

Exoskeleton customised in seconds with lubrication-free igus plain bearings

drylin linear systems and iglidur plain bearings provide lubrication-free adjustment of an exoskeleton for stroke patients

Many stroke patients worldwide suffer from hemiplegia (partial paralysis). Exoskeletons such as Harmony from Harmonic Bionics can help rebuild the nerve tracts in arms and shoulders. In order to quickly adapt the robot-supported system to different body sizes in physiotherapy, the developers rely on the lightweight, lubrication-free and maintenance-free plain bearing technology from igus.

Every year, 16 million people worldwide suffer a stroke. To enable patients to rehabilitate during physiotherapy, the American company Harmonic Bionics, with the support of the National Science Foundation, has developed an exoskeleton especially for healing muscle damage. The robot named Harmony relieves the shoulder joint and maximises the patient's range of motion. In this way, the system should enable a natural and comprehensive therapy for the arms. For this, Harmony relies on Bilateral Sync Therapy (BST). The robot registers the healthy arm movements and synchronises them to the side affected by the stroke in order to help restore the nerve tracts. In order for the exoskeleton to move with the human body, the robot axis must be correctly adapted to the patient, because incorrect setting can lead to injuries to the joints. For a quick adaptation of Harmony, the developers resorted to linear guides and plain bearings from motion plastics specialist igus.

Lubrication-free and quickly customised

The drylin T and R series rail guides, drylin R linear bearings and iglidur plain bearings enable easy adjustment of the system to the patient's height, arm length and shoulder width. The polymer bearings made of the high-performance material iglidur J are distinguished by their high wear resistance and long service life. As there is no need for external lubricants, the bearings are completely maintenance-free, clean and hygienic and ideally suited for medical technology. All components are made of lightweight materials such as plastic and aluminium. The design is so compact that it can be integrated into the slim

design of the robot. "Thanks to the use of the igus polymer bearing technology, the exoskeleton can now be adapted to the patient within seconds", enthuses Rohit John Varghese, Head of Research & Development at Harmonic Bionics.

You can see in the video exactly how Harmony works:
<https://youtu.be/PcmNloLqKk>

Caption:



Picture PM4420-1

The compact and lubrication-free linear guides and plain bearings from igus make the exoskeleton flexibly adaptable. (Source: igus GmbH)

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ABOUT IGUS:

igus GmbH develops and produces motion plastics. These lubrication-free, high-performance polymers improve technology and reduce costs wherever things move. In energy supplies, highly flexible cables, plain and linear bearings as well as lead screw technology made of tribo-polymers, igus is the worldwide market leader. The family-run company based in Cologne, Germany, is represented in 35 countries and employs 3,800 people across the globe. In 2019, igus generated a turnover of €764 million. Research in the industry's largest test laboratories constantly yields innovations and more security for users. 234,000 articles are available from stock and the service life can be calculated online. In recent years, the company has expanded by creating internal startups, e.g. for ball bearings, robot drives, 3D printing, the RBTX platform for Lean Robotics and intelligent "smart plastics" for Industry 4.0. Among the most important environmental investments are the "chainge" programme – recycling of used e-chains - and the participation in an enterprise that produces oil from plastic waste. (Plastic2Oil).

The terms "igus", "Apiro", "chainflex", "CFRIP", "conprotect", "CTD", "drygear", "drylin", "dry-tech", "dryspin", "easy chain", "e-chain", "e-chain-systems", "e-ketten", "e-kettensysteme", "e-skin", "e-spool", "flizz", "igear", "igidur", "igubal", "kineKIT", "manus", "motion plastics", "pikchain", "plastics for longer life", "readychain", "readycable", "ReBeL", "speedigus", "tribofilament", "triflex", "robolink", and "xiros" are protected by trademark laws in the Federal Republic of Germany and internationally, where applicable.