maxonnews

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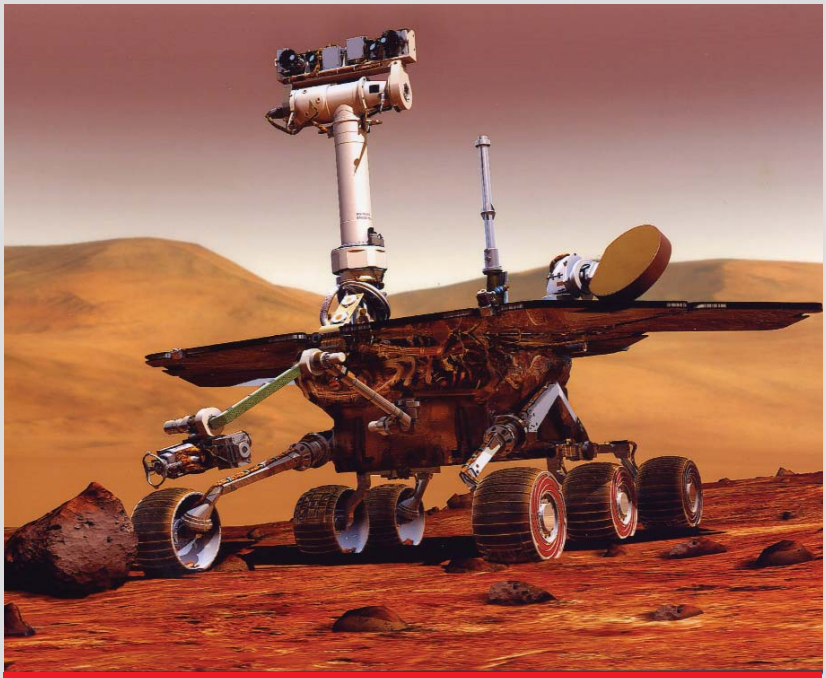
Welcome to the first issue of *maxon news*. We have introduced this publication as part of our continuing and comprehensive service to design engineers. It aims to highlight new solutions, stimulate new ideas and increase awareness of the products and support on offer today.

Mars rovers just keep on going

Driven by *maxon motor*, of course!



Many people have been astonished by the reliability of the latest Mars rovers.

When NASA's Spirit and Opportunity Mars exploration rovers successfully landed on the Red Planet in January 2004, it was hoped that each would keep going for about three months and would cover a distance of a few hundred metres. The fact that they are still going, three years later, is no great surprise to *maxon motor*. Each rover features 39 of our famously dependable motors!

We had already provided the drive motors for the Sojourner rover in 1997, and were heavily involved again in NASA's current Mars expedition which began in June 2003. The plan was for two identical rovers, Spirit and Opportunity, to explore different regions of Mars to find out more about its geological conditions. One of their key tasks has been to look for signs of the existence of water.

NASA's decision to use ***maxon motors*** was based on their excellent performance in the Pathfinder rover, as well as their extremely high efficiency level – 80 to 90% – which far exceeds other motors of this type.

The motors themselves are standard products, with diameters of 20 and 25 mm, and only needed minor modifications to deal with the extremely harsh conditions. The equipment had to be able to withstand enormous temperature changes on the surface of Mars – which can range from around -120°C to +25°C – as well as the vibrations and the special atmosphere.

The motors are used for operation of the robotic arms, rock drills and steering mechanisms, for controlling the cameras and for turning the six high-tech wheels that drive the heavy rovers (each weighing nearly 180 kg) around the planet's surface.

Today's rovers are much larger than their predecessor, the Sojourner, and with an average speed of around 1 cm/s (36 m/h) they are also around ten times faster. They were designed to travel up to 40 metres per "sol", or Martian day. The Sojourner needed the whole of its 90-day mission to cover the same distance.

Further information on the missions can be found at: http://marsrovers.nasa.gov/

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What can *maxon motor* do for *you*?

OK, so you already know that *maxon* components have an *almost legendary* reputation for *reliability*. And you know that the *maxon* range contains no fewer than 147,000 motors, gearheads, encoders, controllers and other components. But are you taking full advantage of the unique level of *support* that *maxon* offers to design engineers?

That support starts, of course, with the ***maxon*** catalogue – more of a reference book for design engineers really. It's a FREE catalogue, and it comes with a FREE CD-ROM containing the same product information plus the '***maxon*** selection program'.

From the catalogue, it's very easy in most cases to choose the most appropriate components for your system. To help you find the right product, we present all the data you will need – along with useful advice, diagrams and formulae.

Then we go further. The ***maxon*** selection program helps you to identify products, and combinations of components, matching your requirements – without the need for laborious manual calculations. You can even take the CAD images of our components from the CD-ROM and drop them straight into your design.

Talk to us!

Information technology is all very well, but some problems require the help of a human being! Our team of highly qualified and experienced product engineers is ready, willing and able to work with you on your design. They're engineers – just like you – and they *love* a challenge.

Give us a call and we will come out to look at your project, do the calculations and give you the solutions. If the answer doesn't lie within our 147,000 off-the-peg solutions, we can create a tailor-made solution for you.
Whatever you need, just ask.

A selection of micro-drives taken from *maxon motor's* 147,000+ product range.

Products for the medical market

***maxon* is increasingly developing products aimed specifically at the medical technology market. When it comes to medical devices, the combination of compact size, low noise, low vibration and very high performance has proved very attractive.**

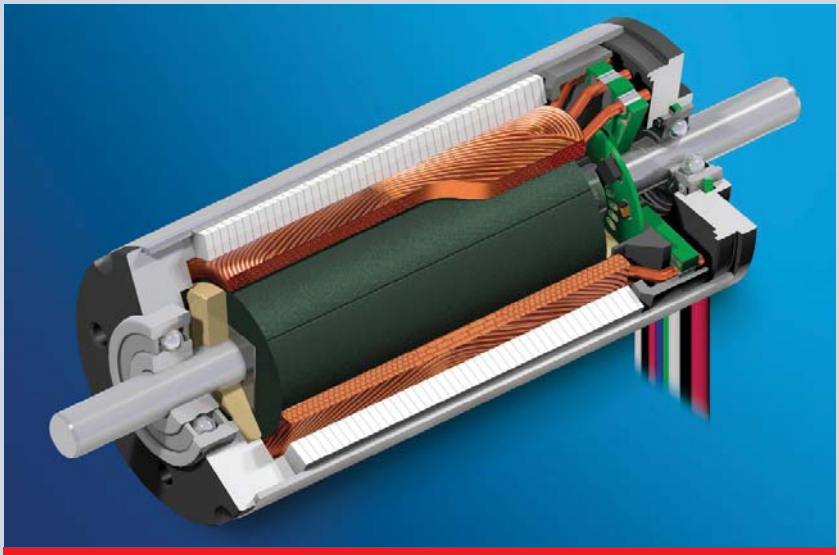
"We find there is a great interest in our smaller products – typically from 6mm to 22mm – and for motors and gearheads that are totally sterilisable," explains ***maxon motor uk*** CEO Keith Ellenden. "And on the electronics side we have controllers such as our EPOS – which is ideal for procedures such as sample testing and indexing."

Because of their almost legendary reputation for reliability, such products are in demand internationally for duties where failure would be totally unacceptable.

For example, ***maxon*** motors are to be found in body-worn medication distribution systems for conditions such as diabetes – where a compact unit constantly monitors the patient's blood sugar and dispenses precisely the right dose of insulin 24 hours a day. ***maxon*** motors are also to be found in many different types of artificial limbs… as well as in intra-artery blood pumps designed to keep patients stable during lengthy operations… in oncology where they control the diameter of the equipment's iris during scanning… and in the depths of space where, on board the space shuttle, ***maxon*** motors help measure astronauts' intercranial pressure.

Power boosted
quality maintained

maxon EC-powermax 30 takes brushless DC motor performance to new heights



***maxon's* EC-powermax 30 – a small brushless DC motor designed to handle unusually high outputs.**

One of the most recent challenges for *maxon motor* has been to squeeze even more power out of a small motor – without sacrificing any of the reliability, efficiency and other qualities that customers demand. Having recently introduced the EC-max premium range of brushless (electronically commutated) DC motors, which took performance to new levels, we have now gone much further. Our new *EC-powermax 30* will deliver a 200 Watt constant output – compared to the 60 Watt rating of the correspondingly sized EC-max 30.

So how do we pack so much power into a motor that measures just 30 mm in diameter and weighs just 270 g?

The answer lies in a host of patented developments, starting with an ingenious new winding. The lozenge-shaped knitted coil normally expected in a high-powered EC motor has been replaced by a multi-layer winding very similar to those used in our mechanically commutated drives. This forms a grooveless stator, with no air gaps, that ensures efficient, detent-free operation. It provides excellent control characteristics, particularly for positioning tasks, and is much quieter at high speeds thanks to the reduction in mechanical vibration.

The stationary winding surrounds a powerful rotating four-pole magnet, equipped with neodymium magnetic material, which replaces the two-pole rotor of the EC-max.

To cope with the extra stresses, the motor has a thicker body, the motor shaft diameter has been increased from 4 mm to 5 mm, larger ball bearings have been used and the number of parts has been reduced. The result is a highly durable and reliable unit with a torque capacity four times better than the powerful EC-max 30.

Like any EC motor, its inherent advantages include almost unlimited life, smooth performance, a very broad speed range and the ability to achieve high speeds even at low voltages. To those benefits the ***maxon*** EC-max range added extra dynamism, lower inductance and higher efficiency. And now the ***maxon*** EC-powermax 30 has taken that technology further still.

For even greater versatility, the EC-powermax 30 can be combined in our ***maxon*** modular system with 42 mm planetary gearheads, digital encoders (up to 1,000 pulse) and brakes. In conjunction with ***maxon*** DES (Digital EC Servoamplifier) controllers or intelligent positioning units (such as the new EPOS), it forms unbeatably high-powered, dynamic drive systems.

"EC-powermax 30 is ideal for applications requiring high torque at low speeds – in robotics or in actuators, for example," says ***maxon motor uk's*** CEO Keith Ellenden. "As well as its exceptional power to weight ratio, it comes with all the build quality and reliability you'd expect from ***maxon*** – and its price is very competitive too."

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Sophisticated… but simple

User-friendly DECV 50/5 digital 4-Q servoamplifier added to *maxon* controller range

DEC 50/5 – a new, convenient, low-cost control solution from ***maxon motor***.

The latest addition to *maxon's* range of control units offers state-of-the-art sophistication… while at the same time simplifying life for the user.

The DECV (Digital Electronically Commutated Voltage-regulated) 50/5 is a compact, digital, 4-quadrant speed controller designed for use with brushless DC motors of up to 250W power rating. It takes its signals directly from the drive unit's internal Hall sensors – which means there is no need for the extra expense and complication of an encoder.

Operation couldn't be simpler, thanks to its convenient settings. There are two set values for speed regulation and current restriction – the required speed range and speed ramp being pre-selected by the flick of a DIP switch. Specifically configured for control of speed rather than position, the robustly designed and extremely stable PI speed controller functions effectively and with the minimum of fuss.

For flexibility, a wide input voltage range is offered – from 12V to 50V DC. The device is designed to handle a 5A current in continuous operation and up to 10A intermittently to allow for overloading. Motor speed and current can be constantly monitored using easy-to-read analogue outputs.

There is no need to add auxiliary devices such as chokes to protect against overheating of the motor. Instead this is achieved through internal control of the link circuit voltage, which reduces current ripple. This is particularly welcome when it comes to low-impedance drive units. Furthermore, the controller has inbuilt protection against excess current and voltage, thermal overload and short-circuiting of the motor cables.

Assembly is very straightforward thanks to the compact aluminium casing, which has a wide range of mounting options. A detachable screw terminal block allows quick replacement, while the unit's compact size – just 95 x 85 x 24 mm – means it will fit neatly into any system.

With all these advantages, the DECV 50/5 is the ideal choice for high-speed motor control in a broad range of applications. It is particularly well suited to use with power tools such as high-speed drills (bone drills, for example), cutters and pumps – in fact any machine whose speed needs to be maintained at a rapid, constant, accurate level over a long period.

"Our aim is to provide an appropriate range of 4-Q and 1-Q controllers to match designers' varying applications and budgets," says Keith Ellenden, CEO of ***maxon motor uk.*** "The DECV 50/5 offers a user-friendly, low-cost solution that will answer many needs. The current ***maxon*** catalogue – free on request – gives comprehensive data and guidance to help ensure the optimum choice of controller, and of course our specialist sales engineers are always available to advise further."

For further information on ***maxon's*** products and services, contact:

maxon motor uk ltd, Maxon House, Hogwood Lane, Finchampstead, Berks, RG40 4QW
Tel: **01189 733337** Fax: 01189 737472
Email: sales@maxonmotor.co.uk
Or visit the ***maxon*** website at **www.maxonmotor.co.uk**