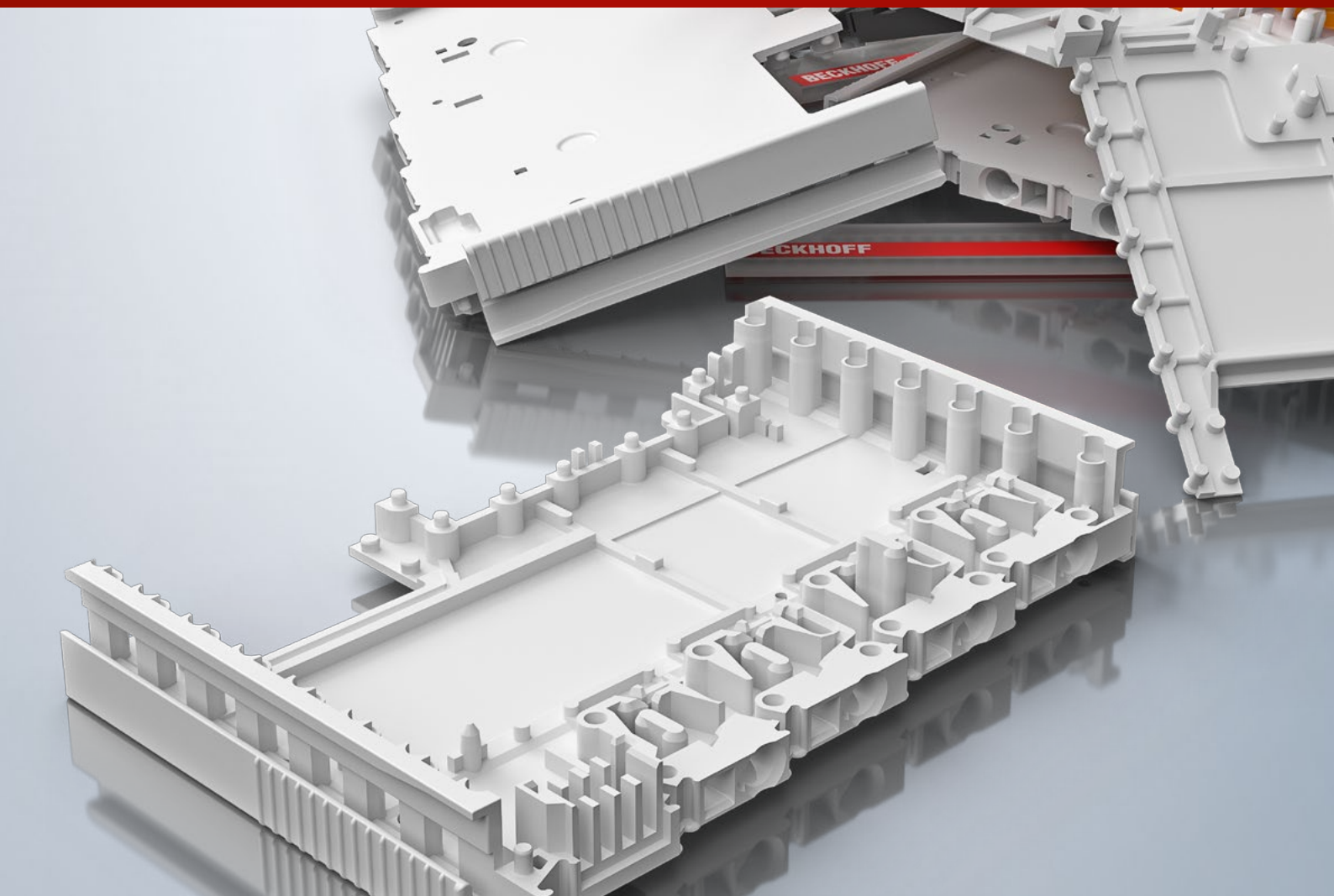
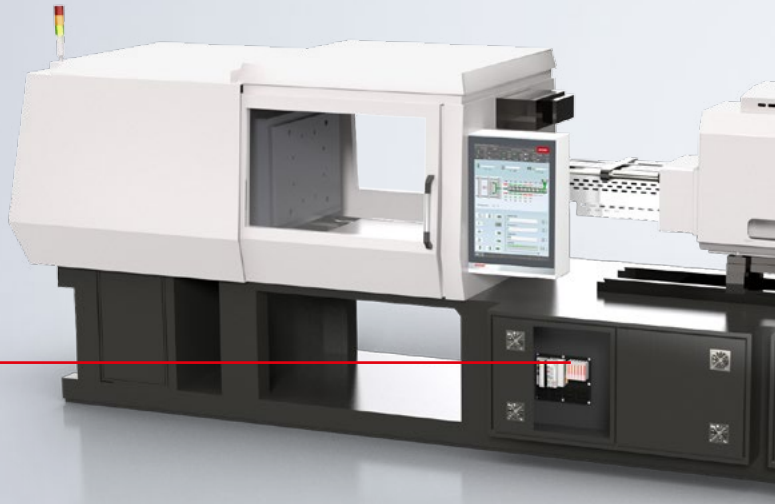
BECKHOFF New Automation Technology

PC-based control for plastics machines



PC-based control optimizes plastics machines

Beckhoff's open PC-based control technology offers comprehensive solutions in various performance classes for all areas of plastics machine automation. Our control system is based on a universal hardware and software platform: It comprises an extensive portfolio of industrial PCs, EtherCAT as a fast communication system, the decentralized I/O modules, scalable drive technology components, and TwinCAT automation software. The latter serves as a software platform for engineering, runtime, and the diagnosis of all control functions: from PLC, motion control, CNC, and robotics to HMI and vision, and from safety and measurement technology to cloud communication and analysis functions. On the one hand, this ensures the efficient interaction of all system components and thus maximum productivity. On the other, special devices can be omitted due to the consistent implementation of all functionalities as software modules. This reduces not only hardware costs, but also lifecycle costs and engineering effort. Through support for the manufacturer-independent Euromap standard based on OPC UA, EtherCAT as a fast fieldbus, and TwinCAT as a universal engineering platform, Beckhoff control technology is suitable for the entire range of plastics machines: Both individual machines and subsystems as well as sophisticated

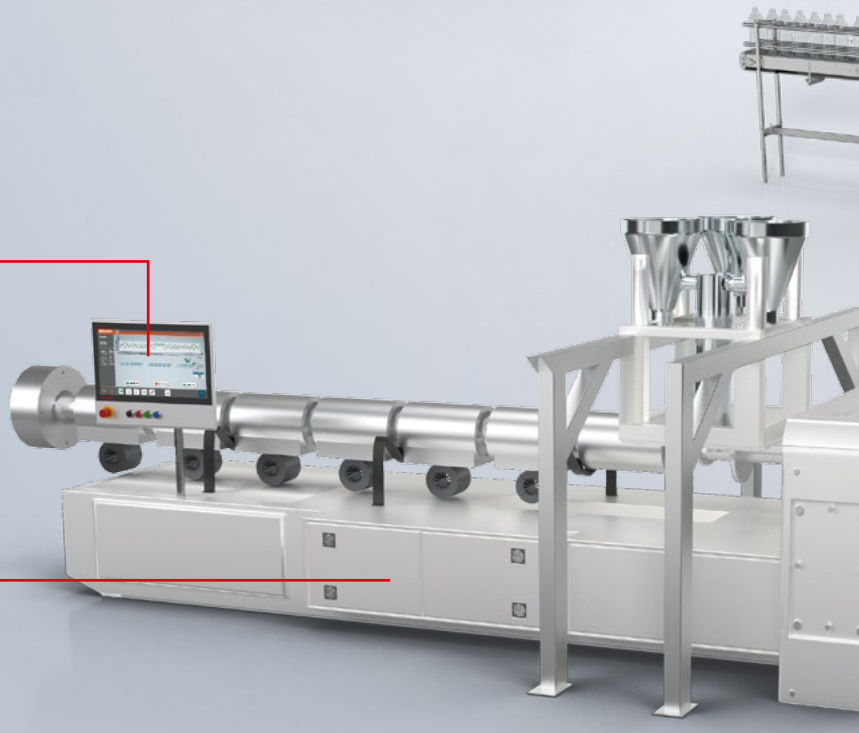


I/O modules on the printed circuit board for high-volume production

Fast servo drive technology

Customer and industry-specific control panels

Energy measuring terminals simplify energy acquisition



production cells can be automated. From individual components to complete solutions, you benefit from our expertise in plastics processing – whether it's for new machine series or retrofitting existing systems.

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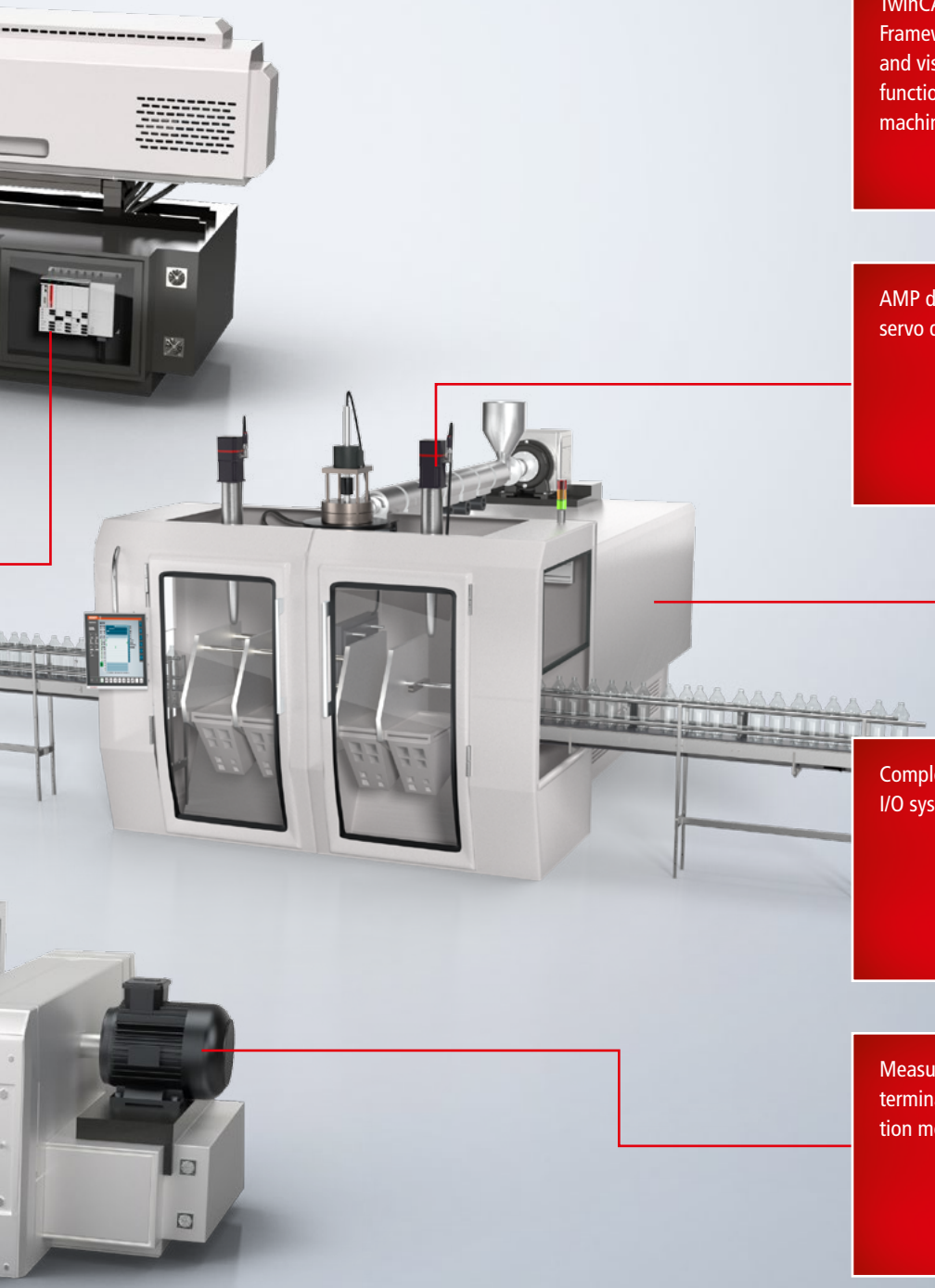
The components for PC-based control: industrial PCs, I/Os, drive technology, and TwinCAT automation software



TwinCAT Plastic Framework controls and visualizes core functions of plastics machines

AMP distributed servo drive system

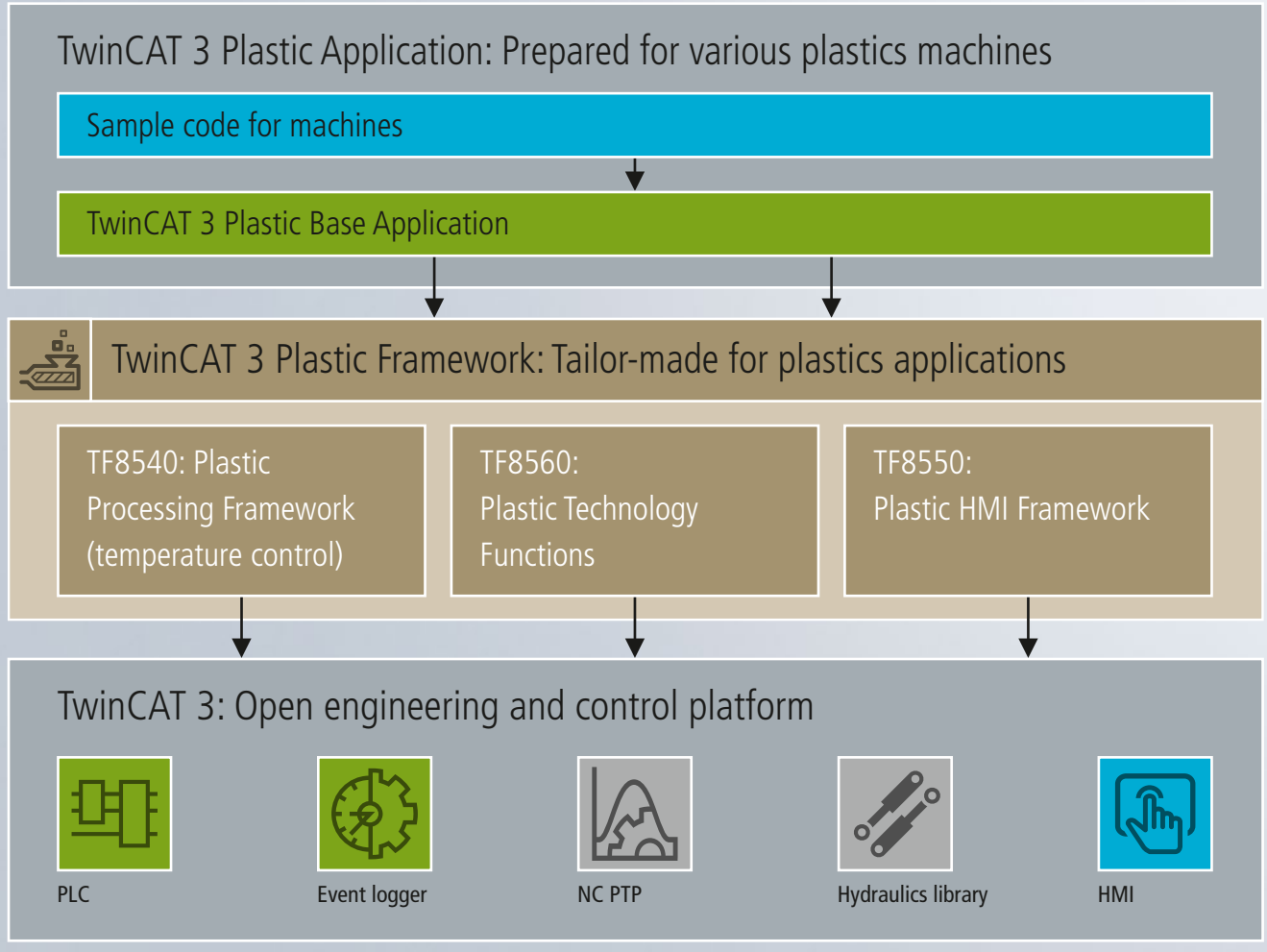
Complete modular I/O system

Measurement terminals for condition monitoring

TwinCAT 3 Plastic Framework

With the TwinCAT 3 Plastic Framework, we offer a modular software solution for the control of plastics machines that minimizes development effort and maintains the open nature of Beckhoff architecture. The TwinCAT 3 Plastic Framework brings together our many years of expertise in plastics, seamlessly integrating important industry-specific control functions into the established TwinCAT Engineering environment. As a result, plastics machines can be programmed, visualized, and controlled on a standardized platform. Thanks to TwinCAT's diverse interfaces, Euromap/OPC UA is also easy to integrate.

The TwinCAT 3 Plastic Framework contains three software libraries: The Plastic Processing Framework (TF8540) enables comprehensive software-based temperature control in plastics processing. With the Plastic Technology Functions (TF8560), a technology package is available that provides all the components for controlling motion functions in plastics machines. The Plastic HMI Framework (TF8550) is a TwinCAT HMI package specially developed for the plastics industry that enables the visualization of typical processes with minimal engineering effort and integrates seamlessly into the other technology packages.



TF8540: Plastic Processing Framework

The result of many years of experience in plastics processing:

- software temperature control supports almost any number of controlled systems
- optimal process adaptation through auto-tuning for thermally coupled heating zones
- intelligent band heater monitoring by current or power measurement with minimized number of sensors

Integrated, application-specific templates and sample code for various plastics applications such as injection molding, blow molding, and extrusion facilitate project planning and programming and are made available free of charge via the TwinCAT 3 Plastic Application. Of course, you can also use templates that are already available in your company and incorporate your own process know-how to program the machine individually or according to customer-specific requirements.

TF8560: Plastic Technology Functions

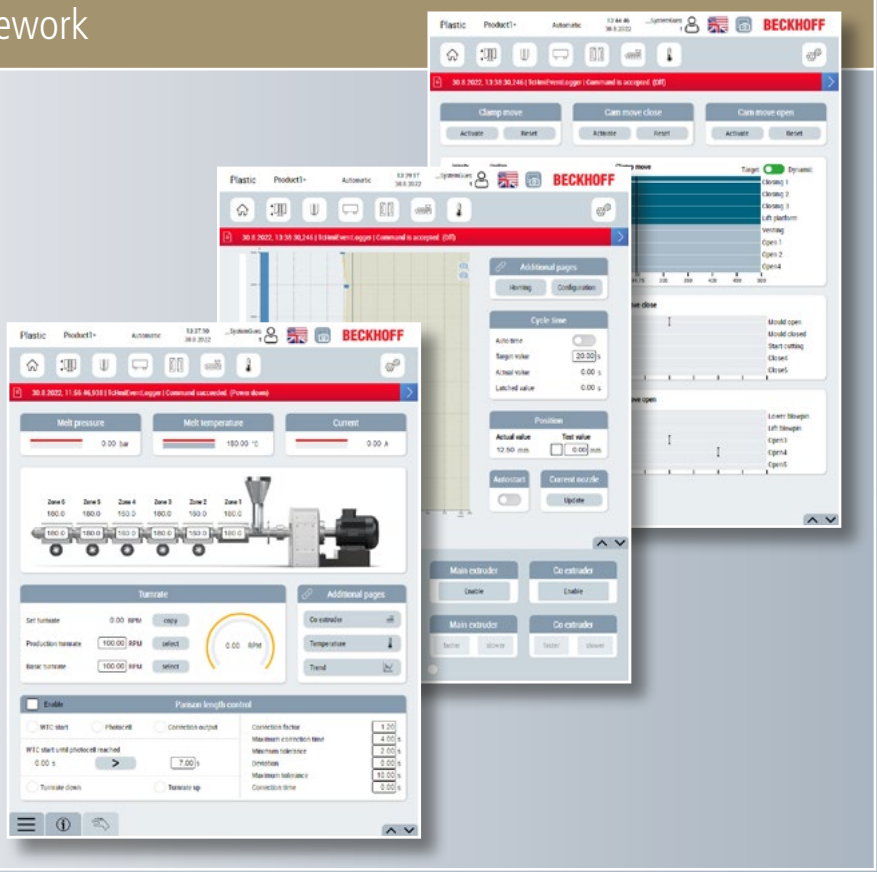
Many years of experience combined in one technology package:

- software system structures can be adapted to machine concept
- reduction of development and commissioning times through pre-developed standard blocks
- field-proven typical motion functions for plastics machines
- software solution independent of the selected drive concept (hydraulic/electric/hybrid)
- intelligent commissioning support for hydraulic axes
- prepared for integrated safety solution with TwinSAFE
- support of virtual commissioning through integrated simulations

TF8550: Plastic HMI Framework

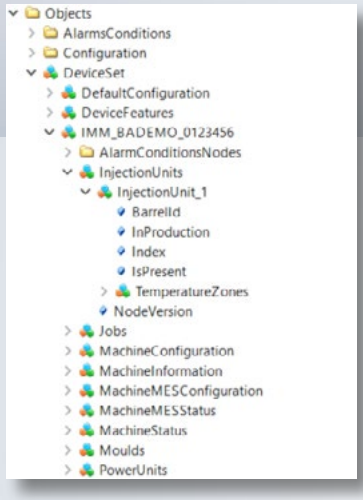
Specially developed TwinCAT HMI package for the plastics industry:

- fully comprehensive HMI application with minimal development effort
- intuitive user interface for the HMI
- wide range of user-friendly functions for specific plastics processes
- interactions and HMI layout based on the requirements of the plastics market
- configurable look and feel for customer-specific HMI brand design

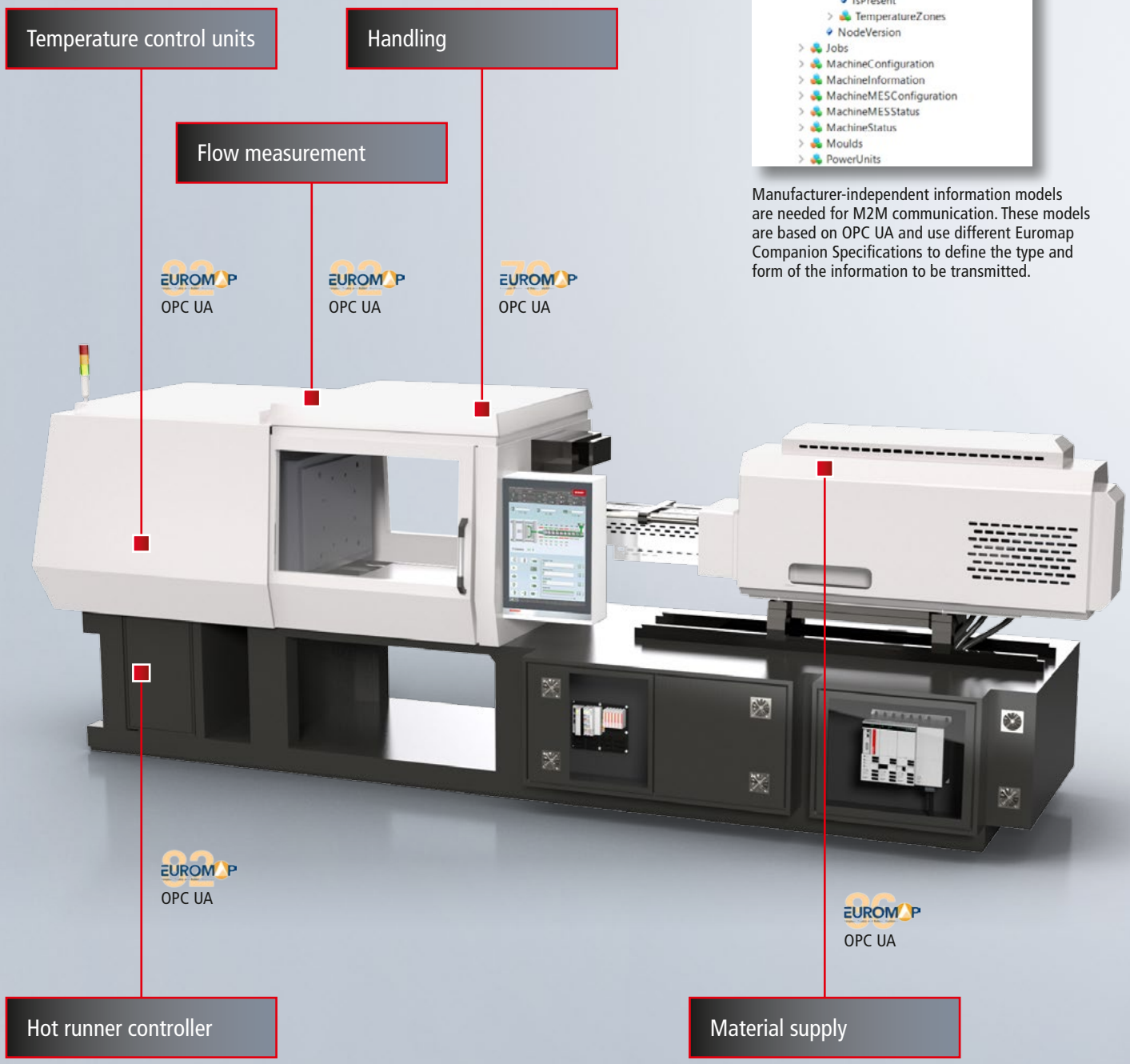


PC-based control integrates Euromap interfaces

As an open automation platform, PC-based control enables seamless integration of Euromap and thus ensures reliable machine-to-machine communication between heterogeneous system parts as well as secure data communication to higher-level systems. As a major supporter of the OPC UA organization, we are committed to open standards and provide corresponding interfaces in our control system as standard. Our customers therefore benefit from a particularly high level of interoperability. We are actively involved in the Companion Specifications for the plastics industry and can therefore promptly integrate new specifications into our products. Euromap 82 provides a standardized M2M interface with which all common peripherals, such as temperature control units and hot runner controllers, can be connected regardless of the manufacturer. For robotics applications, the Euromap 79 interface based on OPC UA (pub/sub) can be used. For the highly precise synchronization of robot and machine, the real-time fieldbus EtherCAT is the suitable alternative.



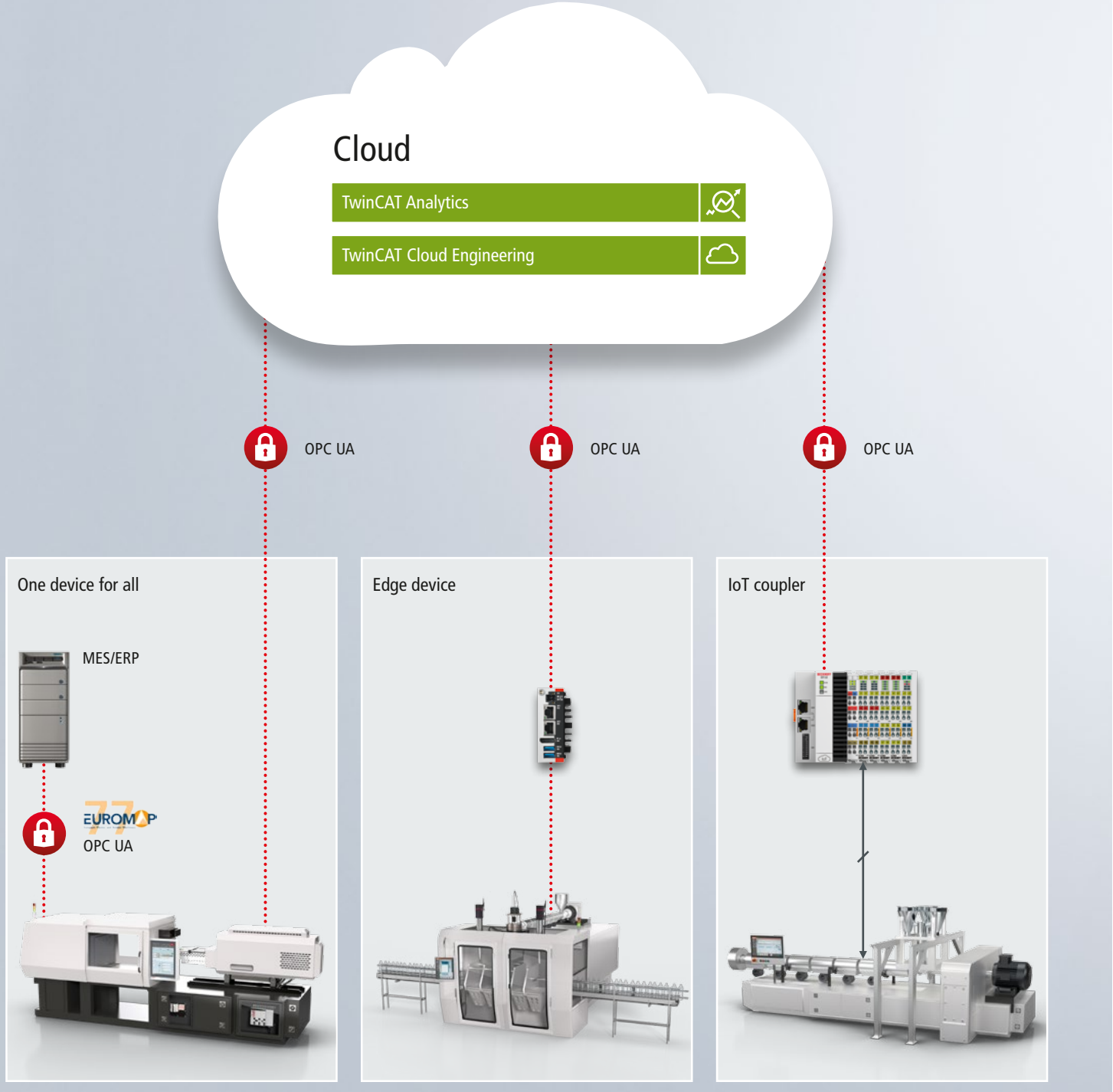
Manufacturer-independent information models are needed for M2M communication. These models are based on OPC UA and use different Euromap Companion Specifications to define the type and form of the information to be transmitted.



Industrie 4.0 for the plastics industry

PC-based control enables IoT scenarios to be implemented easily and safely. Open interfaces, in conjunction with support for all common fieldbus systems and software protocols, enable seamless communication from the field level to the cloud. The TwinCAT IoT software library was developed for secure communication between the machine control system and cloud-based services. It uses standardized protocols, enabling it to also integrate OPC UA-compliant mechanisms. Security mechanisms prevent the misuse of data through unauthorized access and protect your company's intellectual property.

The TwinCAT Analytics software library aggregates process data synchronously with the machine cycle. This data can be used to derive all the necessary information about the manufacturing process and the machine condition in order to optimize production efficiency and energy consumption. Post-mortem analysis, diagnosis of sporadic faults, early detection of quality degradation, and detection of production bottlenecks increase the reliability of your system. TwinCAT Cloud Engineering also allows existing TwinCAT Engineering and Runtime products to be instantiated and used directly in the cloud.



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Secure your advantage in the plastics industry with PC-based control:

▸ **www.beckhoff.com/plastics**

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