A multi-robot pick-and-place machine governed by a single Rexroth controller

Demands for greater speed and efficiency spurred the American division of the Cama Group to develop a new packaging machinery innovation called the Triaflex. Designed to specifically work with chocolate bars, the Triaflex comprises of a loading unit that can integrate up to four delta-style robots. The robot arms are all controlled by a single Indramotion MLC, a combined motion, logic, and robotic control unit from Bosch Rexroth in America.

A single Triaflex delta robot achieves speeds of up to 120 cycles per minute. Through the simultaneous picking of several products using a “multi picks” gripper system, the delta robot can handle up to 300 products per minute. The Triaflex system provides dynamic belt synchronisation to pick up and place products at speeds to 360 ft/min. This also allows for the placement of individual products into secondary packages for overwrapping.

The unique approach of this new multi-robot platform in comparison to other systems available on the market is that Cama utilises a single controller for the entire machine and no longer controls each individual robot with a separate controller. Cama matched its expertise with Rexroth’s knowledge of the packaging industry to develop the innovative solutions that lead to success for both parties, such as calculating several kinematics on one controller to both control and synchronize several robots.
While all three “Triaflex” delta robots are operated by a single Rexroth IndraMotion MLC motion logic controller, even the operation of a fourth robot and two additional belt axes would be possible without any degradation in line performance. Multiple communication interfaces between individual robot controls are no longer necessary. In networks where more than one controller is involved, these interfaces are required to ensure the transmission of camera system information and the coordination of the robot units to prevent collisions.

“There are many solutions in the market, but only Bosch Rexroth offered us the performance we felt we needed,” says Daniele Ballente, Cama’s CEO. “Another factor is that with the drive and control technology from Rexroth we can not only realise robots, but we are also able to automate our complete machine portfolio, including cartoners and tertiary packaging machines.”

The IndraMotion MLC control offers high computing power, scalability, and modularity. Up to 16 kinematics can be controlled simultaneously, each with a maximum of eight interpolating axes and up to four synchronous belts. In addition, machine manufacturers can implement their own kinematics quickly and easily. Rexroth’s IndraMotion for Packaging makes it easy to integrate camera systems and programming with RCL (Robot Control Language) or IEC 61131 robotics function blocks. The company’s standardised IndraWorks engineering software simplifies project planning, parameterising, programming, visualisation, and diagnostics of all Rexroth components.

The ability to control multiple delta robots with the Rexroth motion logic control offered Cama a number of advantages. All functions are integrated in one control system, while the number of interfaces and component costs was cut. With the use of Rexroth’s modular IndraDrive drive systems with dualaxis drives, the cabling effort was reduced by up to 40 percent. In addition, this solution saves space: the footprint was cut by 50% and the control cabinet size was reduced by 40%. Consequently, Cama can install the entire “Triaflex” control system for three robots in one control cabinet. This helps to further reduce the costs for cabling and simplifies installation at the customer’s plant.

“The new compact loading unit with three integrated delta robots allows us to achieve the speed demanded by the end customer. And we save considerable space when compared to a solution consisting of delta robots connected in series, each with its own control cabinet,” says Ballente.
Editor’s Notes: Bosch Rexroth AG is one of the world’s leading specialists in the field of drive and control technologies. Under the brand name of Rexroth the company supplies more than 500,000 customers with tailored solutions for driving, controlling and moving. Bosch Rexroth is a partner for industrial applications and factory automation, mobile applications and using renewable energies. As The Drive & Control Company, Bosch Rexroth develops, produces and sells components and systems in more than 80 countries. In 2010 Bosch Rexroth part of the Bosch Group, achieved sales of around 5.1 billion Euro with 34,900 employees.

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