



CASE STUDY:

KÄRCHER

A Leading Cleaning Systems Provider Powers Up with Delta-Q Technologies



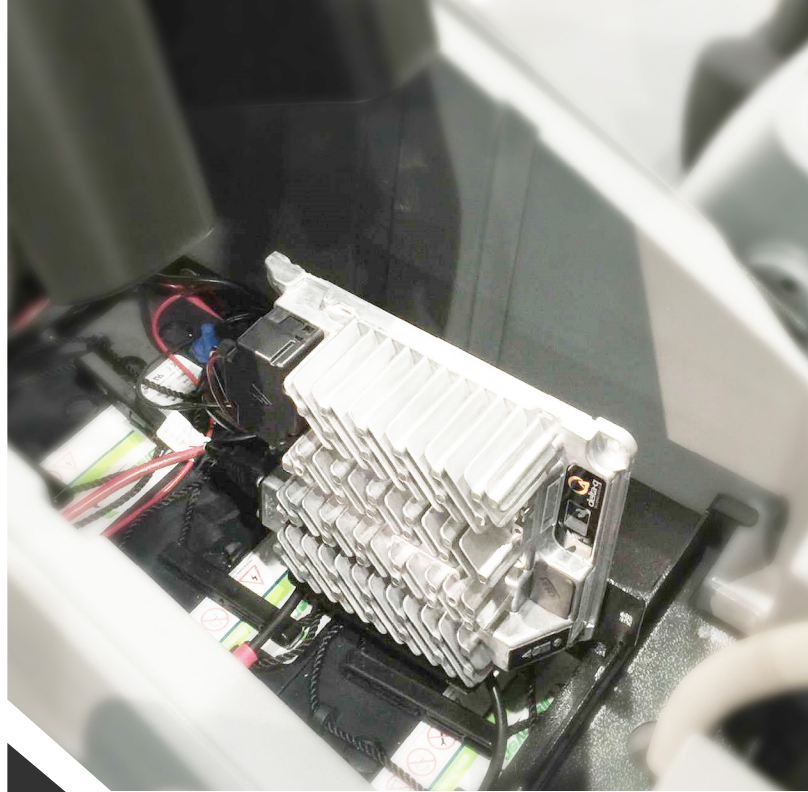
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As the world's leading provider of efficient cleaning systems, Kärcher manufactures pressure washers, vacuums, floor scrubbers and other tools for residential, commercial and industrial use. The company's success stems from their focus on continuous innovation and dedication to designing products with their customers' needs and long-term success in mind. Kärcher invests significantly in innovation - with over 11,000 patents, and a variety of engineering resource offerings, the company has secured its position as the world's leading provider of cleaning technology.

Kärcher's commitment to quality does not stop with manufacturing. The team dedicates time in the initial relationship building stage with its customers. They learn about their needs, operating environments and specific business requirements. By investing this time and prioritizing continuous learning, Kärcher designs products that help its customers achieve their goals and gain a competitive edge.

With its long-standing reputation for delivering exceptional cleaning equipment, Kärcher requires the same dedication to quality from its vendors. When evaluating vendors and partners, Kärcher searches for suppliers with reliable solutions, tools or products that will power its designs and enhance their customers' operational efficiency. After careful consideration, Kärcher's North American operation turned to Delta-Q Technologies (Delta-Q) as a trusted partner for their battery charging needs.



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Rex Shull

**Vice President of Product Management and Engineering,
Kärcher North America**

PROVIDING SOLUTIONS TO ADVANCE INNOVATION

Kärcher and Delta-Q's relationship began after their respective teams met at the ISSA Show North America, a leading industry event for floor care, in the early 2000s. While the Kärcher team was impressed with Delta-Q's solutions, they did not have a specific need for new chargers at that time.

In the years following, Kärcher began to experience charger failure with its incumbent supplier and decided to explore other options. They needed a durable, reliable charger that could withstand tough operating environments without failure. Remembering the offering Delta-Q brought to the table, Kärcher approached the lithium and lead-acid battery charger expert.

Delta-Q helped Kärcher North America develop a tailored charging solution for their new floor cleaning product that met their needs and resolved their charger failure issues. Kärcher was impressed with Delta-Q's similar approach to continuous innovation and dedication to delivering the highest quality solutions. The start of the technical partnership, and tailored solution, would deliver enhanced productivity and performance for Kärcher's customers.



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BUILDING A NEW PARTNERSHIP

Kärcher North America came to Delta-Q with their product idea and a specific challenge that needed solving. Their product—the Chariot™ scrubber—required a specific battery and charger size for optimal performance. The scrubber was being designed and built from scratch, so Kärcher was prepared to invest in the right charger supplier that could help them customize the product from the start.

Kärcher's Chariot™ scrubber had limited space for the battery. The company needed a customized charger that could fit the space requirements and work in an on- or off-board setting. Delta-Q conducted the required testing to prove the new product was possible within the confined space. They also tested against vibration, temperature and water ingress parameters to ensure successful onboard charging. Delta-Q also worked with Kärcher to determine which charge profile was best for the Chariot™. One of Delta-Q's specialties is that they supply a variety of battery-specific charge profiles, which Kärcher found extremely valuable. This offering provides OEMs with greater flexibility in the design and battery selection process.

The Chariot™ launched successfully in 2005. With Delta-Q's charging solutions, Kärcher was able to bring its new solution to life and deliver the customer value that they were looking for. The success of the Chariot™ helped Kärcher launch a new segment in the marketplace – floor scrubbers with on-board chargers.



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After seeing initial success with the Chariot™ scrubber and the newly designed on-board charging solution, Delta-Q became a regular partner and supplier for Kärcher North American products. This marked the beginning of a long-term and lucrative partnership for both companies. Now, Kärcher uses Delta-Q's chargers for 10 of its floor care product lines, with the number of onboard applications steadily increasing.



Kärcher remains dedicated to innovation and values partnerships with suppliers, such as Delta-Q, that help drive the floor care sector forward.



FORGING AHEAD OF THE INDUSTRY STANDARD

Prior to working with Delta-Q, Kärcher North America struggled to find the right battery charger manufacturer to help the company achieve excellence for its customers. The chargers they worked with failed regularly and were not designed to handle vibration, temperature changes and other challenging operating and environmental conditions. Battery and charger issues were responsible for many of the company's scrubber failures.

Industry-wide skepticism of on-board chargers, paired with past battery failures, made some of Kärcher North America's customers wary of transitioning their applications to an on-board charging option. Kärcher worked with Delta-Q and its customers to mitigate these concerns. According to Rex Shull, Vice President of Product Management and Engineering of Kärcher North America, this picture has changed drastically. "We started with approximately 30 percent of the Chariot™ machines with onboard chargers," said Shull. "Today, the onboard charger option is well over 80 percent of what we sell." Onboard charging can help increase equipment and battery life, while also reducing maintenance requirements. This example of driving industry innovation is just one of the many ways Kärcher has approached product design from the inside out, with the overarching goal of improving operational efficiency for its customers.

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CONTINUING TO BUILD ON SUCCESS

Kärcher North America and Delta-Q continue to work together to drive mutual innovation. Delta-Q joins Kärcher early in the product development process, so that they can work with the company's battery partners to size, design and deliver the best charging solutions.

Kärcher also relies on Delta-Q for its flexibility and reliability. This helps Kärcher stick to short development timelines and ensures its products go to market faster, without compromising on product quality and longevity. "Flexibility has been one of the main reasons we continue to turn to Delta-Q as a supplier," said Shull. "They have a number of charge profiles and algorithms available and I've never had to ask the Delta-Q folks to develop a new charge profile – they are already on it." The companies' dedication to quality, and anticipating the needs of their customers, have helped them nurture such a strong relationship.

Kärcher makes concerted efforts to take a fresh approach to designing equipment. The company also constantly innovates as modern technology offerings become more readily accessible for the floor care industry. Its close partnership with Delta-Q helps the company go even further to advance standards within the industry and create the highest quality, best-in-class products that its customers can depend on.



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Rex Shull

**Vice President of Product
Management and Engineering,
Kärcher North America**

ABOUT DELTA-Q:

Delta-Q Technologies develops and supplies battery chargers to original equipment manufacturers (OEMs) of electric vehicles and industrial equipment. Delta-Q's unique blend of engineering capability in high efficiency power electronics and embedded software design delivers innovative battery charging solutions to meet the evolving needs of its customers. With more than three million vehicles and industrial machines already using its products, Delta-Q's innovation is enabling the widespread adoption of environmentally friendly electric drive systems. Delta-Q was founded in 1999 and is a privately held company located in Vancouver, Canada. Please visit

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delta-q.com

for more information

ABOUT KÄRCHER:

Kärcher is the world's leading provider of cleaning technology. The family owned enterprise employs more than 13,000 people in 72 countries and more than 127 subsidiaries. More than 50,000 service centers in all countries ensure continuous and comprehensive supplies to customers all over the world. In 2018, Kärcher reached the highest sales with more than 2.525 billion euros, the highest sales in its history. Kärcher Region North America is one of the largest subsidiaries of the Kärcher Group with over 1,000 employees.

In the United States, Kärcher produces and distributes products and services under the brands Kärcher, Windsor Kärcher Group, Landa, Hotsy, Water Maze, and Spraymart. The company's solutions serve customers' cleaning needs in an economical and environmentally-friendly manner. Visit

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karcher.com/us

for more information



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