



## Please smile with maxon motors.

Digital SLR cameras can deliver extremely sharp photos – regardless of whether the photographer is a professional or a hobbyist. Not only does the skill of the photographer, but also the technology inside the camera play a key role. maxon drive systems help to create lightning-fast images.

With its Leica S system, camera manufacturer Leica offers a unique combination of performance features for digital photography. It combines the image quality of a medium-format camera with the handling, speed and flexibility of a small-format camera. The lenses used in the Leica S system have a built-in dedicated processor for controlling the auto focus. The lenses are also available with a central shutter for maximum flexibility when using a flash. Besides the focal-plane shutter, which is integrated in the camera, the central shutter is one of two common designs. The central shutter is typically located at a “central” position in the lens assembly, between the optical lens elements. It consists of several blades arranged around the optical axis in a concentric pattern. When the shutter release of the camera is pressed, the blades snap back from this axis synchronously and let the light fall on the sensor.

With SLR cameras, the central shutter first closes after the shutter release, because all the settings were made with an open shutter. The mirror swings up, then the central shutter opens for the duration of the exposure before closing again. Finally, the mirror swings back into the path of light, and the shutter opens. Even though it employs the classic solution of mechanical springs for the efficient storage of potential energy, the central shutter is a piece of cutting-edge technology. The tensioned-spring principle contributes significantly to the extremely compact dimensions.

### Small motor for high tension

The springs are tensioned by a specially developed maxon motor with a high-precision overrunning clutch and release their stored energy to activate the shutter blades when the shutter release is depressed. A specially constructed solution prevents the blades from rebounding when the shutter is opened or closed. A microprocessor-controlled pawl and ratchet mechanism controls the shutter cycle via two electromagnetically activated plungers.



*Figure 2: The central shutter generates no vibration and is very fast. The gear motor is used for tensioning three springs that store the energy for the central shutter.*

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The gear motor of maxon motor is used for tensioning three springs that store the energy for the central shutter. A maxon A-max 12 motor is used as the base motor. The gearhead is an all-new development and is adapted to the available space. This presented a special challenge to the gear motor in the central shutter of the Leica lens. What was needed and developed was a very compact, enclosed and sealed custom version of the gearhead with perpendicular power transmission to toothed gear of the central shutter through a crown gear, for a life span of more than 100.000 releases.

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Figure 3: The central shutter is so compact that it can be integrated into most Leica S lenses. © 2013 Leica



Figure 4: A maxon A-max 12 with precious metal brushes is installed in the central shutter of the S lens. The maxon A max program stands for high-quality DC motors with an optimal price/performance ratio. © 2013 maxon motor ag

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