

EC-4pole 32 HD with planetary gearhead

This 480 W motor can withstand 200 °C, 1000 G, -5000 m and 1700 bar.

The Heavy Duty Motor EC 22 HD, innovation of the year in 2010, has now been joined by a larger and more powerful version. The new, electronically commutated EC-4pole 32 HD motor has all the features of the award-winning 22 mm motor. It is designed for extremely rough operating conditions, particularly applications in deep drilling.

Deep drilling technology (called “downhole drilling” in the field of oil and gas exploration) makes it possible to recover oil and gas from depths of more than 2500 m. By combining deep drilling with directional drilling (dynamic position alignment of a bore in the earth), previously unreachable oil reserves are being opened up, with drilling depths of approx. 5000 m and drill lengths of up to 11000 m. The development of specialized electronics and drives has made it possible to better monitor and control many functions across the entire drilling process. For instance, it is now possible to dynamically measure and adjust the position of the drill head during the drilling process. Diverse deep drilling tools also use hydraulic valves or flaps that are operated by electromechanical drives. The temperatures and pressures at these depths, combined with the strong vibrations that occur during the drilling work, present unique challenges for the use of electronic drives.

The different versions of the EC-4pole 32 HD are designed for operation in air or in oil (flooded in hydraulic oil). The power rating depends on the surrounding medium and amounts to 220 W in air and, due to the much higher heat flow, 480 W in oil. They are designed for ambient temperatures of more than 200 °C and atmospheric pressures of up to 1700 bar. The Ø 32 mm motors must also be able to withstand vibrations of up to 25 g_{rms} as well as impacts of up to 1000 G (1000 times the acceleration due to gravity at the earth's surface). As an example, a Formula 1 vehicle is exposed to approximately 2 G and fighter jets are exposed to approximately 13 G.

The motors feature high efficiency (up to 89% in air, more than 80% in oil), making them ideal for use in battery-operated applications. With their detent-free running properties, they have excellent control characteristics and are suitable for high-precision positioning tasks in outer space, even at low speeds.

The EC-4pole 32 HD is ideal for use in environments with extreme temperatures, subject to high vibration, or under ultra-high vacuum. This means the motors can also be used in aerospace applications, e.g. for gas turbine starters, for the generators of jet engines, for regulating combustion engines, or for exploration robots. For the use of the motor in conjunction with a gearhead, maxon offers the GP 32 HD, a powerful and robust planetary gearhead.

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maxon motor ag

Brünigstrasse 220

Postfach 263

CH-6072 Sachseln

Tel: +41 41 666 15 00

Fax: +41 41 666 16 50

E-mail: info@maxonmotor.com

Internet: www.maxonmotor.com



Figure 1: The new 480 W power couple. Planetary gearhead GP 32 HD, 1 to 4 stages.



Figure 2: Inside the EC-4pole 32 HD.



Figure 3: Application in deep drilling.