

A new prosthetic bionic hand.

Prosthetics are a significant engineering challenge because of their conflicting DC motor design goals: high torque, high speed, compact size and the DC motors need to be as energy efficient as possible.

German company Vincent Systems have created a bionic hand prosthesis that is the first commercially available prosthetic delivering haptic feedback about grip strength to its wearer. This is achieved with short pulses of vibration. If the hand were to vibrate evenly, a person becomes familiar to the sensation and eventually stops paying attention to it.

What sets this prostheses apart is that each finger can individually open up. This opens up numerous situations for the wearer such as being able to ride a bike, tie shoelaces, hold a raw egg or open a door. 12 grip patterns are available that can be activated via muscle contractions. Weighing about the same as a human hand it's available in a version small enough for children, with the youngest wearer being eight years old.

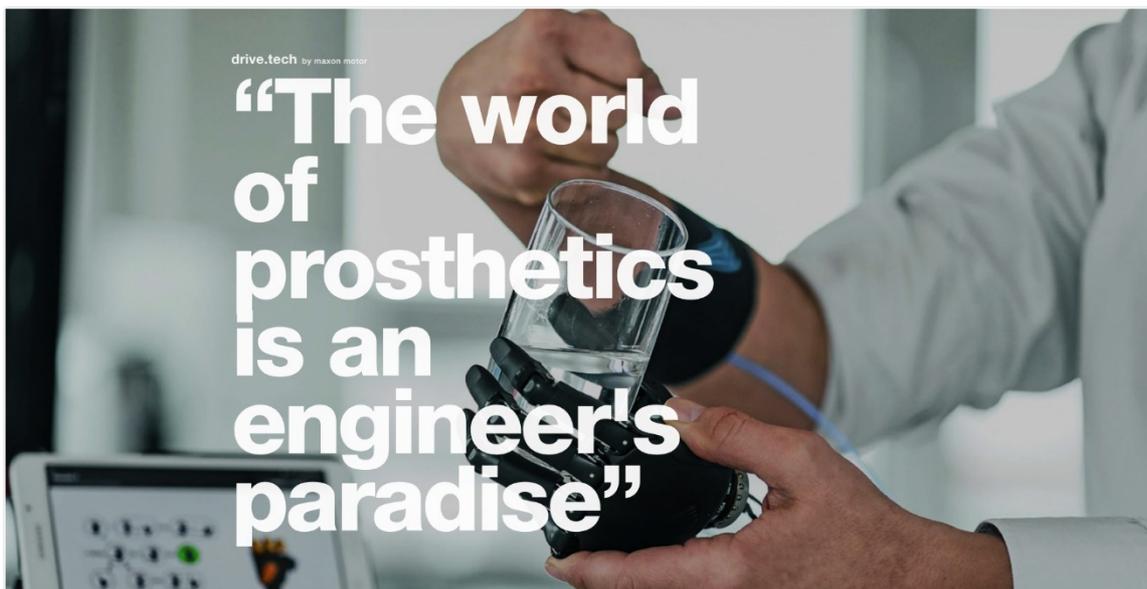
Each individual finger is actively driven by a DC motor, and the thumb is driven by two DC motors. Maxon have up to six brushed DC motors in the hand: DCX 10 DC motors with modified GP 10A planetary gear-heads. The drive systems were selected for their compact size and highest energy density currently available from maxon. Plus the drives needed to be durable and function faultlessly for approximately five years while being exposed to diverse and heavy strain every day.

It was important to CEO and founder of Vincent Systems, Stefan Schulz, that patients wouldn't need their healthy hand to help. "A prosthetic hand should help its wearer and not demand the attention of the good hand."

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With bionic hand prostheses, each finger can be moved individually and is tested by Vincent Systems © maxon motor

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