

Media Information

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In brief:

The all-rounder – the 1-speed gearbox

- Volkswagen Group Components produces the gearbox for all electric vehicles based on the MEB¹ on behalf of the Volkswagen Group.
 - Highly compact gearbox caters for all driving situations with a single gear
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Wolfsburg – The ID.3² from Volkswagen enters the new era of e-mobility – quietly but with full power. After all, the typical properties of the electric drive system change the way in which power is transmitted. The powerful APP310 e-drive unit transmits power to the driven wheels using an extremely compact gearbox. The ID.3's single gear is able to cope with all driving situations. The mechanism used has only a small number of cogs. This 1-speed gearbox is part of the electric drive system for the modular electric drive matrix (MEB) and is manufactured by Volkswagen Group Components at the Kassel plant. But why is a single gear enough for the drive motor?



Small shifting unit: the 1-speed gearbox

How power is transmitted to the wheels

The traction, i.e. the force that allows movement, and speed of a motor vehicle depend on the rotational speed of its drive system. As the speed of the drive system increases, the force transmitted to the wheels – the torque – can vary. With a vehicle with a combustion engine, the torque increases along with the engine speed and then falls again. With an electric drive system, however, the maximum torque is available immediately

and remains constant over a wide range of speeds. The use of a multi-speed gearbox to achieve the desired speed or the necessary torque along the speed curve is therefore not absolutely necessary.

One gear for every situation

That is why a 2-stage 1-speed gearbox is used in the Volkswagen ID.3. When reversing the car, the direction of the electric drive system is simply reversed. In addition to various other components, power electronics is responsible for this and for the power characteristics of the drive system. In order to achieve the maximum power of 150 kW, the electric drive unit must

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rotate at high speeds. In order to provide a high level of torque, a 10x transmission ratio is used. To save space, the gearbox has a two-stage design with two smaller cogs instead of one big one. As a result, the electric drive motor in the ID.3 provides the maximum torque of 310 Nm constantly over a wide range of speeds. The maximum speed of 160 km/h is reached at a maximum of 16,000 rpm. For the ID.3 which is optimized for maximum range, the use of a single gear for all driving situations is perfectly adequate.

Precision manufacturing makes the e-vehicle particularly quiet

Because an electric drive system is very quiet, the level of noise in an e-vehicle is very important. Even the tiniest sources of noise can suddenly be heard. The parts for the 1-speed gearbox must therefore be manufactured with great precision to ensure that they do not cause any additional noise. At the end of the production line, not only the power characteristics of the electric drive system are checked – the relevant noise values are too. All drive systems for European and North American e-vehicles based on the MEB – including the 1-speed gearbox – are manufactured at the component plant in Kassel. Other important parts are produced at the component plants in Salzgitter, Poznań and Hannover.

Find further information on the topic in the [Newsroom Story "Powering into the future with a single gear"](#).

¹⁾ *Modular electric drive matrix*

²⁾ *ID.3: the vehicle is not yet available for sale in Europe*

This is Volkswagen Group Components.

As an independent corporate business unit under the umbrella of Volkswagen AG, Volkswagen Group Components is responsible for the development and manufacturing of strategic components for the Group's vehicle-producing brands. 80,000 employees work in over 60 plants at 47 production sites worldwide in five business areas – Engine and Foundry, Gearbox and Electric Drive, Chassis, Seats and Battery Cells. They develop and manufacture vehicle components, shape future topics such as charging infrastructure and battery recycling – and thus make a decisive contribution to the value of the Volkswagen Group, its brands and products. Thomas Schmall is the Chairman of the Board of Management of Volkswagen Group Components.

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