

Test of a manufacturing line that consists of one standard production platform and six different modules. IMS machines are used for the assembly of small parts in the areas of consumer electronics, automotive parts, and medical technology.



Ready for future trends: Individual customer needs determine production systems

Flexible machine lay-out will be key in the Smart Factory

The intelligent factory of the future will require modular machine concepts that allow users to adapt machines to changing production processes with minimal effort. Dutch company, Integrated Mechanization Solutions (IMS) decided to face this challenge head-on by developing its new METIS 4.0 machine concept. It consists of a standard machine module and individual units that can be flexibly interchanged in order to build a production line based on the steps to be executed. With PC-based control, IMS selected a control system that meets all requirements in terms of modularity, scalability, universal communication, and connectivity.

Industry 4.0 is not a passing trend for IMS, rather it embodies the production system of the future which will have to accommodate end user demands for highly customized products. The machines from IMS are mainly used to assemble small parts for consumer electronics, medical devices, or in the automobile industry. "We are currently building and installing production lines for the assembly of camera lenses and speakers for smartphones," explains Henri Paus, Technical Director at IMS. "While these products are very different, what they all have in common is the precision of the processing steps our machines have to execute."

Modular machine concept

IMS electrical engineer, Bart Deen explains the METIS 4.0 machine concept: METIS 4.0 is a production line with three important characteristics: It is scalable in production capacity; flexible in process sequences and re-configurable in layout. The machine's most important feature is that the production volume can

be expanded in order to match the needs for automation. Customers can start by investing a small amount in low volume automation, and this investment increases with the need for extra automation. "At the core we have the principal of modularity. This means that our machine can be exchanged and combined with each other as needed." For the actual application, this means that any IMS production line consists of two types of components: the standard production module as the underlying framework and application-specific process units.

The process units are installed on the standard platform and carry out specific steps in the production process. These may include: pick-and-place units for positioning parts, or units for applying liquids or connecting materials, treating a product with UV light, or laser-welding. IMS offers a broad range of standard units that can be easily added to and removed from the METIS 4.0 platform. Owing to their plug-in design, the units can be tested offline and installed according to the plug-and-play principle.

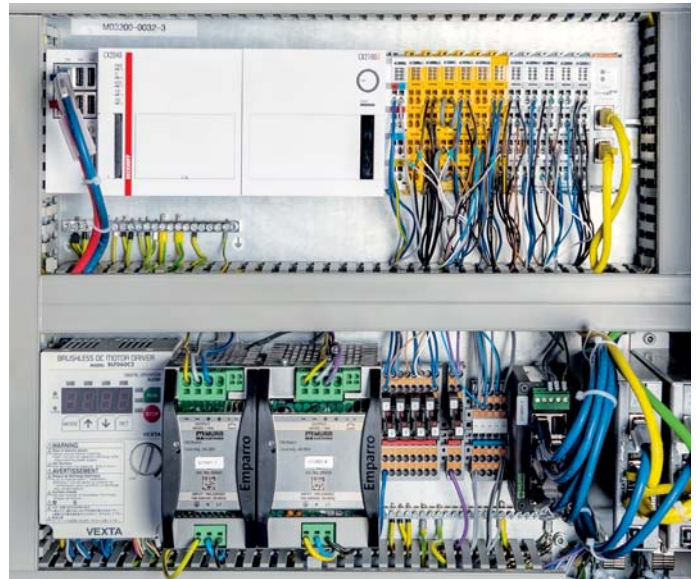
Bart Deen, Electrical Engineer;
Henri Paus, Technical Director;
and Ilse Buter, Marketing Manager at IMS
in Almelo, Netherlands (left to right)



The plug-in production modules can be tested offline and installed according to the plug-and-play principle.



Control cabinet of the METIS 4.0
with Embedded PC CX2040,
EtherCAT and TwinSAFE terminals



High flexibility enables quick changeovers

"Our machine development is focused on flexibility," says IMS Marketing Manager, Ilse Buter. "We face the challenge of ever shorter product lifecycles today, especially in the field of consumer electronics. In addition, products are being offered in many more versions, which means that different production lot sizes continue to shrink. That's why the manufacturing industry needs machines that can be adapted quickly and easily to handle new products, variants and lot sizes. When we already recognized this development some time ago, we promptly shifted our focus to extremely short setup changeover times. For example, we recently built a line for a customer that enables the manufacturing of products in 60 different variants."

PC-based control:

Fast, highly accurate, and exceptionally scalable

Having easily exchangeable units places high demands on the control system," says Bart Deen. "For three years IMS has used PC- and EtherCAT-based control systems from Beckhoff as their standard, depending on the size of project we choose from the CX50x0, CX51x0 or the CX20x0 Embedded PC series. Because of its fast response times, EtherCAT is very important for the types of machines built. The machine uses the EK1101 EtherCAT Couplers to connect the different modules. Each module has its own ID range, which identifies the type of module and its hardware revision. Based on this ID the controlling software loads the correct functions blocks. This enables the easily interchangeability of our modules. "Beckhoff also meets our needs as far as scalability is concerned," says Bart Deen "Since all control components are highly scalable, we can design control solutions that perfectly meet the needs of our customers."

IMS

IMS (Integrated Mechanization Solutions) is headquartered in Almelo, Netherlands. After a management buyout from Texas Instruments in 1999, the company became part of the WWINN Holding. With over 50 years of experience in developing high-end production lines, IMS specializes in customized solutions for complex assembly and manufacturing of small products. Customers include global companies in the automobile and smart-device industries as well as medical device manufacturers.

Further information:

www.ims-nl.com

www.beckhoff.nl