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The new Audi RS 6 Avant – Top performance for everyday driving

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Short version

Pioneering and strong – the new Audi RS 6 Avant

The new Audi RS 6 Avant unites 412 kW of power and 700 Nm of torque with unrestricted practicality for everyday use and leisure. Developed and built by quattro GmbH, a wholly owned subsidiary of AUDI AG, this high-performance Avant offers superior performance and groundbreaking efficiency. Its twin-turbo V8 averages 9.8 litres of fuel per 100 km over a combined cycle. Aluminium and high-end steels in the body have reduced the vehicle's weight.

The new Audi RS 6 Avant is self-assured and powerful. From a displacement of 3,993 cc, the direct-fuel-injection twin-turbo V8 delivers 412 kW and a constant 700 Nm of torque between 1,750 and 5,500 rpm. Positioned in the cylinder banks' 90-degree V, two twin-scroll turbochargers ensure that considerable torque is generated quickly. This large Avant accelerates from 0 to 100 km/h in just 3.9 seconds. On request, Audi will increase the car's top speed from 250 km/h to 280 km/h or even 305 km/h. Average fuel consumption is 9.8 litres per 100 kilometres – 30 percent less than the previous model.

The cylinder on demand (COD) system, which temporarily switches off four cylinders during part-load operation, is a deciding factor in this efficiency. Active engine mounts apply targeted counterpulses to attenuate the minor vibrations that occur during these phases. COD technology reduces standard fuel consumption by around five percent; driving at moderate speeds can achieve up to twelve percent.

Thanks to a sportily tuned eight-speed tiptronic with a tall eighth gear, the power of the 4.0 TFSI is transferred to the quattro permanent all-wheel drive, which makes use of a refined centre differential. Torque vectoring, an intelligent software solution, aids the quattro drivetrain. If desired, Audi will supplement quattro with a sport differential to actively distribute power between the rear wheels.

Standard equipment for this new high-performance Avant also includes RS adaptive air suspension. This firmly tuned suspension with controlled damping lowers the vehicle body by 20 millimetres. It is managed by the Audi drive select dynamics system, as are the sport differential and dynamic

steering, which adjusts the steering ratio to the vehicle's speed. The driver can switch between several modes of operation. Audi offers a taut RS Sport suspension plus with Dynamic Ride Control (DRC) as an alternative to the RS adaptive air suspension.

The new Audi RS 6 Avant boasts 20-inch forged wheels fitted with 285/30 R 21 tyres as standard. Six- piston brake calipers encircle the front brake discs in a wave design and measure 390 millimetres in diameter. Audi offers optional 420-millimetre carbon-fibre ceramic discs for the front axle. Electronic Stabilisation Control (ESC) features a sport mode that can be completely deactivated.

Lightweight and stable: The body

The body of the new Audi RS 6 Avant consists of high-tech steels and approximately 20 percent aluminium. Thanks to Audi's lightweight excellence, this new top-of-the-line model weighs nearly 100 kilograms less than its predecessor. The body nevertheless excels with respect to crash safety and torsional rigidity.

The exterior of this high-performance Avant includes matt aluminium applications, a high-gloss black protective grille, the bumpers, extensions on the sills and wheel arches. An RS roof spoiler, a diffuser and the RS Sport exhaust system's two black tailpipes make it clear that the RS 6 Avant is the sporty high-end vehicle of this model line. Two styling packages – matt aluminium or optional carbon – further customise the appearance. LED headlights with shaded trim and LED rear lights are standard.

The interior of the new Audi RS 6 Avant is dominated by sporty black. The instrument dials are white and the needles red. The RS-specific three-spoke leather sport steering wheel is flat-bottomed and has an especially thick, well- contoured rim. Trim elements in aluminium look or Piano finish, illuminated door sill trims with RS 6 badges and decorative carbon inlays accentuate the look. RS sport seats with pronounced side bolsters and integrated head restraints are standard. The seats are covered in Valcona leather. The centre sections featuring diamond quilting are a highlight. The RS 6 Avant comes standard with a three-person rear bench seat.

At a glance

The new Audi RS 6 Avant

Engine

- Twin-turbo V8 engine with FSI direct injection and a displacement of 3,993 cc
- Output 412 kW, 700 Nm of torque from 1,750 to 5,500 rpm
- 0 to 100 km/h in 3.9 seconds, top speed optionally 305 km/h
- Start-stop-system and cylinder on demand (COD)
- EU cycle fuel consumption just 9.8 litres per 100 km

Power transmission

- Eight-speed tiptronic with shortened shift times
- quattro permanent all-wheel drive with redesigned centre differential
- Torque vectoring, sport differential

Chassis

- Specifically-tuned RS adaptive air suspension
- RS sport suspension plus with Dynamic Ride Control (DRC) as an option
- Audi drive select standard; optionally dynamic steering
- 21-inch wheels standard
- Brake discs in wave design, optionally carbon fibre-ceramic brake discs
- Electronic Stabilisation Control (ESC) features a Sport mode that can be deactivated

Body and design

- Hybrid aluminium body
- RS-specific design elements

Interior

- Black interior, CFRP inlays, many details in aluminium look
- Illuminated entry sills, RS 6 badges in the interior
- RS sport seats with integrated head restraints standard
- Rear bench seat that seats three

Full version

Uncompromisingly sporty – the new Audi RS 6 Avant

The new Audi RS 6 Avant stands for pioneering performance. It is lighter and more efficient than the predecessor version and its performance has improved once more. The RS 6 Avant accelerates from 0 to 100 km/h in just 3.9 seconds. If the customer wishes, its top speed can be 305 km/h. Its 4.0 TFSI develops 412 kW while averaging just 9.8 litres of fuel per 100 kilometres.

The new Audi RS 6 Avant is a high-performance sports car for everyday use and leisure. Its character and thoroughly sporty design is the work of quattro GmbH, a wholly owned subsidiary of AUDI AG. RS models boast powerful engines and constitute the dynamic spearhead of the Audi portfolio. The abbreviation “RS” represents many things: the most powerful engine within a model line, quattro permanent all-wheel drive, extremely dynamic performance, an understated look and comprehensive everyday practicality.

Engine

The Audi RS 6 Avant 4.0 TFSI handsomely illustrates Audi downsizing strategy. The V8 biturbo draws impressive power from its 3,993 cc of displacement in every driving situation. Its peak output of 412 kW occurs between 5,700 and 6,600 rpm, with a constant 700 Nm of torque available from 1,750 to 5,500 rpm.

Every detail is an expression of the high-end character of the charged eight-cylinder engine. The aluminium-silicon crankcase is manufactured in a low-pressure permanent mold casting, which ensures a high level of material uniformity. The bedplate – a stable frame for the crankshaft bearing bridges – further enhances the block’s rigidity. The chain drive is located on the back to save space. The engine’s compact construction reduces its length to 497 mm; bore and stroke measure 84.5 and 89.0 mm, respectively. Even with all key add-on parts, this engine weighs just 224 kilograms.

An unthrottled intake system supplies the four-liter V8, which has a specific engine management system, with air; the Audi FSI direct injection metres the fuel. Switchable flaps in the intake ports mix the incoming air in a cylindrical motion to enhance charging and combustion. The directly injected and intensively swirled fuel cools the combustion chambers. This method enables the high compression ratio of 10.1:1.

Two turbochargers generate up to 1.2 bar of relative boost pressure. The twin-scroll technology, in which the exhaust gas of every two cylinders flows to the turbine wheel via separate exhaust ports, avoids undesirable interactions between the gas columns. The end effect is an early and steep torque buildup.

The large turbochargers and their air-to-water heat exchanger are located in the inside V of the cylinder banks rather than in the usual location outside next to the crankcase. This layout enables short gas flow paths with minimal flow losses and spontaneous engine response. Elaborate and effective insulation of hot components ensures thermally stable conditions in the inside V.

Sound flaps in the dual exhaust system make the engine's sound profile even more resonant. They are controlled independently from engine load, engine speed, the mode in the Audi drive select dynamics system and the eight-speed tiptronic operating level. The RS sport exhaust system from quattro GmbH is fitted as standard to Australian vehicles.

Extensive package: technologies from the modular efficiency platform

The 4.0 TFSI has many technologies from Audi modular efficiency platform – including the start-stop-system. Innovative thermal management controls coolant flow through the engine while it is warming up so that the engine oil heats as quickly as possible. A regulated oil pump varies oil pressure in two stages. At the Audi plant in Győr, Hungary, high-end technologies such as the panel honing of cylinder barrels are used during assembly of the V8 engine. The piston pins have a fine, diamond-like carbon (DLC) coating.

Another pioneering innovation is the cylinder on demand (COD) technology that is based on the Audi valvelift system (AVS). It reduces standard fuel consumption by around five percent; driving at moderate speeds can achieve up to twelve percent.

At low to moderate load and engine speed – up to around 250 Nm and 3,500 rpm – the COD technology deactivates cylinders 2, 3, 5 and 8 by closing the valves and stopping fuel injection and ignition to them. Efficiency in the active cylinders increases because the operating points are displaced toward higher loads. Immediately before closing, the combustion chambers are once again filled with fresh air – this solution ensures relatively low internal pressures in the cylinders.

The switchover occurs within hundredths of a second via sleeves that move axially on the camshafts; they are moved by pins that are electromagnetically extended into spiral-shaped slots on the outside of the sleeves. This transition process runs so smoothly that the driver practically only notices the four-cylinder operation by the message in the instrument cluster display. The cylinders are reactivated as soon as the driver presses the accelerator pedal more firmly.

While the V8 is temporarily running as a V4, ignition only takes place at every 180 degrees of crankshaft angle. Its crankshaft drive produces higher rotational oscillations – the active engine mounts counteract this effect. Utilizing electromagnetic oscillation coil actuators, they induce phase-offset counter oscillations which largely cancel engine vibration. The active engine mounts are also operational during idling.

Audi RS 6 Avant: The 4.0 TFSI

Displacement cc	3,993
Bore/Stroke, mm	84.5/89.0
Compression ratio	10.1:1
Power output kW	412 between 5,700 and 6,600 rpm
Torque, Nm	700 from 1,750 to 5,500 rpm

Power transmission

The 4.0 TFSI is paired with an eight-speed tiptronic featuring especially shortened shift times. The automatic transmission, integrated in the engine's thermal-management system, features a Dynamic Shift Program (DSP) with D (Drive) and S (Sport) modes. If the driver wants to shift on his own, he can use the shift paddles on the steering wheel or the selector lever with unique RS design. Launch Control delivers the engine's power to the road with defined tire slip and superb traction.

The tiptronic's lower speeds are tightly spaced, while its high gear spread of 7.1:1 between the shortest and longest gears reduces fuel consumption. The new RS 6 Avant sprints from a starting position and operates at relatively low rpm even in eighth gear.

A refined centre differential, which can distribute power within an astoundingly broad range, constitutes the heart of the quattro drivetrain in the new Audi RS 6. In normal driving, 40 percent of torque flows to the front axle and 60 percent to the rear axle. Whenever necessary, this purely mechanical component will distribute torque without the slightest hesitation – with up to 70 percent flowing to the front or as much as 85 percent to the rear. Yet another strength of this new differential, serviced by a dedicated oil cooler, lies in its low weight. Indeed, it weighs 1.8 kilograms less than the previous generation.

The centre differential in the new Audi RS 6 Avant operates in conjunction with an intelligent software solution in the brake management system: torque vectoring, which can act on all four wheels. If, during high-speed cornering, the brake management software detects that the wheels on the inside of the curve are about to slip, it marginally brakes these wheels; just a slight application of the pads on the discs at minimal pressure suffices. As a result, the handling of the RS 6 Avant is even more neutral and stable than ever before, even at the limits of handling. And just in case Electronic Stabilisation Control (ESC) does intervene, any instances of this occur later and more smoothly.

Even more dynamics: the sport differential

Another module in the quattro drivetrain provides even greater dynamics.

The sport differential actively distributes torque between the rear wheels. When the driver steers or accelerates in a curve, much of the torque flows to the outside wheel. The sport differential thus guides the new RS 6 Avant during cornering counteracting any tendency toward oversteering or understeering from the outset. The standard Audi drive select dynamics system, allows the driver to fine-tune the sport differential mode of operation.

The sport differential features a conventional rear differential on both sides supplemented by a superimposed stage. It comprises two sun gears and an internal gear and rotates roughly ten percent faster than the drive shaft. A multi-plate clutch in an oil bath and operated by an electrohydraulic actuator provides the power connection between the shaft and the superimposed stage. When the clutch closes, it steplessly imposes the higher speed of the superposition gear on the outside wheel. The additional torque required is drawn away from the inside wheel via the differential.

Chassis

The new RS 6 Avant is the first RS model from Audi with a specifically tuned air suspension as standard. Thanks to a dynamic configuration of the RS adaptive air suspension, the body sits 20 millimetres lower. Integrated damping control operates as per road conditions, a given driver's style and the mode chosen via the Audi drive select dynamics system. The driver can switch between five modes: comfort, auto, dynamic, individual and lift with this system.

The front axle of the new Audi RS 6 Avant comprises five links per wheel. More specifically, there are two transverse links on the upper plane, the support link and control arm on the lower plane, and the track rod. The five-link design can handle longitudinal and lateral forces separately. Its bearings respond smoothly in the longitudinal direction, and are stiff in the transverse direction for sporty precision.

The control arms are aluminium forgings, which keep the unsprung masses low. The wheel carriers and pivot bearings are also made of this same material. The anti-roll bar fabricated from a high-strength tube also saves weight. The integrated support for the engine and the front axle serves as

the backbone of the suspension. Made of high-strength steel, it is rigidly bolted to the frontend of the car.

The electromechanical power-steering unit, a compact and lightweight part, is down low along the wheel centre line. This results in agile response, high precision, and explicit road feedback. Power-steering assistance has been tailored to the personality of this robust top-of-the-line model; it also varies in accordance with the vehicle's speed. This system is extremely efficient because it consumes no energy when driving straight ahead. By supporting proper adjustments and hindering improper steering movements, the electromechanical steering assists the driver with braking and countersteering on a lane that is slippery on only one side.

Featuring characteristic RS performance, Audi dynamic steering is optional equipment for this new high-performance Avant. Its superimposed gear system adjusts the steering ratio by nearly 100 percent as a function of driving speed and the setting in Audi drive select. It applies a very direct steering ratio at low speeds; at higher speeds, a relatively indirect steering ratio promotes steady straight-line stability. At the vehicle's cornering limits, dynamic steering minimises oversteering and understeering by autonomously executing subtle adjustments.

The rear axle of the new Audi RS 6 Avant follows the track-controlled trapezoidal link principle: a compact layout which provides safe, sporty and comfortable driving. The top transverse links and the track rods are aluminium forgings; the stabiliser bar is also a steel tube.

Taut support: RS sport suspension plus with DRC

Audi offers a decidedly taut RS sport suspension plus with Dynamic Ride Control (DRC) as an alternative to the RS adaptive air suspension. This system employs a steel suspension and three-way adjustable shock absorbers that are interconnected via diagonally opposed oil lines and one central valve each. When cornering at speed, the valves regulate the oil flow in the shock absorber of the spring-deflected front wheel at the outside of the curve. They increase the support provided and reduce lateral tilt.

The RS brakes offer uncompromising performance. The four internally ventilated discs feature a weight-saving wave design with wave-shaped outer

contours. The front discs measure 390 millimetres in diameter and are adorned by black, six-piston calipers. Customers can opt for red brake calipers. Another option: especially durable and long-lasting carbon fibre-ceramic brake discs that measure 420 millimetres in diameter and have anthracite gray calipers. Electronic Stabilisation Control (ESC) features a Sport mode that can be completely deactivated.

Standard on the new Audi RS 6 Avant are 21-inch wheels in 5 twin-spoke design that come in three different finishes: high-gloss silver, machine-polished black or machine-polished titanium look. These wheels are fitted with 285/30 R 21 tyres.

Body

Thanks to the lightweight excellence of Audi, the new Audi RS 6 Avant weighs nearly 100 kilograms less than its predecessor. The body consists of about 20 percent aluminium, which makes a crucial contribution towards its low weight. The crossbar in the engine compartment and the cross-members behind the front and rear bumpers are aluminium sections. The front strut domes are aluminium castings. The integral subframe behind the instrument panel, the transverse member in the trunk, the front fenders, the doors, the hood and the trunk lid are made of aluminium.

Hot-formed components throughout the occupant cell ensure supreme strength. These components are first heated in a furnace to over 1,000 degrees Celsius and shaped immediately thereafter at around 200 degrees Celsius in a water-cooled pressing die. This abrupt change in temperature creates an iron-carbon structure of exceptional tensile strength. These high-tech steels are relatively thin and therefore light.

The vehicle body boasts even more highlights. It not only boasts impact safety to a high degree but also outstanding static and dynamic torsional rigidity. They thus lay the foundation for superior quality of manufacture, precise handling and a smooth ride when it comes to the new Audi RS 6 Avant.

Exterior design

The new Audi RS 6 Avant has a sporty, muscular look. The sills have been enlarged and the wings, too. The rear wheel arches are also larger than in the predecessor model. The new RS 6 Avant shows dynamic elegance: a long hood, a wheelbase of 2,915 mm, a low greenhouse and flat D-pillars.

The front end is characterized by a single-frame grille with angled upper corners and the RS bumper with large air inlets. Many more design details underscore the unique personality of the new RS 6 Avant. The single-frame grille, front blade, window capping strips, roof rail and housings of the outside mirrors are in matt aluminium look, whereas the honeycomb grille at the front of the vehicle is high-gloss black.

The large RS roof spoiler, the shaded tail lights and the angular bumpers are the prominent features in the rear. A diffuser with vertical fins encapsulates the two large, elliptical tailpipe trims of the RS exhaust system. RS 6 badges at the front and rear further accentuate the look.

Two styling packages – matt aluminium and optional carbon – impart a truly one-of-a-kind look to this high-performance Avant not only due to a prominent quattro logo on the central front air-intake ducts. With the carbon styling package, the front splitter and the diffuser are even more boldly shaped.

Ten different paint finishes are available for the new Audi RS 6 Avant. Exclusive Daytona Gray matt is brand-new. Also available are the single-color coatings Ibis White and Nardo Gray as well as the following metallic/pearl-effect colors: Suzuka Grey, Misano Red, Daytona Grey and Phantom Black. The crystal-effect finishes Prism Silver, Estoril Blue and Panther Black owe their appearance to special pigmentation. Customers can also take advantage of an exclusive quattro GmbH offer by having any possible paint color customised for the m.

Audi RS 6 Avant: External dimensions

Length	4,979 millimetres
Wheelbase	2,915 mm
Width	1,936 mm
Height	1,461 mm

Interior

The cockpit of the new Audi RS 6 Avant is catered to the driver. The dial instruments feature black faces, white dials and red needles. RS logos adorn the key; the flat-bottomed, three-spoke, multifunction leather sport steering wheel; the illuminated door sill trims; the tachometer; and the driver information system's large color screen. The selector lever bears a specific design and the shift paddles feature an aluminium look.

New in the driver information system's RS menu is the shift light. Green segments illuminate as revs increase; the bar turns red and begins to blink as revs approach the red line. The RS driver information system is further complemented by a lap timer and displays for gear selection, boost pressure and oil temperature as well as a digital speedometer.

Black headlining is standard, with lunar silver and black Alcantara as options. The footrest, pedals and control buttons in the MMI navigation plus terminal shine in aluminium look. Interior door openers feature a filigree double-bar design, a classic RS feature. Decorative carbon inlays are standard. Ten other materials are optionally available, including Piano finish and aluminium/Beaufort.

RS sport seats with prominent side bolsters, integrated headrests and embossed RS 6 logos are standard. The seats are covered in high-grade, honeycomb-quilted Valcona leather in either black or lunar silver. Audi offers optional power-adjustable comfort seats with memory function; the front seats can also be fitted with ventilation and massage functions. By means of the Audi exclusive customization program, quattro GmbH offers a wealth of interior options. A design package in black with red stitching and red seat belts is but one example.

The new Audi RS 6 Avant comes standard with a three-person bench seat in the rear. The luggage compartment holds up to 1,680 litres. The rear seat backs can be folded down simply by pulling on latches in the side walls of the luggage compartment. A rail system for securing cargo as well as bag hooks and a net partition are standard equipment.

Driver assistance systems

Driver assistance and safety systems by Audi grant drivers yet more control in the new Audi RS 6 Avant. At speeds between 0 and 250 km/h, the radar-assisted adaptive cruise control (ACC) with Stop & Go function detects vehicles ahead to always maintain the proper following distance. At speeds below 30 km/h, the system initiates maximum braking in the event of an impending collision.

ACC with Stop & Go function works closely with the Audi pre sense safety system, which is available in a number of different configurations. Audi active lane assist helps the driver to remain in a given lane by gently intervening in the electromechanical steering, if necessary. It makes use of the same video camera as the speed-limit indicator, which presents detected traffic signs on the DIS screen. Audi side assist also uses rear-mounted radar to help drivers to change lanes more safely.

The night vision assistant, which highlights detected pedestrians, makes for less stressful driving at night. The standard driver information system with rest recommendation recognizes when a driver is getting tired and advises him to take a break. The park assist system with surround-view camera handles steering instead of the driver.

In the luxury configuration, several small wide-angle video cameras ensure good views of otherwise hard-to-see spots. The driver can have the MMI monitor display images from these cameras.

quattro GmbH

A dynamic subsidiary of AUDI AG, quattro GmbH is celebrating a special anniversary in 2013. For 30 years, this company has stood for high performance and high-tech – in short, for the fascination of quattro. The magical word quattro encapsulates not only supremely successful technology, but also a dynamic approach to life under the four rings.

quattro GmbH covers three areas of business. The first is the development and construction of the high-performance models from Audi, i.e. the RS and R8 vehicles. The second field of activity encompasses vehicle individualization and accessories. The third, and most recent, concerns customer racing.

Since 1996, quattro GmbH has produced some 75,500 high-performance vehicles, with recent years in particular seeing a further significant rise in output – from 2,500 cars in 2000 to around 11,500 in 2012. quattro GmbH also customised 160,000 cars and sold almost 2.5 million accessories in 2012 alone.

As for customer racing– known as Audi Sport customer racing – the R8 LMS ultra and its predecessor have driven to more than 150 victories worldwide in just three years. The GT race car won such events as the 24-hour races on the Nürburgring and in Spa-Francorchamps in 2012.

As for the R8 and RS models, quattro GmbH is aiming to sell 15,000 units this year. New vehicles are to serve as the engine for growth: the RS 5 Cabriolet, the RS 6 Avant, the RS 7 Sportback and the RS Q3. Eight RS models in all amount to the broadest portfolio of quattro yet. The company is expanding its presence in the United States, China, Russia and the Middle East to reach more customers. As the dynamic spearhead of the Audi model range, vehicles crafted by quattro GmbH satisfy unique requirements. RS models are only produced if they constitute the perfect complement to a model series. Each RS model is an individualist with its own distinct character. The abbreviation RS always stands for the most powerful engine within a particular model series, for extremely dynamic performance, for understated sophistication coupled with comprehensive everyday practicality, and for quattro permanent all-wheel drive.

Technical Development at quattro GmbH employs 120 people, has its headquarters at the Neckarsulm site and collaborates very closely with AUDI AG colleagues. quattro engineers handle many tasks on their own, including engine development. A second key area of expertise concerns chassis, such as Dynamic Ride Control for example. The purely mechanical roll/pitch stabiliser found in RS models is already in its third generation.

quattro GmbH seeks to push the envelope of modern engineering time and time again. Technologies such as the crown-gear centre differential in the quattro drivetrain and the brake discs featuring wavy contours made their respective debuts in RS models. quattro GmbH repeatedly contributes to the lightweight excellence of Audi by blazing trails with respect to components made of carbon-fibre reinforced plastic (CFRP).

quattro development expertise is complemented by production know-how. Some

175 employees produce the Audi R8 in a dedicated, small-batch production facility in the Neckarsulm plant. About 80 percent of their work is done by hand. The Audi RS 5 Cabriolet, the new RS 6 Avant and the RS 7 Sportback are likewise built in Neckarsulm. As for other models, quattro GmbH collaborates closely with production sites for the respective base models: Ingolstadt (Germany), Martorell (Spain) and Győr (Hungary).