

automation

Ready for advanced system solutions



ENGEL
be the first

The constantly changing needs of the market create increasingly complex challenges for your production. **ENGEL automation** offers solutions that meet your specific automation requirements: from the **standardised production cell** to **customised turn-key solutions**.

ENGEL automation competence: we design and deliver **complete system solutions** – from the injection moulding machine and robot to the **automation peripheral equipment** – with all elements interacting in perfect harmony. You can rely on the highest part quality, stable processes and maximum productivity – be sure that your entire production will run smoothly.

Level I

part removal and deposit

ENGEL automation offers pre-defined compact production cells for simple standard applications. An ENGEL linear robot removes the parts and deposits them within the extended safety gate of the injection moulding machine.

automation components

- ENGEL e-pic or ENGEL viper
- ENGEL conveyor belt

automated functions

- part removal
- depositing



Your benefits

- well-proven ENGEL automation technology
- pre-configured compact manufacturing cells with extended safety gate
- layout and costs of the production cell are readily available
- integrated conveyor belt
- integrated data management & convenient operation with the ENGEL CC300
- CE compliant production cell
- worldwide service support

Level II

compact solutions for individual and simple tasks

ENGEL automation addresses the specific needs of your production when it comes to standard applications. For example, in order for your production cell to deliver optimum results, the end-of-arm tooling is perfectly aligned with your mould and the safety guarding is adjusted to meet the requirements of both your production and local safety standards.

automation components

- ENGEL e-pic
- ENGEL viper
- ENGEL safety systems
- ENGEL grip tools
- ENGEL conveyor systems

automated functions

- inserting
- part removal
- sprue separation
- separating
- depositing



Your benefits

- extensive engineering know-how
- proven standardised components
- layout and costs of the production cell are readily available
- tailor-made end-of-arm tooling
- customised safety guarding
- pre-defined conveyor technology (e.g. sliding tables)
- integrated data management & convenient operation with the CC300
- CE compliant production cell
- worldwide service support

Level

competent automation for complex and challenging tasks

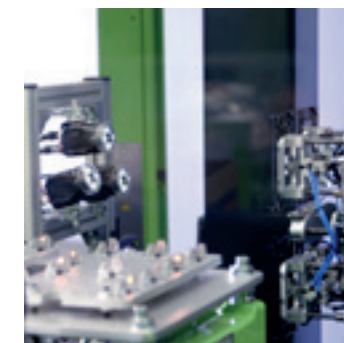
ENGEL automation allows you to perform several production steps in a single manufacturing cell safely and reliably. Thanks to our standardised portfolio of automation products we are able to implement your specific production-related tasks quickly, quickly and cost-effectively.

automation components

- ENGEL viper
- ENGEL easix
- ENGEL conveyor systems
- ENGEL grip tools

automated functions

- feeding
- assembling
- quality testing
- separating
- depositing
- data management



Your benefits

- comprehensive engineering know-how
- customised production cell concept
- proven components
- tailor-made end-of-arm tooling
- innovative assembly and handling technology
- customised conveyor technology
- standardised quality assurance
- integrated data management & convenient operation with the CC300
- CE compliant production cell
- worldwide service support

Level **IV**

everything is possible – turn key solutions

No matter how complex your demands are: ENGEL works with you to develop the most efficient production concept. From initial consulting to implementation and final acceptance we are your competent partner - You can rest assured that your manufacturing cell will master the complex tasks of the production process.

automation components

- ENGEL viper
- ENGEL easix
- ENGEL conveyor systems
- ENGEL grip tools
- processing cells (e.g. easiCell, infrared oven)

possible applications

- pre-forming
- feeding
- isolating
- inserting
- part removal
- sprue separation
- separating
- assembling
- connecting
- quality testing
- marking
- depositing
- buffering



Your benefits

optimum customised plant concept
comprehensive engineering know-how
proven components
simulations, feasibility studies and analysis
tailor-made end-of-arm tooling and end-effector systems
innovative assembly and handling technology
efficient conveyor technology
individual quality inspection
detailed customer specific solutions
integrated data management & convenient operation with the CC300
production cell visualisation
detailed process data documentation
CE compliant production cell
worldwide service support

Fully automatic manufacturing

ENGEL always finds the right solution to perfectly **coordinate and perform all steps** before, during and after the injection moulding process: from the dynamic linear ENGEL viper and e-pic robots and the versatile ENGEL conveyor systems, to the multi-functional six-axis ENGEL easix robot – speed and precision of process is paramount. To compliment our capabilities, we partner with leaders in the field of automation technology providing you with consistently unbeatable levels of manufacturing.

Part removal

Whether an electronic micro part or a large-scale vehicle component: ENGEL automation has the precise and efficient automation solution for the removal of any sized product.

- ENGEL viper
- ENGEL e-pic
- ENGEL easix
- ENGEL grip systems



Sprue handling

ENGEL automation enables the clean and quick handling of sprues:

- ENGEL e-pic
- sprue separation with sprue cutters, ultrasonic & laser technology



Inserting

Whether metal inserts, functional components in electronics or labels in the packaging industry: ENGEL automation allows you to meet the particularly high precision standards both before and during the inserting process. Perfect for:

- metal (screws, sockets, contact plugs ...)
- electronic components (RFID sensors, circuit boards ...)
- in-mould labelling (plastic labels, decorative films ...)
- mould inserts / kernels
- transfer technique for 2C applications



Isolating

Sort, transport or isolate piece by piece:

- vibrating belt conveyor
- step lifting conveyor
- ENGEL conveyor box
- ENGEL conveyor slide
- ENGEL conveyor tray



Assembly

Insert, join, position: ENGEL automation offers perfect solutions for a variety of automatic, semi-automatic or manual operations throughout the production process.



Connecting

Assemble individual components of complex parts securely and permanently by means of screwing, gluing or welding. To achieve optimal results, ENGEL automation ensures the perfect process control of all ENGEL automation ensures perfect process control throughout all stages of production.



Pre-processing

Exceptionally precise preparation:

- pre-heating using infrared heaters, hot air oven or induction furnaces
- plasma treatment
- flame scarfing



Buffering & transporting

Stack and/or transport parts during and after production.

- magazines for nets, films or various inserts
- ENGEL conveyor systems – efficient conveyor systems for perfect part management on the belt, in boxes and on pallets



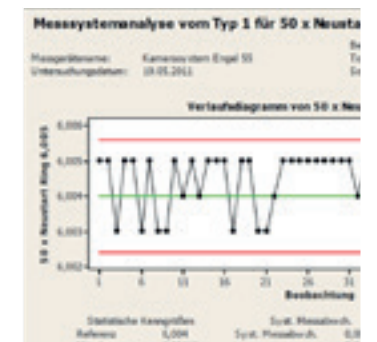
Separating

Sort and advance parts after removal during the production
ENGEL conveyor systems – efficient conveyor belt systems for perfect part handling on the belt, in boxes and on pallets



Validating

- quality assurance (GMP)
- measuring system analysis (MSA)
- feasibility studies
- simulations



Quality testing

- force and distance monitoring
- optical inspection (visual inspection)
- density and temperature check
- electrical test
- function tests



Data management

- storage of all component specific production data
- data tracking for safety-related components
- customer-specific statistics
- interface to customers MDE system



ENGEL **e-pic B**

the dynamic servo-picker

Based on the technology of the proven pick-and-place robot e-pic Z, the e-pic B kinematics. It is in particular an economic choice for the fast removal of sprues, if the parts should be removed manually or fall out of the machine freely. This is an economic solution for the fast removal of sprues of free-falling parts and if the parts are removed manually.

Flexible, strong jib-arm

rotation on the socket possible up to 110°

Low maintenance demand

thanks to no Z-axis

Dynamics and efficiency

light-weight composite construction for high dynamics and efficiency

No machine adaption required for installation

easy installation on machines between 600 and 2,000 kN

User-friendly operation

easy & safe operation thanks to data synchronisation of the RC16 with the IMM (CC300) – no programming skills required



Innovative and unique

fully electric sprue picker

high-speed: removal times below 1 second

thanks to its EM67 interface, the ENGEL e-pic can be used universally

in addition, the EMI allows for high integration in the ENGEL CC300 machine control unit

ENGEL **e-pic Z**

the smart pick & place robot

Simply plug it in, turn it on and get started: the new ENGEL e-pic offers a cost-effective and energy efficient introduction to automation. It ensures you a fast, safe and simple manipulation of the parts and, together with the short intervention times, a trouble-free production process is guaranteed. The added bonus: thanks to its newly developed kinematics, the e-pic is highly compact and can be integrated into the injection moulding machine without taking up much space.

Universally applicable

flexible pick & place robot in fits all machines up to 220 tons

Compact design

can be fully integrated into the injection moulding machine – no control cabinet necessary

Optimum efficiency

economic entry-level model with low investment costs and minimal operating costs

Short cycle times

high performance thanks to optimized weight design and new kinematics

User-friendly operation

easy & safe operation thanks to data synchronisation of the RC16 with the IMM (CC300) – no programming skills required



Stand-alone device with CC300 integration

Thanks to its EM67 interface, the ENGEL e-pic can be used on any machine.

In addition, the EMI allows for high integration in the ENGEL CC300 machine control unit.

ENGEL **viper**

the high-performance linear robot

Benefit from our extensive experience: ENGEL has been building high-performance linear robots since 1980. The ENGEL viper is the perfect compliment to your efficient production cell, and its innovative design gives you improved load-bearing capacity with a low deadweight. Plus, intelligent software packages ensure that all movements are perfectly coordinated.

Increased efficiency

thanks to an innovative multi-dynamic function and the clever iQ vibration control software

Greater convenience

remarkably safe and easy to operate

Low life cycle costs

durable construction combined with efficient software control ensures low maintenance costs

Flexible use

the ENGEL viper can be integrated in ENGEL injection moulding machines or as a stand-alone solution (EM67) for other machine brands

Appropriate sizes

the ENGEL viper is available with a load-bearing capacity range of 6 to 120 kg, sized according to your requirements



multidynamic

top performance & safe operation

the robot's movements adapt to the manipulation weight

iQ vibration control

fast, reliable and precise positioning

In addition to its own oscillations, external interferences are also compensated

efficiency control

less wear, reduced energy consumption and low noise

the movements adapt automatically to the cycle

maintenance control

maximum service-life, no unexpected system downtime and quick troubleshooting

intelligent lubrication and maintenance assistance, graphical diagnostic tools

ENGEL **easix**

the multi-axis robot

Three dimensional movement: The ENGEL easix 6-axis robot and its integrated control unit are ideally equipped for today's current and future tasks, making your production even more efficient. No matter whether you need a particularly flexible automation solution or face special requirements such as cleanroom production.

Easy to operate

thanks to graphical process visualisation, the ENGEL easix can be operated as easily as the ENGEL viper

Integrated system

added safety and convenience with the fully-integrated solution – machine control unit = robot control unit

Broad applications

the ENGEL easix is suitable for injection moulding machines of all sizes

Flexible production

the ENGEL easix can be adapted easily to new production requirements

Perfect for high-speed pick-and-place applications

the easix scara reaches higher speeds in pick & place tasks thanks to its four axis (maximum reach: 400, 600 and 800mm at a maximum load of 7.15kg)



virtual safety zone

for a compact & safe production cell

integrated safety controls

no hardware required

conforms to safety standards

ENGEL easiCell

the flexible and modular production cell

The standardised, but modular design concept of the easiCell allows simple integration of robots and equipment units for pre- and post injection moulding process steps, like laser machining. These production cell components can be quickly replaced with other units. Such components can be removed from the machine fast if other units are required. Long downtimes (for example for production changes) therefore are a thing of the past.

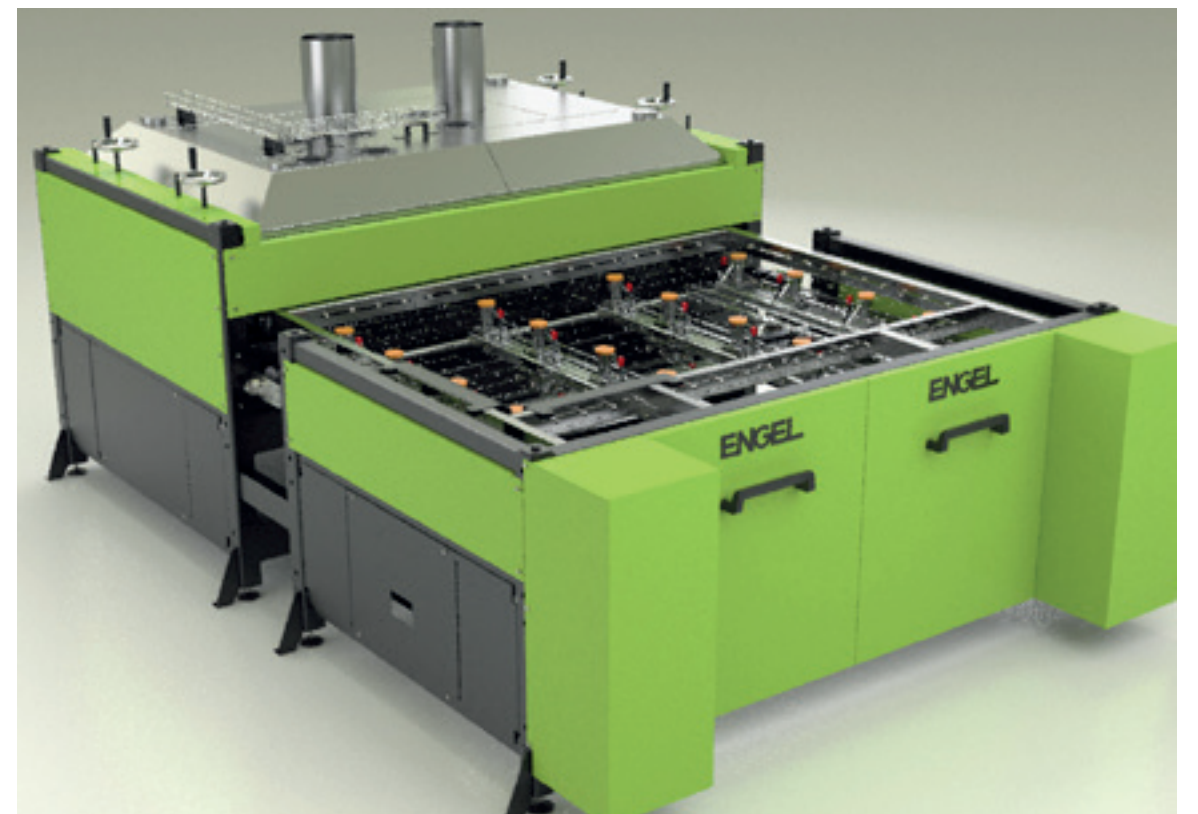


ENGEL Infrared Oven

efficient and gentle heating of semi-finished products

The ENGEL infrared oven adjusts to the requirements of the given components, and is available in various sizes, with or without a sliding table. In order to optimally heat the components, the heating area can be sub-divided into individually adjustable zones. This allows for also efficiently heating smaller components in a large oven, when required. Thanks to the compact design, the oven can be simply installed in any production cell, and can be easily transported by forklift or crane.

The controls are completely integrated into the usual ENGEL CC300 control software, and therefore very intuitive and ergonomic for the user to operate. Set-up time is minimal, and the oven can be adapted to different semi-finished products at any time. All process data can be continuously monitored and logged.



ENGEL conveyor systems

The best conveyor-belt solution for each requirement

The whole is more than the sum of its parts. Consequently, ENGEL conveyor systems guarantee you a smooth production process: thanks to smart conveyor belt solutions, which carefully and quickly transport your high quality injection molded parts from insert and removal to shipment ready product management. Whether with or without a robot, free-standing or as an integrated solution, in bulk, boxes, pallets or trays.

Everything from a single source

machine, robot and conveyors are perfectly integrated

Integrated control

the control of the conveyor system is integrated into the robot control

Fast & trouble-free start-up

ENGEL takes full responsibility from the planning stage until you take over your system

Maximum output

all processes are optimised and perfectly coordinated

conveyor belt



conveyor box



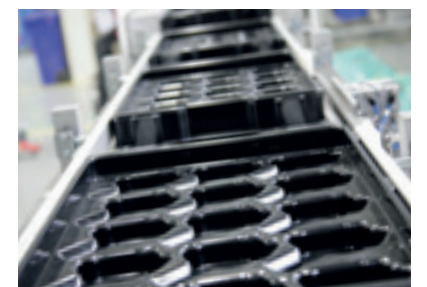
conveyor pallet



conveyor slide



conveyor tray



ENGEL CC300

smart operation of machine and peripherals

The ENGEL CC300 is based on a simple operator interface and groundbreaking process integration. With this smart control in fully integrated production systems, the machine as well as peripherals such as the infra-red oven, the dosage machine, or the robot, can be steered through the production process as easily as though you were just using your smartphone. Ergonomic design, individual configurability and modern operator control logic make controlling and monitoring highly integrated, automated systems much simpler, safer and easier.

higher productivity

start without a reference run
perfectly synchronised movement progressions

intuitive operation

uniform, clear and logical operation
targeted information with no screen changes, customisation possible
colour guide system to differentiate between machine and robot control

simple adjustment of sequences

Conduct adjustment tasks independently thanks to menu-guided sequence programming
individual assignment of tasks and roles

variable handling

direct, safe and stepless control of all movements with e-move, on the panel or using the ergonomic, lightweight C70 handheld unit

increased safety

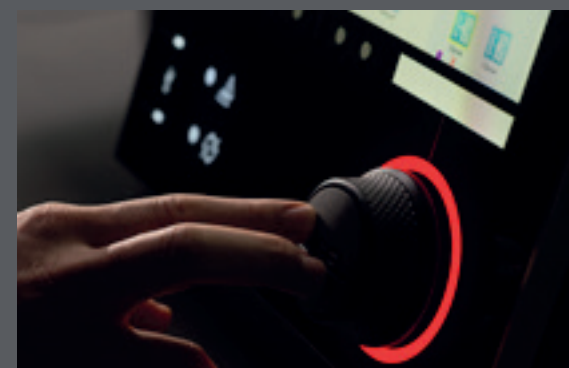
perfect, common data management of machine and robot
sign-in by chip card for individual assignment of user roles and tasks

ergonomic design

individually adjustable, functional and robust hardware
with revamped and simplified user interface
individual settings are loaded upon sign-in with chip card

best readability

generous display with excellent contrast
in all light conditions and from any angle



ENGEL grip tools

ENGEL grip tools let you leverage our expertise as turnkey system suppliers: the fast, precise and reliable removal of parts by the robot ensures the quality of your products.

- comprehensive kit for standard EOAT applications
- gripper systems perfectly adjusted to items/moulds
- maximum output through use of lightweight technologies
- many years of experience & constant new developments

ENGEL safety systems

A comprehensive advanced system offers all-around safety: ENGEL safety systems work according to the ENGEL philosophy and strive to provide our customers with complete system solutions. This means you can leverage all the benefits and the safety of a CE compliant production facility.

- no time-consuming, expensive additional certification required
- well thought out, complete systems for any requirement profile
- safety systems for trouble-free production processes
- many years of experience & constant further development

ENGEL training

- **ENGEL robotics basics (ERB)** Basic knowledge for operating ENGEL robots
Seminar objective: basic operating skills for the ENGEL viper robot systems. After the seminar, participants will be familiar with the mechanical design and the controls and capable of setting up and using standard programs.
- **ENGEL robotics advanced (ERA)** Operating ENGEL robots for advanced users
Seminar objective: advanced operating skills for the ENGEL viper robot systems. After the seminar, the participants will be capable of programming ENGEL robot systems, of setting up more complex sequences quickly and effectively, and of performing production optimisation.

In addition to the trainings described above, you can also attend basic or advanced training for the ENGEL e-pic. Or you can book training on location at your site for your entire team. More information at www.engelglobal.com

