

Balance of power



Ian Kuah drives two remarkable cars modified by STaSiS, the S4 and the S5 Cabriolet



BACK IN THE late 1970s when the first really onerous US emissions legislation began to bite, the engine power of cars sold in this market began to drop off rapidly, despite increases in engine capacity which were aimed at countering this.

The engines of both domestic and imported cars were strangled, and their all-mechanical induction and ignition systems simply could not cope. Loss of power, tardier throttle response and higher fuel consumption were the results. It was not a happy time for car enthusiasts.

The rudimentary electronic engine management systems which began to appear in the early '80s were the tip of the iceberg which would eventually provide a cure. Since then, the rapid onslaught of ever more sophisticated systems has improved things to the point where technology has finally prevailed over the negative threats created by legislation.

By the turn of the 21st century, the differentiation between models intended for the US and the rest of the world had shrunk to a minimal level, and today there is almost no difference at all. Power, driveability, emissions and fuel economy now co-exist in relative harmony. It is a happy time for car enthusiasts.

The last generation of naturally-aspirated, high-performance engines was brilliant in terms of specific output, throttle response and a balance of power, torque, emissions and fuel economy. But, as the second decade of the new century approached, engineers had to face up to the forthcoming EU6 emissions standard and the

politically misguided CO₂ issue; all the major manufacturers realised that their naturally-aspirated engines needed a lift.

Forced induction was once used as a means of extracting more power and torque from smaller capacity engines but, ironically, its more efficient combustion, with potentially lower emissions and better fuel economy under part load, is now seen as a panacea. At the same time, the lower friction of smaller displacement engines also aids efficiency.

As a result, the new generation of sporting models from Audi, BMW, Mercedes-Benz and even McLaren now all use turbocharged or supercharged six



and eight-cylinder engines where once naturally-aspirated eights and twelves reigned supreme.

For Audi's S4, the move from normally aspirated V8 to supercharged V6 has actually improved the car no end. Unlike the magnificent four-cam V8 in the RS4, the cooking V8 motor in the previous generation S4, and indeed the S5, seriously lacks charisma.

The supercharged V6, on the other hand, has a lot more inherent sportiness, not to mention far better economy and emissions, and lower weight. And with 333 PS from 5500 to 7000 rpm, and 466 Nm of torque from 2900 to 5300 rpm compared with 354 PS at 7000 rpm and 440 Nm at 3500 rpm, the supercharged 2998 cc TFSI engine is a far more efficient package.

The old V8 was notoriously difficult to tune, and you could spend a fair amount of money just trying to extract 30 or 40 extra horses. In contrast, any engine with forced induction is just waiting to be on the receiving end of the tuner's art. So it was no surprise that STaSiS has created a package for the S4 and S5 models which puts them on an equal footing, power-wise, with the outgoing V8-powered RS4 and the new RS5.

To say I was pleasantly surprised the first time I drove the modified red S4 would be an understatement. My first quick squirt in third gear when the road cleared towards the Californian hills seriously raised my eyebrows, and any reservations I may have

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For a start, any kind of lag you might experience with a turbocharged engine is absent from the supercharged unit, whose response to a demand for power is as sharp as that of a finely-honed naturally aspirated motor. Low-end torque arrives with a firm shove in the back which feels stronger than the RS4 or RS5 below 4000 rpm.

As revs rise, the push from the beefy torque curve remains constant, and by the time you need to grab the next gear ratio, you realise that STaSiS has convincingly rewritten the rules on how well an otherwise civilised V6 engine can deliver the goods.

The factory supercharger is an Eaton TwinVortices Series Rootes type unit with twin four-lobe rotors, and is mounted in the vee of the engine on its own manifold. A pair of independent, water-cooled intercoolers lower the charge air temperature very effectively.

The conversion created by STaSiS is simple but brilliant and consists of a lightweight, free-flowing, T304 stainless steel exhaust system which uses the cross-flow pulse scavenging technology on the 3.0 supercharged engine, and

provides an additional 8 PS just by itself. The exhaust tube diameter is 2.25 inch for the primaries, with four 3.5-inch tailpipes.

The remapped ECU software raises the supercharger's boost pressure and optimizes the fuel and ignition curves to match the improved intake and exhaust flow.





modified power and torque curves, it was obvious that the new software changes the delivery characteristics for the better. For instance, the factory power curve peaks at 5500 rpm and drops off after that, whereas the STaSIS modified engine continues to climb consistently with undiminished vigour to 7000 rpm.

And, where the standard torque curve suffers from minor dips on its way to peak at 4500 rpm, the tuned engine has a more rapid ascent to its peak which is attained at 1000 rpm lower. The torque improvement is clearly felt on the road, not just in terms

of its more substantial thrust, but also in the way the motor picks up with greater eagerness in the low to medium rev range.

It feels more lively and willing to rev from just off idle, all the way to the cut-out, and after the power and torque curve cross at 5000 rpm, the power just keeps on coming. By comparison, after the standard car's power and torque curves have met at 5500 rpm, it is downhill all the way.

One look at the STaSIS S4 tells you that this car has been seriously lowered. The double digressive rate coil-over suspension system is made to their specification by

Ohlins, and was set up with a 45 mm ride height drop. An uprated anti-roll bar kit provides fine-tuning, and the bushes and bump stops are optimized for this set-up.

9.5J x 20-inch forged, ultra-lightweight alloy wheels with 295/25ZR 20 Yokohama tyres fill the wheel arches fully and give the car a much more purposeful stance.

While this manual transmission car is built to STaSIS Challenge Edition specification, with a high-bias centre differential, a less extreme Touring Edition with the same engine mods is also available. This features lower, uprated springs and the anti-roll



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bar kit, along with either 8.5 x 19 or 8.5 x 20-inch cast alloy wheels.

The Challenge Edition is a full spec trackday-ready car using Alcon brakes with 370 mm two-piece floating rotors and six-pot callipers in front as standard, and the option of even larger 390 mm rotors. In comparison, high-performance street pads are an option on the street comfort-biased Touring Edition.

The STaSIS S4 I drove had the six-ratio manual gearbox and was a great hoot to drive. Apart from being bowled over by its engine, I was also really impressed with its sharp handling and roll-free cornering. The only downside was a ride set-up

which was pretty marginal on bumpy roads. But, as the suspension is fully adjustable, it is no big deal to back off the stiffness a couple of clicks and bring the ride height up 10 mm.

The S5 Convertible is a thing of beauty and was set up with the same engine, but married to the seven-speed automatic with paddle shifts on the wheel. This ends up as much more of a cruiser, but it is still able to deploy the power of its mighty engine in a supercar crushing manner.

Despite being heavier, the S5 Convertible is able to match the 4.3 second 0-60 mph time of the S4, even though the base car is slower by 0.3 second. There is more room

under the Convertible's wheel arches and STaSIS uses 10.5 x 20-inch wheels all round, seriously wide for this type of car. The Touring Edition uses either 9.0 x 19 or 10 x 20-inch cast alloy wheels.

The suspension and anti-roll bar kits are the same as for the S4, with minor changes to accommodate the open car's slightly greater weight. Lateral acceleration is 0.92 g for the Touring Edition and a whopping 1.0 g for the Challenge Edition. The standard car musters just 0.86 g. These are the same numbers as the S4, which shows that Audi builds a stiff convertible.

STaSIS has done an amazing job on the supercharged V6 engine, transforming it from a good to a great powerplant. I never thought I would say it, but it is so good that I would actually be happy to live without the RS4's V8. 🇩🇪



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