

How Kollmorgen Motion System Powers a Cable Robot to Triple Throughput

Rbot9 invented the first industrial cable robot: the ROCAP. Suspended by twelve motor-driven cables, the overhead platform travels above the factory floor. Designed for extra-large work envelopes, the ROCAP spans up to 900 m², lifts payloads up to 250 kg, and supports a wide range of end effectors. Anchored to the facility's existing structure, it eliminates the need for bulky gantries and rails, offering a faster and more flexible alternative to traditional automation systems.

Challenge

Rail-based automation systems are inflexible and require substantial installation work. Ground-based robots compete for floor space. Large-scale gantry systems are complex and costly. Rbot9 sought to overcome these challenges with an architecture based on 12 independent, robotically controlled cables, each actuated by a motor/gearbox assembly.

Each motor must deliver high torque at high speeds while maintaining a compact form factor. In addition, motion systems must be able to brake vertical loads precisely and reliably to ensure safety and performance. And due to the large dynamic forces involved, the system must incorporate effective energy management to prevent regenerative energy from causing overvoltage conditions on the servo drives.

“The Kollmorgen drives have been a key enabler in helping us unlock higher speeds without compromising on torque or safety. Combined with excellent support from Electromate, this collaboration has allowed us to push our cable robot platform to the next level.”

—Frederic Vachon,
Founder and CEO, Rbot9

Solution

Each of the 12 cables are coordinated to precisely position a centralized platform with an end effector that is capable of moving a payload of up to 250 kg at a top speed up to 1 m/s. To achieve these performance characteristics, Rbot9 selected Kollmorgen AKM2G servo motors paired with AKD servo drives.

AKM2G motors provide industry-leading torque density, delivering on average 30% more continuous torque than other, comparably sized servo motors. This allows OEMs to substantially increase machine performance without increasing the motor footprint, or conversely to achieve a desired torque specification while using a smaller motor.

Additionally, AKM2G motors are available with an integrated holding brake option. The brake works in conjunction with the integrated functional safety features optionally available on AKD servo drives. In particular, Rbot9 uses the Safe Torque Off (STO) feature to meet compliance requirements for safely managing vertical loads, without the need for external safety components. The AKD drive also supports an optional regen resistor to dissipate excess energy while braking.

Together, these features contribute to a more modular, responsive, cost-effective robotic platform than would otherwise be possible.



0.2 m/s to 1 m/s

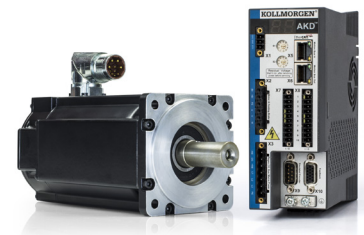
**Speed Increase
at full 250 kg payload
while maintaining
functional safety**

Results

Rbot9 upgraded its cable robot design to Kollmorgen AKM2G motors and AKD drives in March 2024, and the robot has been productive in the field since fall of that year. Compared to previous designs, Kollmorgen technology has more than tripled the speed of operation, from 0.2 m/s to 1 m/s, while maintaining the full 250 kg payload and ensuring vertical-load safety.

Integrating the motion system is also significantly smoother and faster thanks to the Kollmorgen ecosystem and the support of Kollmorgen's local distributor, Electromate, which provided valuable assistance with configuration and testing.

Rbot9's first customer, a fish-processing facility that uses the system for automated cleaning of conveyor systems, is now considering an expansion project incorporating additional Rbot9 systems in their plant.



See the ROCAP
in action

About Kollmorgen

Kollmorgen, a Regal Rexnord Brand, has more than 100 years of motion experience, proven in the industry's highest-performing, most reliable motors, drives, AGV control solutions and automation platforms. We deliver breakthrough solutions that are unmatched in performance, reliability and ease of use, giving machine builders an irrefutable marketplace advantage.