

When drive power needs to go “round the corner” efficiently Crown gearboxes with optimized design

If you’re looking for a particularly efficient and economical angular gearbox, crown gearboxes are often a good choice. Their high efficiency levels are seeing them make a comeback and they are gaining more and more ground over worm and bevel gears.

Spurred on by increasing demand from industry, the design of the gearing components of the crown gearboxes and their manufacturing technology have been steadily improved.

High efficiency with large gear reduction

With the EtaCrown and EtaCrownPlus crown gearboxes from ebm-papst, the involute drive pinion is cylindrical in shape. The contact between the pinion and the output gear is a rolling contact, so there are hardly any frictional losses. Efficiency is therefore in the range of 90% even at high reductions, making the motor power almost fully available for the drive task. 10% power loss compared to up to 75% for conventional worm gear designs (depending on the reduction selected) is an enormous potential for savings even for small drives. In addition, the drive motor can often be designed on a smaller scale, saving installation space and costs.

Optimized gearing technology and improved lubrication

Crown gearboxes of various sizes cover reductions in the single-stage range up to 10:1, two-stage to 113:1 and three-stage to 289:1. Together with the Institute of Machine Elements (FZG) at Technical University Munich as part of a sponsored project (Bavarian Research Foundation: AZ-1379-19; administrator: J.-F. Hochrein) ebm-papst has conducted extensive research into all aspects of gearing technology. In this context, software has been developed that can be used for the first time to realistically calculate parameters important for design, such as geometry determinations and gear contact analyses under load. The values are validated on high-performance test stands and ultimately help to optimize production. A patented separating insert for the housing has also been developed to improve the lubrication of the gear wheels and thereby increase the service life of the gearbox. This keeps the lubricant where it belongs, that is, on the gearing of the gear wheels.

Modular drive system for greater flexibility

EtaCrown and EtaCrownPlus are part of the modular drive system from ebm-papst and can be combined with all DC and EC motors as well as brakes and encoders. Customized complete drive solutions from a single source with perfectly matched components can be easily put together in the online portal and are ready for shipment within 48 hours. Crown gearboxes are typically used in strapping machines as well as in automated transport and shuttle systems, gate and cabinet drives, and in operating tables as a sliding aid.

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Fig. 1: The involute drive pinion in the crown gearbox is cylindrical in shape and the contact between the pinion and output gear is a rolling contact. Hardly any friction losses occur.

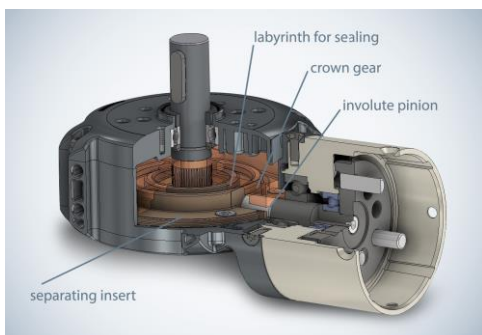


Fig. 2: ebm-papst has developed a patented separating insert for the housing to improve lubrication.



Fig. 3: EtaCrown and EtaCrownPlus are part of the modular drive system from ebm-papst and can be combined with all DC and EC motors as well as brakes and encoders.

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About ebm-papst

The ebm-papst Group, a family-run company headquartered in Mulfingen, Germany, is the world’s leading manufacturer of fans and motors. Since it was founded in 1963, the technological leader has set international industry standards with its core competencies in motor technology, electronics, digitalization, and aerodynamics. ebm-papst offers sustainable, intelligent, and tailor-made solutions for virtually every requirement in ventilation and heating technology.

In the 2022/23 financial year, the Group generated turnover of EUR 2.540 billion. It employs just under 15,000 people at 30 production sites (including in Germany, China, and the U.S.) and in 50 sales offices worldwide. ebm-papst sets the benchmark in almost all sectors, such as ventilation, air conditioning and refrigeration technology, heating technology, information technology, mechanical engineering, intralogistics, and medical technology.

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