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Press Release

Monitoring maxon DC motor performance.

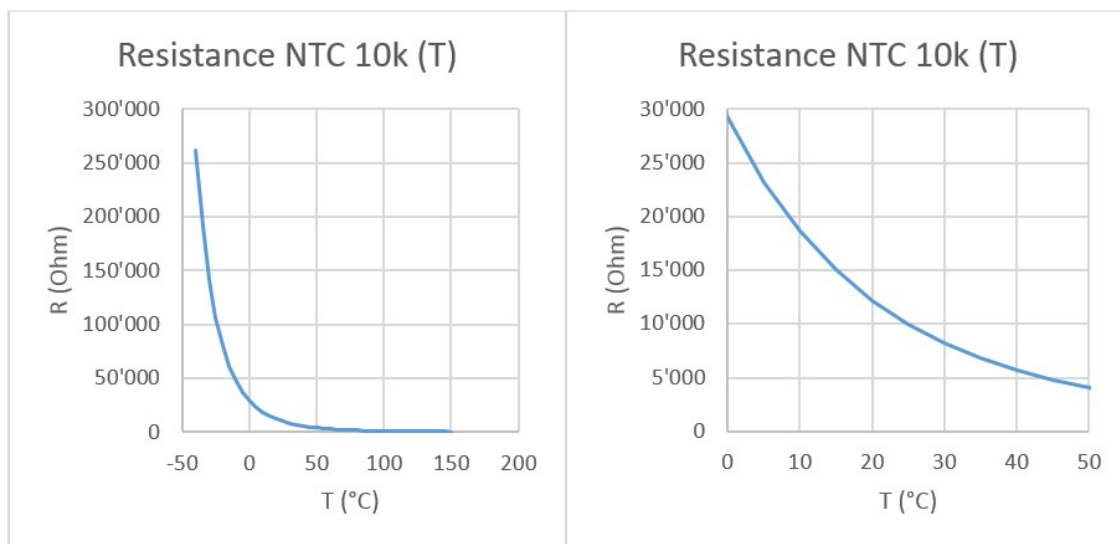
We look at the use of integrated temperature sensors to pre-emptively manage the performance of your DC motor.

Temperature monitoring is one of the most effective ways to perform proactive maintenance on a brushless DC motor. There are several ways to do this. maxon Group offer integrated temperature sensors in many of their units. Understanding how to interpret the temperature profile is key to ensuring a virtually failure free winding performance from the DC motors. In addition, temperature logging can become a key metric to include in a cloud solution for IoT devices.

Negative Temperature Coefficient Thermistor (NTC) is a type of resistor that decrease resistance as the temperature increase. Maxon uses a PCB mounted version of NTCs. They are a very useful device because they can be integrated on the board. There are also winding embedded sensor versions for many brushless DC motors.

For rotating operations, where the temperature is almost homogeneously distributed across the DC motor, a single sensor is sufficient. For operations at standstill, two sensors are required to ensure that the temperature is controlled across all windings.

The relationship between resistance and temperature is not a linear function for the NTC. Even at short temperature ranges the function barely approximates linearity.



There are two major parameters that characterise this relationship. One is the nominal resistance, which is the resistance at a given temperature and the other one is the constant beta that is used to characterise the logarithmic profile. The following formula shows the implementation of both.

$$T(R) = \frac{1}{\frac{\ln\left(\frac{R}{R_{25}}\right)}{\beta} + \frac{1}{T_{25}}} \quad [K] \qquad T_{25} = 298.15 \quad [K]$$

Integrated NTCs are present in all maxon brushless DC frameless motors and in the ECX SPEED 16, 19 and 20 as a configurable option.

An alternative device is the positive temperature coefficient thermistor (PTC). This device increases resistance with temperature also in a non-linear way. The maxon brushless DC motor, the EC60, has a PTC glued into the winding. It produces direct winding temperature measurements. The characteristic profile of its resistance to temperature relation spikes rapidly when reaching 115°C. This becomes a very useful feature to protect a motor from overheating.

To learn more about these options and the full range of maxon DC brushless and brushed motors, please contact maxon Group Australia tel. +61 2 9457 7477.

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

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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.