

Full Spectrum Supply Chain Solutions at MODEX 2024

A few highlights of the transformative technologies revolutionizing the logistics industry

Aaron Fagan, Senior Editor



MHI's MODEX 2024, held March 11–14 in Atlanta, had a record-shattering number of registered manufacturing and supply chain professionals, reaching a total of 48,733. The event saw attendees, myself included, engaged with 1,200 exhibitors showcasing the latest supply chain technology and innovation across three halls and 580,000 net square feet at the Georgia World Congress Center. This was the largest MODEX event to date, with 32 percent more registered visitors than MODEX 2022.

“From attendance to exhibition space and educational sessions, MODEX 2024 exceeded all expectations, delivering our largest and most comprehensive supply chain event to date,” said

John Paxton, CEO of MHI, “The success of this event is a testament to the industry’s ongoing vitality, dedication to innovation, and delivering world-class solutions for supply chain operations. It was a massive win for the entire industry.”

“The excitement on the show floor and the engagement in educational sessions is a sign of the overall power of the supply chain industry and the demand for the latest solutions and technologies in the space,” added Daniel McKinnon, EVP of Exhibitions at MHI. “Attendees representing the Fortune 500, the top 100 retailers, and top 100 consumer goods firms brought large teams to MODEX with plans in hand and budgets in place to make large supply chain investments.”

The biggest trends at MODEX surrounded digital supply chain solutions including automation, robotics, artificial intelligence, autonomous vehicles, augmented reality, the Internet of Things, and data analytics.

VDG Drum Motors

The drum motor is a one-component conveyor belt drive used for powering belt conveyors in a variety of industries, including airline baggage conveyors, food processing, postal parcel, aggregate, mining, and others. The drum motor is a unique belt drive as there are no external rotating parts.

The input power cable passes through the hollow shaft and is connected to the motor stator. The electric motor is mechanically connected in-line to the gear reducer. The drum motor is partially filled with oil. The oil inside the drum motor lubricates all mechanical components and helps to dissipate heat generated by the electric motor and gear reducer onto the drum, and from the drum to the belt. In theory, the drum motor is cooled by the belt making full contact with the rotating steel drum.

With the motor and gear reducer in-line, the drum motor eliminates mechanical losses, as is the case with traditional external motor and gearbox systems. The only mechanical losses are in the gear reducer itself, which is 2 percent per stage of reduction. The majority of gear reducers in VDG Drum Motors are two-stage, with some having three stages depending on the desired belt speed. As a result, the mechanical losses of the drum motor are kept to a minimum and may range between 4 percent and 6 percent.

However, as compared to traditional external motor and gearbox drives, the drum motor, which offers efficiency, safety, and space savings, has not been all that popular with the belt conveyor industry. Most drum motor

failures, regardless of the manufacturer, are related to the inability to extract and dissipate heat generated by the electric motor and the gear reducer. In 2012, the VDG research team began investigating how the lack of heat transfer affects the reliability of the drum motor. To design an electric motor that does not require external cooling, copper and iron losses had to be minimized and electrical and mechanical efficiencies increased. High losses produce high temperatures, and low losses produce low temperatures.

In the new electric motor designs, the laminated stator core and rotor physical size had to be taken into consideration, as well as the length and diameter had to be increased to make up for the horsepower and torque lost by the reduction of the magnetic density. To reduce the operating temperature further, an equalization pressure valve had to be included in the design to prevent pressure build-up in the drum motor. This resulted in significantly increased oil seal service life, substantially better sealing, and reduced oil and motor temperatures.

The VDG engineering team faced a huge challenge in developing and implementing the new motor design. Significant investments along with in-house design and manufacturing of all components, including electric motors and all gear reducers, made it possible for the engineering team at VDG to overcome heat issues experienced with all drum motors when it first entered the market. VDG featured this new generation of VDG Drum Motor designs at MODEX 2024.

vandergraaf.com



New VDG drum-motor designs overcome typical heat issues this type of motor has generally faced.

FANUC America PLC/CNC Motion Controller

Global automation leader FANUC America Corporation unveiled its latest combined PLC/CNC motion controller Power Motion *i*-MODEL A Plus (PMi-A Plus) at MODEX 2024 in Atlanta. PMi-A Plus unlocks the ability to use FANUC controls for general motion control equipment.



FANUC CRX-10iA fulfillment solution.

The demo at MODEX showed the PMi-A Plus controlling FANUC's new Alpha *i*-D Series Servos and Drives to power an automatic storage retrieval system (ASRS) tended by a FANUC CRX-10iA. Visitors saw the PMi-A Plus accurately controlling seven axes simultaneously while the collaborative robot bin picked different products.

"This automated storage and retrieval systems (ASRS) demonstration shows FANUC's factory automation and cobot product lines working together to provide a one-stop-shop automation solution to the supply chain industry," says Jon Heddleson, General Manager of FANUC America's Factory Automation. "Our CNC seamlessly integrated with the collaborative robot shows the possibilities for FANUC products to fuel all parts of an automated warehouse cell."

The CRX cobot is integrated via FANUC's Robot ON-SITE, which simplifies the connection of a FANUC cobot or robot to a FANUC CNC. Up to four FANUC cobots or robots can be connected to one FANUC CNC through the platform, which can enable true lights-out production.

Because the PMi-A Plus is acting as the automated cell's controller, no additional programmable logic controller is needed. Additional FANUC technology featured in this demonstration includes FANUC's new industrial PC *i*PC, which offers a durable touchscreen HMI with faster processing speeds and secure connectivity. The customized graphical screens are achieved by FANUC Picture to ensure simple operability.

The Power Motion *i*-MODEL A Plus can control multiple pieces of industrial equipment as well as run multiple programs simultaneously and independently. A maximum of 32 total control axes can be grouped in up to 10 independent control paths, each path containing

a maximum of 24 axes and four axes of simultaneous motion. PMi-A Plus' advanced functions enable flexible motion control by using position, speed, torque and/or pressure feedback. Applications perfect for PMi-A Plus are controlling machines used for filling, winding, printing, packaging, stamping, and more.

fanucamerica.com

HWArobotics Robotic Shuttles

HWArobotics, a warehousing and logistics robot company with 20 years of experience developing and building shuttle robot systems, introduced its range of automated storage and retrieval systems (ASRS) technology to a North American audience. Designed to optimize logistics and supply chain management operations, four key HWArobotics product lines were launched, including three tote shuttles and one pallet shuttle, as well as associated cargo lifts, racking, and control software.



HWArobotics FPSS1500 pallet shuttle.

HWArobotics' warehouse automation experts were on hand to demonstrate the company's products, which use components from European suppliers, including Siemens (Germany), Voestalpine (Austria), and Hilti (Lichtenstein). The stand featured the SLS300, SLS400, and SLS600 series tote shuttles and the FPSS1500 pallet shuttle.

The FPSS1500 series pallet robot shuttle system is designed for warehouses and distribution centers. The four-directional solution is an advanced ASRS designed for efficient pallet handling and storage, with global standard CE and UL certification. Specialized all-electric shuttle devices are capable of moving in four directions within the racking structure, providing enhanced versatility and operational efficiency.

The FPSS1500A is designed for room temperature environments across the manufacturing, distribution, food & beverage, and industrial sectors, and the FPSS1500B has been created specifically for cold storage, such as food, medicine, and cold chain businesses. Using AI scheduling algorithms, it has achieved swarm intelligence within the

PSR system to automatically adjust efficiency based on the number of vehicles and the rack structure.

Alongside its high-performance shuttle devices, HWArobotics has a wide portfolio of goods lifts, racking and picking workstations (including robotic picking), for maximum performance and conveying capacity, high positioning accuracy, and sturdy, high tolerance storage.

hwarobotics.com

LG CLOi CarryBot

LG Business Solutions USA created a warehouse efficiency and flexibility solution with the new LG CLOi CarryBot family of autonomous mobile robots (AMRs) designed to intelligently navigate complex floor plans to move and deliver payloads in customizable configurations, with loading and unloading performed by workers.



LG CLOi CarryBot is an autonomous mobile robot (AMR).

LG CLOi CarryBot was officially launched in the United States at the MODEX. LG also previewed P5G, the company's private 5G technology under development for dedicated robot networks supporting reliable, stable performance. Development of the new LG P5G network is leveraging the vast technical resources and deep expertise of global innovator LG Electronics.

“The new LG CLOi CarryBot can immediately begin solving warehouse inefficiencies by providing on-time movements and consistent, reliable operation that allows workers to stay within their zones and increase productivity,” said Tom Bingham, Senior Director, LG Business Solutions USA. “CLOi CarryBot offers seamless package movement and delivery within a warehouse and eliminates the need for workers to physically transport packages.”

Having already launched autonomous robots that transport products, guide customers, deliver food and beverages, and provide information in commercial settings, LG is now expanding its robotic line to “help provide true solutions for warehouses of any size by reducing lead times and enhancing efficiency,” Bingham explained.

Featuring LG's advanced AMR platform for autonomous navigation, the latest Wi-Fi capabilities, ergonomic hardware design, an intuitive fleet management system, and an efficiency-boosting material control system that optimizes order distribution and scheduling, the LG CLOi CarryBot can streamline product movement and adjust to real-world situations while reducing physical strain on workers.

With a top speed of 2.7 miles per hour, a typical runtime of 18.5 hours and autonomous dock charging in 6 hours, LG CLOi CarryBot is a powerhouse for delivering small-to-medium packages across virtually any distance. These powerful hardware capabilities combine with cutting-edge software and machine learning for seamless integration with various facets of Warehouse Management Systems, including material control, fleet management, and robot management systems.

Interfacing with material control systems enables smart order grouping, picking item categorization, order information distribution, and total picking cooperation support including notations of shortages or skipped items. Fleet management system integration provides path-planning for multi-AMR users, intelligent AMR fleet navigation and prioritization, traffic balancing and detouring, obstacle avoidance, and automated return for dock charging. On the backend, the robot management system provides managers instant access to location info, AMR status, alerts for abnormal interactions and statistical data to support decision-making.

“LG CLOi robots have already proven their navigation and automation prowess in a variety of industries and environments, and now warehouse owners and managers can shift their operations to more automated routines to improve efficiency and enhance daily productivity,” Bingham said.

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