



Actuators in aviation.

In the aviation industry, a wide range of applications are controlled by actuators. They are used to control and limit velocity and engine speed by adjusting levers and valves. In many of these actuators, DC motors from maxon motors can be found.

Actuators convert electrical signals to mechanical movement or other physical variables, such as pressure or temperature and thus play an active role in control systems. For some fields of application, such as aviation, it is important that the actuators achieve very high dynamic forces yet have a low weight and fit into small spaces. They also have to withstand ambient conditions such as high vibration and cycling temperature. Actuators from Sitec Aerospace GmbH are used in almost all systems in an aircraft, such as the water, oxygen, hydraulic, fuel and air systems. The actuators that are equipped with valves fulfill safety functions by interrupting the flow of a medium in case of emergency. Inside an aircraft, the fresh air is constantly moistened by a humidification system valve.

Sitec aerospace, based in Bad Tölz (Germany), is the supplier for the two largest aircraft manufacturers. In many aircraft programs for large and small manufacturers, such as the Airbus A350 or Bombardier C series, actuators for various application areas are in use. For safety-relevant aircraft functions, dual-motor actuators are usually used. This is also the principle followed with the actuators, which are equipped with two drives, in case one of the systems has a malfunction. One of these actuators is located in the jet engine and blocks off the fuel supply in the event of fire. This function has to be available under all circumstances and at all times, therefore these actuators are always equipped with two motors.

High requirements on the technical components

The areas of use for actuators and also for valves in aircraft are very diverse. Accordingly, the actuators and valves have to meet different requirements. For example, heated water valves have to function perfectly at $-55\text{ }^{\circ}\text{C}$ and at $85\text{ }^{\circ}\text{C}$. The motors used have to be equally robust. The most important requirements on the motors are: An optimal volume/performance ratio, low power consumption, temperature resistance, long life, resistance against vibrations and impact and high corrosion resistance. For the actuators, Sitec uses brushed DC motors from maxon motor. The maxon DC motors are equipped with powerful permanent magnets. The centre piece of the motor is the globally patented ironless maxon winding. Compared to conventional DC motors, this motor principle has special benefits: In the maxon DC motors, a pure copper winding rotates without armature iron. As a result, the inertia is very small, thanks to the lightweight rotor. The acceleration is very high. There is no magnetic detent; this is a very positive characteristic for positioning drives, because the rotor can stop in any position. In addition to the electric actuators, maxon motors are also used inside aircraft. The motors are also part of an electromechanical drive that makes it easier for passengers to close the luggage compartments above the seats.

The motors for Sitec Aerospace have been customized with direct gearing on the shaft. Thanks to the robust motor shaft bearing and high life span, maxon motors are particularly suitable for aviation applications.

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Fig. 1: Sitec Aerospace actuator for aviation. © 2013 Sitec Aerospace



Fig. 2: The headquarters of Sitec Aerospace GmbH in Bad Tölz © 2013 Sitec Aerospace



Fig. 3: Sitec uses brushed DC motors of maxon motor for its actuators.
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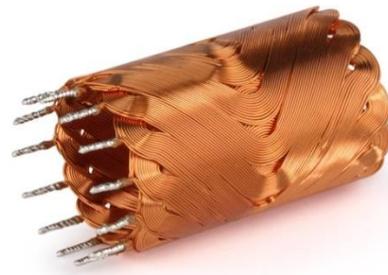


Fig. 4: The centerpiece of the motor is the globally patented ironless maxon winding. © 2013 maxon motor ag

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