Flexible During Ramp-Up. Reliable in Series Production.

From initial ramp-up to stable high-volume manufacturing: How electronics dispensing and potting processes can achieve both scalability and consistent quality.

Electronics only demonstrate their full performance under real-world operating conditions. Mobile control units and displays in particular are continuously exposed to mechanical stress, temperature fluctuations, and challenging environmental conditions.

ifm ecomatic gmbh in Kressbronn, a specialized subsidiary of the ifm Group, develops and manufactures innovative automation and control technologies, helping to drive the digitalization of mobile machinery and equipment. To ensure long-term reliability, critical production processes such as potting, bonding, dispensing, and thermal management play a key role. Sealing performance, heat dissipation, and long-term stability must be reliably maintained throughout the product lifecycle.

To meet these requirements both economically and technologically, ifm scales its manufacturing strategy according to the project phase, from flexible ramp-up support to full series production.

On the one hand, ifm relies on high-quality Atlas Copco Scheugenpflug equipment in its own production facilities. On the other hand, demand-driven subcontract potting services provided by Dipotec complement its in-house manufacturing capacity.

While in-house dispensing and potting systems ensure reliable and stable processes in series production, the

ifm ecomatic GmbH, headquartered in Kressbronn on Lake Constance, Germany, is a subsidiary of the globally active ifm group of companies. The company specializes in the development, manufacture, and distribution of control and monitoring systems, as well as mobile controller platforms for automation and machinery applications.

success of new products at ifm often begins in a much more flexible way. Most customers are OEMs with their own product development and production cycles. As a result, the transition to high production volumes often takes several months until the customer incorporates the product into its own series manufacturing.

Flexibility in Early Project Phases

During the ramp-up of new products, Dipotec plays a key role as a specialized subcontracted potting partner for prototypes, pre-series production and small series, enabling customers to respond flexibly to changing requirements before full-scale production begins.

“We were looking for subcontracted potting services to test new materials and support the ramp-up of our new product. At the initially low production volumes, investing in our own system was not yet economically viable,”
explains Lothar Gschwind, Industrial Engineer at ifm ecomatic.

Particularly with new applications, the actual interaction between a potting material and the component often only becomes apparent during production. During the prototype and pre-series phase at Dipotec, the material was changed, the process optimized, and the application tested under realistic production conditions to prepare for subsequent series manufacturing.

“A highly professional collaboration from all parties involved,”
summarizes Lothar Gschwind, referring to the close cooperation between himself, Alessandro Vogl, Technical Expert at Dipotec, and Sebastian Schmitt, Electronics Dispensing Expert at Atlas Copco.

Supporting product ramp-up through subcontracted potting: Leo Gindele and Lothar Gschwind from ifm ecomatic review vacuum-potted I/O modules for mobile machinery together with Alessandro Vogl from Dipotec.

Seamless Transition to Series Production

Subcontracted potting of medical sensors from ifm electronic (Tettnang) at Dipotec.

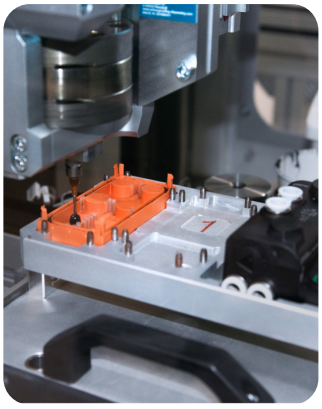
As demand continues to grow, the next milestone is the implementation of an in-house dispensing and potting solution.

“In this particular project, we worked with Dipotec throughout the ramp-up for more than two years. We have now reached a production volume that makes investing in our own dispensing and potting system worthwhile,”
explains Lothar Gschwind.

Stable Processes for Demanding Applications

In series production, dispensing and potting systems play a critical role in the potting of electronic control units. Dispensing cells and vacuum potting systems from the Atlas Copco Scheugenpflug product line enable reproducible, automated processes for bonding displays, applying gap fillers for thermal management, and potting sensitive electronic assemblies.

At the Kressbronn facility, these processes are supported by systems for bonding interface modules, several gap-filler applications for controllers and displays, as well as two vacuum potting systems.



Application of adhesive in the production of interface modules at ifm using an Atlas Copco CNCell multifunctional dispensing cell.

Handling Product Variants in Automated Potting Processes

Vacuum potting of various control unit variants in an Atlas Copco vacuum potting system at ifm‘s Kressbronn facility.

The VDS Universal vacuum potting system is equipped with a volumetric, alternating piston dispensing head as well as integrated needle measurement and scanning technology, enabling the precise potting of varying material volumes. Potting quantities can be flexibly adapted to different product families. Material preparation is handled by a LiquiPrep LP804 system with a 200-liter agitator station.

Reliable Gap Filler Application Through Automation

Gap filler application is carried out using a CNCell multifunctional dispensing cell featuring a CNC-controlled axis system, multiple part programs, and comprehensive process monitoring. The system includes an electronic weighing cell, laser measurement for routine needle inspection, a camera system for reading 2D codes on PCBs, and an ifm signal tower. Together, these features ensure reliable and repeatable application processes, which are essential for the thermal management of high-performance control units.

“For us, process reliability through automation is the key priority,”
explains Tim Roth, Head of Industrial Engineering at ifm ecomatic.
“Only in this way can we consistently ensure the required quality over long product life cycles.”

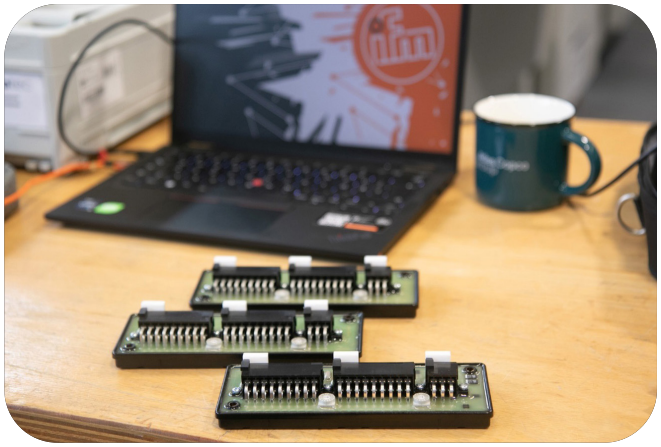
According to Leo Gindele, Industrial Engineer at the Kressbronn site, the intuitive UViS 5 visualization and operator interface (HMI) is an additional advantage.
“It enables the rapid programming of dispensing and potting processes while providing access to all process-relevant data at a glance.”

Scaling as Needed

Modern production systems, new facilities and new controller generations continue to drive the growth of ifm ecomatic. For its controller business, ifm uses subcontracted potting specifically for prototypes and production ramp-up phases. During the introduction of new products, subcontracted potting provides the flexibility required to respond quickly to changing demand. ifm leverages this flexibility to accelerate time-to-market, reduce risk and establish an economically efficient route into series production.

The close collaboration between Atlas Copco Scheugenpflug and Dipotec ensures a seamless transfer of process knowledge throughout every stage of the product lifecycle. Rather than being lost between development, ramp-up and series production, expertise continues to grow with each project phase.

At the nearby ifm site in Tettnang, where sensors are developed and manufactured, sensor potting has in some cases been outsourced alongside in-house production for many years. Small production batches deliberately remain with an external potting partner to optimize costs and maintain flexibility in responding to fluctuations in demand.



Vacuum-potted I/O modules for mobile machinery applications.

Economical at Every Stage

The economic production of high-quality sensors and control units depends on reliable dispensing, bonding and potting processes. Just as important as process quality is the ability to scale capacity according to demand. Flexible during ramp-up, stable in series production.

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