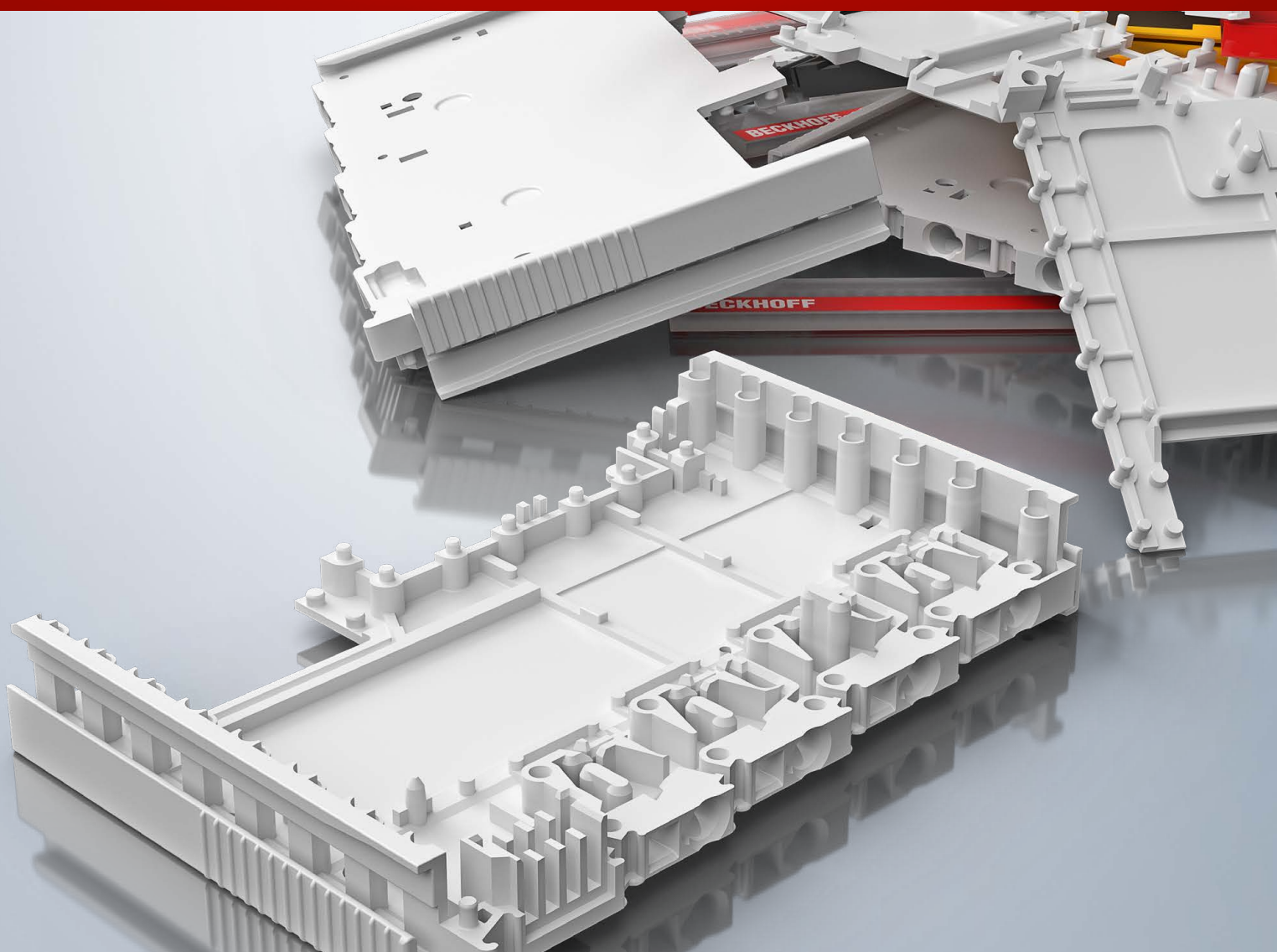


**BECKHOFF** New Automation Technology

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 communi-

cation and analysis functions. This ensures efficient interaction between all system components and thus maximum productivity. Special devices can also 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 work. 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 all types of plastics machines: Both individual machines and subsystems as well as sophisticated production cells can be automated. From

individual components to complete solutions, you benefit from our expertise in plastics processing, whether it's for a new machine series or retrofitting existing systems.

► [www.beckhoff.com/plastic](http://www.beckhoff.com/plastic)



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

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

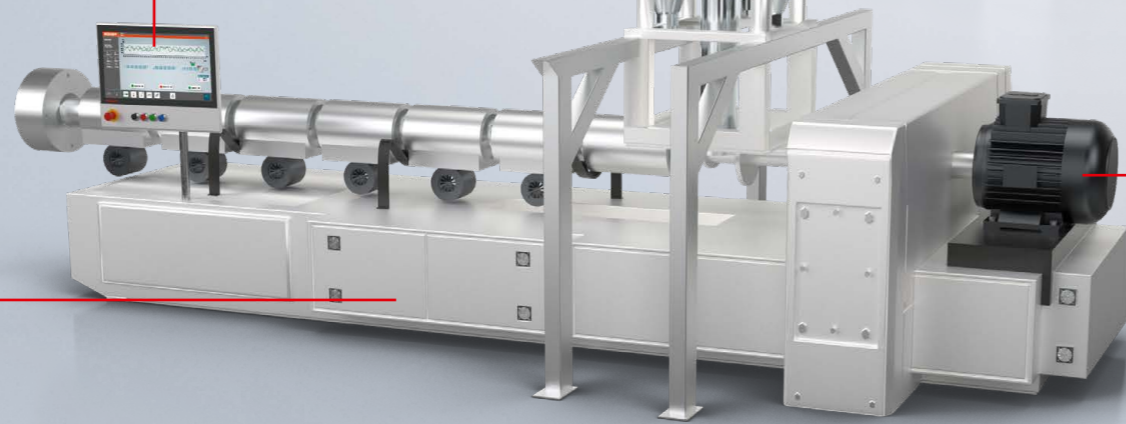


TwinCAT 3 Plastic Framework controls and displays core functions of plastics machines

AMP distributed servo drive system



Complete modular I/O system



Measurement terminals for condition monitoring

# TwinCAT 3 Plastic Framework

The TwinCAT 3 Plastic Framework is a modular software solution for controlling plastics machines and can be used for a wide range of application-specific solutions thanks to its flexible structure. Thanks to the integration of many years of expertise in the field of plastics and industry-specific control functions, the development work for new application solutions is reduced to a minimum. With the TwinCAT Engineering environment, the programming, visualization and control of the machine can be carried out on a standardized platform.

TwinCAT 3 Plastic Framework offers both software packages and application solutions for PLC and HMI which act as a launchpad for developing a specific application solution. The Plastic Processing Framework (TF8540) offers comprehensive software-based temperature control, the Plastic Technology Functions (TF8560) provide motion function blocks and the Plastic HMI Framework (TF8550) consists of elements and functions that allow a machine to be mapped out visually. All software packages are specifically developed for use on plastics machines and can be seamlessly integrated into TwinCAT 3.

The TwinCAT 3 Plastic Application project, consisting of a PLC and HMI, combines all software packages into the ideal application solution for plastics machines. Application-specific templates already included in the HMI project, sample code in the PLC project, and the TwinCAT 3 Plastic Base Application library offer free sample integration and facilitate project planning and programming for various plastic applications. The flexible software architecture allows you to create a customized solution for your company, incorporate your own process expertise and create a unique user interface.



- Panel PC for plastics machines**  
The CP2219-1025-0030 multi-touch built-in Panel PC is the perfect complement to TwinCAT 3 Plastic Framework.
- incremental encoder for manually moving axes and editing the WTC
  - LED status indicator shows the machine status
  - integrated RFID reader for user management
  - Intel® Celeron® G4900 3.1 GHz, 2 cores, 3½-inch motherboard
  - 4 GB DDR4 RAM, expandable to 64 GB
  - 40 GB CFast card, 3D flash
  - USB port, on-board dual Ethernet adapter



## TwinCAT 3 Plastic Application

HMI project:

- web-based user interface (HTML5) with the option of customer-specific design customization, can be extended to mobile devices
- flexible, intuitive user guidance and configuration of user-specific favorite pages
- temperature zone configuration during runtime, recipe management, user management and logging, unit switching
- wall thickness control can be adjusted via multi-touch function (WTC)
- energy measurement for process optimization

PLC project:

- suitable for hydraulic, servo-electric, and hybrid machines
- standardized programming interface that can fit any axis technology and additional axis functionality specifically for plastics processes
- object-oriented programming architecture, can be combined with classic programming languages (e.g. FBD, LAD)
- prepared for Euromap/OPC UA integration

## 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

## 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
- support of virtual commissioning through integrated simulations

## TF8550: Plastic HMI Framework

A TwinCAT HMI package specially developed for the plastics industry:

- a wide range of user-friendly functions, controls, and icons for specific plastics processes
- cuts down on development work with pre-developed, tried-and-tested software modules

### TwinCAT 3 Plastic Application: Prepared for various plastics machines

Sample code for machines

TwinCAT 3 Plastic Base Application

### TwinCAT 3 Plastic Framework: Tailor-made for plastics applications

TF8540: Plastic Processing Framework (temperature control)

TF8560: Plastic Technology Functions

TF8550: Plastic HMI Framework

### TwinCAT 3: Open engineering and control platform



PLC



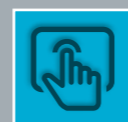
Event logger



NC PTP



Hydraulics library

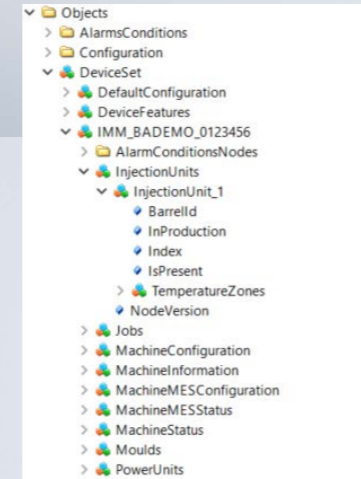


HMI

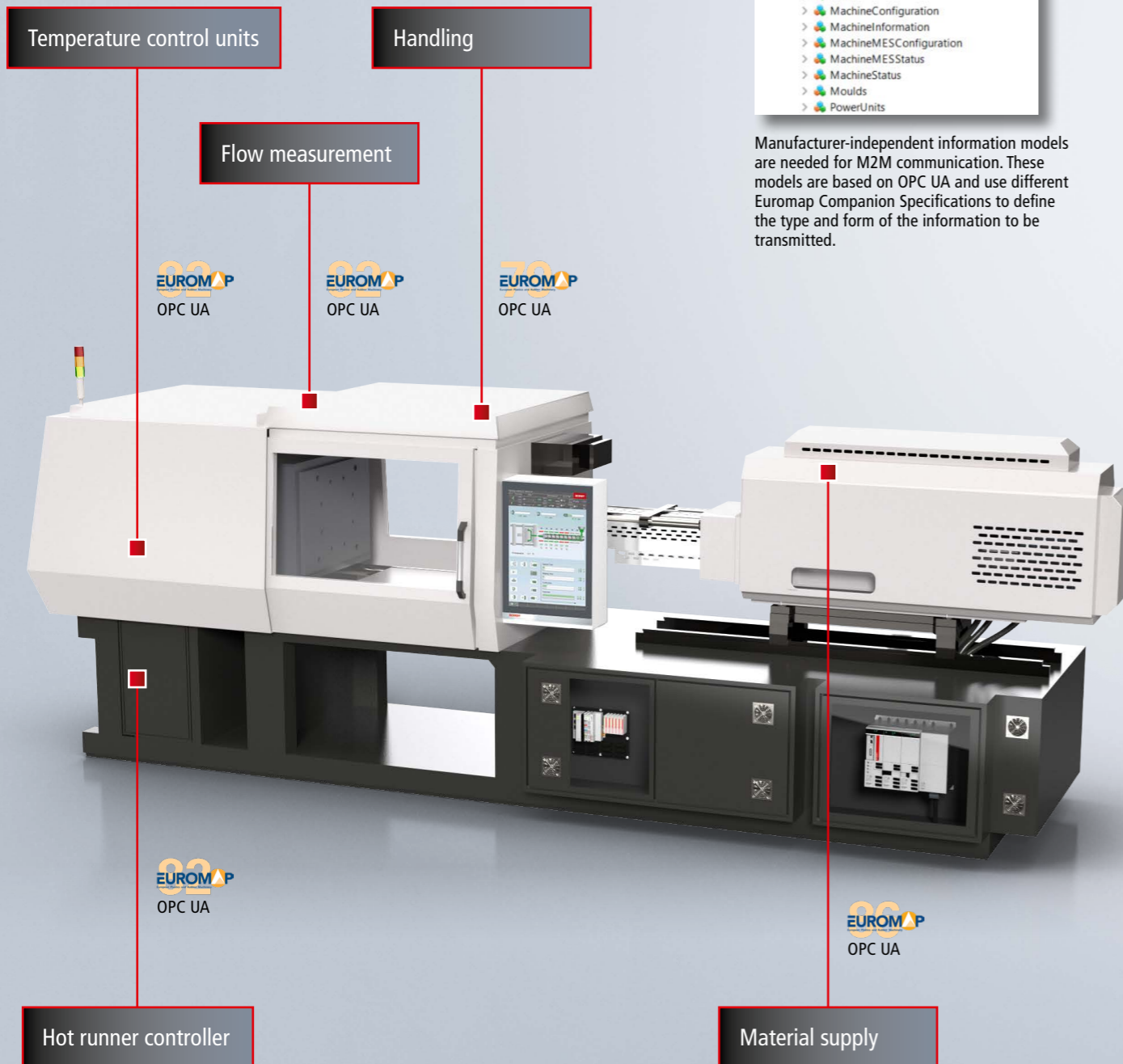
# PC-based control integrates Euromap interfaces

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 the corresponding interfaces in our control system as standard. Our customers therefore benefit from a particularly high level of interoperability. We are actively working on the Companion Specifications for the plastics industry and can therefore promptly integrate new specifications into our products.

Euromap 82 provides a standardized M2M interface that can be used to connect all common peripherals, such as temperature control units and hot runner controllers, regardless of the manufacturer. The Euromap 79 interface based on OPC UA (pub/sub) can be used for robotics applications. The real-time fieldbus EtherCAT is an ideal alternative for highly precise synchronization of robot and machine.



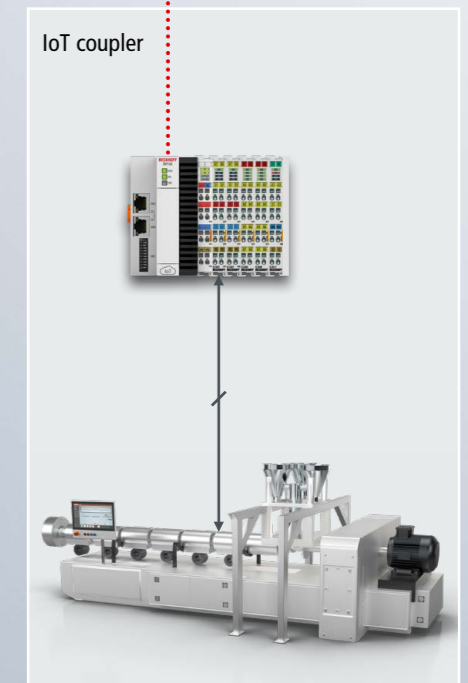
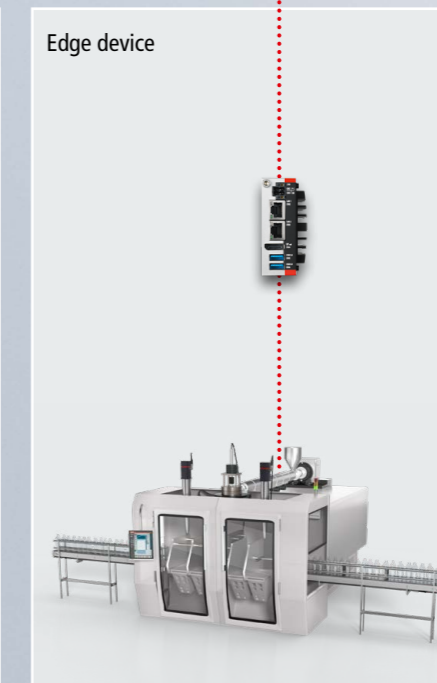
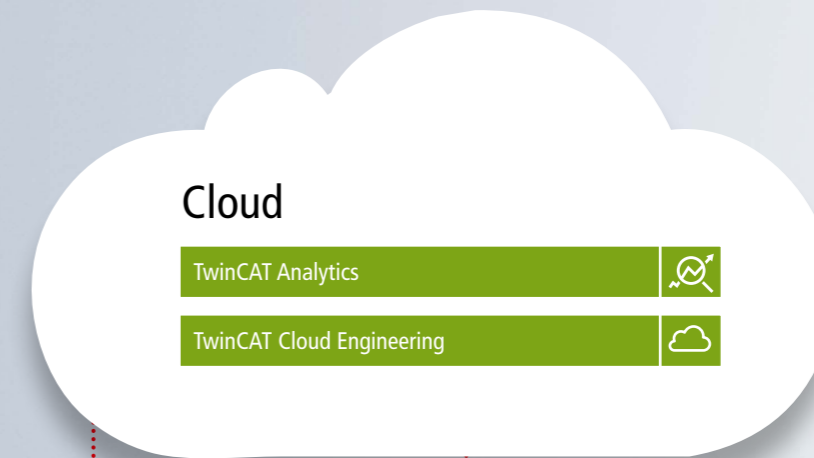
Manufacturer-independent information models are needed for M2M communication. These models are based on OPC UA and use different Euromap Companion Specifications to define the type and form of the information to be transmitted.



# Industry 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 integrate OPC UA-compliant mechanisms too. 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 in sync with the machine cycle. This data can be used to derive all information on the manufacturing process and the machine condition required 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.



## More about Beckhoff



Company



Global presence



Events and dates



Vacancies



Products



Industries



Support

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We reserve the right to make technical changes.