



Bosch SMG 180/120 electric motor: compact powerhouse

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Powerful electric powertrain with up to 80 kW and extremely high efficiency in the urban cycle

- ▶ 32-kilo lighter, reduced-volume motor
- ▶ Immediate 200 Newton meters of torque
- ▶ Four-wheel drive possible with axle-split hybrid

The Bosch SMG 180/120 is a compact powerhouse for use in electrical powertrains. The electric motor weighs only 32 kilos and fits inside a typical school backpack. This makes it considerably smaller and lighter than conventional combustion engines, yet it still packs an impressive punch. “The SMG 180/120 is the Bosch all-around solution for electromobility. It accelerates quickly over the first few meters and can be installed in electric vehicles as well as hybrids,” says Joachim Fetzer, who is in charge of electric vehicle and hybrid systems at Bosch. A look at current series-produced models which feature the motor shows just how versatile it is. Drivers can already experience the compact powerhouse in the smart “fortwo” electric drive and the Fiat 500e. But the permanent magnet synchronous motor can be used in hybrids as well. One example is the Peugeot 3008 diesel hybrid.

In hybrids, the electric motor supports the combustion engine with an output of up to 40 kW. In purely electric vehicles and plug-in hybrids, the SMG 180/120 delivers an output of 80 kW. The numbers only hint at the driving enjoyment this motor offers, however. The small motor delivers a driving experience of the kind that usually only associated with considerably more powerful combustion engines. Even at low engine speeds, the SMG 180 delivers up to 200 newton meters of torque. As soon as the driver steps on the gas pedal, this power is available. Yet at the same time, silent and relaxed gliding is possible.

Despite the power it develops, the electric motor works at over 90 percent efficiency. One unique selling point is that its efficiency has been optimized

[Video link](#)
[Electric drive](#)



for urban traffic. As a general rule, the more efficiently an electric motor works, the greater the electric range of the vehicle.

Four-wheel drive and no need to check the oil

The compact motor's second strength is the level of comfort it offers drivers. As is typical for electric motors, the SMG 180 includes a start-stop function and regenerative braking. Even shifting is a thing of the past, since the motor operates with only one conversion ratio. At up to 12,800 revolutions per minute, the motor's output speed is flexible and covers the entire range of applications. And even when the car has to reverse, reverse gear is no longer engaged mechanically, but instead by changing the direction of electrical current.

In addition, the motor is maintenance-free. It contains no mechanical wear parts which must be regularly checked or replaced. And drivers are relieved of one other irksome task, namely checking oil levels and refilling engine coolant.

Finally, there is no predetermined location for the SMG in the powertrain. It does not have to be in close proximity to the combustion engine, but can be mounted on a vehicle's rear axle. This would allow a vehicle's front axle to be driven by the combustion engine while the rear axle is driven by the electric motor. Such a setup means that customers also get four-wheel drive functionality in their hybrid. One example of this type of axle-split hybrid is the Peugeot 3008 Hybrid4, which PSA and Bosch have already brought into series production.

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Video link
[Axle-split hybrid](#)



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