

# MICRO- INJECTION MOULDING

Great solutions for small parts

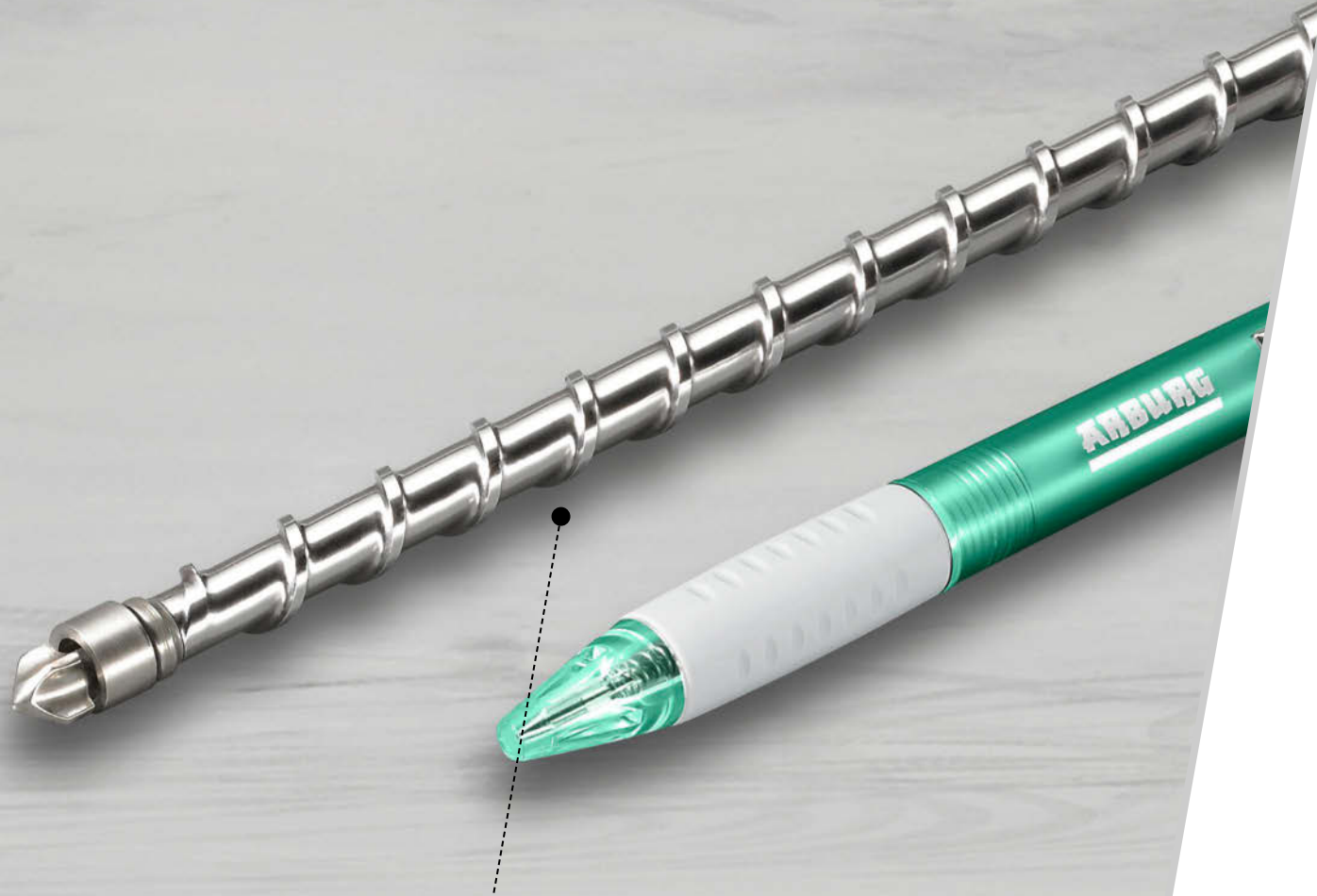
**ARBURG**

# A LOVE OF DETAIL

We deliver greater efficiency:  
Precision production  
of tiny components.

Since we pioneered the injection moulding of small parts in 1954, our expertise in this sector has grown continuously. Today, you in particular benefit from this: Thanks to reliable all-round support and precision technology, the efficient production of high-quality micro components is no longer an issue. We achieve big things on a small scale. That's why you should start small with us in order to win big.

**WIR SIND DA.**



Pioneering technology: Our 8-mm injection screw for extremely small shot weights of less than one gram.

## AT A GLANCE

// Thanks to our modular ALLROUNDER machines, the manufacture of micro components with weights of under one gram is “state of the art”. Furthermore, this is possible in high unit volumes without having to resort to expensive and complicated special machines to achieve homogeneous material preparation and a high level of reproducibility. Your production remains free for a host of other applications. Our offering includes solutions for minute shot weights, through to your customised system solution for micro components. //

### Highlights

- Reproducible injection with position-regulated screw
- Automated turnkey systems
- Size 5 micro injection unit
- Micro injection module for LSR (liquid silicone rubber)

The clean and safe production of tiny parts requires high process stability and control. Our machine control system is ideal for the task: Adaptive position-controlled injection for constant shot weights. Targeted process optimisation via mould signals. Peripherals fully integrated in quality monitoring – no problem! That's because we enable you to work in a reproducible way. In absolutely every respect.


We combine standard hydraulic and electrical machines with optimised injection units to achieve cost-effective and reliable technology for micro applications. To ensure high processing quality, we rely on the proven screw-piston principle throughout, including on our micro injection modules, which operate with an 8 mm screw during injection.

We have grown up with the injection moulding of small plastic parts. Benefit from our unique knowledge across the entire value chain: From individual machine specifications and detailed process technology consulting through to assistance with moulded part design and mould configuration. From stand-alone machines to turnkey systems. Technology that is always perfectly tailored to your needs.



<ul style="list-style-type: none"> <li>■ First-in-first-out thanks to screw/piston principle</li> </ul>	<ul style="list-style-type: none"> <li>■ Reproducible, position-regulated injection (servo-electric or hydraulic)</li> </ul>
<ul style="list-style-type: none"> <li>■ 15-mm screw*</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> 12-mm screw for micro-granulates*</li> </ul>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Size 5 micro injection unit</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Integrated accessories such as robotic systems, clean room modules and ionisation systems</li> </ul>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Micro injection modules with 8 mm injection screw*</li> </ul>	

■ Standard      □ Option

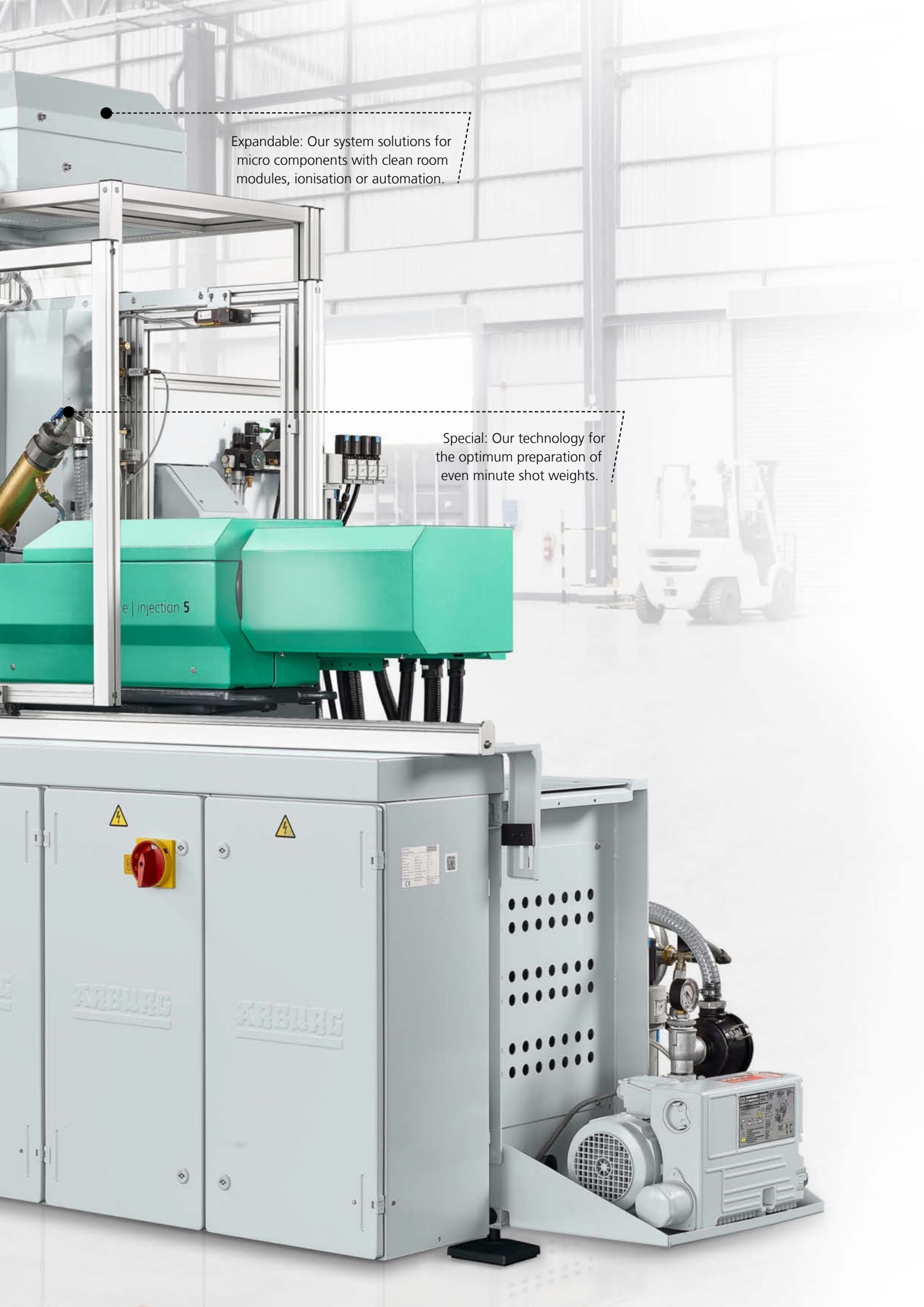


Universal: Our precision ALLROUNDERS are also the perfect choice for micro injection moulding.

## PERFECT SOLUTION FOR SMALL PARTS

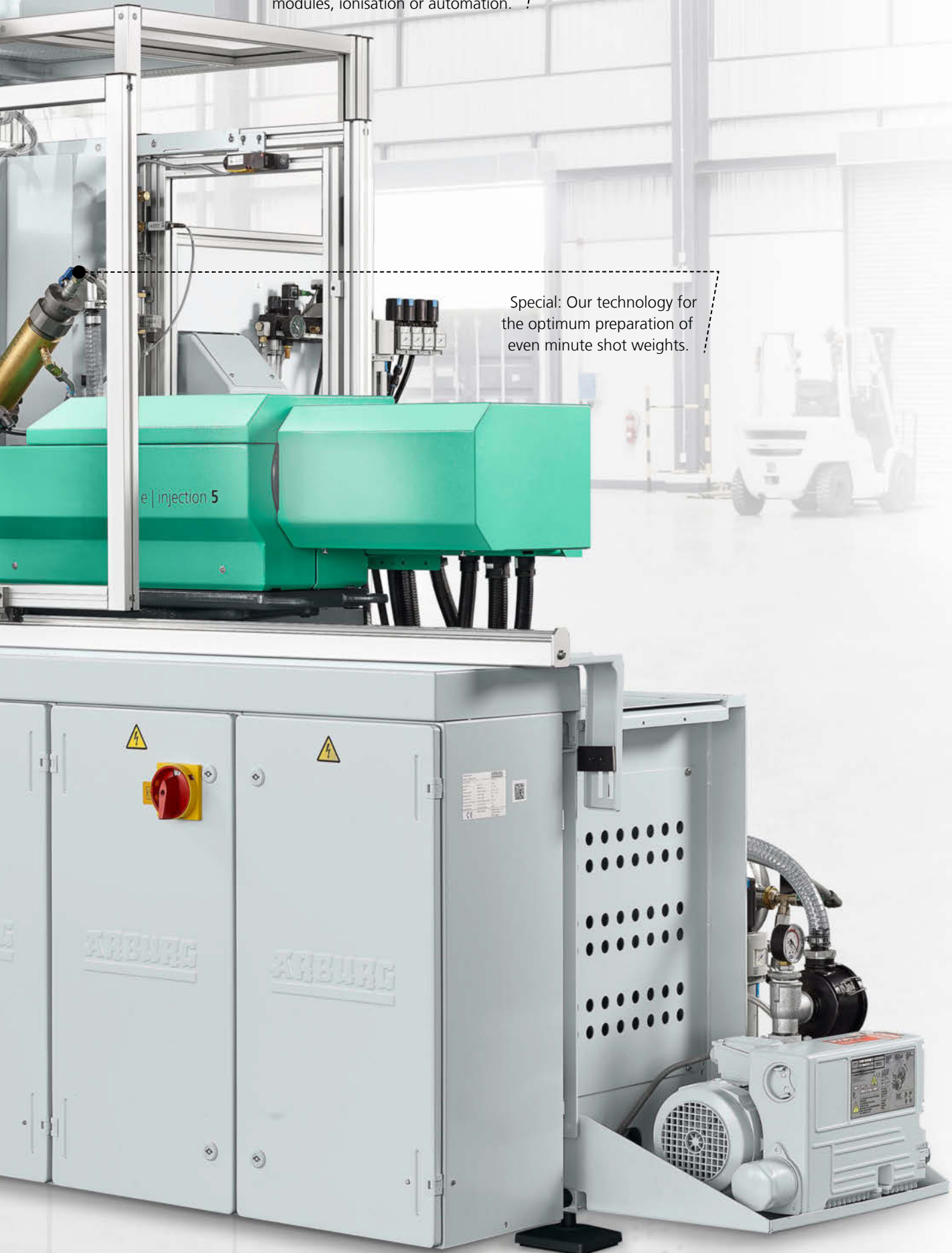
// These days, when it comes to the injection moulding of small parts, details and tolerances are always within the micron range. Especially when it comes to the production of micro components, your choice of machine technology depends primarily on the shot weight of the items to be manufactured and the type of sprue and runner system. Extremely small part weights can be realised via adapted, but always cost-effective, standard machine technology. This means you can also produce micro components at a lower cost. But you will be familiar with such production efficiency from us. //





Expandable: Our system solutions for micro components with clean room modules, ionisation or automation.

Special: Our technology for the optimum preparation of even minute shot weights.





## Production: Ambitious

Often smaller than a single grain of granulate: Micro components place by far the most stringent demands on the technology:

- Homogeneous material preparation
- Short dwell times and low shear stress on the melt ("first-in-first-out" principle)
- Precision injection of minute shot weights
- Short flow paths to avoid unnecessary pressure losses
- Reliable removal with robotic systems.

A precisely configured mould is of at least equal importance. This is particularly the case when it comes to the perfect moulding of micro structures.

Reliable evacuation of cavities, as well as dynamic temperature control, are key factors for ensuring a highly dependable process here.



## WIDE RANGE OF APPLICATIONS

Micro components	Part weight < 1 g
Micro-structural components	Structures < 10 µm
Micro precision components	Tolerances < 10 µm



## ALLROUNDER: Standard

The high demands placed on the high-quality production of micro components are met by our precisely controllable hydraulic and electric standard machines:

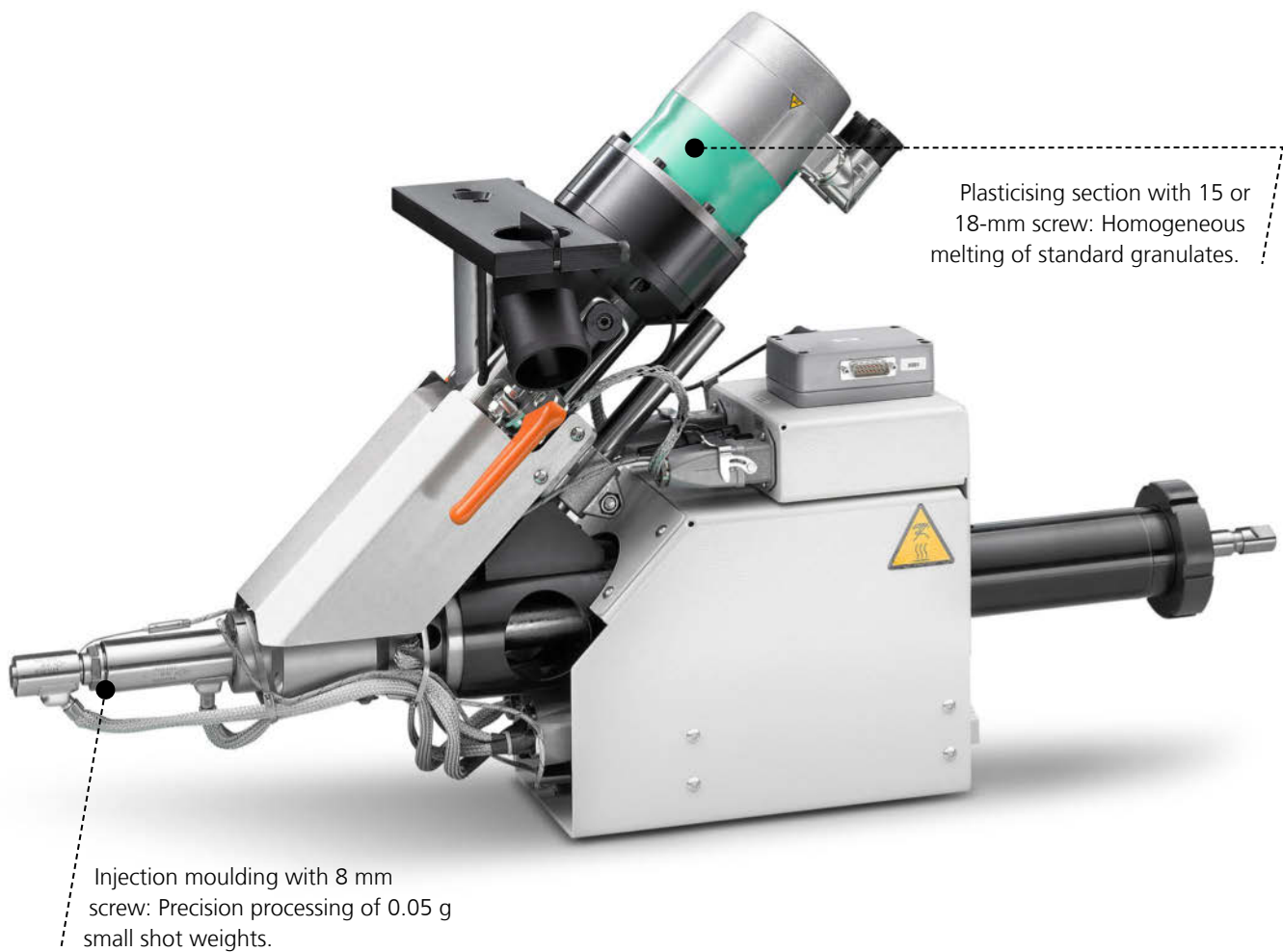
- Position-controlled injection moulding with high dynamics
- Rigid clamping units with three-platen technology and four-tie-bar guidance
- Wide range of equipment and configuration options, e.g. for clean room technology

## Plasticising: Optimised

You need to dose and inject extremely small quantities of melt with high precision? We always use screw/piston-type injection units, which process the granulate according to the first-in-first-out principle. Our range includes screws with diameters of between 15 mm and 8 mm. The geometries are adapted to short and precise travel of the non-return valve. A number of different versions, for example for abrasive materials, ensure a high degree of wear protection.

SCREW	mm	15	12	8
Shot weight	min. g PS	0.5	0.3	0.05
	max.g PS	9.5	6.0	2.3
Displacement distance of the screw (at 0.5 cm <sup>3</sup> shot volume)	mm	2.8	4.4	10





## FIRST-IN-FIRST-OUT FOR SMALL VOLUMES

// Homogeneous melt preparation, long dwell times and an extremely small displacement of the screw – these are the issues that can occur with shot weights of less than one gram. However, our micro injection unit and micro injection modules also offer you a practical solution here. A two-screw combination means that the entire range of plastics for micro injection moulding is available to you, without having to worry about compromising on precision or part quality. //

## 8-mm injection screw

With our micro injection modules, the melt is pressure-controlled and is continuously fed from the material feed to the tip of the injection screw. First of all, a plasticising section featuring a 15 or 18 mm screw ensures the optimum preparation of all standard granulates. The molten material then passes into the 8 mm injection screw through pressurised flow. The screw has a conveying function only and operates with a non-return valve based on the screw-piston principle.

## Homogeneous preparation

Process reliability and reproducibility:  
The micro injection module and micro injection unit operate precisely as you want for producing your micro components.

- The larger displacement of the 8 mm screw makes it possible to implement minute shot weights with great precision.
- Moreover, the dwell time of the plastic can be kept to a minimum.
- Provision of new, homogeneously processed material for each shot.
- Achieve high filling dynamics.

This is the only way to achieve high quality workmanship based on the first-in-first-out principle - with all commonly used plastics!

  
**SMALLER  
THAN GRANULATE**  
The micro-injection module and unit  
operate in a highly reproducible manner

Unique: LSR micro injection module with cartridge for pre-mixed material.



Flexible: special micro injection module for injection unit 70 can be replaced with a standard cylinder module.



# CONTROL SYSTEM: SMART

// Maintaining control over the machine, mould, robotic technology and peripheral technology requires a suitably powerful central control system. This calls for smart technology that offers extensive data integration options, monitors and adaptively controls your process, and supports you in every operating situation.

All the features of our SELOGICA and GESTICA control systems are designed for a fast, secure and convenient set-up and operating process. This allows you to get the best out of all your applications. //

## Highlights

- SELOGICA and GESTICA – fully compatible
- Graphic sequence programming
- Real-time plausibility check
- Assistance packages and connectivity modules – ready for digitalisation
- Central control system for complete production cells

**i** Further information:  
SELOGICA and GESTICA brochure



## Optimum process control

Whether you want uniform melt conveyance, reproducible mould filling or stable processing temperatures: The machine control system ensures precision in every project phase, e.g. with

- Special dosing control with micro injection module and unit
- Dynamic position regulation of the screw movements
- Adaptive temperature control

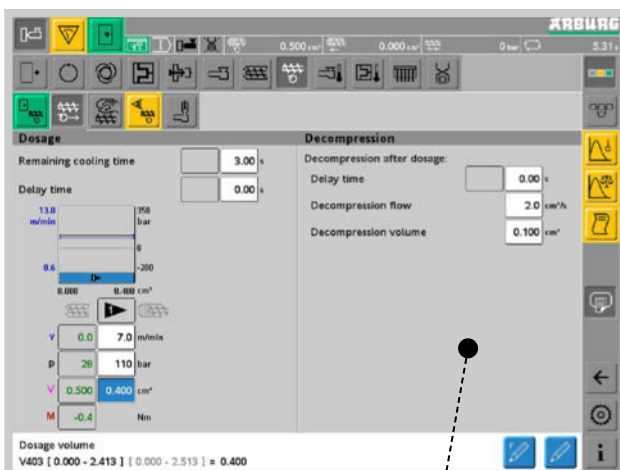
## Flexible processes

Mould, robot or peripheral equipment functions: All processes can be freely programmed and centrally monitored, depending on or in synchrony with machine movements.

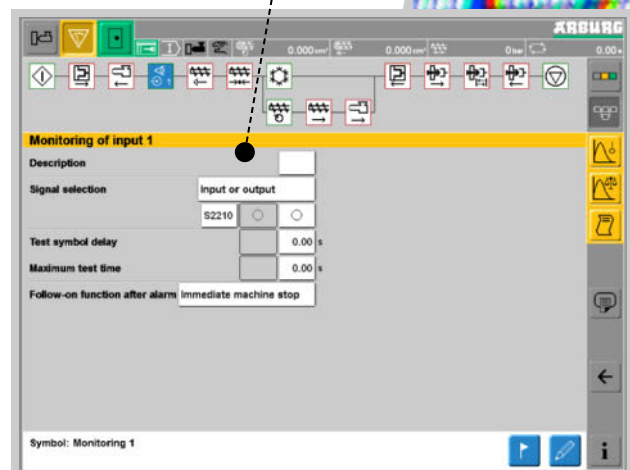
## Reliable quality

Our machine control system enables freely selectable signals to be monitored in detail. This means that the flow volumes of temperature control devices, for example, as well as the compressed air or water supply of the ALLROUNDER machines can be checked. The follow-on functions can also be flexibly adjusted. Thus, depending on the event, stopping can take place immediately, after the end of cooling or at the end of the cycle. The cycle can also be ended without production of a moulded part. All in all, this means maximum process reliability for you.

Individual: Process control depending on signals, e.g. start of injection depending on mould temperature.



Special: Dosage control ensures constant injection conditions with a micro injection module and unit.





# APPLICATIONS: IN PRACTICE

// Freedom of design, large choice of materials and cost-effective production process: The miniaturisation of components can be implemented efficiently with injection moulding. In addition to our sophisticated and innovative technology, you can also rely on our extensive expertise in application technology. Whenever you need it. An individual approach for the best, cost-efficient solutions. //

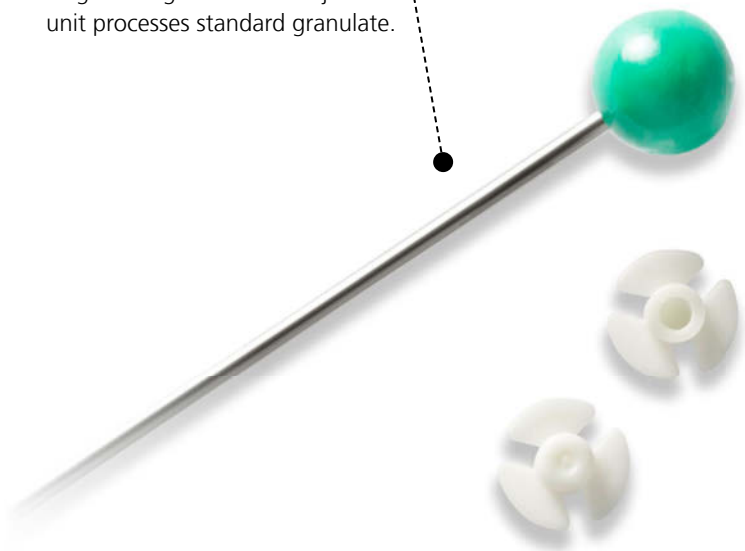
Utmost precision: Injection moulding of ceramic ferrules with  $\pm 10 \mu\text{m}$  to meet the sharpest of tolerances.



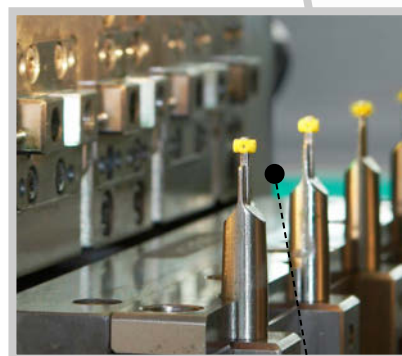
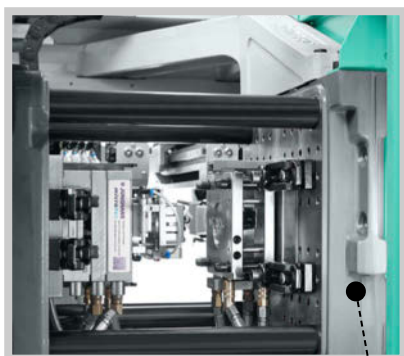
Individual system solution:  
Smooth high-volume production  
with adapted automation.

Further information:  
Application expertise brochure  
Turnkey projects brochure

Micro counter wheels, each weighing 0.004 grams: Micro injection unit processes standard granulate.



Clean medical technology: Micro-fluid chip laboratory for diagnostics in a clean room environment.



Flexible machine technology:  
Plenty of scope for meeting every requirement.

ARBURG standard: 15-mm screw covers many requirements, e.g. assembly injection moulding of articulated joints.



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**WIR SIND DA.**