Press release

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Plug & Produce:
Smart Factory Soon A Reality

Lenze demonstrates at the Hanover Messe how
Plug & Produce uses Industry 4.0 concepts and digital
transformation to generate concrete, economically
measurable benefits

**Greater individualisation, smaller batch sizes, more frequent configuration
changes, but with cost-efficient and competitive production lines – a
contradiction? A huge challenge in any case. The Plug & Produce concept
could soon mean that the production line is quickly back in operation
without excessive manual effort being required for configuration and
programming. Interfaces standardised across manufacturers for control,
configuration, and product data already exist. With the concept of
administration shells and machine skills, Lenze demonstrates what the future
could look like. Visitors can experience Industry 4.0 live from 1—5 April at
the Hanover Messe at the Lenze stand in Hall 14, H22.**

Mechanical engineers and plant operators are constantly asking what the
concrete, economically measurable benefits of Industry 4.0 and digital
transformation are. With its real-world showcase, Lenze, the specialist for
machine automation, demonstrates how this "digital dividend" can be
leveraged. Plug & Produce is an application which combines the various
elements of Industry 4.0 and enables actual progress to be made where the
efficiency of modern production is concerned.

The showcase simulates the packaging of various consumer products – such as washing detergent and creams – with different modules in a production line. The retrofitting of the production line follows the "Plug & Produce" concept – simply plug in and get started. The key idea revolves around how a production line can easily and flexibly be adapted to changing requirements in the future without a significant loss of time.

Customised production lines

The starting position for the showcase is a modularisation of the production line. The individual modules – including Infeed, Pick & Place, Packaging, Paletizer and Outfeed in the showcase – represent the required skills which are made available to production. The skills required for the packaging of creams are different from those for the packaging of washing detergents.

Currently, if the corresponding modules of the production line are replaced, the control system will need to be reprogrammed. With the Plug & Produce approach, this is far easier and quicker. The line is reconfigured in a moderation phase. This takes place via the uploading of configurations which now do not just control the manufacturing process itself, but also contain information on which tasks are to be performed in which sequence, such that the appropriate modules can be selected and linked.

The modules themselves provide the necessary information, for example the height at which transfer points such as a conveyor belt are located, at which position workpieces are to be delivered or how they are fed out and at what speed they can be processed. If the plausibility check indicates that all the required skills are available, at the right position, and with the appropriate physical interfaces, the production phase can be started.

Focus on the digital description of the modules

The next step towards the smart factory is based primarily on the administration shell, which was adopted as part of the reference architectural model Industry 4.0 (RAMI 4.0) in April 2018. There can be administration shells not just for individual components, but also modules or the entire machine. The data they contain provide information on the physics – such as connecting dimensions, service life, operation values – and on the skills: is it a drive, a network component, a packaging module, or a welding installation? This data

forms the basis for creating a digital twin which allows programming and simulation to take place long before the physical implementation of a machine.

The secret lies in communication: open, manufacturer-independent standards allow the various modules and the PLC involved to automatically exchange administration shell data with each other, or even engage in full-fledged interaction during production. For this purpose, a unified data and information model as well as standardised semantics are required so that the data can also be interpreted correctly. The first part of these preconditions is fulfilled by the administration shell. For the second part, Lenze utilises an expansion of the information and communication platform OPC UA. In fact, the OPC UA Companion Specification PackML served as the basis for its own showcase.

The right path towards the future
In order for this concept to function not just in Lenze's own showcase, but also in mixed environments in the field, a certain amount of homework still needs to be done. The main prerequisite is that all current components for mechanical engineering and automation are outfitted with an administration shell by the manufacturer. Secondly, there is still a gap that needs to be closed where standardisation is concerned. Lenze is active on numerous committees in this regard, always with the aim of reaching a manufacturer-neutral, open solution. Once this step has been completed successfully, the developer tools will need to be further developed such that they are able to interpret and utilise the data which accumulates across the various lifecycle stages in the administration shell of components and machines.

OEMs should already gear themselves towards this development, which will manifest as part of digital engineering. Above all, modularisation will need to be emphasised when creating the control software. This allows the machine builder to benefit from Plug & Produce as well, allowing a faster time-to-market to be realised with the use of fewer resources. The manufacturer from Hamelin is already offering comprehensive consulting services for this purpose, thereby providing guidance and paving the way for those who wish to make progress where Industry 4.0 is concerned.

About Lenze

Lenze is a leading automation company for mechanical engineering. With 70 years of experience in providing solutions, Lenze is a strong partner that stands side by side with its customers. The company portfolio includes high-quality mechatronic products and packages, efficient systems consisting of hardware and software for machine automation and digitisation services in the areas of big data management, cloud and mobile solutions as well as software within the context of the Internet of Things (IoT).

Lenze employs around 3,700 people worldwide and is represented in more than 60 countries. As part of its growth strategy, Lenze intends to continue investing strongly in Industry 4.0 sectors in the coming years – with the aim of further increasing revenues and profitability.

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