

Wittmann

Innovative solutions for your success

Machines and equipment
from WITTMANN



world of innovation

We live molding

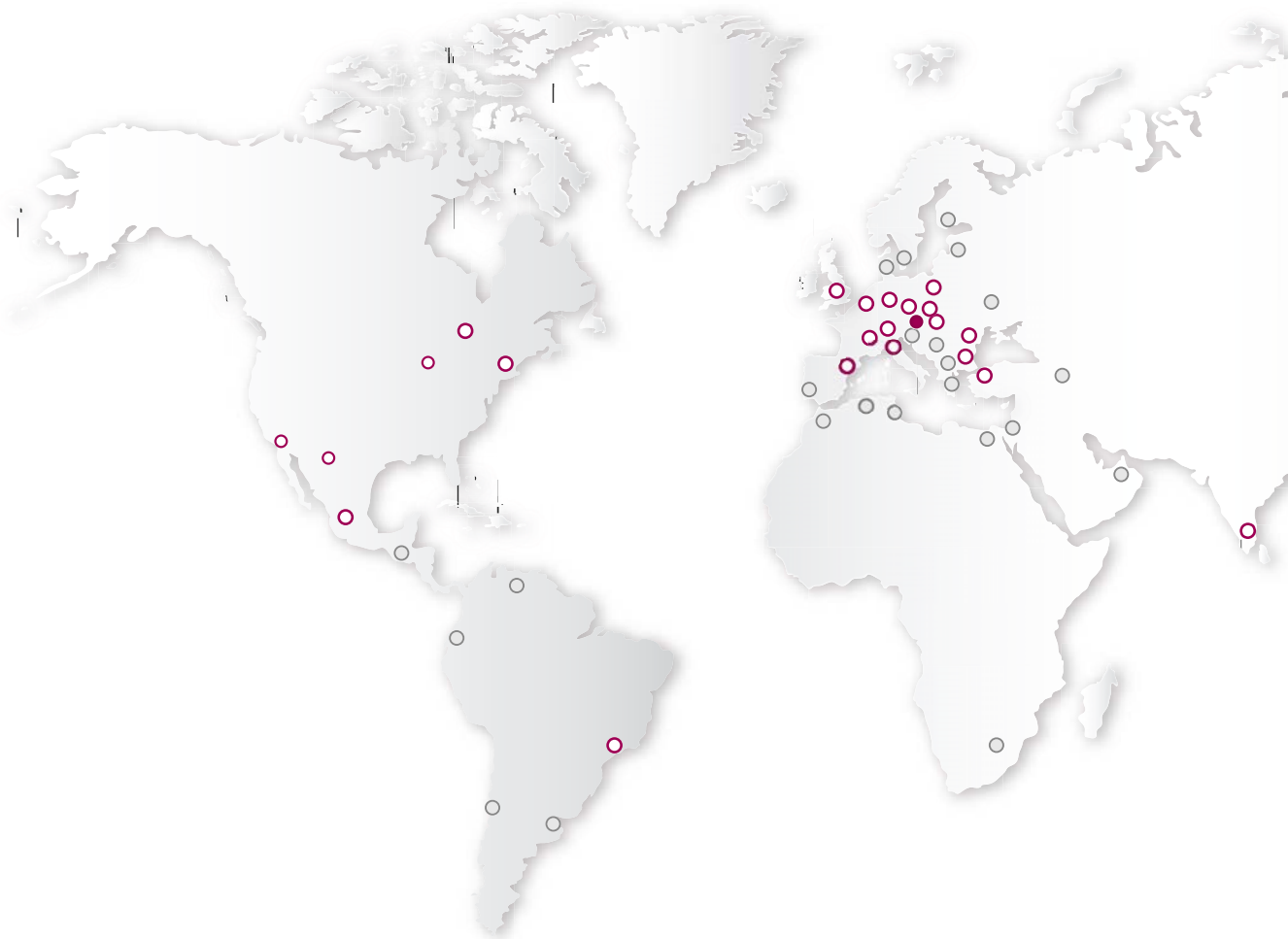
The WITTMANN Group

Innovative, reliable and customized solutions have made the WITTMANN Group a globally leading supplier to the injection molding industry. For all sectors requiring high-quality, safe and affordable plastics products.

At WITTMANN, solid mechanical engineering is combined with innovative hardware and future-oriented software development. From materials handling, injection molding, tempering and automation all the way to in-line recycling, we support smart integration and communication of all process steps from a single source. This enables future-proof functions such as self-optimizing production or Plug & Produce inside work cells.

Founded in 1976, WITTMANN is a family-owned and owner-managed company with a long tradition. Our headquarters are located in Austria, but we are at home around the world – with 10 production plants, over 35 sales and service subsidiaries and many other experienced sales partners.

More than 2000 staff members are responsible for the success of the WITTMANN Group of companies.





Location Kottingbrunn in Austria



Kottingbrunn / Austria, located just under one hour's drive south of Vienna, houses the parent plant for the production of injection molding machines. Here is the center of product development. The facility receives many visitors coming to its training center and its extensive application technology lab.

The portfolio includes all-electric and servo-hydraulic injection molding machines in horizontal and vertical design with clamping forces ranging from 150 to 22000 kN. Whether it be multi-component or gas-assisted injection molding, IMD (In-mold Decoration), clean-room production or processing of LSR (Liquid Silicone Rubber), metallic or ceramic materials as well as new bio materials – with its potent application technology, WITTMANN develops the most economical injection molding solution to meet every challenge.

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Quality – Innovation – Sustainability

Why the WITTMANN Group should be your first choice!

WITTMANN stands for quality, innovation and sustainability. This is what we and our teams are pursuing passionately every day. We develop technologies which fulfill today's and tomorrow's demands, save material and energy and protect the climate.

In addition to producing energy-efficient, clean machines which meet the highest standards, we also offer technologies for

processing recycled or bio-compatible materials, which ensure a stable injection molding process, thus minimizing scrap.

With WITTMANN, you are choosing a partner who is not only a technology leader, but also stands out by its excellent service and dedicated staff members. Only WITTMANN performs all of this so completely.

Digital ASSISTANCE SYSTEMS

for a repeatable and stable
production process

Optimal **ERGONOMICS**

thanks to comfortable working height
and easy accessibility

Highest **FLEXIBILITY**

thanks to short product changeover
times and easy adjustment to changing
production tasks

Shortest SETUP PROCESSES

with Plug & Produce and joint data
storage for the machine, automation
and auxiliaries

Minimal SPACE REQUIREMENTS

for optimal space utilization with maximal
mold space and best possible access to all
important machine components

Integrated **PRODUCTION**

thanks to seamless integration of injection
molding machine, robot and auxiliaries
with Wittmann 4.0

Maximum ENERGY EFFICIENCY

with top performance thanks to energy-
optimized drive and machine concepts

Extensive choice of PROCESS TECHNOLOGIES

for special parts attributes and
functionalities

Easy **OPERATION**

thanks to intuitive Unilog machine
control system and Wittmann 4.0
integration

Reliable **SERVICE**

thanks to corporate, thoroughly trained
service engineers in all industrial
regions worldwide

Suitable solutions for every application

WITTMANN machine portfolio

TOGGLE LEVER MACHINES

MicroPower 15 t



Compact precision
process-safe – clean – economical

EcoPower 55 – 550 t



High-precision, all-electric performance
precise – energy-efficient – dynamic

EcoPower Xpress 160 – 500 t



Ultra-high speed
fast – clean – quiet

HYDRAULIC MACHINES

SmartPower 38 – 400 t



Servo-hydraulic efficiency
robust – efficient – versatile

MacroPower 400 – 2200 t



The compact large machine
compact – powerful – universal

VERTICAL MACHINES

VM 60 – 200 t | VM R 40 – 200 t CM 40 – 80 t | CM S 40 – 80 t



Flexible, automatic production
ergonomic – flexible – highly efficient

VPower 120 – 300 t



Maximum free space
flexible – ergonomic – highly efficient

Wittmann

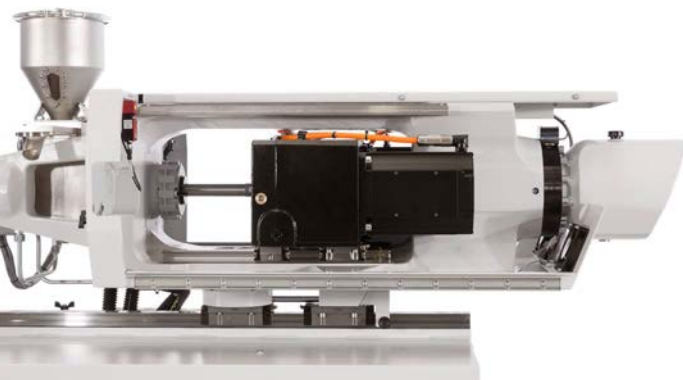
Diversity for maximum efficiency and profitability

Injection units

We tailor them to fit. For your production will only be efficient and economical with an injection unit precisely adapted to the application. This is why WITTMANN offers an extensive range of injection aggregates specially designed for the various injection molding challenges. From all-electric and servo-hydraulic standard aggregates right up to extra high-performance systems – for small, medium and large material throughputs, for all virgin and recycled plastic materials.

Your advantages

- All WITTMANN injection aggregates are easily accessible, many are even pivotable – to minimize setup times.
- Free access to the injection unit simplifies material feeding as well as parameter setting and maintenance work – for highly ergonomic, cost-efficient and flexible production.
- HiQ assistance systems automatically recognize process deviations and fluctuating conditions. They record deviations and re-adjust quality-critical parameters to ensure consistently high parts quality, maximum material efficiency and safe and easy process control.



accurate – fast responding – economical

All-electric injection units

- Servo-electric drive systems ensure maximum precision and repeatability.
- Extremely thrifty energy consumption reduces the operating costs and the CO₂ footprint.
- Parallel movements increase productivity and efficiency.
- Short response times and perfectly coordinated axes ensure extremely high process stability.



powerful – efficient – robust

Servo-hydraulic injection units

- Consistent further development over many decades ensures maximum servo-hydraulic efficiency.
- Regulated servo valves for injection and holding pressure (optional) increase the already high repeat accuracy – for processes with the most demanding requirements.
- Plasticizing barrels can be mounted on different injection units with the same screw diameters – for maximum flexibility.

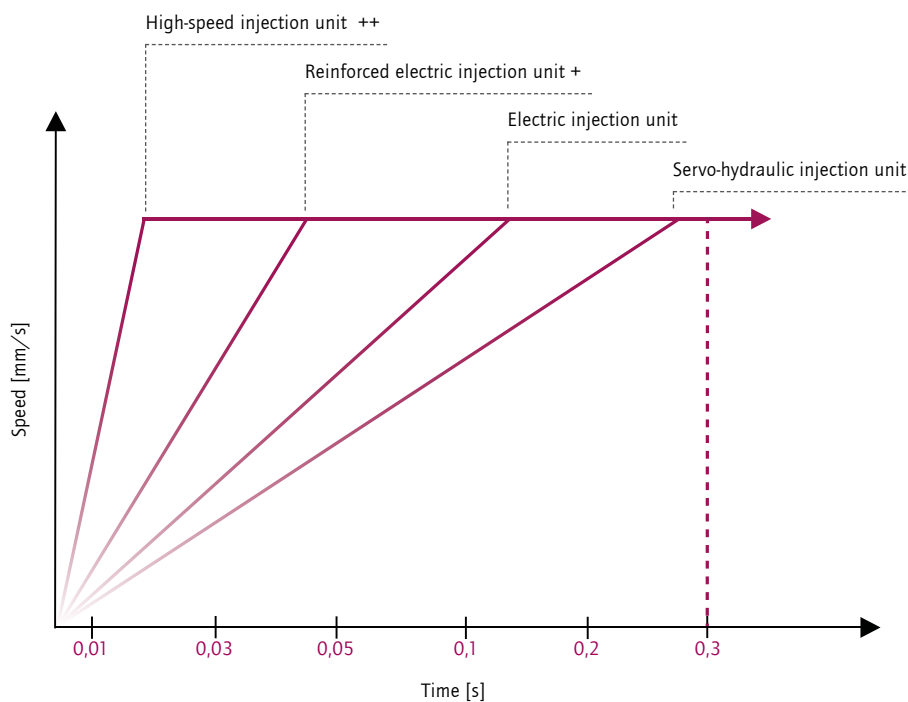
Electric or hydraulic?

The application decides

The decision of whether to use electric or servo-hydraulic injection should not be a question of philosophy. The application decides this issue, so that efficiency potentials can be optimally exploited. WITTMANN has the suitable injection aggregate and the right injection molding machine for every injection molding challenge.

Dynamics that make the difference! – A decisive factor for the performance of an injection unit is its dynamics – i.e., the speed at which it can inject within the shortest possible time.

This characteristic has a significant influence on the cycle time and the quality of the molded part – for maximum efficiency and optimal results.



The right machine to fit the injection unit

Machine	High-speed injection unit ++	Reinforced electric injection unit +	Electric injection unit	Servo-hydraulic injection unit
MicroPower	◆			
EcoPower		◇	◆	
EcoPower Xpress	◆	◆		
SmartPower			◇	◆
MacroPower			◇	◆
VPower			◇	◆
Vertical machines VM VM R CM CM S			◇	◆

◆ Standard

◇ Option

Wittmann

Compact precision

MicroPower

Specially designed for the production of small and micro parts with structures down to nanometer size, the all-electric MicroPower offers ultimate precision, safety and efficiency for shot weights from 0.05 to 6 grams.

The MicroPower is more than just an injection molding machine. On just 2 m² floor space, the machine concept integrates a rotary table, auxiliaries, automation, temperature control, quality assurance and additional process devices. Flexibility is its great strength – right up to the integration of a laminar flow box for sensitive clean-room applications.

Unique PART QUALITY

thanks to highly accurate, patented 2-step injection system

Shortest TIME-TO-MARKET

due to cooperation with leading mold-making partners

Minimal FLOOR SPACE NEEDS

thanks to intelligent integration of all process components in the smallest space

Maximum ENERGY EFFICIENCY

through perfect interaction between injection molding machine, robots and auxiliaries

Outstanding FLEXIBILITY

achieved by processing all standard granulates – no micro granulate required! One grain of granulate yields hundreds of parts.

Low MATERIAL CONSUMPTION

due to minimal sprue for cost savings of up to 90 %

Economic EFFICIENCY

throughout the entire life cycle thanks to short set-up times and minimal maintenance expenses

Clean-room-optimized DESIGN

for extremely demanding applications, such as are found in medical technology, included as standard





The highlights

Clamping unit – all-electric and optimally accessible

The servo-electric two-platen clamping unit ensures even distribution of the clamping force thanks to its high-precision 5-point toggle lever. Linear guides provide highly sensitive mold protection. The maximum plate distance is 400 mm – for efficient set-up processes and easy maintenance work.

Plasticizing unit – safe injection of micro and nano shots

Four injection unit sizes are available with stroke volumes ranging from 1.2 to 6 cm³, as well as two 3-zone screws with diameters of 14 or 18 mm to choose from. The injection plunger is also flexible: it comes with diameters of 5, 8 or 9 mm. Injection pressures of up to 3,000 bar and injection speeds of up to 750 mm/s enable minimal injection times and extremely precise injection pressure regulation with highly dynamic changeover to holding pressure.

Integrated production cell – All-in-one from a single source

The MicroPower production system has a modular design throughout. A rotary table, Scara robot, camera control system, conveyor belt and parts deposit system are all fitted inside the standardized projective housing as required. The production cell will be delivered as an all-in-one solution including CE certificate. This saves time and costs for individual approvals.

Clean room-compatible – as standard

The machine's housing is designed for clean room applications as standard. A laminar flow unit for class-7 clean room applications according to ISO 14644-1 can be added without any structural adjustment. The injection molded parts can be deposited inside the clean room cell sorted according to cavities, and directly packaged as well if required.

Combimould – 2-component technology within minimal space

In addition to the rotary table, a second injection unit can be very easily integrated into the production cell. This will turn the MicroPower into a two-component machine. Thanks to the modular base concept and fast barrel change, changeovers from one pair of materials to another can be carried out very quickly.



process-reliable
clean
economical



toggle lever
15 t



electric
3 – 12
14 – 18 mm



Combimould
Medical technology
Electronics



HiQ
Expert
Wittmann 4.0



Wittmann

Servo-hydraulic efficiency

SmartPower

The SmartPower stands for economic efficiency within an extremely wide range of applications. Ultra-modern servo hydraulics combined with smart assistance systems and WITTMANN 4.0 integration result in highly efficient and extremely flexible work cells which guarantee precision and dynamics in the injection process thanks to the availability of electric injection units.

Minimal MAINTENANCE COSTS

due to highly accurate movements with sensitive mold protection

Minimal SPACE REQUIREMENTS

with maximal mold space and best possible access to all important machine components through optimized design

Consistent high PARTS QUALITY

thanks to controlled injection process

Shortest SETUP PROCESSES

thanks to Plug & Produce based on shared data storage for the machine, automation and auxiliaries

Minimal ENERGY CONSUMPTION

for an optimal CO₂ footprint through ultra-modern servo-hydraulics and KERS

Maximal COST EFFICIENCY

throughout the entire life cycle through low investment and production costs





The Highlights

Drive-on-Demand – ultimate dynamism

All SmartPower injection molding machines combine fast-responding servo motors with high-performance constant displacement pumps as standard. The state-of-the-art servo-hydraulic system from WITTMANN combines ultimate dynamism and speed with extremely accurate machine movements and minimal energy consumption. The drive-on-demand drive unit is only activated when movement and pressure generation require it.

KERS – simple energy recovery

KERS stands for Kinetic Energy Recovery System and transforms kinetic energy into electric energy during braking processes. This power is then made available inside the machine, for example for barrel heating. The patented system reduces the energy consumption further by up to 5 % and makes the machine more resistant to short-term power fluctuations or power failures, which increases availability.

Plasticizing unit – compact and maintenance-friendly

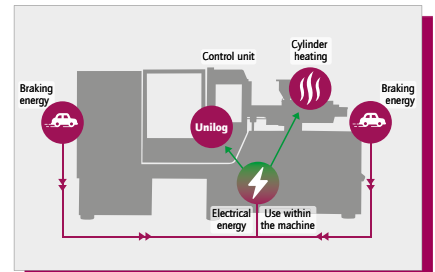
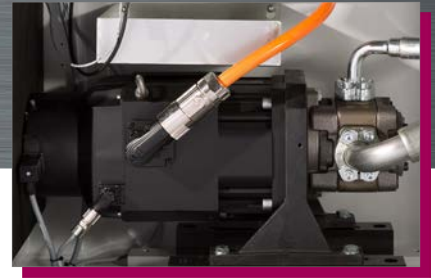
The SmartPower's plasticizing and injection units are designed to be freely accessible, compact and pivotable. Aggregates with servo-electric injection and plasticizing drives are available as an option.

Well-balanced clamping system – with optimal force transmission

The 4-column clamping system with central pressure pad force transmission and two diagonally positioned fast-stroke cylinders provides optimal force transmission into the mold together with excellent mold protection.

Highly sensitive mold protection – even for heavy molds

The movable machine platen moves without tie-bar contact via a sturdy carriage on linear guides and revolving roller bearings. The minimal rolling friction ensures highly sensitive mold protection – even when working with heavy molds.



robust
efficient
versatile



servo-hydr.
38 – 400 t



servo-hydr. 70 – 3400
14 – 85 mm

electric 70 – 1670
14 – 65 mm



Combimould
Cellmould
Airmould



HiQ
Expert
Wittmann 4.0



Wittmann

High-precision performance

EcoPower

The EcoPower is the ideal choice wherever precision, efficiency and cleanliness are called for. Whether in medical technology, in the packaging industry or in high-precision molding of technical parts, the all-electric high-performance machine scores with high injection speeds, extremely precise regulation and high dynamism. Direct servo drives and utilization of deceleration energy reduce its energy consumption to a minimum. Thanks to its modular design, the EcoPower can be flexibly adapted to your specific production requirements.

Highly sensitive MOLD PROTECTION

for longer mold servicing intervals and added service life through optimized platen guidance

Long SERVICE LIFE

thanks to self-locking 5-point toggle lever with rack-and-pinion drive

Minimal SPACE REQUIREMENTS

with maximum mold space and excellent accessibility of all important machine components through optimized design

Top PARTS QUALITY

thanks to precisely reproducible injection dynamism through optimally adapted WITTMANN amplifier with high scanning rate

Shortest SET-UP PROCESSES

through Plug & Produce with shared data storage for the machine, automation and auxiliaries

Maximum ENERGY EFFICIENCY

thanks to all-electric drives and energy recovery as standard – for a presentable CO₂ balance

Independent of MAINS POWER

thanks to optionally available DC model for use of energy derived from renewable sources without conversion loss, and uninterrupted power supply

Spotlessly clean PRODUCTION

with encapsulated drive systems for safe clean-room operation





The Highlights

Direct servo drives – for minimal energy consumption

The EcoPower operates with highly dynamic servo-electric motors for all main movements (opening/closing, dosing, injection) as well as mold height adjustment of the clamping unit. The ancillary strokes are triggered by a servo-electric hydraulic aggregate. Servo-mechanical direct drives are available as an option.

Injection unit – dynamism and precision go hand in hand

The EcoPower's injection aggregates come with a dual drive system for the injection and dosing functions. The EcoPower's single-part, torsion-resistant cast iron frame with linear guides and a central ball screw drive offers ideal conditions for highly dynamic and highly accurate injection. The injection aggregates are freely accessible, compact and pivotable.

Toggle lever clamping system – for fast movements

The 3-platen and 4-tie-bar-clamping system is equipped with a dynamic 5-point toggle lever directly powered by a servo motor via a rack-and-pinion drive. The machine's clamping platen moves without tie-bar contact on linear guides and revolving roller bearings. Injection can already be started during clamping force build-up.

KERS – energy recovery as standard

The Kinetic Energy Recovery System patented for injection molding systems – in brief KERS – transforms deceleration energy into electrical energy. This energy is then used for functions such as barrel heating. In this way, KERS reduces the energy consumption by a further 5 %.

Mould Protect – for fast-response mold protection

The EcoPower provides reliable mold protection from the very first cycle. This is due to the minimal rolling friction of the clamping platen guides and measurement of the amplifier signals directly on the toggle lever drive with a high scan rate.

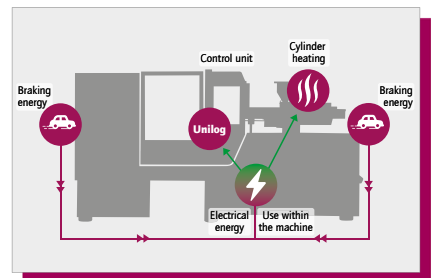
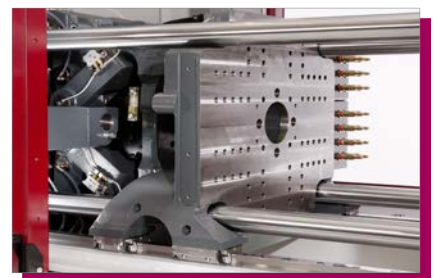
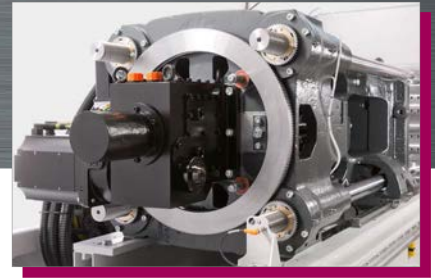


Photo: Plastisud SAS



precise
energy-efficient
dynamic



toggle lever
55 – 550 t



electric
70 – 5000
14 – 95 mm



Clean room
Packaging
Electronics



HiQ
Expert
Wittmann 4.0



Wittmann

Maximum high speed

EcoPower Xpress

Specially developed for resource-saving, high-speed production of closing caps and thin-walled packaging, the EcoPower Xpress is setting new benchmarks for injection performance. Water-cooled servo motors reach maximum injection speeds and high levels of dynamism. As a result, extremely short cycle times are realized with minimal energy consumption.

The machine is equipped with a highly dynamic injection unit. Both the injection stroke and the screw retraction before and after plasticizing are achieved by means of double racks with symmetrical force distribution.

Dynamic INJECTION

thanks to a servo-electric high-speed injection system, with acceleration rates of up to 15000 mm/s²

Flexible AUTOMATION

with both side-entry and top-entry options, including the integration of IML solutions

Maximum ENERGY EFFICIENCY

thanks to all-electric drives and energy recovery system as standard – for a presentable CO₂ balance

Low MAINTENANCE COSTS

because the high-precision clamping unit protects both the mold and the machine

Extremely fast SETUP

thanks to Plug & Produce with shared data storage for the machine, automation and auxiliaries

Maximum EFFICIENCY

due to parallel functions across all machine axes





The Highlights

High-speed drives – for minimal cycle times

For highly efficient achievement of shortest possible cycle times, the EcoPower Xpress operates with water-cooled servo-electric motors for the main movements (closing/opening, dosing, injection). The mold height adjustment of the clamping unit is also moved by a servo-electric drive. A hydraulic aggregate with a servo motor is used for the ancillary strokes.

High-performance injection unit – for efficient production

The feed movement for injection and the active screw retraction movement are performed via double racks with symmetrical force distribution. This enables particularly high dynamics. Injection speeds of up to 600 mm/s and injection acceleration of up to 15,000 mm/s² are achieved. The servo-electric high-performance injection unit thus offers ideal conditions for quickly and completely filling thin-walled or complex components.

Toggle lever clamping system – uncompromisingly stable

The 3-platen, 4-tie-bar-clamping system comes with a maintenance-free 5-point toggle lever, self-locking in the end position and driven by a servo motor combined with a rack-and-pinion drive system. The absolutely stable mold clamping plate is guided via a moving carriage on the basic frame without tie-bar contact. The carriage offers high load capacity reserves for the use of heavy multi-cavity molds without limitation of the precision. The 5-point toggle lever ensures even force distribution.

Encapsulated drive systems – for safe, clean production

Encapsulated drives and automatic central lubrication with progressive distributor keep the clamping unit and its entire environment absolutely clean – for safe clean-room production of food packaging as well as high-volume medical technology products.

Mould Protect – for fast-response mold protection

The virtually friction-free linear guides of the moving mold clamping platen and the fast-response registration of power input fluctuations from the drive motor ensure highly sensitive mold protection even with extremely short cycle times.

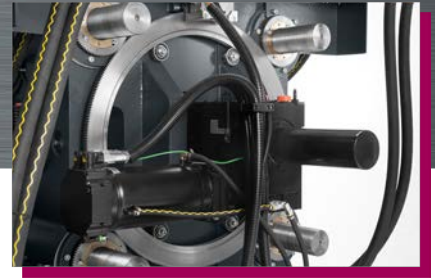


Photo: Plastisud SAS



fast
clean
silent



toggle lever
160 – 500 t



electric
1100+ – 3300++
45 – 75 mm



Thin-walled
Medical
IML



HiQ
Expert
Wittmann 4.0



Wittmann

The compact large machine

MacroPower

The large MacroPower machines with clamping forces ranging from 4000 to 22000 kN offer maximum performance, precision and speed, with simultaneously very moderate footprint and energy requirements. They are used for highly economical production of large and complex components – whether for single-component compact injection molding, Combimould multi-component molding, or in combination with a WITTMANN technology package, such as Cellmould foam injection molding, Airmould internal gas pressure molding or overmolding with IMD.

Easy MAINTENANCE

through comfortable access to all machine components

Fast and safe SETUP

with Plug & Produce thanks to shared data storage for the machine, automation and auxiliaries

Sensitive MOLD PROTECTION

through highly accurate, smooth-running linear guides

Easy INSTALLATION

of large molds directly from the side thanks to the integrated QuickLock system with short bars

Short CYCLE TIMES

through parallel movements for core pulls and ejector as standard

Minimal SPACE REQUIREMENTS

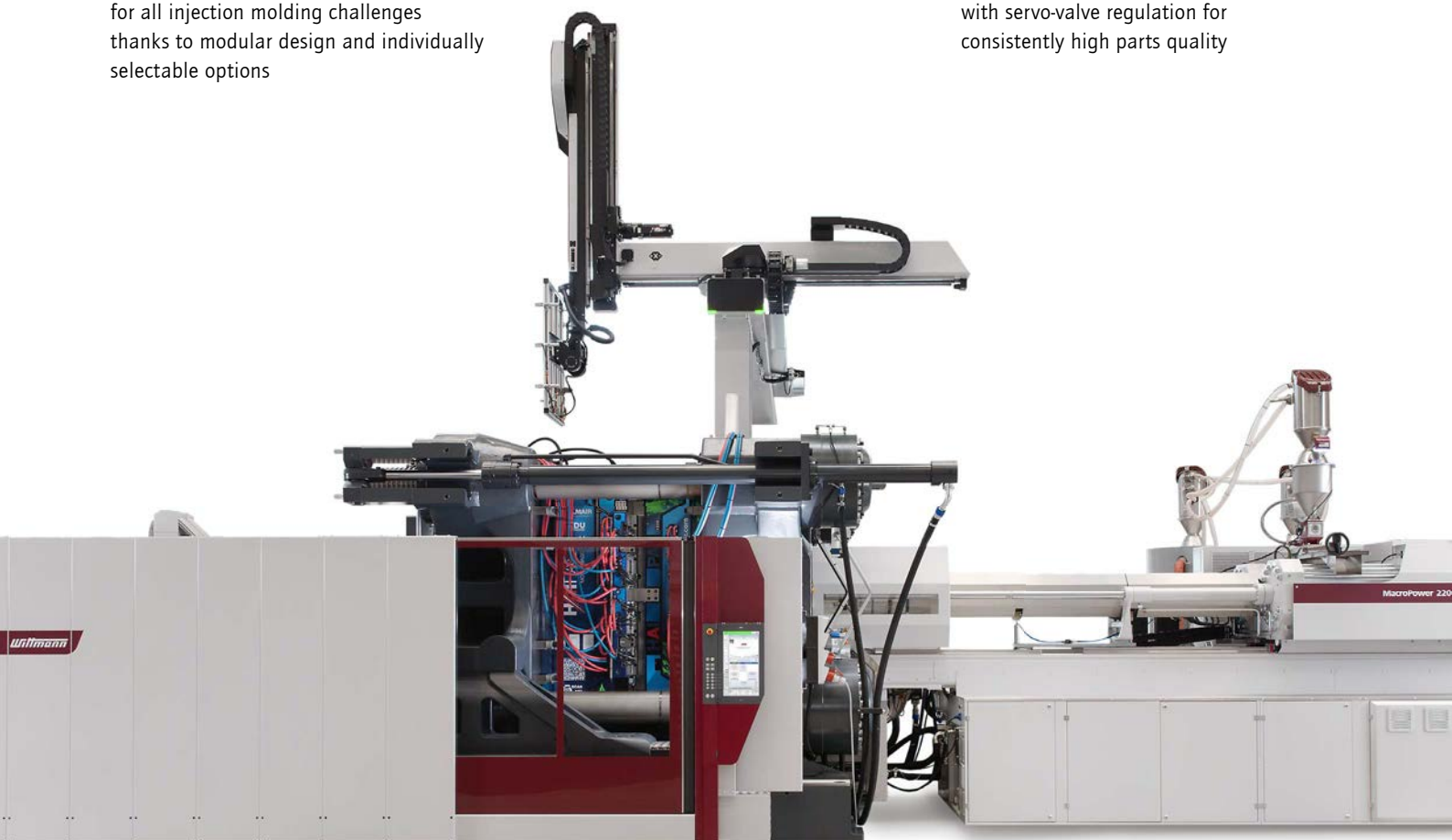
through compact design of the optimized 2-platen system with simultaneously generous mold space

Ample FLEXIBILITY

for all injection molding challenges thanks to modular design and individually selectable options

Precise INJECTION

with servo-valve regulation for consistently high parts quality





The Highlights

Drive-on-Demand – for optimal protection of resources

The MacroPower already comes with high-performance servo-hydraulic drives as standard. The Drive-on-Demand technology reduces the machine's energy consumption by up to 40 % compared to modern variable displacement pump systems. Idle current is completely eliminated. This also reduces the cooling expense. No oil cooling is required during normal operation. The quality of the oil is thus preserved much longer.

Clamping system – generously dimensioned

The 4-tie-bar, -2-platen clamping system offers a generously dimensioned mold space. The tie-bars are each combined with a pressure pad unit and fastened inside the machine's fixed platen. They are position-monitored and ensure extremely accurate platen parallelism.

Quicklock clamping system – synchronous and fast

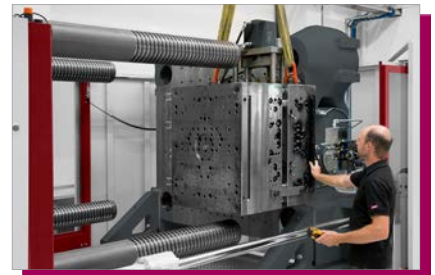
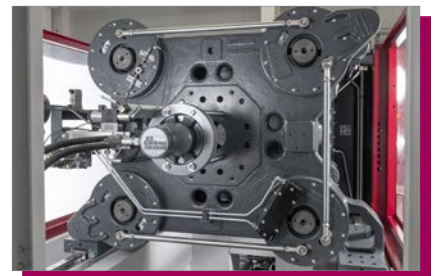
Positive locking between the fixed and moving mold platens is effected via the tie-bars. Mold change is shortened by synchronous locking. Synchronous locking reduces the pressure build-up time. The locking system integrated into the clamping plate allows the use of shorter tie-bars, thereby contributing significantly to a considerable reduction in overall length.

Large platen stroke – for fast, easy setup

The large platen stroke and the short tie-bars of the system ensure free access to the clamping unit during setup. Even large molds can be inserted from the side of the machine with the help of a crane positioned at the rear and then easily fastened.

Servo-electric plasticizing – available as an option

The direct electric servo drive further reduces the energy consumption and offers additional possibilities for parallel operation of the clamping and plasticizing units.



compact
powerful
universal



servo-hydraulic
400 – 2200 t



servo-hydraulic
1670 – 33000
55 – 180 mm



Combimould
Cellmould
Airmould



HiQ
Expert
Wittmann 4.0

Wittmann

Maximum free space

VPower

The VPower vertical injection molding machine scores with its high precision, flexibility and efficiency. It distinguishes itself from the VM and CM model by its enormous size of the mold space. For thanks to its innovative 2-tie-bar clamping system, the VPower can operate without a center tie-bar. This is why it is predestined for producing large parts, as well as for applications with bulky automation systems. Thanks to Uniforce, the VPower ensures even distribution of the clamping force across the entire mold platen and consequently optimal contact pressure.

Extremely low MAINTENANCE COSTS

through highly accurate movements with sensitive mold protection

Efficient AUTOMATION

even for complex processes requiring much space for inserts and finished parts handling. If desired, WITTMANN will deliver the machine and the automation equipment all from a single source.

Shortest SETUP PROCESSES

through Plug & Produce with shared data storage for the machine, automation and auxiliaries

Minimal ENERGY CONSUMPTION

thanks to modern servo-hydraulics with Drive-on-Demand technology and energy recovery for a presentable CO₂ balance

Ideal for 1- AND 2-COMPONENT INJECTION MOLDING

for a second injection unit can easily be retrofitted at any time

Predestined for the CLEAN ROOM

thanks to clean mold space through minimal lubrication requirements for the linear guides

Consistently high PARTS QUALITY

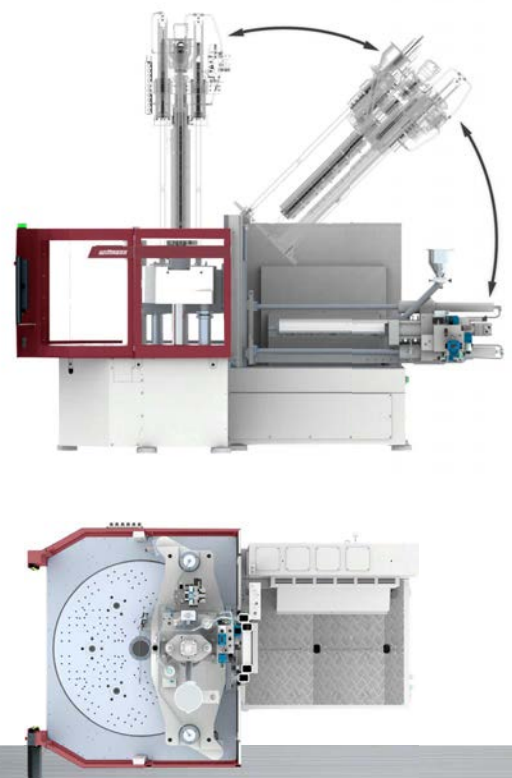
thanks to controlled injection process and Uniforce concept

Minimal SPACE REQUIREMENTS

thanks to compact design with generous mold space and optimal accessibility to all important machine components

Optimal ERGONOMICS

due to comparatively low working height





The Highlights

Clamping unit without central tie-bar – for flexible automation

No other concept offers more free space: the two-tie-bar clamping unit functions without a tie-bar at the center of rotation. This means: free access plus ample space for the mold and the automation equipment. The clamping unit operates with two external fast-stroke cylinders for quick opening and closing with speeds of 300 mm/s. The rotary table is powered by a servo-electric drive.

Injection unit – easily convertible

The attachment interface of the VPower enables extremely easy conversion of the injection unit from horizontal to vertical and vice-versa. This is of special benefit for contract injection molders and other processors with a wide product range and small batch sizes.

Servo-electric rotary tables – fast, precise, clean

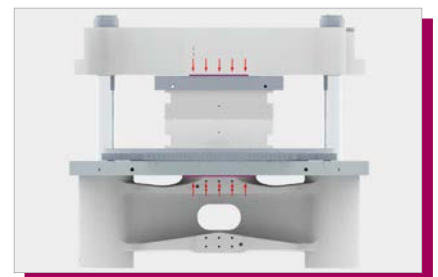
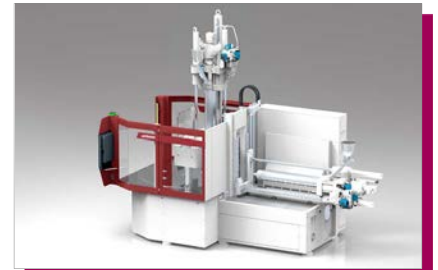
The rotary tables with servo-electric drives for 2-, 3- and 4-station jobs are available with diameters ranging from 1300 to 2000 mm. Their outstanding features are short rotation times and high precision. The central lubrication system for bearings, toothing and low-friction sliding surfaces provides reliable protection against penetration of water and particles and ensures a high standard of operational safety.

Media interfaces – right at the center

The tie-bar-less center of rotation offers ample space for the supply of cooling water, hydraulics, compressed air and power connections directly under the rotary table. The media lines to supply the mold are connected directly via either an oscillating or a rotating distributor, as required.

Uniforce – for evenly distributed surface pressure

The Uniforce concept from WITTMANN is setting new benchmarks in terms of even, gentle force transmission to the mold. It applies extremely even surface pressure – for consistent, high parts quality and a long service life of both mold and machine.



flexible
ergonomic
highly efficient



servo-hydraulic
120 – 300 t R



servo-hydraulic
130 – 1330
18 – 65 mm



Combimould
Assembly injection molding
Automation



HiQ
Expert
Wittmann 4.0



Wittmann

Flexible, automatic production

VM | CM

Insert overmolding imposes extra special requirements on injection molding technology. The range of vertical injection molding machines from WITTMANN is just as flexible as its applications are diversified. With tie-bars or C frame, rotary table or sliding table, for single- or multi-component injection molding – on the basis of our proven and modular VM and CM machine concepts we develop the optimally matching solution – for reel-to-reel applications, manual and robot-assisted insert work, overmolding of cables and any other injection molding tasks for which a vertical clamping unit is of advantage.

Efficient AUTOMATION

through ample free space to accommodate a great diversity of automation concepts. If desired, WITTMANN will deliver the machine and the automation equipment from a single source.

Short CYCLE TIMES

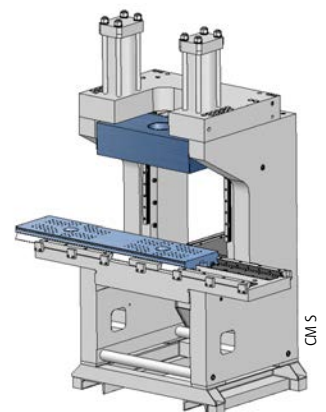
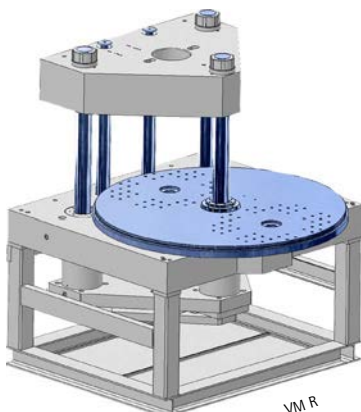
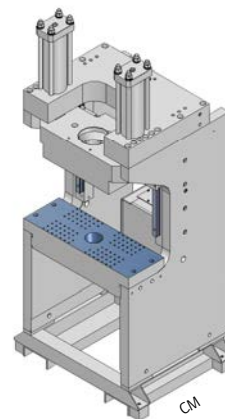
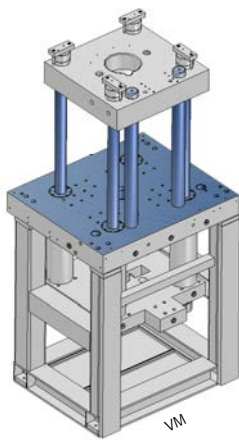
through parallel movements for core pulls and ejector as standard

Outstanding ERGONOMICS

for manual and semi-automatic operation thanks to low working height and optimal access to the clamping unit

High PRECISION and consistent PARTS QUALITY

thanks to controlled injection process





The Highlights

Drive-on-Demand – for sustainability is vital for us

Even the basic models of the vertical machines from WITTMANN are equipped with powerful servo-hydraulic drives. WITTMANN's state-of-the-art servo-hydraulics combine maximum dynamics and speed with highly precise machine movements and minimal energy consumption. The Drive-on-Demand drive unit is only activated when movements and pressure generation require it.

Light screen as standard – for maximum operational safety

Already in the basic version, the insertion and removal area is protected by light screens. This ensures a high safety standard for manual work around the clamping unit.

Servo-electric rotary table – for highly accurate positioning

For fast, precise rotation movements and exact positioning of inserts even inside heavy molds, the rotary tables are driven by a speed-controlled servo motor as standard.

Media distribution – flexibly adjusted to the machine concept

In oscillating operation with 2-station round rotary tables, media distribution is handled by an easily accessible media distribution unit which accommodates a large number of media supply connections. For rotating operation with 3- or 4-station rotary tables, rotary distributors are available which offer ample flexibility for connecting various types of media lines.

Tailored solutions – for single- and multi-C injection molding

The large number of different basic concepts already makes it very easy to adjust the vertical machines from WITTMANN to each specific application. What is more, the injection units can also be installed either horizontally or vertically, either parallel or alternating. Servo-electric injection units are available as options.



flexible
ergonomic
highly efficient



servo-hydraulic
VM 60 – 200 t
VM R 40 – 200 t
CM | CM S 40 – 80 t



servo-hydraulic
60 – 1330
14 – 65 mm



Combimould
Assembly injection molding
Insert technology



HiQ
Expert
Wittmann 4.0



Wittmann

One-Stop-Shop

It's all WITTMANN.

Innovative, reliable and customized solutions make the WITTMANN Group a leading supplier for the injection molding industry.

That includes material preparation and transport, automation, injection molding and mold tempering, as well as in-line recycling, digital technologies or complete solutions from a single source – from automatic production cells all the way to digitally controlled production. Only WITTMANN can offer such a vast range.

Your advantages

- Compatibility of all components
- Central control and monitoring of the entire process
- Efficiency-optimized production processes, with perfect coordination of all components
- Plug & Produce for safe machine setting and a fast production startup
- Simplified procurement, fast commissioning and efficient service processes

Comprehensive system supplier

The extensive range of WITTMANN auxiliaries offers suitable solutions for all secondary processes in injection molding, from parts handling, raw material transport and drying right up to sprue recycling and mold cooling

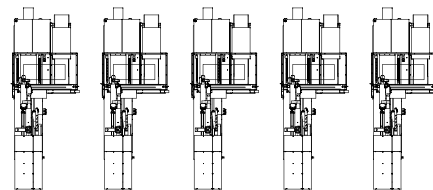
- Injection molding machine including application technology
- Automation solutions
- Dryers
- Conveyors
- Blenders
- Water flow controllers
- Temperature controllers
- Granulators



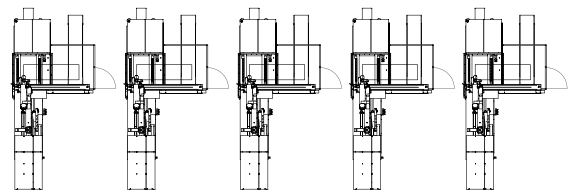
Production cell "ex works" Insider concept

The Insider concept is an ex-works solution for converting a SmartPower or EcoPower injection molding machine into a production cell. In its basic version, the system cell integrates a parts handling device, a parts transfer belt and a protective housing firmly connected to the machine. As options, additional equipment modules are available for downstream processing, quality documentation and packaging. The WITTMANN Group is ready to support its customers in the conception of such higher automation levels with the extensive expert knowledge of the entire Group.

- **Systematization of the material flow** through uniform logistics interface to finished parts release at the end of the clamping unit, an optimization prerequisite for lining up several machines in rows
- **Reduction of the required production floor space** by up to 50% compared to conventional automation solutions
- **Minimized robot cycle times** through shorter travel distances and immediate depositing of molded parts on the conveyor belt
- **Easy access to the mold and the robot in spite of the integration** thanks to the movability of the transfer belt integrated in the protective housing
- **Cost advantages**, since all dangerous areas are already secured and certified ex works



Insider



Standard



CE-certified with type examination

for every machine with Insider solution.
No costs for individual approvals.



Wittmann

The entire process under control

Unilog Control system

With the Unilog control system, even programming and operation of complex production processes becomes child's play. From material feeding, injection molding and temperature control all the way to automation, WITTMANN's control system provides a comprehensive control platform with a uniform look & feel for the machine and all integrated appliances. Unilog is the gateway to the WorkCell. Via the machine's central control system, all auxiliaries, robots and integrated process technologies can be controlled – for maximum efficiency, productivity and safety.

clear – intuitive – flexible

- Brightly lit 21.5" Multi-Touch-screen in Full-HD
- Can be swiveled sideways for wider access to the screw cylinder and for better visibility when adjusting the mold area
- Data input possible either via touch screen, functional graphics or keyboard pop-ups
- Intuitive operation via gesture control
- Membrane keys with haptics and tactile feedback for all movement functions – freely selectable and switchable

ambiLED display

In different colors for specific error causes.
Uniform color codes for all machines, components and appliances from the WITTMANN Group

text display operating status and alarm signals

pop-up menu

login, external access, language selection, network, user limits, USB status, notes

selection of status bar and function freely selectable and switchable

USB interface

Smart Screen

divisible screen display for simultaneous visualization and operation of two functions

function icons

contact point RFID login

access via authorization system
RFID, key card or key chain

help menu

emergency shut-off key

additional keys
for user-defined assignment (optional)

on/off drive

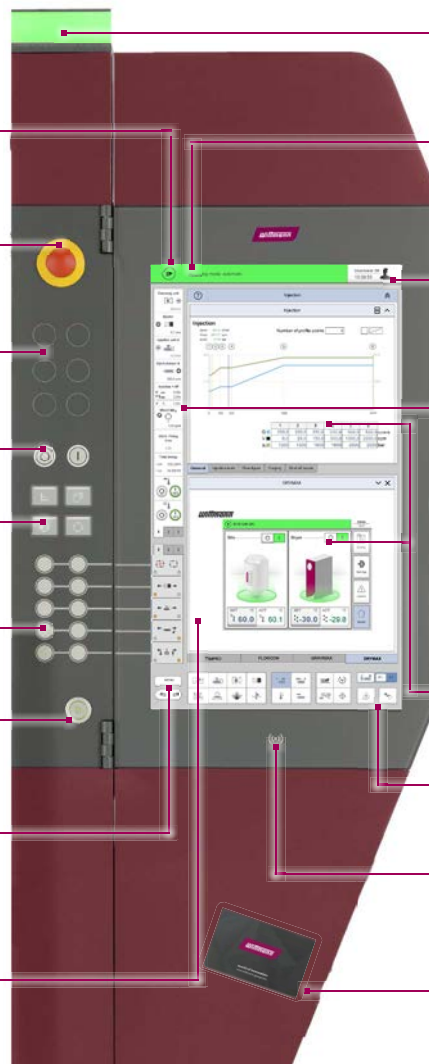
preselection mode

hard keys for movement functions
freely selectable and switchable

cycle start key
with visual signaling

menu key

One-Screen solution
display of integrated WITTMANN devices





The Highlights

Wittmann 4.0 – for more consistency in the Smart Factory

Wittmann 4.0 is the modular library with supportive systems, applications and services across all four segments of the Smart Factory – Smart Machine, Smart WorkCell, Smart Production and Smart Service. Via standardized interfaces and communication protocols such as OPC UA, injection molding machines, robots, auxiliaries and other systems exchange information and coordinate their work sequences. The result is higher total efficiency plus easier traceability of data.

Plug & Produce – saving much setup time

The shared data storage for the machine, automation equipment and auxiliaries ensures faster setup and reduces the error risk as well. The basis is the digital mold data sheet. Already during the second setup process, the machine is able to recognize the mold data and automatically set the recorded process parameters – on the machine as well as on the robot and all auxiliaries involved.

SmartEdit – sequence programming

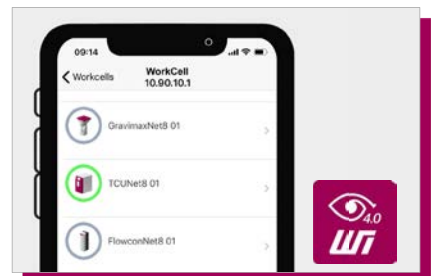
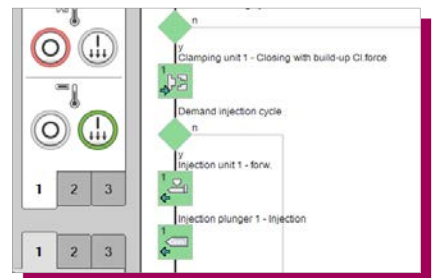
On the basis of a standard sequence, special functions such as core pulls or air valves can be added very easily with SmartEdit. The entire sequence can be individually compiled with icons selected from the menu by drag & drop. The machine cycle can be visualized either horizontally or vertically according to the user's choice.

WiQuickLook 4.0 – remaining informed regardless of time and place

Thanks to QuickLook 4.0, production status checks can be carried out easily and comfortably by smartphone. Via an Internet connection, all operating data can be viewed, including statuses, error signals and production parameters of every appliance interconnected via Wittmann 4.0.

One-Screen solution – entire work cell at a glance

Control is usually carried out directly on the respective device. This means that the machine operator has to walk back and forth between the individual components several times. WITTMANN provides a workaround with its one-screen solution. Thanks to Wittmann 4.0 networking, all components in a Smart WorkCell can be set and controlled centrally on the machine display.



THE COCKPIT FOR THE ENTIRE PRODUCTION PROCESS

With Wittmann 4.0, the Unilog control system of the injection molding machine becomes the cockpit for the entire production process. Thanks to OPC UA integration, all pieces of information from the machine, the auxiliaries and the automation equipment come together here. All process data are made available and saved in real time – for fast, real-time viewing, tracing of process data and long-term process optimization.

For more efficiency and profitability

Wittmann 4.0

With Wittmann 4.0, WITTMANN supports smart integration and communication of all process components across the entire injection molding production. This enables future-oriented functions such as self-optimizing production or Plug & Produce inside work cells.

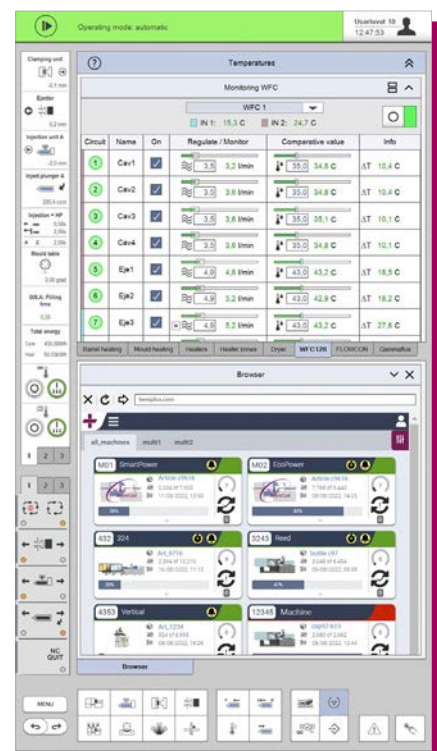
Plug & Produce guides the machine operator in just a few steps towards the optimally combined and set work cell, thus shortening the setup and startup process significantly. The essential tool is the digital mold data sheet.

An additional advantage: the mold data sheet enhances process reliability, for it reduces the error risk inherent in manual input. Already during the second setup, the injection molding machine can recognize the mold and set the optimal processing parameters automatically.

Communication inside and with production cells

Integration of auxiliaries with Wittmann 4.0

- WITTMANN WFC and Flowcon flow controllers, Gravimax blenders and Aton and Drymax dryers
 - Direct control and monitoring of the appliances via the Unilog machine control system
 - Joint data storage in the production cell, in the machine and via MES in the network
- WITTMANN robots with R9 control system
 - Operation of the robot via the machine's monitor
 - High-speed communication between the machine and the robot for synchronization of movements
 - Important machine movements can be set via the R9 robot control system
- WITTMANN Tempro plus temperature controllers
 - The temperature can be set and controlled via the machine's control system
 - All functions can be operated both on the appliance and via the machine's control system.



Wittmann 4.0 system

With Wittmann 4.0, a machine and its robots and auxiliaries are transformed into a uniform technical organism, which communicates externally via a specific IP address. Such a "Single point entry" with an integrated internal firewall substantially increases cyber security.

Transparency for sustainable product development

TEMI+



Clearly structured dashboard

The integration of machines and production cells into an MES (Manufacturing Execution System) is essential for modern, transparent manufacturing according to Industry 4.0 standards. With TEMI+, the WITTMANN Group offers a scalable, high-performance solution for business entities of any size – from small local producers all the way to major global players.

TEMI+ enables intuitive integration of machines, auxiliaries, processes and staff members on a common platform. Production data are collected in real time and directly synchronized with the ERP system – for precise planning, reliable monitoring and informative analysis.

Thanks to Windows® IoT, the machine status and production key figures can be directly displayed on the machine's monitor screen via SmartMonitoring – for maximum transparency in ongoing operation.

Developed in close cooperation with the Polytechnic University of Milan, TEMI+ combines in-depth injection molding expertise with ultra-modern IT competence.

The result: an MES which optimally fulfills industry-specific requirements and delivers reliable KPIs – for future-proof manufacturing.

- › Real-time monitoring of all machines, appliances and system components
- › Easy production planning with the help of interactive Gantt charts
- › Complete traceability of products and material flows
- › Automatic OEE analyses
- › Integrated maintenance management
- › Compatible with all common ERP systems
- › Cycle-time controlled integration of upstream and downstream processes (optional)
- › Easy export of production data

Self-optimizing production

Assistance systems for a stable production process

Assistance starts on the level of individual machines and appliances. Here, it is often already possible to reap significant benefits from relatively small investments. For the adaptive assistance systems from WITTMANN ensure a repeatable, stable injection molding process. Even when the environmental conditions and material qualities fluctuate and expert staff members are not present during every shift.

With the HiQ software packages from WITTMANN, you will optimize the injection process. Expert is the name of software solutions which unfold their performance on the clamping side. Whether alone or in a combination of several assistance systems: HiQ and Expert provide transparency, intuitive operation, greater efficiency and higher quality standards.

All about the clamping unit

Assistance systems and Expert packages

On the clamping side, the WITTMANN Group offers extensive innovative assistance systems, which create substantial added value for customers not only in terms of process technology, but also in mold technology.

Especially **Mould Protect** excels by its high scan rate, thus ensuring high-precision mold protection. This contributes significantly to lengthening the mold's service life and sustainably increases process reliability.

The **Expert packages** can be seen as an extension of the entry-level basic and standard programs. With Expert Coining, Expert StepForce, Expert Venting and Expert ClampAdjust, you will benefit from high-precision control and monitoring of the clamping force, resulting in higher efficiency and better product quality.

Discover the advantages of our made-to-measure solutions and raise your production to the next higher level.

Coining

Higher surface quality
and fewer sink marks

Expert Coining

Basic Coining

Venting

Venting of the mold during
the injection process

Expert Venting

Mold protection

Prevents undesired stops
and protects the mold

Mould Protect

Expert

Clamping force adjustment

Optimized clamping force setting
Monitoring of mold breathing

Expert ClampAdjust

Basic ClampAdjust

Quality monitoring

Analysis of process stability
and detailed data collection

Expert Quality Monitoring

Basic Quality Monitoring

Parallel clamping force build-up

Better mold venting
increases efficiency

Expert StepForce

Basic StepForce

All about plasticizing

Assistance systems and HiQ packages

The HiQ packages are extending the proven Unilog machine control software by adding several intelligent functions, which enable autonomous process optimization. They not only offer machine operators deeper insights into the ongoing process, but also support day-to-day handling of the machine. If desired, the HiQ packages automatically intervene in the process and thus ensure consistently high parts quality, even with fluctuating production conditions.

Injection assistant – “Injection”

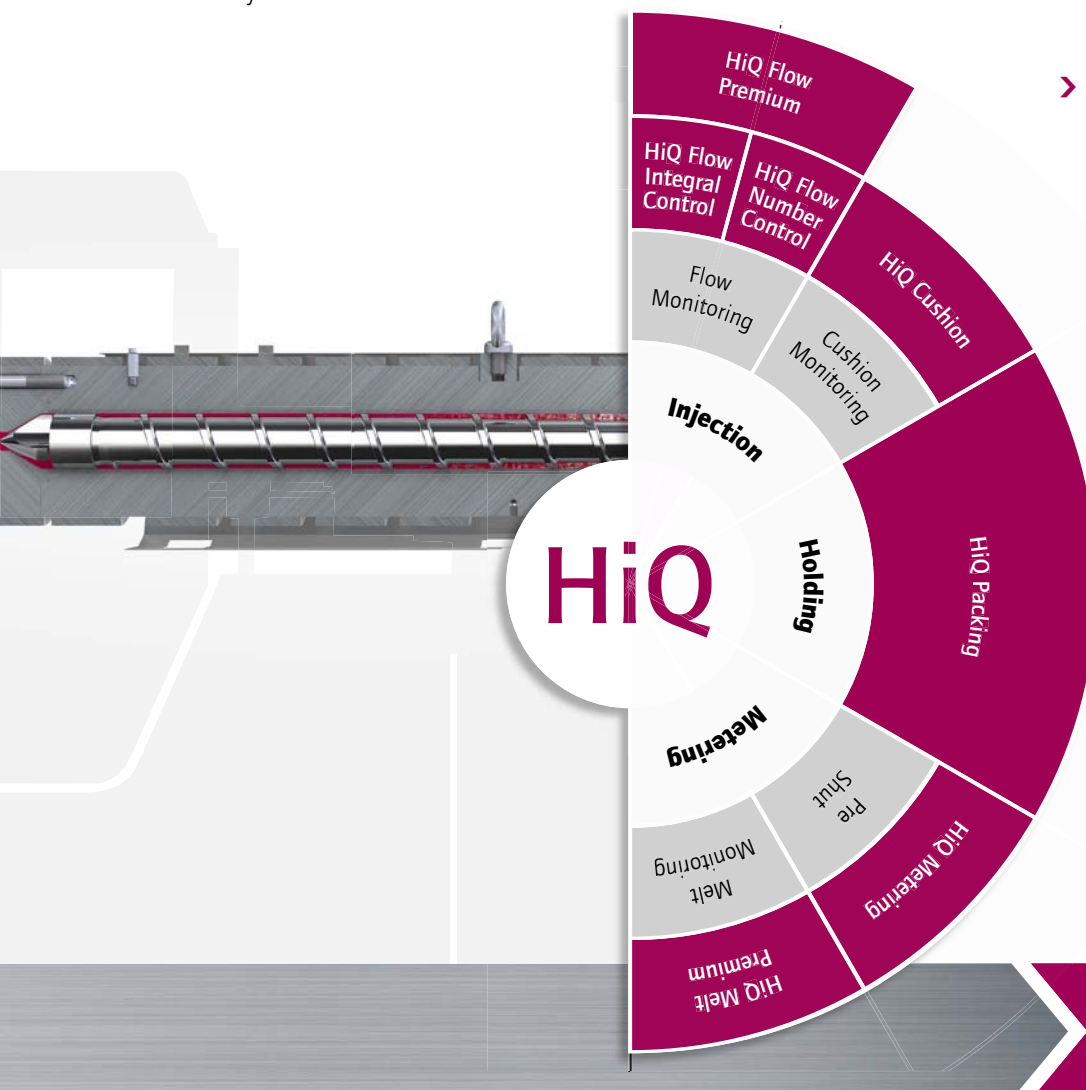
- **HiQ Flow Premium: high parts quality and consistent repeatability** through adaptive process regulation of change-over point and holding pressure within one cycle – “real-time correction” based on the data collected by flow monitoring
- **HiQ Cushion: Perfect production stability** through monitoring (Cushion Monitoring) and automatic adjustment (HiQ Cushion) of the melt cushion in the next cycle

Holding pressure assistant – “Holding”

- **HiQ Packing: reduction of scrap parts through even filling** of multi-cavity molds and in powder injection molding through optimized holding pressure profile and limited screw speed during the holding pressure phase

Metering assistant – “Metering”

- **HiQ Melt Premium: display and monitoring of the melt viscosity** through comparison of the MVR value with a reference value from stable production, in order to detect any material fluctuations early and counterbalance them directly, for stable melt and parts quality, on the basis of data generated by the Melt Monitoring program.
Melt Monitoring: a user-friendly traffic light system for the display and monitoring of dwell time, metering system utilization and melt cushion
- **HiQ Metering: melt cushion consistency and stable injection volume** through active closing of the check valve for consistent parts quality and consistent parts weight



Your key to injection molding success

Plasticizing systems

Plasticizing systems must meet a great variety of different requirements. From easy-flowing thermoplastics to viscously flowing materials with high filler content, and processing temperatures of up to 450 °C. From partly crystalline to amorphous plastics. From elastomers to thermosets. From virgin plastics to regrinds. From standard compact injection molding to specialized processes.

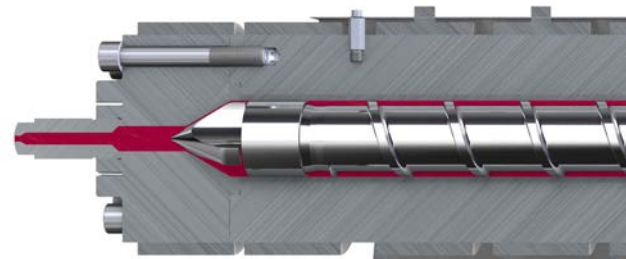
WITTMANN has the optimally adapted plasticizing unit for every injection molding challenge – for consistent high product quality, cost efficiency and a long service life of the injection molding machine.

- **Expert knowledge and experience** – development and in-house production of plasticizing systems have been core competencies of WITTMANN and previously BATTENFELD for more than 70 years.
- **Research and innovation** – the requirements for materials and processing methods are developing at a rapid pace. WITTMANN's plasticizing specialists anticipate these trends. So, you will be securely fit for the future with solutions from WITTMANN.
- **Counseling and support** – from selecting optimally suited plasticizing systems for new investments to continuous process optimization and retrofitting to accommodate changing requirements, WITTMANN will be your reliable partner for the entire life cycle of your production equipment.

Crucial for quality

The check valve

An extensive choice of check valves is available for the wide range of different applications. What they all have in common: their opening and closing is triggered solely by the movements of the screw and requires no separate mechanism. Their right combination of metals and optimized designs ensure a long service life for the machine components.



Ring check valve for universal use

Locking ring with longitudinal stroke and large flow cross-section

- fast-response closing
- minimal material stress
- good wear resistance



Ball check valve for large diameters

Ball valve with large flow cross-section

- optimal closing behavior for processing materials such as PP and PE
- wear-resistant due to smooth closing



PVC tip for highly sensitive processing

Screw tip optimized for PVC processing without check valve

- close to sprue
- low shear stress
- flow-optimized geometry



Customized solutions for specific requirements

In different designs, such as cross-bolt check valves with especially large flow cross-section

- minimal shear stress
- locking ring with longitudinal stroke and cylindrical screw tip with cross bolt

For maximum efficiency The plasticizing screw

WITTMANN offers application-specific geometries and surface alloys for high performance, melt homogeneity and dosing consistency.



Unimelt
The robust universal screw



MeltPro™
Barrier screw for extra high dosing performance



Colourmelt
Mixing screw for homogeneous coloring results



Special geometries
For customized technologies and customer-specific requirements



Wear protection – a top priority The equipment packages

	AK	AK+	AK++	AKCN
	Low-cost anti-wear protection	Good resistance against abrasion and corrosion	Maximum protection against abrasion and corrosion	Transparency for high optical demands
Application	Unreinforced plastics	Reinforced plastics	Reinforced plastics	Transparent thermoplastics (PC and PMMA)
Filler content	< 20 % (without colorants)	≤ 35 %	> 35 %	-
Bimetal barrel	Martensitic Fe-based alloy	Martensitic Fe-based alloy	Ni-matrix alloy with premium-quality tungsten carbide	Martensitic Fe-based alloy
Screw	Q+T steel with flight armoring and hard chrome coating	Powder metallurgical steel, hardened and tempered from ø 75 mm Q+T steel, with flight armoring and nitrided or with hard chrome coating	Powder metallurgical steel, Q+T and plasma nitrided from ø 75 mm fully armored (nickel-based alloy, tungsten carbide)	Powder metallurgical steel, Q+T and CrN-coated from ø 75 mm Q+T steel, with flight armoring and nitrided, CrN-coating
Check valve	Cold-worked steel, plasma nitrided	High-chrome plastic mold steel with armored tip	Hard metal inserts, solid hard metal ring	High-chrome plastic mold steel with armored tip, CrN-coated

Variety of combinations for innovative parts

Combimould multi-component injection molding

More efficiency in production, more sustainability: a decision in favor of multi-component technology is often the key to higher profitability. Process integration also opens the door to completely new parts attributes and functionalities.

WITTMANN has pooled its specialist knowledge about combining different materials and colors with each other under the name of Combimould. The WITTMANN experts are masters of all transfer methods, such as rotary unit and index plate technology or transfer and slide retraction technology, for multi-color, composite, assembly and sandwich injection molding.

flexible – diversified – efficient

The optimal machine to fit every application

MicroPower 15 t
for micro parts and nano
structures – energy-efficient
and cleanroom-compatible

For the production of smallest micro parts with shot weights of 0.05 to 6 g, the all-electric MicroPower Combimould offers ultimate precision, reliability and efficiency.

A rotary table, auxiliaries, automation, quality control and other process equipment are all accommodated on only 2 m² of floor space. Yet this machine concept offers great flexibility, for example in combination of thermoplastics with silicone.

SmartPower 110 – 400 t
for a wide range of applications
– with lots of
room inside the mold space

Flexibility is the great strength of the SmartPower Combimould. For its generously dimensioned mold space including a tie-bar pulling device holds the multi-component molds comfortably. With its modular design, the SmartPower Combimould adapts itself to a great diversity of production requirements.

It combines servo-hydraulic efficiency on the clamping side with high-performance electric injection units.

MacroPower 450 – 2200 t
for large dimensions –
with a compact footprint

Thanks to its two-platen design, the MacroPower Combimould saves valuable floor space also with multi-component applications of large dimensions. The MacroPower Combimould combines power with precision, offers a wide range of options and is equipped for handling all multi-component techniques.

The high-precision WITTMANN rotary unit with servo drive, up to 2 m in diameter, is frequently used and is available for machines of all sizes.

VM und VPower 40 – 300 t
for insert parts – great
flexibility with short cycle times

Their generously dimensioned rotary table and easy accessibility predestine the vertical machines from WITTMANN for multi-component processes with insert parts. Both the VM and VPower machine models are also available with a second injection unit.

To minimize cycle times, parts handling is carried out parallel to the injection process. In many cases, the second injection unit is used for overmolding of sealing, for example on plug housings.



Loudspeaker membrane
Multi-color process

- MicroPower 15 t | H-H
- PA6 | LSR
- Rotary unit technology



Bottle opener
Bonding and assembly process

- SmartPower 120 t | H-S
- PC | TPE
- Rotary unit technology



Photo: ATA KALIP VE PLASTIK

Laundry basket
Bonding process

- MacroPower 650 t | H-H
- PP | TPE
- Rotary unit technology



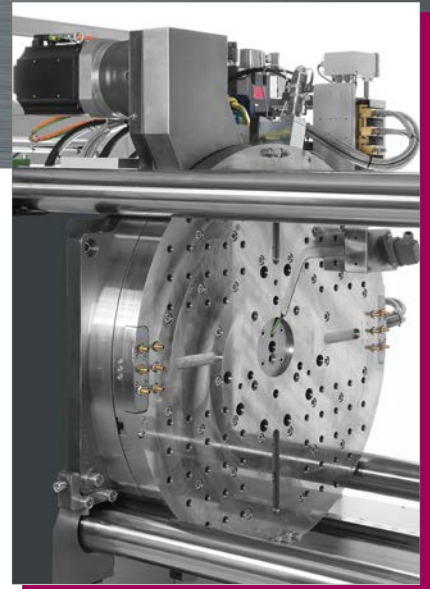
Plug for automotive industry
Bonding and assembly process

- VPower 120 t | H-V
- PA | TPE
- Transfer technology

Fast and precise Rotary unit and index plate drive

Highly dynamic and extremely flexible: the rotary units with servo-electric drives from WITTMANN stand out by their low height and maximal mold protection – in their standard version as well as in customized solutions.

In order to utilize the injection molding machine flexibly with single-component applications, the rotary unit can be very easily dismantled and re-installed within a very short time without renewed centering. Index plate drives are available for complex part geometries requiring a transfer of the preform inside the mold.



High performance meets flexibility The optimal unit arrangement for every application

The powerful WITTMANN injection units can be combined in a virtually unlimited choice of different arrangements. Each aggregate comes with its own path measurement device for the positioning of the nozzle – including display and monitoring by the machine's control system.

- **H-V arrangement:** the second injection unit is positioned vertically to the main aggregate – for injection from above, also within the parting line.
- **H-S arrangement:** the second aggregate is placed diagonally above the horizontal main aggregate.
- **H-L arrangement:** the second component is injected from the side opposite to the operator.
- **H-H arrangement:** both injection units are arranged horizontally and parallel to each other.
- **H-B arrangement:** the second injection aggregate is mounted on the moving mold platen.



Wittmann

Direct Current as energy source

DC Technology

The WITTMANN Group is the first manufacturer of turnkey systems to offer machines and production cells able to make direct use of energy from renewable sources such as photovoltaics. Using a local DC microgrid, the injection molding machine, as well as robots and temperature controllers, are powered directly by solar energy via a DC intermediate circuit. In addition, storage batteries can be used, so that any excess energy, for example solar power, can be stored efficiently for effective use later on.



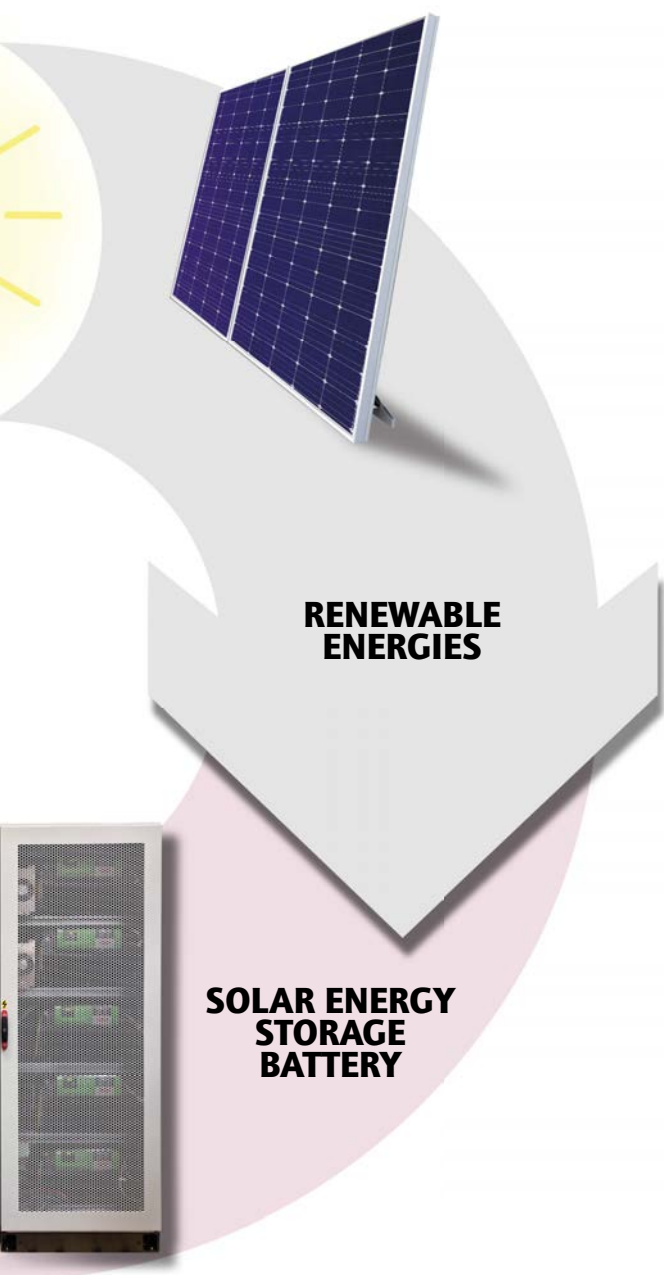
Direct use for more efficiency

Our optimized production cell

- **No conversion loss:** Direct use of the DC current generated by the photovoltaic system via a DC microgrid reduces the transformation losses caused in conventional power supply with alternating current by the constant changeover from AC to DC and vice versa. The result is a significantly more efficient energy transfer.
- **Optimal use of the deceleration energy** released by the machine and the WITTMANN robots thanks to KERS (Kinetic Energy Recovery System). The energy recovered from movements can be used not only within the production cell, but also by all consumers integrated in the DC microgrid. A further move to increase efficiency.
- **Elimination of reactive current transmission:** Reactive power losses can be minimized and energy transmission can be improved by using direct current.

OPTIMIZED PRODUCTION CELL





More sustainability

Use of renewable energies

- **Direct, efficient use of renewable energy sources:** Direct use of renewable energy sources, such as solar energy or wind power, not only cuts energy costs, but also makes a positive contribution to protecting the environment.
- **Conservation of resources and reduction of investment costs by up to 50% savings of copper** in a DC grid. The use of direct current enables more efficient utilization of copper cables, thus saving copper and reducing the environmental impact.
- **Reduction of CO₂ emissions (Greenhouse Gas Protocol Scope 3):** By conversion to renewable energies and efficient use of energy, the CO₂ footprint can be reduced, which contributes to climate protection.

Increasing stability and reducing costs

Solar energy storage battery

- **Storing energy:** Photovoltaic systems produce fluctuating amounts of electric energy. To continue using solar power in times of no sunshine, it makes sense to use a storage battery unit. This increases the internal consumption rate and promotes independence from external power suppliers, and reduces the electricity costs.
- **Peak Shaving:** Energy storage batteries can contribute to reducing costly load peaks. This leads to more even energy distribution and prevents network overloads.
- **Security of supply through bridging of power failures and controlled production stop** in cases of prolonged power grid failure through integrated power storage batteries (uninterruptible power supply – UPS is already included in the DC grid). The integration of storage batteries offers uninterruptible power supply and protects the production process against unexpected power failures.

Above-standard competence

Application technology

The WITTMANN Group proves its innovative strength not only by its machines, but also via a powerful and innovative range of process technology. A team of experts supports users in their choice of the optimal process for each of their specific projects.

Highly accurate machines and equipment specially geared to meeting customers' requirements combined with optimally matching plasticizing systems, software programs, automation and auxiliaries, all produced in-house, offer optimal solutions for your specific application.

Environmental and climate protection is a special concern of the WITTMANN Group. In addition to producing clean, energy-efficient machines, WITTMANN also offers technologies for processing recycled and bio-compatible materials.



Airmould – gas injection process for perfect surfaces

Airmould is the process developed by the WITTMANN Group for gas-assisted injection molding. Its two variants are the Airmould internal gas pressure process and the Airmould Contour external gas pressure process.

The equipment required for nitrogen extraction and pressure generation is available for individual machines as well as for central systems to supply several machines.



Cellmould – structured foam technology

Efficient light-weight construction through physical foaming

The production of structured foam parts by targeted blending of nitrogen gas into the plastic melt before injection into the mold has been a core competence of the WITTMANN Group for more than 30 years. The entire Cellmould technology and its special components, such as special screws as well as nitrogen and compressor units, are all developed and manufactured in-house.



Combimould – multi-component technology

Variety of combination options for innovative components

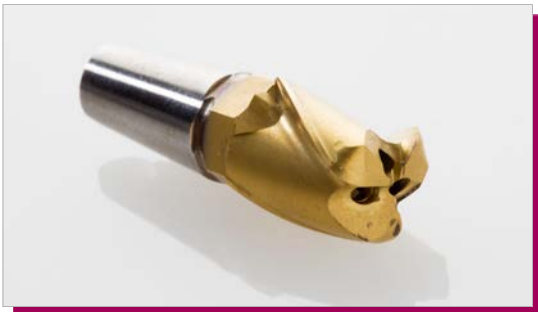
When two or more plastic materials in different colors or with different attributes are to be combined to form one part, the machines can be equipped with additional injection units in different configurations. For this purpose, the WITTMANN Group offers a vast pool of expert knowledge to cover all process variants, such as multicolor, composite, assembly, multi-component and sandwich injection molding.



LIM – Liquid Injection Molding **Material with extensive application potential**

LIM designates the injection molding process to produce elastic parts from 2-component liquid silicone rubber (LSR = Liquid Silicone Rubber).

To process LSR products, the WITTMANN Group uses proven modular machine and automation concepts together with plasticizing systems specially adapted to the viscosity of LSR.



PIM (CIM/MIM) – Powder Injection Molding **Metal and ceramic powder injection molding**

Powder injection molding is a process for series production of parts consisting of metallic or ceramic materials. PIM is the ideal process for making complex, functional parts in large numbers of units and with high demands on the material.



Injection and high-precision coining **Basic and expert coining**

Sequential standard coining is a process requiring high-precision stroke control of the clamping unit and is suitable for applications with symmetric force distribution inside the mold. For producing optical parts or parts with micro structures, the equipment for high-precision coining is available as an option.

Here, the embossing pressure is controlled in a highly dynamic way via the closing stroke.



Insert technology, metal/plastic **Assembly injection molding**

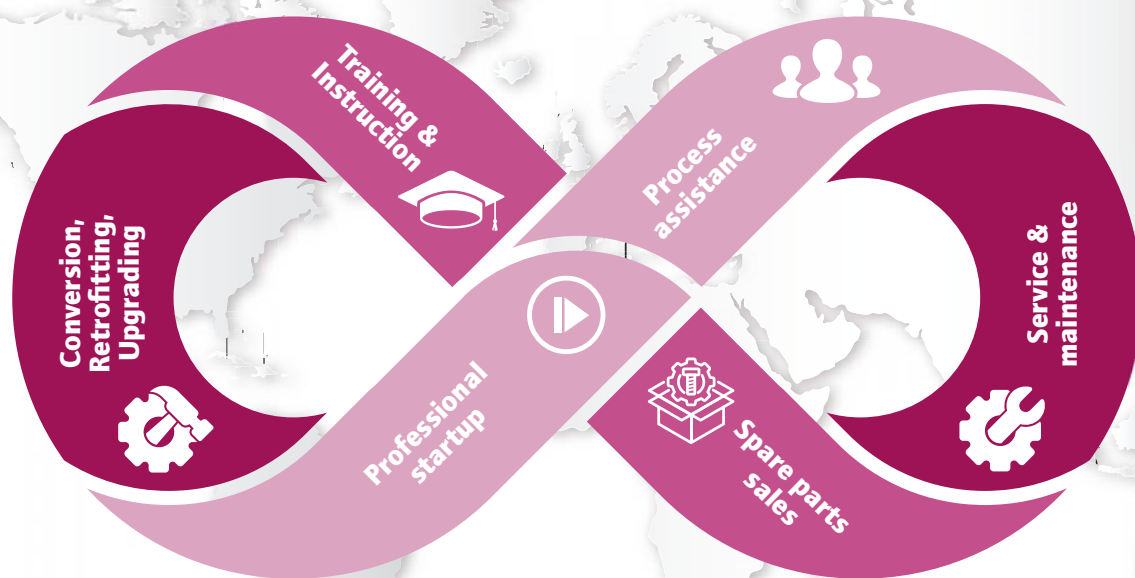
A traditional assembly application is overmolding of metal bushings or threading inserts. A positive connection is created by the overmolding process. The vertical machines from the WITTMANN Group are specially designed for applications with insert parts and offer optimal conditions for flexible production due to their vertical clamping unit.

Reliable partnership – throughout a machine's lifetime

Services

Maximum availability and productivity – that's the exact target to which our WITTMANN service engineers are totally committed. They solve every service problem reliably, fast and expertly – on site and online.

- **Professional installation and start-up:** this is often the beginning of a continuous success story over many years. You will benefit from our service engineers' high expertise and experience from the very first day.
 - **Process assistance:** the experts from WITTMANN have accumulated injection molding know-how and experience over many decades of corporate history. You can benefit from this asset. Jointly with our sales engineers, our service engineers and application technicians leave no stone unturned to achieve process optimization.
 - **Service & maintenance:** regular maintenance and servicing helps to prevent unplanned standstills and to lengthen the service lives of machines, equipment and molds. If you lack the necessary resources, our service engineers stand ready to help. Including preventive checks, calibration service, energy counseling and innovative tools for maintenance.
- With the hotline for immediate troubleshooting, you will lose no time in case of an emergency. Many problems can be solved at once by way of web service. And a WITTMANN service engineer from our global service network will always be quickly on site at your company.
- **Spare parts sales: original spare parts** from WITTMANN are delivered quickly. Many of our global subsidiaries are running a spare parts store of their own to keep the downtimes of your machines short.
 - **Training and instruction** are available to ensure that your workforce can fully exploit the machine's potential. We will train your staff members either on site at your company or at one of our global training centers – using latest machine models and modern presentation technology. You can either select the content of training courses specifically in cooperation with our experienced trainers or book one of our training programs about injection molding technology, robotics, bulk materials technology, process technology or maintenance. Following completion, all participants will receive a certificate to confirm their learning success.
 - **Conversion, retrofitting, upgrading:** whenever the machine has to meet new requirements or is relocated, we will re-adjust it. Retrofitting may also be profitable in other cases, for example when newly developed technologies will improve the efficiency, productivity and quality standards and extend the machine's service life.





Global **SERVICE EXCELLENCE**

guarantees you comprehensive support as needed.

Our **SERVICE ENGINEERS**

at your disposal worldwide

Fast **SERVICE ON SITE**

to maintain your long-term performance

Our **HOTLINE**

offers you support from service staff with practical experience and technological expertise outside of business hours, too.

Efficient **ONLINE SUPPORT**

offers you round-the-clock expertise from the WITTMANN service centers.

At **TRAINING CENTERS**

in many parts of the world, we will teach you and your staff members the know-how you need.

Wittmann

» We develop **technologies that meet the demands of today and tomorrow**, saving materials and energy while protecting the climate. Across the entire injection molding process, from material handling to inline recycling.

We live molding. «

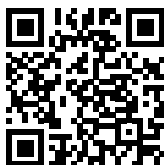
(Dr. Werner Wittmann)



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