Media release

April 29, 2013

Extreme heat, extreme pressure, extreme performance

maxon motor's new 480 W Heavy Duty brushless motor and gearhead can withstand 200 °C, 100 G and 1700 bar.

maxon motor specialises in producing Heavy Duty (HD) motors that deliver exceptional performance for use in the world's harshest environments. The latest product to join the HD family is the EC-4pole 32 HD, designed for extremely rough operating conditions, particularly for applications in downhole tools and geologging devices.

More than 85 per cent of the global energy consumption is based on fossil fuel sources i.e. oil, gas and coal. It is also estimated that energy demand will be about 30 per cent higher in 2040. However, to acquire these valuable resources, it is necessary to drill deeper and deeper. This makes it possible to recover oil and gas from depths of more than 2,500 m. By combining downhole drilling with directional drilling (dynamic position alignment of a bore in the earth), formerly inaccessible oil reserves can be retrieved. Drilling depths of currently approx. 5,000 m and drill lengths of up to 11,000 m can be reached. These types of holes require special equipment to verify the integrity of the well and the diameter of the bore, as well as the location of the oil and the rock properties. The temperatures and pressures at these depths, combined with the strong vibrations that occur during the drilling procedure, present unique challenges to the use of electronic drives. The conditions several kilometres below the surface of the earth are anything but technology-friendly.

The EC-4pole 32 HD brushless motor was developed by maxon when a customer required a higher powered motor than the award winning EC 22 HD. The new motor offers the same features and performance as the EC 22 but with greater strength. Its larger diameter makes the motor suitable for accommodating a 4-pole rotor, allowing for much higher torques.

This new high performance motor is available in two versions for operation in air (power rating of 220 W) or oil (power rating of 480 W). They are both designed for ambient temperatures of more than 200 °C and atmospheric pressures of up to 1700 bar. The 32 mm motors are also able to withstand vibrations of up to 25 Grms as well as impacts of up to 100 G, for example Apollo 16 on re-entry reached only 7 G. The motors feature high efficiency (up to 89% in air, more than 80% in oil) and with their detent-free running properties, have excellent control characteristics and are suitable for high-precision positioning tasks even at low speeds.

For the use of the motor in conjunction with a gearhead, maxon offers the GP 32 HD, a powerful and robust planetary gearhead that is available in ratios of up to 913:1.

The EC-4pole 32 HD and the GP 32 HD is ideal for use in environments with extreme temperatures and/or subject to high vibration. It is ideal for ultra-high vacuum applications as there is no glue or plastics involved. As well as downhole tool technology, these 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.

---

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. Planetary gearhead GP 32 HD, 1 to 4 stages.

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

Figure 3: Application in deep drilling.