



VOLVO CAR GROUP

Press Release

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Volvo Cars introduces Twin Engine technology in world's most powerful and cleanest SUV

The first Volvo designed from the ground up for plug-in/electrification compatibility, the XC90 T8 delivers all the performance of a luxury SUV, but with emission levels that even small hybrid cars struggle to match.

When designing the XC90 T8, Volvo Cars chose not to compromise on performance, driving pleasure, efficiency or even luggage space. By building on the new modular Scalable Product Architecture (SPA) platform and successful Drive-E petrol powertrain, the company has created a uniquely roomy 7-seater SUV that delivers 400hp/640Nm combined with ultra-low emissions (59g/km) and high fuel efficiency (2.5 l/100km). The fuel economy according to the U.S. driving cycle is 59 MPGe.

"The XC90 T8 is a plug-in electric car, hybrid car and high-performance car rolled into one," says Dr Peter Mertens, Senior Vice President Research and Development of Volvo Car Group. "The Drive-E engines already offer highly competitive performance versus the competition. The T8 takes it further into a leading position."



A driving mode for every need

The XC90 T8 can go from 0 to 100km/h in 5.9 seconds, delivering all the driving pleasure customers have come to expect from a Volvo SUV. But driving pleasure is only a fraction of what the XC90 T8 offers: the car has five different driving modes that deliver a range of performance and efficiency-enhancing characteristics. Using either a scroll wheel on the centre console or a touchscreen on the dashboard, drivers can choose from:

Hybrid: This is the default mode, suitable for everyday use. Here, the vehicle will automatically alternate between drawing power from the 2-litre, 4-cylinder Drive-E engine and the electric motor to deliver the best overall fuel consumption.

Pure electric: In this mode, when the high-voltage battery is fully charged, it serves as the car's sole energy source, powering the electric motor over the rear axle. The XC90 T8 has a range of more than 40km using just electricity, which covers the total distance most people drive in one day. And thanks to the regenerative braking system, this mode is super-efficient in the stop-and-go traffic of city environments. If more power is needed, the Drive-E combustion engine starts up automatically.

Power mode: Here, drivers get the combined performance of the combustion engine and the electric motor. On start-up, the SUV takes advantage of the electric motor's superior response and instant torque curve, while the combustion engine gets up to speed. This combination offers better torque at lower revs, equivalent to that of a large displacement engine like the V8.

AWD: This mode offers constant all-wheel drive on demand. The advantage of being able to select AWD manually is that the driver can use it when needed, or choose to save energy for later.

Save: If the battery is charged, this mode allows the driver to "freeze" the battery level and save it for later use with Pure Electric drive. On the other hand, if the battery is low, the driver can use the combustion engine to charge the battery to a certain level for later use with Pure Electric drive.



Under the shell

Many of the XC90 T8's powertrain features have been optimised specifically for hybrid technology. Here are the main components of the system:

Drive-E engine

A specially modified version of the 4-cylinder Drive-E petrol engine is under the hood. Already known for its ability to more efficiently deliver the power of an engine twice its size, the Drive-E engine is enhanced in the XC90 T8 by a supercharger and a turbocharger for a total power output of 318hp and 400Nm torque.

Automatic gearbox

The 8-speed automatic gearbox has also been specially adapted for the hybrid: shift-by-wire technology allows drivers to control the transmission electrically (a luxurious touch is the gearshift is made of handmade Swedish crystal). A larger oil pump provides the necessary lubrication during electric drive and enables quicker pressure build-up when seamlessly going from electric to combustion drive.

CISG

The crankshaft-mounted starter generator (CISG), located between the engine and the gearbox, performs three important functions: it is a powerful, 34kW starter motor that allows the car to go from pure electric drive to combination combustion drive seamlessly, so drivers can experience the car's petrol engine and electric motor as one unit; it is also a powerful electric generator; and finally, it acts as an electric engine booster, working with the supercharger and turbocharger when extra power is needed, providing up to 150 Nm of extra torque.

Battery

The high-voltage (270–400V) battery, delivering 65kW of power, is an excellent example of Volvo's success with the XC90 T8. While other carmakers have struggled to combine the bulk of a battery pack with a luxurious and spacious interior, Volvo has managed to overcome this challenge by

placing the battery centrally in the tunnel of the car. There are several advantages to this position. For example, the battery does not impact the amount of available space inside the car. This means that there is room for three rows of seats – plenty of space for people and luggage. Furthermore, the battery placement gives the SUV a low and central centre of gravity, making the XC90 T8 easier to handle and safer to drive.

Rear electric motor

Delivering 82hp (60kW) and 240Nm torque, the large electric motor sits on the rear axle and drives the back wheels in electric and power-boost modes. The rear placement is significant because it allows for a larger motor, which is useful for following stop-and-go city traffic rhythms. This placement also makes efficient all-wheel drive possible because each axle has its own power source.

Two-step braking system

The XC90 T8 blended braking system partly uses brake-by-wire technology to recover and transmit energy back into the car, either to recharge the battery or for immediate use. The system is also equipped with a unique stability function that controls the amount of energy that may be safely regenerated.

Unique cooling and climate system

The unique cooling system is composed of two extra circuits. The first cools the CISG and the large electric motor on the rear axle, while the second cools the battery in one of two ways: either passively, via the radiator, or actively through integration with the car's climate system.

Pre-conditioning

For convenience and efficiency, drivers can pre-condition the XC90 T8's drivetrain, battery and cabin, either directly from within the car or by using the Volvo On Call mobile app. This ensures that, whether it's freezing or hot and humid outside, the car will be heated or cooled as necessary and ready to go by the time the driver enters. Pre-conditioning can be done while the car is plugged in, which is beneficial from a CO₂ perspective since it ensures that the battery will last as long as possible in Pure Electric Drive mode.

A heritage of innovation

As the world's most powerful and cleanest SUV, the XC90 T8 joins a long list of Volvo Cars innovations designed to create a more comfortable driving experience, a cleaner environment and safer roads.

The data in the press release is based on the NEDC certification cycle used in the EU. The figures are preliminary.

Volvo Car Group in 2013

For the 2013 financial year, Volvo Car Group recorded an operating profit of 1,919 MSEK (66 MSEK in 2012). Revenue over the period amounted to 122,245 MSEK (124,547 MSEK), while net income amounted to 960 MSEK (-542 MSEK). Global retail sales for the year amounted to 427,840 (421,951) cars, an increase of 1.4 per cent compared to 2012. The operating profit was the result of cost control and strong sales and was further tangible proof of Volvo Car Group's progress in implementing its transformation plan. For the full year 2014, the company expects to stay in black figures and predicts to record a global sales increase of close to 10 per cent.

About Volvo Car Group

Volvo has been in operation since 1927. Today, Volvo Cars is one of the most well-known and respected car brands in the world with sales of 427,000 in 2013 in about 100 countries. Volvo Cars has been under the ownership of the Zhejiang Geely Holding (Geely Holding) of China since 2010. It formed part of the Swedish Volvo Group until 1999, when the company was bought by Ford Motor Company of the US. In 2010, Volvo Cars was acquired by Geely Holding.

As of December 2013, Volvo Cars had over 23,000 employees worldwide. Volvo Cars head office, product development, marketing and administration functions are mainly located in Gothenburg, Sweden. Volvo Cars head office for China is located in Shanghai. The company's main car production plants are located in Gothenburg (Sweden), Ghent (Belgium) and Chengdu (China), while engines are manufactured in Skövde (Sweden) and Zhangjiakou (China) and body components in Olofström (Sweden).