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Press Release

Brushed DC motors for higher temperatures.

DC motors that withstand high temperatures up to 200°C were exclusively the domain of brushless DC motors. maxon has now changed that with the new HT (High Temperature) brushed DC motor.

Motors capable of operating at high ambient temperatures are nothing new to maxon. The HD (Heavy Duty) brushless DC motor range, developed to operate in ambient temperatures up to 200°C, has been on the market for over a decade. Until now, these temperatures were exclusively the domain of brushless motors; maxon has now changed that with the new HT (High Temperature) brushed DC motor.

A major oil and gas company approached maxon looking for a brushed DC motor capable of operating in ambient temperatures up to 180°C. Their established multi-imaging tool, utilised for pipework casing inspection, used a high temperature brushed DC motor. However, when new tools with higher seismic shock levels were added, the current DC motor system failed as it wasn't robust enough. Unsurprisingly the company didn't want to redesign the entire system as this would be expensive and time-consuming; instead, they turned to maxon to provide a solution. maxon's engineers set about developing a tailored DC motor drive system based on the standard DCX 22mm brushed DC motor series for the downhole application.

The main fundamental parts of the DC motor, namely the winding and magnet, were the first to be dissected. Unlike the HD brushless DC motors that use Samarium Cobalt (SmCo) magnets for high temperatures, the engineers elected to use a new high-temperature grade Neodymium (NdFeB) magnet. The reason being: strength. Samarium Cobalt magnets capable of elevated temperatures have been available for several years, but they are not as strong as Neodymium magnets. As well as being slightly weaker, using Samarium Cobalt magnets would mean the size of the DC motor would have had to increase to meet the torque requirements.

High-temperature windings are not new to maxon. The maxon configurable DCX motor series using standard winding operates to a recommended maximum of 125°C. If the temperature increased above this level, the insulation in the winding would become soft and unstable and could collapse onto the magnet. So maxon's engineers created a customised winding and produced some samples. Once this was validated, the electro-magnetic circuit was complete.

A DC motor is much more than just the magnet and winding, so once a viable design for these was complete, the engineers looked at the rest of the motor to ensure all the other elements were capable of enduring the temperatures. The standard polymer brush cover required a new design using high-temperature capable material.

maxon produced the first samples and then came the validation testing. maxon's test laboratory facilitates extensive environmental testing. The motors were heated up to 180°C in the test chamber and then run. Also, the stability of the rotor was tested at 180°C and 200°C. Once the maxon engineers were happy that the solution would work in the application, they supplied the customer with samples for their testing. These passed with no issues, and the motors released to production standards.

The DCX22S HT DC motor works with the GPX22 and GPX26 gearbox ranges, including the high-efficiency gearbox GPX22UP. These can have extended temperature lubrication to match the motors ambient temperature capability. Your local maxon sales engineer will help you match the motor and gearbox combination to your application.

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The press release is available on the internet at: www.maxongroup.net.au

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These DCX22S HT motors are now available to the broader market
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The Swiss specialist for quality drives

maxon is a developer and manufacturer of brushed and brushless DC motors, as well as gearheads, encoders, controllers, and entire mechatronic systems. maxon drives are used wherever the requirements are particularly high: in NASA's Mars rovers, in surgical power tools, in humanoid robots and in precision industrial applications, for example. To maintain its leadership in this demanding market, the company invests a considerable share of its annual revenue in research and development. Worldwide, maxon has more than 3000 employees at nine production sites and is represented by sales companies in more than 30 countries.