



Opening of ELEO's factory by His Majesty the King Willem-Alexander of the Netherlands

On Thursday, January 26th, something historic happened in Helmond: His Majesty, the King Willem-Alexander of the Netherlands, performed the opening of ELEO's new battery factory on the Automotive Campus. The grand opening marks a substantial milestone for ELEO, a Yanmar company that employs over 60 people and is projected to reach 200 within the next two years.

Prior to the official opening ceremony, one of ELEO's founders gave a presentation about the company and the new facility. In front of more than 250 guests at the Automotive Campus in Helmond, the Netherlands, the King used an electric excavator to unveil the first battery module produced by the plant.

"The opening of our factory is a special moment for the entire team, so we are very proud that His Majesty King Willem-Alexander performed the official opening of our new facilities," said Bas Verkaik, co-founder of ELEO. "With this factory, we can significantly increase our capacity to meet the growing demand for our battery systems. More than this, our factory serves as a blueprint for further international expansion in the coming years."

After the official opening, His Majesty took on an in-depth tour of the facilities, where he was given special behind-the-scenes access to the production process and talked with various employees about their role within ELEO. The new state-of-the-art battery production plant covers an area of 3,000 m² and intends to expand to 9,000 m². The facility is equipped with leading-edge machinery enabling a fully-automated battery assembly process.

To adhere to only the highest standards in the industry, the facility houses high-tech R&D labs for the furthering of battery technology. The ample space allows for various test facilities, paddocks, assembly, and warehousing. In pursuit of cleaner energy, the building runs on renewable energy generated by a rooftop solar array.

With the opening of this production plant, ELEO is accelerating its goal to advance the world towards a cleaner, more sustainable future.

Partnership with Yanmar

Early 2022, Yanmar Holdings CO., Ltd. acquired a majority share in Eleo Technologies B.V., a battery technology company based in The Netherlands. At the time, Eleo's co-founder, Bas Verkaik, said: "We are thrilled to partner with Yanmar. Its leading position, premium brand reputation, global network, and decades-long experience in off-road applications and Eleo's advanced modular battery systems are a perfect match to accelerate the adoption of electrified powertrain solutions worldwide."

Mr. Verkaik explained to DPi that Eleo is a start-up founded in 2017 as a spin-off from the Eindhoven Technical University in The Netherlands. Its main focus is on off-highway applications, but Eleo batteries are also used in light commercial vehicles and in the marine sector.

Batteries designed for use in off highway machinery

Eleo is a battery manufacturer specialized in batteries with nickel, manganese, and cobalt (NMC) lithium chemistry which, according to Verkaik, are popular for high-end automotive applications but are ideal for use in off-highway machinery as well thanks to their very high energy density.

Eleo utilizes cylindrical battery cells with an optional liquid cooling, in case the application requires it: "Our batteries have some thermal buffer which can absorb quite some heat without overheating, so there are some applications where no cooling is required (depending on the machine's working cycles and other factors as for example ambient temperature)."



These cells feature a single-surface cooling method that accommodates both passive and active cooling and minimizes temperature differences between all batteries within the modules assuring ideal uniformity and a longer lifespan.

What makes ELEO batteries unique?

Verkaik added that Eleo has a standardized, scalable battery platform that offers customers the economy of scale of a standard solution but with the flexibility given by the scalable option, which adapts to every application's requirement. "Scalability means we can offer the right energy content, right voltage, right shape, even the right cooling solution," Verkaik added. "We always deliver fully-integrated solutions with proprietary Battery Management System (BEM) that customers can adopt in their machines with an easy plug&play approach."

Eleo batteries are available for voltage between 48 and 800 V and can deliver from 2 to 2000 kW power, depending on how many battery modules are packed together.

Safety is obviously a main priority, and Eleo's battery system meets the highest safety standards; the company also adopts a proprietary propagation prevention technology so that, in the unlikely event a cell goes into thermal runaway, no thermal runaway propagation will occur, and all surrounding cells are protected—limiting damage to a single replaceable module and thoroughly mitigating any safety risks.

The BEM monitors each battery's voltage, current and temperature, performs diagnostics and detects and prevents faults. It also contains advanced safety features such as a high voltage interlock system, integrated contractors with automatic precharge, and an isolation monitoring device, and is Safety Integrity Level (SIL)-2 compliant.

The BEM architecture ensures that each customized pack is automatically validated, certified, and seamlessly integrates to the application.

Data collected by the BMS is used by Eleo to further optimize algorithms for customer's specific requirements. This creates highly accurate estimations for state-of-charge, state-of-health, and state-of-power, while better balancing cells in the battery pack.

Accelerating toward business growth

According to the terms announced at the time of the acquisition, Eleo will continue to operate within the Yanmar Power Technology Co., Ltd. as a stand-alone entity under its own brand and at the current location in Helmond, The Netherlands. ELEO's founders Bas Verkaik, Jeroen Bleker, and Bram van Diggelen will maintain their focus on further strengthening the company's technology and accelerating business growth. They will be joined by key executives from Yanmar to form the company's management board.

The company is active mainly in the European and North American markets"

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