

Emotion, dynamism and high-tech: The new Audi TT

- Audi TT and Audi TTS celebrate world premiere at Geneva Motor Show
- Compact sports car impresses with its design and driving dynamics
- Member of the Board of Management for Technical Development, Prof. Dr. Ulrich Hackenberg: “Offering drivers a technology experience that is even more compelling”

A completely revised edition of a modern classic is ready to take center stage: The Audi TT and Audi TTS will celebrate their world premieres at the Geneva Motor Show (these vehicle are currently not available for sale. they do not yet have a general type approval and are therefore not covered by Directive 1999/94/EC.). The third generation of the compact sports car is again captivating, with its emotional design and dynamic qualities. The new Coupé is characterized by the use of innovative technologies in its engine and in its control and display concept, including the Audi virtual cockpit.

“The Audi TT is the epitome of an authentic design icon and a top-performance driving machine,” explains Prof. Dr. Ulrich Hackenberg, Member of the Board of Management of AUDI AG for Technical Development. “With the new generation, we are making this technology even easier for the driver to experience – just as they would expect from a real sports car.”

Exterior design

When the first-generation Audi TT came on the market in 1998 it was a design revolution – its strictly geometrical, formally coherent design language made it an icon with huge charisma. For the third TT generation, the Audi designers have returned to many of these ideas and placed them in a new context that is as dynamic as it is diverse.

The front of the new TT is dominated by horizontal lines. The Singleframe grille is much broader and flatter than that of the previous model, with a powerful line dividing it into two zones. Starting in the top corners of the grille, sharp contours run in a V across the hood, which bears the four Audi rings – as on the Audi R8 high-performance sports car (combined fuel consumption in l/100 km: 14.9 – 12.4 (15.79 – 18.97 US mpg); combined CO2 emissions in g/km: 349 – 289 (561.66 – 465.10 g/mile). The air intakes feature struts that direct part of the flow away from the front to the flanks.

The flat headlights give the new TT’s face a determined look. Xenon plus units are standard, and Audi can optionally provide LED headlights or ones in pioneering Audi Matrix LED technology, where the high beam is generated by controllable individual LEDs. On both versions, there is an unmistakable contour created by the separating strip in the headlights, which is illuminated by light guides.

The Matrix LED headlights consist of 12 LEDs and include another Audi innovation: dynamic turn signals that light up sequentially in the direction in which the driver is steering. The predictive cornering light uses navigation data to move the cone of light into the curve before the steering wheel is turned.

From the side, the new Audi TT is equally lean and muscular; it rests low on the road as if ready to pounce. At 4.18 meters (13.71 ft), the Coupé is almost exactly the same length as its predecessor, though its wheelbase has grown by 37 mm (1.46 in) to 2,505 mm (8.22 ft), making for especially short overhangs. It is 1,832 mm (6.01 ft) wide, and has the same height as the previous model at 1,353 mm (4.44 ft).

A lot of the details of the new Audi TT's profile are reminiscent of the first-generation of the modern classic. The contour of the sill creates a striking refracting edge, while the broad wheel arches form their own geometric bodies. The front wheel arch breaches the line of the hood, which continues over the door as a tornado line and runs almost horizontally through to the tail as a strong body shoulder.

The flat greenhouse gives the impression of being an independent unit and the slight kink in the rear side window gives it additional tension. The fuel flap on the right side panel is the classic circle and surrounded by socket screws; a light tap on the TT logo and the flap opens. This shape is again reminiscent of the first-generation TT. What is new is that there is no tank lid beneath the flap. This means that there is nothing to be unscrewed and the pump nozzle slots straight into the tank neck, just like in motor racing.

Specifically at the tail, horizontal lines underline the impression of the new TT's sporty width. Together with the LED and Audi Matrix LED headlights, the tail lights also have dynamic turn signals. Another parallel to the front headlights: the strip in the tail lights, which also form a daytime running light contour – another Audi innovation. The third brake light is an extremely narrow strip positioned under the edge of the rear spoiler. It plays an essential part in defining the tail light silhouette.

At a speed of 120 km/h (74.56 mph) a spoiler extends from the trunk lid to improve both air resistance and downforce. All models have two large round exhaust tailpipes. These are again reminiscent of the original TT. Like all Audi S models, the TTS exhales through four oval tailpipes.

The optional S line exterior package makes the design of the bumpers, air intakes, Singleframe grille, sills and the rear diffuser even sharper and sportier. And handling is even more dynamic, with 18" wheels and a body that rests 10 mm (0.39 in) lower.

Body

Lightweight construction is one of Audi's greatest areas of expertise. The second-generation Audi TT already featured an Audi Space Frame (ASF) body made from aluminum and steel. For the new TT, Audi has systematically taken this composite construction principle even further, in line with the idea: the right amount of the right material in the right place for optimal functions.

The Coupé's underbody structure has optimized axle loads and is made of modern, high-strength and ultra-high-strength steel alloys. In the sections of the passenger cell that are subject to the most structural stress, form-hardened steel panels, which are both ultra-high-strength and light are used – these constitute 17 percent of the body's weight. The side sills and roof frame are made of extruded aluminum profiles that are integrated into the structure using cast aluminum nodes. This structural principle creates a very rigid and safe bodyshell. The aluminum side sections and roof complete the structure. The hood, doors and trunk lid are also made of this light metal.

All in all, the Audi engineers have, for the second time in a row, succeeded in significantly reducing the unladen weight of the Audi TT. At the first model change in 2006, up to 90 kg (198.42 lb) were saved, and the 2.0 TFSI engine variant of the new TT weighs just 1,230 kg (2,711.69 lb). This makes it around 50 kg (110.23 lb) lighter than its predecessor.

The low overall weight is further proof of Audi's expertise in lightweight construction. It impacts positively especially on acceleration, handling and fuel consumption.

Interior

Clearly structured volumes with a taut surface and light, almost floating lines – the interior is the embodiment of the new Audi TT's pure sports car character. As with the exterior, horizontal lines and surfaces emphasize the width of the interior. The center tunnel console, which supports the calves when driving fast through bends, and the door panels have similar flowing shapes.

The rule was once again: "less is more." Clear, purist lines underscore both the lightness and the uncompromising sportiness of the Audi TT's interior. Two other ingenious design and technically innovative tricks enabled the designers to create an instrument panel that is impressively slender: The instrument cluster and the MMI screen have been combined to form a central, digital unit – the so-called Audi virtual cockpit. In addition, the controls for the air conditioning system are positioned directly in the air vents.

Seen from above, the instrument panel resembles the wing of an aircraft; the round air vents – a classic TT feature – are reminiscent of jet engines with their turbine-like design. The vents also contain all the controls for the standard air conditioning system and the optional automatic air conditioning system (standard in the TTS). The controls for seat heating, temperature, direction, air distribution and air flow strength are located at their center; the setting selected is shown on small displays in the automatic air conditioning system. The horizontal control panel is located under the central air vents. The 3D-designed toggle switches activate the hazard warning lights, Audi drive select and the assistance functions.

The standard sports seats in the new Audi TT have integrated head restraints and are positioned lower than in the predecessor model. Compared with the seats in the predecessor model, they are more than five kilograms (11.02 lb) lighter. As an option – and as standard in the TTS – there are newly developed S sport seats with highly contoured and pneumatically adjustable side sections that are exceptionally comfortable and provide excellent support.

The new multifunction steering wheel has a flattened rim, and aluminum-look clasps encompass the spokes. It also has a driver airbag that takes up 40 percent less space without compromising safety, and hence emphasizes the sense of visual lightness.

Countless details demonstrate the high standards which Audi places on interior design and craftsmanship. They include the newly designed, split gear lever, the very precisely engaging MMI rotary pushbutton and the finely finished loudspeaker covers with light guides in the optional Bang & Olufsen sound system.

As a 2+2 seater, the new Audi TT is a sports car that is highly suitable for everyday use. The trunk has a capacity of 305 liters (10.77 cubic ft), which is 13 liters (0.46 cubic ft) more than before, and can be extended by folding the rear seat backrests forward.

Colors and equipment

The new Audi TT offers a far more distinct and colorful range of colors than its predecessor. There are 11 exterior colors, one of which is exclusively for the S line. Seven of the colors in the range are new for the TT, and two of these are completely new for Audi: Nano Gray and Tango Red. There are also two additional paints available for the TTS – crystal-effect Panther Black and the highly expressive Sepang Blue.

There is a completely new range of colors for the interior, too – the Audi TT and the TTS each offer three interior colors to choose from. For the first time, Audi is offering a two-tone interior including sporty contrasting stitching for S line models.

The equipment for the new Audi TTS includes extended interior elements that add individually selectable color accents to the S sport seats clasps, the sides of the center console and the rings of the air vents. Customers with exquisite taste have many options for customization. Upholstery in various cloths and leather grades are available for the seats, as well as three leather packages. The S sport seats have characteristic diamond quilting in the center section.

One special highlight is the exclusive design selection which comprises a combination of two fine leather colors: dark murillo brown on the seats and a slightly metallic shimmering stone-grey pearl on the armrests, knee supports and cowl. Alternating contrasting stitching, dark aluminum, matching paint for the extended interior elements and a special woven floor mat are further features of this elegant upholstery and trim.

For the TTS, the Audi designers have come up with an innovative technical laser texture for the wings of the instrument panel: It has a honeycomb-patterned, slightly raised surface that gives the Audi TTS a unique sporty feel.

Controls and displays

The operating concept for the new TTS has been revised from the ground up – in line with the consistent sports car character, all the elements focus on the driver. There are two variants of the multifunction steering wheel available. Drivers selecting the top version can activate almost all functions from the steering wheel without taking their eyes off the road.

The second control unit is the likewise newly developed MMI terminal on the console of the center tunnel. Two toggle switches activate the navigation/map, telephone, radio and media menus. There are two buttons on both sides of the central rotary pushbutton, supplemented by a main menu and a back button. The driver can easily enter destinations using the touchpad on the top of the rotary pushbutton (from the Connectivity package upwards) – the MMI touch recognizes your personal handwriting. It is also possible to scroll through lists or zoom in on maps.

The menu structure of the MMI resembles that of a smartphone, including the free-text search. All important functions can be accessed directly. One special highlight is the MMI direct search. This enables you to start writing immediately when navigating, without having to use a set form. In most cases, inputting four letters is enough for you to see relevant destinations throughout Europe. The two side buttons activate context-dependent functions (right button) and options (left button). The operating logic is easy to understand and conveys a completely novel “joy of use.”

Alongside the operations possible using the control panel, the Audi TT offers a further possibility: the voice control system. Audi is also breaking new ground in this area, too. For the first time in the Audi TT, natural voice controls are used that enable simple commands – such as “Take me to Munich” or “I want to talk to Sabine” – to control the vehicle systems without having to take your hands off the steering wheel.

Instead of the conventional analog displays, the new TT has the Audi virtual cockpit on board – this fully digital instrument cluster sets new standards with its dynamic animations and precise graphics. Drivers can choose between two display modes: In the classic view, the speedometer and rev counter are in the foreground; in “infotainment” mode the virtual instruments are smaller. The space that becomes free as a result provides ample room for other functions, such as the navigation map. In the Audi TTS there is a third, sporty mode. Here, the centrally positioned rev counter dominates the display.

With a resolution of 1,440 x 540 pixels, the 12.3” TFT screen boasts brilliantly sharp images. At work in the

background is a Tegra 30 graphic processor from market leader Nvidia's Tegra 3 series. At the lower edge of the Audi virtual cockpit, the displays for outside temperature, time and mileage are permanently visible. Warning or information symbols may also appear there.

Engine

[All consumption and output figures are provisional]

Audi offers the new TT and TTS with three different four-cylinder engines with turbocharging and direct injection. Their power output ranges from 135 kW (184 hp) to 228 kW (310 hp). The two TFSI gasoline engines and the TDI combine athletic power with trailblazing efficiency. The start-stop system is a standard feature.

For the launch of the TT, the 2.0 TDI will be available with manual shift and front-wheel drive. It delivers 135 kW (184 hp) and torque of 380 Nm (280.27 lb-ft). The new sports car can thus accelerate from 0 to 100 km/h (62.14 mph) in 7.2 seconds and reaches a top speed of 235 km/h (146.02 mph). Standard fuel consumption is a mere 4.2 liters per 100 km (56.00 US mpg), which translates into CO₂ emissions of 110 g/km (177.03 g/mile), a new record low level in the sports car world.

The 2.0 TDI features two balancer shafts in the crankcase, adjustable camshafts and a common rail injection system delivering maximum pressure of 2,000 bar. The Audi TT 2.0 TDI meets the Euro 6 standard and, thanks to its high efficiency, bears the "ultra" label.

The 2.0 TFSI is available in two versions – a 169 kW (230 hp) version for the TT and a 228 kW (310 hp) version for the TTS. In both versions it unites various ultramodern technologies – the additional indirect injection supplementing the direct injection of the FSI, the Audi valvelift system (AVS) to adjust the valve stroke on the exhaust side and thermal management, which uses a rotary valve module and an exhaust manifold integrated into the cylinder head.

In the Audi TT, the 2.0 TFSI delivers torque of 370 Nm (272.90 lb-ft) from 1,600 to 4,300 rpm. It accelerates the Coupé – which has a six-speed manual transmission and front-wheel drive – from 0 to 100 km/h (62.14 mph) in 6.0 seconds, and on up to an electronically governed top speed of 250 km/h (155.34 mph).

On the version with six-speed S tronic and quattro all-wheel drive, the key figures are as follows: the sprint from 0 to 100 km/h (62.14 mph) takes 5.3 seconds; top speed is 250 km/h (155.34 mph); fuel consumption of 6.8 liters per 100 km (34.59 US mpg) and CO₂ emissions of 159 g per km (255.89 g/mile). The dual-clutch transmission shifts through the six gears without any noticeable interruption in traction, and in manual model it can be controlled by paddles on the steering wheel. In the "efficiency" mode of Audi drive select, the S tronic selects freewheel as soon as the driver takes his or her foot off the gas pedal.

The Audi TTS is a peak performer. It covers the standard sprint in 4.7 seconds; its top speed is electronically governed at 250 km/h (155.34 mph). The 2.0 TFSI produces 380 Nm (280.27 lb-ft) of torque at an engine speed of between 1,800 and 5,700 rpm. Controllable flaps in the exhaust system modulate the sporty sound and make it even richer. A manual transmission is standard. The S tronic option includes launch control, which regulates maximum acceleration from a standstill.

quattro drive

In the new Audi TT, quattro permanent all-wheel drive delivers additional stability, traction and driving fun. It has been consistently advanced and optimized especially for the new TT. Its electro-hydraulically controlled multi-plate clutch is mounted on the rear axle. The special pump design reduces weight by around 1.5 kg (3.31 lb) compared with the previous model. The distribution of drive torque between the axles is controlled

electronically within fractions of a second.

The intelligence of quattro drive – in other words, the software that determines precisely the possible torque distribution between the front and rear axles – is a completely new development especially for the TT. The innovative control philosophy continuously senses the ambient conditions, driving status and the driver's wishes. This means that the ideal distribution of torque is calculated and the TT's dynamic drive characteristics enhanced in every situation.

By networking quattro drive with Audi drive select, the driver of the new Audi TT can adjust the all-wheel-drive properties to suit his or her individual requirements. In "auto" mode, this produces optimum traction and balanced driving dynamics. In "dynamic" mode, torque is distributed to the rear axle earlier and to a higher degree, which means that driving dynamics are enhanced further, especially on surfaces with low friction coefficients.

Alongside optimizing the driving dynamics, the advances made to quattro drive also focused on the subject of efficiency. In the drive select "efficiency" mode the torque distribution is adjusted to optimize the level of efficiency. Determining driving conditions and driver type precisely allows for efficiency-optimized all-wheel-drive control – which can even result in the temporary shutdown of the quattro drive system. In this operating state, the intelligent software carefully monitors the driving situation and activates the all-wheel drive before torque is once again required at all four wheels. In this way, quattro drive provides optimum efficiency along with a level of traction and dynamic handling that is typically quattro.

Chassis

The chassis also reflects the technological expertise behind the new Audi TT. The front suspension is based on a McPherson system; aluminum components reduce the weight of the unsprung chassis masses. The four-link rear suspension can process the longitudinal and transverse forces separately.

One particular highlight is the new third generation of the adaptive damper control system, Audi magnetic ride. Compared with the previous version, it has been improved in terms of characteristic spread, control dynamics and precision as well as user friendliness. Audi magnetic ride can be adjusted to three settings (comfort – auto – dynamic) via Audi drive select and, at the press of a button, either makes the compact sports car hug the road more tightly or lets it glide smoothly across the road irrespective of which mode the driver selects. Magnetic ride technology delivers ultra-swift wheel-selective control of the damper forces, which means that in all driving situations there is optimum contact between wheel and road.

In this way, the new Audi TT's superb driving dynamics are further optimized, and body control also ensures good comfort behavior. The system is unique in this market segment. Audi magnetic ride is standard on the Audi TTS and is available as an option for all other TT versions.

Another highlight is the standard progressive steering – its rack is designed such that the ratio becomes more direct as the steering is turned. In this way, the new TT can be steered agilely and precisely with little movement of the steering wheel in downtown traffic and on winding country roads. The electromechanically driven and thus highly efficient progressive steering adapts its assistance to speed and forms the basis for the optional assistance systems – Audi active lane assist and park assist.

With its elaborate chassis design and firm setup, the new Audi TT handles superbly in all situations. The body is lowered by 10 mm (0.39 inch) on the TTS, with the S line sport package and with the adaptive damper control system, Audi magnetic ride.

The dynamic driving system known as Audi drive select is an option for the new Audi TT, but standard on the TTS. It controls the engine characteristics and the steering assistance. The driver can choose between comfort, auto, dynamic, efficiency and individual modes. In addition, Audi drive select influences several optional modules – the S tronic, quattro drive, the Audi magnetic ride system, which at the press of a button makes the compact sports car hug the road even more closely, and the engine sound. In efficiency mode, Audi drive select influences the air conditioning and the start-stop system accordingly.

There are 11 different wheel versions available. The TT 2.0 TFSI and the 2.0 TDI come as standard with 17" forged wheels in five-spoke design, each of which weighs only 8.7 kg (19.18 lb), and with size 225/50 tires. On request, Audi can supply other wheel designs with diameters of 17", 18" or 19", and tires up to 245/35 R19. quattro GmbH also offers wheels with a diameter of up to 20".

The front discs are ventilated and, depending on engine version, have a diameter of up to 338 mm (13.31 in). The new electromechanical parking brake that the driver actuates by pressing a button is integrated into the rear braking system. The TTS uses newly developed aluminum fixed-caliper brakes to slow the front wheels; these are five kilograms (11.02 lb) lighter than on the predecessor model – another example of Audi's expertise in lightweight construction.

The electronic stabilization control (ESC), which can be switched off either partly or completely, perfectly complements the car's sporty handling. When driving through bends, torque vectoring takes effect. If required, the drive torque is distributed from the inside front wheel to the outside front wheel (front-wheel drive) or, on quattro models, to the rear wheels, too. Thanks to the difference in propulsive forces, the car turns very easily into the curve, which is helpful for the driver. In this way, bends can be navigated with great precision and neutrally. This significantly boosts the TT's dynamism and stability. Sport mode supports particularly sporty driving, facilitating steering and control when drifting.

The way that all components interact and harmonize enhances agile handling and consequently the driving pleasure that an Audi TT offers – just as you would expect of a sports car.

Equipment

All versions of the new Audi TT Coupé come with a generous range of standard equipment. Alongside those features already mentioned above, the MMI radio and the electromechanical parking brake deserve a special mention. The options include – alongside the S sport seat with numerous leather and trim variants – the convenience key, hold assist, high-beam assist, the LED interior lighting package, front seat heating, and the storage and luggage compartment package.

As regards infotainment, customers can choose from various options. The connectivity package boasts a touchpad, MMI touch. At the top of the modular range is the MMI Navigation plus with its large flash memory, two card readers, DVD drive, Bluetooth interface and voice control system. The T30 chip from market leader Nvidia's Tegra 3 series, which is used in the new generation of the modular infotainment platform, controls all navigation and multimedia functions in the car and, together with the processor, presents all content in the Audi virtual cockpit.

The Audi connect system complements the MMI Navigation plus perfectly – it connects the new TT to the internet using the fast LTE transmission standard. The integrated Wi-Fi hotspot means passengers can surf the internet and e-mail as they please, while the driver can rely on the customized Audi connect services.

The infotainment package is rounded out by attractive components. The Audi Phone Box smoothly links a cell phone to the car. Its centerpiece is a universal planar antenna which is integrated into the storage tray in the center armrest. Thanks to close-range coupling, the phone communicates with the flat planar antenna, which uses an amplifier to transmit the signals to the car antenna.

The Bang & Olufsen Sound System features a 14-channel amplifier and 12 loudspeakers; the woofers in the doors gleam in the dark thanks to an adjustable, discrete light conductor.

Powerful assistance systems make driving the new TT an even more pleasurable experience. As an option the car can be equipped with Audi side assist, which uses rear-mounted radar sensors to help drivers change lane more safely; camera-based traffic sign recognition; Audi active lane assist, which helps the driver if required by steadily correcting steering or warning him or her if there is a danger of unintentionally drifting out of lane and the park assist system with display of surroundings, which independently guides the car into suitable spaces.