

Innovative E-Motorcycle Company Turns To Battery Testing

Eco-Minded Zero Motorcycles Reaps Design Engineering, Manufacturing Benefits from MT-30

BACKGROUND

Zero powertrain maintenance.

Zero oil. Zero fumes.

Zero trips to the gas station.

Electric motorcycle manufacturer Zero Motorcycles represents the next step in the evolution of the motorcycle.

By combining the best aspects of a traditional motorcycle with today's most advanced technology, Zero makes high-performance electric motorcycles that are lightweight, efficient, fast, and fun to ride. Zero Motorcycles' 100% electric powertrain significantly reduces CO2 and noxious fumes emissions while also reducing oil consumption.

In 2012, Zero Motorcycles became the first electric motorcycle manufacturer with a bike that could go more than 100 miles on a single charge. Since then, Zero has worked hard to offer more features, more safety options and a longer range. In order to successfully compete with gas-powered bikes, Zero needs its electric motorcycles to exceed the quality and reliability of traditional bikes. This mission can only be



accomplished through enhanced design efficiencies and superior manufacturing processes.

With a dream of changing the world for the better – one motorcycle at a time – Zero set out to optimize its manufacturing and design engineering processes. Zero is focused on offering fast, high-performance electric motorcycles that offer everything that gas-powered bikes do – and more. A critical component of this is managing the battery and battery management system. In order to achieve their mission, Zero turned to the MT-30 solution, a dual-channel cycling station designed for testing energy storage systems and drive train components such as battery modules, low voltage battery packs, chargers and motor / inverters.



Electric-powered vehicles live and die by their batteries

Improving the batteries that go into their bikes was critical to Zero. Having purchased equipment to do battery testing during the development phase, Zero now needed to build better quality production batteries and put them through more extensive tests. Webasto's MT-30 gives Zero the ability to conduct thorough battery lifecycle testing, running the batteries through a variety of tests to determine their performance over time and in real-world conditions – something they were not able to do before. The MT-30 is able to run a battery through the paces of a real drive cycle, including standard drive simulation EV tests such as FUDS and SFUDS. This improved battery power system ensures that Zero knows exactly how long each battery will last and that it will perform consistently in a variety of situations over the lifetime of the motorcycle.

Battery testing is a critical component of the manufacturing process that can save countless dollars and hours down the road. By pinpointing any issues with the battery before the bike progresses down the line, potential problems or areas of weakness can be addressed without



having to disassemble a completed motorcycle. When Zero conducted testing with their old equipment, they were uncovering battery issues late in the process, which required a lot of time and money to fix – and made the production line slower. By testing the battery before it goes into a bike and hits the manufacturing floor, the MT-30 does away with bottlenecks and increases throughput on the line. The ability to conduct these additional functional tests makes the design of Zero's bikes more robust, reducing warranty claims and road failures – and improving the customer experience.

Webasto provided Zero with a turnkey solution. The MT-30's Remote Operating Software (ROS) allows for customization, making it ideal for smaller, innovative companies like Zero Motorcycles. With the MT-30, they are free to focus on what they do best – break conventions and pioneer the technology of the future.

Improving how it's made

Webasto pioneered bi-directional functionality in battery test systems, and Zero took full advantage of this feature by employing the MT-30 in its battery discharge process. In addition to improving design validation testing, the MT-30 brought benefits to Zero on the manufacturing floor – including cost savings and improvements to efficiency and reliability.

Placing fully-charged batteries on the production line can be dangerous. The ability to pre-test and discharge the batteries to a safer level eliminates this risk and makes for a safer environment. It also makes for a greener production facility and saves Zero money. When discharging batteries, Zero wanted to ensure that the energy was not wasted and could be reused, and the bi-directional nature of the MT-30 allowed Zero to send that power right back to the electrical grid at 90% efficiency. Furthermore, this reduces the heat load on the building and HVAC system. Without the MT-30, this energy would otherwise be wasted and Zero would not be able to recuperate it.

“The MT-30 allows us to put out a lower cost, better performing bike that is more reliable than ever.”

**Raakesh Bhat, Production Engineer
for Zero Motorcycles**

“The better we can test our bikes before they get on the road, the better they will perform once they're there. The MT-30 ensures that our batteries can and will do what they are supposed to do for a superior riding experience.”

**Raakesh Bhat, Production Engineer
for Zero Motorcycles**



THE Standard for Advanced Energy Testing

Zero is in good company. The world's leading automotive, battery and fuel cell companies rely on Webasto's bidirectional, programmable power cycling and test systems – and for good reason. For more than three decades, Webasto's breakthroughs in the testing, charging and development of batteries have been setting the standard for high-power test equipment.



Cruising the Open Road

with confidence

By improving everything from design to manufacturing to the overall customer experience, Zero is achieving its goal of providing fast, exciting, environmentally-friendly motorcycles that compete with traditional bikes in terms of performance and reliability.

Zero is now more efficient operationally, is able to offer a lower cost product, produces motorcycles with fewer defects, and handles a reduced number of warranty claims.

What does the future hold for Zero?

Zero's initial investment consists of two MT-30s, and the company has plans to add a third unit over the next few years. Additionally, Zero will potentially use the MT-30 to charge batteries as well as discharge them in the manufacturing process, which can save the company even more time and throughput— and narrow the gap between electric and gas-powered motorcycles even further.



PRODUCT DESCRIPTION

THE MT-30 is ideal for testing lighter duty applications such as battery modules, fuel cell stacks, partial modules and smaller battery and hybrid drive components. This system provides an economical solution for a variety of testing needs while occupying a small footprint in the laboratory.