Drive technology TODAY

Tronrud Engineering: Fully automated transport in battery cell production

Driverless transport systems for lithium-ion battery production in the clean room

Overview

Electromobility is booming and the demand for batteries is higher than ever. Recent years have shown that the European market urgently needs to catch up with the long-growing lead of mainly Asian battery cell production. In order to do this, more and more battery plants are now being built in Europe.

SEW EURODRIVE

Customers

Tronrud Engineering, Norway

Sector: Battery cell production

Application: Cleanroom AGV for pallet and container transport in the production of lithium-ion battery cells.

More information about our customer:

- Tronrud Engineering has been developing, manufacturing and supplying automation solutions for more than 40 years.
- The company currently employs around 150 people at the Eggemoen site and 50 at the branch in Moss, south of Oslo.

Project description

The cooperation between Tronrud Engineering and SEW-EURODRIVE MAXOLUTION® System Solutions has existed for quite some time: prior to the realisation of series production, an AGV test system was installed in a pilot factory of the end customer as a proof-of-concept. After this successful test project, the cooperation was continued.

Customer requirements

From test system to series production:

- Deployment of an automated guided vehicle (AGV) in a complex environment with high cleanroom requirements and numerous interfaces, e.g. airlocks, lifts, continuous conveyors, special machines.
- Installation of an AGV test system in a pilot factory of the end customer as a proof-of-concept for series production.
- After successful test: realisation of the material flow in a new greenfield factory by means of AGVs

Innovative automation through driverless transport systems:

- The end customer, a producer of lithium-ion battery cells, wanted to automate non-value-added activities through automated guided vehicles (AGVs) so that employees could focus exclusively on value-added tasks.
- The vehicles and other systems in the cleanroom must meet the requirements described in ISO 14644-1 Class 6 (cleanroom classification).
- Use of the standardised, interoperable VDA 5050 communication interface between fleet manager and vehicles.

Special challenge in the battery plant:

The vehicle-to-vehicle transfer in the airlocks requires precise positioning and sophisticated safety technology. In addition, different levels (ground and mezzanine floor) have to be overcome. For this purpose, the automated guided vehicles (AGVs) including the load are transported in a lift.

Solution

Two strictly separated AGV areas:

Different routes distributed throughout the plant ensure that the specified material flow is maintained. There are basically two separate AGV areas: While the AGVs in the so-called "grey area" do not have to meet any special cleanliness requirements, the AGVs in the "white area" are subject to increased requirements according to ISO Class 6. To avoid cross-contamination, load transfer takes place in special airlocks.

A main route is the connection of the central warehouse with the respective production areas (coating, calendaring, slitting, stacking, cell assembly) to supply them with the required materials. In addition, other materials are transported from areas close to the central warehouse to the manufacturing area (battery cases, maintenance materials). Typical materials to be transported are coils of various metal foils, battery cases, separators, etc.

Within the white cleanroom area, the materials are transported to the respective place of use. This is done directly or indirectly: if the material is not delivered directly, it goes through further processes before delivery, e.g. picking/separating and intermediate storage, from pallets to individual small load carriers (KLT). This also involves a transfer from one AGV to another. Furthermore, AGVs are used to transport pallets from the warehouse to the "supermarket" as well as to the cell assembly.

A total of 42 vehicles are used in the first expansion stage - 31 vehicles for pallet transport and 11 vehicles for transporting containers (KLT). The longest distance to be covered is 345 meters, including two lift journeys.

Customer benefits

A complete MAXOLUTION® system from a single source:

The end customer receives reliable products and vehicles from an established supplier with decades of proven industrial quality.

Maintenance-free recharging of vehicle batteries thanks to MOVITRANS® contactless energy transfer.

Fast and easy maintenance thanks to standardised and industrial-grade AGV components from the MAXOLUTION® modular technology system of SEW-EURODRIVE

Cleanroom solution due to compliance with customer requirements in accordance with ISO 6

Simple, project-specific adaptations of the fleet manager - thanks to SEW-EURODRIVE's own solution based on the latest communication technology

Reliable, precise and process-safe load transfer in the airlocks - thanks to innovative navigation and safety technology from SEW-EURODRIVE

Shared responsibility - double customer benefit:

Tronrud Engineering and SEW-EURODRIVE share the responsibility:

SEW-EURODRIVE is responsible for the platform FTF from the modular system and Tronrud for the load handling attachment as well as the customer-specific interfaces.

SEW-EURODRIVE is responsible for the integration of the load handling device and provides a complete vehicle including a declaration of conformity.

On site, both partners provide support during commissioning in order to achieve the requirements and goals together. The European and worldwide presence of the two partner companies SEW-EURODRIVE and Tronrud Engineering will also ensure rapid on-site support in the future. ◀

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