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#### **Editor & Publisher:**

Paul Harris

#### **Design & Production:**

Ian Fermor

#### **Contributors:**

Neil Birkitt, Andrew Chapple, Paz Chauhan, Robert Couldwell, Andrew Everett, Ian Kuah, Martyn Pass and Susanne Roeder

#### **Advertising Manager:**

Debbie Forbes Telephone: 01525 750504

#### **Finance Manager:**

Bridgette Cooksley Telephone: 01525 750503

#### **Subscription & Website Manager:**

Sally Appleby *Telephone: 01525 750500* 

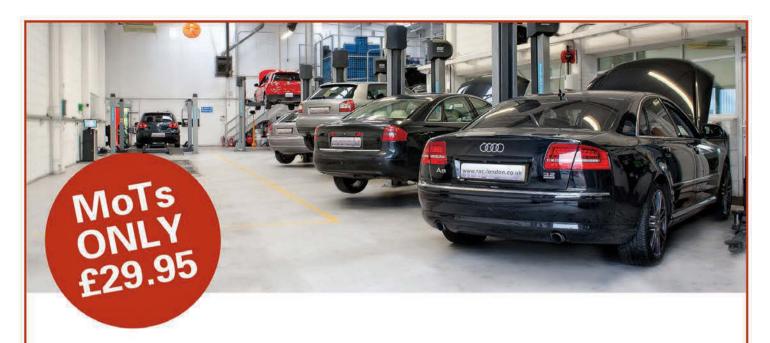
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## **Hybrids**

I HAVE TO GO back quite a way to recall when I first drove a Volkswagen Group hybrid and I am pretty sure that it was a Touareg which I steered around the streets of Wolfsburg. One characteristic of the Volkswagen Group is that things don't happen very quickly, at least as far as new designs and technology are concerned. Yes, Audi is a leading manufacturer when it comes to the practical application of new technology, but the advances always take time to come to fruition. As you would expect from a German company, new technology is developed carefully and steadily, one of the reasons why, when it arrives in a production model, it all works properly.

This is the attitude which has characterised Audi's developments in the field of electric propulsion – nothing has happened too quickly, but the end result is effective and reliable. Audi developed hybrids in the early Nineties and the various models which were called Duo showed the way ahead. But then things went very quiet until the great surge in the desire to make use of electrical power which has occurred in the past few years. Now the A3 Sportback e-tron shows that a plug-in hybrid can be a thoroughly practical car, but bear in mind that it is also heavier because of the weight of its lithium-ion battery, and the motor itself. When the car is being driven by the combustion engine alone, it is having to lug around the battery and motor and, on electric power alone, it has the weight penalty of the combustion engine.

I know that, despite the success of the e-tron, there are still engineers, who work for Audi and other manufacturers, who question whether hybrid drive is the best way to achieve low emissions – which is what the added complexity is really all about.

As you will see later in this issue, I have been driving the A3 Sportback e-tron and found it a thoroughly competent car, good to drive and very practical. The problem is that it is expensive to buy and, even though your running costs might be cut considerably, it will take a long time to outweigh the higher purchase price. If your motoring is confined to relatively short journeys when you can rely on electrical power alone, the e-tron makes sense but, for those whose motoring involves longer journeys, an ultra TDI would be a better option.



# 'There are still engineers who question whether hybrid drive is the best way to achieve low emissions...'

We all know that the biggest drawback in the use of electricity to power cars is the weight of the battery. Even though the A3 Sportback e-tron used a lithium-ion battery pack, the weight, 220 lb or 125 kg, is pretty enormous. Placed under the rear seat, it is in about the safest position it can be if a collision were to occur, and being at this level it doesn't have much effect on the excellent handling of the Sportback. Even so, the weight has an inevitable effect on energy consumption, whether it is petrol or electricity.

Initial impressions of any car can be misleading, though, and it will be interesting to get feedback from anyone who decides to purchase an A3 Sportback e-tron.

A SCOTTISH journalist recently told me a story about an A6 allroad quattro. I don't know how genuine it is, as a certain amount of Scotch was flowing at the time, but it is certainly unusual.

The A6 allroad has always been a popular Audi, and the further north you go, the more it comes into its own, with Torsen-based four-wheel drive and variable ride height. One was owned by a resident of one of the Hebridean isles and, in three years of ownership he had been delighted with it. However harsh the weather, it had never let him down.

Then, one day, he started up the allroad and, when he accelerated, all the power disappeared. He could just about keep it going, but that was all. Well, you don't find Audi Centres on Hebridean isles and so he took it along to the local garage, which did have some experience of Volkswagen Group vehicles because they are so popular in that part of the world. They connected up their diagnostic equipment, but just couldn't get anywhere with it.

What do you do when faced with this sort of problem on one of the islands? You catch a ferry and drive, very slowly, to Glasgow, which has one of the biggest and most advanced Audi centres in the British Isles. But, even then, the situation didn't get any better, the fault codes adding to the problem rather than solving it. Eventually, an engineer came over from Germany, consulted the fault codes and said, 'I've never seen that one before, but I think I know what it means'.

He pressed the lock button on the key, waited a moment and then unlocked it and, when the key was turned in the ignition, the engine started and ran smoothly.

Now, when you live on a remote Scottish island, one thing you don't often do is to lock your car – there is no need. If anyone were to pinch it, you would just need a lift down to the ferry terminal and claim it back before the ship sailed, but then that has never happened. As a result, hardly anyone ever locks their car on the island and this owner had not locked the allroad for three years. The suggestion is that, deep inside the ECU, there is a piece of programming which checks on this and, if the car hasn't been locked for three years, then there must be something wrong and it goes into limp-home mode. True or false?

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NOT SURPRISINGLY, the A3 has become the biggest seller of all the Audi models which are available on the British market. The less expensive A1 is also doing well, but the A3 has established itself very strongly in the market place. The Sportback is more popular than the two-door version, but now there is a third choice with the introduction of the Saloon, called Sedan in the USA, and Limousine in Germany.

Although the A3 Sportback is a more practical vehicle, because of its hatchback design, the Saloon has a lot going for it. The lines make it look bigger than it actually is and, in overall size, it is very similar to the first A4, although, in the intervening years, the A4 has grown and grown. As a result, there are probably quite a few potential buyers who look at the A3 Saloon and see it as an elegant car, very much an Audi, more compact than the A4, and less expensive, by more than £3,000. And, as well as the threebox styling having quite strong appeal, there are those who prefer to have a separate boot, where luggage is completely out of sight.

At present, the A3 Saloon range is relatively simple. Two levels of specification are available, Sport and S line, and the petrol engine range consists of the 150 PS 1.4 TFSI and the 180 PS 1.8 TFSI. Two diesel engines are available, the 110 PS 1.6 TDI, and two versions of the 2.0 TDI, one with an output of 150 PS, and one delivering 184 PS. Both the 1.8 TFSI and the more powerful 2.0 TDI

are available with quattro four-wheel drive.

The test car was powered by the 150 PS TDI engine and came with the S line specification. The Sport version is well equipped, and to this the S line adds bigger wheels and tyres, a combination of cloth and leather upholstery, flat bottomed three-spoke multifunction steering wheel, storage package, xenon discharge headlamps, and a variety of cosmetic changes which make it look a little more purposeful. This package adds £2,150 to the price of the Sport.

Inside the Saloon, things are little different to the other A3s. The sports seats in the front are comfortable and the bolsters help to provide lateral support when cornering. The combination of biathlon fabric and leather, and they way in which they are stitched, makes them look very attractive. All the Saloons have four doors

and so they are relatively short, which means that getting in and out in confined spaces is easier than with a two-door car. All the doors have pockets which are of a reasonable size, but the styling of the door panels means that getting something out, when it has slid to the back of the pocket, is not easy.

The boot is surprisingly long and you can pack a great deal into it. Providing the suitcases are not too big, you can lay four of them flat on the floor and still have room for other bits and pieces. The height of luggage which can be packed in is more limited than with the other A3s, but careful arrangement can pack a tremendous amount in. As with the A4 Saloon, pressing the boot button on the key allows the lid to spring up, very helpful when your arms are full. The rear seat backs are divided 40:60 and fold down

**Providing the** suitcases are not too big, you can lay four of them flat on the floor and still have room for other bits and pieces...'

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to extend the luggage space. Beneath the boot floor is a space-saver spare wheel and tyre which will get you home if you have a puncture, something you cannot always rely on with the so-called tyre mobility kit.

Because of its design, the Saloon carries less weight high up than the other A3s and so the handling feels a little more balanced, with less roll when cornering. Both the Sport and the S line normally come with Sport suspension which lowers the ride height by 15 mm and involves stiffer springs and firmer damping. This is not always the case, though, because, as a no-cost option, you can specify that the car has the normal suspension, bringing the ride height back to its normal level, and with softer suspension. That was the case with the test car and we found that the regular suspension and ride height gave

a very agreeable compromise between sharp handling and comfort.

These days, the brakes which are fitted to Audis always have plenty in reserve so that, even with the car fully loaded, you can stop in a very short distance, the ABS system allowing you to continue steering yourself out of trouble while the brakes are being applied. The use of electro-mechanical parking brakes has also become virtually universal and, as an optional extra, the test car was fitted with Hold Assist, which stops the car rolling when you move away on an incline. The cost for this is £90 and it makes driving so much easier that we are surprised it is not fitted as a standard feature. When you have to wait and then pull away on a steep slope, Hold Assist can be invaluable.

All A3 Saloons are fitted with Drive Select, the system which allows the driver to have a

certain amount of control over the operation of various functions. By pressing the Drive Select button on the facia (or by using the Car section of the MMI switchgear), you can select Efficiency, Individual, Comfort, Auto and Dynamic modes. With all models, these options are applied to the way in which the engine responds to the accelerator pedal and the sharpness of the steering response. What the Drive Select system does not control, on the A3, is the suspension, even though you would expect this when one of the choices is 'Comfort'. Drive Select can only be used to vary the suspension characteristics if the car is also fitted with variable dampers and this is not the case with the A3. The S3 Saloon has Magnetic Ride dampers as a standard fitting but, if you want these fitted to either the Sport or S line versions of the A3 Saloon, the cost is an additional £995.





'All A3 Saloons are fitted with Drive Select, which allows a certain amount of control over the operation of various functions...'

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Drive Select will alter other functions, however and, in Efficiency mode, it ensures that the engine performs as economically as possible and that the air-conditioning system uses the minimum amount of power.

If the car is fitted with S tronic transmission, the effects of Drive Select go even further. As you move through the choices from Comfort to Dynamic, the gearbox will hold on to the revs longer and, as you accelerate in Dynamic, full revs will be achieved in each gear. In effect, the gearbox has moved to the Sport mode and the 'D' in the instrument panel, showing which gear you are in, is replaced by 'S'. If, on the other hand, you select Efficiency, the S tronic gearbox demonstrates another of its virtues, allowing the engine to coast when you take your foot off the accelerator pedal, thereby improving fuel efficiency. This coasting function is carefully controlled and there is no possibility of the car running away with you on hills.

Choosing the S tronic option puts the price of the A3 up by nearly £1,500 and we wonder, as we have done so often, whether it actually costs this much more to build an automatic rather than a manual gearbox. Having said that, we would emphasise how well the S tronic 'box operates, making driving less stressful in heavy traffic and allowing you to change up and down through the gears using the paddles behind the steering wheel, just like a racing driver.

Although the 150 PS version of the 2.0 TDI engine is not the most powerful available, it does give the A3 saloon very lively performance, the impressive torque allowing it to pull strongly from low engine speeds. From rest, you can reach 50 mph in 6.3 seconds, while getting to 60 mph takes 8.4 seconds, and 70 and 80 mph are achieved in 11.1 and 14.9 seconds respectively. When you kick down the accelerator pedal, the S tronic gearbox comes into its own, and the A3 takes just 3.1 seconds to go from 30 to 50 mph, and 4.8 seconds to reach 70 from 50 mph.

You will see from the performance comparison table that the acceleration of this 2.0 TDI saloon was almost identical to that of the A3 Sportback, with the same engine, which we tested in December '13. The Saloon, though, had the advantage

of the S tronic gearbox and so the times from 30 to 50 mph, and from 50 to 70 mph, are quicker.

Another advantage of the S tronic gearbox is that it has a high sixth gear, contributing to fuel economy on long runs. The miles per hour per thousand revs in sixth gear is 37.9 and this means that, at a steady 70 mph, the engine is turning over at just about 1850 rpm.

As you would expect, the overall fuel consumption which we recorded with this A3 Saloon was almost identical to that of the Sportback with the same engine. It returned 44.9 mpg, whereas the Sportback achieved 44.8 mpg, a remarkable correlation. We carried out several long motorway journeys when, because of traffic conditions, the speed varied between 65 and 75 mph and, under these conditions,





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the A3 regularly achieved 57.2 mpg. This sort of driving, with the engine fully warmed up and keeping to moderate speeds, is the ideal way of getting the best from every litre of fuel and, even when we resorted to economy driving techniques, we couldn't do much better.

One can usually expect the fuel consumption read-outs of the driver information system to be somewhat optimistic, around 5 per cent being quite normal. This car, though, had a remarkably accurate computer, with an error of less than 1 per cent. The tank holds 50 litres or 11 gallons and so, if you wanted to stretch your range to the limit, you could cover around 550 miles and still have a gallon of fuel remaining.

Another feature which has become virtually universal on Audis, and which contributes to improved fuel consumption,

is the stop-start system, the engine cutting out, once it is warm, whenever you come to a stop. We've become used to this happening, but we know that, with some drivers, it is not popular and this particular car gave an indication of why this can happen. Instead of the almost instant start-up when pulling away from a junction, there was a brief but unwelcome delay which became quite frustrating. We are not, for one moment, suggesting that this is typical of the A3 Saloon, and it was clearly a feature of this individual car, but it did illustrate why some drivers press the button to turn the stopstart mechanism off. When you do this, the setting only stays in place while the engine continues to run; once you have switched it off, you have to press the button again to eliminate the stop-start procedure when you next drive the car.

The hatchback versions of the A3 are more versatile, in terms of luggage accommodation, but many find the Saloon more stylish...'

As with the majority of cars which we test, this example was fitted with a range of options, some of which are of great benefit, but the cost can be high. LED headlamps are not a commonly fitted option, but they give out an intensely white light and, if you travel abroad, the beam can be altered to prevent dazzling other drivers. The beam pattern is very versatile and adapts automatically to a variety of driving conditions. This option costs £795 while xenon discharge headlamps, which used to cost much the same, are now available on the Sport version of the A3 Saloon, together with light and rain sensing, for £295.

We have now driven a variety of A3 Saloons and, whichever engine is fitted, we have found them enjoyable to drive, the combination of sharp responsive handling and comfort being on a par with the hatchback versions. We do feel, though, that the handling of the Saloon has a slight edge because the centre of gravity at the back of the car is lower. The hatchback versions of the A3 are more versatile, in terms of luggage accommodation, but many find that the Saloon is more stylish and has a certain presence which you don't get with the other versions.



#### **Price comparison**

Honda Accord 2.2i0DTEC 150 ES GT Nav	£27,520
Audi A3 Saloon S line 2.0 TDI S tronic	£27,905
BMW 320d SE	£28,775
Mercedes-Benz C 200 Sport	£28,850

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### Facts and figures: A3 Saloon 2.0 TDI (150 PS) S line

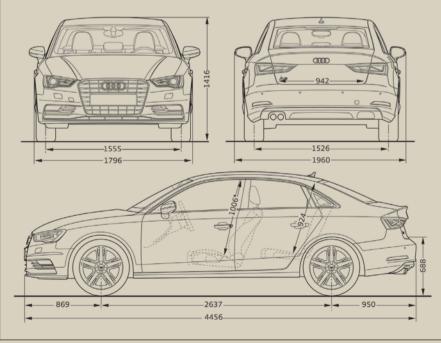








#### **DIMENSIONS & WEIGHTS**





Turning circle	36.1 ft, 11.0 m
Unladen weight	2911 lb, 1320 kg
Total permitted weight	4123 lb, 1870 kg
Permitted trailer load; with brakes	3969 lb, 1800 kg
Permitted trailer load; without brakes	1522 lb, 690 kg
Wheels and tyres	8 x 18 225/40 R18

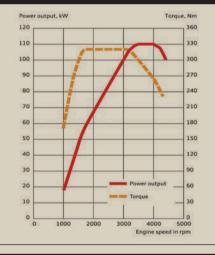
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#### **Test publication date: January 2015**



#### ENGINE / FUEL ECONOMY / ACCELERATION

ENGINE SPECIFICATION	
Displacement	1968 cc
Configuration	In-line
Cylinders	4
Bore and stroke	81.0 x 95.5 mm
Power output	150 PS (111 kW) @ 3500-4000 rpm
Maximum torque	237 lb.ft. (320 Nm) @ 1750-3000 rpm
Compression ratio	16.2:1
Valves per cylinder	2 inlet, 2 exhaust
FUEL CONSUMPTION	
Overall test value	44.9 mpg, 6.3. l/100km
Economical driving	57.2 mpg, 4.9 l/100km
Urban cycle	54.3 mpg, 5.2 l/100km
Extra urban cycle	70.6 mpg, 4.0 l/100km
Total	64.2 mpg, 4.4 l/100km
Fuel required	Diesel to EN 590
Fuel tank capacity	11.0 gallons, 50 litres
CO <sub>2</sub> emission	115 g/km



ACCELERATION FIGURES	
Maximum speed	139 mph, 222 kph
0-50 mph	6.3 sec
0-60 mph	8.4 sec
0-70 mph	11.1 sec
0-80 mph	14.9 sec
30-50 mph (3rd gear)	3.1 sec
30-50 mph (4th gear)	_
50–70 mph (3rd gear)	4.8 sec
50-70 mph (4th gear)	_
50-70 mph (5th gear)	-
50-70 mph (6th gear)	-
Road speed/1000 rpm in top gear	37.9 mph, 60.7 kph

Acceleration figures recorded using VI Monitor. For more information visit the website at: www.vi-performance.com

#### PERFORMANCE COMPARISONS

	A3 Saloon 2.0 TDI (150 PS)	A3 Sportback 2.0 TDI (150 PS)	A3 Sportback 2.0 TDI quattro
Displacement, cc	1968	1968	1968
Power output, PS/kW	150/111	150/111	184/135
@ rpm	3500-4000	3500-4000	3500-4000
Maximum torque, lb.ft./Nm	237/320	237/320	280/380
@ rpm	1750-3000	1750-3000	1750-3250
Maximum speed, mph/kph	139/222	134/214	144/230
0–50 mph, sec	6.3	6.3	5.3
0–60 mph, sec	8.4	8.6	7.3
0-70 mph, sec	11.1	11.2	9.8
0–80 mph, sec	14.9	15.0	12.8
30–50 mph (third gear), sec	3.1	4.1	3.0
30–50 mph (fourth gear), sec	-	7.0	-
50–70 mph (third gear), sec	4.8	4.5	4.3
50-70 mph (fourth gear) sec	-	6.0	-
50–70 mph (fifth gear), sec	-	7.8	-
50–70 mph (sixth gear), sec	-	10.5	-
Overall consumption, mpg / I/100km	44.9/6.3	44.8/6.3	40.5/7.0
Unladen weight, lb/kg	2911/1320	2889/1310	3142/1425
Power/weight PS/ton, PS/tonne	115/114	116/115	131/129
Test publication date	Jan '15	Dec '13	Jun '14

'When you kick down the accelerator pedal, the S tronic gearbox comes into its own, and the A3 takes just 3.1 seconds to go from 30 to 50 mph...'

To read any of the other tests mentioned in the comparison chart, back issues can be ordered online, securely, from our website: www.audidrivermag.co.uk

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# Fresh faced

Enhanced styling, equipment upgrades and improvements in performance and fuel efficiency for the revised Q3, and even more power for the hot RS Q3...





IT DOESN'T SEEM all that long ago that we attended the UK press launch of the  $\,$ brand-new Q3, based in Scarborough, as I recall, with the driving experience centred around the North York Moors - ideal territory both for the road routes and for a little impromptu mild off-road driving with Audi's first step into the compact SUV market.

But it was back in 2011 in fact; we've since carried out five full 7-page road tests of various Q3 models in the meantime, and time has marched on sufficiently that we're now looking at the first major facelift, recently presented at an international press event based around Munich, just ahead of the UK launch in January 2015 with first deliveries expected in March.

Of course, we'd love to have seen an allnew MQB-based model in the same mould as the recent A3 and new TT, and that will undoubtedly come in time, but for now

Audi's compact SUV benefits from a sharper new look, equipment upgrades and modest improvements in performance and fuel efficiency. There's also a significant upgrade in the power and performance for its unique-in-class high-powered variant, the RS Q3 - more of which later...

So, while it might be substantially unchanged beneath the surface, still based on essentially the same PQ35 platform as the VW Tiguan, the new Q3 is clearly distinguishable on the outside by its sharper styling and, especially, its new 3D-effect single-frame grille, reshaped front bumper and revised headlights. The single distinguishing element, from a distance, is the way that the aluminium border at the top of grille also bridges the gap to the headlights on either side.

At the rear, the tail lights have also been restyled, the bumper revised and the rear diffuser is flatter and wider. The full body

available - that was previously applied to the S line models is now also a standard feature of the SE.

There are also several new designs of alloy wheels, with 7 x 17-inch '5-spoke Y' with 235/55 R17 tyres standard on the SE, 7 x 18-inch 5-parallel-spoke alloys with 235/50 R18 tyres on the S line and  $8.5 \times 19$ -inch 5-segment-spoke, with 255/40 R19 tyres, on the S line Plus.  $\rightarrow$ 

While it might be substantially unchanged beneath the surface. the new Q3 is clearly distinguishable on the outside...'



The SE now features Bi-xenon headlights and LED DRLs as standard and also comes with LED tail lights, while S line and S line Plus models now have all-weather daylight-colour LED lights and have rear indicators where the light bar operates with a sweeping action, illuminating sequentially from the inside to the outside in the direction of the turn.

But it's not all for show. Significant improvements have also been made in both performance and fuel efficiency, with the engine options for the new Q3 including two TDI clean diesels and three TFSI petrol units, all EU-6 compliant.

Making its debut in the Q3 is the 150 PS 1.4 TFSI engine with cylinder-on-demand (COD) technology, which we've previously seen in the A1 and A3. It is exclusive to the front-wheel-drive Q3, with a choice of either 6-speed manual or 6-speed S tronic auto transmission. In either case, it provides sprightly performance, with an

official 0-62 mph acceleration time of 8.9 seconds for the S tronic version.

Its ability to almost imperceptibly deactivate two of the four cylinders on the over-run, or during low-load driving situations, also helps it to return a combined cycle fuel consumption figure of 50.4 mpg for the manual and 47.9 mpg for S tronic, with 128 and 136 g/km  $\rm CO_2$  respectively.

Next up is the 2.0-litre TFSI, which has seen a power upgrade from 170 to 180 PS, this time exclusively driving all four wheels through an enhanced electronically-controlled Haldex coupling system, in conjunction with the 7-speed S tronic auto transmission, claimed to be capable of 42.8 mpg on the combined cycle along with an emissions figure of 152 g/km  $\rm CO_2$ .

But it's the diesel engines which provide the torque and fuel efficiency that best suit the Q3, with a choice of two 4-cylinder common-rail TDI units providing outputs 'As well as the extra power and performance throughout the range, the driving dynamics of the new Q3 also benefit from the adoption of Drive Select as a standard feature...'

of 150 PS (up from 140 PS) and 184 PS (up from 177) with fuel economy improved to 61.4 mpg and 53.3 mpg respectively.

The 150 PS TDI is available in conjunction with a choice of front-wheel drive only, or Haldex quattro four-wheel drive, and either 6-speed manual or 7-speed S tronic transmission, while the 184 PS unit only comes with quattro four-wheel drive and the option of 6-speed manual or 7-speed S tronic.

As well as the extra power and performance throughout the range, the driving dynamics of the new Q3 also benefit from the adoption of Drive Select as a standard feature. It was previously only available as an extra-cost option. Enabling the driver to adjust a variety of control systems, including the optional dynamic damping, between Comfort, Sport, Efficiency and Individual permutations, it allows the driver plenty of latitude to set the car up to suit different driving requirements and personal preferences. It's worth noting here that the

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S line can also be ordered with sports suspension (lowered by 20 mm) at no extra cost.

Other equipment upgrades include the adoption of sports seats with four-way electric lumbar support as standard on the SE models, as well as the S line and S line Plus; S line also includes black 'Sprint' cloth and leather upholstery with en embossed logo while S line Plus has perforated leather and Alcantara trim, and all Q3 models now get a new leather-trimmed three-spoke multifunction steering wheel and aluminium dash trim panels with inlays in monometallic platinum.

S line models are further distinguished externally by different front and rear bumpers and body styling; it has larger air intakes, with no front fog lights, and it has auto-folding electric and heated door mirrors along with headlight washers as standard.

S line and S line Plus models now have powered tailgate operation and there's a

new retractable luggage cover. As before, luggage capacity amounts to 420 litres with the seats up and 1325 with the rear seats folded flat.

All versions now come with dual-zone climate control, Concert Audi system with 6.5-inch colour display screen (although still only manually retractable), Bluetooth, Audi Music Interface iPod connection and light and rain sensors as standard equipment.

S line Plus comes ready-prepared with SD-based navigation as standard, while SE and S line models have the provision for navigation to be activated retrospectively by purchasing the appropriate SD card.

Top of the range is the S line Plus, which comes with 18-inch alloys, privacy glass and metallic paint as standard, as well as the satnav upgrade, perforated leather and Alcantara seat trim, cruise control and Audi parking system plus.

As usual, all kinds of expensive extras can be added to the order form, including

driving aids like Side assist, Active lane assist and Traffic sign recognition, while a Technology pack incorporates MMI navigation plus with hard disc mapping and a colour driver's information system. Audi connect allows the Q3 to be linked to the internet, with an integrated WiFi hotspot, to make use of services such as the web radio Audi music stream, online traffic information, *Google Earth* and *Google Street View*. There are also many options for personalisation using a bespoke options ordering through Audi exclusive.

All things considered, while not radically improved in any way, it amounts to a significant enhancement in styling, equipment and performance, with the Q3 remaining fairly competitively priced against obvious rivals like the Range Rover Evoque, BMW X1 and Mercedes Benz GLA. The Q3 starts at £25,340 for the 1.4 TFSI (150) SE 2WD, rising to £35,720 for the 2.0 TDI quattro S line Plus Stronic.



'While not radically improved in any way, it amounts to a significant enhancement in styling, equipment and performance...'







But then there's an ace up the sleeve of the Q3 model line-up, with a version which is virtually unrivalled in this part of the market. The high-performance RS Q3 sees a similar range of styling upgrades to the Q3, but with RS-specific detailing including high-gloss black honeycomb grille and RS bumpers, distinctive rear diffuser and prominent tailgate spoiler.

Its piece de resistance is found under the bonnet, where the turbocharged 2.5-litre 5-cylinder engine – similar to that of the RS 3 and TT RS, but previously detuned for the Q3 application – has now been upgraded to develop 340 PS and 450 Nm (up from 310 and 420), with the 0 to 62 mph acceleration time trimmed from 5.2 to just 4.8 seconds, although the top speed remains limited at 155 mph.

It has the quattro four-wheel drive system, of course, using the enhanced fifth generation Haldex coupling to transmit torque to the rear wheels, and is exclusively equipped

with the 7-speed S tronic auto transmission which has been refined for faster shifting, with its gearing spread to provide shorter low ratios for climbing and strong acceleration, with a longer seventh gear for cruising. The combined fuel economy figure is now 32.8 mpg, a 2 per cent improvement on the previous version despite the additional power output, with CO<sub>2</sub> emissions reduced to 203 g/km.

Dynamically, the RS Q3 is endowed with the RS sports suspension as standard, the ride height reduced by 25 mm compared with the standard Q3, with adjustable damping available as an option, and its big brakes with 8-piston callipers now operate on 365 mm diameter lightweight wavestyle drilled discs which are 1 kg lighter than conventional full-circle discs. The



distinctive 8.5-inch alloy rims are 20 inches in diameter, fitted with 255/35 R20 tyres.

Inside, the RS Q3 has sports seats upholstered in Fine Nappa leather, with contrast stitching, and bespoke instrumentation with red tacho and speedo needles on grey dials plus a driver information system that provides special RS features such as a lap timer, oil temperature and turbo boost pressure displays.

The RS Q3 has very little competition in this part of the market, with its only comparable rival the Mercedes-Benz GLA 45 AMG 4Matic, providing similar performance from its 360 PS 4-cylinder 2.0-litre engine and 7-speed auto transmission, while the Range Rover Evoque Si4 Dynamic Lux lags far behind with only 240 PS and 135 mph. Neither, though, can begin to compete with the RS Q3's unique engine note, with its distinctive 5-cylinder sound amplified through an exhaust system with switchable flaps.



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Audi announces even more power and performance, allied to additional equipment and several new optional extras, for the forthcoming RS 3...

AUDI HAS recently revealed full details of the forthcoming RS 3 Sportback, now featuring increased power and performance from its 2.5 turbo engine as well as reduced weight, a faster-shifting S tronic twinclutch gearbox, and a quicker-reacting four-wheel drive system.

Like its predecessor, the new RS 3 will be powered by the 2.5-litre 5-cylinder turbocharged 20-valve TFSI engine, but with the power output increased from 340 to 367 PS and developing 465 Nm (343 lb.ft.) of torque between 1625 rpm and 5550 rpm.

Despite additional equipment and safety features, the new car weighs in at 1520 kg (without driver) – some 55 kg lighter – thanks to the improved construction processes and materials achieved with the Volkswagen Group's modular transverse

matrix (MQB). The main bodyshell uses many components of ultra-high-strength and hot-shaped steels, and the bonnet is made of aluminium.

The resulting power-to-weight ratio of 241 PS per ton results in a 0 to 62 mph time of just 4.3 seconds, 0.3 seconds faster than the previous model, and it has an electronically governed top speed of 155 mph. This can be increased to 174 mph by special request.

In addition to the highly distinctive sound of the five-cylinder engine, the exhaust flow can also be controlled by two flaps in the exhaust pipes, to provide an even more intensive exhaust note that varies with engine load and speed. The driver can control these flaps via the Audi Drive Select adaptive dynamics system.

There is also an extra-cost optional sports

exhaust system, to provide an even richersounding sports exhaust note.

Despite the extra performance, the use of an energy recuperation system, a demand-controlled oil pump and a newly developed start-stop system which turns off the engine shortly before the car comes to a stop, result in improved fuel-efficiency. The new RS 3 is claimed to be capable of returning up to 34.8 mpg, corresponding to CO<sub>2</sub> emissions of 189 g/km and complying with the latest EU6 emissions regulations.

The RS 3 comes exclusively with the 7-speed S tronic auto transmission, now further improved to provide even faster gearshifts, which directs the power to the permanent all-wheel drive system which uses the electronically-controlled, hydraulically-activated multi-plate clutch-type Haldex coupling to transfer torque to the rear wheels. Depending on driving style and the coefficient of friction, it can send between 50 and 100 per cent of the available torque to the rear axle. Its weight has been reduced by 1.4 kg.

The coupling is governed by software specific to the RS 3 and can be controlled

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'When Audi Drive Select is in dynamic mode and the ECS system is in its Sport setting, power is transferred to the rear wheels much more readily and in greater amounts, for enhanced agility and much more direct turn-in...'



via the Audi Drive Select system so that, when dynamic mode is selected and the Electronic Stabilisation Control (ECS) system is in its Sport setting, power is transferred to the rear wheels much more readily and in greater amounts, for enhanced agility and much more direct turn-in. In this mode, it is claimed that the driver can even perform controlled drifts on low-friction road surfaces. For specialised track use or to arm the launch control system for faster standing starts, ESC can also be completely deactivated by pressing and holding the button for more than three seconds.

Compared with the standard A3 Sportback, the ride height of the RS 3 has been reduced by 25 mm, and the front track has been increased to 1559 mm. The MacPherson front suspension incorporates specially developed high-strength aluminium pivot bearings.

The rear axle, which has a track width of 1514 mm, is a four-link construction with control arms made of high-strength steel, to handle the longitudinal and lateral forces. There are heavy-duty anti-roll bars at both front and rear.

The new progressive steering system is capable of varying its ratio between 15.3:1 and 10.9:1 as a function of steering input,

while its efficient, electromechanical servo boost has specific settings for the RS 3.

Audi's magnetic ride adaptive damper system is available as an option, with the damping rate instantly adjustable via Audi Drive Select to provide comfort, auto, dynamic and individual modes, according to the driver's requirements.

Internally ventilated disc brakes measure 370 mm in diameter at the front and 310 mm at the rear. The front discs feature the weight-saving wave design and are drilled for maximum heat dissipation. Pins connect them to the aluminium brake hubs, and they are gripped by eight-piston fixed callipers painted black (red optional) with RS logos.

To cope with extreme braking requirements, carbon fibre-ceramic front brake discs are available as an option, also measuring 370 mm in diameter, with the callipers finished in anthracite grey.

Externally, the RS 3 is readily distinguished by the high-gloss black, honeycomb-look treatment for the Singleframe grille with its matt aluminium-look frame, as well as the pronounced central air intake and large side intakes. The blade integrated into the front apron extends upward into the air intakes to form a vertical dividing bar.

Flared front wings, chiselled side sills, matt aluminium-look mirror housings also instantly distinguish the RS 3, while at the



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'The RS 3 Sportback has sports seats upholstered in Fine Nappa and the flat-bottomed RS-style multifunction sports steering wheel is trimmed with leather and Alcantara.

rear is an enlarged tailgate spoiler, reshaped bumper with high-gloss black diffuser insert, honeycomb grille and four bars, framing the two large, oval tailpipes.

Eight paint finishes will be available, including the two new shades called Nardo grey and Catalunya red metallic, the latter exclusive to the RS 3 Sportback.

Inside, the RS 3 Sportback has sports seats upholstered in Fine Nappa leather, with contrasting stitching in rock grey, and the flat-bottomed RS-style multifunction sports steering wheel is trimmed with leather and Alcantara.

There are also stainless-steel pedal trims, Alcantara door inserts and inlays in either 3D design black or optional Aluminium Race or Carbon, while gloss anthracite black trims frame the main instruments. These include black-faced speedo and tacho dials with red needles and white scales, plus a driver's information system with a turbo boost pressure indicator, an oil temperature gauge and a lap timer.

The RS 3 will also have the same infotainment and driver assistance systems used in the wider A3 range, including MMI navigation plus with MMI touch, while Audi connect will provide internet-based services.

In addition to the aforementioned ceramic discs and magnetic ride, the optional equipment list includes 19-inch diameter matt titanium or high-gloss anthracite black machine-polished alloy wheels as an alternative to the 19-inch five-arm rotor design fitted as standard. There's also a carbon-fibre engine cover and styling packages in matt aluminium and gloss black, also including a quattro logo in titanium grey in the air inlet.

There are also newly developed RS bucket seats with integrated side airbags and a carbon seat shell, saving 7 kg in weight compared with the standard sports seat, as well as an RS 3 interior design package with red accents on the seats, knee pads, air vents, floor mats and seat belts.

With the advent of the new RS 3 Sportback, quattro GmbH – the high-performance subsidiary responsible for developing and building the most extreme models in the Audi portfolio – now has seven 'RS' models, with the new RS 3 joining the RS Q3, RS 4 Avant, RS 5 Coupé and Cabriolet, RS 6 Avant and RS 7 Sportback.

Prices have not yet been announced but the order books open for the new RS 3 Sportback in March 2015, with first deliveries next summer.

## 'Order books open for the new RS 3 Sportback in March 2015, with first deliveries next summer...'



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### ALYNX PERFORMANCE



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# **Bluefin is back**

Superchips has cracked the complex codes and can now program the current crop of Volkswagen Group vehicles using the OBD port...

OF ALL THE many brand names on the UK performance tuning market, especially among those involved in the modification of electronic engine management systems, one particular company has been at it much longer than most...

Superchips, based in Buckingham, has a pedigree in specialist tuning and ECU remapping that can be traced right back to the late Seventies, when the company's predecessor was one of the first to modify the electronic mapping in ECUs for cars like the Mitsubishi Starion, leading – quite literally – to a number of Group N championship wins.

This was the era when turbocharged fast-road cars were in the ascendancy and a range of re-mapped ECU chips followed during the mid-Eighties, for cars like the Ur quattro of course, with the brand name eventually becoming the company name when Superchips was founded in 1989.

While significant power gains could always be made by turning up the boost on turbo cars, re-maps also followed for naturally-aspirated cars and the Superchips expertise

in engine management modifications spread to include a great many marques, both here in the UK and in the USA, including consultancy work for major manufacturers.

Throughout all this time, though, the procedure required removal of the ECU from the car, for the re-mapping to take place on the workbench. But then, after working extensively on Volkswagen Group cars since the early '90s, Superchips became one of the first to pioneer serial port re-mapping, via the on-board diagnostic port – literally plugging in to the OBD port and downloading the new software to the ECU, without having to touch the control unit itself, let alone remove it from the car.

Of course, Superchips wasn't the only company with this capability, and in order to compete with rivals who could

offer multiple programs, selected using a switching box, to run with different power outputs according to fuel grade, or offering security functions, Superchips developed its own take on the hand-held tuning module. The Bluefin device was first pioneered on the Ford model range, but it wasn't long before the system was applied to the many and varied Volkswagen Group models.

The beauty of the Bluefin system is that it allows the customer to download the revised software themselves, using a handheld module about the size and shape of a slipper. This is first plugged in to the OBD port and the standard software is copied off and then sent to Superchips by internet, using the PC software provided.

The standard software is checked by the Superchips technicians and a revised version, with the new high-performance

'The beauty of the Bluefin system is that it allows the customer to download the revised software themselves...'

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modifications incorporated, is returned, usually within the hour. This is then loaded from the PC into the Bluefin handset, and from then on the handset can be used to load or off-load the high-performance map simply by plugging it in to the OBD port and following a simple sequence of procedures, taking about 15 to 20 minutes.

The big advantage with Bluefin is that, rather than just being deactivated, the modified map is completely removed from the ECU when not needed; for instance, when another driver borrows the car, when it goes in for servicing or when it is sold.

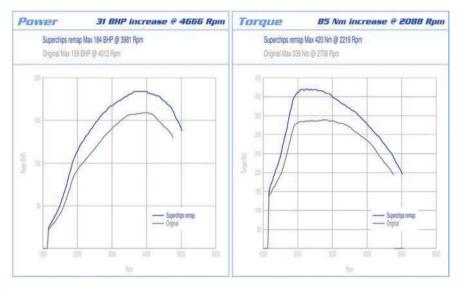
But then the beauty of Bluefin was temporarily thwarted, when the revised engine management systems used over the last few years meant that high-performance software could no longer be uploaded through the OBD port. Superchips could still re-configure the ECU, but it now meant taking it out of the car again and opening it up on the bench so that it could be modified using a special download rig, a process that also had to be repeated to put the car back to standard.

It was just as effective in terms of performance, but nowhere near as convenient for the customer. But where









there's a will there's a way and rather than see the Bluefin concept remain underutilised – after a lot of investigation and development – Superchips have finally cracked the complex codes involved and can now map all the most recent models through the OBD port again. Bluefin is back.

To prove the point, we recently visited Superchips HQ to drive a 2014 (63-reg) A3 Sportback S-line 2.0 TDI, powered by the CRBC series 1968 cc turbocharged 16-valve common-rail TDI engine, with Bosch EDC 17C64 engine management. It's essentially the same long-stroke (81.0 by 95.5 mm) 2.0 TDI unit that is used in the MQB Mk 7 Golf and SEAT Leon. In standard form, this engine is officially rated at 110 kW (150 PS/148 bhp) at 3500 rpm, with a maximum torque figure of 320 Nm (236 lb.ft.) between 1750 and 3000 rpm.

It's always interesting to examine the before and after power plots for any re-map. Even allowing for the minor discrepancies between PS and bhp when measuring the car in standard form, Superchips often find that the standard engine produces higher than the factory figures; in this case, the A3 2.0 TDI was recorded at 159 bhp at 4013 rpm and 339 Nm at 2708 rpm.

With the high-performance Superchips map installed, now by Bluefin, the most noticeable increase in power comes from about 1750 rpm, when the power and torques curves simply swell and rise on the vertical axes. Much more power and torque is produced at exactly the same engine speeds, rather than the curves being shifted up the rev range in the search for 'headline' figures wrung out at the red line. Indeed, it's significant that those maximum figures – now 184 bhp and 420 Nm – are produced

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#### 'The subjective impression when driving the modified car is of 'the same but much better'

at slightly lower engine speeds than the standard mapping.

And the improvement in power claimed by Superchips, in this case by 31 bhp and 85 Nm, is based on that initial recorded figure, rather than related to the more modest factory figure - a sleight of hand that is used by some tuning companies to exaggerate the actual improvement achieved.

Clearly, from the conservative shape of the curves, these improvements in power and torque are aimed more at improving the overall driveability, performance and response in normal road use, rather than any intention to turn the car into a fire-breathing monster. The subjective impression when driving the modified car is of 'the same but much better', or to draw a parallel with the current promotion for a health-enhancing product: 'like you, but on a really good day'!

Unfortunately, ambient conditions weren't conducive to a full before and after performance test, with cold wet and slippery roads in mid-November thwarting any attempt at accurate standing-start acceleration tests, even with the car in standard form.

Comparing the in-gear acceleration times, though, shows a measurable improvement, particularly in the higher gears; with the Bluefin knocking nearly two seconds off the 50 to 70 mph time in sixth gear, for instance. That might not seem all that significant on paper, but in the real world it produces a very useful improvement in response and road speed – when encountering a long ascent, driving into strong headwinds or changing lanes in busy motorway traffic, for instance.

Neither did a half a day driving the car give a real opportunity to scientifically compare fuel consumption figures, before

and after Bluefin, but previous experience suggests that – driven accordingly, using the improved torque and tractability to achieve the same road speed in a higher gear - the modified car can maintain and often improve its performance in terms of miles per gallon.

So, the good news is that the Bluefin system is now available again for virtually the whole range of Volkswagen Group vehicles, enabling the customer to carry out the conversion themselves and enjoy the enhanced performance and tractability - also perhaps even improving the fuel economy - with the option to just as easily remove the modified mapping whenever the need arises...

#### **Performance figures** (in-gear acceleration) Audi A3 Sportback 2.0 TDI 150

	Standard car	With Superchips Bluefin
30-50 mph ( 3rd gear)	4.3	3.6
30-50 mph (4th gear)	6.5	5.1
50-70 mph (3rd gear)	4.6	3.9
50-70 mph (4th gear)	6.0	5.3
50-70 mph (5th gear)	7.8	6.5
50-70 mph (6th gear)	10.7	8.9



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#### 'Comparing the in-gear acceleration times shows a measurable improvement, particularly in the higher gears...'





## Oblique View ROBERT COULDWELL

# How does the Q5 stack up against the Porsche Macan?

WITHOUT PORSCHE, Audi and, to a lesser extent, Škoda, the Volkswagen Group would be in some difficulty. Porsche, in particular, makes huge profits, despite sales of just 162,145 in 2013. In fact, Porsche makes more profit per car than any manufacturer in the world. On turnover of  $\ensuremath{\in} 14$  billion it made an incredible  $\ensuremath{\in} 2.6$  billion nett profit, almost the same as the Volkswagen brand that produced 7.7 million cars.

Porsche's profitability has increased substantially since it became part of the Volkswagen Group, thanks to shared development. The Cayenne is based on the VW Touareg, and the Macan on the Audi Q5. It is likely that all Porsche models in future will be jointly developed with Audi, which can only improve the profitability of Porsche and the dynamic qualities of Audis.

Like its sister, the Q5, the Macan has been a huge success and it is said that Porsche received 50,000 orders even before its launch. There is now a 12-month waiting list.

The Macan is currently available with a choice of one four-cylinder and three six-cylinder petrol engines, and 3.0-litre diesel, and a petrol hybrid is on the way. It would appear that Porsche has attempted to avoid too many direct comparisons with the Q5 which has no 3-litre petrol engine and uses a diesel for its 'hot' model, the SQ5, against the 3.6 turbo petrol of the Macan. A direct performance comparison between the Macan Turbo and the SQ5 would be interesting for, while the Macan can get to 62 mph in 4.6 seconds against 5.1 for the SQ5, the Audi produces a stump-pulling 650 Nm of torque against just 550 for the Macan, which would probably make the Audi faster point-to-point.

Unusually, the Macan S diesel is the same price as its petrol equivalent, at £43,648, which sets it against the Q5 S line Plus at £43,270. That must cause Audi executives some concern. Thanks to the Porsche name, the dynamic qualities of the Macan and its long waiting list, it has even better residual values than the Q5, resulting in lower running costs, 45.9 pence per mile against 51.39 for the Audi, according to trade guide  $CAP\ Monitor$ . That doesn't sound a big difference but represents £3,240 over three years and 60,000 miles.

The Macan uses Audi's 3-litre diesel with the same torque output, but another 13 PS, resulting in an extra 3 mph and 0-62 mph in 6.3 seconds against the Q5's 6.5. In view of the extra performance, it is surprising that the Macan is slightly more economical, with lower emissions. Considering that the Macan is based on the Q5, it is also surprising that it is nearly  $100~\rm kg$  heavier than the Audi.

When Porsche launched its first SUV, the Cayenne, the engineers were determined that at least their critics couldn't say the new car wasn't a proper Porsche in terms of driving responses. It had to perform and handle like a Porsche and it did, despite the extra weight and length. The same ethos has been applied to the Macan which, thanks to its smaller size and lower centre of gravity, handles even better. It is amazing that Porsche can basically take a Q5, which is already highly developed, and transform its dynamic qualities.



# Like its sister, the Q5, the Macan has been a huge success and it is said that Porsche received 50,000 orders even before its launch...'

As you would expect from Porsche, the Macan is beautifully built and is a wonderful place in which to sit. If I owned one I can imagine creeping into the garage at night to sit in the car and listen to the wonderful sound system – Wagner would be particularly appropriate. It is extremely well-equipped and the Macan S includes 18-inch alloy wheels; automatic rear hatch; multi-function steering wheel with gearshift paddles; Alcantara upholstery; electrically adjustable front seats; bi-xenon headlights; two-zone climate control, electrically folding mirrors and automatic wipers.

The Q5 is a finely engineered, beautifully built and furnished SUV, but can only come second to the Macan because of the Porsche pedigree, its superior dynamic qualities and the more exciting interior and, all for the same price. Porsche could easily charge £10,000 more!

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# Introducing Project TT quattro Sport

**Andrew Chapple** outlines the background and sketches out his plans for an ongoing project with this recently-acquired TT quattro Sport...



IT'S SYMBOLIC of the success of Audi Driver International, organised by the publishers of this magazine, that inspiration for this project came from this event. Taking place in the autumn, it is perfectly timed to help decide what to spend your spare time on during the dark days of winter while daydreaming about long summer evenings enjoying the fruits of your labours...

Another benefit of its late season timing is that the used car market usually takes a significant drop in the two months leading

'Standing on the banking at Camp Corner during Audi Driver International, watching the specially organised track session just for TT owners proved inspiring – the plan was hatched...'

up to Christmas and there can be rich pickings to be had, especially on the more interesting cars in the Audi range which tend to have greater demand during the seven months when British Summer Time is in force.

That's how I found myself in Macclesfield on Saturday, November 1, casting my eye over an early example of the Series 1 Audi TT quattro Sport, and not for the first time. In the late summer I'd been instructed by a retired gentleman to find him a Mk 1 Audi TT to replace his Mk 4 Golf R32 and I eventually convinced him that finding one of the 800 quattro Sport 240 models imported to the UK would be well worth the effort, so I placed a wanted advert in the classifieds pages of the *Pistonheads* website.

This came up trumps within a few weeks, with a lovely low-mileage example bought from a retired Major in Hampshire and the experience of driving it back to Birmingham reminded me how much I'd liked the quattro Sport in the past, when I'd sampled the few examples I'd sold previously. So, standing on the banking at Castle Combe's Camp Corner during Audi Driver International,

watching the specially organised track session just for TT owners proved inspiring – the plan was hatched, so that I could be part of that in 2015.

I decided to leave the Wanted advert online and within a matter of days I received a call from a gentleman in Macclesfield who'd had his quattro Sport for five years, having purchased it from his local Audi main dealership at four years old when he became its third owner. Now with 91,000 miles, I wouldn't need to be too precious over it, and instead of the no-cost option standard seats, it had the more desirable Recaro Pole Position bucket seats, which made it ideal for track use.

All I needed to do was find out if it was one of those cars where the condition is better than the high mileage and therefore low price would suggest; after all, there's very little reason why a high-mileage car should be that much worse than a low-mileage car of similar age, and at this age and mileage the car may have had more remedial work carried out than fresher cars which still have it all to come. It's quite a common syndrome for an owner to get













### 'It transpired that the owner hadn't realised that the rear wheels were wider than the fronts...'

fed up fixing things and then lose patience and sell a car, when in fact they've fixed everything that was going to go wrong it's the new owner that benefits!

First impressions were excellent, with the Mauritius blue paintwork gleaming in the autumn sunlight, but something wasn't quite right with the way it looked. My suspicions had already been aroused by some photos e-mailed over by the owner, where the car didn't seem to have the unique quattro Sport stance produced by the rear wheels being slightly wider than the fronts.

I queried this and was told that the wheels were all original, but on physically seeing the car something was clearly wrong. It transpired that the owner hadn't realised that the rear wheels were wider than the fronts, an easy mistake, given that the tyres are the same size all round. As a result, he thought nothing of swapping them front to rear to equalise tyre wear, but – to confuse matters even further – he'd purchased what he thought was an original wheel from an internet auction site, to

allow him to get a wheel refurbished. This wheel turned out to be a non-original replica, which was the same width as the narrower front wheels, but the curve of the spokes from the rim to centre was noticeably less prominent, especially when fitted to the rear of the car. Luckily, the original front wheel was still in his garage and was now to be included in the sale.

Apart from that, aesthetically the rest of the car was very impressive. Even with a keen eye, it's always a good idea to ask an owner if any bodywork repairs have ever been carried out and he pointed out an area on the driver's door that had developed a rust spot. Audi had repaired this free of charge, under the 12-year anti-corrosion warranty, although the quality of the repair wasn't to a particularly high standard.

Nevertheless, the rest of the car more than made up for this and after a brief test drive I could only criticise the excessive road noise, for which I initially blamed the stripped-out interior. It later transpired to be due to the worn Toyo Proxes T1 Sport tyres on the rear, which had become distorted

on their inner edge. It was not exactly a deal breaker, so I promptly paid the price I'd agreed in advance and headed back to base.

There is something quite special about being behind the wheel of a quattro Sport, especially when held tight by those somewhat impractical but truly gorgeous lightweight bucket seats with their body-coloured backs and the somewhat superfluous grip-enhancing Alcantara cushions simply attached by velcro to the seat shell. Alcantara continues on the steering wheel, gearknob and handbrake, to continue the track-prepared theme, the quattro GmbH engineers no doubt being inspired by the 911 GT3 produced literally 'down the road' in Stuttgart.

However, the most important enhancement over the standard 225 model for me is how the turbocharger goes about its business. A TT 225 is no slouch, but the engine responds smoothly and progressively, no doubt to maintain the

'There is something quite special about being behind the wheel of a quattro Sport...'





### 'Top priority has to go to safety and roadworthiness-related issues such as brakes and tyres, followed by dealing with any mechanical issues...'

appeal to a broad audience. Thanks to what is effectively a factory applied 're-map' the higher-powered quattro Sport is somewhat different, with a more punchy power delivery and a little bit more lag, which only makes progress more exciting, especially when coupled to revised gear ratios.

And 'my' quattro Sport is still exciting, even just short of its 10th birthday, but it wasn't going to be perfect at this age. Lest we forget, it wasn't so long ago that the government deemed cars eligible for the aborted 'scrappage scheme' after 10 years of service, so even with its full Audi service history a few jobs are to be expected.

Top priority has to go to safety and roadworthiness-related issues such as brakes and tyres, followed by dealing with any mechanical issues. These can be divided into two groups; attending to existing faults and prevention of others – the 225 PS 1.8-litre 20-valve turbo engine has proven to be one of Audi's most durable units, but with so much power being produced from such a small engine it's important that everything is working correctly, especially if future track use is envisaged.

Somewhat further down the list of priorities comes attention to any cosmetic issues, and performing modifications,

although if a particular part is worn-out and can be replaced with something better then it would be foolish not to replace and upgrade simultaneously.

Hopefully, by the end of this process, we should have a TT that can handle the 1200-mile round trip to the Nurburgring in relative refinement, and then notch up some hard-driven track time, safely and reliably – that original target of some track time at Audi Driver International 2015 should be a breeze in comparison!



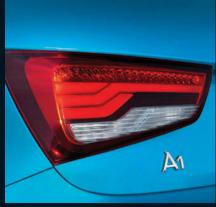


**NEW MODEL - REVISED A1/A1 SPORTBACK** 

# Ultra compact

**Paul Harris** takes a look at the revised A1...







### 'The biggest changes for the A1 apply to the engine range and there are now two ultra models...'

SINCE PRODUCTION started at the Brussels factory in 2010, more than half a million A1s have been built. This model, although more expensive than most of its competitors, has been extremely successful because it allows entry to the Audi brand at a relatively modest price. The A1 may be compact, but the design and build quality is of a high standard.

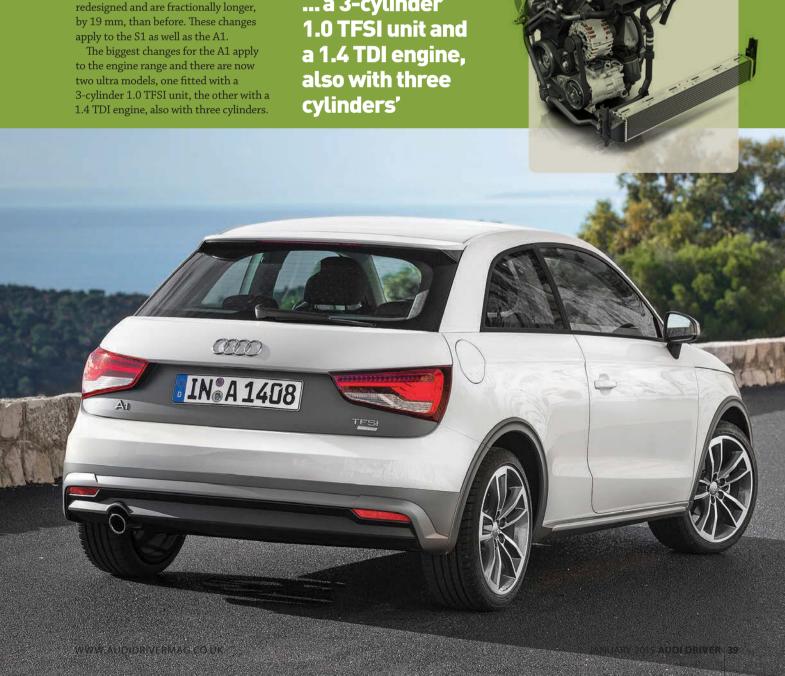
Now a general facelift has taken place, the main emphasis being on a new or revised range of powerplants, but there are also alterations to the appearance of the A1 and A1 Sportback. The front grille is wider and flatter, while the headlamp units, and the rear lamps, have been reshaped. The bumpers have also been redesigned and are fractionally longer,

The 1.0 TFSI has an actual displacement of 999 cc and develops 95 PS (70 kW), with maximum torque of 160 Nm (118 lb.ft.). This is a very light engine, with an aluminium crankcase, and, in basic form, it weighs just 88 kg (194 lb.).

The 3-cylinder 1.4 TDI develops 90 PS (66 kW), with maximum torque of 230 Nm (170 lb.ft.). This unit, too, has an aluminium crankcase and is very light and, with common-rail injection at 2,000 bar, it will be extremely economical.

Further engines are two versions of the 1.4-litre TFSI, one developing 125 PS while the other, with cylinder on demand

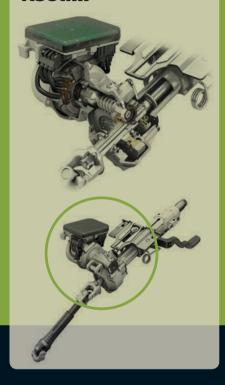
'... a 3-cylinder 1.0 TFSI unit and a 1.4 TDI engine, also with three







# 'A new feature is electromechanical steering, with its electric motor mounted on the steering column itself...'









technology, develops 150 PS. There is one 4-cylinder TDI engine, the 1.6, with an output of 116 PS (85 kW) and maximum torque of 250 Nm (184 lb. ft.).

The most powerful engine being offered for the new A1 is the 1.8 TFSI, developing 192 PS (141 kW), with maximum torque of 250 Nm (184 lb.ft.). With this amount of power, it gives the A1 very brisk performance, with a 0-62 mph time of 6.8 seconds. S tronic will be standard for the 1.8 TFSI, and will be an option for other models. With this gearbox, Hill Hold Assist will be a standard feature, a welcome introduction.

Interestingly, this is the same engine which is being fitted to the new VW Polo GTI but, in that case, both manual and DSG gearboxes are available, with Volkswagen reckoning that most buyers will go for the manual 'box.

The 1.0 and the two TDI engines are mated to 5-ratio manual gearboxes, while other models have a 6-ratio manual box.

A new feature is electromechanical steering, with its electric motor mounted on the steering column itself. It has quite a direct steering ratio of 14.8:1 and the power assistance gradually decreases with increasing speed. The new steering system

is lightweight and consumes less energy for its drive than the previous system. The turning circle measures 10.6 metres

(34.8 ft).

No less than 16 different wheel designs will be available for the A1, seven of which are new. Wheel sizes range from 15 to 17-inches, the larger wheels being fitted with 215/40 tyres. There is also an 18-inch wheel, from quattro GmbH, which is fitted with 225/35 tyres. The front ventilated brake discs have diameters of 256 or 310 mm, depending on the engine output, while the rear discs measure 230 mm.

Drive Select will be available on some models and, as an option, adjustable shock absorbers can be fitted, controlled by the Drive Select system.

All the changes also apply to the S1 and S1 Sportback. We had hoped that an S tronic transmission would be offered for this model, but it continues to be fitted with a 6-ratio manual box, without an automatic alternative.

The A1 has been particularly successful in the British market and these changes, particularly the introduction of the ultra models with their energy efficient engines, will make them even more popular



IN LUC BESSON'S spectacular sci-fi movie, *The Fifth Element*, set in 2263, Bruce Willis' character, Korben Dallas, is a New York City cab driver in a world where autonomous flying cars are everyday transport.

The Fifth Element was released in 1997 and, 17 years on, we are still a very long way from such a scenario. But be in no doubt that the motor industry has already taken its first tentative steps towards autonomous driving cars.

Today, I am at the Ascari Race Resort near Ronda, in southern Spain, for a passenger ride in the Audi RS 7 Piloted Driving Concept car, nicknamed 'Bobby'. The aim of this exercise is to show that it is possible, even at this relatively early stage of piloted driving technology, for a car to be programmed to drive itself around a given race circuit almost as rapidly as a professional race driver.

The 'almost' is significant, as the engineers told me they naturally have to conserve their precious prototypes, so hanging it all out right on the very limit is not part of today's demonstration.

First, though, we were given an initial 'proof of life' demonstration, with the driverless Bobby concept car set up to accelerate away from rest on the main straight, traverse the chicane at the end, and carry on for a couple of bends before returning to the pits.

While a human 'pilot' stood trackside with a remote control device, not unlike the advanced remote control used by model aircraft enthusiasts, the amount of support Audi has in place for safety reasons is formidable.

'We could do a complete lap of the 5.4-km track, but we simply do not have enough staff here to monitor this. So we are only covering a short stretch of track, with no-one on board,' explained lead project engineer Thomas Müller.

Later, with an engineer in the driver's seat purely as a precaution, we each had the opportunity for a passenger ride round the track. As Ascari is my home circuit, I was able to judge the mapped lines and gearshift points, and was amazed at just how quickly and smoothly Bobby negotiated this demanding track, with its various level changes.

As Thomas said, Bobby was not out to break the lap record, but the way the steering spookily turned in to bends, taking the ideal line from kerb to kerb and braking late and progressively, just as a professional driver would, was astounding, and has to be experienced to be believed.

I also noticed just how late and strongly the computer braked the car, moving into the ABS activation zone in some instances, just as a professional driver would.

'This depends on the friction level of the road surface, and the value the computer assesses in this case is not the brake pressure but rather the g-force,' Thomas explained. 'Given an optimum road surface, the ceramic brake equipped RS 7 can generate a peak braking force of minus 1.3 g, with a build-up line pressure of 150 bar/sec.'

What is also immediately apparent, though, is that Bobby had been programmed to hold back from the limit. I noticed the computer shortshifting from second to third gear on the straights after exiting from a couple of bends. Anyone familiar with this track would normally rev the engine to the red-line for maximum slingshot effect and terminal velocity at the end of the straights.

'The way the steering spookily turned in to bends, taking the ideal line from kerb to kerb and braking late and progressively, has to be experienced to be believed...'



In the event, the lap times made for interesting reading as each of us had the possibility to do a lap in a standard RS 7, before setting a 'Banzai' lap to be bench-marked against Bobby.

Bobby's benchmark lap time was around 2 min 14.0 sec for the longer 4.0-km section of this 5.4-km circuit, which had been divided into two for this event. On the day, most of the participants managed around 2 min 12.0 sec, a whole 2.0 seconds quicker than the robot pilot.

The fastest human driver was Guido Naumann, the chief road-tester and pro race driver, from Germany's *Auto Bild Sportscars* magazine, who set a blistering 2 min 04.30 sec time in the morning session. This was a spectacular 10 seconds faster than Bobby.

As I didn't have a plane to catch, I was allocated the final slot of the day, in the afternoon, but the changeable December weather decided to play foul and dumped rain on the track just before my turn to battle the stopwatch. I was not best pleased, and experienced lots of understeer and oversteer in the slippery conditions, cursing the rain as I manhandled the big, heavy RS 7 around the track.

Returning to the pits, I was convinced that my untidy lap would result in an equally untidy lap time, and was very surprised when the digital readout announced a lap time of 2 min 09.53 sec. The chief instructor explained that as a wet lap

### 'I was curious about how long it will be before we can actually buy a car that really can drive itself...'

is about five seconds slower, this translated to around 2 min 4.53 sec in the dry, so I was not unhappy in the end.

Audi did not just set one lap time for Bobby. The engineers went to the trouble of sending him out after every participant, to prove that the computer was also capable of very consistent lap times. Looking at the results, it was clear that Bobby could regularly set lap times within around 0.2 sec, which is the sort of level of consistency you'd expect of a top drawer professional driver.

Interestingly, the rain I experienced during my session threw a spanner in the computer's speed works. The system uses the car's sensors to detect slip, and its self-preservation protocols backed right off in the rain, resulting in a 2 min 23.6 sec lap time. As Thomas said, Bobby is a precious prototype!

Back in the pits, I had the chance to speak with Thomas, in great depth, about Audi's RS 7 Piloted Driving project, which was first demonstrated in

this form at the last DTM meeting of the 2014 season at Hockenheim, back in October.

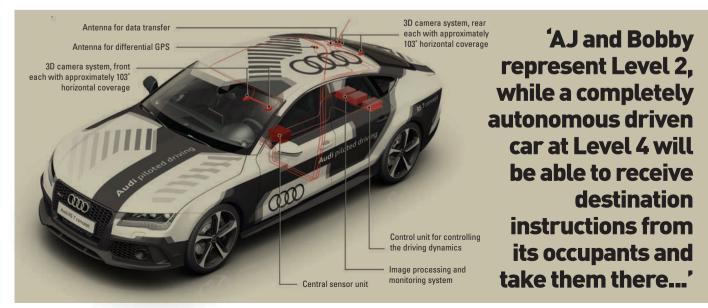
First off, I asked Thomas why the two prototypes were called AJ and Bobby. 'Bobby is a US-spec RS 7 that we named after the famous US racing driver Bobby Unser, while AJ was not only the letters that come after the IN (Ingolstadt) on the German-spec RS 7's licence plate, but also referred to the racer A.J. Foyt' he explained.

'We find that having names for the cars is good, because it helps us to build personal relationships with the cars,' said Thomas. 'For instance, when the car comes back by itself after a test session, we pat the roof and say, 'Good job Bobby!'

I was curious about what kicked off the Piloted Driving programme, where it is going, and how long it will be before we can actually buy a car that really can drive itself in all the scenarios people would require.

"The SAE in America has mapped out four levels of competence for Piloted Driving. AJ and Bobby represent Level 2, while a completely autonomous driven car at Level 4 will be able to receive destination instructions from its occupants and take them there', Thomas explained.

'However, it will still have a manual-over-ride capability so that a human driver can take over, while Level 5 uses exactly the same technology, but is a totally autonomous car with no manual over-ride possibility.'









'The systems constantly test themselves with check sums, and if the numbers don't add up, the system is deactivated for safety reasons...'

"The reality is that we will not achieve Level 4 for maybe another 20 or 30 years,' said Thomas. 'While the rapidly advancing speed and capability of computers will allow the technology to mature quite rapidly, there are many other issues surrounding it that make the practical implementation a steep uphill battle.'

"The biggest of these is worldwide legislation,' he explained. 'While California has already passed legislation that allows such technology on its roads, we still have a long way to go elsewhere. The issue of liability alone in case of an accident is a veritable minefield.'

Where aircraft require triple redundancy in their systems, as a car operates in two-dimensions, it only requires double redundancy for the power, braking and positioning systems, which are GPS and camera-based.

The systems constantly test themselves with check sums, and if the numbers don't add up, the system is deactivated for safety reasons, a red light goes on and a warning buzzer sounds, so that the driver has to take over.

#### Rationale & Technology

'THE CRUX of the idea is like the auto pilot on board an aircraft,' said Thomas. 'The pilot is still there to set the destination and monitor the flight, and can take over again if needs be.'

'However, there are mundane tasks like driving in traffic jams in the city or on the motorway, which can be given to an autonomous driving car so that the driver can get on with more productive tasks such as making phone calls, doing work on a laptop or tablet, or even watching a movie.'

When you consider how much of people's lives are wasted in traffic jams, both in terms of lost work productivity and leisure time, the case for autonomous driving practically makes itself.

'There are some aspects of driving which are no fun, no matter how much you like cars,' he continued. 'Driving along a motorway within a low speed limit for miles on end is one of these uninspiring tasks that can be given to a machine that will not lose concentration and crash due to boredom and inattention.'

'At Audi, we are very conscious of driving fun and will always give the driver the possibility to take over and experience driving pleasure as we know it today,' said Thomas. 'Thus, we will always consider Piloted Driving as a driver support system and not as a total replacement for human beings.'

While Google may have been the first to test a pilotless car on public roads, Audi was the first car manufacturer to do so, having obtained a special licence from the State of Nevada to do so in 2013

The car used for this test instantly became known as 'The Bond Car' as the Licence prefix issued by Nevada's DMV for autonomous driving cars is AU, and the number issued was 007!

Audi has a lot of experience with the high-speed autonomous driving cars, having established a 210 kph (130.5 mph) speed record for driverless cars, and sent one up Pike's Peak in 2010.

There are many aspects to Piloted Driving, and many of these are speed related. It is one thing to guide a car through a busy urban situation, quite another to control it on the limit in a high-speed situation.

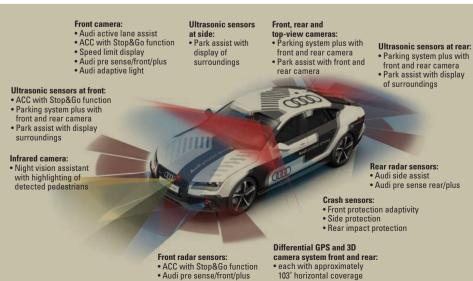
"The latter is the reason why we have done so much race track work on AJ and Bobby', Thomas explained, 'and we are working with other prototypes for urban scenarios.

'For the demonstration you experienced here today, we wanted to show that you need a high level of competence to drive at the limit. The computer would never change lane while steering and braking, because the street is longer than it is wide and you need to control the car without ever making it unstable.'

'The computer has to think two steps ahead, which is why the speed of the sensors and the computer programming have to be very fast and well resolved,' he said. 'In that respect, driving in urban traffic is much easier because the relative speed of everything is slower and more predictable.'

In both cases, the Piloted Driving equipment is piggybacked on existing technology, which itself is improving step-by-step with each generation of production cars.

'In the 1980s, we had cruise control, then we progressed to adaptive cruise control with Stop-Go functions that can accelerate and brake to and from a set speed according to the pace set by the car in front,' Thomas explained. 'This has also now been linked up with autonomous braking and other functions, and the sensors from these



'The computer has
to think two steps
ahead, which is
why the speed of
the sensors and
the computer
programming have
to be very fast and
well resolved...'

Thomas Müller



current production technologies are incorporated into our Piloted Driving concept cars with some additions'

A racing driver knows the precise line he has to take for the best speed through a given corner. However, as civilian GPS is not precise enough to guide a car to within a couple of inches, Audi has to use correction data to improve the accuracy of their on-board GPS systems.

For track driving, the way things are set up, you first need a path around the circuit. Some of us assumed that a professional driver sets up the perfect lines, which are then programmed into the computer.

"This is not the case at all, and what we have here is a mathematical model where the outside limits of the track are plotted, and the computer calculates the fastest way round while incorporating its risk mitigation strategy," Thomas explained.

The drive around Ascari, for instance, required the engineers to map the track, which took two

days in itself. 'Our team then went home and applied the algorithms they developed over the last two years, which checks all possible paths with regard to position and speed and comes up with what it thinks is the ideal line,' Thomas explained. 'We came back three weeks later to fine-tune everything before we were happy we could run this demonstration event perfectly.'

I was told that the reason Bobby backed off when it started to rain is that the system does not (yet!) have the capability to assess the grip levels of the road surface in real time, and so the computer engaged its safety protocols when it detected the slippery surface.

When Piloted Driving technology is finally perfected, our quality of life will improve, since spending hours in traffic jams is both unproductive and soul-destroying, and is far better spent on other activities. However, you can be sure that one aspect of driving cherished by car enthusiasts all over the world will never be touched by this new technology – competition...

'Motorsport is as much about drivers and personalities as it is about the cars, and this is the reason why there is no point whatsoever in having race cars with Piloted Driving technology,' said Thomas.

'When Piloted Driving technology is finally perfected, our quality of life will improve, since spending hours in traffic jams is both unproductive and soul-destroying...'



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RBP361	A3 SPORTBACK 5 € 8.2004>5.2008
RBP362	A3/S3 SPORTBACK 5 € 6.2008>3.2013
RBP158	A4 4 12.2007 > 1.2012 (NOT \$4)
RBP462	A4 AVANT/ESTATE/S-LINE 9.2004>3.2008 (NOT \$4)
RBP159	A4 AVANT/ESTATE/S-LINE 4.2008>1.2012 (NOT \$4)
RBP566	A4 AVANT/ESTATE/S-LINE 2.2012> (NOT S4)
RBP341	A6 AVANT/ESTATE/S-LINE/ALLROAD 11.2004>8.2011 (NOT RS/S6)
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IN RECENT YEARS, manufacturers have rushed to bring pure electric and hybrid cars to the market place, but Audi's involvement with electric vehicles goes back much further than this. A series of concept and production models, all called Duo, were launched during the early '90s, but none of them went into full-scale production.

As is so often the case with the Volkswagen Group, the development of new models is not rushed and so it is only now that we have a model, the A3 Sportback e-tron, which ticks all the right boxes. It has electric power which enables you to drive silently and economically when required, a combustion engine which will ensure that you are never going to be stranded with a flat battery and which can be used in conjunction with the battery to give good performance, and a plug-in facility which means that you can charge it at home or at



### 'To look at, you wouldn't think that the A3 Sportback e-tron is different to any other A3 Sportback...'

one of the increasing number of charging points which are being set up around the country.

We've already seen and tested hybrid versions of the A6 and the A8, but no-one at Audi would suggest that these were cars which were going to have mass appeal. Now, though, the car which is probably the company's most successful current vehicle, the A3 Sportback, is available with plug-in hybrid drive.



To look at, you wouldn't think that the A3 Sportback e-tron is different to any other A3 Sportback. True, there is a little more brightwork on the grille, the wheels are special to this model, and there are e-tron badges on the tail and flanks, but that is where the visual differences end. The first batch of cars did have big A3 e-tron graphics on each side, but this won't be a feature of the regular production models.

And, when you sit inside the e-tron for the first time, very little appears different. The tachometer is replaced by a power meter which gives you plenty of information about how the power units are behaving, and there is an EV switch on the facia which allows you to choose which mode you wish to drive it, but that is about all.

The A3 Sportback e-tron has two power units, a 1.4-litre petrol engine which develops 150 PS, and an electric motor



which develops 75 kW. The total power available is 204 PS, fed through a 6-ratio S tronic gearbox to the front wheels.

All A3 e-trons have the advanced key system and you simply press the Start button when you want to move away. That will demonstrate the first major difference to a conventional A3 – nothing seems to happen. Well, actually it does, the power meter lighting up to show that electric power is available and, when you press the accelerator pedal, the car moves away almost silently, using only the electric motor.

Once under way, you have choices, which are displayed via the MMI system with its normally concealed central display screen. You can continue to drive on electric power alone (providing the battery has enough charge) and, if you suddenly need extra power, kicking down the pedal will cut in the combustion engine. A second choice is the Auto mode where both motor and engine are used either alone or together, under the control of the ECU. A third option allows you to maintain the voltage



of the battery so that it is fully available for pure electric driving later, while the fourth option is to ensure that the battery is being charged by the engine as you drive along.

The battery consists of 96 lithium-ion cells. It is guaranteed for eight years and the cells can be replaced individually if this becomes necessary. The battery is quite heavy, increasing the weight of the e-tron by 220 lb (125 kg), and it is fitted in a protective housing beneath the rear seat.

Needless to say, the battery pack and the electric motor have a substantial effect on the weight of the e-tron, but the combination of combustion and electric

'In theory, it can go for up to 31 miles simply using electric power, at speeds up to 80 mph...'



power means that the performance, in terms of acceleration and general driveability, is just as good as the average A3 Sportback. You do notice one or two small points when you are driving it: when the car is running on the programme which also charges the battery, the amount of slowing when you take your foot of the accelerator is more noticeable. We felt that the brakes needed a little more pressure than usual, but this is linked to the extra weight of the e-tron.

As well as some general driving across the wonderful country to the west of Darlington, and along the delightful A689 across Weardale, we also carried out a driving exercise on the busy roads around Newcastle, finding out just how far the A3 Sportback e-tron could travel on battery power alone. In theory, it can go for up to 31 miles simply using electric power at speeds up to 80 mph, but this is very dependent on traffic conditions and the geography of the area. We only had to cover 14 miles, but, as we pulled away, we realised that the











battery only had enough charge for 13 miles. That should have meant that, by the end of the course, the control unit would have switched the car back to combustion mode, but we discovered that coasting can be just as effective in an e-tron as it is for any conventional Audi. By selecting neutral whenever possible, and using plenty of anticipation, we were able to cover the 14 miles on battery power alone.

There are really no drawbacks with the A3 Sportback e-tron. The space for people and luggage is no worse than with the conventional versions of the A3, it performs briskly when you want it, with quite enough power to overtake slow-moving traffic and, like all the current A3s, it demonstrates a nice blend of ride comfort and sharp handling.

So, what justifies the extra cost, because you have to realise that the complexity of the power train adds quite a bit to the price? It has now been agreed that each A3 Sportback e-tron is eligible to receive a government subsidy of £5,000 and this

brings the on-the-road price down to £29,950. That is still quite a bit to pay when you compare the e-tron with other A3s, but don't forget that, in EV mode, the cost of travelling is very low in comparison. If your driving was such that the combustion engine was hardly ever used, filling the tank with petrol would be a rare occurrence and the cost would be down to how much of your domestic electricity you would be using while the car was being charged up. For official rating purposes, the combined fuel consumption value is 176.6 mpg and the CO<sub>2</sub> emission figure is 37 g/km. In real life, these values will depend entirely on how the car is used, and it might be possible to achieve an even lower consumption of petrol. You also save in terms of road tax, benefit in kind, and congestion charging.

The specification of the e-tron includes LED headlamps and rear lamps, 17-inch wheels with low rolling resistance 225/45 tyres, light and rain sensors, MMI Navigation Plus, and rear parking sensors. And, in the boot, you will find a lead which

allows you to plug it in to electricity supply points, the business end plugging into a socket revealed when you move the front grille badge to one side. With normal mains supply, it should take four hours to fully charge the battery, while a special wall box supply system reduces this to two hours fifteen minutes.

Is it worth investing in an A3 Sportback e-tron? It is an expensive vehicle because of its complexity and you have to weigh up running costs against the outlay. You may well find that one of Audi's ultra TDIs will be less expensive to run if you do a lot of long-distance motoring, but there is one particular type of driver for whom the e-tron will be a good purchase. If you use your car largely for short-distance commuting and can run it on electric power nearly all the time, it is clear that your running costs can be kept down. If, however, your driving will involve using the combustion engine for a substantial amount of the time, it is worth thinking about what the alternatives are.





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### Simply the best!

Across Europe and the whole world, Audi Sport Customer Racing has had a fabulous season to look back on. But how did it all begin? Romolo Liebchen, Head of Audi Sport Customer Racing, has been one of the main proponents of the R8 in competition and, with the introduction of the TT Cup this year, the sport will open up even further, as **Susanne Roeder** reports.

AUDI'S R8 supercar came, saw and conquered racetracks all over the world. In little more than six years, Audi Sport customer racing has become a force to be reckoned with, snatching 26 Championships, 240 victories, and 700 podium places, from more than 1000 race entries. Without a shadow of a doubt, this is proof that the R8 LMS is one of the best GT3 cars out there, and also one of the most popular racecars. "I think I can safely say that no other carmaker has built more GT3 cars," Romolo Liebchen hastens to add.

Romolo used to be a typical engineer, quiet and dedicated to his work. He still is, but these days he can no longer withdraw completely into the back room, and has had to get used to answering journalists' questions. He has no one else to blame for this but himself, as he was the one who came up with the idea of the R8 entering the racing arena.

Up to that point, Audi Sport had been committed purely to professional racing. Motorsport boss Dr. Wolfgang Ullrich and his team engaged in sports prototype racing in the Le Mans Prototype Series and in single races like Sebring, as well as the American Le Mans Series (ALMS). Originally run by the International Motorsports Association (IMSA), this latter series has



more recently been merged into the United SportsCar Championship. On a European level, Audi Sport re-entered the Deutsche Tourenwagen Masters, or DTM, in 2004.

The biggest departure from this pure pursuit of international level works sportscar racing came in 2008, when Audi AG decided to branch out into customer racing, using a car closely related to their mid-engined supercar. This was the R8 LMS.

So how did this happen? "When we developed the R8 road car, it was crystal clear to me that this car would find its place in motor racing. This is what spurred me on," Liebchen recalls. He set out to find support for his idea, and quickly succeeded.

Once Audi AG decided to embark on a customer racing programme, an internal organisation was quickly formed to cover the entire process chain, from development to production, through sales, customer service, spare parts logistics, to marketing. In some cases, this even included entering factory works cars and drivers for prestigious races like the 24 hours of Spa or the 24 hours of Nürburgring.

"If we were going to establish customer racing, we wanted to do it professionally, to give us the best chance to produce good results," said Liebchen, describing Audi's total commitment to the programme.

Within a year of Audi AG committing itself to customer racing, the team around Liebchen had 12 customer-owned R8s, which they were contracted to service for European races. The idea quickly caught on, attracting followers all over the world. Step by step, Asia, Australia, Japan and America joined in with their own customer teams,





keen to enter championships in their home countries and elsewhere.

"The next step took us to America, where we built up partners," Liebchen recounts. Nowadays, Audi Sport customer racing is supported by the national Audi sales organisations in China and America. This means that Audi Sport Customer Racing China and Audi Sport Customer Racing North America have been set up on their own initiative, and racing there is hosted by the national sales organisations. It is also via these national sales organisations that Audi Sport Customer Racing sends vehicles to these markets and has them serviced by their partners.

In Japan and Australia, on the other hand, customer racing is organised and serviced through private partners not directly linked to Audi AG. The entire European Market, however, is taken care of by Headquarters.

Looking back on the past six years, the 54-year-old engineer has every reason to be satisfied with the way customer racing has developed. "Out of the 132 R8 LMS cars we have built so far, 120 are customerowned. The other cars are used by us, either

for development purposes, training or for races in which we determine everything ourselves," he said.

This year, for example, both Nürburgring and Spa were run by Audi Sport Customer Racing from beginning to end. This meant that Audi Sport took over the entire responsibility, from preparing the cars to naming the drivers for the R8s owned by Audi Sport. "This leaves us time to get perfectly prepared. You must understand that customer cars are constantly participating in races, frequently at weekly intervals," said Liebchen.

For the Spa and Nürburgring longdistance races, everything was carefully planned in Ingolstadt and Neckarsulm, where all the necessary know-how is readily available. The decision proved Liebchen and his team right: Audi won both races!

Customer racing is much more varied than that, however, and ranges from truly amateur events to highly professional races like Spa and Nürburgring, the Liqui-Moly Bathurst 12 Hour in Australia or the Macau GT Cup, which is part of the glittering Macau Grand Prix in Hong Kong. "We are racing in 17 countries at present. That is quite amazing."

Whether or not a racing series catches on depends on how professionally it is planned, on the financial situation in the territory and how strongly its people feel for motorsport. "Take Australia for instance," said Liebchen. "Considering its population

### "The Pirelli World Challenge has made our breakthrough with the R8 in the US possible."





of some 20 million people, it is a rather small country. Nevertheless, we have seven or eight R8 LMS competitions down under."

For him, customer racing is not just motorsport as an end in itself, but it is about selling and servicing the R8. And for doing successful business, the GT races have to be attractive events. As is the case with the Pirelli World Challenge in which customer racing has up to eight R8 LMS taking part. "It is not least due to this series that our business is developing very well in America." Liebchen explained, underlining the fact that this racing series was the first to accept the GT3 rules and regulations. This was what finally made the traditional IMSA series accept GT3 cars, too, as from 2016.

Unlike in the US, however, motorsport in Asia is still in its infancy. "It has not been that professional so far, which is why teams hesitate to enter the races," he observes. As with the Pirelli World Challenge, the Blancpain Series, on the other hand, has been very well received by the customer teams, in both the Endurance and the Sprint Series. These series have become truly international and are run at a very high level. "We have had up to eight teams running in the Sprint Series, with six cars on average in the Endurance Series," Liebchen points out.

### "We have races in China, Korea, Thailand, Japan, Taiwan and Abu Dhabi..."

Considering the importance of China, Liebchen is quite pleased that he and his team have managed to get a 'China Cup' going. Initially, races only took place in China, but these days they encompass the entire Asia Pacific region. "We have races in China, Korea, Thailand, Japan, Taiwan and Abu Dhabi," Liebchen explained. Just how important this region has become is demonstrated by the fact that this year's Audi R8 LMS Cup season finale took place at the Yas Marina Circuit in Abu Dhabi, known for its prominence in the Formula One calendar.

This is also the first time that an LMS race has taken place in the capital of the Arabian Emirates, the only region not yet conquered by the R8. "It was also an attempt to see if the idea of customer racing might work in the Emirates, and if we could find a partner in this country too," said Liebchen.

He takes great delight from the fact that customer racing takes place "almost all over the world, in very different kinds of races and on quite different levels." In fact so many races take place he finds it increasingly hard to keep track of exactly what is going on and when.

At the same time he reports with regret that England, the cradle of motorsport, has not joined the customer racing programme. "Apart from private teams like United Autosports who at one point all but won the championship, we currently do not have a significant number of cars in England, nor are we getting support from the importer." Of course, that does not keep customer racing from organising events in England, for instance the Silverstone round of the Blancpain Endurance Series.

Last year was particularly successful, with Audi Sport and Audi Sport customer racing triumphant in some of the most significant races. After taking first and second places in the Le Mans classic for Audi Sport in June, customers racing continued the winning streak for Audi by winning at Spa and Nürburgring, the other two prestigious 24-hour European races. →

### "The 24 Hours of Spa is the Who's Who of sports car racing..."

In fact, following 2011 and 2012, the factory R8s won Spa for the third time this year.

"Nothing compares to Spa!" says Liebchen with a sparkle in his eyes. "Some 60 cars in the same GT category populate the starting grid, with 10 manufacturers taking part this year." He passionately rattles them off: "Aston Martin, Audi, Bentley, BMW, Ferrari, Jaguar, Lamborghini, McLaren, Mercedes-Benz and Nissan. This really is the who's who of sports cars." So winning the 24 Hours of Spa yet again against such esteemed opposition really has done Audi Sport customer racing and its boss proud.

So what is the next highlight for Liebchen going to be, following 25 years in motorsport? He thinks for a few moments before declaring: "We have essentially launched it with the TT Cup." But the popularity of this series will depend on what demands the various markets worldwide will have. Liebchen is deeply convinced of its success, and swiftly proceeded to outline the potential of this new racing series as he sees it. "I would imagine that building upon the technology that we have with the TT so far, we might well have some further surprises in store which, could be introduced worldwide with a few slight tweaks."

He is certain that the TT Cup will involve a considerably larger number of cars than





the R8 LMS, simply because the new series is so much more affordable. "The logistics are going to be quite a challenge, just as it has been a challenge to build 132 R8s and supply their spare parts."

"In the case of the R8 LMS racecars, this challenge has become even more demanding over the years as the older cars are still going strong," he explained. "At the same time, new R8s are being added to the number and so providing backup for these cars and their spare parts is a mammoth task in itself."



## Romolo Liebchen, the driving force behind Audi Sport customer racing

A BILINGUAL Bavarian, with, as his Christian name suggests, Italian blood, Romolo Liebchen has been a motorbike addict for as long as he can remember. It was this passion that made him carefully map out his professional career: study automotive engineering at the Senior Technical College in Munich, and aim for an engineering career developing engines for motor cycles, preferably at BMW.

Everything went according to plan. He was well on his way, completing an internship at BMW's motorcycle division, his thesis dealing with one of BMW's new motorcycle engines, when he received an invitation for a job interview with Audi. And what a surprising interview it turned out to be.

He still vividly remembers the first thing he was told: "Perhaps we should have informed you beforehand. We do not have a job for you as an engine designer. However, we would like to offer you a job in motorsport." When Liebchen heard this eyebrow raising news, he grabbed with both hands what was to become his life's work as a motorsport development engineer for Audi Sport.

On October 1, 2014, Romolo celebrated a quarter of a century at Audi Sport. Having been through many ups and downs, he is one of the oldest members of the original team; five years longer in the job than even Audi motorsport boss Dr. Wolfgang Ullrich.

All these years later, Liebchen remains passionate about his career choice, but the one thing that still grates on him is the fact that the V6 DTM car was never raced in anger. The reason was a regulation change at such short notice before the beginning of the new season that Audi simply could not react. "It would have been an extremely good car," he recalls ruefully.

Life went on, however, and so did his engagement with Audi Sport. He became deeply involved in the Le Mans project, which was to develop into the ongoing success story for Audi it is today. Yet, Liebchen's most exciting professional challenge was still to come.

At the turn of the millennium Audi thought about developing a sports car. And, in 2002, Liebchen was offered the position of motorsport representative in the product design team whose task it would be to define the parameters of this new sports car. "This is when we mapped out and developed the R8 concept," he explained. "From the beginning, I was convinced that if Audi was to make such a car, we would definitely have to enter GT racing."

Over the last three years especially, Liebchen has been able to reap the fruits of his work, with 2014 having been the most successful motorsport season for Audi Sport customer racing so far.



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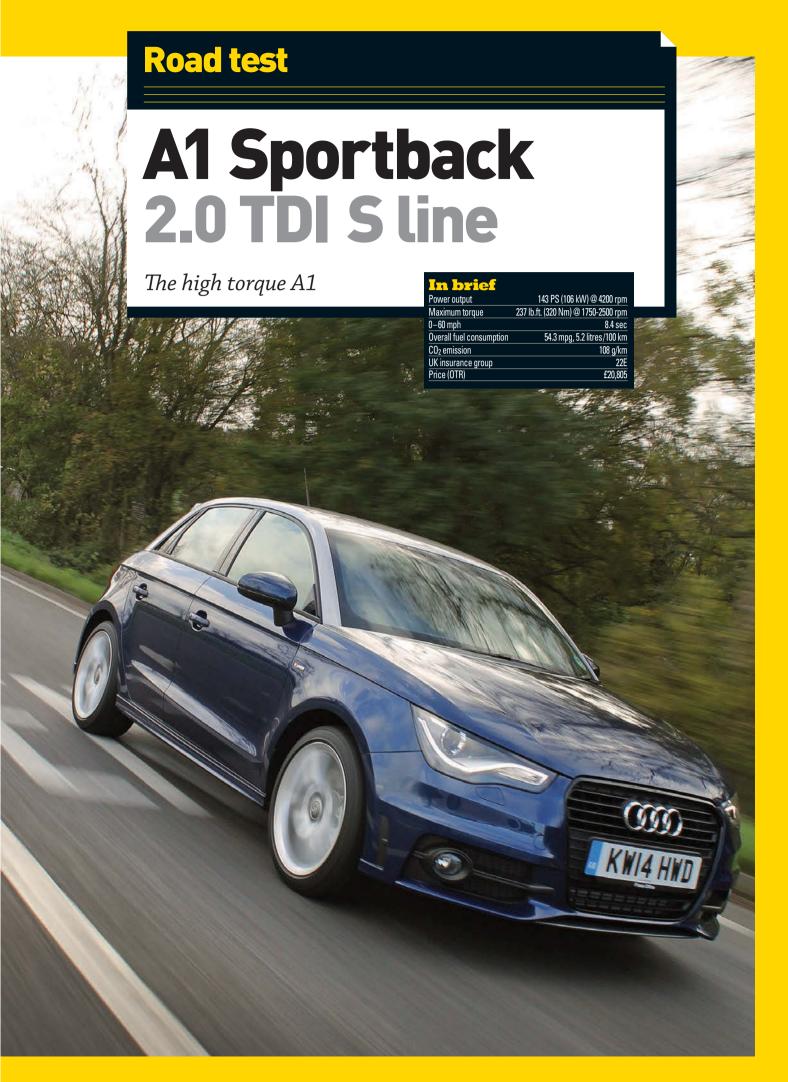
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THE A1 HAS rapidly become a well-established Audi model, its price making it an attainable objective for many potential buyers who, in the past, would never have been able to consider buying an Audi. Its styling gives it a unique character, although those in the know will be aware that its underpinnings are the same as Volkswagen's Polo. Despite this, the two cars have an entirely different character and, as is so often the case, the Audi engineers and designers have given the A1 a unique personality, both in terms of its appearance, and the way in which it behaves.

The two-door version was the first to arrive and, when the four-door model was announced, it was given the name Sportback, in line with what had been done for the A3. Some will find the two-door better suited to their needs, but there is no doubt that having four doors can be a big advantage, especially when you frequently need to carry children or elderly people in the back. It makes getting in and out so much easier and, because the doors themselves are shorter, opening them in confined parking spaces is easier.

A1s come in a wide variety of specifications, with SE, Sport, S line, S line Style and S line Black Edition all available. Add to this mix a range of engines, from the 86 PS 1.2 TFSI petrol to the 143 PS 2.0 TDI diesel, and you end up with some 24 different models to choose from, even if you exclude

the high-performance four-wheel drive S1.

The SE is the basic specification, but don't think that this means it is not well fitted out: the range of equipment and trim is quite extensive and includes 6.5 x 15-inch wheels with 205/55 tyres, digital Concert radio and CD player, three-spoke steering wheel, tyre pressure monitoring, manually-controlled air-conditioning, electric windows all-round and electrically powered and heated mirrors.

The Sport model costs a further £1,840, quite a jump, but this includes bigger wheels and tyres, stiffer sports suspension, multi-function steering wheel and driver information system. The S line adds a further £1,545 and includes another step up in wheel size, even stiffer suspension, a blend of cloth and leather upholstery, and some attractive bodywork modifications

including a hefty rear spoiler.

The Style version of the S line, at an additional £950, concentrates on cosmetics, largely black, both inside and out, but also gives you the valuable xenon discharge headlamps. The Black Edition, costing an additional £1,250 over the S line, really goes to town with the black paint and, apart from the four rings, there is not much in terms of external trim which doesn't get this treatment.

The test car, though, was a pure and simple S line, an attractive package in itself and made even more good-looking by the addition of the Floret silver roof paintwork which sets off the Scuba blue of the rest of the car. With the A1, you have the ability to make the car more distinctive, either by having the complete roof finished in a contrasting colour, or choosing to have just



Some will find the two-door better suited to their needs, but there is no doubt that having four doors can be a big advantage...'



the sides of the roof painted in this way. The contrast roof line, available in white, silver, grey or black, costs an additional £350, while having the complete roof painted, in either silver, grey or black, costs £400. With the Scuba blue paint costing an additional £340, and the silver roof, the total extra cost for the external paintwork on the test car came to £740, a hefty amount.

The wide colour choice extends to the interior of the A1 and, with the S line specification, you can choose one of two cloth and leather combinations, while having the upholstery completely in leather costs £650.

One of the reasons why the whole range of Audi models is so successful is that the standards of design and build quality are very similar, whether you are paying £15,000 or £95,000. When you slide into

the driving seat of the A1 and look around, you will be aware that you are sitting a bit closer to your passenger than in the bigger models, but there is little you can see which smacks of anything other than high quality. True, the central display screen, normally hidden inside the facia, has to be pressed by hand to make it emerge, but then you can say the same of the Q3. All the controls and instrumentation, and the way in which the various surfaces are finished, are of a high standard.

Despite the fact that this is a very compact car, there is a surprising amount of room for your rear seat passengers, enough to keep them comfortable on reasonably long journeys. The amount of luggage space is somewhat limited, but, with care, you can pack quite a lot in. Loading the boot is made easier by the big tailgate, but the S line

spoiler adds to its weight and it needs quite a push to lift it.

The backrests of the rear seats are split 40:60 and it is easy to fold one or both down to increase the amount of luggage space. You don't get a spare wheel and tyre with the A1; instead, there is a tyre repair kit which, hopefully, won't have to be used.

The 2.0 TDI engine, which develops 143 PS at 4200 rpm, is the most powerful diesel engine you can buy for the A1. Like all of the 2.0 TDI units, it develops a considerable amount of torque, 320 Nm between 1750 and 2500 rpm, and it is this which determines the way in which this A1 performs. A relatively light car, with an engine which develops plenty of torque, can have high gearing, ensuring that the least amount of fuel is used, particularly when cruising at steady speeds. It is no





'Like all of the 2.0 TDI units, it develops a considerable amount of torque, 320 Nm between 1750 and 2500 rpm'

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Both the Sport and the S line versions

wonder, then, that this A1 proved to be very economical, our overall fuel consumption figure being 54.3 mpg. Driven economically, we improved this to 67.7 mpg. These are real-world figures and rather different from the official ones, but we all know that these cannot be used as a guide for what the car will achieve during normal motoring.

The fuel tank of the A1 holds 45 litres or 9.9 gallons and so you can reckon on a safe range of close on 500 miles if you drive without too much enthusiasm. If you were trying really hard to get the best possible fuel consumption, you could probably manage a journey of close to 600 miles before having to refuel. Those comments, though, refer to continuous journeys; any sort of short-range motoring will knock the figures down substantially. Diesel engines perform at their best when they are fully warmed up and maintained at a steady cruising speed,

The amount of torque which this engine develops is vividly shown if you cruise along at 30 mph in sixth gear on a level road. Without pressing the accelerator, you will find that the car begins to accelerate, running away with you if you are not careful, and you have to use the brakes to keep within the speed limit.

The suspension of the A1 is fairly simple, with MacPherson struts at the front and a simple torsion beam axle at the rear. When pushing the car hard through roundabouts, you can begin to feel the front end losing

its grip, but a moment's easing of the accelerator pedal overcomes this instantly. With the Sport and S line versions, the lower ride height and the lower profile tyres add to the stability on bends and you can negotiate curves surprisingly quickly.

Because only the front wheels are driven, and the engine delivers a great deal of torque, you have to be careful when accelerating away from rest if the road is at all slippery. With a sensitive right foot, however, you will find that it should not be too much of a problem.

Driving the A1 can be very enjoyable if you have the desire to make use of the available performance, but it is not at the expense of ride quality. A compact car like this can never be as comfortable as one with a longer wheelbase but, even so, your passengers won't complain.

Both the Sport and the S line versions are fitted with sports front seats, the bolsters helping to keep you in place when you corner enthusiastically. As well as the normal manual controls to alter the position of the seat, there is an additional handwheel which allows you to vary the amount of lumbar support.

There is one aspect of driving a dieselengined car which makes it less attractive than a petrol version and this is the speed at which the engine warms up. If the weather is cold, you will find that you have to cover a few miles before the heater is working really effectively. The engineers have worked hard on improved warm-up times but diesels always take longer than petrol-engined cars.

One item which is not part of the standard specification of any of the A1 models is a navigation system, and this has







to be ordered as an option. This particular car had the Technology package which includes HDD-based navigation, one of Audi's most comprehensive systems, with 20 GB of space available on the hard disc for storing your own music. It is a very good system, but it is not cheap at £1,375. A less expensive SD card-based system is available for £875.

Another option fitted to the test car was xenon discharge headlamps. These make a big difference when you are travelling at night, the conventional headlamp beams being quite poor in comparison. As we have said, the discharge lamps are part of the S line Style and the Black Editions but, with the regular S line, they have to be ordered at an additional £765.

As we explained earlier, the A1 range is quite extensive, with a wide range of

individual models, and a good selection of engines. Things go further than that, though, because there are numerous opportunities to alter both the external and internal trim to personalise your A1. As well as the external paint options, prospective owners can choose from a variety of upholstery designs and materials, and internal paint finishes. You need to be careful, though, because it is all too easy to add the best part of £10,000 to the normal list price!

It is little wonder that the A1 has become such a success for Audi. Within its compact dimensions, the engineers have created a car which is very well designed and constructed. It has dynamic qualities which will satisfy enthusiastic drivers, and yet those whose motoring style is more conservative will find it a thoroughly practical car, but one which often draws admiring glances.

This particular example, with a pretty hefty options list, would cost you close to £27,000, but A1s don't need to be anywhere near that price level. The SE, fitted with the 1.2 TFSI engine, is listed at £14,115, a price which makes it a very attractive first step on the Audi ladder.

Price comparison	
Volkswagen Polo BlueGT 150	£18,490
Mazda 3 2.2D 150 SE Nav	£20,245
SEAT Leon 2.0 TDI CR 150 SE	£20,285
Audi A1 Sportback 2.0 TDI S line	£20,805
BMW 114d Sport	£21,510

The A1 series has just undergone a series of upgrades and so this is likely to be the last of the present crop which we will be testing.





'Within its compact dimensions, the engineers have created a car which is very well designed and constructed...'

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### Facts and figures: A1 Sportback 2.0 TDI S line

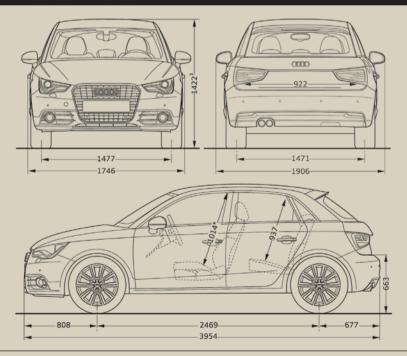








#### **DIMENSIONS & WEIGHTS**





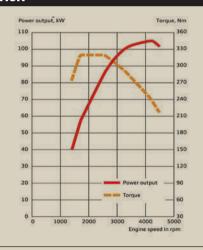
Turning circle	34.8 ft, 10.6 m
Unladen weight	2679 lb, 1215 kg
Total permitted weight	3715 lb, 1685 kg
Permitted trailer load; with brakes	2646 lb, 1200 kg
Permitted trailer load; without brakes	1411 lb, 640 kg
Wheels and tyres	7.5 x 17 215/40 R17

### **Test publication date: January 2015**



#### ENGINE / FUEL ECONOMY / ACCELERATION

1968 cc
In-line
4
81.0 x 95.5 mm
143PS (106 kW) @ 4200 rpm
237 lb.ft. (320 Nm) @ 1750-2500 rpm
16.0 : 1
2 inlet, 2 exhaust
54.3 mpg, 5.2 l/100km
67.7 mpg, 4.2 l/100km
56.5 mpg, 5.0 l/100km
78.5 mpg, 3.6 l/100km
68.9 mpg, 4.1 l/100km
Diesel to EN 590
9.9 gallons, 45 litres
108 g/km



ACCELERATION FIGURES	
Maximum speed	135 mph, 216 kph
0-50 mph	5.8 sec
0-60 mph	8.4 sec
0-70 mph	10.9 sec
0-80 mph	14.8 sec
30-50 mph (3rd gear)	3.9 sec
30-50 mph (4th gear)	6.2 sec
50–70 mph (3rd gear)	4.4 sec
50-70 mph (4th gear)	5.6 sec
50-70 mph (5th gear)	7.6 sec
50-70 mph (6th gear)	10.6 sec
Road speed/1000 rpm in top gear	26.3 mph, 42.1 kph

Acceleration figures recorded using VI Monitor. For more information visit the website at: www.vi-performance.com

#### PERFORMANCE COMPARISONS

	A1 Sportback 2.0 TDI	A1 2.0 TDI	A1 1.4 TFSI (185 PS)	A1 1.4 TFSI (122 PS)
Displacement, cc	1968	1968	1390	1390
Power output, PS/kW	143/106	143/106	185/137	122/90
@ rpm	4200	4200	6200	5000
Maximum torque, lb.ft./Nm	237/320	237/320	185/250	148/200
@ rpm	1750-2500	1750-2500	2000-4500	1500-4000
Maximum speed, mph/kph	135/216	135/216	141/225	126/202
0–50 mph, sec	5.8	5.8	5.6	6.1
0–60 mph, sec	8.4	8.0	7.1	8.9
0–70 mph, sec	10.9	10.3	9.2	11.8
0–80 mph, sec	14.8	13.9	11.5	15.4
30–50 mph (third gear), sec	3.9	3.2	2.5	4.6
30–50 mph (fourth gear), sec	6.2	5.1	-	6.0
50–70 mph (third gear), sec	4.4	4.5	3.5	5.1
50-70 mph (fourth gear) sec	5.6	4.8	-	6.1
50–70 mph (fifth gear), sec	7.6	5.7	-	8.9
50–70 mph (sixth gear), sec	10.6	7.3	_	11.3
Overall consumption, mpg / I/100km	54.3/5.2	56.1/5.0	34.9/8.1	39.8/7.1
Unladen weight, lb/kg	2679/1215	2624/1190	2624/1190	2426/1100
Power/weight PS/ton, PS/tonne	120/118	122/120	158/156	113/111
Test publication date	Jan '15	Aug '12	Mar '12	Mar '11

'Because the engine delivers a great deal of torque, you have to be careful when accelerating away from rest if the road is at all slippery...'

To read any of the other tests mentioned in the comparison chart, back issues can be ordered online, securely, from our website: www.audidrivermag.co.uk



Tom Kristensen has retired from professional motor racing. The 'Great Dane' and his former team-mates, talked to **Martyn Pass** about the decision Tom made . . .

ONE OF the really big names in motorsport announced his retirement recently when Le Mans record race-winner Tom Kristensen hung up his helmet from professional motor racing, although the 47-year-old Dane will be retained by the Four Rings brand as a representative and partner of Audi Sport.

His incredible Audi career included 75 sports-prototype races, eight poles, and 53 podiums including 24 wins. Including his Audi DTM career, plus a one-off Audi R8

LMS appearance at Spa, his amazing stats for Audi read: 137 races, 17 poles and 28 wins.

"I've had the privilege of driving for the best team and the world's coolest car manufacturer for 15 years," reflected Tom. "I've had great team-mates and worked together with fantastic people. With Audi, I've been able to win many titles and numerous races as well as experiencing some unforgettable, emotional moments.

"My string of victories in the Le Mans 24 Hours would not have been possible without Audi. Leaving this team as a driver is hard for me. But the day had to come at one time or another. I can only thank Audi and the entire staff for the great time I've

'I've had the privilege of driving for the best team and the world's coolest car manufacturer for 15 years...' had and look forward to my new tasks for the brand and the team of Audi Sport.

"I've had a feeling inside that kept getting stronger in recent months. I felt that the right point in time to end my career had come. Allan McNish and Dindo Capello have confirmed to me how difficult it is to make a decision like this, but at the same time I'm happy and will no doubt be able to enjoy my free time.

"Of course it's not easy to really fathom the end of my career and I'm no doubt going to miss the fact that I won't regularly be sitting in a race car anymore. But to me it was important to make this decision while I was still ahead of the power curve.

"I'm going to continue to contest a few races here and there in the future, such as the Race of Champions or some historic events, including Goodwood. I'm also very much looking forward to my new role at Audi and to having more time for family and friends. I've had 35 near-perfect years in motorsport, but I'm sure that there are a few other great things in life."

ALLAN MCNISH commented: "What a fantastic career Tom has had, throughout karting, the junior formulas, DTM, and sportscar racing. He's enjoyed a very versatile career, being able to jump from one type of car to another and that was one of the qualities of driving that I most admired





about him and that is why I think he was able to become 'Mr Le Mans'.

"I'm pleased for him that he was able to step away from the cockpit when he felt the time was right, still at the top of his career in terms of his passion, his drive, his speed, and his capability behind the steering wheel. Now he will be able to spend a little bit more time with his family and to enjoy life on the other side of the pit wall. I am looking forward to spending much more time with him and Dindo in exactly that position at Le Mans 2015. Tom, 'Mr Le Mans', friend, team-mate, congratulations on a stunning career."

LOÏC DUVAL added: "By hanging up his helmet, Tom has ended an important chapter in the history of both endurance racing and Audi Sport, a chapter I am honoured to have been a part of. Although we have only been crew-mates for two years, I will treasure the countless memories we made together. In a field of many talented drivers, there is only one Tom Kristensen. With charisma, impeccable results and a fantastic attitude in and out of the car, he is the ultimate role model for any racing driver.

"His motivation and dedication have never waivered over the years. The extraordinary amount of time he's spent at the top equally provokes admiration and jealousy! I am proud and privileged to have been a part of his unforgettable career. He is the best ambassador for endurance racing and Audi. Tom inspired what seems like the whole of Denmark to visit La Sarthe every June, devotion that has never been seen before. What he has done for our sport is simply remarkable.

"When I started with Audi Sport in early 2012 he was one of the first to come and greet me at our traditional pre-season winter training camp. It was humbling to say the least. A few months later he opened the door of my Audi in parc fermé only moments after the chequered flag had dropped on the Le Mans 24 Hours, embraced me and whispered, "I'm happy you will be on the team". This meant the world to me, coming from the Le Mans race-winning record holder.

"In 2013, I was trusted with the difficult job of trying to fill the shoes of his long-time friend and team-mate Dindo Capello, when asked to join Allan and him. I am proud to be counted as one of the drivers who have won Le Mans alongside both. I know that Tom's ninth and final triumph at La Sarthe holds a special place in his heart for many reasons, and I am honoured to have shared it with him. I am equally proud to have become World Endurance Champion alongside Allan and Tom, a trophy that was missing from his collection."

TOM KRISTENSEN'S last race with Audi saw them finish the finale of the FIA World Endurance Championship (WEC) on a positive note, achieving its sixth podium result of the season at São Paulo on Sunday November 30, with Tom securing another trophy in his last race as a pro.

Audi closed the year in second place of the manufacturers' standings, while Marcel Fässler / André Lotterer / Benoît Tréluyer took second place in the drivers' championship. Following a remarkable recovery, the trio in the No. 2 Audi R18 e-tron quattro battled its way forwards from the last to fifth place, with Tom Kristensen once more proving his prowess.

Together with Lucas di Grassi and Loïc Duval, the nine-time Le Mans winner, in third place, clinched his last trophy for Audi in Brazil when, in the thrilling final stage, he prevailed against the No. 7 Toyota – thanks to excellent lap times with low fuel consumption.

The Dane, who'd announced the end of his professional career before the last race of the season, experienced an overwhelmingly emotional weekend brimming with recognition. A medal presented by the Brazilian Automobile Association, a lap of honour on Saturday, the inscription 'Thanks Tom – Mister Le Mans' emblazoned on the No.1 Audi R18 e-tron quattro and a finish with messages from all WEC teams and honours on the podium provided the Dane with an unforgettable finale.

For Lucas di Grassi, the result was a special one as well. After having started from sixth on the grid, the Brazilian – born in São Paulo – presented himself to his home audience in top form.

Audi's No. 2 car also came close to a podium result, in spite of a setback during the first lap of the race when it had to have a system reset performed and dropped to the back of the field. After only 30 minutes, Benoît Tréluyer had battled his way back to sixth place and his teammate André Lotterer underscored the



pace of No. 2 by setting the fastest race lap, eventually finishing in fifth place following repairs to body damage.

Although Audi surrendered the constructors' title for the first time after two years as World Champions, at the end of the third FIA WEC season it can look back on a successful interim tally. In 24 races since 2012, the company has scored 13 victories, which makes it the most successful marque in the LMP1 class. Two World Championship titles in the drivers' and manufacturers' classifications in 2012 and 2013 complete the sporting results, while the highlight of the 2014 season was the success at Le Mans in June – marking Audi's 13th win in the iconic 24-hour race since 2000.

After the final race in Brazil, Dr. Wolfgang Ullrich (Head of Audi Motorsport) commented, 'This was a very emotional weekend. It's fantastic that Tom Kristensen on his last double stint still defended the podium place. We managed to end the FIA WEC season on a positive note in Brazil. It's great that we managed a podium finish although our aim, obviously, is to be on the very top of the podium.'

Chris Reinke (Head of LMP) added: '2014 was an emotional roller-coaster ride for us. That was true for the Le Mans 24 Hours but applies to the WEC season as well. The way

we closed the season wasn't ideal but it ended on a positive note. The highlight of the weekend, no doubt, was the farewell of Tom Kristensen, who's been with us for such a long time. We thank him very much – he had a part in shaping our sweetest successes.'

Ralf Jüttner (Team Director Audi Sport Team Joest): 'Congratulations to Porsche on their first victory. We made the best of our potential. The greatest part about it is that Tom finished on the podium in the final race. He more than deserved his champagne shower. If there's a driver that can do a particularly good job of saving fuel while extracting the best possible performance from the Audi, it's Tom.'

#### **Race results**

- 1 Dumas/Jani/Lieb (Porsche)
  - 249 laps in 6h 01m 44.608s
- 2 Buemi/Davidson (Toyota) + 0.170s
- 3 Di Grassi/Duval/Kristensen (Audi) -1 lap
- 4 Conway/Sarrazin/Wurz (Toyota) -1 lap
- 5 Fässler/Lotterer/Tréluyer (Audi) –1 lap
- 6 Bradley/Howson/Imperatori
- (Oreca-Nissan) –24 laps Mücke/Turner (Aston Martin) –28 laps
- 8 Makowiecki/Pilet (Porsche) –28 laps
- 9 Calado/Rigon (Ferrari) –28 laps
- 10 Bruni/Vilander (Ferrari) –29 laps



ANOTHER WHO WILL be missing from the Audi Sport Team Joest pit wall in 2015 will be Kyle Wilson-Clarke. The No. 1 Engineer helped Allan McNish, Tom Kristensen and Loïc Duval to the 2013 FIA World Endurance Championship including victory at Le Mans that year. The Londoner remained the No. 1 engineer on the Audi R18 e-tron quattro of Kristensen, Duval and Lucas di Grassi this season apart from the Brazil race finale.

"My first race for Audi was in 2010 at Spa as a Data Engineer in the Le Mans Series on the R15+ with Marcel Fässler, André Lotterer and Benoît Tréluyer. I will have done 35 races with Audi, 29 as race engineer, spanning five years which includes races in the LMS, Intercontinental Le Mans Cup and the WEC. In that time 'my' Audi achieved five pole positions, 15 front row race starts, four race wins and 23 podiums.

"The 2013 season was, not surprisingly, my most satisfying year. We won Le Mans, which had always been my dream, and then went on to win the WEC title. We had several wins that year and it was definitely the most memorable.

I've been very fortunate to have worked with some great drivers. There are so many, sadly some of the best have or are now retired including Allan, Tom and Dindo.

"But there are many still on the team including Marcel, André and Benoît, a fantastic crew, as well as Loïc and Lucas, who I thoroughly enjoyed working with in 2014. Then there was the like of Timo Bernhard, Romain Dumas and Mike Rockenfeller who I did my first Le Mans with for Audi as race engineer.

Le Mans in 2014 was my biggest disappointment in my Audi career. We were in the lead with a little over three hours to go when we ran into issues, having survived the torrential weather and demanding hours in the dark."

### **Race of Champions**

HE MAY HAVE recently retired but Tom Kristensen clearly still has the competitive edge, as he and Petter Solberg stormed to the Nations Cup title for Team Nordic in the 2014 Race of Champions Nations Cup at Bushy Park Barbados, on December 13.

On a hot Saturday afternoon in the Caribbean, legends from many of the world's biggest motorsport series teamed up in pairs to battle for national and regional pride, racing a mix of cars – including the Ariel Atom Cup, Audi R8 LMS, Stadium Super Truck, VW Polo RX, KTM X-Bow, ROC Car and Euro NASCAR – on a purpose-built parallel track at Bushy Park, Barbados.

Team Nordic, comprising Kristensen and FIA World Rallycross Champion Solberg, prevailed in the final against Team Scotland. First Kristensen defeated Williams F1 official test driver Susie Wolff, then 13-times F1 Grand Prix winner David Coulthard won out against Solberg to take it to the decider, but Kristensen came out on top in the end, winning the final heat after Coulthard spun off at the final corner.



Earlier in the afternoon, Team Nordic (four wins) and Team France (three wins) both progressed through Group A to reach the semi-finals with Team Nordic beating Romain Grosjean and Esteban Ocon by two heats to one. Kristensen and Grosjean both won their original heats, but the Dane avenged his defeat in the 2012 individual Race Of Champions final to take his team through.

Sadly, the individual Race Of Champions on the Sunday saw Kristensen come back down to earth with a bump after a spectacular off in the Stadium Super Truck. The title of Champion of Champions went to David Coulthard who put in a stunning performance to eclipse 15 fellow stars of motorsport and win the Race of Champions, beating Mercedes F1 official reserve driver Pascal Wehrlein in the final.











TALK TO ANYONE today about the Porsche 924, and more than likely it'll be referred to as 'the one with the Volkswagen van engine'. The 924 may have strong VW connections, but the EA831 engine started life in an Audi long before the Volkswagen LT Van was even thought about.

To find out just where this engine came from, we need to go back to 1958 when Mercedes-Benz (or rather Daimler-Benz AG) took an 87 per cent shareholding in the struggling Auto Union group. By 1964, though, Mercedes had invested a lot of money in the company with no tangible results and, in 1964, Volkswagen took a 50 per cent share in Auto Union – just as the fruits of Mercedes' investment was about to be seen. These investments included a new range of cars, new engines and an all-new factory at Ingolstadt. By 1966, Volkswagen had bought the entire company from Daimler Benz, with the brands of Auto Union, DKW, NSU and Audi, the latter of which hadn't been seen for a long time. One of the first new cars from the company was the Audi Super 90, or the F103.

'To find out just where this engine came from, we need to go back to 1958 when Daimler-Benz AG took an 87 per cent shareholding in the struggling Auto Union group...'

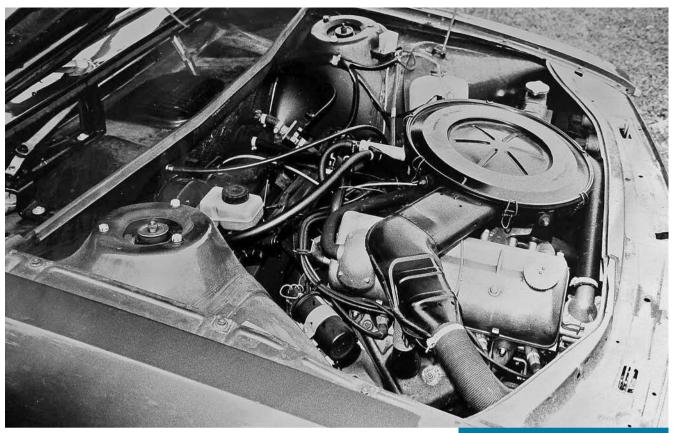
So, the Audi Super 90 was powered by a new 1.8-litre overhead valve engine, with an iron block and an alloy crossflow head. Then, as now, the detailing was superb with a fabulous cast alloy cam cover designed to damp out top-end valve noise. With an 81.5 mm bore and an 84.4 mm stroke, the engine gave a very creditable 87 PS using a single carburettor.

The next new car to be launched by Audi was the all-new 100 for 1968. A bigger, sleeker version of the Super 90, the new 100 needed a more powerful engine to haul its increased weight along. So, with a few tweaks, the standard 100LS was powered by the Super 90 1761 cc engine, but now with an astounding (for 1968) 101 PS and still

on a single Solex twin-choke carburettor, with a high 10.2:1 compression ratio; these early OHV units were all designed with a high compression ratio, one of the first engine ranges with this feature. There was a need for an even more powerful version as well, and this was for the 100GL and Coupé S. The displacement was increased to 1871 cc, the extra capacity achieved by boring the cylinders to 84 mm and, with twin Solex carburettors, the new engine delivered an impressive 114 PS.

More was to come later, however. In 1976, the second generation 100 was launched and with it came a radically redesigned version of the old 100's 1871cc engine. With a larger bore size of 86.5 mm and







'The 100 was not the only home for this unit because it was also used, in much detuned form, in the new VW LT Van as well as the Porsche 924...'

still retaining the 84.4 mm stroke, the new engine had a capacity of 1984cc. As well as the rebore, the engine (now officially coded EA831) was also given a new OHC (overhead camshaft) cylinder head.

The 100 was not the only home for this unit because it was also used, in much detuned form, in the new VW LT Van as well as the Porsche 924. As you may know, the 924 was built at the Audi NSU factory in Neckarsulm, as was the later 944 range. If you want to know what LT stands for, it's 'Lasten Transporter' which translates to 'Cargo Transporter'.

The new engine was available only in fuel injection form in the 924 and gave 125 PS with the Bosch K Jetronic system. This injected engine was, sadly, not used in the 100, but it was soon to be replaced by the new 5-cylinder range we discussed last month. As it stood, the 100's carburettor



unit gave 113 PS, so came halfway between the LT unit and the 924.

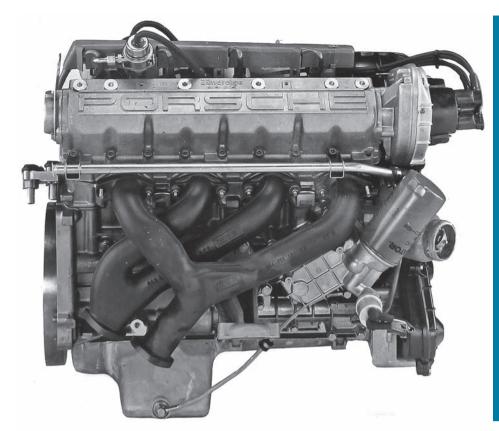
The first use of this engine was indeed in the LT van that arrived in late 1975. With a carburettor, it developed 70 or 75 PS depending on usage with the accent being on torque needed to haul a well-laden van. As an engine, the EA831 was satisfactory, but not exceptional. It was quite heavy and

its 1960's design roots meant that it was never very rev happy, but it was very strong to the point of being almost unbreakable.

Porsche turbocharged it with mixed results. The original version from 1978 featured an all-new cylinder head and a low compression of 7.5:1 as well as a KKK K26 turbocharger. Power was a startling 170 PS, enough to worry 911s but reliability was

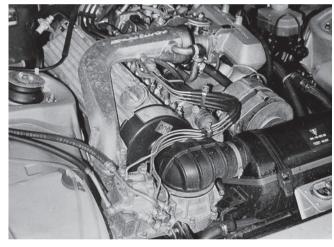
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'Audi already had the lighter and more efficient EA827 unit and had no need for the old EA831 and finished with it in 1979. Volkswagen replaced it in 1982 and finally Porsche in 1986 when the 924 was re-engined with a detuned 944 engine...'





suspect. From 1979, revisions included a smaller turbo running at a higher boost level, as well as a higher 8.0:1 compression. Power was up to 177 PS and detonation was avoided with DITC flywheel triggered ignition, not completely dissimilar to what Audi was planning for the 200 Turbo.

Not that this was the end for the old Audi unit. The 1980 Carrera GT used a more highly tuned EA831 with an 8.5:1 compression and an intercooler; power rose to 210 PS and the 1981 GTS model gave 245 PS with more boost. The ultimate version was the 924 GTR racer that gave 375 PS. These used only the bare Audi block and everything inside was new, but it shows what a tough old boot this was.

Audi already had the lighter and more efficient EA827 unit and had no need for the old EA831 and finished with it in 1979. Volkswagen replaced it in 1982 and finally Porsche in 1986 when the 924 was re-engined with a detuned 944 engine.

But there is more to the story because, like the Golf/Audi 80 EA827 unit, the EA831 also went to the USA. In 1977, AMC (American Motors Corporation) badly needed a 2-litre 4-cylinder engine to power the low-end Gremlin and it became available in much the same carburettor form that the LT van used. For 1978, the AMC Concorde saloon also used this engine and a cash-strapped AMC eventually bought the rights to manufacture it in the USA. Sadly, though, it was not popular and

was replaced in 1980 by the GM 'Iron Duke' 2.5-litre 4-cylinder.

That, then, is the story of 'The LT van engine'. Designed by Auto Union and Mercedes, powering the first VW-era Audis, refined by Audi engineers with an overhead camshaft, used by Porsche for a successful sports car and racer, VW for a van and powering American sub-compacts; it looks as though everyone involved certainly had their money's worth from this almost forgotten engine!



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OVER 65,000 visitors to this year's Lancaster Insurance Classic Motor Show at the Birmingham National Exhibition Centre, over the weekend of November 14-16, saw impressive displays from both the quattro Owners' Club and the Audi Owners' Club, among the 250 individual marque and owners' clubs which attended this year, amounting to a total of over 1800 display cars.

Attending for the first time in over 20 years, the quattro Owners' Club pulled out all the stops to put on a very professional looking stand, largely thanks to the expertise of Club Events manager Phil Jamieson and Lorraine Ward of Leisuretec UK Ltd. in Wigan, who distribute sound, lighting, video, special effects and staging etc. to the trade.

With its rigging all round, a black backdrop over two sides of the 10 metres by 9 metres stand and extensive lighting with 18 LED battens, it was quite a task to set up but looked very impressive indeed. Phil had also planned and written a summary of the quattro's history, which formed a 'Timeline' storyboard along two sides of the stand, and the club also had a huge plasma screen with a rolling display about the club, the quattro and club events.

Chairman John Coughtrie had also organised quattro rallying videos to be viewed, with accompanying soundtrack via

## Classic Audis at the NEC

'Since the event is primarily for classic cars, club members' Ur quattros on display were chosen primarily for their originality and top-notch condition...'

headphones, in a 'quattro sound booth', as it became known, where visitors could see and hear Michelle Mouton waxing lyrical about 'the sound of the quattro', as well as Walter Rohrl taking an A2 quattro up the Col de Turini, with both in-car and external video coverage, leading to plenty of nostalgic conversations with those visitors who'd experienced quattro rallying in its heyday.

Since the event is primarily for classic cars, club members' Ur quattros on display

were chosen primarily for their originality and top-notch condition. Four cars were selected, with Stephen McPherson's early quad-lamp 1982 right-hand drive car in Diamond silver, with Fuchs alloys; Roger Galvin's Sport quattro, one of only six Tornado red examples here in the UK; Steve Hagger's carefully rebuilt 1988 Panther black MB, with its superbly detailed engine bay, and David Bell's pristine low-mileage Alpine white RR.

Undoubtedly considered a great success, with a huge amount of interest from the public and many new members recruited, we can expect to see the quattro Owners' Club as a regular fixture at Classic Motor Show events in the future.

Judging from the turnout at this year's event, the 2015 Lancaster Insurance Classic Motor Show, November 14-15, looks set to be even bigger and better. For more information, visit www.necclassicmotorshow.com

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YouTube video of the stand: http://www.youtube.com/watch?v=WUKwK7qDkzc&feat





#### **Audi Owners' Club**

THERE WAS NO presence from Club Audi at the show this year, but next door to qOC was the Audi Owners' Club with a trio of display cars, most noticeable of which was the 1987 Safari Rally replica, based on a 1986 Audi 200 quattro. Currently fitted with a 20V turbo Audi S2 engine running around 270 bhp, it belongs to Mike Coward from the South West, but isn't used all that often as it draws too much attention so is mostly just seen at shows.

On the other hand, the 1993 Audi Cabriolet 2.3E belonging to Syd, the father of one of the AOC club managers and southwest regional host Ben Baldey, has been owned for five years and used daily. It is finished in a lifestyle colour, brilliant yellow, with colour-coded bumpers and sills, V6 bumper and later projector lights. The car had full a re-spray after being hit in the side by a mail van two years ago, and had a new manually-operated roof four years ago.

Another daily driver, also on show, was the 1993 Audi Type 89 Coupé 2.6 V6 belonging to Callum Pearson, the AOC regional host for the North East. Now painted in Byzanz purple with colour-coded bumpers, it is lowered all round on H&R springs and rolls on BBS Avantgarde wheels, with CAC rear brake callipers and has a custom-made stainless-steel exhaust. Inside, it has lots of carbon-fibre bits replacing the original wood panels.

'Next door to the qOC was the Audi Owners' Club with a trio of display cars, most noticeably a 1987 Safari Rally replica 200 quattro...'



#### Hankook tyres for new TT

AUDI HAS CHOSEN Hankook tyres as the original fitment for the new TT and TTS models. They will be factory-fitted high-performance Ventus S1 evo² tyres, in sizes 225/50 R17, 245/45 R17 or 245/35 R19 as standard or optional equipment, depending on the individual model specification.

The tyres, which are produced exclusively at the company's cutting-edge manufacturing facility at Rácalmás in Hungary, feature an especially high grip combined with high long-term durability and a low rolling resistance.

The Hankook Ventus S1 evo<sup>2</sup> is claimed to demonstrate optimum performance even under demanding conditions with its successful combination of precise handling, outstanding braking ability and high directional stability. The use of high tensile yet extremely lightweight steel cord material, which is also used for Hankook racing tyres in the DTM for example, means the Ventus S1 evo<sup>2</sup> still enables highly dynamic driving even under permanently challenging conditions. The development of the Ventus S1 evo<sup>2</sup> also took the ever more important environmental aspects into account, resulting in a significantly reduced rolling resistance and low rolling noise.

Hankook will also be exclusively supplying tyres for the cars racing in the forthcoming Audi Sport TT Cup. Motorsport tyres (slicks or rain tyres) of the type Ventus Race, 260/660R18, are to be fitted all round.

'We are pleased to be able to expand our commitment to motor sports by this attractive new Audi brand cup,' said Manfred Sandbichler, Motor Sports Director at Hankook Tire Europe. 'The tyres we are supplying as original fitment to the TT road cars are derived from technologies used in the DTM, where we have been co-operating very successfully with Audi Sport for years.' www.hankooktire-eu.com

#### **Audi Sport TT Cup dates**

THE CALENDAR for the Audi Sport TT Cup has been finalised. The new Audi one-make cup will be held together with the DTM a total of six times in its inaugural year of 2015. Two races per event are planned.

The season will start on the first weekend in May at the DTM opener at Hockenheim. "The participants, partners and fans of the Audi Sport TT Cup can look forward to six superb events as part of the DTM," says Project Leader Rolf Michl. "The German rounds have traditionally been held in front of a great crowd. And the Red Bull Ring in Austria typically attracts a very large number of spectators as well."

Tickets for the 2015 DTM events can now be ordered online at www.audimotorsport.com



 May 01-03
 Hockenheim (D)

 Jun 26-28
 Norisring (D)

 Jul 31-Aug 02
 Red Bull Ring (A)

 Sep 11-13
 Oschersleben (D)

 Sep 25-27
 Nürburgring (D)

 Oct 16-18
 Hockenheim (D)



## Bridgestone Winter tyres

BRIDGESTONE, like many other premium tyre manufacturers, is encouraging motorists to start switching to winter tyres, emphasising the point that – as winter conditions continue to become more and more unpredictable – fitting purpose-built winter tyres and knowing how to handle them is more important than ever.

Sixteen points, ranging from safety and technology right through to price considerations, as the life of a car's summer tyres will be prolonged by switching to winter alternatives, have been made on Bridgestone's official website in the hope that motorists in the UK will follow the trend seen in many other countries in Europe. Deciding to fit winter tyres early means that motorists can choose from a larger selection of tyres and avoid the inevitable delays caused by the annual rush when winter really kicks in.

With winter tyres, both the compound and tread design are much better adapted to cold conditions, offering dramatically improved safety, grip and performance on snow, ice, slush, but also on wet and frozen roads. Both internal and independent testing have proven that the braking distance of summer tyres can be almost three times longer than that of winter tyres on snow. But even in less extreme conditions, winter tyres offer greatly enhanced response, precision and control than their summer counterparts.

Bridgestone has invested heavily in developing some of the most advanced winter tyre technology possible, resulting in Bridgestone's most comprehensive and high-performance winter tyre range yet, following the overwhelming success of the Blizzak LM001 in the 2014 ADAC winter tyre test.

For full details of independent test results, see *bridgestonenewsroom.eu* and for Bridgestone's latest *YouTube* videos about winter driving, visit *http://bit.ly/1wNON6f* 

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#### Professional Wheel packages

HOPPO'S MOTORSPORT, based in Exeter, sells aftermarket wheels, nationwide, predominantly via its web shop at www.hopposmotorsport.co.uk

In addition to the existing range of alloy wheels and tyres for both cars and vans, as well as accessories like wheel nuts and spacers, the company is now offering a new wheel and tyre package, the main selling point of which is that they personally deliver and fit everything wherever the customer requests, anywhere in the UK.

Hoppo's Motorsport is focusing this service on the very busy professional who wants maximum convenience and to minimise the time spent going to tyre fitters or hanging around waiting for couriers etc. In particular, they have been concentrating heavily on the German executive vehicle market, especially as German cars are the focus of the company's expertise and experience.

As well as this Professional Package, Hoppo's Motorsport offers two other packages with this convenience at their core, but with more specific problems in mind. The 'Winter Professional Package' is aimed at supplying Winter wheel and tyre set-ups, and the 'More Tyre Professional Package' is aimed at people who keep cracking large diameter wheels on our potholed roads.

For more details, visit the website at www.hopposmotorsport.co.uk or contact Ed Hopkins at Hoppo's Motorsport on 01392 826 169.



#### Forge Motorsport supercharger reduction pulley for S5 3.0 TFSI

FORGE MOTORSPORT has created a bespoke supercharger reduction pulley for the 3.0T S5. When used in conjunction with a software upgrade, this component will help to achieve more power and, in particular, more torque from this model.

Unlike turbochargers, a supercharger provides a fixed amount of additional airflow or 'boost' relative to engine speed, which means that engines thus equipped don't usually make the same kind of gains as turbocharged engines, once mapped with similar custom software.

Forge's reduction pulley drives the supercharger at a higher speed, increasing airflow and power output. The best news is that this increase is felt throughout the rev range, allowing alteration of the map to optimise the engine management to improve throttle response in every gear.

Forge's engineers spent many dyno hours ensuring that the pulley's new diameter would be the optimum improvement for the Audi's Eaton TVS unit, with each pulley being precision machined and then dynamically balanced to ensure vibration-free operation, even at the highest achievable engine speed.

The Forge S5 pulley kit comes with a new drive belt, to take into account its smaller size, and is a direct replacement for the OEM part. It is priced at £107.00 plus VAT. Forge also offers a tailored pulley removal tool for £113.00 plus VAT. For more information, visit www.forgemotorsport.co.uk

#### Disc and pad upgrade for the S1

ITALIAN BRAKING specialist Tarox has announced a braking upgrade for the S1. Although many enthusiasts will know the Tarox brand from its ultrahigh performance range of 'Big Brake' kits, not all will know about the Italian firm's class-leading range of uprated disc and pad set-ups that offer direct replacements to the OEM parts – but with significantly greater performance and much less tendency to fade. Each of the discs are CNC machine-faced and then hand-finished for the perfect braking surface, down to a tolerance of 0.015 mm. Each disc undergoes a structural stress-relieving heat treatment at the end of each machining cycle which increases durability and massively reduces the risk of warping under repeated heavy braking.

Three styles are available. The OEMesque 'Zero' with its factory look, the diagonally vented 'G88', the JDM inspired 'Sport Japan' and the classic, spirally grooved 'F2000'.

The discs need equivalent pads, and Tarox's own Strada pads offer OEM characteristics, but with much higher levels of retardation and zero fade even under heavy, repeated braking. For those venturing out on track, the Corsa pad upgrade gives even more bite and higher temperature handling ability. Nothing increases driver confidence like a set of consistent, big-hitting brakes, so if you want to increase safety – or decrease lap times – and don't want the expense of a full big brake kit, then these are the perfect upgrade for any S1.

Prices (all include VAT): Front discs £299. Front pads £100. Rear discs £199. Rear pads £58. Hoses £90

For more information, or to order, please visit www.tarox.co.uk



#### **Normfest TermClean** from ECP

EURO CAR PARTS now stocks TermClean, the electrical contact cleaner formulated by Normfest, the respected producer of chemical solutions for the automotive industry and others.

The 400 ml aerosol container is ideal for workshop use and can be used to clean all types of electrical contacts including switches, relays and contacts. The process is a simple spray and wipe regime and it is claimed that TermClean will restore the connections to as good as new performance in minimal time and at marginal cost.

For more information please contact your nearest





#### **Vetech pads from GSF**

Brake

VETECH BRAKE pads, available exclusively through GSF Car Parts, are now to be supplied with 5 ml sachets of a specially formulated copper-free lubricant to ensure smooth movement of braking components, minimising noise and vibration.

Technicians, who know to apply the grease sparingly where the pad assembly meets the calliper, or where brake shoes contact the wheel cylinder, can now benefit from the time-saving of receiving the sachet of grease along with the pads.

In line with good practice, the grease should be kept away from friction faces, rubber parts and seals. It is specified to resist both water and high temperatures, and is fully compatible with ABS and other electronics.

'This upgrade applies to all Vetech pads,' said GSF Managing Director Jonny West. 'To manage the run-through of existing pad stocks, we're adding the grease sachet completely free of charge already.'

GSF have seen sales of Vetech braking parts grow consistently. The brand aims to strike a balance, delivering a quality trade brake friction programme that garages can trust, but which is ideal for price-sensitive work. The range of discs and pads offers extensive parc coverage.

GSF claims that Vetech braking products are sourced from leading global manufacturers to meet high specifications. All brake pads are European Regulation 90 (R90) compliant, while discs are engineered to fine tolerances from top quality alloys.

For further information, contact your nearest branch of GSF Car Parts. See www.gsfcarparts.com



#### Powerflex geometry kit for PQ35 models

THE LATEST innovations from the development team at Powerflex provides adjustment of the suspension geometry for cars based on the Volkswagen Group PQ35 platform (Series 1 and 2 A3, S3 and TT).

There are two kits in the package, to provide camber and castor adjustment. The PFF85-501G front wishbone front bush camber adjustable kit features a CNC-machined stainless-steel sleeve with an offset bore that can be rotated using the special C-spanner provided, giving +/- 0.5 degrees of on-car camber adjustment. It retails at £107.88 inc. VAT

The PFF85-502G front wishbone rear bush anti-lift and castor adjustment kit can be used to achieve castor adjustment of one degree and 7.5 mm additional anti-lift properties, Powerflex has produced its own bracket and a new polyurethane bush that increases the stiffness of the bush by 120 per cent at a load of 4000N. The bracket kit is supplied with the bush already fitted at the factory, using high-pressure tooling, and is ready to fit straight onto the car using brand-new corrosion-resistant bolts. It retails at £132.00 inc. VAT.

Feedback from Powerflex test drivers has confirmed that adjustment made to the geometry dramatically increases traction and reduces front wheel hop, while changes made to the castor angle increase turn-in response and serve to eliminate torque steer.

All parts carry a Powerflex lifetime warranty. For more details call 01895 460 033 or visit www.powerflex.co.uk

#### **Camera warning**

TOMTOM is offering Android smartphone users in the UK a dedicated speed camera app., available to download from the Google Play Store.

The app offers alerts based on TomTom's extensive coverage of fixed speed cameras. App users will automatically get camera reports shared by more than 3.4 million TomTom drivers, and will also receive an update every minute, with upcoming mobile speed cameras based on the latest information from TomTom.

Drivers can download the app from the Google Play Store for a free three-month trial. After the trial period, subscriptions can be purchased for £1.99 per month or £15.49 per year.

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#### **Ultra Racing TTS quattro strut brace**

ULTRA RACING has released details of its stylish and effective front strut brace for all '06-on TTS quattro models. Claimed to be ideal for those owners looking to increase the torsional rigidity of their car, or make the chassis more efficient for fast road or track driving, it is formed using a unique 'one-piece' steel construction, making it far more rigid and effective than many flexible or 3-piece designs.

The Ultra Racing brace uses the shortest and most direct bracing route possible, to ensure maximum rigidity – a fact augmented by the fact that the bolting flanges are a substantial 4 mm thick – significantly more than many other aftermarket offerings. With a complete lack of pivot points or hinges, it becomes an integral part of the chassis, so that it is far more effective in reducing unwanted flex in the bodyshell of the car during hard cornering, or when driving quickly. With the front and rear suspension components able to remain much nearer to their optimum pick-up points while under load, accurate suspension geometry is maintained and perfect handling results.

Improving the torsional rigidity of the TTS doesn't just enhance handling of course, but also gives a real sense of confidence in its driving dynamics, with the car feeling more precise and the steering being much more responsive.

Priced at £107.80 including VAT, the Ultra Racing brace bar has been carefully designed on a custom jig, and features crash deformation characteristics that work in harmony with the car's carefully designed crumple zones. For more information, please visit www.potn.co.uk

Casio Edifice x Infiniti Red Bull Racing EQB-500RBK-1AER

THE LATEST timepiece collaboration between Casio Edifice and multiple F1 champions, Infiniti Red Bull Racing, the striking EQB-500RBK-1AER is a precision timepiece specifically designed for world travellers and gadgetgeeks, using Bluetooth v4.0 technology to seamlessly synchronise with a smartphone and simultaneously display the exact time at home and abroad.

This timepiece features the latest retro-inspired design language from the latest AW14 range of motorsport chronographs. The tough, black-passivated case and bracelet are incredibly resilient and contrast beautifully with the sharp gold detailing and precision screened colour graphics on the face.

Developed through years of working with the globe-trotting
Infiniti Red Bull Racing F1 team, the EQB-500RBK-1AER is a feat
of ingenious packaging. Not only does this latest model feature a motor that is 26 per cent
smaller than models from previous collections, it is the first motorsport-inspired Casio Edifice
timepiece with the ability to link to a user's smartphone.

Once paired using a simple one-touch operation, this novel feature allows the watch to automatically correct the main analogue display to precisely match the local time in whatever country you alight in. Meanwhile, the supplementary dials are used like a watch-within-awatch to clearly indicate the day, time and am/pm status back at home. Twice a year, the EQB-500RBK-1AER will also use its smartphone link to automatically adjust the clock for summer time.

An additional feature, to save constant checking of your smartphone, is that the app can be used to remotely set alarm calls and even provide incoming e-mail notifications on the watch.

With a recommended retail price of £580, the 2014 Casio Edifice EQB-500RBK-1AER is available from the Casio London store, branches of H. Samuel and other quality jewellers, or via www.casioonline.co.uk For more information visit www.edifice-watches.co.uk



## On a charge with CTEK

CTEK, specialising in the care and maintenance of vehicle batteries, estimates that as many as 25 per cent of vehicles have a battery that could fail when cold mornings strike – placing car owners at severe risk of breakdown. With early predictions saying that it is going to be colder than average this year winter, it becomes more important than ever that batteries are regularly charged.

A further 32 per cent of vehicles are at some risk of battery failure if action isn't taken to maintain the condition of the battery. This is because battery performance can reduce by 35 per cent when temperatures hit freezing, and fall by as much as 50 per cent if temperatures go even colder.

Figures released by the RAC support this prediction, placing battery failure as the single biggest cause of breakdowns during the colder months. At freezing temperatures an engine's starting power requirement increases by as much as 250 per cent, compared to that of a summer's day. Furthermore, with additional drains on the battery e.g. heated screens and seats, headlights and an increase in short journeys during the winter, the battery is being placed under a huge amount of strain.

CTEK recommends the regular use of a smart battery charger, such as the MXS 5.0 which offers a unique eight step-approach to battery charging that will make sure your car battery is fully charged, conditioned and ready when the cold weather strikes. Using advanced, patented technology to measure the battery's state of health, the CTEK charging system will maximise the power and lifetime of the battery.

The patented CTEK battery charging system of the MXS 5.0 maintains and conditions the battery. The charger can be left attached indefinitely without risk of over- or undercharging, and there's no need to disconnect the battery before use as it regulates mains voltage to protect sensitive vehicle electronics from damaging voltage 'spikes'. CTEK chargers are safe and simple to use – simply connect two clips to the battery and the smart CTEK charger does the rest and tells you when you're good to go.

For further information on the full range of CTEK chargers and accessories visit www.ctek.com

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ROAD TAX — Note that, under the new rules, effective since October 1, 2014, road tax can no longer be transferred between vehicle owners. When the registered owner sells a car, you will get a refund of any remaining full months of tax when you inform the DVLA that you no longer own it. If you are buying a car, you will need to get new vehicle tax in your name before you can drive it.

#### **FOR SALE**



**AUDI A4 AVANT** B6 2004 1.9 TDI quattro Sport. Black. Late 2004 car - last of this shape (B6) in good condition for age and mileage (150,000) MoT until September 5, 2015. All the usual A4 Avant Sport refinements including extras: Cruise control, Alcantara leather seats, genuine Audi roof bars included, full Audi boot cover included. Front washer iets from an Audi B7 spray pattern far better! RS4 rear antiroll bar - makes cornering far more stable. 120% brighter headlight bulbs (legal) White LEDs for interior / number plate bulbs. Well maintained, regardless of cost (huge itemised service history available for scrutiny). This has been a great car and I have also done a lot of work to it. Bad bits: bubbling rust by the number plate, some scratches on the paintwork but nothing too bad. The new wings I had fitted were pre-painted, so not perfect paint match but not far off. Interior in very good condition – just some rubbing on the Alcantara interior but dash buttons all perfect etc, a lot of money spent on maintaining it engine-wise etc. Available after Christmas as I have a new car coming! Sensibly priced at £3,200 ono. placing it squarely in the middle of poorly maintained examples and some very highly-priced models with similar mileage. Contact Richard Saunders via funkyfin2000@gmail.com or you can call / text 07891 343 377



AUDI A6 4-door Saloon. Silver. 2000 (W-reg) Rare 2.4 V6 Avant SE Automatic. 6-CD autochanger and all usual SE accessories. Low mileage only 88,000 miles approx. New cambelt at 80,000 miles. Currently SORN declared, hence £1,999. Tel: 07478 527 003 (Witney, Oxfordshire)



AUDI A4 3.0 QUATTRO SPORT 2002 Owned from new. Mileage: 120,000. Full service history. Original specification. Tiptronic, V6 petrol engine, Crystal blue metallic, black leather interior. Recent cambelt service. Excellent condition. £3,300 Tel: 07077 087 689 (SW London) E-mail: markman7387@vahoo.co.uk



AUDI A4 2.8 QUATTRO 2000 X-reg Only 77,000 miles. S4 lookalike fitted with genuine Audi S4 front and rear bumpers, side sills, S4 17-inch alloys refurbished 2011 with new tyres, rear boot spoiler with additional brake light. Santorin blue with contrasting blue interior and Ecrue beige leather upholstery. Cosmetic modification to S4 status took place in 2011 and was professionally carried out at a total cost of nearly £4000. Specification includes heated seats with electric lumbar support, electric windows all round, electric heated doors mirrors, BOSE Sound Audi, Climate control working perfectly and cruise control, central-locking with factory immobiliser. Wood dashboard and door cappings. MoT until December 2014. New rules came into effect from October 2014 so tax cannot be transferred to new owner. Currently SORN. Car is in excellent condition for its age. I have owned it since 2009 and only driven 15,000 miles in it. Genuine reason for sale, as purchasing newer Audi S4 £1.995 ono. Contact on either (Home) 01293 887 188 or Mobile 07703 356 987 or e-mail: michaelsportquattro@btinternet.com



2009 AUDI TTS ROADSTER TFSI One previous owner, 25,300 miles, FSH. Satnay, Bose sound system, full leather. Four new tyres, £17,250 ono. Tel: 07572 530 376 (Essex)



1988 AUDI 90 OUATTRO Sold for spares or renovation. Non-runner, as induction components have been removed to boot, (broken exhaust manifold stud), therefore will have to be transported using a trailer, full history of components fitted, some spares with vehicle tyres almost new. new lowered springs etc. Phone 01383 737 239 (Answerphone, if no-one in)



**FOUR YOKOHAMA C-DRIVE 225/40** R18 92W tyres with 4 mm tread (measured to the tread bars - not full depth) Have been dry stored for some time, correctly on racks. £80. Tel: 01525 750 500 weekdays, during office hours (Bedfordshire)



FOUR CONTINENTAL CONTISPORT CONTACT 3 235/40 ZR18 with 4 mm tread (measured to the tread bars not full depth) Have been dry stored for some time, correctly on racks. £80. Tel: 01525 750 500 weekdays, during office hours (Bedfordshire)



ONE AVON ZZ3 235/40 ZR18 91Y, Brand-new, never been fitted, still with original label. Dry stored for some time, correctly on rack. £40. Tel: 01525 750 500 weekdays, during office hours (Bedfordshire)

AUDI A6 (13 LATE) S-line, leather upholstery, cruise control, satnav, mobile preparation, 7,000 miles, Glacier white metallic, 9,000 miles, totally as new, driven by elderly driver. Tax to 2015. £24,550. Tel: 01299 832 777 (Worcestershire)

HONDA C90 MOPED 2002 Electric start. 5,000 genuine miles from new, totally immaculate unmarked condition, currently in storage. Collector's item. Offers over £2,000. Tel: 01299 832 777 (Worcestershire)

DC 03 XXX REGISTRATION FOR SALE: Cherished number plate, on retention ready for transfer, open to sensible offers around £475. Tel: 01299 832 777 (Worcestershire)

E-MAIL: CLASSIFIED@AUTOMETRIX.CO.UK



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#### **FOR SALE**



AUDI TT/S3 225 ALUMINIUM ALLOY RACE RADIATOR Latest design 40 mm twin core for maximum cooling - capable of up to 30% more cooling capability than a standard radiator! Manufactured from aircraft quality aluminium, Polished alloy and fully TIG welded for strength and durability. Significantly reduces engine temperatures - ideal for track use and modified cars. Full alloy radiator with custom polished end tanks. 100% genuine Direnza product. Dimensions: Core: 670 mm x 410 mm x 40 mm. Overall: 720 mm x 410 mm x 50 mm, Inlet/outlet: 1.25 inch. Bought for a mate's car, but he sold it. Still in its box, unused looking for £90 for it. I'm in Belfast, but can post Parcel Force. Tel: 07974 809 233

#### W8 CYL

REGISTRATION on retention: W8 CYL £495. Tel: 01243 263 643 or e-mail: robert@couldwell.eu

TWO BRAND-NEW 235/35 ZR 19 Continental ContiSportContact 3s. £180 (collect only: Surrey, near M25 J8). Tel: 07850 654 911.



ALLOY WHEEL & TYRE: AUDI A6 2005 - 2011 S-line Special Edition Le Mans alloy wheel and tyre. Brandnew and unused 8.5J x 19-inch seven twin-spoke alloy wheel, complete with unused Pirelli P Zero Rosso tyre, 255/35 ZR19. Wheel Part No. is 4F0 601 025BA. I believe it will also fit A4 and A5 but please check part number to satisfy yourself of correct fitment. This wheel and tyre has never been fitted to a vehicle and has not been refurbished. It is brandnew, unmarked and perfect. From Audi, this wheel costs in excess of £700 and the Pirelli tyre is over £200. Please e-mail martynwillis@aol.com and I can send some photos. Bargain price £350 ono. I may consider a sensible and realistic offer. Please contact Martyn on 07802 442 962. The item is located near Kingston, Surrey. Collection required, or I could arrange a meeting place convenient to both parties. E-mail Martyn Willis at martvnwillis@aol.com

AUDI TT COMPS Set of freshly refurbished Audi TT Comps, 5 x 100 mm PCD 7.5J x 17-inch rims. Powder-coated Ral 9010 which is an 'off white' but not quite cream. As new, not seen a tyre since refurbishment. Come with a choice of centre caps. Asking £400 ono. Contact Wayne on 07585 707 255.



WINTER WHEELS Set of four steel wheels (6J x 15 H2 ET47) with Goodyear Ultragrip 8 tyres (195/65-15 91H) and wheel covers. The tyres have covered approximately 1000 miles and have 7 mm of tread. They were used on my Mk 5 Golf GT TDI, which has now been sold, but will also fit some Audi with same 5 x 112 mm PCD. The wheels have some slight rust blemishes; the tyres have never been kerbed and the wheel covers are in excellent condition. £375.00 ovno. Tel: 01327 358517 (Northants near J15A of M1)

#### WANTED

**WANTED:** RS2 Avant rear red light reflector plate, situated between left and right rear light assemblies. Tel:07990 517 492 or 01628 620 714 or: andreahornblower@hotmail.co.uk

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#### **ROAD TEST INDEX NOV/DEC 1997 – DECEMBER 2014**

A1 1.2 TFSI SE	Mar '11	A4 (3) 2.0 TFSI quattro	May '08	A6 Avant 2.5 TDI	Nov/Dec '98	S6 quattro V10	Jan '07
A1 1.4 TFSI Sport	Mar '11	A4 (5) 2.0 TDI 120 PS	Dec '09	A6 Avant 2.5 TDI quattro	Jan/Feb '00	S6 Avant quattro	May/Jun '00
A1 1.4 TFSI (122) S line	Jan '13	A4 (5) 2.0 TDIe 136 PS	Apr '10		Nov/Dec '01	S6 Avant quattro V10	Jul '08
A1 1.4 TFSI (185) S line	Mar '12	A4 (5) 2.0 TDI 170	Apr '09	A6 Avant 2.7 TDI SE	Jun '05	S7 quattro	Jan '13
A1 1.6 TDI Sport	Dec '11	A4 (6) 2.0 TDI SE Multitronic	Aug '14		Jul '06	S8 quattro	Mar/Apr '00
A1 2.0 TDI S line	Aug '12		Dec '14		Aug '02	S8 (V10)	Jan '09
A1 Sportback 1.4 TFSI S tronic	Nov '13		Aug '05	A6 Avant 3.2 FSI quattro	Apr '06	S8 (V8 bi-turbo)	Dec '12
A1 Sportback 1.6 TDI Sport	Mar '13	A4 (2) 2.5 TDI quattro Sport	Mar '04	A6 4.2 quattro, Avant/Saloon	Nov/Dec '99		
A2 1.4 SE	Jan/Feb '01	A4 (4) 2.7 TDI Multitronic	Jul '08	New A6 3.0 TFSI quattro SE	Aug '11	RS Q3	Apr '14
A2 1.4 3E A2 1.4 TDI	Feb '05	A4 (2) 3.0 manual	Apr '02	New A6 Avant 3.0 TDI SE	Apr '12	RS 3 quattro	Feb '12
A2 1.4 SE TDI	May/June '01	A4 (3) 3.0 TDI quattro SE	Dec '05	A4 allroad quattro 2.0 TDI	Aug '09	RS 4 quattro Saloon	May '06
A2 1.6 FSI	Mar '04	A4 (3) 3.2 quattro	Jan '08	A4 allroad quattro 2.0 TDI (177 PS)	Jun '12	RS 4 quattro Cabriolet	Sep '06
A2 1.6 FSI Sport	Dec '02	A4 Avant (5) 1.8 TFSI	Oct '08	A4 allroad quattro 3.0 TDI S tronic	Nov '09	RS 4 Avant quattro	Feb '13
		A4 Avant (2) 1.9 TDI 130 SE	J/F '02	A4 allroad quattro 3.0 TDI S tronic	Feb '11	RS 5 quattro	Dec '10
A3 1.6	Mar/Apr '99	A4 Avant (2) 2.0 SE Multitronic	Aug '02	allroad quattro 2.5 TDI	Jan/Feb '01	RS 6 Avant quattro	Jan '03
A3 1.6 FSI	June '06	A4 Avant (5) 2.0 TFSI quattro	Jan '11	allroad quattro 2.5 TDI	May '01	RS 6 Avant quattro	Sep '04
A3 1.6 FSI	Mar '07 Mar '01	A4 Avant (6) 2.0 TDI 177 PS A4 Avant (6) 2.0 TDI quattro	Sept '12 Sept '13	allroad quattro 2.7T	Nov/Dec '00	RS 6 quattro Plus Avant	Feb '05
A3 1.6 Sport	Jan/Feb '99	A4 Avant (3) 2.0 TDI quattro A4 Avant (3) 2.0 TDI Multitronic	Oct '05	allroad quattro V8 4.2	Jan '04	RS 6 quattro Saloon (2)	Dec '09
A3 1.8 SE A3 1.8 SE, 4-door	Nov/Dec '01	A4 Avant (2) 2.4 SE Multitronic	May '04	allroad quattro V8 4.2	Jul '04	RS 6 quattro Avant (2)	Sep '08
A3 1.8 SE automatic, 4-door	Sep/Oct '00	A4 Avant (2) 2.5 TDI quattro	Sep '03	allroad quattro 3.2 FSI	Dec '06	RS 6 Avant (3)	Feb '14
A3 1.8T Sport	Mar/Apr '98	A4 Avant (2) 3.0 TDI quattro	Aug '06	allroad quattro 3.0 TDI	Aug '07	RS 7	Mar '14
A3 1.8T Sport	Sep '02	A4 Avant (5) 3.0 TDI quattro	Jul '09	A6 allroad quattro 2.7 TDI	Oct '10		
A3 1.8T quattro Sport	Mar '02	A4 Cabriolet 1.8T	Nov '04	A6 allroad quattro 3.0 TDI	Sept '12	TT Coupé 1.8T	Apr '05
A3 1.9 TDI SE	Jul/Aug '98	A4 Cabriolet 1.8T Sport	Aug '03	A6 allroad quattro 3.0 TDI (245 PS)	Aug '14	TT Coupé 1.8T quattro (180)	Sep/Oct '99
A3 1.9 TDI Sport, 4-door	May/Jun '00	A4 Cabriolet 2.0T	May '06	A6 allroad quattro 3.0 BiTDI	Sept '12	TT Coupé 1.8T quattro (225)	Mar '03
A3 1.9 TDI quattro Sport	May/Jun '02	A4 Cabriolet 2.4 Multitronic	Nov '03	A7 Sportback 3.0 TDI quattro	Mar '11	TT Coupé quattro Sport	Feb '06
A3 (2) 1.2 TFSI	Sep '11	A4 Cabriolet 2.5 TDI Multitronic	Nov '03	A7 Sportback 3.0 Bi-TDI quattro	Sept '14	TT Coupé 3.2 quattro – DSG	Jun'04/Apr '05
A3 (2) 1.6 TDI	Jun '10		Dec '02	A7 Sportback 3.0 TFSI quattro	Jun '11	TT Coupé (2) 2.0 TDI quattro	May '13
A3 (2) 1.4 TFSI	Jun '08	A4 Cabriolet 3.0 Multitronic				TT Coupé (2) 2.0 TFSI	Jul '07
A3 (2) 2.0 FSI	Feb '04	A4 Cabriolet 3.0 TDI	Apr '07	A8 2.8	Nov/Dec '98	TT Coupé (2) 2.0 TFSI quattro	Sep '09
A3 (2) 2.0 TFSI	Oct '10	A5 1.8 TFSI S line	Aug '12	A8 3.0 TFSI quattro SE	Nov '12	TT Coupé (2) 2.0 TFSI quattro (211)	Feb '11
A3 (2) 2.0 TDI SE	Apr '04	A5 2.0 TFSI	May '09	A8 3.0 TDI quattro	Dec '04	TT Coupé (2) 3.2	Feb '07
A3 (2) 2.0 TDI Sport	Feb '09	A5 2.0 TDI quattro	Jun '09	A8 3.0 TDI quattro	Oct '08	TT Roadster 150	Oct '03
A3 (2) 2.0 TDI quattro S line	Aug '05	A5 3.0 TDI quattro	May '13	A8 3.0 TDI quattro SE	Apr '12	TT Roadster 1.8T quattro (180)	Mar/Apr '00
A3 (2) 2.0 TDI (170) quattro Sport	Jun '07	A5 3.0 TDI quattro	Dec '14	A8 3.2	Nov '07	TT Roadster 1.8T quattro (180)	Nov '02
A3 (2) 3.2 quattro	Aug '04	A5 3.2 FSI	Jun '08	A8 3.7	Sep/Oct '98	TT Roadster 1.8T quattro (225)	Sep/Oct '01
A3 (3) 1.4 TFSI	Dec '12	A5 Cabriolet 2.0 TFSI	Oct '11	A8 3.7 quattro Sport	Jul/Aug '99	TT Roadster 1.8T quattro (225)	Sep '05
A3 (3) 1.8 TFSI Sport S tronic	Nov '13	A5 Cabriolet 2.0 TDI	May '10	A8 3.7 quattro Sport A8 3.7 quattro Sport	Jul/Aug '01 Jul '03	TT Roadster (2) 1.8 TFSI	Sep '10
A3 Sportback 1.4 TFSI	Jul '13	A5 Cabriolet 3.0 TDI quattro	Sep '09		Oct '03	TT Roadster (2) 1.8 TFSI	Jul '11
A3 Sportback 1.6 Sport	Dec '07	A5 Sportback 2.0 TDI Sline	Feb '10		Sep/Oct '00	TT Roadster (2) 2.0 TFSI	Sep '07
A3 Sportback 1.9 TDI	Jan '06	A5 Sportback 2.0 TDI (177)	Sept '14		Aug '04	TT Roadster (2) 2.0 TDI quattro	Sep '09
A3 Sportback 2.0 TFSI S tronic	Aug '07	A5 Sportback 2.0 TFSI	Aug '10 Apr '13	A8 4.2 FSI quattro	Oct '10	TT Roadster (2) 2.0 TDI quattro	Dec '13
A3 Sportback 2.0 TFSI quattro A3 Sportback 2.0 TDI	Sep '05 Dec '13	A5 Sportback 2.0 TFSI quattro A5 Sportback 3.0 TDI	Apr 13 May '11	A8 4.2 TDI	Dec '10	TT Roadster (2) 3.2 quattro	Jan '08
A3 Sportback 2.0 TDI S line	May '07			A8 4.2 TDI quattro	Mar '06	TTS Coupé	Nov '08
A3 Sportback 2.0 TDI quattro	May '11	A6 1.8T SE	Jul/Aug '98	A8L 4.0 TFSI quattro	Mar '02	TTS Coupé	Jul '11
A3 Sportback 2.0 TDI quattro	June '14	A6 1.8T Multitronic	Jan/Feb '02	A8L 4.2 quattro	Mar '02	TTRS Coupé	Apr '10
A3 Sportback 3.2 quattro Sport	May '05	A6 1.8T quattro	Sep/Oct '00	A8L 4.2 TDI quattro	May '14	TTRS Plus Coupé	Mar '13
A3 Cabriolet 1.2 TFSI	Jan '11	A6 1.9 TDI 110	Mar/Apr '99			TTRS Roadster	Nov '09
A3 Cabriolet 1.6	Aug '09	A6 1.9 TDI 115	May/Jun '01	S3 quattro	Nov/Dec '99	-	
A3 Cabriolet 1.8 TFSI	Aug '08	A6 2.4 SE Tiptronic	May/Jun '98	S3 quattro	Apr '02 Jul '07	Q3 2.0 TFSI quattro	Jul '12
A3 Cabriolet 1.8 TFSI	Nov '11	A6 2.5 TDI SE	Jun '03	S3 (2) quattro S3 (3) quattro	Jul 07 Jan 113	Q3 2.0 TDI FWD	Jul '13
A3 Cabriolet 2.0 TDI	Jan '10	A6 2.8 SE A6 2.0 TDI	Nov/Dec '97	S3 (2) Sportback	Mar '10	Q3 2.0 TDI FWD	Feb '14
A3 Cabriolet (2) 2.0 TDI	May '14	A6 2.8 FSI	May '09	S3 (2) Sportback	Dec '11	Q3 2.0 TDI SE	Jan '12
A4 1.8T Sport	N/D '97	A6 3.0 TDI quattro	Sep '07 Jan '05	S3 (3) Sportback	Jul '14	Q5 2.0 TFSI	Jun '09
A4 1.81 Sport A4 1.9 TDI 110 SE	M/A '98	A6 3.0 TDI quat S line Sp. Ed.	Sep '10		Jun '14	Q5 2.0 TDI	Jan '10
A4 2.4 SE	J/F '99	A6 3.0 TFSI	Nov '10		Mar/Apr '99	Q5 3.0 TDI S line	Aug '10
A4 3.0 quattro automatic	M/J '98	A6 3.2 FSI quattro SE	Mar '05		Dec '03	Q5 3.2. FSI	Nov '11
A4 quattro	J/F '99	A6 4.2 quattro	Nov '05	S4 quattro (V8)	Jul '04	SQ5 TDI	Aug '13
A4 Avant 1.8T Sport	N/D '98	A6 2.0 TFSI	Jul '10		Jul '05	Q7 3.0 TDI	Oct '06
A4 Avant 1.8T Sport	J/A '00	A6 2.0 TFSI Avant	Nov '06	<b>S4</b> (4) quattro	Oct '09	Q7 3.0 TDI Clean Diesel	Mar '10
A4 Avant 1.8T quattro Sport	\$/0 '99	A6 2.0 TDI SE	Mar '05	S4 Avant quattro	Jul/Aug '99	Q7 3.6	Apr '08
A4 Avant 2.5 TDI quattro	N/D '98	New A6 2.0 TDI	Sep '12		Jul '09	Q7 4.2	May '07
A4 Avant 2.8 quattro, Tiptronic	M/J '99	New A6 3.0 TDI quattro SE	Jun '12		Apr '11	Q7 6.0 TDI	Mar '12
A4 (2) 1.8T	Apr '03	New A6 3.0 BiTDI quattro SE	Oct '12		O'ct '05	-	
A4 (2) 1.8T S-Line	Sep '04	New A6 Hybrid	Jun '13		Feb '08	R8 V8 Coupé manual	Dec '08
A4 (3) 1.8 T quattro	Jun '07	A6 Avant 1.8T Multitronic	Jul '02		Aug '11	R8 V8 Coupé manual	Jun '13
A4 (5) 1.8 TFSI	Apr '11	A6 Avant 2.0 TDI	Mar '08	S5 Sportback quattro	Oct '11	R8 V10	Jun '10
A4 (2) 1.9 TDI Sport	J/A '01	A6 Avant 2.0 TDI	Feb '12		Oct '12	R8 V10 plus	Oct '13
A4 (2) 2.0 FSI	Feb '03	A6 Avant 2.0 TDle	Mar '09	S6 quattro	May/Jun '02	R8 V10 Spyder manual	May '10
A4 (3) 2.0T FSI quattro DTM	Nov '05	A6 Avant 2.0 SE	May '04	S6 quattro	May '03	R8 V8 Spyder manual	Sep '11

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