# World premiere: the HD-Matrix LED Headlights

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**24/09/2026** World premiere: the HD-Matrix LED Headlights

With the model change, the Cayenne now features new LED headlights with matrix beam technology as standard. They use speed, camera and navigation data to ensure ideal illumination. Their high beam area is divided into 11 segments that can be illuminated or dimmed according to the situation (known as a matrix beam). In this way, they enable optimal visibility with the high beam activated without dazzling vehicles ahead or oncoming traffic.

As an option, Porsche is also offering the high-resolution HD-Matrix LED lights for the first time in the new Cayenne. These innovative headlights create a bright, homogeneous and precise light area that adapts dynamically and at lightning speed to the respective driving situation. The new adaptation is calculated every 16 milliseconds. This technology also enables adaptive functions such as lane

brightening, construction-site and bottleneck light or a dedicated motorway high-beam. The innovative headlights also stand out for their energy efficiency.

At the heart of the technology is a chip half the size of a thumbnail (12.8 by 3.2 mm), which holds 16,384 individual micro-LED pixels. Porsche installs two of these chips per headlight in the new Cayenne with HD-Matrix LED technology – four per vehicle. A control module, comparable in its function to a powerful PC graphics card, can activate, deactivate or dim each of the diodes in 1,024 steps. This makes it possible to produce an almost unlimited variety of light patterns. To optimally adapt the light pattern to the demands of a sports car, Porsche combines the chips with special lenses to create HD modules. One module per headlight has a wide-angle lens that allows for wide light dispersion. The 'Illumination' HD module covers an angle of 40 degrees of width by 10 degrees of height. The respective 'Performance' module, equipped with a telephoto lens, focuses its light on a range of 20 degrees of width by five degrees of height. The light from both modules overlaps and guarantees wide illumination with high intensity in the centre. Since only the required diodes are active at any given time, the HD-Matrix LED Headlights are exceptionally efficient.

The 'Illumination' and 'Performance' modules are adjacent to each other in the lower section of the headlights. Two bi-functional modules are positioned above them. They are responsible for courtesy lighting and the additional high beam. If the system does not detect any vehicles driving ahead or any oncoming traffic when the automatic high beam is activated, it switches on the additional high beam. This mode increases the amount of light from 1,400 to 2,500 lumens. This makes the new Cayenne capable of illuminating the road over a distance of up to 600 metres. As soon as the system detects a vehicle ahead or any oncoming traffic, it deactivates the additional high beam and returns to HD-Matrix mode. The four modules represent the characteristic Porsche light signature. It is active in all available light modes in the new HD-Matrix LED Headlights, including dipped and high beam modes.

With its pinpoint control of the light, the high-resolution headlight technology enables additional functions. If individual pixels are deactivated to avoid dazzling another vehicle, the additional available energy flows into the surrounding pixels and intensifies their brightness. This guarantees optimal visibility at all times. On motorways, the system controller adjusts the light distribution to the course of the road, accurate to the pixel, without dazzling the oncoming lanes of traffic. In construction areas and bottlenecks, a carpet of light in front of the new Cayenne marks the width of the vehicle within the system limits, giving the driver additional confidence that they can position their vehicle accurately. What's more, lane brightening helps the driver detect dangerous objects at an early stage. In this way, The HD-Matrix LED Headlights actively contribute to occupant safety.

## New and optimised assistance systems

The new Porsche Cayenne has a number of new and improved assistance systems. Its extended range of functions assists and relieves the driver on long drives, in traffic jams on motorways, when turning and in dangerous situations that require evasive manoeuvres.

The optional Adaptive Cruise Control comes with additional functions in the new Cayenne. One of them is the new Evasion Assist function. If the driver has to steer around a truck, car or motorbike in a critical situation, the assistant calculates the ideal evasion route. As soon as the driver steers during the evasive manoeuvre, Evasion Assist provides support with a situation-specific adjustment of the steering angle and targeted braking of individual wheels. This enables the vehicle to get to the calculated evasion route. The functional scope of the system also supports counter steering into the parallel lane, depending on the situation. In other words, the new Cayenne helps its driver avoid leaving the lane or crossing to the parallel lane.

Another function of Adaptive Cruise Control is the new Turn Assist capability. This function monitors oncoming traffic when turning left (or when turning right for right-hand drive countries) up to a maximum speed of 10 km/h. It also pre-conditions the braking system and thereby shortens the possible stopping distance. If there is a threat of a collision with oncoming traffic, Turn Assist automatically brakes the vehicle until it comes to a standstill. At the same time, it warns drivers both audibly and visually.

Porsche has also optimised the Lane Keeping function of the InnoDrive system, an extensive functional upgrade of Adaptive Cruise Control. The new Cayenne now keeps its lane even more reliably in congestion situations at up to 60 km/h with a vehicle driving ahead. If desired, the system can perform lane keeping in slow-moving and stop-and-go traffic on motorways and well-developed country roads, with continual steering interventions. It always prioritises lane markings, but also uses vehicles ahead for orientation. The new range of functions significantly increases driving comfort and demands less effort from the driver. Hands-off monitoring ensures that the driver is paying attention, as the driver remains responsible for the vehicle. If the driver takes their hands off the steering wheel, the system audibly and visually prompts them to resume control. If there is no reaction, the familiar Emergency Stop function automatically brings the vehicle to a standstill within the detected lane and then makes an emergency call.

## MEDIA ENQUIRIES

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## Consumption data

**Cayenne Coupé (WLTP)*:** Fuel consumption combined: 11.7 – 10.7 l/100 km; $CO_2$ emissions combined: 265 – 242 g/km; $CO_2$ class: G

**Cayenne E-Hybrid (WLTP)*:** Fuel consumption weighted combined: 4.4 – 3.9 l/100 km; Fuel consumption with depleted battery combined: 10,5 – 9,8 l/100 km; Electrical consumption weighted combined: 19.7 – 19.1 kWh/100 km; $CO_2$ emissions weighted combined: 101 – 90 g/km; $CO_2$ class weighted combined: C – B; $CO_2$ class with depleted battery: G

**Cayenne E-Hybrid Coupé (WLTP)*:** Fuel consumption weighted combined: 4.4 – 3.9 l/100 km; Fuel consumption with depleted battery combined: 10,5 – 9,8 l/100 km; Electrical consumption weighted combined: 19.7 – 19.0 kWh/100 km; $CO_2$ emissions weighted combined: 101 – 89 g/km; $CO_2$ class weighted combined: C – B; $CO_2$ class with depleted battery: G

**Cayenne (WLTP)*:** Fuel consumption combined: 11.7 – 10.6 l/100 km; $CO_2$ emissions combined: 266 – 242 g/km; $CO_2$ class: G

**Cayenne S Coupé (WLTP)*:** Fuel consumption combined: 12.6 – 12.0 l/100 km; $CO_2$ emissions combined: 288 – 273 g/km; $CO_2$ class: G

**Cayenne S (WLTP)*:** Fuel consumption combined: 12.6 – 12.0 l/100 km; $CO_2$ emissions combined: 287 – 272 g/km; $CO_2$ class: G

*Further information on the official fuel consumption and the official specific $CO_2$ emissions of new passenger cars can be found in the "Leitfaden über den Kraftstoffverbrauch, die $CO_2$-Emissionen und den Stromverbrauch neuer Personenkraftwagen" (Fuel Consumption, $CO_2$Emissions and Electricity Consumption Guide for New Passenger Cars), which is available free of charge at all sales outlets and from DAT (Deutsche Automobil Treuhand GmbH, Helmuth-Hirth-Str. 1, 73760 Ostfildern-Scharnhausen, www.dat.de).

## Video

https://newstv.porsche.com/porschevideos/newstv.porsche.com_239223_en.mp4

## Link Collection

Link to this article
https://newsroom.porsche.com/en/press-kits/cayenne/licht-und-assistenzsysteme.html

Media Package
https://pmdb.porsche.de/newsroomzips/f3343872-f133-4d10-bfc8-1e2591ad513c.zip

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