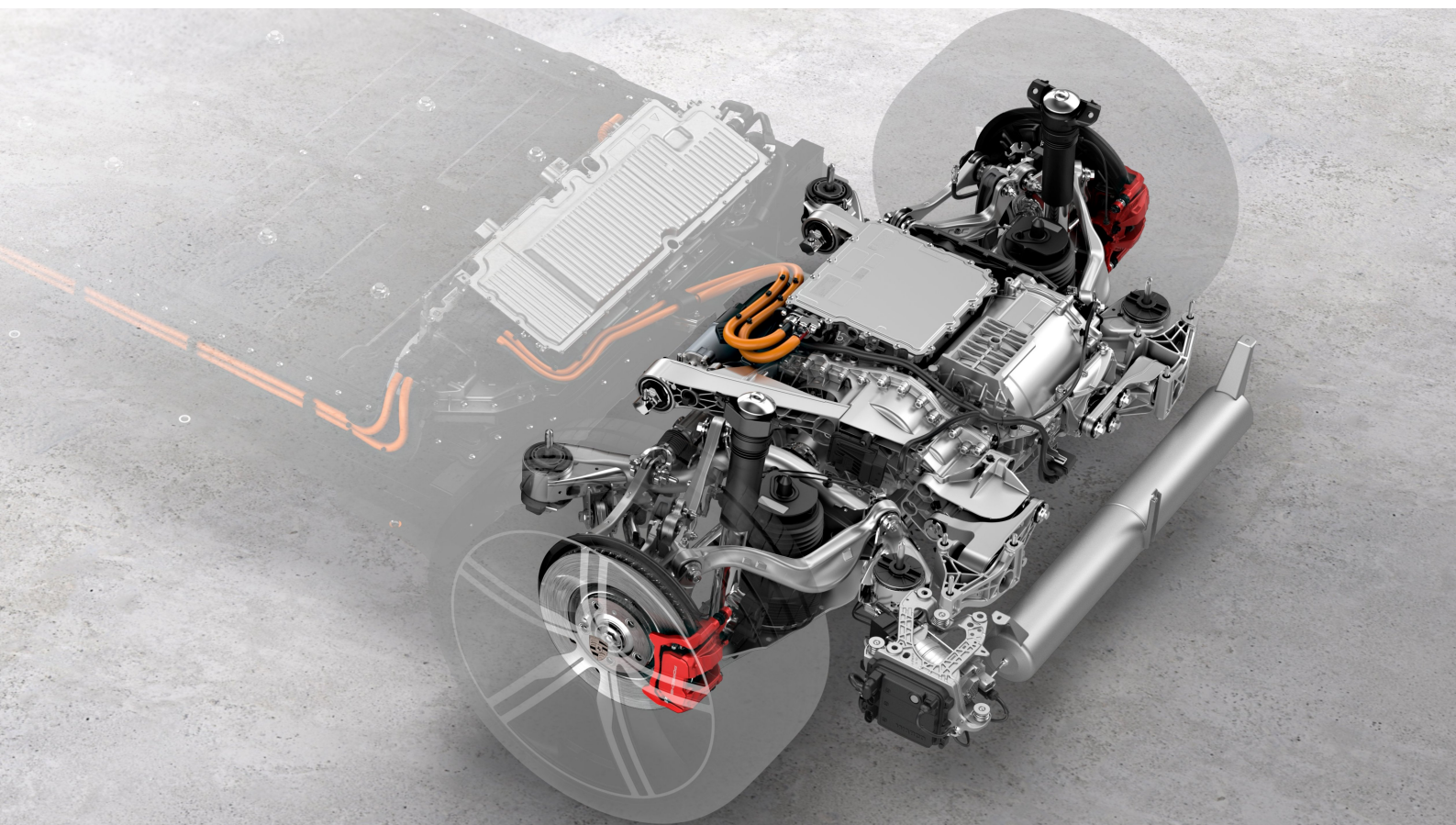




Powerful new-generation PSM motors

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The innovative drive architecture of the Macan, which is based on the Premium Platform Electric (PPE), is designed for long-lasting sportiness and high efficiency. The 800-volt technology, powerful electric motors and sophisticated battery and charging management ensure impressive, reproducible driving performance with combined WLTP ranges of up to 613 km.

Depending on the model, the Macan is equipped with different powertrain combinations. Permanent magnet synchronous motors (PSM) are exclusively used on both the front and rear axles, as they enable high efficiency and robust reproducibility of the power output. All electric motors in the new Macan use windings made of rectangular copper wire to maximise the copper filling factor of the slots in the stator. The windings are arranged either as U-shaped hairpins and therefore welded on one side or – as in the performance rear axle motor of the Macan Turbo – as an i-pin welded on both sides.

The electric motor on the front axles of the Macan 4 (Macan 4 Electric: Electric power consumption*

combined (WLTP) 21.1 – 17.9 kWh/100 km, CO emissions* combined (WLTP) 0 g/km, CO2 class A) and Macan Turbo (Macan Turbo Electric: Electric power consumption* combined (WLTP) 20.7 – 18.8 kWh/100 km, CO emissions* combined (WLTP) 0 g/km, CO2 class A) has a diameter of 210 mm and an active length of 100 mm. It alone delivers up to 175 kW. The two models differ at the rear axle. The Macan 4 utilises a compact concept with an inverter, which ensures a particularly efficient and lightweight powertrain. The electric motor has a diameter of 210 mm and an active length of 200 mm and boasts an output of up to 280 kW. The Macan Turbo has a larger and more powerful drive unit on the rear axle with a diameter of 230 mm and an active length of 210 mm. With a maximum output of 470 kW, the electric motor delivers particularly high torque and therefore a very high continuous output and power density as well as a maximum efficiency of up to 97 per cent.

System output up to 470 kW and 1,130 Nm of torque

In combination with both electric motors, the Macan 4 achieves a system output of up to 285 kW (387 PS) and the Macan Turbo up to 430 kW (584 PS). With Launch Control in the Sport and Sport Plus driving modes, overboost output of up to 300 kW (408 PS) in the Macan 4 and up to 470 kW (639 PS) in the Macan Turbo is possible for a short time. The maximum torque is 650 and 1,130 Nm respectively. This guarantees excellent driving performance. The Macan 4 accelerates from 0 to 100 km/h in just 5.2 seconds, while the Macan Turbo takes only 3.3 seconds. They reach top speeds of 220 and 260 km/h respectively.

Power is transmitted to the wheels on the front and rear axles via a two-stage single-speed transmission, designed as a parallel-axis three-shaft gearbox. On the front axle, the Macan 4 and the Macan Turbo use a gearbox with a ratio of 9.2. A lightweight spur-gear differential is used here to keep the gearbox compact. The two models differ again at the rear axle. The Macan 4 uses a gearbox with a ratio of 9.8. The Macan Turbo uses a gearbox with a ratio of 9.0, which is designed for higher forces. A special feature here is the additional integration of an electronically controlled rear-axle differential lock for Porsche Torque Vectoring Plus.

Power electronics with silicon carbide semiconductors in the Turbo

The pulse inverter comprises the power electronics that convert the direct current from the battery into three-phase alternating current for the electric motors. The main distinguishing features are the current carrying capacity and the semiconductor material. The pulse inverter used on the front axle of the Macan 4 and Macan Turbo utilises silicon as the semiconductor material. It conducts a maximum of 350 amps to the electric motor. In the pulse inverter on the rear axle of the Macan 4 and Macan Turbo, the highly efficient semiconductor material silicon carbide (SiC) is used for the sake of higher efficiency. This significantly reduces switching losses in the pulse inverter and enables higher switching frequencies. The rear-axle pulse inverter in the Macan 4 conducts a maximum of 480 amps; in the Macan Turbo it achieves an impressive 900 amps.

The operating strategy also plays an important role in the overall efficiency of a vehicle. Depending on the selected driving mode and the driving situation, the drive torque of the new Macan is distributed fully variably between the front and rear axles. Under stable, moderate driving conditions, it actually comes exclusively from the rear-axle drive unit. In this case, the front axle runs passively and can immediately provide drive torque again if required. This fully exploits the efficiency potential of the SiC pulse inverter while retaining the driving stability of an all-wheel drive vehicle.

Up to 240 kW recuperation capacity and coasting

Recuperation offers further efficiency benefits. Up to 240 kW can be recuperated in the Macan, depending on how much the driver presses the brake pedal as well as the temperature and state of charge of the battery (SoC), among other factors. This corresponds to a deceleration of around 4.3 m/s^2 , which is about 40 per cent of the maximum braking power. This means that up to 98 per cent of the total braking energy can be recovered in everyday use. If the desired deceleration is greater than the power that can be absorbed via recuperation, the hydraulic brake is applied. The driver does not perceive the fine adjustment via the blending function.

In keeping with the Porsche philosophy, the Macan can also coast. If the driver eases off the accelerator pedal but does not actively brake, the drive unit is switched off or, at higher speeds, put into zero-torque-control mode. This slows down the dissipation of kinetic energy and the car glides as far as possible without energy input. Alternatively, the driver can activate thrust recuperation via the PCM. Recuperation then takes place with a moderate deceleration of 0.6 m/s^2 . This corresponds approximately to the deceleration generated by engine drag torque, commonly referred to as the engine braking, in conventional drive systems.

All in all, the efficient high-voltage and drive systems of the new Macan models result in long ranges despite the typical sports car performance. The combined WLTP range is up to 591 km in the Macan Turbo and up to 613 km in the Macan 4. In city driving, well over 700 km is possible on a single charge with both models.

Exhilarating sound experience: Porsche Electric Sport Sound

The sporty driving experience of the new Macan models can be underscored with a Porsche Electric Sport Sound specially created for the SUV. An intelligent control algorithm provides the right emotional sound depending on the driving situation, the torque and speed of the electric motors. The specific sound of the Macan is reproduced throughout the entire sound system as well as to the outside.

MEDIA
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Consumption data**Macan Electric Models**

Fuel consumption / Emissions

WLTP*

Electric power consumption* combined (WLTP) 21.1 – 17.9 kWh/100 km

CO emissions* combined (WLTP) 0 g/km

CO2 class A Class

Macan Turbo Electric

Fuel consumption / Emissions

WLTP*

Electric power consumption* combined (WLTP) 20.7 – 18.8 kWh/100 km

CO emissions* combined (WLTP) 0 g/km

CO2 class A Class

Macan 4 Electric

Fuel consumption / Emissions

WLTP*

Electric power consumption* combined (WLTP) 21.1 – 17.9 kWh/100 km

CO emissions* combined (WLTP) 0 g/km

CO2 class A Class

*Further information on the official fuel consumption and the official specific CO emissions of new passenger cars can be found in the "Leitfaden über den Kraftstoffverbrauch, die CO-Emissionen und den Stromverbrauch neuer Personenkraftwagen" (Fuel Consumption, CO 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).

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