

Communications Model Lines, Innovation and Technology

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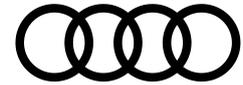
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PRESS INFORMATION

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The equipment, data and prices specified in this document refer to the model range offered in Germany. Subject to change without notice; errors and omissions excepted.



Condensed information

Electrifyingly fun to drive: the Audi e-tron

The brand with the four rings presents its first fully electric series-production model, the Audi e-tron. The full-size SUV combines sportiness and everyday practicality. Its two electric motors together with electric all-wheel drive provide for awesome performance and agile handling. The large high-voltage battery lays the foundation for a range of more than 400 kilometers (248.5 mi) in the WLTP driving cycle. In combination with a comprehensive range of charging options for home and on the move, customers can enjoy fully electric driving without having to compromise.

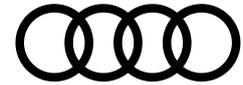
The Audi e-tron is an electric SUV for sport, family and leisure. It is 4,901 millimeters (16.1 ft) long, 1,935 millimeters (6.3 ft) wide and 1,616 millimeters (5.3 ft) high. It offers the spaciousness and comfort of one of the brand's typical full-size models. With a wheelbase of 2,928 millimeters (9.6 ft), the Audi e-tron has ample space for five occupants along with their bags. The total luggage capacity is 660 liters (23.3 cu ft), equipping the electric SUV for major tours.

Powerful performance on any terrain: drive and dynamic handling system

Efficiency, performance and quiet tranquility – the Audi e-tron exemplifies the driving experience of a new era. Two electric motors drive the electric SUV powerfully, free of emissions, and almost silently, with a system output of up to 300 kW and 664 Nm (489.7 lb-ft) of torque. The maximum drive torque is present within fractions of a second and provides enormous torque. The Audi e-tron completes the standard sprint in 5.7 seconds. Top speed is an electronically-limited 200 km/h (124.3 mph).

A new quattro generation – the electric all-wheel drive – provides for superlative traction and handling on any terrain and in any weather conditions. It continuously and fully variably regulates the ideal distribution of drive torques between the two axles – within a fraction of a second. In most cases, the electric SUV mainly uses its rear electric motor in order to achieve the highest efficiency. If the driver demands more power than it can supply, the electric all-wheel drive redistributes torque as required to the front axle. This also happens predictively even before slip occurs in icy conditions or when cornering fast, or if the car understeers or oversteers. The dynamic talents of the Audi e-tron are especially apparent at low coefficients of friction, such as on snow.

A key factor for the sporty character and outstanding transverse dynamics is the low and central position at which the drive components are installed. The battery system is optimally matched to the dimensions of the Audi e-tron and is located between the axles in the form of a flat, broad block beneath the passenger compartment. That makes the Audi e-tron's center of gravity similar to that of a sedan. Axle load distribution is perfectly balanced at almost 50:50.

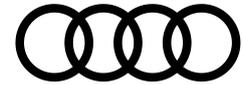


With Audi drive select, the driver can vary the characteristics of the Audi e-tron between seven profiles depending on the driving situation, road conditions or personal preferences. The system also influences the standard air suspension with adaptive dampers. As a result, there is a vast difference between smooth rolling comfort and sporty, stable handling. The pneumatic springs adjust individually to the road conditions depending on the speed and the driver's preferences, varying the ride height by as much as 76 millimeters (*3.0 in*). Especially on long journeys, a lower ride height improves aerodynamics, thus increasing the range.

High efficiency: recuperation, aerodynamics and thermal management

The Audi e-tron can cover more than 400 kilometers (*248.5 mi*) on a single charge in the WLTP test cycle. This value is due primarily to the innovative recuperation system, which is responsible for up to 30 percent of the range. The electric SUV can recover energy in two ways: by means of coasting recuperation when the driver releases the accelerator, or by means of braking recuperation when the brake pedal is depressed. In both cases, the electric motors function as a generator and convert the kinetic energy of the Audi e-tron into electric energy. At up to 0.3 g of deceleration, the electric SUV recuperates solely via the electric motors. This is the case well over 90 percent of the time. The wheel brakes are involved only when the driver decelerates by more than 0.3 g using the brake pedal. They respond extremely quickly, thanks to a new electrohydraulic actuation concept. Audi is the first manufacturer worldwide to use this concept in a series production vehicle with electric drive. When braking from 100 km/h (*62.1 mph*), for example, the Audi e-tron can recuperate electric power with a maximum of 300 Nm (*221.3 lb-ft*) and 220 kW. That corresponds to more than 70 percent of its operating energy input. No other series production model can achieve such a value. Depending on the driving situation, the electrohydraulically integrated brake control system decides whether the SUV will use the electric motor, the wheel brake or a combination of the two acting on each axle individually for recuperation. The transition between electric and hydraulic braking is smooth and homogeneous, so the driver does not even notice it. Brake forces remain constant.

Another key factor for the high efficiency of the Audi e-tron is the sophisticated aerodynamics. One highlight of this concept are the optional virtual exterior mirrors – a worldwide first in a series production model. Integrated into each of the mirror supports is a small camera, whose images are displayed on high-contrast OLED displays inside the vehicle. Other aerodynamic solutions fulfill their purpose hidden away from sight, such as the air suspension and the fully lined underbody with the aluminum plate to protect the high-voltage battery. These reduce drag, as does the adjustable cooling air intake. It includes channels for cooling the front brakes and serves as a switching point for the complex thermal management system with the standard heat pump. Benefits of the thermal management system include unwavering high performance even under high load, long battery life and fast DC recharging. When equipped with the virtual exterior mirrors, the Audi e-tron achieves a Cd value of 0.27, which is a top result in the SUV segment. With a typical use profile, that drag coefficient provides for a range advantage of approximately 35 kilometers (*21.7 mi*) per battery charge versus a comparable, conventionally powered vehicle.



Intelligent solutions for home and on the move: the charging concepts

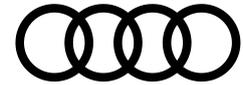
The large high-voltage battery in the Audi e-tron can store up to 95 kWh of energy and is thus the foundation for the long range. There is generally no need to stop at charging stations during everyday driving. On long trips, such as when going on vacation, customers can use fast charging stations to charge with direct current (DC) at up to 150 kW – a first for series-production automobiles. This means that the Audi e-tron is all set for the next long-distance stretch of a journey in approximately half an hour. The electric SUV can also be recharged with alternating current (AC) at up to 11 kW; recharging with 22 kW is available as an option. A proprietary Audi charging service provides e-tron customers with easy access to roughly 80 percent of the public charging stations in Europe. Whether it's AC or DC, 11 kW or 150 kW – a single card is all customers need to start the process. The procedure will become even more convenient with the function Plug & Charge, which will follow in 2019: The car self-authorizes at the charging station and activates it.

Audi offers various solutions for charging at home. The standard mobile charging system can be used with either a 230 volt household outlet or a 400 volt three-phase outlet. The optional “connect” charging system doubles the charging power to as much as 22 kW. Combined with a home energy management system, it offers intelligent functions such as charging when electricity is less expensive or with solar electricity if the home is equipped with a photovoltaic system. Audi customers can control all charging processes as well as pre-heating/pre-cooling via their smartphone with the myAudi app.

Electrification visualized: exterior and interior

The Audi e-tron reflects the fundamental formal idiom of Audi design – translated into the electric age by new, stylistically defining details. Typically for one of the brand's SUV models, the Audi e-tron bears the octagonal-design Singleframe grille with vertical struts. Its corpus is largely enclosed and presented in platinum gray – identifying it as a fully electric model. At the lower edge of the Matrix LED headlights, four horizontal struts create the e-tron-specific signature in the daytime running lights. For the first time this is integrated directly into the headlights. The expressive design of the sill area with the black inserts visualizes the location of the battery and thus the energy center of the Audi e-tron. At the rear, slats in the wide diffuser call attention to the omission of exhaust pipes. The e-tron logo on the charging flap and optionally the brake calipers stand out in the high-voltage signal color orange.

Colorful accents such as these are also available for the spacious, airy interior, whose design embodies performance, intelligence and lightness. The large arc, into which the optional virtual exterior mirrors are harmoniously integrated, stretches across the expansive instrument panel to the sculpted door trims, taking in-car digitization to a whole new level. The center tunnel console rests on open sidewalls. Seeming to float above it is the hand rest with integrated shifter, which the driver operates with thumb and forefinger. Lightness and performance are fused into one.



The entire driver's area has a driver bias, and the two large MMI touch response displays are angled in the driver's direction. They replace nearly every conventional switch and control. Many functions can also be controlled via the natural voice control system. With the standard Audi virtual cockpit, the driver can choose between two views that clearly present all information in the form of sharp, high-resolution graphics. The optional Audi virtual cockpit plus offers a third screen that highlights the electric drive system. The comprehensive comfort features paired with high-quality materials and fine workmanship make electric mobility a premium experience.

Top-caliber connectivity: Infotainment and assistance systems

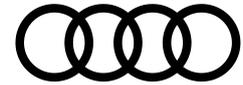
In the German market, the Audi e-tron comes standard with the high-end media center MMI navigation plus, including LTE Advanced and Wi-Fi hotspot. The navigation system makes intelligent destination suggestions based on previous routes, ideally supplemented by the e-tron route planner. This displays the suitable route with the required charging points. The navigation system considers not only the battery's charge but also the traffic situation and includes the required charging time in its arrival time calculation.

Numerous assist systems make the drive even more relaxing, including the standard efficiency assist. With predictive tips in the Audi virtual cockpit and automatic recuperation, it helps the driver to drive economically. The system uses radar sensors, camera images, navigation data and Car-to-X information to detect the traffic environment and the route. In combination with the adaptive cruise assist, the efficiency assist can also brake and accelerate the electric SUV predictively. Backing the assist systems is the central driver assistance controller, which continuously computes an exact model of the environment. The required data is obtained – depending on the selected options – from up to five radar sensors, six cameras, twelve ultrasound sensors and the laser scanner.

The Audi e-tron will be the brand's first model to allow customers to add certain functions online whenever the need for them arises. This will be possible from mid-2019 onwards. For example, the LED headlights can be upgraded to matrix LED headlights with intelligently controlled high beams, and assist systems or infotainment extras such as DAB+ digital radio and the Audi smartphone interface can be added.

Initial deliveries: Early 2019

The Audi e-tron is being built in the CO₂-neutral plant in Brussels and will be arriving in European dealerships in early 2019. The starting price of the electric SUV in Germany is 79,900 euros. In certain markets, customers who have already reserved their car can choose the exclusive "Audi e-tron edition one," a special model in a limited edition of 2,600 featuring special design details and a particularly generous equipment package.



The car in detail

Audi e-tron: powering up the Four Rings

The brand with the four rings presents its first fully electric series-production model, the Audi e-tron. From 0 to 100 km/h (62.1 mph) in 5.7 seconds, a range of over 400 kilometers (248.5 mi) in the WLTP driving cycle, zero local emissions – the full-size SUV is powerful, efficient, sporty and practical for everyday driving. Its two electric motors produce up to 300 kW and combine with the electric all-wheel drive to deliver optimum performance on any terrain. A comprehensive range of charging options for at home and on the go makes electric driving convenient and effortless.

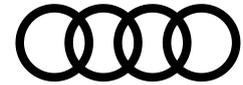
The Audi e-tron is an electric SUV for sport, family and leisure. It combines the practical requirements for an automobile with the comfort of the full-size class and the efficiency of an electric drive system. All while offering the premium experience one expects from the brand with the four rings complemented by innovative highlights. For the first time in a volume-production car, virtual exterior mirrors are available as an option in the Audi e-tron. They not only provide a new technology experience, but also many practical benefits in terms of comfort and safety. Another first is the ability to flexibly add additional functions even after purchasing your Audi e-tron, taking in-car digitization to a whole new level. Initial deliveries of the Audi e-tron are planned for early 2019. The starting price in Germany for the extensively equipped electric SUV is 79,900 euros.

EMOTIONAL: product and driving experience

Standing still or on the move, the Audi e-tron is electrifying. Orange-toned elements and the distinctive sill area signify the high-voltage technology beneath the skin that provides for a very special driving experience. The Audi e-tron generates excitement, while at the same time its premium interior and high acoustic comfort create a relaxing environment for the passengers. The digital control and display concept completes the new form of mobility.

Performance and fascination: the design

With the Audi e-tron, Audi Design has translated the brand's fundamental design language for the electric age, both inside and out. New, stylistically defining details, such as the special daytime running light signature, the electric charging flap, the lack of exhaust pipes, and stitching on the seats reminiscent of an electric circuit board, transmit a clear signal that the Audi e-tron is fully electric.



Electrification visualized: the exterior design

Typically for one of the brand's SUV models, the Audi e-tron bears the octagonal-design Singleframe grille with vertical struts. Its corpus is largely enclosed and presented in platinum gray – identifying it as a fully electric model. At the lower edge of the Matrix LED headlights, four horizontal struts create the e-tron-specific signature in the daytime running lights. For the first time this is integrated directly into the headlights – another exclusive design feature for the all-electric drive system. Light is used as a core design feature.

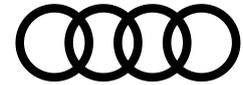
The wrap-around shoulder line is an important design element in the side view. It extends from the headlights, along the flanks, to the rear lights, giving the Audi e-tron a low visual center of gravity. The roof stretches low across the muscular body, which displays clear SUV attributes with its brawny D-pillars and the underbody protection. The quattro blisters over the wheels hint at the electric all-wheel drive. The sill area is boldly contoured and visualizes with the black inserts on the door trim the location of the battery and thus the energy center of the Audi e-tron.

At the sculpted rear end, the long roof edge spoiler and the wide diffuser emphasize the horizontal and thus the sporty character of the electric-powered SUV. A light strip – a typical feature of Audi's top models – connects the LED rear lights. With their horizontal emphasis and segmented appearance, the tail lights echo the graphics of the daytime running lights. Transverse louvers on the sides of the diffuser draw attention to the lack of exhaust pipes, once again spotlighting the all-electric drive system.

At market launch the electric SUV will be available in a choice of ten colors, including the exclusive shade Antigua blue. The e-tron logo on the electric charging flap and optionally the brake calipers stand out in the high-voltage signal color orange. The wheel arch trims and sills are in a contrasting color, to emphasize the off-road look.

Progressive elegance: the driver's area

The interior of the Audi e-tron stands for performance, intelligence and lightness – attributes that are manifested in an array of details. Design and technology are fused into one. A generous arc, the wraparound, envelops the cascading instrument panel with pronounced horizontal lines as far round as the sculptural door trims. It harmoniously integrates the hood above the Audi virtual cockpit, whose sleek display stands visually free in space, as well as the displays of the optional virtual exterior mirrors. These mirrors are used for the first time in a volume-production automobile in the Audi e-tron, taking in-car digitization to a whole new level.



The entire driver's area has a driver bias, and the two MMI touch response displays are angled in the driver's direction. When off, the upper one blends almost invisibly into the large black-panel surface. In clear contrast, the lower display is incorporated into the broad center console. Options include the multifunction buttons on its edge and the control element for the lighting functions in black-panel design with touch response technology

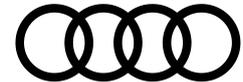
Both touch displays present all images and information on a black background. Generally the graphical user interfaces have been deliberately reduced and clearly structured so that the information can be assimilated quickly. All pictograms are precisely dimensioned, a few subtly animated.

The center tunnel console rests on open sidewalls, which lend it the feel of a light, sleek sculpture. In addition to a stowage compartment, it also incorporates cup holders as well as the optional Audi phone box. This layout combines lightness with functionality. The hand rest appears to float above the console. It incorporates the shifter and the function for the electronic parking brake. The driver selects the drive position in a one-touch action with their thumb or index finger. Shifting gears becomes a brand-new experience.

Precision personified: electrification down to the last detail

In every equipment line, the Audi e-tron features carefully coordinated upholstery materials, colors and inlays. Whether refined Valcona leather or dark brushed aluminum for a sporty look, the electric SUV meets the highest quality standards in terms of craftsmanship and choice of materials. Applications in open-pore, grained ash are available exclusively for the Audi e-tron. The stitching on the seats creates a motif reminiscent of electric circuit boards. Contrasting stitching adds accents. On the customized contour seats, it and the piping are bright orange – a cue borrowed from the high-voltage electrical system.

In the dark the optional ambient lighting package with its white LED lights effectively brings the interior to life. It softly illuminates surfaces such as doors and the instrument panel, making them appear to float. The contour/ambient lighting package with 30 adjustable colors provides a further upgrade. It also precisely traces the elemental lines of the interior. With this option, the e-tron logo with its unique graphic extending over the entire width of the passenger side is backlit. A standard feature is the welcome sound that plays when the engine is started to signal that you have entered a luxury lounge.



Electrifyingly fun to drive: engines and suspension

Efficiency, performance and quiet tranquility – the Audi e-tron offers the driving experience of a new era. Two electric motors drive the electric SUV powerfully, free of emissions, and almost silently, with a system output of up to 300 kW. Its high-voltage battery stores 95 kWh of energy to provide a range of over 400 kilometers (*248.5 mi*) in the WLTP cycle. The Audi e-tron is thus predestined for long distances. The new electric all-wheel drive system combined with cutting-edge suspension solutions provide for optimal traction and handling in all driving situations and any weather.

Powerful performance: the electric motors

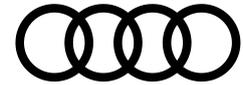
The Audi e-tron offers driving pleasure in a new dimension. With 265 kW and 561 Nm (*413.8 lb-ft*) of torque, the two electric motors accelerate the electric SUV from zero to 100 km/h (*62.1 mph*) in 6.6 seconds – with no hesitation and virtually silently. The asynchronous motors can deliver this peak performance for up to 60 seconds. This way, they allow the vehicle to accelerate from a standstill to the electronically limited top speed of 200 km/h (*124.3 mph*) several times consecutively without output losses. The start-off performance, for example at a traffic light, is comparable to that of a sports car. The maximum drive torque is present within fractions of a second and provides enormous torque. The front electric motor, which is positioned parallel to the axle for the purpose of optimum packaging, achieves a peak output of 125 kW at 247 Nm (*182.2 lb-ft*) of torque. The rear, coaxially positioned motor reaches an output of 140 kW with a torque of 314 Nm (*231.6 lb-ft*). Two-stage planetary gearboxes with one gear range transfer the forces to the axles via the differentials.

Asynchronous motors can increase their output for a short period of time. By shifting from drive range D to S and fully depressing the right-hand pedal, the driver can activate boost mode. It is available for eight seconds. Here, the drive produces 300 kW of system output and 664 Nm (*489.7 lb-ft*) of torque. The Audi e-tron then sprints from 0 to 100 km/h (*62.1 mph*) in 5.7 seconds. The forces are distributed as follows between the electric motor at the front axle and the one at the rear axle: 135 kW of boost output with 309 Nm (*227.9 lb-ft*) of torque at the front, 165 kW with 355 Nm (*261.8 lb-ft*) at the rear.

The two asynchronous machines (ASM) of the Audi e-tron offer major design advantages. They do not produce any electrically induced drag losses in the deenergized condition, which makes them highly efficient. Not only are they lightweight due to the aluminum rotor, they require little maintenance and are particularly robust.

Current transformers: power electronics modules

Every motor in the Audi e-tron is supplied and controlled by its own power electronics module, which works together closely and extremely dynamically with the drive control unit. All requests come together in the drive control unit – from the accelerator pedal, the brakes, or the electric all-wheel drive. The power electronics modules read in sensor data 10,000 times per second and output current values for the electric motors.



This results in the optimum use of output during dynamic vehicle operation in particular. Some functions, such as vibration damping and the slip control functions, are integrated into the power electronics directly. This enables the deceleration-free translation of interventions and improves, for example, the vehicle's ability to accelerate on icy roads significantly.

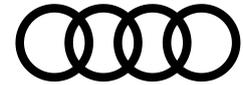
The two structurally identical power electronics modules are positioned on the housings of the electric motors and are integrated into the thermal management system of the drive system. They take up little space, and each weighs only eight kilograms (*17.6 lb*); this is also thanks to their aluminum housing. The pulse width modulating inverter, its central component, converts the direct current from the battery into three-phase current. When the electric motors operate as a generator during recuperation, it converts the generated three-phase current into direct current and feeds it back to the battery.

Agile in any terrain: electric all-wheel drive and suspension

In the Audi e-tron, the brand with the four rings introduces a new quattro generation as standard: electric all-wheel drive. It continuously and fully variably regulates the ideal distribution of drive torques between the two axles – within a fraction of a second. That enables the electric SUV to achieve optimum traction in all weather conditions and on any type of surface.

In most cases, the Audi e-tron mainly uses its rear electric motor in order to achieve the highest efficiency – the torque is generally distributed with a rear-axle bias. If the driver demands more power than the rear electric motor can supply, the electric all-wheel drive redistributes torque as required to the front axle. This also happens predictively even before slip occurs in icy conditions or when cornering fast, or if the car understeers or oversteers. Only around 30 milliseconds pass between the time the system recognizes the driving situation and when the torque from the electric motors takes effect. That is much faster than with conventional quattro technology. This is because the electric all-wheel drive system distributes electricity rather than activating a mechanical clutch. And that happens fast as lightning and with extreme precision. Full quattro performance is thus ensured even in extreme driving situations or if the coefficient of friction changes suddenly.

The key to the electric all-wheel drive is the intelligent networking of numerous control systems. The central suspension control unit integrates both the handling controller of the quattro drive and the wheel-selective torque control. If understeer is detected during sporty driving, it gently brakes the inside wheels, which are under a reduced load, thus directing the torque to the outside. The car turns into the curve and precisely follows the steering angle. Furthermore, an innovative anti-slip control system provides for high traction and stability. Wheel slip is controlled directly at the power electronics of the electric motors, 50 times faster than before and even more precisely matched to the driving situation. For the driver, this is particularly noticeable in combination with the four-stage function modes of the Electronic Stabilization Control (ESC).

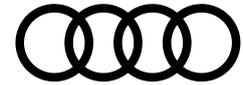


This allows the driver to choose the desired level of vehicle stabilization support and enhance road performance in certain situations. The ESC therefore includes sport and off-road modes, or can even be deactivated entirely. In addition, the characteristics of the Audi e-tron can also be adapted to various types of terrain using the standard dynamic handling system. Whether relaxed cruising, dynamic cornering or excursions off the beaten track, the driver can choose between seven profiles depending on the driving situation, road conditions or personal requirements. Besides the drive system characteristic and steering boost, Audi drive select also influences the standard adaptive air suspension with controlled dampers. As a result, there is a vast difference between smooth rolling comfort and sporty, stable handling. The pneumatic springs adjust individually to the road conditions depending on the speed and the driver's preferences, varying the ride height by as much as 76 millimeters (*3.0 in*) from the base ground clearance of 172 millimeters (*6.8 in*). On the highway, the body is lowered by as much as 26 millimeters (*1.0 in*), which improves stability and the aerodynamics, thus facilitating a long range. In "offroad" mode, it increases ground clearance by 35 millimeters (*1.4 in*). If the driver also activates the "Lift" function in Audi drive select, the body is raised an additional 15 millimeters (*0.6 in*) – a real advantage in rough terrain.

A key factor for the sporty character and outstanding transverse dynamics is the low and central position at which the drive components are installed. The high-voltage battery system is optimally matched to the dimensions of the Audi e-tron and is located between the axles in the form of a flat, broad block beneath the passenger compartment. That makes the Audi e-tron's center of gravity similar to that of a sedan. Axle load distribution is perfectly balanced at almost 50:50. The front and rear suspensions are five-link designs. The standard progressive steering adjusts its generally direct ratio according to steering angle and provides speed-dependent power assistance. It becomes more direct with increasing steering angle, which provides handling advantages when maneuvering and in tight curves. The car can be moved agilely and precisely with little steering effort. Power assistance is increased at low speeds for easier maneuverability.

95 kWh of energy: the high-voltage battery system

The large lithium-ion battery in the Audi e-tron provides for a range of more than 400 kilometers (*248.5 mi*) in the WLTP driving cycle. The battery operates with a nominal voltage of 396 volts and stores 95 kWh of energy. The battery system in the Audi e-tron is located beneath the cabin and is 2.28 meters (*7.5 ft*) long, 1.63 meters (*5.3 ft*) wide and 34 centimeters (*13.4 in*) high. It comprises a total of 36 cell modules in square aluminum housings, each of which is roughly the size of a shoe box. They are arranged on two levels, known as "floors" – a longer lower floor and a shorter upper one. At market launch, each module is equipped with twelve pouch cells having a flexible outer skin of aluminum-coated polymer. In the future, Audi will use both technically equivalent prismatic cells in its modular concept, also in terms of a multiple supplier strategy.



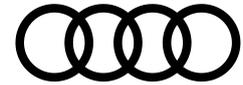
The cell modules in the Audi e-tron can reproducibly discharge and charge electricity over a broad temperature and charge status window. They can be densely packed to achieve a very high output and energy density in the volume available.

A cooling system of flat aluminum extruded sections divided uniformly into small chambers has the task of maintaining the battery's high-performance operation over the long term. Heat is exchanged between the cells and the cooling system beneath them via a thermally conductive gel pressed beneath each cell module. In what is a particularly efficient solution, the gel evenly transfers the waste heat to the coolant via the battery housing.

The battery and all of its parameters, such as charge status, power output and thermal management, is managed by the external battery management controller (BMC). This is located in the occupant cell on the right A-pillar of the Audi e-tron. The BMC communicates both with the control units of the electric motors and the cell module controllers (CMC), each of which monitors the current, voltage and temperature of the modules. The battery junction box (BJB), into which the high-voltage relays and fuses are integrated, is the electrical interface to the vehicle. Enclosed in a die-cast aluminum housing, it is located in the front section of the battery system. Data exchange between the BMC, the CMCs and the BJB is via a separate bus system.

Sophisticated measures have been taken to protect the high-voltage battery of the Audi e-tron. A strong enclosing frame of cast aluminum nodes and extruded sections, plus an aluminum plate 3.5 millimeters (*0.1 in*) thick protect against damage from accidents or curbs. Inside, a framework-like aluminum structure reinforces the battery system. Also comprised of extruded sections, it holds the cell modules like a typecase.

Including the housing with its sophisticated crash structures comprising 47 percent extruded aluminum sections, 36 percent aluminum sheet and 17 percent diecast aluminum parts, the battery system weighs around 700 kilograms (*1,543.2 lb*). It is bolted to the body structure of the Audi e-tron at 35 points. This increases its torsional rigidity by 27 percent and contributes to the high level of the safety of the Audi e-tron, as does the cooling system bonded to the outside of the battery housing. Compared to a conventional SUV, the Audi e-tron offers 45 percent higher torsional rigidity, a key parameter for precise handling and acoustic comfort.



Quiet tranquility: Acoustics and sound

With its combination of electric drive and a comfortable, sophisticated interior, the Audi e-tron creates a new sense of mobility. Especially when driving in the city, it radiates an almost perfect sense of calm. The only sounds are from its tires and the gentle hum of the electric motors. The acoustic comfort is one of the strengths of all Audi models – the Audi e-tron raises this level even further and, as such, offers outstanding long-distance comfort.

Relaxed atmosphere: aeroacoustics and soundproofing

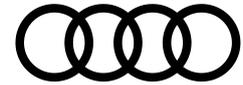
The body, which was specifically optimized in terms of vibration and noise comfort, provides the necessary foundation for the tranquil cabin. Those areas where forces are channeled into the body, particularly the connection of the axles, play an important role: Due to their high local rigidity they are resistant to excitations from the assemblies and the road.

To reduce structure-borne and air-borne noise effectively, the engineers in the Audi e-tron employ a mixture of absorbent and insulating materials. Design-related openings and cavities within the body are sealed and filled systematically. For instance, the wheel arches were lined with sound-absorbing material in the direct vicinity of the wheel. Relevant areas are also coated with a special material, thus reducing the vibration of the metal sheets. On the firewall, a complex multilayer structure dampens the sound penetration from the front-end to the interior. In the rear-end too, this kind of design of the new vehicle architecture with additional rear-axle drive is also taken into account. In the interior, specifically configured components, such as foam-backed carpets, ensure minimal noise in the Audi e-tron.

The second important factor for the relaxed atmosphere in the Audi e-tron is the highly developed aeroacoustics. As a rule, the wind noise becomes the overriding component in any car from a speed of 85 km/h (*52.8 mph*). With the Audi e-tron, however, intensive finishing touches on door seals, exterior mirrors and water-catching strips mean that the noise remains very low and barely reaches the occupants. The passengers can talk to each other comfortably even at high speeds. The windshield comes standard with double glazing. Audi also offers acoustic glazing for the side windows as an option.

3D sound like in a concert hall: Bang & Olufsen Sound System

The optional Bang & Olufsen 3D Premium Sound System lends the Audi e-tron additional acoustic quality. A small loudspeaker in each A-pillar reproduces the spatial dimension of height. The music unfolds exactly how it was recorded – without any artificial effects. Behind this technology is an algorithm that Audi developed in collaboration with the Fraunhofer Institute in Erlangen. It takes stereo or 5.1 recordings, computes the information for the third dimension and conditions it for the 3D loudspeakers.



At the heart of the Bang & Olufsen Premium Sound System is a highly efficient amplifier. It drives 16 loudspeakers with 705 watts. Some of them, for instance the 3D loudspeakers in the A-pillars and the surround loudspeakers in the D-pillars, feature neodymium magnets, which are very light and consequently produce minimal distortion. All of which creates an airy, highly resolved sound. The bass loudspeakers in the front doors are located in a separate housing; the surrounding paneling is thus excited less which, in turn, reduces resonance. That improves the sound quality and reduces the sound propagation outside the vehicle. The decoupling of the loudspeaker also provides a precise, voluminous bass.

Improving perception: technologically futuristic sound

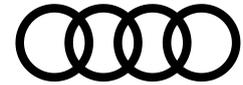
In certain countries in North America and Asia, an artificial driving sound is superimposed on electric cars at low speed to satisfy legal requirements. Depending on the country, it must be clearly audible up to 32 or 20 km/h (*19.9/12.4 mph*) and gradually fades as speed increases. A small control unit generates the technologically futuristic sound, which a loudspeaker in the right wheel arch of the Audi e-tron emits, thus improving perception. When the car reverses, the sound level increases so it is clearly perceptible at the rear.

Digitalization in a new form: Controls and displays

The Audi e-tron comes standard with a fully digital control and display concept. It represents the next step in a systematic evolutionary process. It began in 2014 with the introduction of the Audi virtual cockpit in the TT. A brand new control concept followed last year in the fourth-generation Audi A8. With its two MMI touch response displays, it offers the same operating logic that customers are familiar with from their smartphones, complemented by haptic and acoustic feedback. The Audi e-tron opens this digital control window a bit farther with the virtual exterior mirrors.

World premiere in a volume-production automobile: virtual exterior mirrors

For the first time in a volume-production automobile, virtual exterior mirrors are available as an option in the Audi e-tron. They not only provide a new technology experience, but also many practical benefits in terms of comfort and safety. Integrated into the hexagonal end of their flat supports is a small camera, whose images are digitally processed and displayed on high-contrast, 1,280 x 800-pixel OLED displays in the transition between the instrument panel and the door. They blend harmoniously into the driver's area's wraparound concept. The 7-inch displays, whose brightness adjusts automatically, are equipped with proximity sensors. If the driver moves their finger toward the surface, symbols are activated with which the driver can move the image. A switching function allows the driver to also adjust the virtual passenger-side mirror.



Thanks to the sophisticated image processing, the displays provide a significantly better image than a conventional mirror in certain situations, such as in direct sunlight. The mirrors adjust automatically to three driving situations: highway, turning and parking. On the highway, the field of view image is reduced in scale so that the driver can better estimate speeds when driving fast – other vehicles then appear larger in the display. If the driver signals an intention to turn or change lanes by indicating, the indicator view extends the image detail on the relevant side. This reduces the blind spot. When maneuvering and parking, the displayed field of vision is expanded downward. The display visualizes the turn signal as a green contour on its outer frame and also displays notifications from the Audi side assist lane-change assistant and the exit warning.

Full HD resolution: Audi virtual cockpit

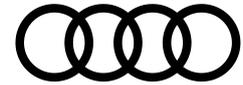
The digital display and operating concept in the Audi e-tron is rounded off by the standard Audi virtual cockpit, which can be operated from the multifunction steering wheel. Its display benefits from the very high resolution of 1,920 x 720 pixels – full HD – and new e-tron-specific graphics. The driver can choose between two display modes: In the classic view, the powermeter and speedometer are presented as large dials; in the infotainment mode, they appear smaller and the focus is on the navigation map. Customers who select the optional Audi virtual cockpit plus can call up an additional view that puts the powermeter right in the center. The head-up display complements the displays as an option. It projects important information directly onto the windshield – meaning the driver always has everything in view.

Attentive dialog partner and tactile feedback: operating concept

In common with all other Audi full-size models, the Audi e-tron features the MMI touch response operating system. Its two large, high-resolution displays – the upper one with a diagonal of 10.1 inches and the lower one 8.6 inches – take the place of almost all conventional switches and controls. Operation is swift and reliable: When the finger activates a function, it triggers a tactile and acoustic click by way of confirmation.

In the upper display, the driver controls the infotainment, telephony, navigation and special e-tron settings – where they can activate a charging timer or specify the type of recuperation, for example. In the lower one, the driver manages text input, comfort functions and the air conditioning with their wrist resting comfortably on the support with integrated gear selector switch. The menu structure is intuitively logical and flat like on a smartphone, including freely configurable favorites and start screens.

In addition to operation by the two touch displays, the driver can activate a host of functions using natural language voice control. Information on destinations and media is either available on board or is delivered from the cloud at LTE speed. The system understands freely worded commands. The ingenious dialog manager asks questions if necessary, allows corrections, offers choices and also defers to the speaker when interrupted.



EMPOWERING: intelligent overall concept

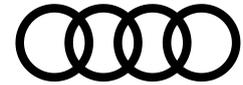
The Audi e-tron combines the practical requirements for an automobile with the comfort of the full-size class and the efficiency of an electric drive system. The brand with the four rings thought about more than just the car, however. Audi offers e-tron customers a comprehensive and reliable range of charging options with intelligent solutions for at home and on the go. From navigation to automated billing at the charging station to remote control via smartphone, the Audi e-tron is well connected. The latest offer further underscores this: Starting in mid-2019, customers can individually and flexibly book functions at any time.

Everyday practicality and premium quality: spacious and comfortable

The Audi e-tron is 4,901 millimeters (*16.1 ft*) long, 1,935 millimeters (*6.3 ft*) wide and 1,616 millimeters (*5.3 ft*) high. Not only does the interior have an airy design, it genuinely offers plenty of space. With its long wheelbase of 2,928 millimeters (*9.6 ft*), the Audi e-tron has ample space for five occupants along with their bags. Interior length, head room in front and rear as well as knee room in the second seat row are top-class in the full-size SUV segment. In the rear, a flat plateau – instead of the center tunnel usually found in conventional models – creates additional space.

Luggage capacity is 660 liters (*23.3 cu ft*), equipping the electric SUV for major tours. The practical storage compartment beneath the front hatch accounts for 60 liters (*2.1 cu ft*) thereof. This accommodates the vehicle tool kit and mobile charger cable. With the rear seat backs folded down, the Audi e-tron has up to 1,725 liters (*60.9 cu ft*) of luggage space. The standard power tailgate provides for easy loading; foot gesture control is available as an option. The optionally available trailer tow hitch increases the Audi e-tron's versatility, for example as a sport and leisure vehicle. With it, the electric SUV can pull a trailer load of 1,800 kilograms (*3,968.3 lb*). It can also be used for mounting a cycle carrier, for example.

As well as the car's spaciousness, its standard of comfort and convenience is what you would expect from a typical full-size model of the brand. The panoramic glass sunroof keeps the interior even lighter and intensifies the impression of airiness and space. As an alternative to the standard two-zone automatic air conditioning, Audi also offers four-zone automatic air conditioning and the air quality package. The latter maintains first-class air quality by means of an ionizer and aromatization, the intensity of which can be adjusted over several levels. It fills the interior with either a summer or winter fragrance – the former with a Mediterranean note reminiscent of sea air, the latter with a pine note and similar to a breath of mountain air. The air quality sensor also detects harmful gases and activates recirculated air mode as necessary.



The three-stage ventilation ensures pleasant seating comfort even as the outside temperatures soar. Ventilation is already available for the standard seats – the perforated leather on the seat features a host of details. The top-of-the-line option comes in the shape of customized contour seats with their numerous adjustment functions. Besides pneumatic seat and lumbar support adjustment they also come with a massage function as an option. Ten pneumatic cushions relax the back muscles in seven different programs and three intensities. As such, they help ensure the well-being of everyone, particularly on long journeys. The S line interior package comes standard with more strongly contoured sport seats in a combination of leather and Alcantara.

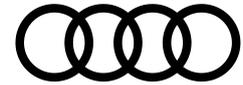
For customers who have already reserved their car, there is the exclusive offer in certain markets of the “Audi e-tron edition one” special model in a limited edition of 2,600, in the paint finish Antigua blue. It includes special exterior details such as the virtual exterior mirrors, 21-inch forged wheels in five-arm turbine design and aluminum-look attachments. The entry lighting in the door projects the logo “Audi e-tron edition one” onto the ground. Referencing the high-voltage electrical system, the fully electric drive is visualized by orange brake calipers and an e-tron badge in the same color on the charging flap. Other equipment features include sport seats, the Bang & Olufsen Premium Sound System with 3D sound up front, the Tour assist package and Matrix LED headlights with intelligent high-beam control.

Highly efficient: recuperation, aerodynamics, thermal management

The Audi e-tron achieves a range of more than 400 kilometers (*248.5 mi*) on a single charge in the realistic WLTP test cycle. Behind this value are numerous high-tech solutions. Besides the low drag coefficient of 0.27 with virtual exterior mirrors and effective thermal management, the innovative recuperation system in particular is crucial here. It contributes up to 30 percent of the electric SUV’s range.

Intelligent energy recuperation: recuperation and brake system

The Audi e-tron can recover energy in two ways: by means of coasting recuperation when the driver releases the accelerator, or by means of braking recuperation when the brake pedal is depressed. In both cases, the electric motors function as a generator and convert the kinetic energy of the Audi e-tron into electric energy. Up to 0.3 g, the SUV recuperates energy solely via the electric motors, without using the conventional brake – that covers well over 90 percent of all deceleration. So, energy is returned to the battery in practically all normal braking maneuvers. The internally ventilated, 18-inch wheel brakes do not come into play until the driver uses the brake pedal to decelerate with more than 0.3 g.

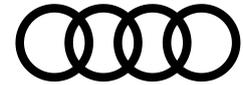


The driver can select the degree of energy recovery in three stages using paddles on the steering wheel. In the lowest setting, the Audi e-tron coasts with no additional drag torque when the driver releases the accelerator pedal. The Audi e-tron continues to roll forward. No electricity flows to or from the electric motor while the vehicle is moving. In level 1 (balanced – minimal deceleration) and level 2 (strong – high deceleration), the electric motors generate regenerative brake torque and produce electricity. The electric SUV reduces the speed noticeably – the driver can decelerate and accelerate using just the accelerator pedal. This creates the one-pedal feeling. There is no need to use the brake pedal in this case.

In addition to manually adjusting the recuperation level with the steering wheel paddles, the driver can also select automatic mode in the MMI. The predictive efficiency assist then regulates the deceleration as needed and predictively, for example in relation to the route or vehicles in front. The driver can adapt the deceleration effect by selecting the desired recuperation level via the shift paddles. It remains active until the driver operates the accelerator pedal again.

The Audi e-tron taps its maximum recuperation potential using the integrated electrohydraulic brake control system. Audi is the world's first carmaker to use such a system in an electrically powered series-production vehicle. Depending on the driving situation, the electric SUV decides whether to decelerate using the electric motor, the wheel brake, or a combination of the two acting on each axle individually. The transition between electric and hydraulic braking is smooth and homogeneous, so the driver does not even notice it. Brake forces remain constant. It is in the rare cases that the Audi e-tron uses its wheel brake, for example during maximum full-stop braking, that the powerful properties of the integrated brake control system really stand out. The new electrohydraulic actuation allows it to build up brake pressure for the wheel brakes with great precision and roughly twice as fast as a conventional system. When automated emergency braking is performed, there are only 150 milliseconds – slightly more than a blink of the eye – between the initiation of braking and maximum brake pressure between the pads and disks. Thanks to this rapid pressure buildup, the electrohydraulically integrated brake control system shortens the braking distance by up to 20 percent compared with a conventional brake system.

In case of a brake application at a speed of 100 km/h, for example, the Audi e-tron can recuperate electric power with a maximum of 300 Nm (*221.3 lb-ft*) and 220 kW; that corresponds to more than 70 percent of its operating energy input. No other series production model can achieve such a value. Overall, the Audi e-tron attains up to 30 percent of its range through recuperation. The system is the most variable and thus the most efficient on the market.



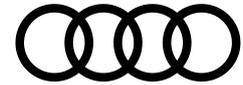
Every thousandth counts: drag

With an electric car, weight influences energy consumption far less than in the case of a car with a combustion engine. In town it is generally efficient because it can recover a large part of the energy, which it uses to accelerate, when rolling up to the next red light. The situation is totally different on long journeys, however, where the Audi e-tron is perfectly at home: Here from speeds of around 70 km/h (*43.5 mph*) the rolling resistance and the inertia take second place to aerodynamic drag irrespective of the type of car. The energy required to overcome that drag is lost. This is why the engineers were so focused on the aerodynamics during the development of the Audi e-tron. When equipped with the standard exterior mirrors, the Audi e-tron achieves a drag coefficient of 0.28. Even with the optional virtual exterior mirrors the value is 0.27 – a top result in the SUV segment. Customers benefit directly from this low figure as drag contributes decisively to the high range of more than 400 kilometers (*248.5 mi*) in the WLTP cycle. A hundredth of the drag coefficient figure represents a range of around five kilometers (*3.1 mi*) driving under everyday conditions.

To achieve this value, the Audi engineers used a wide range of aerodynamic measures in all body areas. Some of these technical solutions are evident at first glance, while others fulfill their purpose hidden away from sight. Thanks to these solutions, the drag coefficient for the Audi e-tron is almost 0.07 less than for a comparable, conventionally powered vehicle. With a typical usage profile this set-up increases the range by around 35 kilometers (*21.7 mi*) per battery charge in the WLTP cycle. To achieve this additional range simply by cutting weight, the engineers would have had to shed a half a ton (*1,102.3 lb*).

The optional virtual exterior mirrors, which in the Audi e-tron are making their world debut in a series-production automobile, are both a visual and aerodynamic highlight. Compared to the standard mirrors, they reduce the vehicle width by 15 centimeters (*5.9 in*) and, thanks to their new shape, not only reduce drag, but also noticeably cut the already low wind noise. Their flat supports incorporate a small camera with a resolution of 1,280 x 1,080 pixels. The captured images appear on OLED displays in the transition between the instrument panel and door.

The standard adaptive air suspension, an air suspension system with controlled damping, also plays a major role in reducing drag. From speeds of 120 km/h (*74.6 mph*), it lowers the body of the Audi e-tron by as much as 26 millimeters (*1.0 in*) from the normal height of 172 millimeters (*6.8 in*). As a result, the rectangle that the tires represent for the airflow and opposes the slipstream partially disappears into the wheel arch. This measure also improves handling.



Also contributing to the low Cd value is the fully lined underbody of the all-electric SUV. The front and rear sections are completely covered. Underneath the passenger cell, an aluminum plate protects the high-voltage battery against damage from below, such as stone chipping or curbs. Its bolting points come with bowl-shaped indentations, similar to the dimples on a golf ball. They make the air flow much better than a totally flat surface.

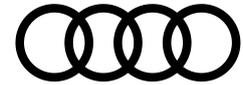
Because the wheel arches and wheels are typically responsible for one-third of the drag, Audi uses air curtains at the front of the electric SUV. Integrated into the side air inlets and easily visible from the outside, they direct the slipstream so that it flows to the outside past the standard, aerodynamically optimized 19-inch wheels. Their design is flatter than with conventional wheels. The 255/55 size tires stand out with their ultralow rolling resistance.

Another measure at the front of the car to help lower drag is the adjustable cooling air intake – a frame behind the Singleframe with two electrically operated louvers. When shut, the air in this area flows with virtually no swirl. As soon as the drivetrain components need cooling or the air conditioning condenser requires ventilation, the top louver opens first and then both louvers. When the hydraulic wheel brakes are subject to high loads, the controllable cool-air inlet opens and releases two ducts which channel the cooling air into the front wheel arches to the brakes.

Important performance factor: thermal management

The effective thermal management system in the Audi e-tron guarantees fast DC charging with up to 150 kW, long battery life and reproducible road performance even under heavy load. For the customer, this means high performance at all times.

The thermal management system comprises four circuits that can be connected in various ways as required. It cools the electric motors including their rotors, the power electronics and the charger. It also cools and warms both the interior and the high-voltage battery. The rotors, which reach up to 13,300 revolutions per minute during real vehicle operation, consist of magnetically conductive electrical sheets and lightweight, high-purity aluminum. Coolant flows through the inside of the shafts to ensure that the temperature does not exceed 180 degrees Celsius. The stators and end shields of the electric motors are also water-cooled. This solution indirectly benefits the gearboxes mounted on the end shields. Effective cooling, particularly of the coaxial electric motor on the rear axle, presented the developers with new challenges. The solution is to route coolant through a double-walled tube with a ceramic seal at the rotor of the electric motor. A total of 22 liters (*5.8 US gal*) of coolant flow through the roughly 40 meters (*131.2 ft*) of coolant lines in the Audi e-tron. Being the hottest components in the powertrain, the electric motors provide the thermal management system with a large quantity of heat.



The standard heat pump uses their waste heat – up to 3 kW of actual power losses are efficiently used for heating and air conditioning the interior. Depending on the outside temperature, that can boost the Audi e-tron's range by up to ten percent in customer operation.

The thermal management system also ensures that the battery is kept within its optimal efficiency range of 25 to 35° Celsius in all situations, from a cold start in winter to fast highway driving on hot summer days. This also contributes to the long service life. During DC charging with 150 kW, which is possible for the first time ever in a series production automobile with the Audi e-tron, cold coolant dissipates the heat from electrical power loss. If the battery is still cold when charging in winter, it is heated with warm coolant.

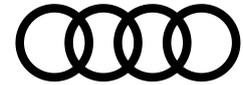
Reliable: charging network and charging technology

With its first fully electric series production model, Audi has transformed from a classic automobile manufacturer to a system supplier for mobility. Thanks to a comprehensive range of charging options with intelligent solutions for home and on the move, customers can enjoy fully electric driving without having to compromise.

At up to 150 kW: charging on the move

In the realistic WLTP driving cycle, the electric SUV achieves a range of more than 400 kilometers (*248.5 mi*) with its high-performance, high-voltage battery. That will mostly avoid the need to stop at charging stations during everyday driving. On long trips, such as when going on vacation, customers can recharge with up to 150 kW DC at fast charging stations meeting the European Combined Charging System (CCS) standard – a first for a series-production automobile. This means that the Audi e-tron is all set for the next long-distance stretch of a journey in approximately half an hour. It is all made possible by the sophisticated thermal management of the lithium-ion battery, which allows charging at up to 150 kW. Plans call for the Ionity network to include 400 such high-power charging (HPC) stations installed at 120-kilometer (74.6 mi) intervals along European highways and main transportation corridors by 2020. The Volkswagen Group including Audi and Porsche, the BMW Group, Daimler AG and the Ford Motor Company are jointly promoting the expansion of the HPC network. Beyond this joint venture, too, other compatible HPC charging points are currently being installed in Europe.

In addition to fast charging with direct current, the electric SUV can also be charged on the move with alternating current at AC chargers, with up to 11 kW as standard and at 22 kW with the optional second on-board charger. The car is connected to the charging station using the standard mode 3 charging cable. Roughly 95 percent of all existing charging points in Europe currently conform to this standard.



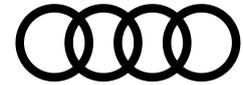
From market launch Audi will offer a proprietary charging service for its customers – the Audi e-tron Charging Service. It provides convenient access to roughly 80 percent of all charging stations in Europe, corresponding to well over 70,000 public charging points in 16 EU countries. Whether it's AC or DC, 11 kW or 150 kW – just one card is all customers need to perform the charging process. Customers have to register one time on the myAudi portal and conclude an individual charging contract. Billing is automatic via the user account. No physical means of payment is used. The procedure will become even more convenient with the function Plug & Charge, which is set to debut in 2019: The card will no longer be needed – the car authorizes itself and unlocks the charging station.

Standard with 11 kW, optionally with 22 kW: charging at home

The Audi e-tron will typically be recharged most often at home. And each charging cycle costs the owner just a few seconds of time, i.e. the time required to connect and disconnect the charging cable. In most cases, the electric SUV is charged overnight and then sets off the next morning with a fully charged battery and a range of more than 400 kilometers (*248.5 mi*) according to the WLTP test cycle.

Audi offers various solutions for charging at home. If desired, an electrician referred by the local Audi dealer will check the power supply in the garage and install the suitable technology. The standard mobile charging system can be used in two ways – with a charging power of up to 2.3 kW when connected to a 230 volt household outlet, and with up to 11 kW when connected to a 400 volt three-phase outlet. In the latter case, the battery can be fully recharged in roughly eight and a half hours. The optional connect charging system doubles the charging power to as much as 22 kW. This requires a second charger on board the Audi e-tron, which will be available from 2019.

Together with a home energy management system, the connect charging system offers intelligent functions. In this case, the Audi e-tron can be charged with the maximum power available with consideration of other consumers in the household to avoid overloading the electrical system. Customers can also define their own personal priorities, such as charging when electricity is less expensive. If the home is equipped with a photovoltaic system, the car can be charged preferentially using the electricity generated by the system, and charging even considers forecast phases of sunshine.



Well connected: Audi connect and assist systems

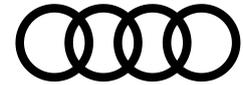
The Audi e-tron offers comprehensive infotainment and is very well connected. Numerous assist systems support the driver and enhance comfort, as do the optional and flexibly bookable equipment and functions. For the first time, Audi customers can add functions as needed even after purchasing their Audi e-tron.

All the information you need: navigation and Audi connect

On the German market, the Audi e-tron is supplied with MMI navigation plus as standard. The top-end media center supports the high-speed data transmission standard LTE Advanced with integrated Wi-Fi hotspot for the passengers' mobile devices. The navigation system makes intelligent destination suggestions based on previous journeys. The route is calculated both on board in the car and online on the servers of the map and navigation provider HERE, using real-time data for the overall traffic situation.

The online services of Audi connect ideally complement the navigation system, especially the e-tron route planner. The customer can use it either in the in-car MMI system or in the myAudi app. In both cases they are shown the appropriate route with the required charging points. The navigation system considers not only the battery's charge but also the traffic situation and includes the required charging time in its arrival time calculation. The e-tron route planner includes DC charging stations along with most AC charging stations throughout Europe. The route planning includes charging station information such as output and – provided the chargers are so configured – even whether they are currently occupied or out of service. While driving, detailed information about the remaining range is displayed in the Audi virtual cockpit and in the top MMI touch response display. Charging planning is continuously updated to the prevailing conditions. For example, an alternative suggestion is made if a targeted DC fast charging station can no longer be reached. Charge planning is mirrored seamlessly between the display in the car and in the myAudi smartphone app. During an active charge process, it displays the charging time remaining and the battery's current charge status. Customers can also opt to receive push notifications as soon as they can continue their journey.

With the myAudi app, the customer can plan, remotely control and monitor charging processes and the preliminary air conditioning of the Audi e-tron. They can set a departure time, for example, so that the electric SUV is charged and/or heated/cooled at the desired time. Customers can even choose for the first time to heat or cool certain zones in the car. On cold winter days, for example, they can turn on the seat heating, heated steering wheel or the heated rear window using their smartphone. The app also displays charging and driving data. Communication with the car is via the integrated LTE module, which is standard equipment in the Audi e-tron.



The driver is also supported with Car-to-X services that use the swarm intelligence of the Audi fleet. Suitably equipped vehicles report moving into and out of parking spaces so that forecasts on the availability of roadside parking space appear in selected towns and cities. The cars from the swarm also warn each other of hazardous spots such as fog or black ice, and report current speed limits.

The optional Audi connect key provides digital access to the Audi e-tron. It enables the driver and four other authorized users to unlock, lock and activate the electric SUV by android smartphone. Their preferred settings can be saved in up to seven different user profiles. Personalization covers up to 400 parameters, from the driver seat position and the preferred air conditioning settings to navigation destinations previously used and favorite media. The Audi e-tron identifies the individual user from the key signal as soon as he unlocks the car and activates the right profile for them.

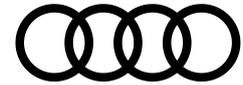
New offering: flexible booking of additional features

The Audi e-tron will be the first model from the brand with the four rings to offer its customers scope for adding certain functions in the areas of light, driver assistance systems and infotainment – on demand and at any time. This will be possible from mid-2019 onwards. Even after they have taken delivery of it, the customer can now continually customize it to their individual requirements. Every function can be obtained for varying periods – monthly, annually or permanently. Functions are booked either conveniently via the car's MMI system, the myAudi app or the myAudi service portal, and paid for easily and securely via AudiPay.

In the lighting package, customers can upgrade the LED headlights to Matrix LED headlights with intelligent high-beam control. The package also includes other functions such as dynamic turn signals, daytime running lights with e-tron signature, and lighting scenarios that are activated when the SUV is opened and closed. Under assistance systems, there is initially park assist as an add-on option. The infotainment package comprises DAB+ digital radio and the Audi smartphone interface.

Convenient support: the driver assistance systems

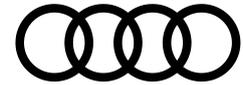
Whether parking, in the city or on long journeys, the Audi e-tron makes life easier for its driver in many situations. The system at the heart of the Tour assist package is adaptive cruise assist, which comfortably provides longitudinal and lateral control across a range between 0 and 200 km/h (*124.3 mph*). It supports the driver with accelerating, braking, maintaining speed, keeping distance and in traffic jam situations. The system detects lane markings, roadside structures, vehicles in adjacent lanes and vehicles driving ahead. In construction zones, the Audi e-tron automatically adapts its speed to the traffic situation, taking into account the speed limit. If the lane is too narrow to allow side-by-side driving, adaptive cruise assist enables offset driving through narrow stretches.



Adaptive cruise assist works closely together with the standard efficiency assist. Thanks to the interplay between these two systems, the Audi e-tron predictively slows down and accelerates based on its evaluation of sensor and navigation data as well as traffic signs. It automatically adjusts to the current speed limit, reduces the speed before corners, during turning and on roundabouts. The predictive system always maintains a driving style that reflects the driving program selected – from efficient to sporty – and uses the individual opportunities for recuperation. If the adaptive cruise assist is not active, the efficiency assist uses predictive notifications and automatic recuperation to help drivers drive economically, thus helping to increase range. The system uses radar sensors, camera images, navigation data and Car-to-X information to detect the traffic environment and the route. The driver is shown corresponding information in the Audi virtual cockpit and the optional head-up display as soon as it would be sensible to take the foot off the right-hand pedal. If the driver has selected the automatic recuperation setting in the MMI, the information and automatic recuperation interact to form a convenient overall system. The system determines the ideal deceleration for the particular situation and recuperates energy in a way that is optimally adapted to the events.

In town, features including crossing assist, rear cross traffic assist as well as lane change and exit warning provide for safety. The 360 degree cameras provide multiple views to facilitate centimeter-precision maneuvering, show crossing traffic and give a detailed view of the wheels. The highlight is the 3D view with freely selectable perspective. Park assist eases the parking process. It steers the Audi e-tron independently into parallel parking and perpendicular parking spaces – forwards or backwards. The driver only has to accelerate, select the gear and brake.

Operating as standard behind the driver assistance systems in the Audi e-tron is the central driver assistance controller. It continuously computes a differentiated model of the surroundings. The required data is obtained – depending on the selected options – from up to five radar sensors, six cameras, twelve ultrasound sensors and the laser scanner.



ESSENTIAL: experience and future viability

The Audi e-tron represents a sea change for the premium brand that began long before the start of production of its first fully electric automobile. Experience and competence from a well-oiled production network, the clear objective of bringing about a comprehensively sustainable change and the innovative power of all the sites: That is the three-pack with which Audi guarantees its customers the Vorsprung of tomorrow even with new production technology.

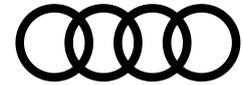
e-tron is the future: electric mobility of the Audi brand

For the company, the Audi e-tron means is more than a new automobile with a revolutionary drive system. The model is a key stage along the strategic roadmap for redefining mobility in the premium segment. By 2025, there will be an electrified variant, whether fully electric or plug-in hybrid, in every Audi core car line. By the middle of the next decade, roughly every third car sold by the brand will be electrified. Audi will also launch an initial limited-production model with a fuel cell drive system early next decade, as hydrogen is another perfect energy source for the e-mobility of tomorrow. The company is also heavily involved in research into synthetic fuels that can be used in conventional engines to help conserve resources and protect the climate.

Moving beyond the product, Audi is also driving infrastructure development. The brand and its partners have founded Ionity, a joint venture for establishing a European fast charging network. Plans call for 400 stations with six charging points each along the main transportation corridors by 2020. In the USA, Electrify America means that Audi customers have the benefit of a similarly strong charging backbone in 17 metropolitan regions and along the highways.

Thanks to the strategic master plan, the electric vehicle revolution at Audi is picking up steam. Two major synergy levers are bringing additional Vorsprung: the modular electric platform that Volkswagen developed for the compact segment and the premium electrification architecture on the basis of which Audi and Porsche are building mid-size, full-size and luxury class electric cars. The synergies make fully-electric drives profitable and at the same time quickly offer customers a diverse range of attractive models for emissions-free driving. Then there are entirely new services revolving around mobility, all digitally connected and available anytime and anywhere. Including in the car itself, of course.

The Audi e-tron is a sign of the new age here, as well. It is the first series-production model from Audi for which functions can be booked on demand using the brand's mobile platforms. Audi is already shaping this future of electric mobility today. It will be digital, electric and autonomous. Audi will invest some 40 billion euros in new, key technologies by 2025 and will always remain true to its brand promise: Vorsprung durch Technik.



Clean beyond the automobile: CO₂-neutral production in Brussels

The Audi e-tron demonstrates the passion for a drive system that sustainably fulfills the premium expectations of the customers. A responsible supplier of mobility looks at the entire ecological footprint left by its products. As the home of the brand's first fully electric automobile, the Audi Brussels plant is exemplary in this regard. The pioneering product comes from the world's first CO₂-neutral volume production facility in the premium segment.

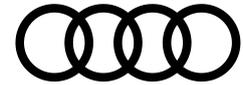
Independent assessors certify that the plant remains clean with respect to carbon dioxide emissions. Audi e-tron customers therefore know that its production in Belgium was as climate-neutral as operation of the car at home with green electricity generated by the customer's own photovoltaic system. The Belgian site's groundbreaking achievement was the result of three measures: green electricity, ecological heat supply and climate compensation projects.

The plant has been supplied with 100 percent ecologically generated electricity since 2012. The site makes a key contribution to this as a power generator with the largest photovoltaic system in the Brussels region. A photovoltaic system with a total area of 37,000 square meters (*398,264.7 sq ft*) – that corresponds to more than five soccer fields – is in operation across the roofs of most of the plant's buildings. There are plans for even more trees. The plant also purchases green electricity. Audi Brussels compensates for the use of every megawatt hour of natural gas with biologically produced methane, which is also certified as such.

The second approach for the CO₂-neutral plant is the supply of heat to the entire site. The plant meets its heating requirements with certificates for biogas. Gas consumption is thus rendered CO₂-neutral. Through these two energy requirement aspects alone the site saves up to 40,000 metric tons of CO₂ a year by relying solely on renewable energy sources. On the environmental balance sheet, that covers more than 95 percent of the total energy requirement.

The remaining requirements currently arise from emissions due to the fuel consumption of the company cars, heating oil and the incineration of solvents. Here Audi Brussels brings the environmental balance sheet to zero by compensating with so-called carbon credit projects. With all of these compensation measures, it is important to the brand with the four rings that these solutions themselves sustainably improve the environment, which is why certificates are only purchased from projects meeting the recognized gold standard.

The sustainable promise does not just apply to the Audi e-tron, its production site and CO₂ emissions, of course. The next steps are firmly in sight throughout the Group, including the ambitious goal of making all production sites CO₂-neutral by 2030. A balanced life cycle assessment for the product before the first kilometer is driven, closed resource cycles and significant contributions to maintaining biological diversity are part of Audi's ecological commitment for the future.



New drive systems from experience: Győr Center of Competence

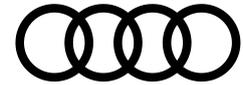
The claim “Vorsprung durch Technik” takes on a new dimension with the Audi e-tron. The vast experience in building premium automobiles is uniquely combined with electric mobility’s passion for innovations. One example of this are the developers and production specialists at Audi Hungaria. The electric axle drives for the Audi e-tron are produced at the world’s largest engine factory.

With the electric drive assembly plant in Győr, the drive experts are taking a significant step toward the intelligent factory – digitally networked and without the classic assembly line. The axle drives are produced in a modular assembly shop, which allows the greatest possible cycle flexibility. Production systems, robots, and bolting and measurement stations for the production of the electric motors are arranged in so-called production islands. Automated guided vehicles transport the axles and components to the stations. This is made possible by machine learning, controlled by a smart IT system in the control room. Even without the order of a traditional line, people and machines always have an overview of all the systems, transport systems and the product itself. The advantages for the customers: Higher quantities and new variants of the electric axle can be implemented more quickly.

The production of the electric drives demonstrates the advantage of an established team of innovators. Electric Motor Development, Production Planning and the Engine Startup Center in Győr worked hand-in-hand. That ensured a head start for technically optimized production. Furthermore, Electric Motor Development in Győr provided targeted assistance with environmental testing, acoustic optimization and the design of sub-components. Examples include the castings for the housing and the end shield.

As the core component of the electric motor, the objective for the stator was to incorporate as much of the thin enameled copper wire into the blank as possible. An innovative modular machine winds the wire particularly compactly. The tighter the winding, the more efficient the power development. In the next step, the blank is pressed into the gray cast iron casing. The rotor and attachments follow the stator. Once they are installed, the housing can be closed. Tightness and high-voltage tests plus a test bench run verify proper function of the electric axle unit following assembly.

The electric axle consists of three further large components: the power electronics, located to the side in its own housing, the gearbox and two flange shafts that transmit power to the wheels. Two electric axles are produced for each Audi e-tron. Following installation of the speed sensor and the coolant circuit for the rotor, a die carrier automatically places the gearbox on the engine. This is followed by the power electronics and finally the flange shafts.



To sustainably ensure the quality of the electric drive, three new development test benches specifically for the electric motors were commissioned at Technical Development parallel to the start of series production. There the electric axles must repeatedly demonstrate their peak performance levels – in testing and continuous load operation.

Audi Hungaria quality assurance staff also put the finished electric axles through numerous tests. Optical 3D measurements, computer tomography, special robots and digital microscopy measure the exactness of the parts down to the tenth of a millimeter and check material quality. Here, too, the Audi e-tron benefits from the vast experience with production methods for drive systems.

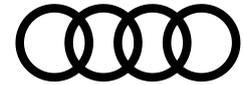
High-voltage pioneers: the new battery assembly facility

Audi is committed to mastering all stages of production for electric mobility and to optimizing these processes to meet the particular expectations of the customers. An “off-the-shelf” battery is therefore out of the question for the brand with the four rings. The Vorsprung that Audi represents can only be achieved in the future with proprietary expertise. It therefore became clear during at an early point in the development of the Audi e-tron that the comprehensive approach had to also include an in-house battery assembly facility.

Using battery systems the way Audi does requires aligning stringent and in some cases contradictory requirements. Agile road performance and enthralling handling require a lightweight, compact construction. At the same time, the battery should deliver as much energy as possible and thousands of charging sessions should function properly with no loss of power output. Efficient cooling is every bit a must as maximum safety of the batteries and their connections.

Expertise from other Audi locations is also channeled into battery assembly in the production network. Parts of the battery cover are sourced from Audi Hungaria’s Győr plant and parts of the battery housing from Neckarsulm, for example. New production technologies were developed specifically for the manufacture of the batteries, such as automated setting of the cell modules using dies allowing precision joining of modules in the compact housing. The individual elements are pressed and bolted to make optimal use of the space, to ensure the load-bearing function of the housing and to make the structure particularly safe.

Production employees have also performed pioneering work in these process steps, too. For example, the electrical connections for the modules are now flexible instead of rigid. The experts from production succeeded in completely automating this highly complex process. A patent application has been submitted for the process.



The Audi e-tron has an aluminum battery housing that is delivered to the assembly line from the body shop. There it is precisely and tightly packed with modules. In the Audi e-tron, there is no cooling system and thus no coolant inside the housing. Instead, a gap filler conducts the waste heat from the cells evenly into the cooling system, which is bonded to outside of the battery housing. This thermally conductive gel also prevents air inclusions, thus guaranteeing full contact with every surface. This construction is a particularly demanding task for production, as there is nothing else like it in the industry. The Audi specialists accomplish this with the largest bond in terms of surface area anywhere in the car.

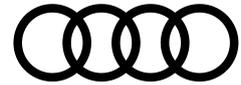
Electric contacting is the step in which the cell modules are connected to one another. The developers designed a connection with two bolts per module pole to achieve outstanding contact resistance. This means extremely low heat-related energy losses and the maximum flow of current to where it is needed – the electric motors of the Audi e-tron.

After contacting, the voltage level in the system is nearly 400 volts. All employees are therefore appropriately qualified for working with high-voltage technology. Robots mount the cell modules in two layers, one atop the other. The employees then equip the units with the proper wiring and seal the housing. Each battery then undergoes a comprehensive test cycle in two test units. The complete unit is now ready to be precisely installed in the floor assembly of the Audi e-tron. An automated guided vehicle delivers the battery just in time directly to the line.

Route to the “marriage”: production of the Audi e-tron

The entire Group and the team at Audi Brussels in particular spent two years preparing for the start of electric mobility. The Belgian site is a key plant for electric mobility within the Audi Group.

The electric SUV has resulted in profound changes throughout production. Audi implemented the necessary operations step by step, so as to perfectly prepare the body shop, paint shop and assembly for the challenges of the Audi e-tron. The other plants involved from the production network were included from the very beginning. These include the press shops in Győr, Ingolstadt and Neckarsulm, for example, which provide body parts in aluminum and steel. Technical Development, the Pre-Series Center, Logistics and Planning were also involved. At Audi Brussels itself, the move to electric mobility required changes to the very substance of the plant. Prior to the start of production of the Audi e-tron, the planners reinforced the entire hall level of the assembly shop and gradually reconfigured the assembly line.

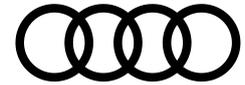


No tank, no exhaust system, no internal combustion engine – rather an integrated battery unit and work performed under high voltage. Many steps in the production of the Audi e-tron have been completely rethought, planned and implemented. This already begins with the layout of the building. For the new battery assembly a logistics shop has been completely rebuilt. Production and Logistics ensure that the batteries will arrive at the line ready for installation in the car – just-in-sequence as it is known in the vernacular. The finished battery system is then transported to Installation Preparation. This unit is located on the ground floor of the Audi e-tron assembly hall. Many work steps there are very similar in their basic principles to those in the production of conventional cars with internal combustion engines. This is a major advantage for the employees, since most of them have previous experience with other production startups.

The experienced and extensively qualified team is a key pillar of the successful start of production. The team has an average of 19.3 years of experience at Audi Brussels. Over 900 workers lay hands on each Audi model in final assembly. In addition, there are also more than 400 robots used in production. They rather than the employees perform physically demanding activities or those that require contact with the high-voltage battery. The complete simulation of all production sequences in a virtual factory also played a key role in the smooth startup. Months before the actual start of production at the plant, the production planners used powerful computers to play through every scenario down to the smallest screw.

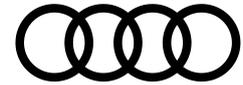
The first large component placed at the start of the two-kilometer (*1.2 mi*) production line is the front axle with the electric motor, gearbox and power electronics. The entire component comes from the electric axle assembly shop at Audi Hungaria. The next big work step in this assembly process is laying the high-voltage cables and connecting the coolant lines. The batteries in their housing, the cooling unit bonded to it and the underbody protection complete this work step. Before the underbody of the car being produced leaves the ground floor, the third major step is performed: the assembly of the rear axle, on which another electric motor is located.

Once the technology and drive units are complete, it is time for the “marriage” – connecting the body to the drive system. At exactly the right work cycle, the complete chassis frame from the ground floor below is fitted into the body through an opening specially created for this purpose. At the next station the electrically driven SUV finally receives its charging units and the corresponding connectors. The employees in this area are trained as electrical specialists.



As the Audi e-tron continues along its way through production, the control units are fed with data and trained. The windows, headlining, seats, steering wheel, displays and switches are now installed. The company pays the utmost attention to these classic parts with the Audi e-tron as well. The quality of the interior with respect to materials and workmanship is a primary reason why millions of customers are fans of the brand with the four rings.

Before the Audi e-tron leaves production, it completes a comprehensive program on the break-in test bench. All important situations of subsequent operation are simulated – from battery charging to coasting and high-speed driving at full throttle. Finally, the car moves outside for the road test. The plant has a test track with various road surfaces where the Audi e-tron has to prove itself in various real-world driving situations. Only after the stringent acceptance procedure is the electric SUV ready to be delivered to the customer.



Facts and figures

The Audi e-tron

Exterior design

- 4.90 meters (*16.1 ft*) long, 1.94 meters (*6.5 ft*) wide, 1.62 meters (*5.3 ft*) tall, 2.93 meter (*9.6 ft*) wheelbase
- distinctive SUV design with wrap-around shoulder line, flat roof, brawny D-pillars and underbody protection
- new, e-tron-specific details: light gray Singleframe grille, expressive sill area, diffuser with no exhaust pipes, logo and brake calipers optional in high-voltage signal color orange
- horizontal e-tron light signature integrated into the headlights; wide light strip at the rear

Aerodynamics

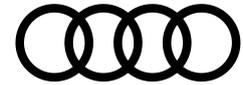
- sophisticated aerodynamics: virtual exterior mirrors, adjustable cooling air intake with brake cooling ducts, fully lined underbody, air curtains, flow-optimized wheels and low rolling resistance tires, long roof edge spoiler
- drag coefficient of 0.28 with standard exterior mirrors, 0.27 with the optional virtual exterior mirrors – a top value in the SUV segment
- very low wind and intrusive noise for a novel, quiet driving experience and high comfort

Drive system

- one electric motor at the front and rear axles; total system output up to 300 kW and 664 Nm (*489.7 lb-ft*) of torque
- off-the-line performance on par with a sports car, acceleration from 0 to 100 km/h (*62.1 mph*) in 5.7 seconds (in boost), electronically-limited top speed of 200 km/h (*124.3 mph*)
- electric all-wheel drive with lightning-fast control and wheel-selective torque control; very tight networking of drive and brake control
- variable and thus particularly efficient recuperation concept with energy recovery when coasting and during braking; three levels selectable by driver
- range per battery charge of over 400 kilometers (*248.5 mi*) in the WLTP cycle

Suspension

- sporty base character thanks to low and central installation position of the battery
- Audi drive select dynamic handling system with seven profiles; electronic stabilization control with sport and off-road mode plus deactivation function
- innovative wheel brake system with compact central unit and rapid pressure development through electric powered displacement piston; brake pedal simulator makes pressure development and relief imperceptible to driver
- Progressive steering and adaptive air suspension standard; body ride height adjustable by 76 millimeters (*3.0 in*)



High-voltage battery

- 95 kWh of energy, 396 volts nominal voltage, weight approx. 700 kilograms (*1,543.2 lb*)
- dimensions: 2.28 x 1.63 x 0.34 meters (*7.5 x 5.3 x 1.1 ft*), 36 cell modules, each with twelve pouch cells in two layers
- indirect cooling system of aluminum sections separate from cell space
- crash protection via framework structure, enclosing frame and thick floor plate
- effective thermal management system with four circuits and heat pump

Charging options

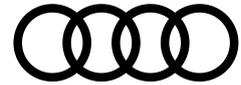
- charging on the move: with DC and up to 150 kW of power or with AC and 11 or 22 kW (with optional second integrated charger)
- service for Audi customers: one card activates roughly 80 percent of all charging points in Europe; from 2019 Plug & Charge for automatic authentication at the charging station
- charging at home standard with up to 11 kW, optional up to 22 kW; intelligent additional functions such as use of own photovoltaic system in combination with a home energy management system
- myAudi app for remote management charging and pre-heating/cooling

Interior

- interior design with elegant, reduced design language
- encircling wraparound, driver-oriented driver's area, sculptural center tunnel with hand rest including gear switch that appears to float
- carefully selected colors and materials, including open-pored ash
- generously spacious: room for five persons, 600 liters (*21.2 cu ft*) of luggage capacity in base configuration, up to 1,725 (*60.9 cu ft*) with rear seats folded down; stowage compartment under the front hatch with 60 liters (*2.1 cu ft*) volume
- comprehensive comfort and convenience equipment (option): seats with ventilation and massage function, contour/ambient lighting package, Audi connect key and personalization

Controls and connectivity

- two large touchscreens with diagonals of 8.6 and 10.1 inches and haptic feedback
- optional virtual exterior mirrors with touch displays as new technology experience
- natural-language voice control with onboard and online search
- Audi virtual cockpit standard, optionally as plus version with third view and optional head-up display
- MMI navigation plus standard, data transmission at LTE speed, Wi-Fi hotspot
- Audi connect with many online services, including flexible e-tron route planner
- starting in mid-2019, various lighting, assist and infotainment features can be booked online after purchase of the car
- driver assistance systems for long trips, city and parking, including adaptive cruise assist and efficiency assist; central controller for processing of sensor data



Strategy and production

- Audi e-tron – the first fully electric series production model from the brand with the four rings
- by 2025 one electrified variant in each Audi core car line, whether fully electric or as plug-in hybrid; Audi e-tron Sportback to follow in 2019; 2020 an electric-powered compact model; from 2020 production of the Audi e-tron GT at the Böllinger Höfen outside Neckarsulm
- in 2025 every third Audi delivered should be electrified, that is 800,000 automobiles
- new services centered on the Audi e-tron: involvement with Ionity for the establishment of a long-distance fast charging network in Europe; e-tron Charging Service for card access to roughly 80 percent of all public charging stations in Europe; starting in mid-2019, some vehicle functions can be flexibly booked on demand
- production at CO₂-neutral Brussels site: Audi wants to have all production sites CO₂ neutral by 2030
- electric axle drives for the Audi e-tron produced at Audi Hungaria in Győr, in the world's largest engine plant
- own battery assembly facility at the Brussels plant; competence center in Gaimersheim at the Ingolstadt site