Press release

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Arburg host computer: Complete data management via OPC-UA

- **Industry 4.0: networking of machines, order information and process data**
- **Arburg host computer system (ALS): Communication via OPC-UA application protocol**
- **Application example: fully networked process chain at the Hannover Messe 2015**

Arburg has already been focused on the topic of "Industry 4.0" for some time now. Thanks to its automated Allrounder injection moulding machines, its Freeformer for industrial additive manufacturing and IT solutions such as the Arburg host computer system (ALS), the company is increasingly developing into a system supplier for networked production in the digital factory of tomorrow. Arburg presented an impressive example of the manufacture of individualised high-volume products as an exclusive partner of the "Additive Manufacturing Plaza" at the Hannover Messe 2015, based on a networked process chain using the OPC-UA application protocol.

This Industry 4.0 example for the plastics processing industry involved the networking of all technical components and production data required for a

manufacturing process, combined with end-to-end production traceability. Arburg opted for the OPC-UA application protocol for the exchange and archiving of all data and process parameters in the host computer system (ALS) because it can be used across manufacturer platforms and operates quickly, efficiently and reliably.

Fully networked process chain

Here, individualised rocker-type light switches were produced on the networked system. All the required components for the networked production of these plastic parts came from a single source in the form of system supplier Arburg. An Allrounder injection moulding machine for the production of the light switches, a laser marking device, two Freeformers for individualisation using additive manufacturing and a robotic cell for packaging the end products were all integrated in the production line. The individual process steps were linked by an end-to-end data and information chain. The central component here was the Arburg host computer system (ALS). This is not only where all the individual production and quality parameters came together, they were also archived in the ALS and made available online over the Internet for each part so that they could be called up by the visitors via an individual code.

The host computer system manages the data via OPC-UA

With the ALS, all process steps were documented seamlessly and the relevant process parameters uniquely assigned at a later stage. Firstly, each user individualised his or her light switch at a PC terminal and saved the order digitally on an RFID chip card. When the visitor was ready, the card was then read into the Selogica control system of

the injection moulding machine. Production then began. With the next injection moulding cycle, a rocker-type light switch was produced, then an individual DM code was applied by laser and the associated process data was communicated back to the ALS. The code turned the product itself into an information carrier. In the next step, the Freeformer enhanced the serial product in an additive manufacturing step in accordance with the previously determined individual specifications. The product ID also controlled the automatic printing of the associated packaging.
The host computer system recorded and archived the process data from the injection moulding and additive manufacturing processes, as well as the automation and transmitted it to a web server. Using the QR code on the packaging, the data for the entire production process could then later be retrieved online using a smartphone on a part-specific web page. This contained all the process data for the unique item. This included details of the cycle time, injection pressure and ambient temperature of the injection moulding process as well as the construction chamber temperature, number of droplets and construction time of the additive manufacturing.

Communication via OPC-UA took place in both directions. Events such as production of the parts and the individual laser marking were initiated by reading the order into the Selogica control system of the injection moulding machine. Conversely, the order-specific parameters of the machine and automation components integrated in the process were recorded and stored in the ALS. Data entry in the Freeformer, in turn, was performed using a hand scanner and the laser-applied DMC code of the relevant switch.

The scanning results were also communicated back to the ALS based on the order.

Full control of planning and production with ALS and OPC-UA

A trend towards smaller production orders, greater deadline pressure and growing levels of automation in production require an increased use of IT solutions in plastic part production. With ALS, Arburg's host computer system, special machine, operating, setting and order data can be acquired, processed and transmitted. This means that several machines and the entire production process can be efficiently controlled and documented at the same time.

The major advantage of the ALS is its modular structure. The basic expansion stages for machine and operating data acquisition (MDA and ODA) form the basis. These can be freely combined and extended across various expansion stages. In order to acquire machine data, the ALS utilises the internationally recognised Ethernet networking standard. The collected data can be displayed by retrieving the machine status. The three possible information areas can be subdivided into status data (operating modes, alarms and fault causes), operating data (parts counter, programme, mould and order information) and process parameters (actual process values from the injection moulding cycle).

The ALS is integrated directly into the company network via a PPS or ERP interface. All the important planning data and production orders can be downloaded onto the ALS server from such higher-order planning systems. The actual data for the production orders can be fed back continuously in the opposite direction from the ALS to the planning system. This ensures permanent data calibration.

The example of the process chain at the Hannover Messe 2015 demonstrated how the OPC-UA application protocol can actively be used for the data management of overarching automated production sequences. Arburg's new additive manufacturing system, the Freeformer, can also be simply and fully integrated into production processes of this kind via OPC-UA. In this specific case, Arburg was able to build on its experiences with communication between its Allrounder injection moulding machines and the ALS host computer system. This configuration has already been successfully implemented more than 5,000 times for customers. On this basis, the company has now also successfully implemented the entire cell communication via OPC-UA.

Images

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Thanks to its product range, Arburg is developing into a system supplier for networked production in the digital factory of tomorrow.

Photo: ARBURG

About Arburg

German machine manufacturer Arburg is one of the world's leading manufacturers of injection moulding machines with clamping forces between 125 and 5,000 kN. This is complemented by robotic systems, customer- and sector-specific turnkey solutions and further peripherals. An innovative additive manufacturing system was added to the plastic processing range in 2013.

The company places the topic of production efficiency at the centre of all its activities, taking into account the entire value-added chain. The objective is to enable the Arburg customers to manufacture their plastic products, whether one-off parts or high-volume production, in optimal quality and at minimum unit costs – e.g. for the automotive and packaging industries, communication and entertainment electronics, medical technology, or the white goods sector.

An international sales and service network guarantees first-class, local customer support. Arburg is represented by its own organisations at 32 locations in 24 countries and by trading partners in more than 50 countries. The machines are produced exclusively at the parent factory in Lossburg, Germany. From a total of around 2,400 employees, around 2,000 work in Germany. About 400 further employees work in Arburg's organisations around the world. In 2012, Arburg became one of the first companies to gain triple certification: to ISO 9001 (Quality), ISO 14001 (Environment) and ISO 50001 (Energy).

Further information about Arburg can be found at www.arburg.com.