



4industrie
4r.0

powered by Arburg

SMART FACTORY

Digital transformation for
the factory of the future

ARBURG

EFFICIENCY DRIVER

**We are technology and system
partners for your „smart factory“.**

Become ever more efficient! And do so despite ever-shorter product life cycles, greater variant diversity and increasing demand for customised products. To achieve this, resources must be conserved, productivity, quality and availability increased, innovations must be made ready for market more quickly and high-volume production rendered more flexible. The fundamentals of Industry 4.0 provide the opportunity to master these great challenges. Companies who think about the digital transformation of their production together with us at an early stage secure and enhance their competitiveness.

WIR SIND DA.



Networked process chain in 2015:
ARBURG makes digitalisation
experienceable at the Hannover Messe.



Fully automated production system
from 1986: ARBURG has been involved
in digitalisation for decades.

DIGITALISATION: THE FUTURE STRATEGY

// In many industries, the digital transformation remains a vision. We, however, are already well on the way to implementing it. For example with flexible automation. With adaptive process control. With identifiable products, which control their own production process. With the online production organisation. With the integration of order information and process data, including cloud-based solutions. We offer all the components for networked production. In your „smart factory“! And we work on the further development of our product range in a targeted manner. Direction: Industry 4.0! //

WE HAVE LONG BEEN THINKING ABOUT DIGITALISATION.

Early recognition of potential

A fully automated production system comprising several linked injection moulding machines, which operates without manual set-up operations: Under the term „Computer Integrated Manufacturing (CIM)“, we already demonstrated solutions and the potential for digitalisation at the K trade fair back in 1986. We were then ahead of our time with this technology. The development of the modular ALLROUNDERS, the intuitive SELOGICA and GESTICA control systems, automated turnkey systems, the overarching host computer system (ALS) and ultimately the freeformer for industrial additive manufacturing are the consequences of this early involvement with a topic that is increasingly gaining ground under the name „Industry 4.0“.

Targeted further development

We are convinced of the potential of IT-networked production. Digitalisation is therefore a permanent feature of our corporate strategy – be it in product development or the organisation of in-house operational sequences. Furthermore, we actively support projects for digital transformation and demonstrate their specific implementation to the plastics industry. We were:

- A pilot company during the creation of the „Guideline Industrie 4.0“ published by the VDMA (German Engineering Federation)
- Exclusive partner in the Digital Factory at the Hannover Messe 2015
- Initiator and pioneer of EUROMAP interfaces based on the OPC UA communication platform

We are a technology and system partner for IT networked production – more than

30 YEARS
OF EXPERIENCE



The background image shows a futuristic industrial setting. A long line of modular machines, primarily in shades of teal and grey, is arranged in a perspective view. The machines have various components, including rollers, sensors, and control panels. Some machines are labeled with binary code and the text 'Injection 4500' and 'Injection 3200'. The floor is dark with glowing yellow and white lines that resemble a road or a data path. The walls are made of large, dark panels. The overall atmosphere is high-tech and digital.

DIGITALISATION: A MODULAR CONCEPT

Just-in-time production, 100 percent traceability, production-on-demand, time-to-market and mass customisation – these are just a few of the possibilities which are being driven forwards through the digital transformation of production. However, this calls for interdisciplinary expertise. As a technology and system partner, our expertise ranges from the machine, process, automation and control technology through to IT networking. It enables your individual solutions for digitalisation to be implemented in a targeted manner. For maximum product efficiency and greater value creation, but also for completely new business models! //

ROAD TO DIGITALISATION



ABBURG

ALLROUNDER 1120 H

DIGITALISATION THAT BEST MEETS YOUR NEEDS.

Individual strategies required

The digital transformation will decisively change the industrial process:

- Transparent production – processes are traceable
- Flexible production – small-volume and one-off parts can be produced cost-effectively
- Efficient production – processes are resource-saving and fast

There is no general solution for digitalisation! This is because no two injection moulding production tasks are alike. Every company must rather devise dedicated solutions for their own production processes. We'd be delighted to help you!

ARBURG offers numerous components

Our aspiration is: To be your technology and system partner! Whether you want to make individual machines „smarter“. Whether you want to flexibly implement automated turnkey systems. Whether you want to make your production more transparent through integrated data exchange. On the basis of our machine, robotic, process, control and information technology, we can support you on your way to the „smart factory“. You benefit from modular, scalable and individually combinable components with which you can efficiently design and optimise your processes. That is „Industrie 4.0 – powered by Arburg“.

Flexible combination is key: Digitalisation requires the interaction of various components and systems.



ALS Mobile
Order Status Program
Prog.admin. - 2823003
15:20

Level 1

Send progr. to host comp.
54910

Level 2

Send progr. to host comp.
54913

Load progr. vom host comp.
100236





Online data exchange: Through IT networking, customer wishes can be integrated in the value-added chain.

Close-knit interaction forms the basis

A decisive factor for the digital factory is the IT networking on the basis of a standardised communication platform. Only in this way can production sequences be implemented that enable fast, open and secure data exchange – both between machines, moulds, products and peripheral equipment, as well as in the integration of order information with process data, including cloud-based solutions.

1,800,000,000,000 
SIGNALS PROCESSED
annually between peripheral equipment and injection moulding machine by our control systems worldwide.

Network interfaces

Thanks to its manufacturer and language independent technology, the OPC UA communication platform provides the best conditions for the creation of an industrial Ethernet network. Since 2010, ARBURG has been using OPC UA for data exchange between ALLROUNDERS and its host computer system ALS. This protocol is now also being used as the basis for re-engineering the EUROMAP interfaces.

Machine interfaces (OPC UA)

- Connection of robotic systems (EUROMAP 79) and peripheral equipment (EUROMAP 82) on machines
- Objective: Controlling the production process

Expert interface (OPC UA)

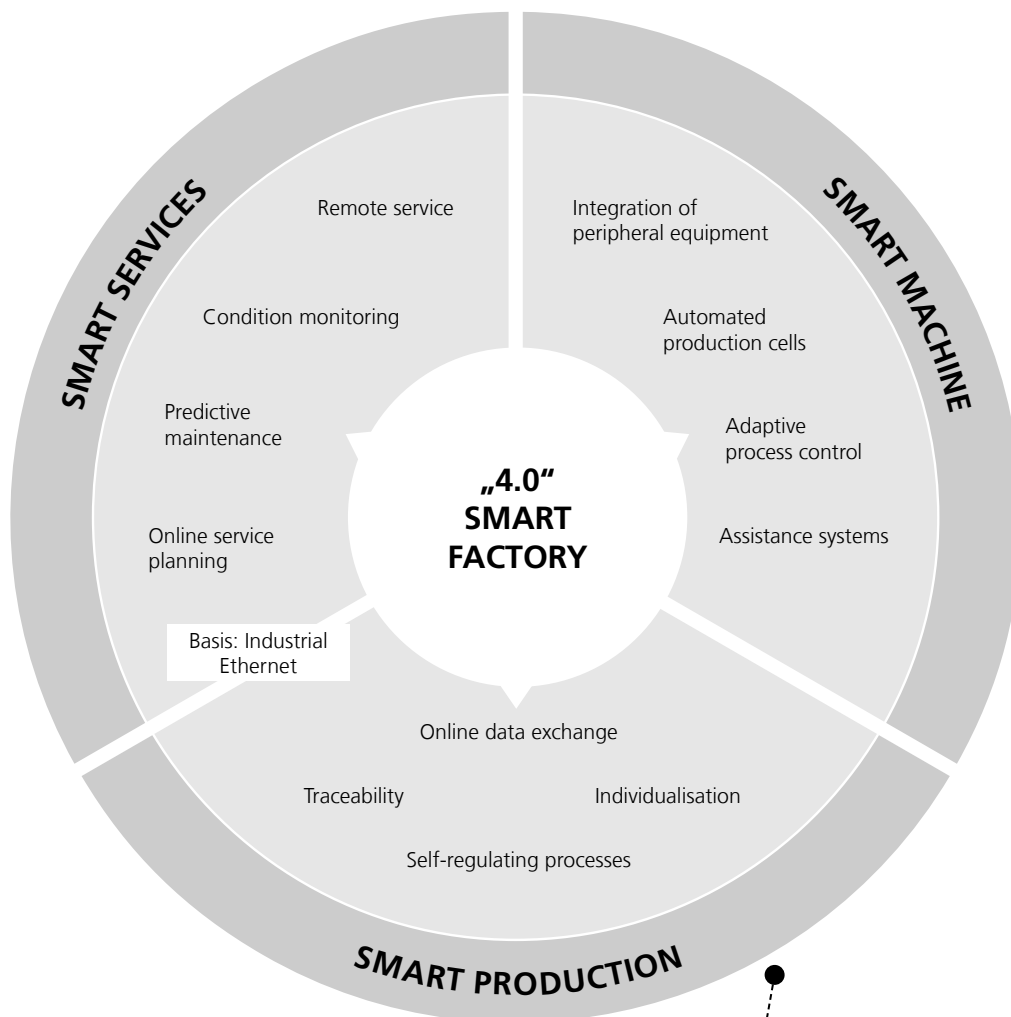
- Connection of external control systems to the machine control system, e.g. for monitoring mould cavity pressure
- Objective: Automatic process control

Host computer interface (OPC UA)

- Connection of machine to an MES system (EUROMAP 77)
- Objective: Data exchange and archiving in production

PPS/ERP data interface

- Connection of a production management system (MES) to a project planning system
- Objective: Vertical integration



From a single source: We offer you all the components for digitalisation.



reddot award 2018
winner

SMART MACHINE: ASSISTING AND CONTROLLING

// Complex requirements can be handled with ease! Your operators need to be able to adjust and control processes intuitively, however complex they may be. What is required is a „smart machine“, which integrates your peripheral equipment trouble-free, supports you actively in all operating situations, as well as monitoring and adaptively controlling your process. This is precisely the aim of many of our control system features: For greater productivity. For higher process reliability. For better part quality. For fault-free operation. In other words: for more value all-round! //



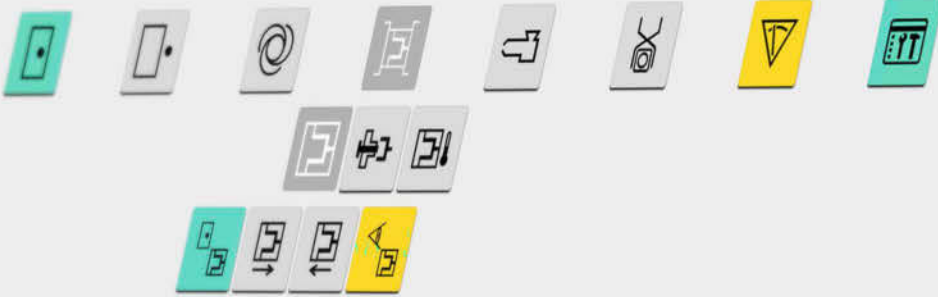
GESTICA

ARBURG



0,0cm³ 0,0cm³ 0 bar 0

Maschinenbild





OUR ASSISTANCE PACKAGES MAKE IT EASY FOR YOU.



4.set-up

Guided set-up: You receive active support during set-up and parameter entry, leaving you more time for productive tasks.



4.start-stop

Fast production start-up: start-up and shut-down of complex processes are made easier for you, reducing the number of start-up parts required.



4.optimisation

Assured quality and productivity: Allows you to get even more out of your machine in each case - because every split second counts.



4.production

Greater programming freedom: Special processes become standard for you and even complex moulds can be quickly mastered.



4.monitoring

Controlled system status: Comprehensive monitoring functions enable you to detect deviations early and seamlessly document them.



4.service

Time-saving online support: Have faults analysed quickly, efficiently and safely in a remote process – for even greater machine availability.

Process control

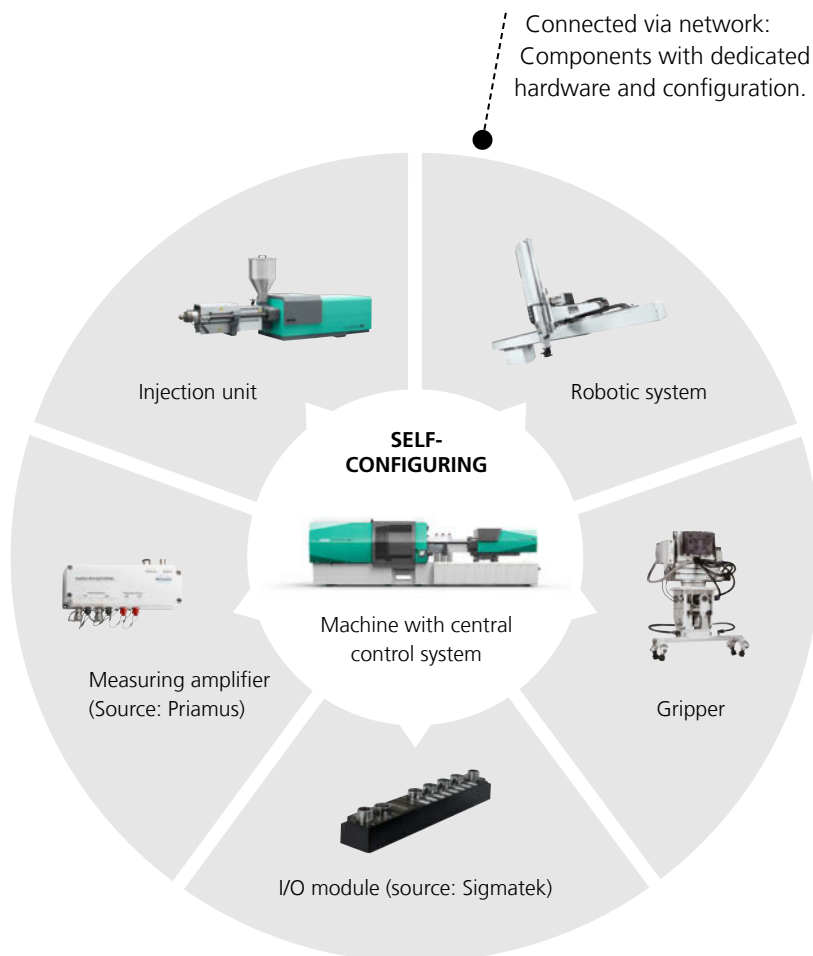
Stabilising the injection moulding process to produce a specific part quality? A prerequisite for this is a constant pressure characteristic from shot to shot during the holding pressure phase. To achieve optimum reproducibility, we have developed „reference curve control“ for our ALLROUNDER machines. This feature is based on the principle of recording the internal mould cavity pressure characteristic of a moulded part deemed to be „good“ and employing this as a target characteristic.

Cooling water control

Increasing filter clogging, varying utilisation levels of the machines and line losses can lead to fluctuations in the quantity and temperature of cooling water. In order to compensate such influences automatically, ALLROUNDERS can be equipped with a flow and temperature detection system. For individual online control, tolerance bands can be defined for each monitored cooling channel in the machine control system. Optionally, this can also be used to control the cooling water quantity and temperature.

„Plug and play“

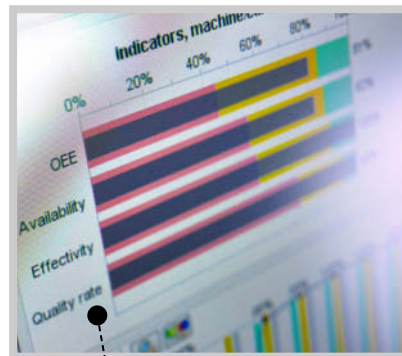
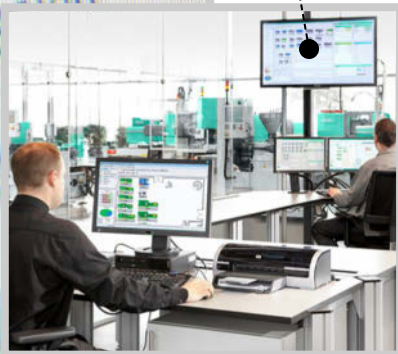
Lower effort, flexible use: The advantages that IT-networking of the ALLROUNDERS offers within the production facility is demonstrated by the principle of the „self-configuring production cell“. Functional assemblies connected to the machine control system by means of a real-time Ethernet and automatically identify themselves when they are plugged in – even during operation. In the case of a robotic system, for example, whose specifications have been detected (type, number and length of axes), the associated operating functions are automatically made available.



SMART PRODUCTION: CONTROLLED DYNAMICALLY

// More transparency, more flexibility, more efficiency! The basis for this are automated processes and direct information exchange. Process data is captured online, shared across the network, and the sequences are dynamically controlled and optimised. As a technology and system partner, we not only implement customised turnkey solutions, but also take care of the implementation of a digital data management system for the organisation of production. //

Digital production organisation: The host computer system ALS ensures end-to-end IT networking.



Reliable information: ALS provides data evaluations at the press of a button.

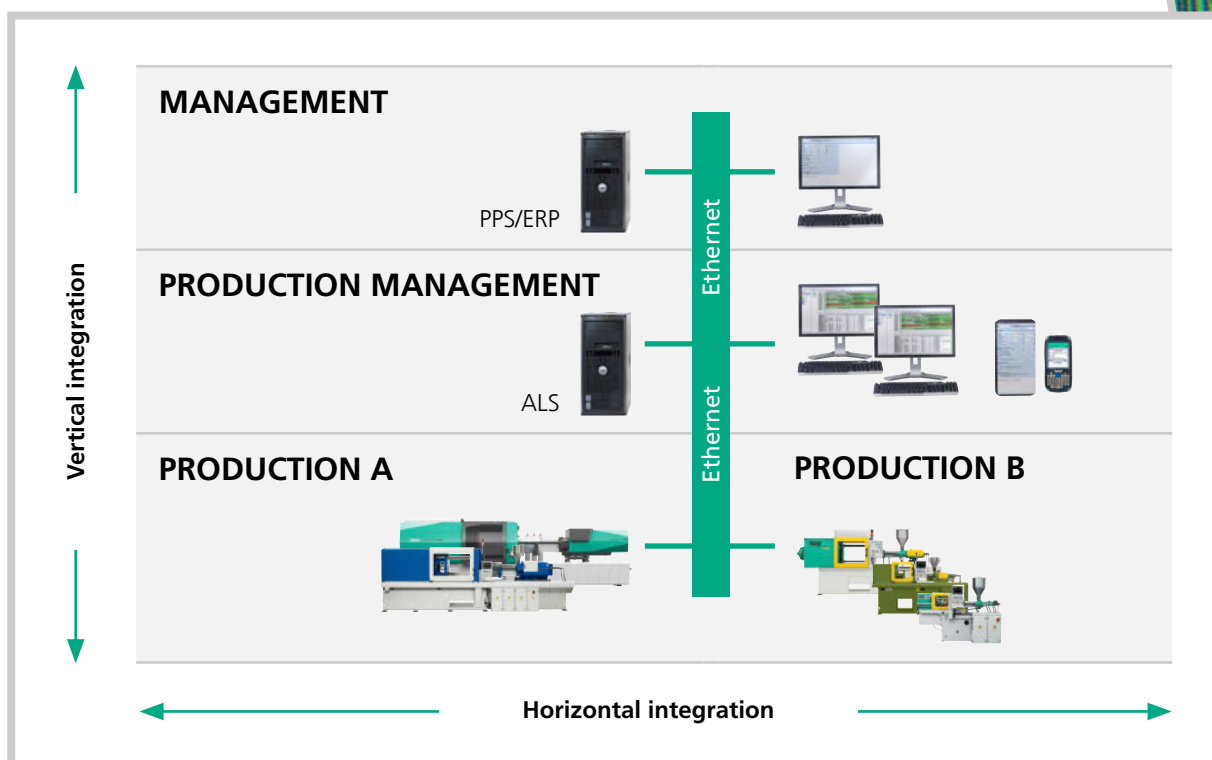
i / Further information:
Host computer system brochure

Online data acquisition

The ARBURG host computer system (ALS) plays a key role in data exchange – both across production facilities/locations (horizontal integration) and via a PPS/ERP system (vertical integration). Using ALS, the complete machine fleet, including manual workstations can be networked via terminals, I/O modules and interfaces. Complicated manual data acquisition is dispensed with. Feedback and key figures relating to machines, pending maintenance, ongoing orders and production quality are directly available - even using mobile devices! It allows you to utilise your available resources much more effectively – whether during order planning, quality assurance, mould management or maintenance.

Fine planning

ALS allows the direct assignment of orders to machines and the creation of order queues to ensure a high degree of planning reliability. On the basis of online data, start-up processes as well as set-up times and downtimes when changing orders can be reduced. The provision of the necessary settings data, moulds or materials, as well as the activation of audit tasks are initiated automatically. This is ensured by the synchronisation of ALS with material control systems and quality assurance systems, for example.



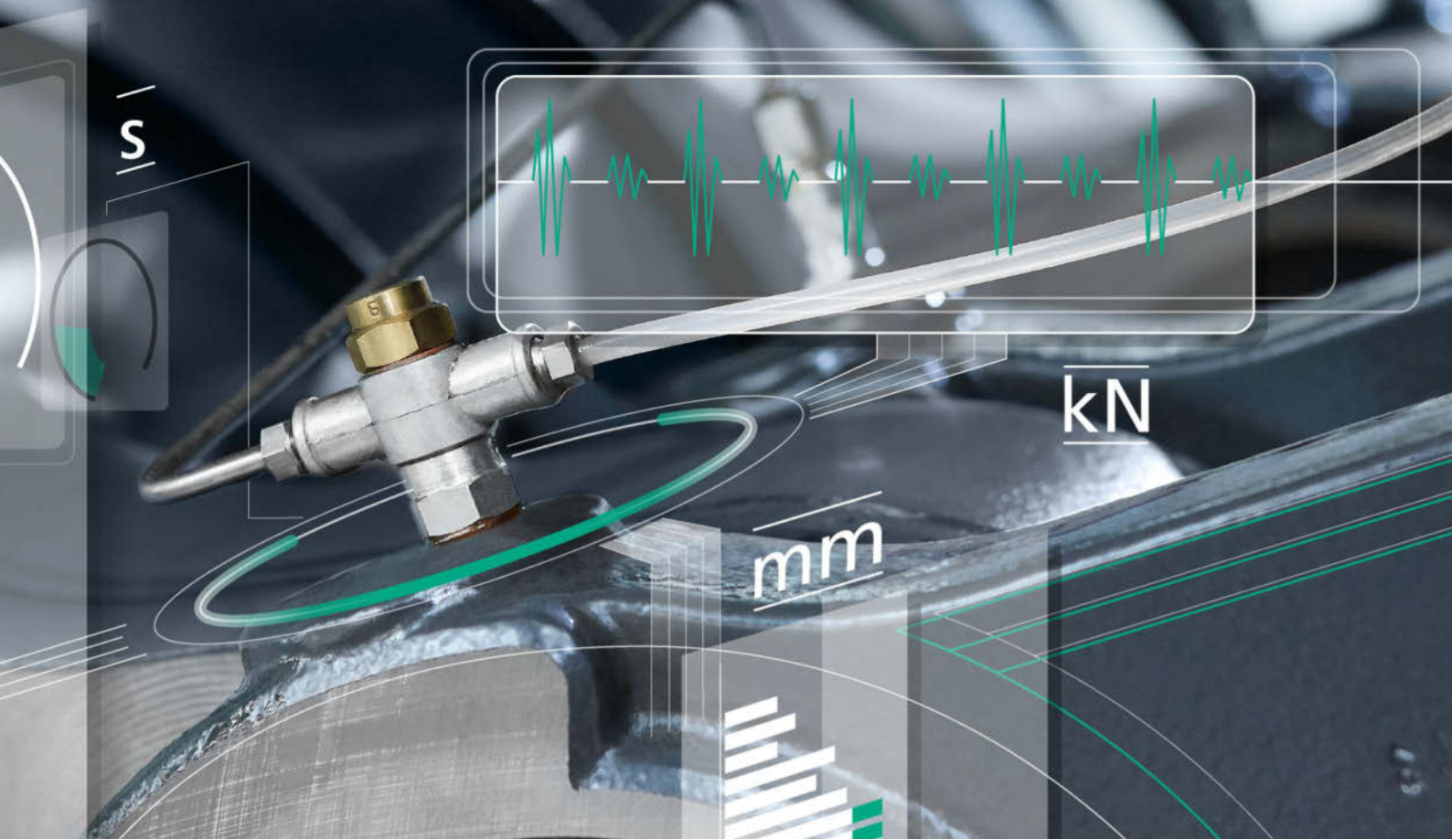
Performance-dependent response:
Lubrication intervals are calculated
automatically.



Quick assistance: Remote access to
machine data via secure data connection.

SMART SERVICES: MONITORING AND ACTING

// Fast and uncomplicated assistance whenever it is required. Smart systems continuously monitor the condition of important machine elements, provide targeted estimates of the service life of wearing parts and simplify the rectification of faults. Comprehensive services, which, like all the products undergo a continuous optimisation process, are a matter of course for us. After all, our machine technology for plastics processing needs to not only convince through top-class functionality, but also through maximum availability. //



Condition monitoring

Greater reliability and fewer unplanned production disruptions: The real-time capable network system of our ALLROUNDERS also enables condition monitoring of the parts. We have installed these, for example, in vacuum generators for robotic systems. This allows us to continuously monitor the evacuation time, pressure drop and switching frequency in order to draw conclusions with regard to leaks, soiling levels and wear on the suction pads, for example.

Predictive maintenance

Reducing maintenance costs: Smart data analyses enable a situation or load-dependent response by the machine control system. For this type of predictive maintenance we have, e.g., optimised the lubrication of our electric toggle-type clamping units. Here, lubrication intervals are no longer simply defined based on the number of cycles, but are individually calculated depending on the set forces, speeds, strokes and times for all applications.

Remote service: ARS

Quickly and efficiently analysing malfunctions and downtimes: ALLROUNDERS can be equipped with a service router, which allows us to access the control system via a secure data connection. You can enable the relevant authorisation as required on a case-by-case basis. The service router thus represents an important diagnostic aid for the ARBURG service and application-technology hotline. This cuts waiting times and saves costs.

i Further information:
Service worldwide brochure



Flexible production:
IT networking is a key prerequisite
for process optimisation.



Transparent production: The part
itself provides information, for
example on its production data.

BEST PRACTICES: DIGITAL POTENTIALS

// This digitisation of the factory will make it possible to integrate processes that respond extremely flexibly to changes and can largely control themselves. This leads to a higher value creation from products. Furthermore, completely new business models can be developed, e.g. through the direct integration of customer wishes. As a technology leader and trendsetter in the plastics industry, we are constantly opening up new horizons in what is technically possible. And we impressively demonstrate this with specific solutions. This means that the associated potential is directly available for you. //

Highlights

- IT-networked process chains
- Integration of customer requirements into production
- Mass customisation in 3D
- Online data acquisition – products with dedicated website in the cloud



Nele





Traceability

Seamless batch tracking from the finished part back to the granulate: To meet the increasing documentation requirements such as those in automotive manufacturing, production and material supply can be synchronised using the ARBURG host computer system ALS.

- Material verification via bar code scanning
- Automatic assignment and documentation of material data to orders – including information on the current batch
- Part identification with process data such as date, order number, material and batch

Individualisation in 3D

From high-volume part to one-off item: To manufacture individualised office scissors, an ALLROUNDER and a freeformer for industrial additive manufacturing are linked by means of automation components and digitally networked – including the direct integration of customer wishes.

- Flexible manufacturing of single-unit batches – without changeovers
- Online order immediately triggers production order
- Individualised lettering is additively applied in 3D using the freeformer
- The scissors become an information carrier by means of a lasered-on DM code

Unique production line:
Automation combines
injection moulding with
additive manufacturing.



Flexible production according to
customer requirements: Product
independently provides the data
for the production process.

WE SHOW YOU WHAT DIGITALISATION CAN ACHIEVE.

Smart products

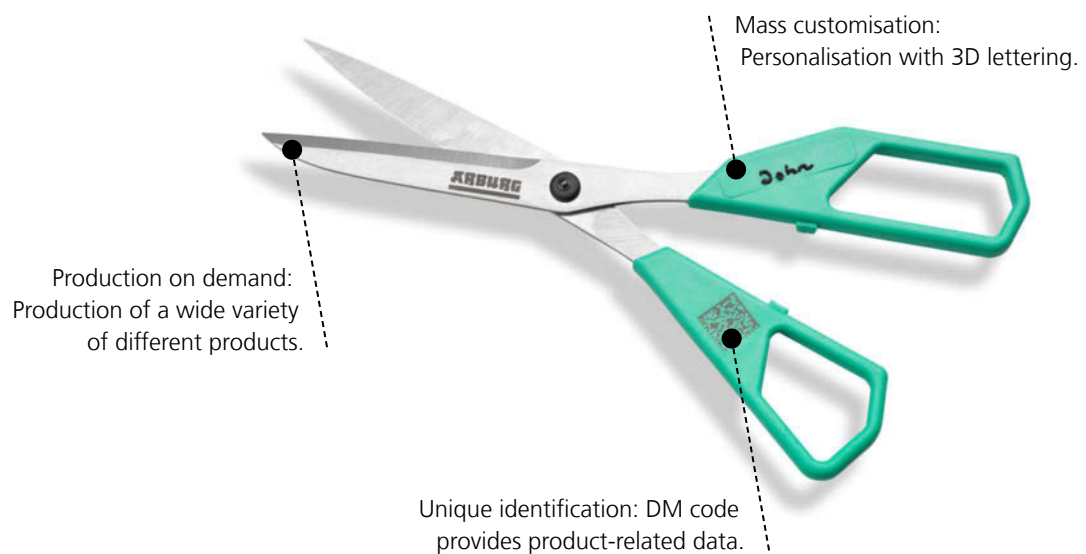
Through integration of a memory chip in luggage tags, the parts themselves become data carriers. They provide all the necessary information to independently control their manufacturing process, while also enabling data-supported actions such as unique identification.

- Electronic calling card as well as data for the manufacturing process are saved on the chip
- “Decentralised production” at different stations that are remote from one another
- Traceability: Production data is captured and transmitted to a web server

Production on demand

High-volume, multi-variant production: In order to produce elastic tension straps, customer requirements are integrated into the running injection moulding process online. In industrial practice, such an application would be ideal for cable assembly in the automotive industry, for example.

- According to customer requirements: Length/colour and ends of the tension strap (hooks or eyes) freely selectable
- Direct process control: The order is transferred to the control system via OPC UA
- Compact turnkey system: Variant changes from shot-to-shot without any changeover





Scan this code to visit our
Media Centre: in-depth,
captivating, entertaining.

ARBURG GmbH + Co KG
Arthur-Hehl-Strasse
72290 Lossburg
Tel.: +49 7446 33-0
www.arburg.com
contact@arburg.com

WIR SIND DA.