



Kalmar's RT022 rough-terrain telescopic forklifts keep expeditionary military operations up and running with Eaton's DuraForce® pumps

Products:

DuraForce HPV pump and HMV motor with CA control

Location:

US Department of Defense.

Challenge:

To provide a durable pump solution to keep Kalmar's new RT022 Light Capacity Rough-Terrain Telescopic Forklift moving through sand, mud and water.

Solution:

Eaton supplied DuraForce pumps to equip the RT022 with reliable, precise control and excellent maneuverability, even in difficult terrain.

Results:

More than 1,000 RT022 forklifts with Eaton's DuraForce pumps have gone into the field, and the military has been pleased with the issue-free performance.

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Randy Wingenroth, vice president, Product Development, Kalmar.

Background

Kalmar is the industry forerunner in port automation and energy-efficient cargo handling, with one in four containers moving around the globe being handled by a Kalmar solution. Working to make every move count for their customers, the company has provided cargo handling solutions to ports, terminals, distribution centers and heavy industry since the 1940's.

A business built on innovation, Kalmar has consistently developed new solutions for the material handling market – from the first industrial straddle carrier in the 1940s and the first RoRo tractor in the 1970s, to first generation commercialized reachstackers in the 1980s. A decade later, Kalmar introduced the first container handler for rough terrain operations.

More recently, Kalmar was looking to build a new telescopic forklift for rough terrain operations, and turned to Eaton for a durable and reliable ground drive solution for the vehicle.

Challenges

Looking to meet the imposing standards of the United States Military, Kalmar developed the RT022 Light Capacity Rough-Terrain Forklift. With a robust lift capacity of up to 5,000 pounds, the machine is compact enough to drive right into a container, and features two-wheel, four wheel and crab steering modes. Designed to load and unload ISO containers, which carry supplies and ammunition for military expeditionary operations, the machine required excellent maneuverability on terrain ranging from sand to mud to water. Additionally, the military needed machines with a life cycle of at least 15 years.

Kalmar challenged Eaton to find a pump solution reliable enough to run for the required 15 years, durable enough to withstand rugged conditions, and precise enough to maneuver inside of ISO containers – all within a reasonable price point.



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Solution

Eaton's DuraForce HPV pump and HMV motor with CA control provided the RT022 with a robust solution that met Kalmar's exacting control requirements. A DuraForce ground drive solution, the CA control regulates both the pump and motor displacement in accordance with engine speed and operator input. This solution enables smooth and repeatable vehicle motion through high resolution control of the pump's output flow, which in turn is synchronized to the motor rotation speed. Control of the forklift ground speed is predictable and highly reproducible independent of external factors such as vehicle load and system operating temperature, thus making the RT022 easy to use for skilled and novice operators.

Additionally, smooth and repeatable DuraForce CA motion control has demonstrated notable vehicle positioning advantages in low speed conditions, as well as increased productivity at high rates of operation. Both vehicle level benefits are industry-recognized as critical traits for the safe and productive operation of material handling equipment such as the RT022. Load and temperature independence provided by the

CA control also allows operators to depend on the same vehicle response again and again, regardless of the different terrains, environments and cargo the RT022 is sure to experience over its working life.

Designed for dependability, DuraForce products will meet the 15-year life expectations of the RT022 platform. The robust design begins with an innovative aspect of the rotating kit – replacing the traditional bronze piston slipper with a steel version. This replacement strengthens a traditional weak link of piston product design. Other design features, including the rigid housing and hydrostatic bearing, ensure a highly reliable product with the ability to handle extreme duty cycles with peak operating pressures of up to 500 bar.

Eaton delivered both the pump and motor with the CA control as an out-of-the-box solution that saved engineering development time for Kalmar. With no need for an electronic controller, less electrical engineering and no software development is required at the OEM level. The combination of exceptional control performance, durability and reduced development time are key factors reinforcing why Kalmar's selection of DuraForce products was the right one.

Results

"Eaton's DuraForce solution has been fantastic, with the best cost for performance in the market," said Randy Wingenroth, vice president, Product Development, Kalmar. "The performance of the RT022 has met the demanding needs of the application, and this success has been due, in part, to the DuraForce product and the support we've received from Eaton."

Over the past two and a half years, more than 1,000 RT022's have been deployed, with more on the way. There have been no issues in the field, and the military has been pleased with the performance and operation of the machines.

"At Eaton, we are dedicated to solving customer challenges with innovative products and reliable service," said Vince Duray, product manager, Eaton. "Kalmar needed the right product for a demanding application, and DuraForce provided the best combination of performance and life characteristics to meet their needs."

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