy to see why New Hampshire's easy living is such a strong draw for holidaymakers. This same quality

also attracts well-heeled retirees in pursuit of a quiet life by the coast. As I found out not long after setting foot in what's known as The Granite State (on account of its many quarries), it's not

Above When was the last time you saw an 987 RS 60 Spyder on your travels?





Above 944 S2 is a low-miler offering a fantastic driving experience at a superb price point

Right Black 911 SC has covered a shade over sixteen thousand miles and is currently looking for a new home

unusual to come across wealthy local residents who have amassed impressive collections of sports cars. Some of these fleets, though undoubtedly impressive, are modest in size, while others fill massive barns. Needless to say, Porsches rank high among the inclusions, going some way to explaining why Tom saw fit to establish Seacoast Specialist Cars in Candia in April 2022.

"I've been working on Porsches for thirty years," he tells me. "I started as a mechanic's apprentice in New York State and, by the age of twenty-six, opened my own shop specialising in Audis, but with a side-line in Porsche servicing and maintenance. After sixteen years, I sold up and moved to New Hampshire. Seeking gainful employment, I joined the local Porsche Centre, where I took on the role of Service Manager." Christopher was working as a technician at the same site, but this isn't where the dynamic duo met. "We're cousins," Tom laughs. "Christopher interned at my old shop. We then worked alongside one another at the Porsche Centre, and now toil together at Seacoast Specialist Cars."

Tom is unboastful when talking about his reputation for excellent customer service, but away from Candia, while I have been journeying around New Hampshire and meeting fellow Porsche

enthusiasts, I've been struck by just how many owners have sung Tom's praises without being prompted to do so. It is abundantly clear any Porsche in the custody of Seacoast Specialist Cars is in exceptionally safe hands.

Talking of which, during our visit, a gorgeous black air-cooled classic takes centre stage. A late 911 SC, this 1983 machine has covered a ridiculously low 16,400 miles from new. In addition to repair, maintenance, modification and restoration of Porsches, Seacoast Specialist Cars also offers them for sale. This stealth-styled SC is the latest offering from the company's showroom.

Boasting just two previous owners — the most recent change of ownership occurred in January 2023 — and offered with desirable optional extras, not limited to sunroof delete, tea tray rear spoiler and fog lights, this cool coupe has undergone recent heavy maintenance, including installation of new tyres, an engine service, valve adjustment and replacement of shifter assembly bushings. As you'd expect, the engine is the original three-litre air-cooled flat-six, which remains unmodified, save for a timing chain tensioner update kit.

The exterior of this 911 SC is well-preserved, with the original black paint showing minor stone chips on the front





lid, typical for a car of this age. The paint is original, with uniform meter readings across the vehicle, nose to tail.

Included with the sale is the original title, the car's service records and all documentation pertaining to the Porsche's history and maintenance. Additionally, a CarFax report is available upon request.

So, then, whassit gonna cost you? Well, an air-cooled 911 with such low mileage is usually the stuff of auction rooms, but no fear of the price shooting sky high at Seacoast Specialist Cars — Tom's team is asking a reasonable \$134,995. Granted, this pushes the SC into Turbo territory, but not everybody wants a 930 and, let's face it, short of a major restoration commanding more than the price of this SC, this is the closest you're going to get to a new example of the model.

The condition of this 911 is typical of the Porsches Seacoast Specialist Cars offers for sale. Indeed, the company recently shifted a 1989 944 S2 with

just 58,455 miles from new. In single ownership before its arrival at Tom's workshops, the three-litre Guards Red road rocket joined a 2008 987 Boxster RS 60 Spyder in the firm's showroom. One of just 1,960 examples of its kind, this particular RS 60 holds designation number 120 and had covered a meagre

13,002 miles from new when it passed into new ownership following a full service. Clearly, immaculate presentation and low mileage are the order of the day at Seacoast Specialist Cars.

At the time of our tour, a handful of customer cars sit out front, but regular free-to-attend coffee mornings bring in a much higher number of Porsches from far and wide. "We're very much 'open house' during these meets, encouraging attendees to have a look around and chat with fellow enthusiasts

in the comfort of our working space," Tom says, proudly. "I know only too well how stiff the main dealer customer experience can be. The Seacoast Specialist Cars approach is far more informal — this is a friendly and inviting place for customers to get to know their cars a little better."

It's also totally spotless. This is a crucial aspect of modern workshops — no longer do Porsche owners expect to be told to sit quietly in waiting rooms

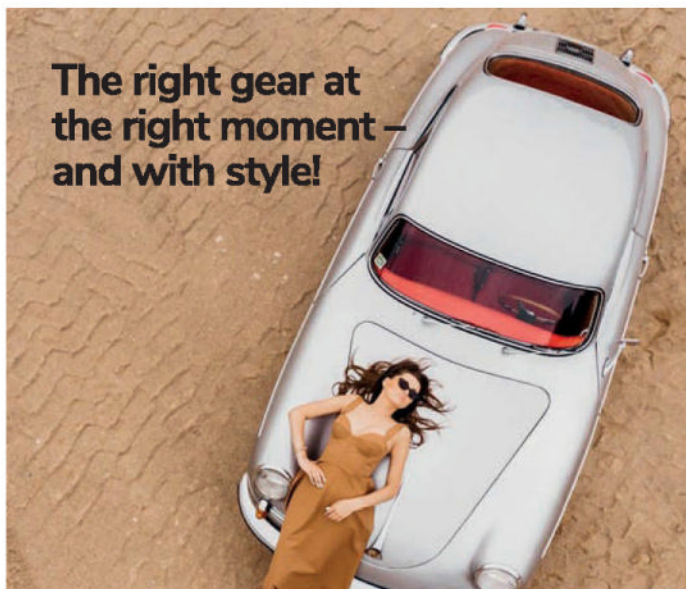
while their cars are spannered in areas hidden from view. Today's enthusiasts wish to learn more about their four-wheeled friends and want to understand what's involved in keeping them on the road. A working environment every bit as clean as a showroom is essential. Tom has it licked.

For details of all services offered by Seacoast Specialist Cars, as well as information relating to each of the firm's sales cars, visit the company's website, which can be found at sscarnh.com. ●

Above 987 RS 60 is number 120 and had covered little more than thirteen thousand miles from new when offered for sale by Tom's team

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PORSCHE 356



£130,000. B T6 Coupe 1600S. This car was originally sold in the USA in January 1963, it was then in Canada for a period of time before being imported to the Netherlands, from where it was purchased to commence its extensive restoration. The focus of the restoration was originality, the car is presented in 'oslo' blue (bare metal respray) with the interior trimmed in the 'factory option' red leather to give a truly stunning colour combination. Please call 07967 260673, East Midlands. (T)

124072

PORSCHE 356



1955, £300,000. Continental. This 356, (pre A as they have come to be known as) is the Knickscheibe, or bent screen model. A complete restoration of this car, including braking system, suspension, mechanical, bodywork and interior was completed in 2023, finished in the original specification of silver with red leather interior as confirmed by a copy of the Kardex for the car. The dash is finished in Turkish Red with ivory switches and steering wheel. Please call 07967 260673, East Midlands. (T)

124073

PORSCHE 911T



1973, £134,995. Meticulously maintained and always garaged. Completely restored in California in 2014 covering around minimal since. Finished in its original colour combination of classic Aubergine with beautiful Beige interior and removable Black targa top. Porsche COA on file. Fitted with many rare options. Please call 01765 609798, Yorkshire and the Humber. (T)

124071

PORSCHE 911



1987, 48033 miles, £89,999. A highly original 1988 Porsche 911 Carrera 2, boasting a desirable factory specification. This Porsche 911 Carrera Super Sport Cabriolet is a highly collectible open-top performance car, combining its soulful air-cooled flat-six with an involving G50 transmission and the Turbo's bodywork, suspension, brakes, and spoiler. Having covered a modest 48,033 miles at the hands of just four owners from new, this example would make a fantastic addition to any collection as well as a stylish and involving weekend cruiser for any marque enthusiast. Please call 07999222999, Wales. (T)

123711

PORSCHE 911 996 CARRERA 4



2002, 73000 miles, £16,990. Finished in basalt black with contrasting graphite grey leather upholstery. Last owned for the past 11 years the previous keeper had the vehicle in dry storage and used purely on occasional weekend 911 club drives. The vehicle comes with the certificate of authenticity from Porsche UK also. www.kccarsales.co.uk. Please call 01322226766, South East.

122959

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PORSCHE 911



2005, 22000 miles, £35,000. 996 Carrera 4S Tiptronic one owner from new, seal grey, midnight blue leather interior, PSM, 18" turbo wheels with mitchelin tyres, switchable sports exhaust, full service history. An outstanding 911 which are appreciating in value making it a great solid investment. Please call 07973760534, South East. 124438

PORSCHE 911



2006, 117000 miles, £19,000. C2 997, manual. Fabulous car in great condition. No issues, ready to enjoy. Please call 07900374300, East Midlands. 122762

PORSCHE 911



1983, 8655 miles, £99,999. The 'Holy Grail', for any British Porsche enthusiast, is a sub-10,000 mile low-production C16 car. Fully matching number Porsche 911. The odometer displays an incredible 8,653 miles from new. Please call 07999222999, Wales. (T) 123710

PORSCHE 911



1984, 208000 miles, £32,500. Bright Red 3.2 911 Carrera, Left Hand Drive. MOT till April 2025. Previous owner was the editor of Porsche World. Please call 07871924318, East of England. 122960

PORSCHE 911

1994, 54000 miles, £45,950. 993 Carrera Cabriolet 3.6 Tiptronic. I am delighted to present for sale my beautiful Porsche 911 993. Owned by me for the last 18 years. Always garaged. Used sparingly only in the summer months. Please call 07957212299, Greater London. 120815

PORSCHE 911



2004, £36,950. Turbo X50 (450 BHP) Cabriolet Tiptronic S with 4 wheel drive. Metallic Basalt Black with Black full leather interior and Black mohair power roof. Permanent All Wheel Drive, twin turbo fitted with the desirable X50 'Performance Kit for Turbo' delivering circa 450 BHP, Tiptronic gearbox with the optional steering wheel buttons, 18 inch factory alloy wheels, plus other extras. Really superb condition. ULEZ compliant. Please call 01277365415, East of England. (T) 124070

PORSCHE 993

1996, £95,000. 3-6LT Twin Turbo 6 speed g/box. Wide arch body kit wide BBS wheels full cage. Air jack system ex race car V5 registered. Stunning car. Please call 07860 379440, East of England. 121509

PORSCHE 996 TURBO



2001, 70200 miles, £36,000. Tiptronic, Metallic Lapis Blue. Full black leather immaculate interior, Michelin sport tyres, excellent condition, turbo wheels also immaculate. Purchased from 911 Virgin 9 years ago, last major service carried out at Eporsche at 69456 miles. Amazing car to drive. Please call 07796246116, South East. 121897

PORSCHE 996



2000, 16246 miles, £29,999. An original right-hand drive 'C16'-code UK-market car. More usable all year round thanks to the hard top and all-wheel-drive system, this Porsche 996 Carrera 4 Cabriolet is a wonderfully capable sports car. Finished in the lesser-seen hue of Paladio Metallic and presented in excellent overall condition, it will make a fun daily driver or weekend cruiser for its next owner. Please call 07999222999, Wales. (T) 123709

PORSCHE 996 COUPE C2 TIP S



2003, 66000 miles, £29,995. One previous keeper prior to ourselves. Originally supplied by H R Owen and original delivery docs in the file. Finished in midnight blue metallic with full black leather upholstery. Factory fitted 'GT3' Aero spoiler and Carbon Fibre interior package. Full specification includes £8k+ extras. 18" Sport Classic alloy wheels in silver. Brake calipers in black with Porsche Logo; sports suspension; Tiptronic S transmission; factory fitted GT3 Fixed Aero Spoiler; PSM – Porsche Stability Management; Sports exhaust system; electric tilt / slide sunroof; heated manually folding body coloured door mirrors. Please call 01765 609798, Yorkshire and the Humber. (T) 121203

PORSCHE 996



1999, 145000 miles, £10,000. 3.4 Carrera 4, FSH, bore scored symptoms hence priced at £10,000 as it is. Has MOT and comes with 2 keys, additional Clifford Security. Full clean bill of health on the instrument panel with no loss of power at all. Plenty of factory options including xenon's, sunroof, rear wiper, etc, confirmed by the buildsheet. Lots of time and money spent maintaining this vehicle with stacks of receipts available in a folder. Lots of car here for a reasonable price. Ideally looking for a cash sale due to reducing fleet. Please call 07989961039, East Midlands. 122153

MOTORFREE ADS

PORSCHE 928

1987, £12,000. 4951cc immaculate 95k MOT recent service. Please call 07399144780, South East.

122480

PORSCHE BOXSTER



2001, 109500 miles, £5,500. Sadly it's time to let my much cherished 986 s go to a new home after almost 8 years of ownership. The colour is Lapis blue metallic complimented by Boxster red leather interior and hood in Fulham red. It comes with a 2 inch thick folder of every receipt since new and has a very good history, last serviced at 104,500 miles. Next MOT due 4.4.25. The private plate T11 EPB will go with the car (THE PB). Tyres are excellent Kuhmos and still have the checker flag imprint on the tread. A new clutch and flywheel were fitted at 106,500 miles and new genuine Porsche front springs fitted a couple of weeks ago along with new rear brake pads and new wear sensors on each corner. Just before lockdown I was about to have a new red hood fitted with a glass rear window but that didn't happen so in lockdown madness I dyed the hood myself, it's the one thing I would get done if I were keeping the car. Please call 07469713341, North East.

124233

PORSCHE BOXSTER 2.7



2005, 75000 miles, £10,995. With blue paintwork and tan interior, sports exhaust, recent service, full mot, genuinely immaculate condition. Please call 07500714593, Scotland.

123115

PORSCHE BOXSTER



2003, 82000 miles, £6,950. Arctic Silver paintwork, blue hood, leather seats, Porsche crest on seats, 18 inch Carrera wheels, 4 new P1 Pirelli tyres, polished new exhaust. Please call 07923105828, East Midlands.

122859

PORSCHE BOXSTER



2003, 51150 miles, £10,450. 3.2s-260BHP. Full history. All original. Last main service at 50k. Recent wheel refurb. Summer use only, garaged in winter. VGC in and out. Hard top and stand included. Please call 07530773273, Scotland.

123409

PORSCHE BOXSTER 987



2005, 67000 miles, £10,795. 2.7 5 speed manual, 67K with full main dealer and specialist service history. Arctic metallic silver with black leather partial electric heated seats. Bi Xenon lights, Sat Nav, Bose sound system, 19" Carrera "s" alloys in excellent condition, multi function steering wheel, wind deflector. Recent service and brake fluid change hence next service not due until March 2026, MOT till 23 August with no advisories. Please call 07845298551, North West.

122776

PORSCHE BOXSTER 987



2008, 44400 miles, £10,500. 2687 cc. Sport edition, 6spd. Blue. Sports seats. Bose audio. New blue hood 2017. Excellent condition with FSH. MOT October 2024. Private sale. Please call +447939528614 or 01603400971, East of England.

123261

PORSCHE BOXSTER 986



2000, 115600 miles, £7,900. 3.2 s in lovely condition. Currently has hand controls fitted - car can be driven with hands only or these can be ignored and driven as normal or the controls can simply be removed. Recent respray and fabric hood in red. The car is currently on upgraded 18" black wheels although I have the original refurbished 17 s. Last serviced late last year including coil packs and gearbox oil. Please call 07850741438, North West.

121739

PORSCHE 944



1987, 95000 miles, £11,500. Dark Blue. Two previous owners. Current owner 18+ years. Summer use only. Always garaged, well maintained. Recent new cam belt. Excellent condition. Please call 07747020758, East of England.

122920

PORSCHE 924



1986, 37000 miles, £9,750. A very smart Porsche 924 S finished in Guards Red with Teledial alloy wheels. It has the 2.5-litre engine and a five-speed manual gearbox. It has immaculate black leatherette and flannel cloth upholstery. There are some cracks on the top of the dash panel - a common 924 issue. The rest of the interior is in very good condition and everything works as it should, including the radio with electric aerial, and the sunroof has recently been sorted so it works perfectly. The car has also recently had a new battery and alternator, as well recent oil service. It had its second full belt service in 2018 that included the cam belt, balancer shaft belt, and power steering belt at 34,500 miles. It's a 1986 car that was delivered new from AFN Porsche in Guildford to its first owner. Please call 07768372440, Scotland.

124470

PORSCHE CAYENNE



2012, 80000 miles, £16,500. Here we have a very rare black Porsche Cayenne S that drives absolutely as new. Extremely good on fuel, just been used in a music video. Full service history, no oil leaks, lovely body work, pleasure to drive, sunroof, electric tail gate, no warning lights on the dash, SAT NAV. HPI clear and ULEZ Compliant. Please call 07355417118, South East. (T)

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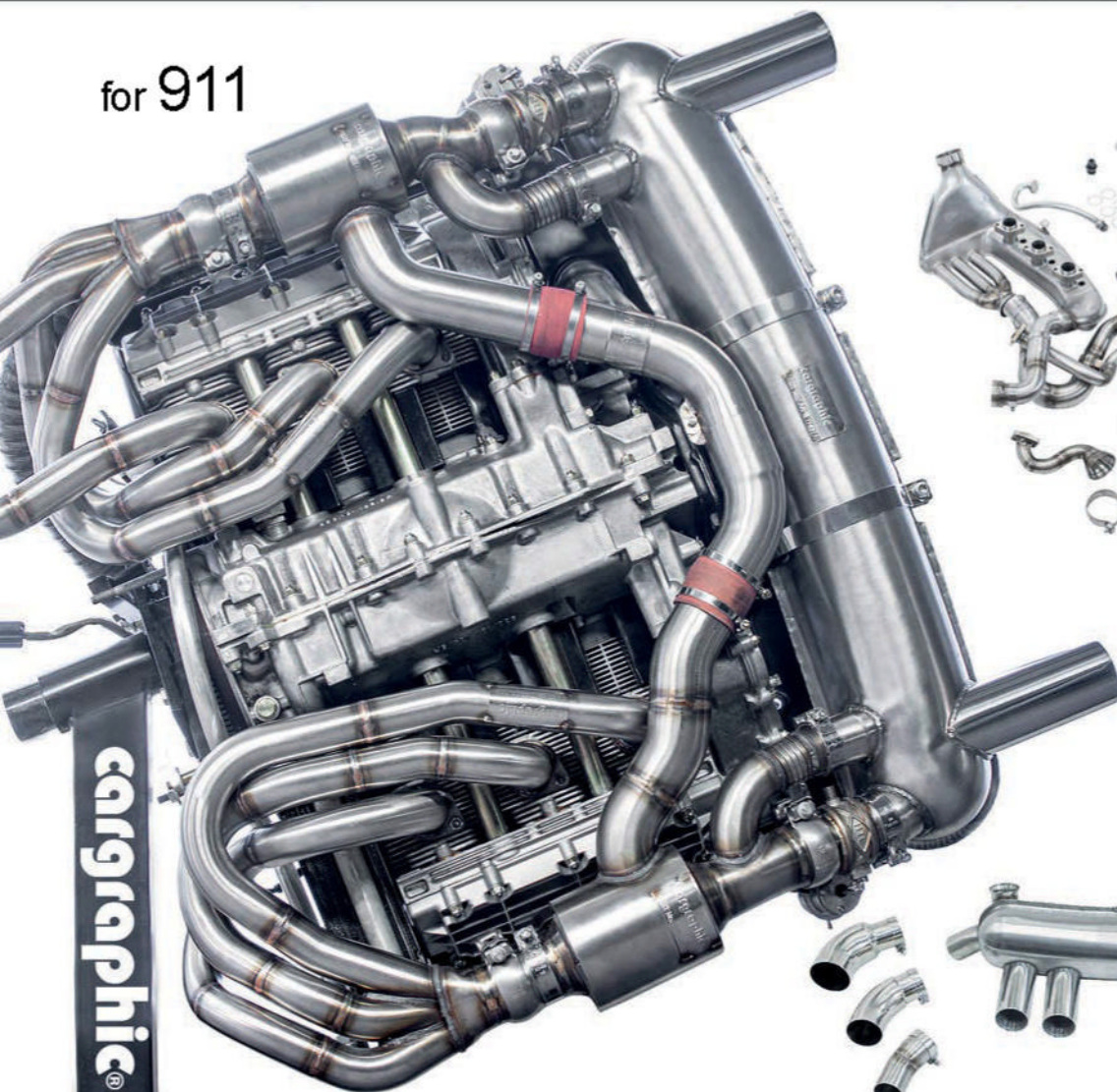


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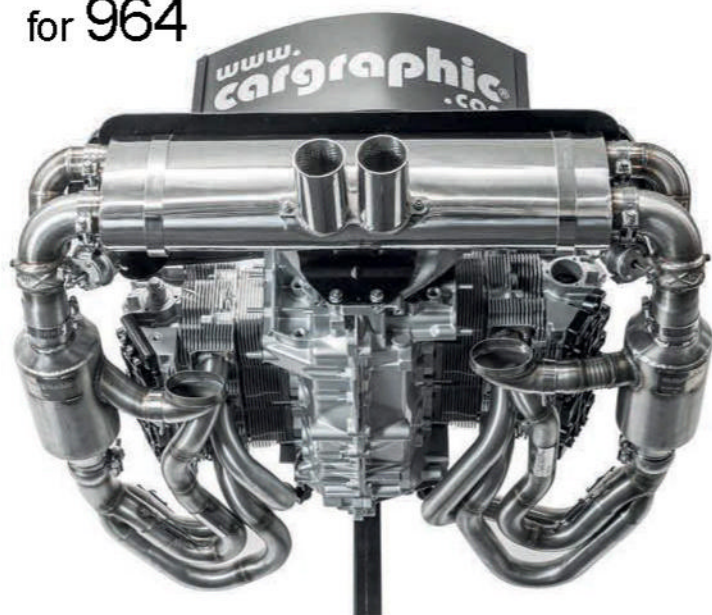
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