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### THE MIGHTY BOOST

PORSCHE'S AMAZING ACHIEVEMENTS with turbocharging at the race circuit resulted in refined forced induction technology which was subsequently applied to many of the brand's most exciting road cars. As is often the case, non-premium manufacturers eventually benefitted from Porsche's massive investment in the research and development of harnessing boost; low-cost turbochargers were found beneath the bonnet of many sports cars after the technology became affordable to the mass market. Ford Sierra? Slap a turbo on it. Fiat Uno? Why not, eh? It didn't end there, though.

Throughout the 1980s, it seemed like everything you could buy had Turbo printed on it. The word came to represent outstanding performance, no matter the application. Even the makers of toiletries got in on the act. Deodorant, shower gel, toothpaste. Turbo, obviously Ahem

Regardless of how much enjoyment you got from your new Turbo-labelled 'soap on a rope', you didn't have to haul ass to Le Mans in order to witness the difference forced induction could make to the performance of a sports car. You could simply fire up your tellybox on a Saturday afternoon, kick back and watch David Hasselhoff press the 'turbo boost' button in KITT, the talking Trans Am from the smash hit American TV show, Knight Rider. Week after week, the black Pontiac would launch itself skyward, often clearing buses, buildings and exploding bombs at speeds of more than a gazillion miles per hour after The Hoff enthusiastically pressed that magic button. How the car landed without

destroying itself or killing its occupants was never fully explained, but that didn't matter. If Turbo was good enough for KITT, it was certainly good enough for bath time.

Turbo became so recognised as a term of reference used to signal extraordinary levels of performance, you didn't need to identify it as the abbreviated name of a bhp-boosting engine component. All you needed to know was that your mate's ride had Turbo printed in massive letters on its doors, which meant it was capable of smoking anything else on the road. Or so he said.

Today, *Turbo* is seldom banded about outside the automotive sector, yet Porsche's famous script indicating the presence of forced induction still has the power to set pulses (and engines) racing! In this issue of Ultimate Porsche, we shine a light on the Stuttgart brand's class-leading achievements with turbocharging technology, from blisteringly powerful, all-conquering race cars to some of the world's most revered fast-road machines.

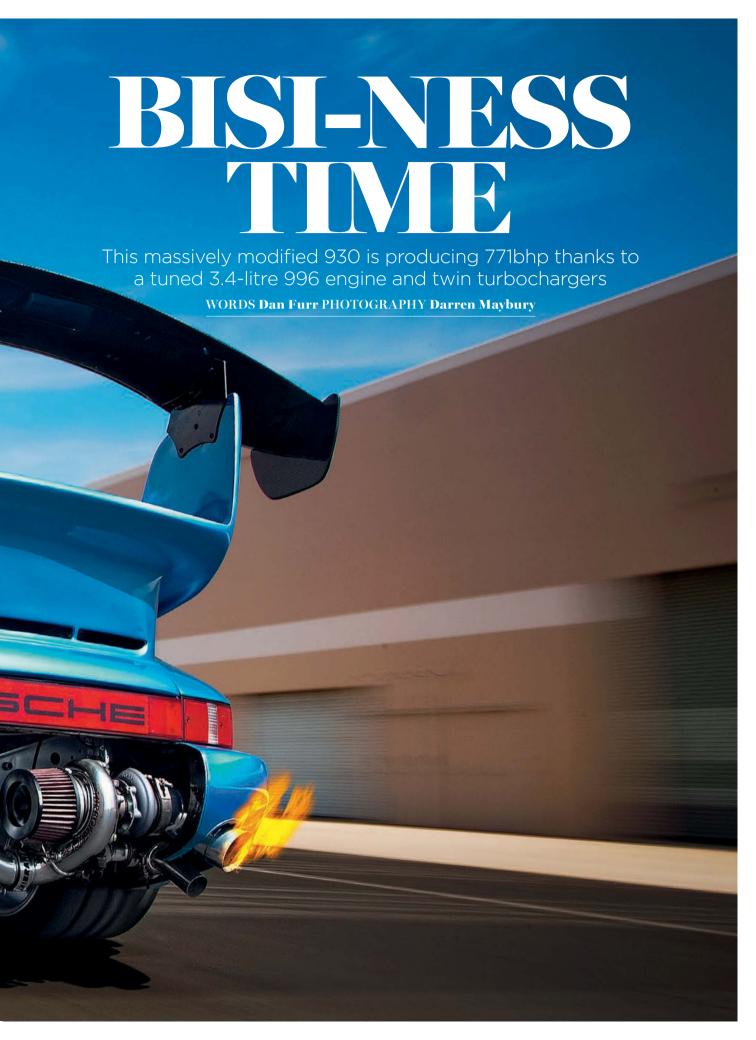
I'm off to fit a 'turbo boost' button to my force-fed 944. I'm hoping the new suspension equipment that's arrived for the car will soften landings after it jumps skyscrapers. If it's good enough for KITT...





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hat is it that encouraged



your love of Porsche?
Many of our readers
will openly admit to
fostering an affection
for Stuttgart's finest
after years spent doting
on Volkswagens. A significant number of those
migrating from one scene to the other consider
Porsche to be the logical 'next step' from
dabbling in the world of Dubs, although old
habits die hard, meaning the choices somebody
new to Porsche ownership makes when it comes
to tweaking and tuning their ride are often
informed by the way he or she treated their
previous chariot of choice.

With such a large number of Porsche owners confessing to an earlier life playing with VWs, it comes as little surprise to see so many modified classic 911s featuring the same performance

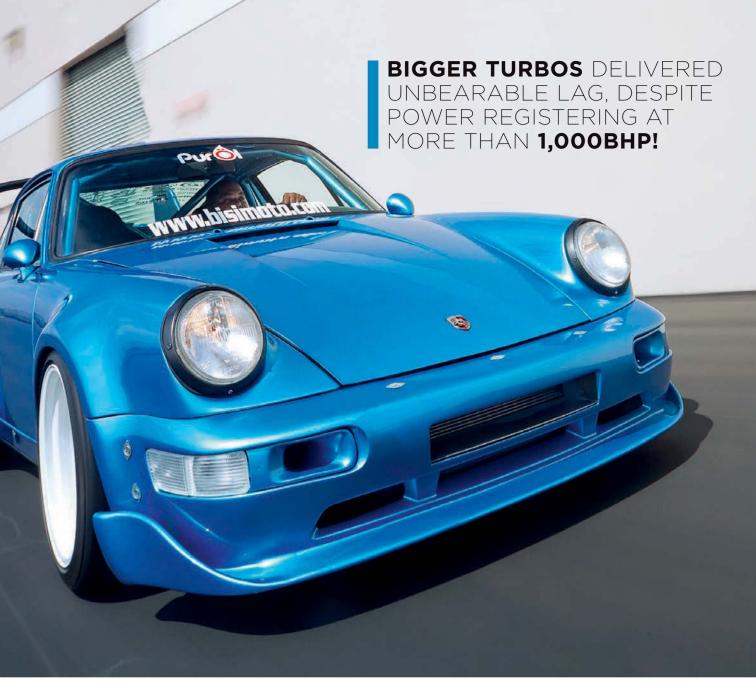
and styling upgrades as one another. This observation led us to wonder how those dipping a toe into the wonderful world of Porsche approach the task of tuning when making the move from an entirely different automotive landscape. Enter Bisi Ezerioha.

After a decade spent working in the field of pharmaceutical research and sales (following time spent studying for a degree in engineering), Bisi indulged his passion for high horsepower by establishing a business specialising in the design and development of performance parts for motorsport use. Initially, he focused his attention on extracting trapped ponies from naturally aspirated Honda engines. We're not talking DOHC B or K-series units. No, Bisi based his experiments on cheap SOHC non-VTEC lumps, scoring praise around the world for turning the great unloved into powerhouses of performance that repeatedly smashed drag racing records.



#### Set the scene

Born on 6th January 1972, Bisi Ezerioha is the chief engineer and brains behind Bisimoto Engineering. Many of our readers will know the Californian company's name from the various 911s we've featured propelled by Bisimoto-fettled powerplants. In addition to tuning road cars, Bisi and his team are involved in various professional race series, setting many records along the way, including one for competing with the fastest carburetted front-wheel drive car in the world. Visit the website bisimoto.com



Five years into Bisimoto Engineering's existence, Bisi changed the company's direction to be less concerned with racing applications and more focused on engine development and overall vehicle design for street use (although his builds continue to set records in various sprint competitions). This shift in philosophy saw him flirt with forced induction, a move that resulted in an invitation from Honda to present a custom ninth-gen Civic Si at the Specialty Equipment Market Association (SEMA) show in Las Vegas. Our man didn't disappoint, rocking up at the planet's most widely talked about annual automotive trade extravaganza in a 1004bhp monster powered by a twin-turbocharged 2.4-litre lump!

His efforts caught the attention of other Asian car makers keen to see their standard production models turned into showstoppers, but it was component manufacturer, NGK Spark Plugs, which set Bisi his most exciting challenge to date. The task? To build a turbocharged classic 911 producing big bhp in time for the next SEMA show. Needless to say, he relished the opportunity to modify a Porsche using the knowledge he'd gained during many years spent creating some of the world's most impressive Japanese joy toys.

#### TREAD WATER

A 1976 930 (911 Turbo) was to serve as the platform for the project, but it became apparent that an air-cooled flat-six wasn't going to deliver the kind of power Bisi had in mind without requiring far more development work than a modern water-cooled 911 engine would need to reach the same goal. Consequently, a 996's 3.4-litre M96 was sourced, as was a 997's six-speed transmission.

The idea of using a duo of high-output

Facing page Giant radiator is cooled by custom stainless ducting sucking air through the widemouth of a heavily modified 964 bumper

**Above** Resplendent in a coat of gorgeous bright blue, Bisi's twin-turbocharged 930 generated interest that resulted in further commissions from big-name manufacturers



turbochargers registered on Bisi's radar early on, but he reasoned whatever engine he settled on would require serious upgrades if it was to cope with furious firepower. To that end, he equipped the M96 with Golden Eagle sleeved cases, RSR mounts, bespoke steel connecting rods, Arias ceramic-coated forged pistons with moly-coated skirts, a Supertech uprated valvetrain, ARP fasteners, custom profile camshafts, a performance ignition system (featuring NGK Iridiums, of course!), a Burns stainless exhaust system, Vibrant Vanjen clamps, an Action 2MS clutch and a highflow fuel system comprising 1,000cc injectors, Kinsler filters, G&J braided lines, a Holley billet pump and an AEM Series 2 EMS ECU loaded with bespoke engine management software, a 5bar MAP sensor, an electronic boost control solenoid and extensive Raychem wiring.

He managed to shoehorn the new nuts and bolts into his 930's rear end before installing a

Griffin large-core dual-pass shrouded radiator cooled by air sucked into ducting fed through a modified 964 front bumper. A Sparco custom air-to-air intercooler, Driftmotion solid air and coolant pipework, a louvered engine lid and a custom intake also keep toasty operating temperatures at bay, yet it's the twin Turbonetics BTX6162 turbochargers fully exposed at the rear of the car that take centre stage. Bisi experimented with various dual turbo setups prior to settling on the billet beauties you see on the pages before you, but bigger turbos delivered unbearable lag despite top end power registering at more than 1,000bhp on the dyno!

#### **BOOST BEAST**

Armed with K&N filters, Turbonetics RG-45 wastegates and the company's Godzilla blow-off valve hardware, this naughty 930's brace of boosters contribute towards a "perfectly usable" power figure of 771bhp. Understandably, those



**Above** Comprehensive roll cage illustrates Bisi's focus on building a track-friendly, super-

fast classic 911 Turbo









BISI EZERIOHA
Occupation
Owner of Bisimoto

Engineering

First Porsche

What reaction do you get from other road users when driving your tuned 930 around town?
People drive recklessly in order to take photos or catch a glimpse of the car. Everybody wants to race me, and I'm

always getting stopped by the police. There are certainly less frustrating ways to travel! What's next?

What's next?
I'm building a classic
911 coupe specifically
for hard racing



galloping ponies need to be kept in check, especially when Bisi wants to bring them to a sensible canter. To achieve a swift halt, a caliper and disc kit based on a 996 setup has been introduced to each corner, while stability at speed and under hard braking conditions is promoted by Eibach custom coilovers, chassis stiffening (in the form a weld-in, multi-point chromoly roll cage) and super-wide Eins Gramm staggered alloys painted Grand Prix White and wrapped in sticky Falken Azenis rubber (265/35/18 at the front, 315/30/18 at the rear).

#### **SPLIT OPINION**

A custom front lip and a giant carbon-fibre rear wing help to create downforce, yet Bisi admits they're exterior adornments that fans of classic Porsches will either love or hate. The same goes for the side skirts held in place by Dzus quarter-turn aircraft fasteners. "Styling is the least strongest part of my game!"



#### First class

Hailing from a family interested in the sciences, Bisi attended the Anambra State University of Technology at the age of fifteen in order to begin studying petrochemical engineering. His father, Dr Emesia Ezerioha, holds batchelor's degrees in Earth sciences and geology, a master's degree in economics and a doctorate in international International
marketing. After
spending twelve months
studying at a school of
technology in West
Africa, Bisi transferred
to Cerritos College in
California and graduated with honours in the field of applied natural science, obtaining his batchelor's degree in chemical engineering from California State University in Long Beach. Transferring the skills he learned in the Bisimoto workshop, Bisi has since built the world's most powerful naturally aspirated SOHC Honda engines.

**Above** Imagine pulling up behind this at the stop lights!

laughs the 46-year-old from Los Angeles, acknowledging that while the striking pearlescent blue and black accents covering his custom creation do a great job of catching the eye, there's no escaping his desire to prioritise function over form, a trait he has to adopt when hammering record-breaking Hondas along the quarter-mile. As if to prove the point, a step inside Bisi's potent Porsche reveals little more than bucket seats, a 997 shift knob, Rennline foot rests, a MOMO Prototipo steering wheel, lightweight door cards, the aforementioned AEM ECU and custom gauges with revs registering all the way to 11,000rpm.

Following a series of supremely quick 'standing start' sprint tests, the finished car was presented at SEMA in accordance with NGK's wishes. As you can imagine, the bright blue boost machine went down a storm with all those in attendance, resulting in yet another commission for Bisimoto Engineering. This time, Bisi was challenged to create the world's first drive-by-wire air-cooled flat-six, which he did in the form of a twin-turbocharged 911 SC Cabriolet boasting Controller Area Network (CAN bus) connectivity and a luxury interior.

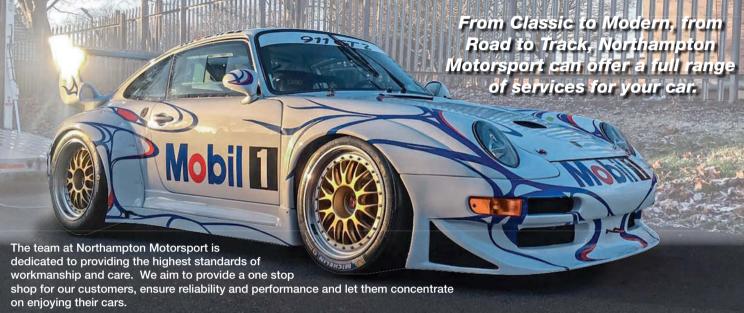
#### **OUTSIDE THE BOX**

The results of a Honda modifier's dalliance with Porsche might not be to everyone's taste, but there's no denying the awe-inspiring power and performance of Bisi's 930, the product of an unusual approach to tuning a classic 911. Bitten by the bug, he now splits his time

between working on Japanese and German cars (his recently-built 1,029bhp Honda Odyssey MPV raced against an altered 2014 Porsche Cayenne Turbo S on an episode of *Top Gear USA*) and works hard to continue building Bisimoto Engineering's reputation for producing unusually powerful, headline-grabbing vehicles. We can't wait to see what he unveils at this year's SEMA show!







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**NEWS & EVENTS** 

# Platform

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RUF Automobile reveals new SCR in Geneva

# Carbon-bodied 510bhp stunner stole the show

n 2016, thirty-eight years after the first RUF Automobile SCR (Sports Carrera RUF) was announced, the German manufacturer presented a newly developed prototype carrying the same DNA as the 1978 model, but blessed with a modern performance and styling package. Featuring Blood Orange paintwork, a long wheelbase, lightweight materials, a powerful naturally aspirated engine, a sixspeed manual transmission and a fully integrated roll cage, this radical RUF promised more than 500bhp and bulk of less than 1,250kg.

The concept was well received, leading RUF to dedicate a further two years to development work, resulting in the gorgeous green SCR revealed at last month's Geneva International Motor Show. The new car is built around a carbon-fibre monocoque shell propelled by a four-litre flat-six chucking





out 510bhp without the aid of forced induction. Torque is rated at 347lb/ft, while a claimed top speed of 199mph was enough to get interested parties clambering for their cheque books.

The new SCR includes design cues from the 1978 model, including a wide-mouth front bumper with large brake cooling ducts and a visible oil cooler. Interior kit is offered in the form of carbon-fibre seats, lashings of sumptuous Alcantara and a RUF three-



spoke steering wheel, all wrapped up in a brilliantly designed classic 911 silhouette punctuated by distinctive exterior lighting and fantastic staggered five-spokes.

We're told orders are already coming in thick and fast, which isn't surprising when you consider the fact that RUF has stayed true to the traditions of what made the original SCR so popular. Interested parties should visit rufautomobile.co.uk.



#### **Fever-fuelled** tribute to Henry **Hope-Frost**

Motorsport commentator. Henry Hope-Frost, tragically lost his life in a motorcycle accident when leaving Goodwood last month. A passionate presenter with an encyclopaedic knowledge of all things related to circuit racing, Frost was a keynote speaker and interviewer at some of the UK's biggest motorsport events, including Autosport International and the Festival of Speed. His connection to the Porsche brand was strong, in part thanks to his interviewing of marque legends, such as Derek Bell, Jacky Ickx and Magnus Walker. Organisers of the recent 76th Goodwood Members' Meeting paid tribute to Frost by encouraging those

in attendance to fire up their car engines for a minute of noise. He'll be sorely missed by all who knew him, but most of all, by his wife, Charlotte, and their three young children, who are welcoming donations made through a Just Giving page. Check it out by visiting bit.ly/frostfever, and view Frost's April 1995 appearance on ITV's *You Bet!*, when he attempted to identify fifteen winning F1 drivers, race teams and engines picked at random. Visit bit.ly/frostyoubet, but try to avoid eye damage through prolonged exposure to Bruno Brookes' choice of pullover



#### **Porsche Classic launches Parts Explorer** service on the worldwide web

Porsche Classic supplies more than 52,000 immediately available parts to classic car enthusiasts across the world. To make searching for items as easy as possible, the Porsche Classic Parts Explorer is now available to view online. This new service enables users to find original parts and accessories for their classic Porsche with ease, and it provides regularly updated information outlining which newly-manufactured, old-school Porsche parts are about to be reissued. Visit porsche.de/classic-explorer

## See you

#### PHOTOGRAPHY DAY

PCGB has ioined forces with Canon UK to provide club members with an introduction to car photography. Pro snappers, Darren Woolway and Rod Fountain, will share their experiences providing hints and tips highlighting how to improve your technique. Bring your camera, point and click! There will even be an opportunity for you to print your work on Canon's exceptional range of high quality printers, enabling you to learn about photo colour management from capture to the printed result. The day takes place at PCGB's Costwold clubhouse on Saturday 14th April. Visit bit.ly/pcgbpics

#### 928 PASSION GROUP MEET

Those not attending PCGB's day of picture-taking might be interested to learn that the guys and girls of the 928 -Passion Group host their annual bash at The Cock Inn. Sarratt. on Saturday 14th April. A relaxed afternoon will see 928s of all ages in attendance. Enthusiasts are welcome regardless of whether they own a 928 (last year's meet saw a stray 944 Turbo join the line-up!). The inn will be serving food and drink all day, and proceedings kick off at 10am. Set your sat nav to find post code WD3 6HH, and visit the 928 Passion Group Facebook page at bit.ly/928passion

HISTORIC FESTIVAL Taking place for three days from Friday 4th May, Donington Historic Festival is an opportunity for fans of historic racing cars to see classic metal do battle. Book tickets at bit.ly/donnyfest

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the units from over voltage, output short circuit and reverse polarity. Performance and durability are confirmed by race and endurance teams worldwide.

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# Smuggler's box





#### **MOMO CALIFORNIA**

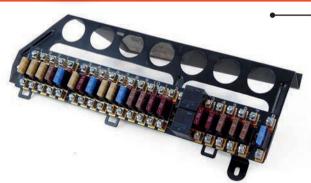
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#### **WO-WO WASH MITT**

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porscheclubgb.com or call 01608 652911





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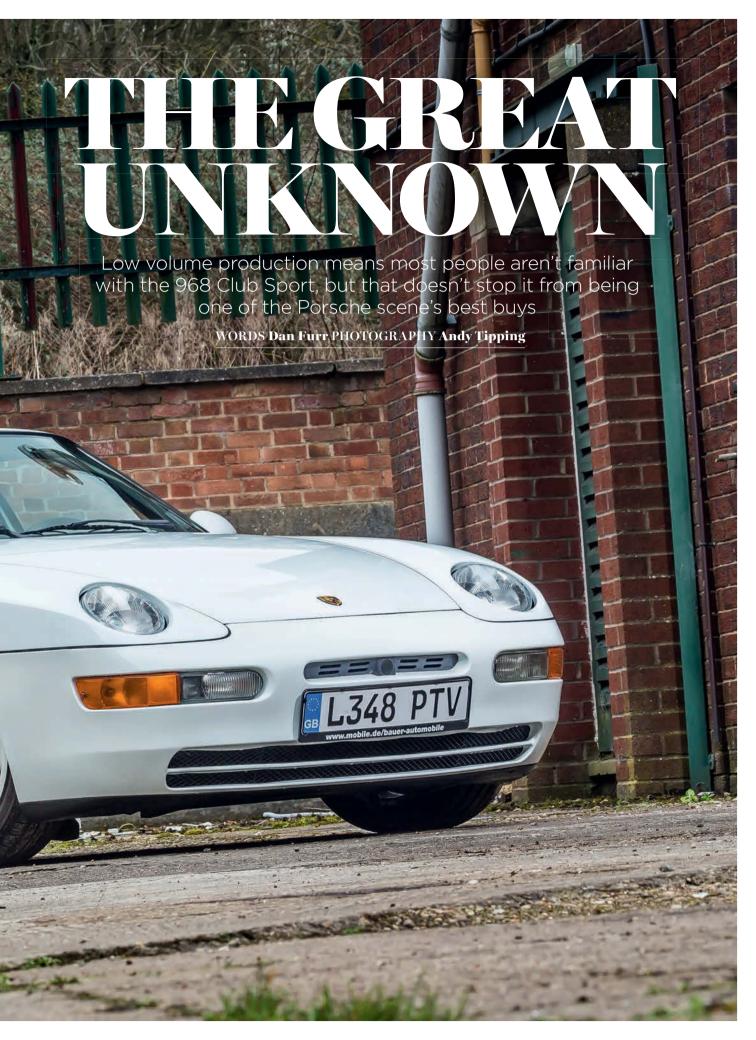
#### £85,000 1986 928 S2

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£72,000

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hen it comes to
celebrating a
manufacturer's output,
few occasions give cause
for renewed interest in
a model as much as an
anniversary year. We're

seeing it right now with the 356's seventieth birthday party in full swing, merrymaking which comes hot on the heels of four decades of 928, not to mention the 944's thirty-fifth journey around the sun. Unfortunately, the negative impact of reminding the world about the existence of a particular model is an inevitable rise in sale prices as collectors and enthusiasts do battle to secure the best examples of cars that in many cases had previously disappeared off the mainstream radar. That is, of course, if the model being applauded was ever on it.

While there's little doubt the purchase of a 924 - Stuttgart metal still enjoying elevated status among petrolheads following the watercooled classic's fortieth festivities a couple of years ago - is the cheapest way to see your name on the logbook of an old Porsche, bargain hunters could do a lot worse than taking themselves further along the transaxle timeline until they arrive at the dawn of the 968. Despite being the final evolution of the manufacturer's twenty-year experiment with front-engined machinery prior to the arrival of the Cayenne SUV in 2003, this last-of-the-line transaxle is little known outside of Porsche circles. Put it this way, casual observers frequently frustrate 968 owners by referring to their cars as 944s!





#### Making tracks

In 1993, the Porsche Motorsports R&D division at Weissach produced the 968 Turbo S, a limited run of sixteen special transaxles which shared the same body and interior trim as the 968 Club Sport. To aid with under-bonnet cooling, the Turbo S was equipped with NACA-style bonnet ducts. The model can also be recognised by its adjustable rear wing and prominent front splitter. The Turbo S made use of a 944 eight-valve cylinder head which sat atop a modified three-litre 944 S2 block. This super-aggressive 968 managed a 0-60mph dash in 4.7 seconds with a claimed top speed of 175mph. The Turbo S wasn't the ultimate in track-ready 968s, though. That accolade went to the ace 968 Turbo RS, a limited edition of just four units, making it the rarest 968 factory model ever produced.

Factory designer, Harm Lagaay, claimed the 968 to be "eighty percent new" when compared to the outgoing 944. Perhaps more convincing in his approach to winning over sports car buyers distracted by lighter, nimbler, quicker two-doors being churned out in the Land of the Rising Sun, works test driver (and two-time World Rally Championship victor), Walter Röhrl, claimed the 968 Club Sport to be the finest handling Stuttgart-crested car he'd ever driven. The same model bagged Performance Car magazine's Performance Car of the Year award in 1993. Sadly, it wasn't enough to result in much needed 968 sales success, as evidenced by the model's discontinuation little more than a year later. Drat!

#### **KEEP A SECRET**

Today, the 968 represents something of a bargain on the used car market, which is why those in the know are snapping up surviving examples before the rest of the world cottons on to the brilliance of this hidden gem in the Porsche portfolio. Track day enthusiasts, however, have always enjoyed the 968's ability to convincingly attack the asphalt, which is why they hold the transaxle's awesome Club Sport variant in such high regard.

Offered from 1993 onwards, this lightweight, stripped-out track toy was more than 100kg





Facing page RUF Automobiles three-spoke steering wheel is an unexpected surprise

**Left** Colour-coded wheels were standard equipment for all 968 Club Sports



lighter than the regular 968. Bulk was lost through the removal of rear cabin furniture, electrically operated front seats (Recaro buckets with colour-coded backs and manual controls took their place), a three-spoke steering wheel lacking an airbag, deletion of heated washer jet functionality, eradication of the rear window wiper, a smaller battery, a slim wiring harness and 944 S2 door cards.

Sixteen-inch alloys made way for wider seventeens, allowing for low profile rubber with a bigger surface contact area than could be found touching the tarmac beneath standard 968s. Factory options were extensive; the Club Sport's three-litre naturally aspirated engine and six-speed manual gearbox were no different from the regular 968's vital organs, but a choice of limited-slip differential, uprated suspension, a no-cost removal of Club Sport body script and the reinstatement of creature comforts were afforded to buyers in period. In fact, many Club Sport owners surprised Porsche by expressing an interest in retaining luxuries such as air-conditioning!

Porsche Cars Great Britain was only too happy to respond to this demand for what buyers saw as the best of both worlds; the boys in Berkshire ordered more than three hundred Club Sports before reconfiguring each car with parts deemed necessary to





make the model easier to live with if used predominantly on the road. After the work was complete, each altered 968 was given the shortened Sport designation before being launched as UK-only variant, albeit one still listed as Club Sport by Porsche in Germany.

As if you needed any further convincing regarding how great the 968 is, the Grand Prix White Club Sport we recently spent time with at Rutland-based specialist car sales and restoration outfit, Car Iconics, was originally ordered by the head of Mizwa Motor Corporation, Japan's sole concessionaire of Porsche cars for almost five decades prior to the manufacturer taking control of its Asian distribution network in the late 1990s. Mizwa's window sticker can still be seen in the transaxle's rear window, indicating how original the car is. "It was ordered with a M030 suspension package, no sunroof, a limitedslipper, a RUF Automobiles steering wheel and air-conditioning," confirms Daniel Gannon, managing director at Car Iconics. "It was the Mizwa man's personal car, and one he took incredibly good care of," he says, alerting us to the presence of original, blemish-free paint.

#### **HIGHWAY STAR**

Considering what we've just said about
Porsche Cars Great Britain's efforts to appeal
to Club Sport owners who defied expectation
by choosing the public road as their forum of
fun for sporty 968 action, it doesn't surprise
us to learn none of the 41k miles the Mizwa
boss's former pride and joy has covered from
new were registered at a race circuit. That's
not to say the car hasn't travelled considerable
distance since rolling off the production line
twenty-five years ago; this tip-top transaxle has
crossed continents, activity proven by paperwork
highlighting transport from Japan to Germany
in 2014 before the potent Porsche's relocation to
Britain two years later.

"A UK resident bought the car in 2016," continues Daniel. "He drove it to his home in Britain from a storage facility in mainland Europe. Eventually, he contacted me with a request for Car Iconics to find a buyer. I'm pleased to report an American collector of rare transaxles has just secured this excellent 968 as part of his ever-growing fleet. I fully expect to see the car gain a high profile now it has been afforded a new lease of life in the hands of an enthusiast keen to promote his Stateside collection of powerful modern classics."

Yep, you read that correctly – we teased you into considering the merits of a 968 Club Sport, presented you with one of the finest examples out there, then snatched it away by telling you it's already heading to its new home. Fret not, dear reader! Despite a production run totalling less than two thousand units, you won't have difficulty finding a Club Sport for sale; take a look on eBay at any given time and you're likely to spot this top-of-the-range 968 being offered for less than the price of an average classic 911. And with the twenty-fifth anniversary of the 968's end of production fast approaching, you'd be wise to bag an example of this lesser-known front-engined Porsche before prices rocket skyward quicker than it can reach 60mph!



DRIVER Q&A



**DANIEL GANNON** 

Occupation
Managing director of
Car Iconics

First Porsche 968 Clubsport (not this one!)

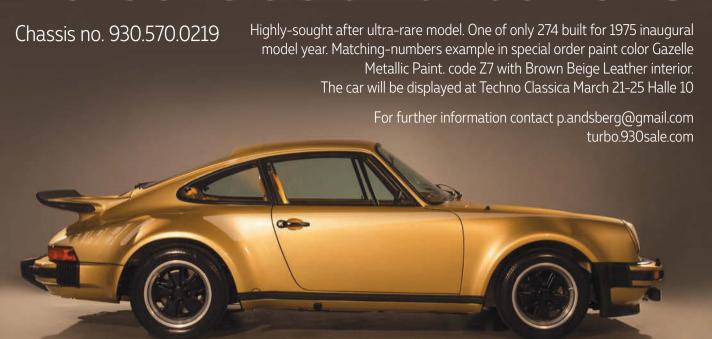
Favourite Porsche

#### True colours

The most desirable 968 colour is Speed Yellow. It's also one of the rarest, particularly in North America where only ten L12G-painted 968s are thought to have been ordered. Originally offered as a no-cost option, 968s in this vibrant hue tend to shift for more than those finished in other factory colours when sold on the used car market. Club Sports were originally offered in eye-popping shades of Grand Prix White, Guards Red, Maritime Blue, Black and Speed Yellow, but during the summers of 1994 and 1995, Porsche dealer customers could choose pretty much any OEM colour they liked for their new Club Sports, including the gorgeous Riviera Blue. Club Sports specified with option M346 had silver wheels in place of the model's standard colour-coded rims.

Left Clear reverse light segments found in the rear light assemblies are typical of 968s originally destined for the Japanese domestic market

# Porsche 930 Turbo 1975





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### Torque Specialist



# Richard Sekula

Chasing numbers is all well and good, but the key to manageable big bhp is to be just as concerned with how you reach high horsepower, suggests the director of RUF Automobile UK...

he forced induction technology of yesteryear is famous for its erratic delivery of power. Ask any owner of a turbocharged car built in the 1970s or 1980s what it's like to live with classic turbo tech, and they'll probably smile before suggesting excessive lag and sudden boost is all part of the charm of an older sports car. That's certainly one way of looking at it, whereas an alternative opinion is to suggest that what's being experienced by the driver is a simple case unrefined performance!

When RUF Automobile main man, Alois Ruf Jr, decided to develop his own cars based on unmarked Porsche 911 chassis, his first plan of action was to build a tuned version of the contemporary 911 Turbo. The resulting 3.3-litre model debuted in 1977, but recognising the need to create a car that distanced itself from the peaks and troughs produced when pushing a turbocharged 911 hard, a year later (exactly four decades ago), Alois launched the SCR, RUF's first complete naturally aspirated model. It was a game-changer.

Here was a car that set the benchmark for achieving turbo-esque levels of power and performance without the need for forced induction. No more waiting for boost to kick in, no more wondering which way the car would point when it did! A linear power curve instantly produced pace. Combined with top quality trim, the 3.2-litre SCR was everything fans of luxury German sports cars were waiting for.

In the main, RUF cars are assembled using the company's own parts and materials. Each vehicle has its own certified RUF VIN and serial number. They're recognised as production models (as opposed to badge-engineered Porsches), and as such, the firm holds status as an official manufacturer listed by the German government. Such dedication to rewriting the 911 rule book has even seen RUF develop its own transmission in an effort to further improve the overall driving experience. No more 'widowmaker', thank you very much!



A thrill seeker hell-bent on buying a turbocharged classic might be surprised at the difficult-to-manage sudden spikes in power felt when piloting his or her prospective purchase, especially if hopping into an older sports car after stepping out of one more modern. To his credit, Alois succeeded in designing a naturally aspirated 911 just as potent as one making use of forced induction, and he did so through a carefully executed series of engineering exercises that resulted in seriously impressive horsepower whilst simultaneously advancing driver enjoyment. It's a principle RUF has stood by for forty years, and while it's true to say turbocharged models currently feature in the company's portfolio, the just-revealed 510bhp 2018 SCR (see page 16) is a brilliant example of RUF's determination to continue safely pushing naturally aspirated powerplants to turbocharged levels of performance.

Above In addition to selling complete cars, RUF offers its signature components as individual parts for sale, hence the enhanced appearance of this classic 911 Turbo Flachbau

www.rufautomobile.co.uk **Twitter:** @rufautomobileuk **Instagram:** @rufautomobileuk



Alois succeeded in designing a naturally aspirated 911 just as potent as one making use of forced induction





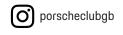
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Founded in 1961, the Club operates for the benefit of its 20,000 members and warmly embraces every model of Porsche.

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### Torque Enthusiast



# George Mayson

An unexpected spell behind the wheel of a 944 Turbo saw George Mayson end his love affair with Land Rovers in favour of hopping into a transaxle of his own, although he had a little help along the way...

bought my first Porsche not long after celebrating my twentieth birthday. Two years later, I'm still enjoying the low mileage 1983 944 Lux I brought home from its previous owner's abode located a short distance from where I live in Scotland. Truth be told, as a fan of vintage Land Rovers, I wasn't too bothered about Porsches during my formative years. I saw them as premium cars way beyond my financial reach, but a summer job working at a luxury sports car specialist changed my opinion entirely.

The turning point came during my first day on the job. A customer arrived with a 944 Turbo suffering sticking brake calipers. Not only was I tasked with fixing the problem, the workshop boss insisted I took the car for a spin to ensure the rebuilt stoppers were back to their best.

I felt at home the moment I stepped inside the turbocharged transaxle. I was surprised at how low the seating position was, but I was pleased with the way my legs stretched out into deep footwells, enabling my feet to push firmly onto the pedals. The car's interior struck me as being made to an incredibly high standard, and the pull of the 2.5-litre engine had me hooked. I decided there and then to buy a 944.

The rapidly rising cost of acquiring a solid Turbo – not to mention the difficulty in a twenty-year-old lad obtaining reasonably priced insurance on a boosted Porsche – meant forced induction was out of the question.

Unsurprisingly, I was pleased to find naturally aspirated 944s being offered for a fraction of the sum of their higher-powered stable mates. Before long, I'd identified the car I wanted (the very same Lux I'm in possession of today), but knowing little about what to look for when buying a 944, I contacted the guys at Porsche Club GB (PCGB) for advice.

They offered to send one of the club's knowledgeable members to join me in viewing the object of my desire. Not only did this inspire confidence in my spend, but the model expert in question was able to highlight areas of concern that helped me to secure my first Porsche at a



favourable price. Since then, I've spent a few quid bringing the car up to a standard I'm happy with (new sills, wheel arch repairs, paint, new engine mounts, replacement front struts, wheel bearings and a stainless steel exhaust system), but the money saved thanks to PCGB's help has more than softened the blow.

Some of the work was carried out on my driveway at home, a fact that highlights how user-friendly 944 mechanical equipment is to the DIY mechanic. And with new parts available at low cost, it's no wonder so many young petrolheads are choosing naturally aspirated transaxles as their route into Porsche ownership. Long may it continue!

Above George's decision to buy this stunning 1983 944 Lux made him what's thought to be the youngest PCGB member to own a Porsche in the club's long and colourful history



The car's interior struck me as being made to an incredibly high standard



# RESTORATION

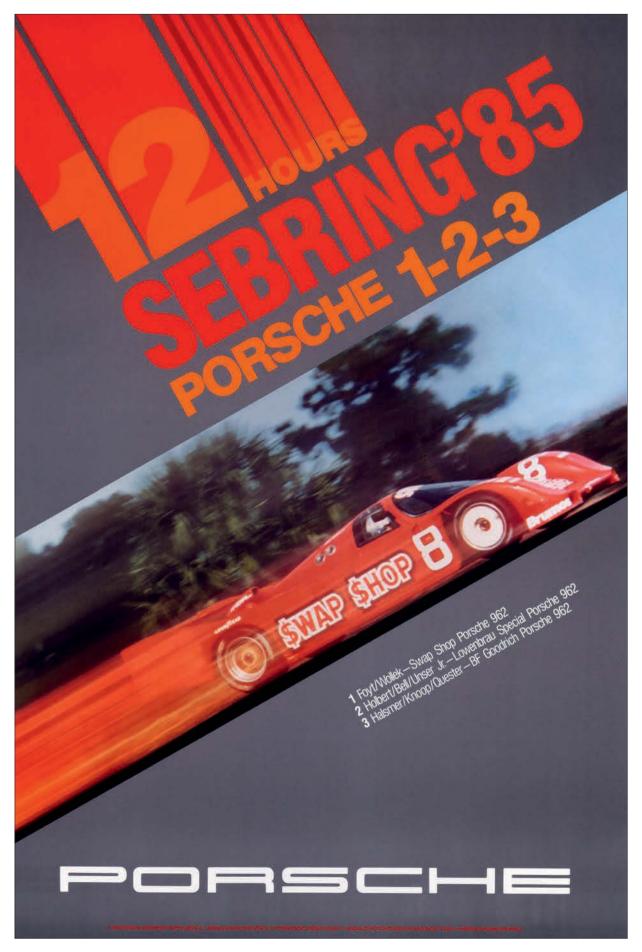
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WORDS AND PHOTOGRAPHY Ade Brannan





# Porsche people

#### **TIPEC**

The Independent Porsche Enthusiasts Club (TIPEC) brought an interesting trio of transaxles to the show. Two of the German threesome were grey 944 'works in progress'. The Turbo you can see rolling on orange D90s is a former *Wheeler Dealers* project that has since fallen into disrepair. The guys at Redditch-based independent Porsche specialist, Pro-9, are in the process of reviving the car, returning it to the track-friendly, street-legal state Mike Brewer and Edd China built it to a few years back.

The TIPEC car which excited us the most, however, was Paul Bird's World Championship Edition 924. This special transaxle built in 1977 celebrates Porsche's motorsport achievements in sports car racing from 1969 through to 1976. It's a rare beast, being one of only 100 right-hand drive examples assembled. Sporting the famous Martini Racing colours, the model offers owners chunky anti-roll bars, white alloy wheels, deep-pile red carpets, a leather steering wheel, twin-tone Martini-themed upholstery and a commemorative dashboard-mounted plaque.

Paul's car holds on to all of the trim that made World Championship Edition 924s so desirable when they arrived in dealer showrooms, but there's no getting away from the fact his retro ride is in need of a serious amount of TLC. Fortunately, its proud owner is on the case, sourcing new fabric to brighten the car's interior, whilst simultaneously formulating a plan of action that will see the cosmetic condition of aging bodywork improved.

With only a handful of Martini-decorated 924s left in the UK, we look forward to seeing this one improved through restoration.

















**Top** Have you got a passion for Porsche Pascha?!

**Middle** *Car SOS* presenter, Fuzz Townshend, takes time out to answer questions from the show's attendees

**Right** 968 Cabriolet sold at auction for almost fifteen grand



# Porsche people

#### **Porsche Club Great Britain**

In keeping with the theme of the show, Porsche Club Great Britain (PCGB) had a variety of partially-built cars on its stand. Interestingly, one of the club's key exhibits was a classic 911 that had been half restored... literally! The offside of the car was a stunning example of how good a revitalised air-cooled classic can look, whereas the nearside was left entirely untouched, complete with metalwork ravaged by rot. We'll leave it for you to decide if punters were looking at a demonstration of how well 911s can be restored, or how badly they can rust!

The club's cheeky 356 Speedster coffee trailer (autographed by Urban Outlaw, Magnus Walker, with the script, "get out and brew") was pumping out Americanos a-plenty, while Andy Prill (chief at Prill Porsche Classics, and the guy responsible for overseeing the restoration of the club's stupendously good 1960 356 B, as featured in last month's issue of *Ultimate Porsche*) was stationed on the stand, meeting and greeting those wanting to find out more about the club and its members. Elsewhere, PCGB presented a 356 flat-four engine in pristine condition and an utterly fascinating demonstration of old-school machinery configuring the advance weights in distributors.



**Below** Porsche Club GB's coffee machine is better than your coffee machine

Facing page No wonder the 924 Owners Club won the show's award for Best Live Demonstration on a Club Stand







Transaxle restoration joy was waiting for those venturing in the direction of the club's stand thanks to the 924 exhibited by PCGB member, Chris Pruden. This is a Porsche Chris has owned twice. He first acquired the car twenty-two years ago and drove it "like a boss" after time served behind the wheel of a VW Scirocco. He sold the 924 a few years later, but was alarmed to discover its new owner left the car sitting motionless in a barn... for fifteen years. In fact, by the time Chris managed to buy his former steed back, the level of deterioration suffered was so bad that the car's nose had pretty much rusted away! Thankfully, close inspection suggests the damage is largely superficial. Chris says his poorly 924's unveiling at the NEC is all the motivation he needs to crack on with the restoration.











#### 924 Owners Club

It's at this point of our show report you'll be more than aware of the fact that 924s dominated when it came to the classic Porsches in attendance at the NEC. Naturally, nowhere was this more apparent than when walking towards the 924 Owners Club's stand. A hive of activity saw a white two-litre model being treated to a timing belt change, rear wheel bearing replacement and a rear braking system overhaul, while club member, Ben Murphy, was taking great pride in carrying out work on his Zermatt Silver 924 S. Jacked with its arse in the air, the car was being fitted with new brake lines and a new master cylinder before dashboard removal and reinstallation, a move Ben hopes will cure annoying rattles. It'll also afforded him the opportunity to fit a much-needed new throttle cable!



# Porsche people





#### **Up for grabs**

Forget wistfully looking at unattainable cars! We hit the Classic Car & Restoration Show sales section in search of bargain buys. Dealers were offering everything from immaculately presented Porsches to full-on projects, while the imaginatively-named classic car auction company, Classic Car Auctions, offered a superb selection of privately owned Porsches for sale. Here's a list of the lots which caught our attention.

**Above** Chris Cranston tries out the RS homage for size

**Top right** Wheeler Dealers double act, Mike Brewer and Ant Anstead, chat restorations

**Below** Rebecca East (ArtByBex) wowed with her impressive portfolio of paintings







#### 1981 911 SC (RS homage)

#### Sold for £36,850

We took time out to chat to Chris Cranston, one of the bidders keen to take this bright orange SC home with them. "I love the idea of owning a classic 911 with RS looks," he told us. "This car appealed to me because it can be regularly enjoyed on the road without concern for maintaining low mileage or pristine condition," he told us. Chris took full advantage of being able to have a good poke around the car before bids were invited. Sadly, his pockets weren't deep enough on the day, but he's vowed to continue his search for a wild-styled, naturally aspirated 911.

1986 911 Carrera 3.2 Targa Sold for £29,700

1994 968 Cabriolet Sold for £14,850

1976 911 S 2.7 Sportomatic Sold for £33,000

1982 924 Sold for £6,050

1990 928 S4 Automatic Unsold!

1979 928 Sold for £18,150

1965 912 Sold for £31,350

1990 964 Carrera 4 Targa Sold for £36,850





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# Nash Hunter



#### Who are you and what do you do?

I'm Nash Hunter, owner of Porsche 944 maintenance, modification and restoration business, Retro Restorer.

#### When was Retro Restorer established?

The company has been up and running since 2009. My staff and I have been in our current premises in Banbury, Oxfordshire, for the past two years. We used to have a smaller unit nearby, but the growth of the business covering all aspects of keeping a 944 in tip-top condition meant we needed a bigger space to work in. We now occupy a 3,000ft² workshop complete with its own dedicated paint booth.

#### How many people work at Retro Restorer?

Five, including an apprentice technician. Roles cover all aspects of mechanical and bodywork services relating to the 944 and Porsche's wider transaxle family of cars.

#### Tell us about the history of the company.

Retro Restorer was born out of my love for the 944 after I bought an early Lux. I restored the car, took it to shows and then found myself on the receiving end of enquiries from impressed enthusiasts keen for me to work on their treasured 944s. Demand grew quickly, meaning I moved out of the single garage I was inhabiting and took out a lease on a fit-for-purpose workshop. At that point, I was outsourcing paintwork, but after deciding to

Right Regardless of whether your 944 is standard or modified, Nash and the Retro Restorer team are on hand to help bring this important aspect of the restoration process in-house, my team was bolstered by the appointment of a highly skilled automotive painter in readiness for the move to our current workshop in 2016.

#### What was your first Porsche?

The same 1983 Lux that kick-started my career restoring transaxles. I still own the car!

#### What's the best thing about owning a 944?

Whatever your requirement from a sports car, the 944 can satisfy it through a wide variety of different flavours. For example, if you want comfortable GT-style cruising, an S2 is just the ticket. If you want a livelier 944, get hold of a Turbo. If you're on the hunt for a well-built, good-looking, high quality sports car that's happy to be called into action as a daily driver, pretty much any 944 will do the job.

#### What's your favourite 944 variant?

At the risk of sounding like a broken record, it's the Lux. Admittedly, it's a fairly basic model in comparison to later 944s, but in my opinion, a Lux's early 944 dashboard, dials, front end design, stiffer suspension and lack of driver aids ensures a far more involved driving experience than many later editions of the wide-arched transaxle are able to offer.

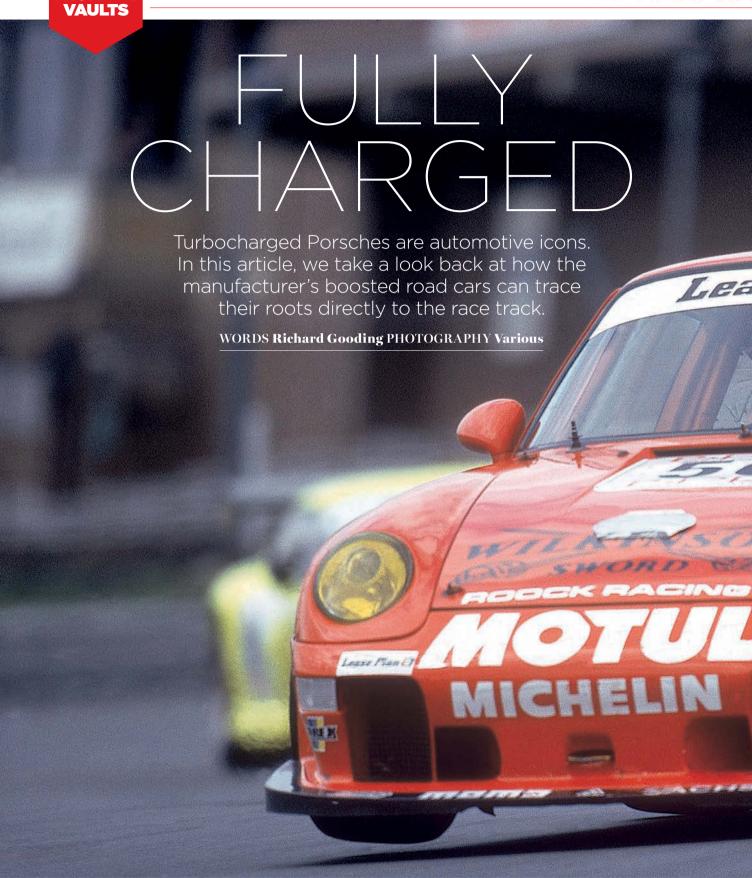
#### Can we follow your adventures online?

Absolutely! Search for Retro Restorer on Instagram, where I post photos of the work my team and I carry out each and every day. You can follow me on Twitter at @Porsche944Resto, and the Retro Restorer website can be found at www.restorestorer.co.uk

Thanks for your time, Nash. It's appreciated!

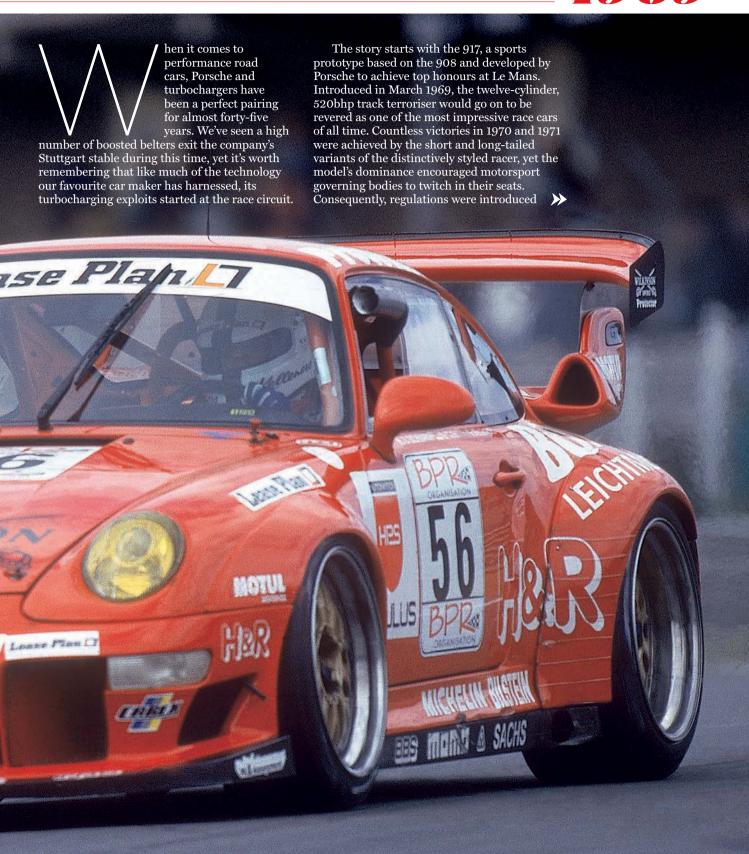


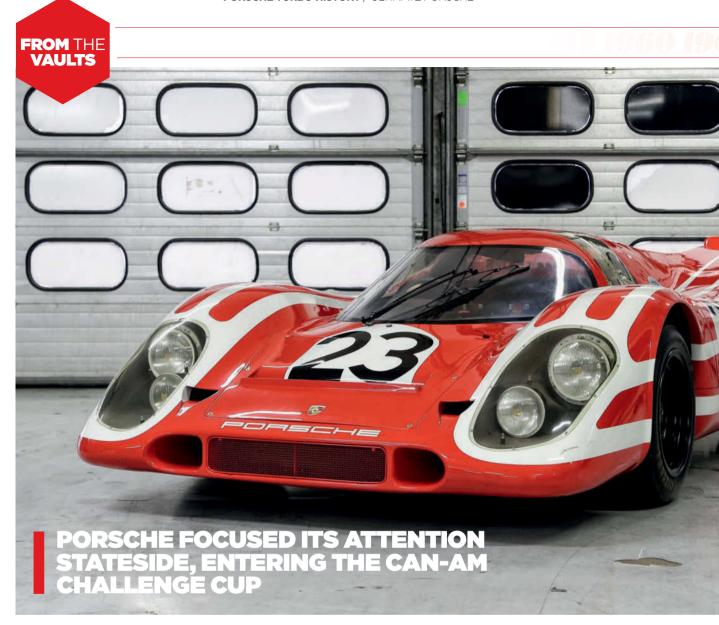




## 1962 1963 1964 1965 1966 1967 1968







favouring cars loaded with three-litres
of displacement (the smallest 917 engine
was 4.5-litres), a move designed to entice
manufacturers building three-litre Formula One
engines to enter the world of endurance racing.

In response to the altered rulebook, Porsche focused its attention Stateside, entering the Canadian-American (Can-Am) Challenge Cup in 1972. With fewer rules than were being dished out in Europe, not to mention a lack of enforced limit on displacement, the 917's 912/00 engine (named after the lowest-powered production Porsche in order to disguise the true nature of the beast!) grew to 5.4-litres with a power output of 660bhp, but that was just the start. Porsche engineers, Hans Mezger (read about this pioneer of turbo technology by ordering a copy of our March issue at bit.ly/993special) and his colleague, Valentin Schäffer, developed a sixteencylinder version of the engine producing 760bhp, but the host 917's chassis had to be extended to accommodate such a massive lump, which

negatively affected the car's handling abilities. Consequently, a turbocharged twelve-cylinder engine was developed under the watchful eye of factory motorsport chief, Ferdinand Piëch, and head engineer Helmuth Bott (learn more about the man responsible for some of Porsche's biggest technological breakthroughs by ordering a copy of the winter edition of *Ultimate Porsche* at *bit.ly/964special*).

#### **HEAVY METAL**

The new engine's turbos were supplied by Eberspärcher (the company subsequently bought by KKK in 1972), but this wasn't the first time Porsche looked to turbos for extra 'get up and go'; Ferdinand Porsche bolted boosters onto sixteen-cylinder diesel-fed tank engines many years beforehand, but the twelve-pot 917 represented the first time the company bearing his name used a turbocharger to achieve truly prodigious performance. Initial results, however, were poor. Massive, uncontrollable boost and

**Top** The winning 917 KH Coupe finished in first place at the 1970 24hrs of Le Mans

**Right** Al fresco 917 action at the '72 Can-Am championship

Far right The 935 competing in the 1976 World Championship of Makes before the 936/77 was first across the line at Le Mans in 1977

### 1962 1963 1964 1965 1966 1967 1968







the danger of mechanical failure causing a fire (due to high levels of ignitable exhaust gas) gave cause for concern. These teething problems were solved by diverting unwanted gas through a wastegate (see our detailed analysis of wastegate and blow-off valve technology on page 66), enabling the Penske Racing 917/10K to take Can-Am spoils with 850bhp at its disposal, breaking McLaren's five-year dominance of the competition as it did so.

Powered by a 1,580bhp twelve-cylinder engine, the 917/30 of 1973 was a force to be reckoned with. Driven by American, Mark Donohue, it decimated the competition. Sadly, the global oil crisis that followed – plus drivers of other motorsport machines dying in fires caused by excess levels of combustible gas leading to exploding fuel cells – forced Can-Am's regulatory body to introduce a limit on the amount of fuel that could be expended by participating cars. This pretty much outlawed

the 917/30 for the 1974 season, although some privateers backdated their 917s with naturally aspirated engines in a desperate bid to qualify for inclusion in a series McLaren had quit in favour of a renewed focus on F1 and the Indy 500.

Porsche had ably demonstrated its ability to harness and refine turbocharging technology. Indeed, the 917/30 was the most powerful sports racing car ever produced. It delivered 1,369.68bhp per tonne! It wouldn't be long until our favourite manufacturer's output would also rule on the road...

#### **NEW ARRIVAL**

In 1973, a prototype 911 Turbo revealed at the Frankfurt Motor Show signalled the shape of things to come. Essentially a force-fed version of the 911 Carrera RS 3.0, the white 'Turbo' script on the silver demonstrator's wide rear quarters – coupled with a large, rubber-lipped 'whale tail' rear wing – signalled something special was



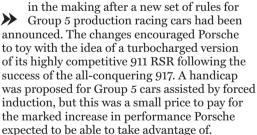












A 2,142cc flat-six was developed and boosted by a KKK turbocharger benefitting from NACA intake ducts and an intercooler sitting under a comically enlarged rear wing. Boost pressure of 1.5bar gave the new RSR (listed as 911 Carrera Turbo RSR 2.1) 500bhp and a zero to 62mph of just 6.2 seconds. Nought to 124mph clocked in at just 8.8 seconds. Proof, if proof be needed, that a turbocharged production 911 would be a riot on the road. Second place finishes at Le Mans and Watkins Glen sealed the deal. And so, the 930 (factory designation for the classic 911 Turbo) was readied for production.

Porsche was inspired to take the 911's



silhouette racing in 1976. Presented as the 935, the radically-designed racer can be described as an evolution of the turbocharged RSR. With 590bhp on tap, the newer car succeeded in snatching a stack of silverware.

#### NAME GAME

The 935/77 'Baby' won the German Sportscar Championship in 1977. Its 1,425cc flat-six may have only packed a 380bhp punch, but its design was deemed crucial to ensuring the world could see Porsche's ability to be first across the finish line with small engines after such huge success with far bigger powerplants. Today, 'Baby' lives alongside the 935/78 in the belly of Stuttgart's Porsche Museum. The newer car is known by the nickname 'Moby Dick' due to its long body and giant 'whale tail'. The wildly styled monster features a twin-turbocharged 3.2-litre engine with water-cooled heads and four valves per cylinder, resulting in 845bhp and a top speed of 225mph, attributes that make it the fastest 911 ever built!

Further iterations built by Kremer Racing and driven by the infamous Whittington



**Top left** The 911 Carrera RSR, 936 Spyder and 935/77 'Baby' in their natural habitat

**Middle left** 'Baby' is adequately powered by a turbocharged 1.4-litre engine

**Top right** The legend that is the 935/78 'Moby Dick'

## 1962 1963 1964 1965 1966 1967 1968





Brothers (among others) kept the 935's winning game strong. Other turbocharged 911-based racers – not least of all the Group 4 934 and Group 6 936 Spyder – proved dominant in the face of stiff competition by securing numerous victories at Le Mans, but with changing regulations and rival car makers doing their best to chip away at Porsche's dominance at the track, a new approach to winning races was required as the 1970s drew to a close.

#### THE MAGIC NUMBER

Before today's trend of strapping a turbo to a small engine, the boffins in Stuttgart were trailblazing the concept of force-feeding four-cylinder engines as far back as 1980. Three front-engined 924 Carrera GTPs producing 320bhp a piece were sent to Le Mans, the highest placed car of the transaxle trio finishing sixth overall. The 410bhp 944 GTP came home seventh in the hands of Walter Röhrl and Jurgen Barth a year later, a feat the car managed to achieve by spending less time in the pits than any other vehicle on the track. This fact is

significant, because it proved Porsche's claim that turbocharged engines can be supremely reliable even when pumping out big bhp.

The manufacturer's appetite for racing success arguably reached its zenith in 1982 when the Type 956 was revealed. A Group C racer destined for participation in long-distance racing championships, the 620bhp monster featured electronic fuel injection, as well as 'groundeffect' chassis and bodywork design. Success was immediate; the triplet of 956s entered in the year's 24-hour race at Le Mans crossed the finish line in first, second and third place. Privateer variants brought home even more wins as the decade progressed; in 1983, the 956 occupied the top eight finishing positions at Circuit de la Sarthe. This astonishing achievement was repeated by the 800bhp 962 in 1985! With fifty-one championship titles and seven Le Mans victories, the 956/962 is rightly regarded as one of the world's most successful racing cars.

By the mid-1980s, a range of Stuttgartcrested production machines boasting forced induction were bombing about on

#### Band leader

The success of all versions of the 935 can be attributed to Porsche's former chief race engineer, Norbert Singer. His first job for the works team was to find a way of cooling 917 gearboxes after they kept overheating at Le Mans in 1969. He completed his task with great success, his efforts contributing to the 917's ability to to win the competition in 1970 and again in 1971. The talented Singer was then charged with turning the 911 into a capable racer. In doing so, he created the 935, the most powerful car Porsche has ever campaigned and sold to its private customer racing teams.



the public highway, but there was still one motorsport arena the bods at Porsche had yet to conquer. We're talking Formula One.

Even though Porsche had acted as a direct competitor to McLaren in the Can-Am series back in the 1970s, the German company's engineers produced the Type 2623 engine (labelled 'TAG-Turbo made by Porsche') for McLaren's F1 concern. Debuting in the MP4 in the summer of 1983, the Mezger-designed, 1.5-litre V6 featured twin turbochargers and power that could be dialled-in to the tune of 900bhp. Other technical innovations included an electronic engine management system and exhaust valve seat cooling, features that helped McLaren to win the constructor's championship in 1984 and 1985 in addition to three driver's championships (1984, 1985 and 1986). In all, Porsche's brilliant engine helped McLaren to secure twenty-five Grand Prix victories between 1984 and 1987. Nineteen of those were achieved by two-time world champion, Alain Prost, while six were coined by three-time title winner, Niki Lauda, in 1984.

A string of seminal road machines from Porsche have benefitted from forced induction refined at the race track. As mentioned earlier in this article, the groundbreaking 930 (classic 911 Turbo) was the first. Importantly, it was also the first production car to have its turbocharger located on the exhaust side of the engine (an

BB-PW 916

idea pioneered during the design of Can-Am 917s). The 260bhp, three-litre 930 combined phenomenal-for-the-time performance, a luxurious interior, suspension derived from the RSR, wheel hub assemblies borrowed from the 917 and a boost pressure control system that'd proved its worth in motorsport applications. With a top speed of 155mph and a claimed dash to 62mph from a standing start in just 5.5 seconds, the 930 was a massive sales success.

#### HARD CHARGE

A procession of turbocharged, air-cooled 911s would follow in the 930's tyre tracks, a run that ended with 1997's 993 Turbo S (read about this special creation from the boys in the Porsche Exclusive department by ordering the March issue of *Ultimate Porsche* at bit. ly/993special). The excellent 924 Turbo was the first turbocharged model in the transaxle family of cars, providing DNA that would go on to assist with the development of the 944 Turbo and the super-rare 968 Turbo S. Notably, the 959 supercar of 1985 (and its race and rally counterpart, the 961) was the first road-going Porsche to make the 917/30's twin-turbo setup a production reality. And it's this legacy of forced induction technology successfully translated from race to road which has ensured the Porsche brand and boosted sports cars remain the perfect double act to the present day!



**Left** Twin-turbocharged 959 and mega-rare 968 Turbo S are just two of models to benefit from Porsche's track-developed turbo tech



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Recent progress with the *Ultimate Porsche* 944 Turbo restoration has been awesome in more ways than one

#### WORDS AND PHOTOGRAPHY Dan Furr

hose of you who read last month's issue of *Ultimate* Porsche (order your copy online at bit.ly/greatpretender) will recall the duo of backdated Carrera 3.2s we showcased. The beautifully presented aircooled 911s are owned by celebrated menswear designer, William Hunt, who commissioned Cambridgeshire-based automotive upholstery specialist, Awesome, to fully retrim the interior of both cars. To say I was impressed by the company's work is an understatement!

The seats and carpets in my 944 Turbo are wrecked thanks to years being dripped on by rainwater leaking into the car's cabin from a leaking sunroof seal. I'd bought replacement 'tombstones' thanks to a successful eBay snipe, and it was these seats I showed brothers Glenn and Greg Ward (the guys behind Awesome) in the hope they'd be able to repair the worn bolster hide I inherited with my purchase. It was during a subsequent consultation at their workshop in St Ives that we decided to look at the possibility of retrimming the car's cabin in full. After all, the body of my restoration-inprogress will be treated to a full glass-out respray in OEM Guards Red following completion of the corrective surgery currently being carried out at 944 restoration specialist, Retro Restorer, so it makes little sense to refit decades-old leather that's already past its best.

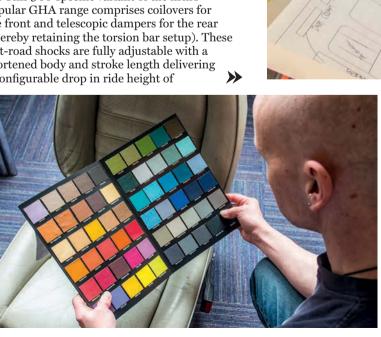
#### **PLAN OF ATTACK**

Out came Awesome's swatch books of leathers, Alcantara and samples of deep pile carpets. The Wards and I discussed various finishes. I expressed my desire to see the car's seats, dashboard, door cards, carpets, headlining, gaiters and other interior furniture trimmed in such a way that those unfamiliar with 944 Turbos will think they're looking at an unusual factory cost option. The three of us bounced ideas off each other, discussing exciting options

for the colour and treatment of leather and other materials. Suggestions extended to the finishes achievable through the application of custom stitching, embossing and perforation.

After we settled on a plan of action, Glenn ordered samples of the hide and fabrics we agreed to experiment with. Greg is going to use them to produce test panels for approval. In the meantime, I need to head down to Retro Restorer in Banbury to retrieve the car's ruined half-leathers after we decided it would be desirable to strip and work with the original seats instead of using the Linen leathers I bought, which can be put to good use in somebody else's restomod project.

After returning home from my meeting with Glenn and Greg, I took delivery of a stack of recently-ordered aftermarket suspension equipment. First to arrive was a GAZ coilover kit. This 944-specific variant of the firm's popular GHA range comprises coilovers for the front and telescopic dampers for the rear (thereby retaining the torsion bar setup). These fast-road shocks are fully adjustable with a shortened body and stroke length delivering a configurable drop in ride height of







**Left** Awesome's work is nothing short of fantastic, and we can't wait for the Wards to work their magic on the 944 Turbo's interior

**Below** Read next month's project progress report for an update on the state of the car's bodywork







between 25mm and 65mm. Zinc-plated for longevity and fitted with easy-to-operate adjustment dials (which enable a variety of damping settings to be easily selected while the parts are in situ), they'll allow for a lower centre of gravity and will vastly improve the car's handling abilities.

The full complement of Powerflex polyurethane bushes I ordered to accompany the GAZ kit will also enhance the way my car handles, primarily through vastly reduced suspension movement (resulting in a pleasingly stiffer ride and more focused feedback), stable braking behaviour and massively reduced tyre degradation. The rubber bushes currently on the car show signs of wear through age, so I didn't think twice about investing in Powerflex's famous purple parts.

#### **BOX OF DELIGHTS**

The package which landed on my doorstep from the manufacturer's Uxbridge headquarters contains polybushes for the front wishbones, as well as those for the rear front arms, anti-roll bars (plus bushes for the ARB outer links and eye bolts), rear axle carriers, trailing arms and pivot struts. There's no doubt about it – my car is shaping up to be a seriously sorted 944 Turbo!

Meanwhile, work continues apace at Retro Restorer. The car's rotten inner and outer sills – and the other similarly compromised metal revealed in my last project update – have now been removed and are in the process of being replaced with carefully sculpted thick-grade steel. I'll outline this work in detail on the occasion of next month's progress report. Suffice to say, giant steps forward are being made bringing my turbocharged transaxle back to life. I can't wait until it's ready for a return to the road!



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**Above and left** The marrying of GAZ shocks and Powerflex polybushes should make the car handle like it's on rails



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Wrong. Many of us would rather ditch chinwagging in favour of taking on the challenge of tackling the harsher elements of nature from behind the wheel of a powerful car. As if to prove the point, 964 owner and irrepressible modifier, Mark Helliker, was only too happy to meet us near where he lives in the city of Perth, Scotland, on a freezing day while the Siberian storm was enjoying a well-earned rest.

His beautiful black 1990 Carrera 2 was supplied by independent Porsche specialist, Williams Crawford, as a standard car, but Mark freely admits that it wasn't ever going to stay that way. "I can't help myself!" he laughs. "I used to own a 924 Turbo. It ended up with a hybrid turbocharger, standalone engine management and a large-bore stainless exhaust. I was equally as passionate about tuning the other sports cars I've owned," he admits, before reminiscing about a Rover V8-powered TVR that he pushed to the 400bhp mark before it became "a bit fragile." No such concerns with his 964, a superreliable 3.8-litre street-legal track toy which has been pushed hard on the hallowed grounds of Silverstone, Knockhill, Spa-Francorchamps and the wide, open space of the European roads that lead to Le Mans.

The car's engine started life as a standard 964 3.6-litre flat-six before Mark handed it to Porsche Cars Great Britain for a comprehensive overhaul and in increase in displacement. Two thousand miles after the work was completed, he's over the moon with the way his cool Carrera behaves. "The guys at Ninemeister in Warrington added a 993 Variocam setup to my 964's powerplant after I acquired the kit during my travels in Canada. A MoTeC 800 ECU was added at the same time as the later model's induction kit, although this was well before I commissioned Porsche to strip and rebuild the flat-six to its current specification."

In addition to 3.8-litre forged pistons and barrels, the modified engine makes use of Carillo connecting rods, Schrick camshafts, a 996 GT3 crankshaft, an oil pump from the same model, K&N filtration and a bespoke exhaust system crafted by Hayward and Scott in Basildon. Highflow injectors keep things sweet with a plentiful supply of high octane fuel, while power is transmitted to the road by a gearbox containing a hybrid steel gear set (a mix of 993 and 996 GT3 cogs) capable of withstanding the abuse dished out by Mark's lead foot.

#### **EARLY START**

"My intention was always to personalise the car," he beams. "In fact, my tinkering began before the car left the Williams Crawford showroom!" He's talking about his request for the red piping snaking its way around the car's standard seats to be coloured black before he hit the road in his new ride. It didn't take long for the car's suspension to be exhaustively reimagined either, with Bilstein HD dampers, a RUF Automobiles strut brace, polyurethane bushes, H&R springs and anti-roll bars from the same manufacturer replacing factory equipment.

Though altered as per Mark's instruction, the seats soon made way for gorgeous Recaro Pole Position buckets that hold him firmly in place when he's turning sharply into corners with the pedal to the metal. Retaining sliding adjustment functionality, the leather-trimmed bum huggers look as though they were designed as standard equipment for the 964, and are a good match for the stock-spec rear seats he's left in place. In contrast, he was quick to ditch the standard audio equipment. "In addition to a request for altered seat pipework, I asked Williams Crawford to install a Hertz five-channel amplifier and component speakers prior to my collection of the car. The













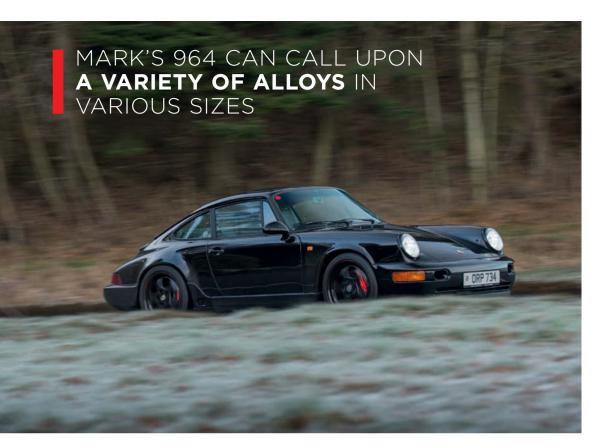
#### Back on track

The first version of the 964 as a race car blasted onto the track in 1990, the same year Mark's Carrera 2 was registered. The roll cage-equipped 964 Cup, however, was built for the Porsche Carrera Cup competition. 55mm lower than its tamer road-going counterpart, the Cup had hardly any interior furnishings, power steering or sound deadening. A tweaked chassis and modified gear ratios could exploit the 1,120kg car's 265bhp, while a standard-fit catalytic converter ensured this race-ready 964 was as eologically sound as it was energetic. Changes in 1992 saw the model adopt an RS body and gain a 10bhp increase in power, while a ride height drop of another 20mm saw the Cup get ever closer to the asphalt before the model ended in 1993.

Facing page 3.8-litre flat-six is the result of Mark handing his 964's engine to Porsche for a rebuild at 95k miles

**Left** Recaro Pole Position seats are every bit as comfortable as they are stylish

**Right** 993 Turbo brakes are easily detected thanks to bright red powdercoating







MARK HELLIKER

Occupation
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Favourite Porsche 991 GT3 RS

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Worst thing about your 964 Carrera 2 It's getting too valuable to drive aggressively on the road!

factory speaker grilles have been left in place to promote an OEM look, which I've also tried to achieve through the installation of a Becker Grand Prix head unit instead of a more modern in-car entertainment system."

As is the case with many Porsches put to the test during open track days, Mark's 964 can call upon on a variety of alloys in various sizes. Gemballa Le Mans, BBS E28s, Cups and Cartographic Racing wheels in seventeen and eighteen-inch options with a selection of different Yokohama and Toyo compounds to suit all weather and driving conditions are ready to roll whenever needed. Painted bright red and peeking out from behind the rare rims are 993 Turbo brakes which ensure superior stopping, a characteristic that will undoubtedly come into its own if Mark's flirting with forced induction results in another major engine upgrade.



"I'm toying with the idea of buying a Rotrex supercharger," he reveals. "It's either that or independent throttle bodies. I've heard horror stories about flat-sixes not coping particularly well with the demands of a blower, but the strength of my car's engine following the work by Porsche should ensure it's more than able to cope with what a supercharger would ask of it. I don't want to sacrifice driveability, which is why I'm currently weighing up the pros and cons of a Rotrex kit when compared with throttle bodies, but I'm sure to be investing in one setup or the other in the not too distant future."

In the meantime, he's got a fibreglass



ducktail spoiler to fit, but as you can see, exterior updates on this black beauty are minimal; an RPM Technik LED headlight upgrade, front bumper intake inserts and "a little bit of paintwork here and there" are just about the only changes detected.

"There's not a great need to alter the look of a classic 911," says the design agency creative director. "I love the way people stop and stare at my 964. Everybody I encounter when I'm out and about wants to chat to me about their own experience with a Porsche. I've owned the aforementioned 924 Turbo, a 944 Turbo, a Boxster S and various other fun vehicles, including a succession of TVRs, a 1974 MG Midget and a recent Quattro-kitted Audi, but not one of these cars has proved to be as much of a talking point as my modified Carrera 2."

Beast from the East? Who needs to wax lyrical about stormy weather when Mark's tuned 964 thunders into view?!



**Above** Mark's 964 gets plenty of use on the road and at various race circuits



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7

Wastegates and blow-off valves play a vital role in keeping your turbocharged Porsche's boost in check...

# Look smart

uch has been written about the performance benefits of forced induction and turbocharger technology, but what of the supporting

equipment that keeps boost pressure under control? The world of modified motors all too often gets hung up on the size and quoted power capabilities of a snail-shaped bhp booster, but even the world's greatest turbocharger won't deliver the performance it promises without accurate boost management. Granted, a giant Garrett or a cool KKK is an exciting engine component to tell your mates about, but the wastegate and actuator you invest in (and the way these parts operate) are just

as important as the specification of turbocharger your car makes use of. Flick through the following pages and read about the design, development and application of these important parts. By the end of the article, we hope you'll have a better understanding of the components that help to control boost beneath the bonnet of your turbocharged Porsche.



## WHAT IS A WASTEGATE?

A wastegate is essentially a valve which 'wastes' the gas pressure we don't want sent into a turbocharger. When a wastegate is shut, all exhaust gases exiting the engine are forced through the turbo. This creates boost, which encourages more exhaust gases to be produced. The turbo then spools even faster, creating yet more boost. By allowing some of the gases to bypass the turbo through a wastegate, we have control over how fast the turbo spools, which gives us the ability to control the amount of boost being generated.

Without a wastegate, the cycle of increased boost pressure would continue until vast pressure forced mechanical failure. That said, some variablegeometry turbochargers (VGT) don't require a wastegate thanks to aerodynamicallyshaped vanes in the turbine housing at the inlet. The vanes rotate in unison to vary the gas swirl angle. For the vast majority of turbocharged sports cars, however, a wastegate is essential forced induction componentry.

## INTERNAL WASTEGATES

There are two types of wastegate: internal and external. An internal wastegate is cheap and easy to manufacture, and is usually what you'll find as part of a factory-fitted turbocharger. In this design, a wastegate hole is located inside the turbocharger exhaust housing. This hole offers exhaust gases a route to escape, enabling them to exit without passing through the turbocharger. A simple penny washer (controlled by an actuator) blocks or lifts away from the hole, managing the level of gas that bypasses the turbo. As we've already highlighted, this activity influences the speed the turbocharger is able to operate at.

#### **ACTUATORS**

An actuator's job is to open and close an internal wastegate. A spring and diaphragm sit inside the actuator. The spring applies force in order to keep the wastegate closed. It remains in this state until enough boost pressure is produced to overcome the rating of the spring fitted. At this point, the spring starts to compress, a condition which results in movement of the actuator arm and the opening of the wastegate valve. It's worth noting that the rating of the spring will drastically influence a turbocharger's ability to perform at its full potential.

As you now know, an actuator's spring holds the wastegate shut. In other words, if we want to produce more boost, we need to ensure the wastegate remains closed until we're ready to ease off. A spring with a stronger rating will help, which is why many wastegate manufacturers, such as Turbosmart, produce spring kits featuring a variety of different springs with different load ratings. You simply swap your car's actuator spring for one better suited to the target boost range. Of course, a standard-spec sports car will be producing factory-prescribed power, which is why turbocharged production vehicles tend to come fitted with a simple flat-rate actuator spring designed to compress at a specific boost level. In other words, if Porsche wants your car to produce 6psi boost, then the spring fitted to your car's actuator will open the wastegate at 6psi!

When you start modifying, the need to change the actuator spring may arise, but we can also alter boost pressure above the diaphragm. For example, in an actuator's most basic installation, we connect a pipe from the turbocharger compressor housing to the actuator, enabling the latter to be subjected to boost pressure. Using the same 6psi example scenario as outlined in the last paragraph, when the turbo produces 6psi, the actuator sees 6psi, which is enough to compress the spring and allow the wastegate to open. This means the turbo can only produce a maximum of 6psi, but what if there was a leak in the pipe between the turbo and the actuator? For argument's sake, let's say 4psi is lost due to a ruptured hose. In this instance, the turbo would be producing 10psi before the actuator spring sees the 6psi it needs to open the wastegate. Deliberately creating and controlling a 'leak' like this means we can bleed-off a specific amount of pressure to accurately alter the amount of boost produced without the need to change the spring in the actuator.

The crudest way to achieve this is by way of a simple bleed valve, but most modern turbocharged sports cars feature electronically controlled boost solenoids managed by the host vehicle's ECU or a standalone electronic boost controller. This method enables instant changes in pressure to be achieved in accordance with variations in engine operating behaviour (influenced by factors including speed and throttle position, gear and ambient temperature).

#### **UPRATED ACTUATORS**

A factory actuator will be perfectly adequate for standard power, but if you're planning to ask your car's turbocharger to produce more boost, then OEM parts can quickly become a limitation. In truth, an OEM actuator spring tends to be soft, which can result in a series of unwanted effects when it comes to tuning. In some cases, you may run into issues with exhaust back pressure, whereby the exhaust gases on the exit side of the wastegate overcome actuator spring load and force the wastegate open prematurely. As Chris Milne at Turbosmart, explains, "OEM wastegate actuators tend to use springs that are fairly soft, which can allow wastegates to start opening long before peak boost is reached. The risk is that you lose out on much of the power your car is capable of producing! A stronger actuator spring will provide faster spool-up, less boost drop at high rpm and a more stable, more responsive boost curve."

Unsurprisingly, the spring inside a Turbosmart uprated actuator can be switched to meet the demands of the host engine and turbocharger. Additionally, Turbosmart's offerings feature an increased surface area in the diaphragm housing (an important design consideration), which equates to more mechanical advantage over the actuator – your car benefits from quicker peak boost, and you're able to control it fast due to the altered diaphragm surface area. This aspect of wastegate and actuator design is referred to as 'control ratio'.

More often than not, uprated actuators offer improved reliability over OEM actuators thanks to high-performance fluorosilicone diaphragms with Nomex reinforcement.

Additionally, most aftermarket performance actuators are adjustable, allowing fine-tuning through selectable springs and preload adjustment.

A stronger actuator spring will provide a more stable, more responsive boost curve



#### **EXTERNAL WASTEGATES**

An external wastegate does the same job as an internal wastegate, but as its name suggests, is a separate component to the turbocharger. Inside, you'll find a spring and a diaphragm (as you would if looking inside an actuator), but rather than the parts moving an arm which opens a valve, they control the valve directly.

The main benefit of an external wastegate is that the part allows us to use a much larger wastegate hole through which exhaust gases can bypass the turbocharger. For example, a Turbosmart wastegate can be bought with an exhaust gas channel measuring between 38mm and 60mm in diameter. To put this into perspective, the standard internal wastegate on a Garrett T4 turbo is just 22mm. A larger hole allows us to control boost far more accurately, primarily because more exhaust gases can be allowed to bypass the turbo.

A secondary benefit of using an external wastegate is that your car's

turbocharger can be accompanied by a more refined design of exhaust housing thanks to the absence of an internal wastegate mechanism.

On a conventional turbocharged engine, an external wastegate needs to be located in the exhaust manifold between the cylinder head and the turbocharger. Many aftermarket performance exhaust manifolds will have bosses already fitted to enable the use of an external wastegate, but be careful if using a 'twin scroll' manifold - because of the divide within the pipework, you'll need to ensure you're using two external wastegates, one per scroll! In truth, with careful preparation of the manifold, you can use a single wastegate in this instance, but there's plenty of evidence to support claims this is a compromise that'll cost you many hundreds of rpm in boost response.

Most external wastegates offer multiple boost ports, meaning you can provide boost above and below the diaphragm for even greater boost control. Incidentally, when talking about wastegates, you may have heard owners of turbocharged Porsches mention 'boost creep'. This is where a car's turbo produces more boost than desired due to the wastegate not being able to ditch exhaust gases quick enough. An external wastegate will eliminate the problem thanks to its larger channel for gas to escape.



#### **BLOW-OFF VALVES**

A blow-off valve (often referred to as a dump valve or recirculating valve) is simply a pressure relief valve that allows excess boost pressure to escape when the throttle is shut. On most conventional applications, when the throttle is wide open, the boosted air from the turbo is going straight into the engine, but what happens when the throttle closes during gear changes, lift-off or braking? In these situations, the boost air is stifled by a closed throttle body, encouraging air to travel back from whence it came! The air hits the spinning blades of the turbo, resulting in a distinctive 'chatter' sound (known as 'turbo stall', but often mislabelled as 'wastegate chatter'). This condition is less than ideal, although on most moderately tuned road cars, is not massive cause for concern. For big boost race or drag cars, however, this can be hugely detrimental to the turbocharger's health.

To prevent damage occurring, a blow-off valve is fitted between the turbo

and the throttle, allowing stifled air to escape. The part is usually controlled by a vacuum source, which opens the valve and frees the air. Many modern turbocharged production cars feature a blowoff valve built into the turbo's compressor housing. The valve fitted is usually a plastic unit featuring a small spring and diaphragm, which is fine for a standard road car, but a bad idea for a tuned engine enjoying enhanced levels of boost. Most performance blowoff valves, including those marketed by Turbosmart, feature a robust body and a piston in place of the weaker diaphragm design, promoting longevity and reliability, as well as resistance to extremes of heat and pressure. Much like the company's actuators, a Turbosmart blow-off valve can be fitted with a variety of different springs, enabling you to tailor the part to your needs.

The inner workings of a blow-off valve are simple, with differences in design being where the trapped air goes after it is released.



#### **Vent-to-atmosphere**

The simplest way to get rid of excess boosted air is to jettison it straight into the atmosphere. This is a fast and efficient way of relieving system pressure. It offers performance advantages too; when we vent air to atmosphere, the turbo keeps spinning, even with the throttle closed. In other words, the turbo is already spinning when we open the throttle again (e.g. after a gear change), enabling the immediate creation of boost pressure.

There are some drawbacks to this design. For example, when it comes to modern cars with mass airflow (MAF) sensors, unmetered air can be allowed into the inlet system, while already metered air has the potential to escape, momentarily encouraging the engine to run rich.



#### **Recirculating valve**

A recirculating-type blow-off valve, such as Turbosmart's Big Bubba offering, operates in the same way as other types of blow-off valve, but rather than dumping trapped air into the atmosphere, it's plumbed back into the inlet before it enters the turbocharger. As the air is channelled back into the system before the MAF, there's no chance of unmetered air being introduced or escaping. This is obviously good news for air/fuel ratios!





#### **Dual port**

Recirculating valves tend to be much quieter than vent-to-atmosphere dump valves, but whether you think this is an advantage or drawback is down to personal preference. What if you want a blow-off valve that recirculates air (enabling you to avoid MAF sensor issues and emptying of your car's inlet tract), but you still want to hear that joyous blow-off valve badooosh?! Thankfully, Turbosmart has a range of 'dual port' products which do exactly that! These brilliant blow-off valves recirculate some of the air back into the inlet whilst dumping the rest of the trapped air direct to the atmosphere. This design enables quiet operation around town, with the benefit of quick expelling of trapped inlet air under heavy boost conditions.





Liquid wastegate cooling isn't necessary for the majority of fast-road applications

#### **WATER-COOLED WASTEGATES**

In addition to boasting modular interchangeable actuators, independently oriented actuator bases, new 'strap type' V-band clamps, a diaphragm design offering linear travel (regardless of spring), optimised pressure, user-defined valve positioning, increased thermal performance and superior gas flow, Turbosmart's award-winning, fifth-generation external wastegates feature integrated liquid cooling ports following successful adoption of the technology in punishing motorsport environments. Liquid wastegate cooling isn't necessary for the majority of fast-road applications, but if your setup dictates less than optimal positioning of equipment and/or a particularly hot engine bay, it's good to know Turbosmart tech has you covered!



#### **Thanks**

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# Hans-Joachim Stuck

Son of a Grand Prix legend, and one of the fastest drivers ever to compete at Le Mans

WORDS Harry Turner-Stickley PHOTOGRAPHY Various

uring the early 1930s, German racing driver, Hans Stuck, was making a name for himself in Grand Prix outings for Auto Union (the immediate predecessor of Audi). This was the era of the famous 'Silver Arrows', and in 1934, Stuck won the German, Swiss and Czechoslovakian GPs in his Porsche-designed motorsport machine. He went on to drive a Spyder in 1953 before becoming a racing instructor at the Nürburgring, where he taught his young son, Hans-Joachim, the secrets of the Green Hell.

Stuck the Younger was born in 1951. At the tender age of eighteen, he started his first-ever race at the challenging circuit his father had urged him to master. Hans-Joachim proved competitive from the off, succeeding in winning his first 24 Hours Nürburgring a year later. It's a feat he accomplished three times, following his initial success in the competition with victories in 1998 and 2004.



Porsche, "having the perfect combination of power and downforce." He felt immediately comfortable inside the car, as is proved by his third place finish at Le Mans in 1985 (where he scored the circuit's fastest-ever average lap speed during qualifying), followed by victories at Sarthe in the summers of 1986 and 1987.

He would go on to secure second, third, fourth and seventh place finishes at Le Mans for the works team, Dauer, Joest and Konrad Motorsport, continuing to campaign the awe-inspiring 962C before racing the

# Continuing the family tradition of driving competition cars designed by Porsche

He followed in his father's footsteps by embarking on a Grand Prix driving career. Formula One outings for March-BMW and Brabham-Alfa followed, appearances which contributed to no fewer than eighty-one top-flight races with Hans-Joachim at the wheel. Unfortunately, his towering height meant a change in F1 regulations (primarily the moving forward of car cockpits) in the late 1970s made it difficult for him to continue in this field. Instead, he focused his attention on sports car racing.

Continuing the family tradition of driving competition cars designed by Porsche, Hans-Joachim became one of the manufacturer's works drivers in December 1984. He was given the task of competing with the mind-blowing 962C (an aerodynamic, twinturbocharged masterpiece generating more than 700bhp). He describes the model as being his favourite

911 Turbo S LM-GT as a works driver in 1993. He competed with the K8 Spyder for Kremer in 1995 and contributed to Porsche's continued dominance at Le Mans by racing the 911 GT1 to first place in 1996, aided by co-drivers, Bob Wollek and Thierry Boutsen.

Hans-Joachim also raced in America, notably winning the 1992 IMSA Bridgestone Supercar Championship in a 3.8-litre 964 Turbo. After forty-three years of active racing, he announced his retirement in 2011, delivering an emotional farewell at the legendary racing circuit his father taught him to conquer. Since hanging up his helmet, Hans-Joachim has served as president of the German Motorsport Association.





# DELIVERING 11HE GOODS

Rob Ida's 911 Turbo hill climber has been painted a colour mostly associated with classic cargo carriers







hat is it? Skoda Meteor
Grey? It's too light for
Lamborghini Grigio
Telesto, too subtle for
Audi Nardo. Ah, got
it. It's Porsche's own
Fashion Grey, right?

"It's Blaugrau Hell, a Mercedes-Benz colour used on Daimler's heavy goods vehicles back in the 1960s!" laughs Rob Ida, chief architect of the 930 (classic 911 Turbo) we've come to gawp at in downtown Las Vegas. The industrial hue looks fantastic on his wide-arched hill climb weapon, a car wearing a front bumper unusually understated for a modified air-cooled classic with a "Turbo' badge stuck to its butt.

"My 930 was first registered in 1986," explains Rob, the car's second owner. "In my opinion, standard specification air-cooled Porsches from the era of impact bumpers have a fairly bloated front end, yet guys updating the styling of their 911 Turbos tend to buy into the idea of fitting an even larger, RS-inspired bumper with a widemouth opening revealing a giant oil cooler. That's fine for street or circuit use, but my car's competition life means I'm regularly taking part in events hosted on rough terrain. I need decent ground clearance and protection for engine cooling equipment. Bucking the trend, instead of enlarging my car's nose, I've reduced it in size!"

Not only does his 930's modified front bumper sit higher than you might expect, it's been positioned closer to the car's body thanks to the removal of the 'accordion' elements that make up a standard impact bumper. "I reasoned the guys in Porsche's design department probably felt the inclusion of these parts was an enforced compromise dictated by the need to comply with strict American automotive safety legislation. It was fun eliminating the big bellows, a move that inspired me to make further amendments by smoothing the lower section of the bumper before adding slim intake ducts that feed two separate oil coolers."

The slits directing air inward are easy to miss at first glance, especially when your eye is uncontrollably drawn to those yellow headlight lenses. "Regardless of what people might think of the tints, I wasn't attempting to backdate or update my car, hence retaining the standard square fog lamps, but you'll notice the unusual rake of the headlight lenses," continues Rob, before revealing they're early Volkswagen Beetle parts. The same subtle approach to styling has been applied to the lone wing mirror, a part Rob created after seeing a 550 Spyder in the metal. Aping the detail of the older car, this unorthodox bodywork decoration is fused to his 930's wing-located fuel filler flap, meaning that the wing itself remains free of modification.

### **NEW LIFE**

The OEM+ theme is carried over to the car's engine, a 3.3-litre flat-six converted to Electromotive twin-plug ignition and bolstered by an auxiliary electronic fuel injection system that's called into action at high boost. "The stock Continuous Injection System remains, but two electronically controlled injectors with their own MAP sensor spring into life when the car is being pushed hard," confirms Rob. To achieve increased horsepower, he's fitted a K27 turbocharger and a 964 Turbo intercooler. Down below, the torsion bar setup remains, although 964 braking equipment and thick anti-roll bars do their best to keep the car on the straight and narrow. Literally!





### IDA CONCEPTS 930 / ULTIMATE PORSCHE









Facing page 3.3-litre flat-six benefits from extra fuelling when high boost is reached

**Top** Custom flat-fronted bumper with narrow oil cooler intake ducts ensures protection of parts from loose stones on hill climb circuits

**Right** 550 Spyder-inspired wing mirror is attached to the car's fuel filler flap



Beach build

Ordinarily concerned with building hot rods, Rob and his father have built a replica of the Tucker 48, a 1948 model limited to just fifty-one units before production ended prematurely. The Ida Concepts version of the 48 features the original car's body, but is powered by new mechanicals. The Ida build has been selected to display at this year's Pebble Beach Concours d'Elegance, the first time a new motor has been invited to the event.



At first, Rob's desired combination of tyre and wheel sizes proved difficult to source, but after much searching, he managed to hit the jackpot with European vintage-spec Pirelli P7 Corsa DOT slicks that he's wrapped around staggered five-spokes painted a custom shade of brown. The front wheels measure fifteen inches in diameter with eight inches of width and 235/40 profile rubber, while the rears are sixteens with a fat eleven inches of girth and 315/40 black circles. He tells us this combination has ensured excellent driveability, contributing to his 930's ability to cover ground at a rapid pace, be it road or race.

Even though he insists the car's appearance is less about drawing a crowd and more about keeping things simple for hill climbing, his decision to commission GTS Classics in Texas to modify single-piece buckets with recliner functionality suggests he's secretly a fan of creature comforts! Presented with basket weave centres, colour-coded backs and multi-point safety harnesses, the seats occupy a cabin that also plays host to RS-spec carpets, lightweight door cards, a half-roll cage, a Renown 100mm steering wheel and a shift knob owing more than a passing nod to 917 race cars.

"With the exception of the updates applied to my car's seats, all the work was carried out at my workshop in New Jersey," says Rob, touching Above Rob's street-legal hill climb machine is to serve as the blueprint for at least two identical builds due to roll out of the Ida Concepts workshop

on his role as head of Ida Concepts, a custom vehicle design and assembly firm based in the quiet town of Morganville. He's frequently asked to build modified classic Porsches for his dedicated customer base, a pursuit he engages in with great enthusiasm. In fact, he's already been instructed to build two 930s matching the exact specification of his own car!

"Those orders came to me quite unexpectedly, but they serve as a great compliment to the fit, finish and enhanced performance of my personalised 911 Turbo," he muses. "Furthermore, I've been surprised by the huge amount of positive feedback I received after I mirrored some of the design elements seen at the front of my car over to its rear, where a standard 'whale tail' sits above a custom reflector panel insert and a smoothed bumper with a centre-exit aperture for ceramically-coated exhaust tips producing a loud bark."

### **EXTRA MILE**

Much of the applause for his efforts has come from owners of classic 911s wanting copies of his 930's bumpers in order to update the appearance of their own cars. Keen to assist, the serial modifier is currently in the process of producing a batch of bumpers ready for distribution. "If there's demand, I'll make 'em!" he chuckles, seemingly surprised by how much interest there is in parts that fail to follow the format of what's usually seen bolted to the bodywork of modified classic Porsches. "Of course, I wanted my car to look good, but I didn't think others would show such enthusiasm for components I designed to help me win hill climb contests." He probably didn't think paint associated with 1960s heavy goods vehicles would create such a stir either, but his decision to cover a classic Porsche in an unassuming shade has arguably made it stand out more than if he'd opted for a rich, vibrant coat of colour. Make no mistake, grey matters!





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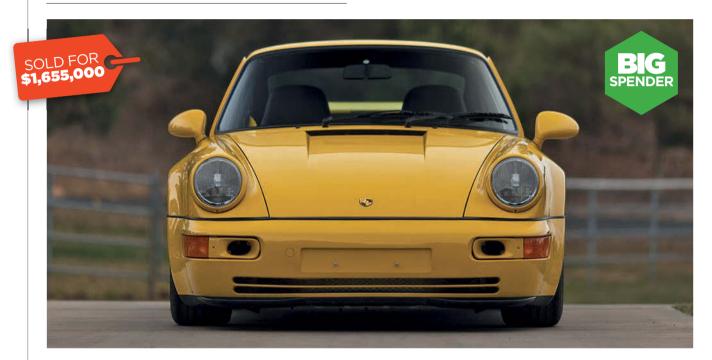


# Under the hammer

# Hammer time!

One of the most highly anticipated features of RM Sotheby's recent Amelia Island auction was the sale of many rare 964s offered by a single collector. Here are the highlights...

WORDS Dan Furr PHOTOGRAPHY D.B. Cooper



# 1993 964 RS 3.8

The first RS 3.8 was based on a pre-production 964 under the direction of Porsche engineer, Roland Kussmaul, in 1991. Jürgen Barth was head of Porsche's Customer Sport Department at the time. He explained to the press that the company's positive experience with the single-model 944 Cup racing series prompted the creation of a fresh motorsport machine based on the 964. The new car would comply with the FIA's Group N regulations for larger, series-production touring cars and GTs. A road-going version of this competition car was required for homologation purposes, and so the 964 RS 3.8 was born. Largely following the look of its

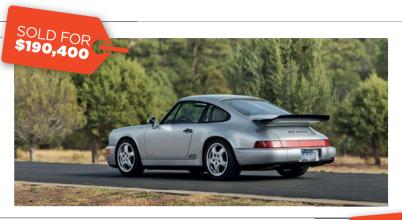
964 Turbo sibling, the RS 3.8 features a larger rear wing, but lost creature comforts, making it 600lb lighter than the 964 Carrera 2. Only fifty-five RS 3.8s were built (offered in a choice of Lightweight or Touring trim). This 1993 example is the second-to-last RS 3.8 completed. It was among several delivered to German racer, Helmut Reis, and his Eco-Tec consulting outfit in Aachen. Reis immediately exported the car to a buyer in Japan. Imported to the USA under a 'Show and Display' license issued in 2015, this nifty 964 went on to smash its pre-sale estimate of \$1.2m and set a new record for a 964 RS sold at public auction. Nice!

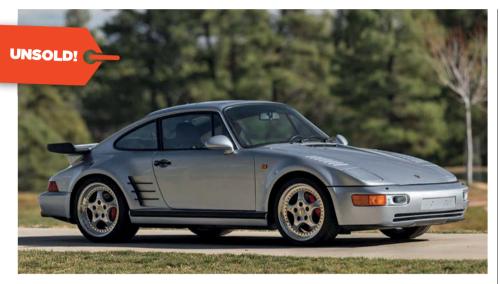




# **1993 964 RS AMERICA**

Porsche's goal in creating the 964 RS was to offer a lightweight road racer based on the Carrera 2, but with minimal luxury options. While the model was available to buy in Europe, it was unable to meet strict US import regulations, resulting in the development of a detuned 964 RS specifically for the US market. Only 297 of the RS America were built. Seen here is the thirty-fourth car, finished in Polar Silver Metallic and having covered no more than 1,633 miles. Carefully preserved, this gorgeous America's final sale price reinforces the seller's claim that it's the best surviving example.









# 1994 964 TURBO S X83

When Porsche ended the 964's five-year production run in late 1993, more than ninety wide-bodied Turbo shells were said to remain in the company's inventory. They were delivered to the Porsche Exclusive department, where each was transformed from layabout leftover to tantalising Turbo S, a new model boasting the "works increased horsepower" M64/50 X88 engine package, a stronger flywheel, a hardcore clutch, uprated heat exchangers and a modified limited-slip differential. Producing 385bhp, the Turbo S set a new benchmark for street-legal, high-powered Porsches.

Trim option X83 was specified for the Japanese market. Only ten examples were built. All had the earlier 930-style Flachbau front end, various steel and fibreglass body components, widened front and rear fascias, large side skirts and rear-quarter air inlet strakes. Customers had a choice of the standard Turbo rear wing or the much larger (and more costly) rear adornment from the RS 3.8. All X83s were painted silver. This one was enjoyed for more than 74,532km before being offered for sale at Amelia Island. Unfortunately, it failed to attract a winning bid.



# 1991 964 TURBO

The original 911 Turbo turned the automotive universe on its head, placing Porsche squarely among the leaders of the supercar fraternity. In 1991, the 964 Turbo arrived. It too was a rule breaker; unlike exotic creations offered by other European premium car makers, the 964 Turbo's 3.3-litre flat-six could be exercised along urban streets with a minimum of fuss. Moreover, it was perfectly happy to demonstrate 170mph along a straight stretch of asphalt! The consignor purchased this particular 964 Turbo in 2011. Boasting fewer than 11k miles from new, the tidy Turbo was added to his vast collection of exceptional 964s before finding a new home with an enthusiastic bidder at the Sotheby's auction.





# Under the hammer





# 1993 964 RSR 3.8

Yes, this bright yellow 964 looks remarkably like the RS 3.8 featured at the start of this roundup of Amelia Island spending, and like the RS, it sold for a similarly bonkers sum, but the Porsche you're looking at is an RSR. The wide-bodied wonder is one of just forty-eight production examples built (plus one prototype, one works race car and a delayed run of four further RSRs), which was all that was required to satisfy FIA homologation rules and Porsche's European GT and Stateside Supercar competition ambitions. This stunning widebody was one of three 964 RSRs sold to the Japanese domestic market. The car has been driven regularly, but only in a private motorsport facility, hence the ridiculously low distance covered, amounting to just 475 circuit miles from new.







### **1994 964 SPEEDSTER**

Light, agile, and possessing ample power for its day, the 356 Speedster became the benchmark for production sports car racing the world over. Porsche revived the Speedster concept with the Carrera 3.2 in 1989, and again with the 964 in 1994, although fewer than 1,000 964 Speedsters were constructed, with only 469 examples earmarked for US distribution. Eye-catching in paint-to-sample Ferrari Yellow (10L) with a full black leather interior and black rag top, this narrow-bodied Speedster is the 325th in the series. The car left Stuttgart with a forty-percent limited-slip differential, air conditioning, painted wheel centre caps, Recaro sport seats and headlamp washers. Its 3.6-litre engine produces 247bhp and is capable of a factory-claimed top speed of 163mph. Showing just 21,722 original miles, this super Speedster attracted generous bidding.





### 1991 964 CARRERA CUP

Porsche introduced the 964-based Carrera Cup in 1990 as a single-model championship to replace the successful 944 Cup series. Just 120 964 Carrera Cups were sold to privateer drivers in 1991. Each car was built from a 964 pulled off the regular assembly line before being carefully tweaked and tuned for track work. The Carrera Cup series was staged nationally, regionally, and then internationally, often running as a support event for Formula One. 964 Carrera Cups were fitted with a welded-in Matter roll cage, a firesuppression system and Recaro racing seats with six-point safety







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s mentioned in the feature about Mark Helliker's 964
Carrera 2 on page 60, The Best from the East caused chaos when it arrived the UK a short while ago. Thankfully, temperamental weather wasn't enough to stop petrolheads gathering at Goodwood Motor Circuit for the venue's seventy-sixth Members' Meeting while snow did

its best to fall from the sky.

Even as the final competitors of this world class, two-day historic race meeting left the paddocks when the event drew to a close, icy temperatures and biting winds did their best to make themselves known. A layer of white powder settled on the various legendary four-wheelers that had been driven on and off the track all weekend, but in spite of stiff opposition from Mother Nature, none of the planned races were cancelled (with the exception of the Hailwood Trophy motorcycle competition).

Following the announcement that this year's Festival of Speed's central feature will be a celebration of Porsche on the occasion of the manufacturer's seventieth anniversary, spectators at the Members' Meeting were treated to a glimpse of what's likely to be in store at the annual motorsport event in July; a high number of Porsches took to what is one of the world's most famous circuits, competing in three races and a Group 5 high-speed demonstration starring a brace of 935/77As, three K3s and the legendary 935/78 'Moby Dick'.











**Top** As far as dream garages go, this one ain't bad!

**Left** Off-track entertainment (including ferret racing!) wasn't in short supply

Facing page Porsche was well represented in advance of the Festival of Speed's celebration of the brand in July

















Far left 924 GTP chassis 002 being readied for action







The weekend opened with the Ronnie Hoare Trophy (presented by JD Classics), a hotly contested competition for production-based sports and GT cars in the spirit of the action witnessed at Goodwood Members' Meetings in the early 1960s. Almost half the grid was made up of machinery from Stuttgart! Classic 911s and 904s wowed spectators who briefly forgot about the icicles forming at their end of their noses, while a pair of 356s attempted to secure status as giant killers against Jaguar E-Types, short-wheelbase Ferrari 250 GTs and Aston Martin DB4s in the two-driver Moss Trophy. Similarly ambitious pilots of 906s and 910s did battle with drivers of Ford GT40s, Shelby American Daytona Cobras and McLaren M1As in the eleven-lap Gurney Cup. Alas, the Porsches were unable to match the might of the ex-Willy Mairesse GT40 driven by David Hart after the bruising Blue Oval blasted into an early lead.

Many of the cars being tested in adverse weather wore stickers featuring the hashtag #Fever, a word heavily associated with the inimitable Goodwood commentary maestro, Henry Hope-Frost, who tragically lost his life when his motorcycle collided with a car shortly after he left the venue a week before the Members' Meeting. Tributes could be seen wherever you looked around the paddock. They could be heard too, with an incredibly emotional 'Minute of Fever' (engines roaring their appreciation for the absent 47-year-old) encouraged by event organisers ahead of Saturday's Formula 5000 demonstration.

### **FLOWER POWER**

When not watching historic race cars zip across the finish line, attendees could be seen filling themselves up with the finest food the South Downs has to offer. Axe throwing, fairground playing, flower arranging, live

### Speed centre

Goodwood Circuit is a historic motorsport venue situated near Chichester, West Sussex. The 2.4-mile course began life as a part of Royal Air Force Westhampnett, with the first race taking place on-site in September 1948. Sir Stirling Moss won the 500cc class! In the 1950s, Goodwood hosted nine-hour endurance races. Today, the name Goodwood is best known for the Festival of Speed, an annual hill climb that takes place on a separate track close to Goodwood House. The famous event always attracts huge crowds.



music and, erm, ferret racing were also popular features of the weekend, as was 4x4 'football', a competition won by a team proudly led by ex-BTCC star, Anthony Reid.

In a Members' Meeting first, Goodwood was chosen as the location for the worldwide debut of a brand new car – the evocatively-titled McLaren Senna. Taking to the track twice across the weekend, the 798bhp hypercar formed part of an on-track parade displaying the entire history of McLaren Automotive, with guest commentary provided by Amanda McLaren, the daughter of founder, Bruce.

### **DREAM MACHINE**

Perhaps even more dazzling was the street-legal 935 Flachbau parked in the paddock before it made its way around the track. Yes, you read that correctly. A street-legal 935. This is the most extreme classic 911 Turbo assembled by Porsche's famous Special Wishes department (latterly known as Porsche Exclusive). The instruction came from Saudi businessman and head of Techniques d'Avant Garde (TAG), Mansour Ojjeh. TAG had joined forces with Porsche and McLaren to develop a highly competitive Formula One engine, which went on to secure numerous title victories (see page 54). Ojjeh was in a good position to call the shots when it came to his custom build, and while he's undoubtedly proud to own a large percentage of today's McLaren Technology Group, we'll wager he's just as pleased to be able to say he's the man responsible for making the concept of a 935 race car for the road a reality.



**Top** That's what a road-legal 935 race car looks like, folks!

**Right** The weekend was marked by tributes to late Goodwood commentator, Henry Hope-Frost





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