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July 2018

PRESS INFORMATION

Audi e-tron: Interior and acoustics

Comfort taken to the next level: the interior of the Audi e-tron

Driver and passengers experience their environment in a wholly new dimension in the Audi e-tron. In addition to its generous space and the stylishly reduced design, Audi's first electric car offers a high level of calm, in turn, the perfect stage for the Bang & Olufsen 3D Premium Sound System. At the same time, the Audi e-tron delivers a new digital display and operating experience – the first volume-production car with virtual exterior mirrors.

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. The interior is not only airy, but the available space is generous, on a par with a typical full-size model from the brand with the four rings. 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, front and rear headroom as well as second-row knee room are top-notch 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.

Design and quality

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 incorporates harmoniously the hood above the Audi virtual cockpit whose sleek display stands visually free in the 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. As an option, Audi supplies the multifunction buttons on its edge as well as the control for the light functions in the 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 gear change switch along with the function for the electronic parking brake. The driver selects the drive position in a one-touch action with their thumb or index finger.

Sophisticated and comfortable: e-mobility as a premium experience
The Audi e-tron comes with carefully coordinated upholstery materials, colors and inlays in every equipment line. Whether refined Valcona leather or dark brushed aluminum for a sporty look, the electric SUV meets the highest quality standards in terms of build quality and choice of materials. The instrument panel comes standard in leather. As an option, the customer can also choose from sophisticated Valcona leather including contrasting stitching for the door armrests and the knee pads. Trim in open-pore grained ash is available exclusively.

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 stitching on the seats creates a motif reminiscent of electric circuit boards. Contrasting stitching adds accents, on the flint gray customized contour seats it stands out along with the piping in orange – taking its cue 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. In addition, it traces precisely the interior’s basic lines and backlights the e-tron badge in the instrument panel.

The air quality package, which provides first-class air quality, offers a further sensory experience. It includes an ionizer and fragrancing function that can be adjusted with several levels of intensity. Optionally, it fills the interior with a summer or winter fragrance – the former with a Mediterranean feel reminiscent of sea air, the latter with a pine feel with a breath of fresh mountain air. The air quality sensor also detects harmful gases and activates recirculated air mode as necessary.

Acoustics and sound

Quiet on board: aeroacoustics and soundproofing
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.

The body, which was specifically optimized in terms of vibration and noise comfort, provides the necessary foundation. A combination of hot-formed steel sheets forms the ultra-high-strength backbone of the passenger cell. The battery system integrated into the body with its cooling unit and the sturdy aluminum housing improves rigidity. Those areas where the forces are channeled into the body, particularly the connection of the axles, also 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 heard clearly up to 32 or 20 km/h *(19.9/12.4 mph)* and gradually fades as the 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.

Controls and displays

Vision 360 degree experience: Audi e-tron as the next step
With the Audi Aicon show car, the premium brand presented a clear vision for the interior of the future at the International Motor Show (IAA) in Frankfurt in 2017. An integral component is the digital display and operating concept, which can be positioned variably around the driver and the passengers.

The brand with the four rings took the first step along this path in the Audi TT in 2014. The compact sports car was the first volume-production model to use the Audi virtual cockpit entirely. In 2017, Audi introduced an entirely new operating concept in the fourth generation of the A8. With the two touch displays, it picks up on the operating functions familiar to people from their smartphones. Tactile and acoustic feedback ensure ease of use in the automobile. The Audi e-tron opens this digital operating window slightly more – 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. Their flat support incorporates a small camera with a resolution of 1,280 x 1,080 pixels at its hexagonal end. A heating function prevents the unit from misting over or freezing, thus ensuring good visibility in all weathers. Once the cameras detect dirt, the heating function is automatically activated. An alert also appears in the instrument cluster whenever the camera also needs to be cleaned.

The camera controls the brightness of the image automatically in accordance with the environmental conditions, for instance when driving through a tunnel. In addition, each mirror support also incorporates an LED indicator and an optional TopView camera. Compared with standard mirrors, the virtual exterior mirrors reduce the vehicle width by 15 centimeters *(5.9 in)*. They can be folded manually like conventional exterior mirrors.

The camera image is processed digitally and shown on high-contrast OLED displays with 1,280 x 800 pixels in the transition between the instrument panel and door. They blend harmoniously into the driver's area's wraparound concept. The 7-inch displays come 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. An integrated light sensor registers the brightness of the surroundings and automatically controls the display brightness. In the MMI the driver can also adjust this manually.

The virtual exterior mirrors adjust automatically to various driving situations, thus improving safety. The driver can activate three views in the MMI system – for highway driving, turning and parking. The highway view appears when the driver is traveling above 90 km/h *(55.9 mph)* and the navigation data reports that vehicle is on the highway. The field of vision is zoomed-in, for better estimating speeds during fast driving – 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. If the driver selects reverse, the curb view improves visibility for maneuvering and parking. The image is enlarged downwards – similar to the automatic lowering function with a conventional exterior mirror.

Since the LED indicator integrated into the camera housing is not visible for the driver, the displays in the interior also represent an activated indicator as a graphics element. The warnings from the lane change assist and the exit warning are also shown in the interior. The indicator appears on the outer frame as a green contour. If the lane change assist detects a vehicle in the blind spot or a car approaching fast from the rear, the display on the inside is framed in yellow. Should the driver nevertheless operate the turn indicator, the contour brightly lights up four times in succession. With the exit warning the frame of the display is also framed in yellow in a situation deemed hazardous or flashes – depending on the warning stage.

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, the comfort functions and the air conditioning with their wrist resting comfortably on the hand rest with integrated gear change 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.

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 e-tron route planner ideally supplements the navigation. 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 spaces 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.

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 center stage. 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.