

maxon motor

driven by precision

Medication delivery systems are vital for the survival of patients. New technologies and the expertise it takes to understand and use them are a must for designing absolute reliability into these systems, which will remove risk and reduce costs for hospitals and users alike.

Market drivers for delivering automated and semi-automated drug delivery systems are many. The growth over the past few years in e-health is a primary one. More and more applications are coming into the marketplace that provide e-health services, from setting a smart phone app to remind a person when to take their pills, to providing a device to deposit those pills, to collecting physical data about a person's body in order to sound an alarm when a problem occurs.

Another important focus has been in the growing move towards the creation of liquid medications to make delivery simpler, as well as fully automatic. At the moment, pharmaceutical companies are involved in the research and production of a variety of

liquid forms of medication that can easily be tailored to a specific person's needs.

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The impact of protein- and gene-based therapies has also been limited by the need for better methods of delivery into cells within tissues. The ability to provide medication in this way will affect a variety of fields, including micro-molecular delivery of proteins, hormonal injections and even specialised genetic therapies, all of which

will revolutionise the potential to provide services in the medical industry.

Liquid dosing is not new, but through the use of the right delivery systems – ones that are accurate, repeatable, long lasting and quiet – medicines can be delivered locally. What this means is that the whole body does not have to be medicated in order to deal with a local ailment. For example, why take a painkiller for your whole body if your only problem is a sore knee or elbow. Local, automatic delivery will decrease the overall amount of medication that has to go into a person's body, which will eliminate a lot of unnecessary side effects and decrease the amount of the medication being used. Plus, for serious patient care, the ability to deliver medication locally will eliminate the possibility of someone becoming addicted to the painkiller or other drug.

User requirements for drug delivery systems include comfort for the user, which means it must be super compact to fit seamlessly into a person's life. The device must produce very low noise, offer extremely long battery life and be flexible enough to fit into all aspects of the person's life. The new systems must be water resistant, chemical resistant, and mechanically and electronically robust in every way.

Some of the devices already on the market include ambulatory infusion pumps, patch pumps for insulin delivery, linear peristaltic pumps, rotary peristaltic pumps and tiny implantable pumps for those with chronic pain (Figures 1 and 2).

maxon offers their expertise in finding the perfect drive solution for whichever drug delivery system chosen. For example, it has designed an artificial pancreas with a dual pump that measures the blood sugar amounts and delivers insulin and glucagon to balance those blood sugar levels. Such a device needs to be the size of a



Figure 1: The active implant is implanted in the lower abdomen directly underneath the skin.

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match box and mounted as a patch pump or wearable to the body.

For more invasive, implantable pumps, maxon has designed and manufactured a device using biocompatible materials in the manufacturing process. For example, the company uses titanium, which requires a high level of expertise to machine and laser weld. The entire assembly of the implantable microdrive takes place under cleanroom conditions.

maxon continues to create delivery systems for medical use that offer some of the smallest micro drives – that are

not only compact but offer low noise and provide high-efficiency – while maintaining a user-friendly interface to control systems of all types. There must never be any concern over the ability for the systems to co-operate, especially in life-or-death situations in which drug delivery systems must often serve their function. Trust in the components being used is a requirement.

Presently, maxon has specialist teams working on the next generation of drive solutions for drug delivery as well as permanent and disposable devices for numerous applications based on syringes as well as needle-free solutions. The company’s expertise allows it to design and manufacture complete systems for a multitude of specific applications.

Since 1961, maxon motor has researched and developed a growing line of products and services, including integration of many systems for the medical

and pharmaceutical industries. More than 2,100 employees work worldwide, with production sites in Switzerland, Germany, Hungary and South Korea, as well as sales companies in more than 30 countries.

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Figure 2: maxon medical pump mechanism.

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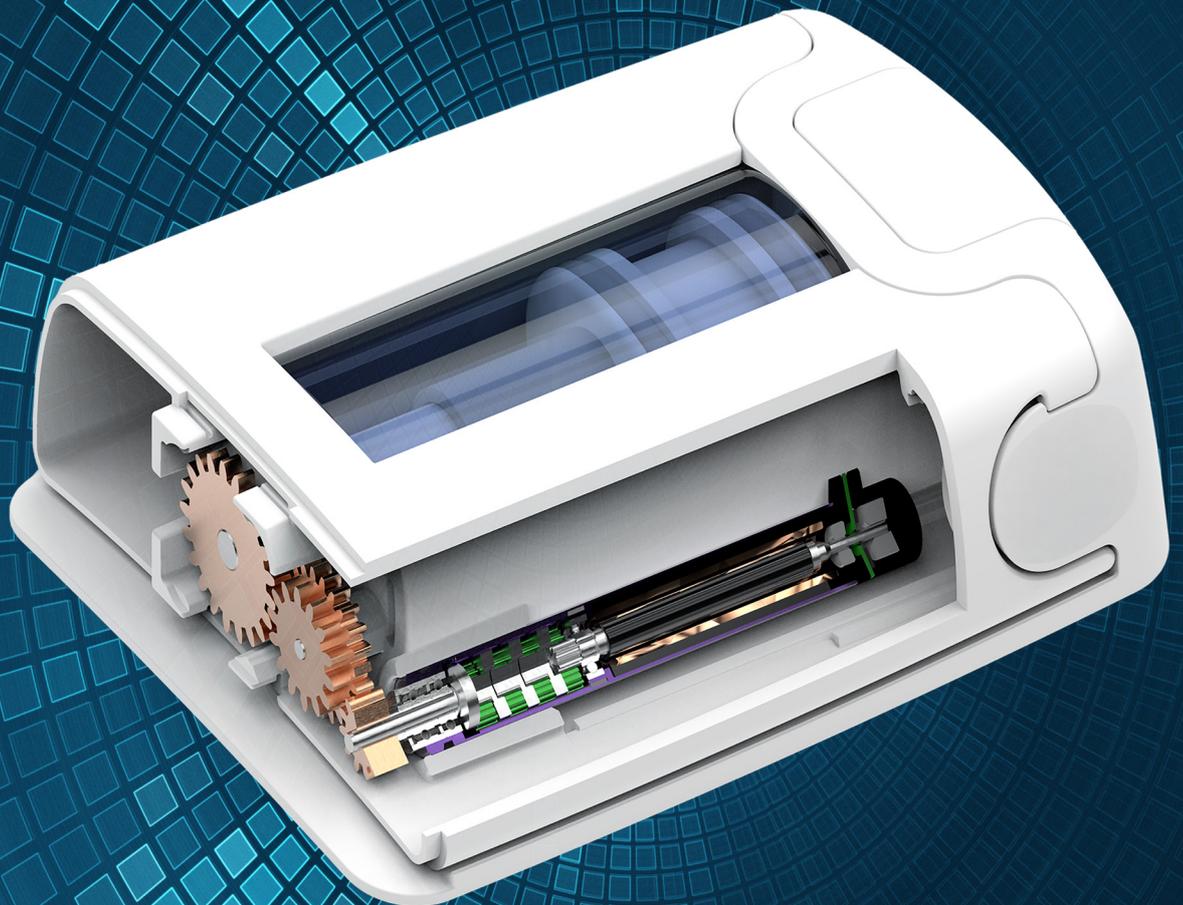
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