



# MTM K500

**Ian Kuah  
looks closely  
at what MTM  
can do for the  
A8 4.2 quattro**

*Photography: Ian Kuah*

ONCE UPON a time, the Mercedes S-Class was the car to be seen in if you wanted to demonstrate one-upmanship, while BMW's fortunes in this class come and go according to the 7-Series generation in question. The new Audi A8 achieves what all prestige manufacturers aspire to, desirability. Of these three, it is the one which feels the most special – it is the premium limousine of the moment. Having compared it to its rivals, there is no doubt that in styling, quality and chassis dynamic terms, it has a distinct edge in every area except ultimate ride quality unless you choose the smallest wheel and tyre combination.

The interior of the A8 4.2 quattro is in a different league compared with its challengers from Munich and Stuttgart. A perfect blend of flowing and organic modern forms, its cabin is trimmed with high quality hides, and tastefully embellished with wood and chrome.

Build quality and attention to detail are impeccable.

Although the S-Class interior works fine on an ergonomic level, it looks and feels less expensive and less exclusive. And while the BMW's cabin is almost as well made as the A8's, the hard-edged elements which make up its rather piecemeal composition look comparatively clumsy, and will date more quickly.

The A8's rivals include its own cousin, the VW Phaeton. As well made as this is, the exterior styling is more staid and its interior design far too conservative to attract the younger wealthy buyer who might consider the other three. And from an engineering standpoint, the Phaeton is not a particularly efficient design compared to the A8. Sharing many of its components under the skin, the Wolfsburger ends up over 300kg, and this blunts its performance, fuel economy and handling when compared to the aluminium Audi.

So if we acknowledge that the A8 is the big saloon of the moment, where do we go from here? In 4.2 quattro form, the Audi is adequately fast, as



a W12 it is arguably less balanced. So, the appeal of the W12 badge apart, what if the V8 were made more powerful?

That is precisely the question MTM's Roland Mayer asked at the end of last year when he embarked on a development programme to give the new A8 more guts. "We have conversions to make the V8 more powerful, but the character of the A8 is quite different from, say, an S4. With a big limousine you need more torque, not just outright horsepower and revs, so we had to consider forced induction."

MTM has experience of both twin-turbocharging and supercharging the first generation A8, but in the interim, supercharger technology has advanced quite considerably. "The main disadvantage of turbocharging is the massive amount of heat produced," Roland explained. "One issue with the A8 is simply packaging, as there is only a limited amount of space around the engine to install turbos, new pipework and intercoolers."

"Superchargers are very convenient for V6 and V8 engines," he continued. "This is because you can place them in the included angle of the Vee and sometimes even put a liquid-cooled intercooler in that space as well."

The supercharger of choice for the A8 comes from Kleeman in Denmark. Kleeman is well known as a Mercedes tuner, providing bespoke supercharger installations for the V6 and V8



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Mercedes engines. I tested its system on a Mercedes SL500 two years ago and was very impressed with its smoothness and efficiency.

AutoRotor in Sweden makes the relatively compact supercharger for Kleeman. It is a twin-screw positive displacement unit with very low internal friction, as I realised when I spun the drive pulley easily by hand.

Low friction means that it operates at about 100°C, 30° less than rival designs.

Effective forced induction is all about charge air temperature. The cooler the air you can get to the inlet manifold, the more power you can achieve. The problem is that although superchargers do not produce as much heat as turbochargers, it is still too much.

"Once you have too much heat at the air intake, you have a cascade effect through the whole engine," Roland explained. "You have to have a lower compression ratio to avoid detonation, but this blunts throttle response. Then you have to run higher boost to get the power and torque, but the higher the boost, the more heat you get and the closer you run to detonation. It all goes round in a vicious circle."

"The secret is cool air and low

boost," he continued. "Thermal stress puts a limit on reliability, so Kleeman approached heat as the root of all problems. With this in mind, they set out to develop a special intercooler system which would effectively reduce the temperature of the supercharger's output from 100°C to no more than 25 or 30°C above ambient air temperature at the inlet manifold."

This design allows the stock compression ratio to be retained, cutting out a lot of expensive internal engine work. It also means that the conversion is easily reversible should you decide to sell the car in standard form. "The results speak for themselves and there are dozens of Kleeman modified Mercedes running around in Germany with over 50,000 problem-free kilometres on the clock.

The innovative intercooler which does the trick comes from Laminova,

another Swedish engineering firm, and is mounted between the supercharger and its manifold. This water-cooled intercooler is so efficient that, at full power, it can dissipate nearly twice as much heat from the charge air as the comparable IHI unit Mercedes uses on its supercharged AMG cars.

Because of this, the nett horsepower gain is higher. It is achieved with relatively low boost pressure, the stock compression ratio being retained and not lowered. The 485 PS Kleeman SL500 uses just 0.45 bar of boost compared to 0.8 bar on the 500 PS SL55 AMG, and does not require the engine to be fitted with low compression pistons. This is important, keeping the conversion costs reasonable.

The 4172cc Audi V8 has different internal architecture from the Mercedes

engine and starts off by giving away 1.3 litres in engine capacity. "We run slightly higher boost of 0.48 bar to make up for this and achieve 500 PS at 6070 rpm with 620 Nm (458 lb. ft.) of torque at 3900 rpm," said Roland. As on the Mercedes, the A8 supercharger installation uses a separate closed loop cooling system with pump, independent of the engine's own system, and this has its own smaller radiator in the nose.

In weight terms, the aluminium A8 is light for its size and MTM's K500 test car tips the scales at 1780 kg. Not as light as the aluminium Jaguar XJ8 perhaps, but significantly less than the equivalent S500 or 745i. Because of this, its power-to-weight ratio is impressive and, against the stopwatch, the K500 digs in and blasts to 100 kph in just 5.2 sec, passes 200 kph (125 mph) in 17.9 sec and, thanks to the removal of the 250 kph top speed limiter, will reach 300 kph (188 mph).

"It will actually go faster than that, thanks to the high sixth gear on the MTM updated gearbox," Roland

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## 'In combination with its electronic lowering module the K500 looks even more purposeful, both at rest and on the run'

explained, "but we decided to limit top speed to 300 kph to avoid overstressing the mechanicals if you were to run flat out on the autobahn over long distances at night."

It may be the case that some of MTM's A8 customers will simply go for the engine and cat-back exhaust system, but MTM wanted to show off its full range of upgrades which run to carbon-fibre aerodynamic aids, bigger wheels and tyres, and suspension lowering.

All cars benefit visually from larger wheels and tyres, and the sleek A8 is no exception. It is down to the size and design as to how much visual impact the finished car commands. MTM has named its nine-spoke alloy wheel 'bimoto', after the screaming yellow twin-engined TT it was first seen on.

On the A8, MTM uses 9.5J x 19-inch wheels all round with 255/40ZR19 Yokohama AVS Sport tyres. In combination with its electronic lowering module for the suspension, which takes 20mm out of the ride height, the K500 looks even more purposeful, both at rest and on the run.

The big A8 takes some stopping, so MTM applies its biggest brake kit to the front, using 380 mm vented discs with eight-pot callipers. The aerodynamic aids are quite subtle and both the front spoiler lip and the small boot trailing edge spoiler are left in natural carbon-fibre finish. One finishing touch which will not appeal to everyone is the chromed mirror covers. The only interior changes are the MTM sill panel trims and speedometer recalibrated to 300 kph.

First impressions of the K500 from behind the wheel are of a car which drives exactly like standard around town. Since the compression ratio is unchanged, there is none of the off-boost lethargy that plagues high-boost cars with low compression pistons.

When you reach a clear stretch of road and start to dig deep into the throttle travel the supercharger begins to earn its living and provides a mountain of torque to thrust this heavy car forwards. Rather than slamming you back in your seat and pinning you there, the K500's headlong rush towards the horizon is smooth and relentless.

Its true ground-covering ability is

only judged by the rate at which the scenery and other traffic rushes past, while you enjoy the serenity and comfort of the A8's plush cabin.

In my opinion, this suits the long-legged luxurious character of the A8 very well, since it is a limousine and not a sports saloon. Those who prefer catapult take-offs and high drama should go for MTM's lighter and more powerful RS6 Club Sport! 



### Contact

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