



HARSH
ENVIRONMENT



SMOOTH
MOTION



MULTI-AXIS



LONG LIFE

HIGH OUTPUT BATTERY ASSEMBLY

Automation - Electronic Product Transfer

Automated battery assembly line increases production and reduces health risks.

CUSTOMER & APPLICATION:

Based in South Wales, Mechtek Automation is a specialist engineering company offering advanced automation solutions. From mechanical to electrical, Mechtek designs in-house and specializes in complete turnkey solutions.

Mechtek's latest project was to design and build an automated battery assembly line for one of the largest battery manufacturers in the world. The application is assembling large lead acid battery packs used to power electrically operated vehicles such as forklifts, pallet jacks and aerial lifts.

CHALLENGE:

A fully automated assembly line, with a number of different stations and processes, this turnkey solution requires numerous low maintenance products that can withstand the harsh environment of battery production and operate 24/7.

Lead is a major health risk and exposures are controlled by automating the process, thus removing the workers from the hazard. Increasing production was also key focus for Mechtek designing the system.

"With a strong working partnership we were able to overcome many design challenges by providing fully modular Hepco linear systems. We were able to draw upon our wide product range to provide specification to meet the requirements for each of the linear applications involved in the process".

- Alec Dick, HepcoMotion Sales Engineer



HepcoMotion® PDU2 Profile Driven Unit Actuator



HepcoMotion® HDCS Heavy Duty Compact Screw

SOLUTION:

Mechtek employed a modular approach with this detailed assembly line by subdividing the system into stations that could be independently created.

The assembly line begins with the formation of positive and negative plate stacks. There are three loading sections, loading the positive, negative and double-negative plates onto the line. Each conveyor moves its stack of plates forward to the end of the line where they are lifted 100mm by a ZIMM Screw Jack to reach a pick and place process that picks one plate at a time and places it onto the next conveyor belt.

The plates are picked in sequence, alternating between positive, negative and double negative. As a plate is picked, ZIMM Screw Jacks raise the stack of plates by one index to compensate for the reduction in height of the stack due to a plate being picked. The ZIMM Screw Jack continues to raise the stack as each plate is taken – indexing a total of 100mm over 6 indexes. This cycle is repeated every 22 seconds.

The plates are then moved via a conveyor belt to the separator pick and place system where a sheet of paper is added to the top of each plate. The paper acts as a separator between the positive and negative plates preventing short-circuit through physical contact. Two PDU2 belt driven actuators on X axis support the Z axis pick and place. The payload here is only 10g and the two grippers approximately 2kg each. The X axis beams are 1000mm long, with beam centers of 1800mm. The PDU2 is a compact, low maintenance actuator that saves time in specifying as they are ready to mount and designed for simple fitting of stepper or servo motors. PDU2 also offers a long service life.

The conveyor then moves the plates to the stacker assembly drive unit where the plates are stacked with the sheets of paper between each plate. Hepco's HDCS heavy duty ball screw actuator provides the necessary Z movement; dropping down in 10-20mm increments as plates are added to the stack. When the stack is full, the stack is released to the conveyor belt, and the HDCS returns to the top of the stroke to collect the next stack, moving down as plates are added. The cycle time is approximately 1 minute, although the number of plates in the stack will vary depending on the product. The HDCS is particularly suited to this application as this heavy duty actuator can cope with high moment loads; in this case 70kg at 300mm offset. Bellow covers protect the HDCS from the harsh and dusty environment.

Actuated solutions such as PDU2 and HDCS are available from Bishop-Wisecarver, the exclusive North American distributor of HepcoMotion products since 1984.

RESULTS:

The new automated assembly line will have a profound impact on productivity. Mechtek anticipates the line will produce 1200 batteries per shift; effectively tripling current production rates and removing up to 40% of the manual handling from the operation. Furthermore, the new machine produces less dust, making it environmentally safer.

CONTACT US TO DISCUSS YOUR SPECIFIC GUIDED MOTION NEEDS

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