

## The Pinion gearbox used on the e-bike – the right order

### In a nutshell:

E-bikes with rear motor and Pinion gearbox offer key benefits:

- No overload of transmission components as the motor power is only released after the gearbox.
- Carefree cycling: The combination of two self-contained systems ensures durability and minimal wear
- More agile riding performance, as the force at the rear wheel is applied directly onto the road
- Precise shift in gear in every situation, also when parked
- Silent cycling, thanks to rear motor and Pinion gearbox.

### Problems of mid-motor as e-bike drive train

The sequence of motor and gearshift plays a much bigger role than is commonly assumed. This applies to the riding sensation, but primarily to the load on the components.

Problematic: Development of increasingly higher torques for mid-motors (more and more a marketing tool).

Increased forces mean extreme loads and higher wear on the drive train. More sensitive electronics are required as an offset. The specifications of the manufacturer on torques at the mid-motor are definitely questionable. What matters is what is applied permanently at the bike.

Certified Engineer Christoph Lermen, Managing Director of Pinion:

"The current success of the mid-motor has evolved historically. From a technical point of view, however, the combination of a mid-motor and gears at the rear wheel is the less favourable way for many applications. From an engineering stance, the sequence of the motor first and then the downstream gearshift is not the best alternative. Furthermore, the option of system integration for e-bikes is limited here."

### Benefits for the cyclist

The force from the rider is decoupled from the motor support at the rear wheel. This brings back the feeling for cycling and the correct shifting time. As a result, the system is intuitive to use, more efficient, smoother and can be shifted without an electronic interruption of the motor. The force acts best on the rear hub. This means more agility and dynamics, more "riding pleasure".

### Mid-motors vs rear motors in combination with Pinion

The mid-motor has a number of advantages for mountain bikes on difficult terrain. However, for everyday bikes, urban bikes, touring bikes, modern sports bikes and e-bikes with high kilometre readings, the mid-motor is the second choice. The reasons for this are the system-related noise and the generally underestimated wear. When it comes to a maintenance-free design, two self-contained systems with mid-motor combination working in the right order are ultimately superior.

Frequent cyclists have high quality standards, which not only relate to the riding performance, but also the ease of servicing. Pinion gearboxes are practically wear-free. With the Pinion gearbox an oil change is only due after 10,000 kilometres. The combination with a low-maintenance rear motor is especially ideal for premium e-bikes and frequent cyclists.