

EUROBIKE 2021

Chainless electric drive system for bicycles

At Eurobike 2021 in Germany, the automotive and industrial supplier Schaeffler presented the "bike-by-wire" system, Free Drive, as a solution for bicycles. All system components communicate with each other via a CAN connection.



The Free Drive operates using bike-by-wire technology (Source: Schaeffler)

The central component of the Free Drive system is the Schaeffler generator, which sets the constant resistance on the pedal while simultaneously absorbing the rider's pedaling power. The regenerative solution is a serial hybrid drive that converts the mechanical energy generated during pedaling into electric energy, which in turn is converted back into mechanical energy in the wheel hub motor. Excess energy is stored in the battery.

As with cars, all system components communicate with each other via a CAN connection. The complete, matched system sold by Heinzmann, which generates a continuous output of 250 W, consists of a pedal generator, drive motor, battery powerpack, and human-machine interface (HMI). "The Free Drive system combines Heinzmann's long-standing drive and industry expertise with Schaeffler's system and mechatronics expertise," said Peter MÉRIMÈCHE, Managing Director Electric Drives at Heinzmann.

One system for various applications

"Regardless of whether the system is used in 2-, 3-, or 4-wheel applications, the absence of a mechanical connection between the generator and motor means that Free Drive can provide maximum flexibility in the bicycle architecture and a freely configurable pedaling sensation, which is tailored to the requirements of the bicycle and the needs of the rider, while ensuring minimal wear," said Dr. Jochen Schroeder, President of the E-Mobility Division.

The dimensions of the system permit a standard distance of 138 millimeters between the two pedals. The product can be specified for various applications, irrespective of the manufacturer, claimed Schaeffler. The system does not require wear parts and peripheral chain equipment.

The chainless drive system is a joint development with two-wheel electric drive provider Heinzmann. The company dispenses with the mechanical connection between the generator and motor, thus enabling bicycle architectures and pedal configurations combined with a lower requirement for wear parts.

"The development is proof of our transformation into a leading supplier of electrified drives. Our decades of expertise in the field of vehicle mechatronics, which we are now also transferring to the two-wheel segment, have assisted us in this development. The e-bike market is growing steadily and offers Schaeffler, as e-mobility partner, further business potential", said Matthias Zink, CEO Automotive Technologies, Schaeffler.



The pedal generator in the middle can be individually configured and used on a modular basis for various systems and applications (Source: Schaeffler)

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