HBK
HOTTINGER BRÜEL & KJÆR

E-Bike Cadence Sensors from HBK Lead to Market Tailwind

HBM

Brüel & Kjær

E-Bike Cadence Sensors from HBK Lead to Market Tailwind

E-BIKES ARE AMONG THE LARGEST GROWTH MARKETS WORLDWIDE

The estimate of the global market size in 2020 was at 25 billion USD with an annual growth rate of almost 10 % until 2028, when the market size is likely to be at 48 billion USD.

Growth has been driven primarily by the USA, Asia, Latin America and more recently Europe, which is considered to be the largest growth market.* Looking at the more common pedal-assist e-bikes (pedelecs), their advantages over conventional bikes are undeniable: ideal for short-distance commuters, inclines and headwinds are no longer a problem, and even less athletic riders can ride longer distances with ease. In larger cities, they help solve logistical problems. They take up less space, are cheaper and more environmentally friendly than cars. In brief: They are fun to ride!

HUMAN AND MOTOR POWER NEED TO BLEND SEAMLESSLY FOR THE BEST RIDING SENSATION

These favorable forecasts resulted in more e-bike manufacturers (OEMs) entering the market and a stronger competition among them. With a wider range of models and features available, the expectations of a potential buyer regarding the riding sensation have also changed: no matter the bike's purpose (trekking, city, cargo or mountain bike), whether under load or not - the starting and stopping behavior, acceleration, and motor assistance should be smooth, immediate, intuitive and reliable. In any case, the riding experience depends on the human-machine interface: if the rider's pedaling power and the motor power interact smoothly, the riding sensation will be a pleasant one.

*Source: GLOBE WIRE, April 2021

CUSTOMIZED OEM CADENCE AND PEDAL ASSIST SENSORS HELP SOLVE DESIGN AND TECHNOLOGY ISSUES

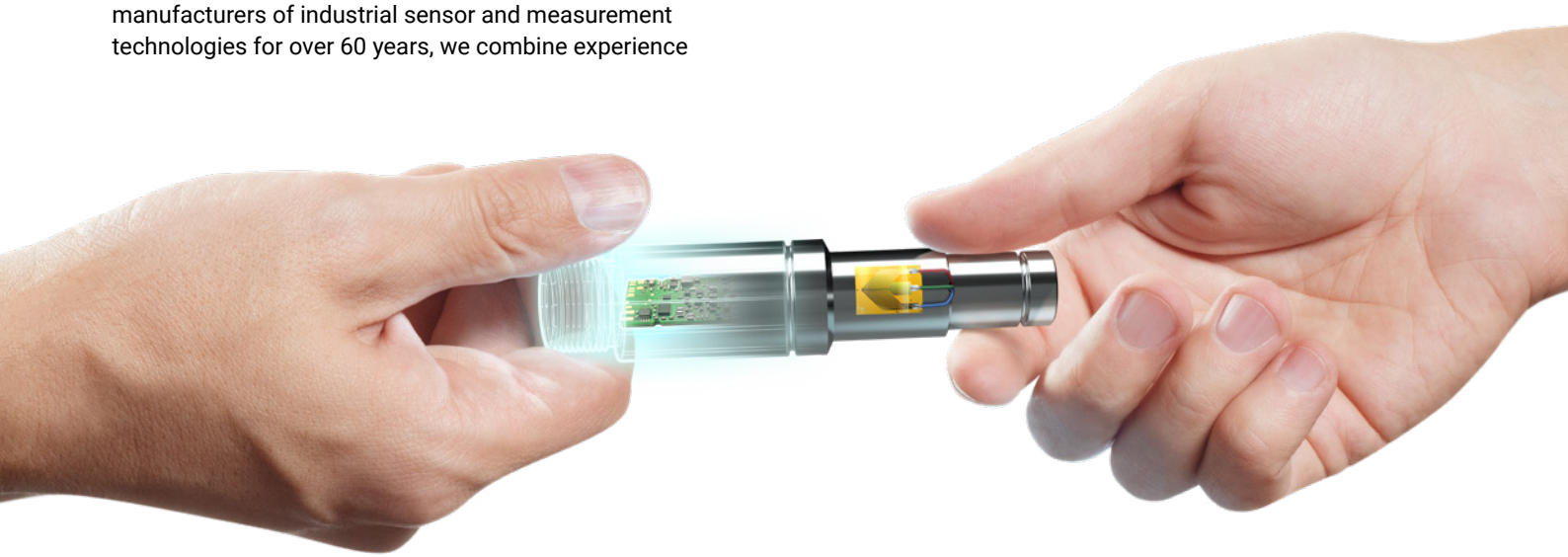
Hence, e-bike manufacturers work on optimizing the drive control by improving the interoperability of battery, motor, gearbox, the controller, and the sensors that perform the relevant measurements. The more precise these measurements, the finer the drive control. Whereas in the past the drive control largely relied on cadence measurements, today these are no longer sufficient. How fast does the rider pedal and how much force does he or she apply to the pedals? At what point does the bike start to move and when does motor power have to be switched on? Does the level of assistance match the rider's choice? Force and torque sensors perform thousands of measurements per second to enable the appropriate controller decisions. Only when all components of the drivetrain interoperate seamlessly, does the rider have the best riding sensation.

In those cases where commercially available force and torque sensors are not suitable because their dimensions do not fit the bike's geometry or for other reasons, e-bike manufacturers will have to find solutions tailored to their specific needs. They will look for custom-made OEM sensors, such as cadence sensors or pedal assist sensors that are flexible, robust, durable, and reliable all at the same time; sensors that deliver highly precise results, require no external power, are maintenance-free and, of course, cost-effective. In brief, customized OEM solutions that fit the application both technically and on the cost side. Among the currently available technologies, customized strain gauge-based force and torque sensors are the best option because they meet all the aforementioned requirements.

Example of possible areas of application

Dedicated HBK competencies for optimal customer-specific sensor solutions

At HBK (Hottinger Brüel & Kjær), one of the world's leading manufacturers of industrial sensor and measurement technologies for over 60 years, we combine experience and expertise that make us the ideal partner for e-bike OEMs. Not only are we firmly in the saddle in the bicycle industry, as we have been successfully supplying a variety of measurement methods – notably power meters and strain gauges – for over 20 years. As the global market leader for strain gauges, we have developed this technology to perfection for use in a wide range of industries. Depending on the application, strain gauges are available in different categories and hundreds of designs. They can be used to convert existing parts or mechanical components into sensors. Moreover, we managed to eliminate a common problem of strain-gauged based sensors: signal drift (the shift of the 0-signal, especially under the influence of temperature) does not occur with HBK strain gauges. They reliably deliver reproducible results.



With our competence center in the US created specifically for the development of OEM sensors, HBK is placing a clear focus on this market segment. A specialized engineering team develops and manufactures complex, highly customized strain-gauge-based sensor solutions for our OEM customers. Together with our customers, we identify the optimal sensor and the bike component it fits onto or into. Depending on the customer's requirements, our engineering services range from manufacturable gluing technology by developing and building stand-alone sensors to sub-assemblies and even electronics. Thanks to lean processes, development costs are very low, and it usually takes only a few weeks to reach PoC or a few months to go into production.

HBK is not only able to respond quickly and unbureaucratically to challenging customer requests; a dedicated engineer is always available as a point of contact for each OEM customer. We see ourselves as part of our customers' R&D teams as we accompany their development process from design to prototyping and testing and finally series production. Thanks to our production capacities in the US and China, we can easily supply high volume production series with consistent high quality. Speaking of quality: Of course, we provide the necessary certifications for our customers' regional sales markets.

Since many OEM projects are highly innovative, they are usually subject to non-disclosure agreements. We attach great importance to lasting strategic partnerships and comprehensively accompany and support our customers. Whether it is the implementation of new sensor technologies, design improvements or potential savings. We join forces with our customers to achieve the best possible results.

Your competent contact partners at HBK

European Sales Manager
OEM Sensor

Dario Masato
dario.masato@hbkworld.com

Sales Engineer
OEM Sensor DACH

Christoph Miks
christoph.miks@hbkworld.com

HBK – Hottinger Brüel & Kjær
www.hbkworld.com
info@hbkworld.com

S05791 01 E00 00