Image ©RB3D

This arm lends a strong hand

Hard and repetitive work weakens the body. The consequences are chronic back pain and other ailments that keep workers off the job, resulting in high costs to employers. The Cobot robotic arm is aimed at changing this. It holds the tool and the worker simply has to guide it.

In Europe, approximately 25% of workers suffer from severe back pain. Musculoskeletal disorders are among the most common work-related illnesses. The reasons are simple: high paced work, monotonous procedures and heavy loads. The consequences are severe. Not only does the health of the individual suffer, but the economic and social costs are immense.

To combat this sociall problem, new solutions are needed. One of these is the Cobot 7A-15, created by French company RB3D. Cobot takes a load off the industrial worker's back – literally. The robot arm, which is mounted to a wall, is equipped with seven axes and a workable radius of more than two meters. A heavy tool such as a grinder can be attached to the lower end of the robot arm. This means that the workers no longer need to carry the weight of the device themselves, but instead only guide it. Cobot takes care of the heavy lifting.

Sensors transmit the desired movements

The robot assists the operators in executing the movements that they would like to perform, whether up, down, left or right. A sensor immediately recognizes the operator's intent. The controller then ensures that the robot arm goes where it should, without exertion on the part of the worker. The quick, smooth movements of the Cobot's arm axes are executed by maxon's brushed DC motors.

These high-precision brushed motors, with 150 W and 250 W of power, amplify the force exerted by the worker many times over. The worker saves energy and can concentrate on the work itself. “If a certain task would usually require 20 kg of force, the Cobot reduces the force needed to 1 kg,” says Serge Grygorowicz, CEO and founder of RB3D. Together with his team, he has made it his goal to improve work conditions in the industrial sector and in doing so, help reduce musculoskeletal disorders. maxon drives were his team's first choice. “They provide the best combination of weight, quality and power density.” The requirements that the motors have to meet are high. They have to provide both speed and torque and have to transmit large forces with high precision yet remain easy to control.

All axes of this robot arm are equipped with motors and control elements of maxon motor. **Image ©RB3D**

Important know-how from the nuclear industry

maxon motor supplied not only the motors, but also the entire drive system. The brushed DC motors of RE series are used in combination with the matching planetary gearheads, encoders and EPOS positioning motor controllers. There were several key factors that contributed to the French developer's decision to work with maxon: the compactness, torque and acceleration of the solution, as well as having all parts of the system come from a single source. In designing the solution, maxon worked closely with CEA LIST, a French research institute which played an important role in the development of the Cobot. Until now, there were very few industrial robots that could be controlled and guided by means of a human's strength. Those that did exist were slow and did not significantly reduce the amount of effort required from the worker. This made the experience that CEA LIST has gained with force feedback controllers in the nuclear industry even more valuable. With this specialized knowledge, RB3D succeeded in developing a new generation of industrial robots that will permanently change the work conditions in factories.

maxon products in this article

maxon RE 65 motor
This drive, which has a diameter of 65 millimeters and graphite brushes, provides 250 W of power. It is used in combination with a maxon HEDL encoder.

maxon GP 42 C gearhead
This ceramic-reinforced planetary gearhead is responsible for providing the right gear ratio in the Cobot robot. It is driven by a brushed RE 40 motor.

maxon EPOS2 controller
This digital maxon EPOS2 positioning motor controller is suitable for both DC and BLDC motors. In the case at hand, they are used in all seven axes.

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