EcoPower 55 – 550 t
All-electric, fast and precise
The advantages

» Dynamic toggle clamping unit with sensitive mold protection
» High-precision injection units with extreme shot-by-shot accuracy
» Fast, precise and efficient thanks to servo drive axes with parallel operation
» Additional energy bonus through patented KERS energy recovery system
» User-friendly through new UNILOG B8 control system with integrated assistance systems
» “Plug & Produce” extension into a full-fledged production cell possible with WITTMANN peripheral units and the WITTMANN 4.0 integration package
» Optimal price/performance ratio

The machine series

EcoPower standard: 11 clamping force sizes from 55 to 550 t
EcoPower MEDICAL: for clean room applications – from 55 to 550 t
EcoPower COMBIMOULD: for multi-component injection molding – from 55 to 300 t
EcoPower
The system-highlights

» Direct servo drives for main movements
The EcoPower machines come with highly dynamic servo motors to drive the main movements (closing/opening, plasticizing, injection). The mold height adjustment device in the clamping unit is also driven by a servo-electric motor. The ancillary strokes (ejector, nozzle stroke/contact pressure, core pulls) are driven by an integrated servo-hydraulic aggregate powered by a servo-electric motor. Direct servo-mechanic drives are available as an option.

» High-performance injection unit
The EcoPower injection units are equipped with a twin drive system for the injection and dosing functions. A torsion-resistant, one-piece cast iron frame with linear guides and a central ball screw drive provides the basis for highly dynamic, precise movements.

» Fast toggle clamping system
The EcoPower clamping unit is a 3-platen/4-tie-bar system with a 5-point toggle lever, driven directly by a servo motor via a rack-and-pinion drive. The moving platen of the machine travels on linear guides and rotating roller bearings without coming into contact with the tie-bars. Injection can already start during clamping force build-up.

» KERS – energy recovery is standard
The KERS kinetic energy recovery system, patented for injection molding machines, converts the kinetic energy released by braking processes into electrical energy. The resulting current is used within the machine, e.g. for barrel heating. With KERS, the energy consumption can be cut further by up to 5 %.

» Mould Protect – fast-response mold protection
The minimal rolling friction of the moving platen guide system combined with measurement of force changes inside the toggle lever drive offers optimal conditions for highly sensitive, self learning, fast-response mold protection.
CLAMPING UNIT
Servo-electric speed and dynamism

» Ample space for complex molds
  - Generously dimensioned mold platens [1] and a clean toggle lever clamping system offer the optimal environment for all molds including all media connections.
  - The ejector area and the environment of the platens offer easy access for machine setup and adjustment work. [2]

» Sensitive and precise
In the EcoPower clamping system, the tie-bars are exclusively used for force transmission between the outer platens. The moving platen travels virtually free of friction across the linear bearings without coming into contact with the tie-bars. [3]

» Servo-electric dynamism
  - The moving platen is moved quickly and with high precision by a self-locking 5-point toggle lever. [4]
  - The toggle lever is driven by a highly dynamic servo motor via a rack-and-pinion drive system. [5]
  - The synchronized mold height adjustment via 4 bronze bar nuts and a sun gear system is driven by a servo motor. In this way, an extremely accurate clamping force regulation can be achieved. [6]

» Servo-hydraulic ancillary strokes
To drive the ancillary strokes (ejector, nozzle strokes and core pulls), a hydraulic aggregate powered by a servo-electric motor is mounted on the inside of the machine frame. Being specially designed for high efficiency, it requires no cooling water connection. The maintenance-friendly access is from the rear, behind the clamping unit. Servo-mechanical drives for the ancillary strokes are available as options.
INJECTION UNIT
Precision from beginning to end

» Everything to ensure series consistency
  - All screws > 25 mm come with a 22:1 L/D ratio.
  - All injection units offer a wide injection pressure range.
  - Plasticizing parallel to clamping unit movements and start of the injection process during clamping force build-up are possible as standard.
  - EcoPower injection units with a higher injection performance can be supplied as an option.
  - Moment-free nozzle contact thanks to axial configuration of traveling cylinders [7]
  - Plasticizing units can be mounted to different injection aggregates with identical screw diameters.
  - In combination with WITTMANN BATTENFELD HiQ software packages sensitive adjustment facilities are available in the form of (optional) software modules to compensate environmental factors such as temperature and moisture, regrind or masterbatch content.

» Optimal operational excellence
  - The complete range of all-electric injection units is designed for quick barrel exchange from above.
  - Easy access for changeover work thanks to compact design and sliding guard [8]

» More productivity and efficiency
  - High-resolution absolute value encoder for precise control [9]
  - Low-noise injection spindle with modern ball screw drive and “spacer” technology and low grease consumption [10]

Anti-wear options
In addition to the premium-quality standard equipment, an extensive range of options is available to provide extra anti-wear and/or anti-corrosion protection. Predefined option packages and a selection matrix facilitate the selection of the right plasticizing unit.
**DRIVE TECHNOLOGY**

Energy efficiency with servo motors

Fast-responding, precise, cost-efficient

The use of servo-electric drive technology for all main movements affecting the cycle offers a large number of advantages compared to conventional hydraulic injection molding machines:

» Energy efficiency through direct drive without energy conversion into hydro energy
» Energy efficiency through the servo drives’ high efficiency rates
» Digital control for maximum repeatability
» Use of recovered braking energy via KERS system for powering of heater bands and bridging of short power failures
» Cycle flexibility thanks to possibilities with parallel movements
» Low sound emission (< 65 dBA)

The combination of servo motors and drive units (rack-and-pinion drive for the toggle lever and spindle drive for the injection stroke) can be supplied at different performance levels for different speeds.

Basically, the EcoPower drive concept offers the advantage of modularity for demand-oriented adjustment of drive performance to the intended use in each case.

Servo-hydraulic drive for ancillary strokes

» Integrated in the machine frame without additional space requirements
» Drive unit for hydraulic core pulls
» Energy-efficient, maintenance-free nozzle contact with high pressure
» No cooling required for standard applications
INSIDER CONCEPT
“ex works” production cell

The insider concept is an ex-works solution to transform an EcoPower injection molding machine into a fully fledged production cell. In its basic version, the equipment cell integrates a parts handling system, a conveyor belt for parts transport and a protective housing firmly connected with the machine. Additional equipment modules for further processing, quality documentation and packaging are available as options. For the design and configuration of such higher automation levels, WITTMANN BATTENFELD places the combined expert knowledge of the entire group at its customers’ disposal.

The advantages of insider automation

» Material flow systematization
  thanks to a uniform logistics interface for finished parts transfer at the end of the clamping unit, a prerequisite for positioning of several machines in rows

» Reduction of production space
  by up to 50 % compared to conventional automation solutions

» Minimization of robot cycle times
  through shorter travel paths and immediate parts depositing on conveyor belt

» Easy access in spite of integration
  to the mold and the robot thanks to mobility of the conveyor belt integrated in the protective housing

» Cost benefits,
  since safety features for all danger areas are already in place and certified ex works.

» CE mark included
  for every machine with an insider solution. No more costs for individual approval.
The new UNILOG B8 machine control system is the WITTMANN BATTENFELD solution to facilitate the operation of complex processes for human operators. For this purpose, the integrated industrial PC has been equipped with an enlarged intuitive touch screen operator terminal. The visualization screen is the interface to the new Windows® 10 IoT operating system, which offers extensive process control functions. Next to the pivable monitor screen, a connected panel/handset is mounted on the machine’s central console.

UNILOG B8
Highlights

» Operating logic
  with a high degree of self-explanation, similar to modern communication devices

» 2 major operating principles
  – Operating/movement functions via tactile keys
  – Process functions on touch screen (access via RFID, key card or key ring)

» Process visualization
  via 21.5" touch screen display (full HD), pivoting laterally

» New screen functions
  – Uniform layout for all WITTMANN appliances
  – Recognition of gestures (wiping and zooming by finger movements)
  – Container function – split screen for sub-functions and programs

» Status visualization
  uniform signaling system across the entire WITTMANN Group
  – Headline on the screen with colored status bars and pop-up menus
  – ambíLED-display on machine

» Operator assistance
  – QuickSetup: process parameter setting assistant using an integrated material database and a simple query system to retrieve molded part data with machine settings pre-selection
  – Extensive help library integrated
The process in constant view

» **SmartEdit**

*SmartEdit* is a visual, icon-based cycle sequence programming facility, which enables direct addition of special functions (core pulls, air valves, etc.) based on a standard process via touch operation on the control system’s monitor. In this way, a total user-defined sequence can be compiled from a sequence menu. This machine cycle, visualized either horizontally or vertically, can be adjusted simply and flexibly to the process requirements by finger touch with “drag & drop” movements.

**The advantages**
- Icon visualization ensures clarity.
- Clear events sequence through node diagram
- Alterations without consequences through “dry test runs”
- Theoretical process sequence can be quickly implemented in practice.
- Automatic calculation of the automation sequence based on the actual set-up data set without machine movements

» **SmartScreen**

- Partitioning of screen displays to visualize and operate two different functions simultaneously (e.g. machines and peripherals)
- Uniform design of the screen pages within the WITTMANN Group
- Max. 3 containers can be addressed simultaneously for the **SmartScreen** function.
- Adjustments of set values can be effected directly in the set value profile.

Remote communication

» **QuickLook**

Production status check via smartphone – simple and comfortable:
- Production data and statuses of all essential appliances in a production cell
- Complete overview of the most important production parameters
- Access to production data, error signals and user-defined data
- Facilities for grouping of appliances and sorting according to status available

» **Global online service network**

- Web-Service 24/7: direct Internet connection to WITTMANN BATTENFELD service
- Web-Training: efficient staff training by means of the virtual training center
With its communication standard WITTMANN 4.0, the WITTMANN Group offers a uniform data transfer platform between injection molding machines and peripheral equipment from WITTMANN. For an appliance exchange, the correct operating software is loaded automatically via an update function according to the "Plug & Produce" principle.

Connection of peripherals via WITTMANN 4.0

» WITTMANN FLOWCON plus water flow regulator, GRAVIMAX blenders and ATON dryers
  - Units directly addressed and controlled via the machine’s control system
  - Joint saving of data in the production cell, the machine and in the network via MES

» WITTMANN robots with R9 control system
  - Operation of robots via the machine’s monitor screen
  - High-speed communication between machine and robot to synchronize movements
  - Important machine movements can be set via the R9 robot control system

» WITTMANN TEMPRO plus D temperature controllers
  - Setting and control of temperatures via the machine’s control system possible
  - All functions can be operated either on the unit or via the machine’s control system

Integration in MES system
The integration of machines and complete production cells in an MES system is a prerequisite for an efficient and transparent production facility according to the Industry 4.0 concept. Depending on the customer’s requirements, small and medium-sized companies are offered a compact MES solution based on TEMI+. For large-scale and globally active companies, our cooperation partner is MPDV Microlab GmbH, a leading MES service provider. Due to the Windows® 10 IoT operating system, it is also possible to have selected status information from all connected machines on the production floor shown under SmartMonitoring on the display screen of every machine.

WITTMANN 4.0 system
With WITTMANN 4.0, a machine and its robots and peripherals are transformed into a uniform technical organism, which communicates externally via a specific IP address. A single point entry increases the cyber security significantly.
EcoPower
The option highlights

» Performance increase for injection
As an option, a "high-speed" version of the toggle lever drive is available. The injection dynamism and precision of the servo-electric injection units provide the prerequisites for manufacturing thin-walled molded parts with high standards of dimensional accuracy. This enables the production of thin-walled plastic parts for the packaging and electronics industries.

» Faster ejection
As an alternative to the standard servo-hydraulic drive for the ejector, a more powerful version with a servo-mechanical drive is available as an option.

» Electrical nozzle movement
Instead of the standard version of the nozzle system with hydraulic cylinders, the nozzle carriage equipped with a servo-electric drive can be supplied as an option (up to injection unit 1330).

» Fast media connections
For the ergonomically positioned standard connection points for cooling water, air and core pull hydraulics, optional fast-coupling plates (individual plates or system plates) can be supplied, as well as electrical plug-in systems for the hot runner heating circuits, temperature and pressure sensors and coding signals.

» WITTMANN peripherals
The extensive range of WITTMANN peripheral units offers appropriate solutions for all secondary processes of injection molding, including parts handling, material feeding and drying, sprue recycling and mold cooling. Via the optional WITTMANN 4.0 integration package, all additional appliances can be integrated into the production cell according to the "Plug & Produce" principle.
APPLICATION TECHNOLOGY
Outstanding competence

» Clean room injection molding
Whenever medical or electronic components need to be manufactured in a particle-free environment, the EcoPower concept with its easy-to-clean mold space offers good basic conditions, which can be further optimized to meet more stringent requirements by adding optional equipment modules (such as water-cooled servo motors and clean room packages).

» Technical precision injection molding
The EcoPower ensures highest standards of precision and reproducibility, with free-of-play force transmission and servo-electric drives. Technical parts such as SIM card holders can be produced with high accuracy and at high speeds. Minimal cycle times and reliable production processes ensure profitability and top-quality products.

» IML – In-Mold Labeling
The fast running EcoPower machines in combination with the proven WITTMANN handling technology are the basic equipment for high-performance in-mold labeling production cells to make directly decorated containers.

» COMBIMOULD
Where two or more different plastic materials in different colors or with different attributes are to be combined into one part, the EcoPower machines can be fitted with additional injection units in V or L configuration.
PIM (CIM/MIM) – Powder Injection Molding
Powder injection molding (PIM) is a manufacturing process for series production of parts made of metallic or ceramic materials. PIM is the ideal process to produce large quantities of complex, functional components with a high material requirements profile.

LIM – Liquid Injection Molding
LIM designates the injection molding process to make elastic parts from 2-component LSR (liquid silicon rubber). For LSR product manufacturing, WITTMANN BATTENFELD uses proven modular machine and automation concepts with special plasticizing systems adapted to the viscosity of LSR.

BFMOLD® – Variothermic technology
BFMOLD® (“ball filled mold”) technology combined with specially adapted heating and cooling aggregates enables cyclical heating and cooling of cavity areas close to the contours. The effect of this process is the elimination of joint lines and sink marks as well as accurate forming of high-gloss surfaces.

Injection molding of high-precision components
The high degree of precision in the movements of servo drives stands for an equally high level of precision and consistency of the injection parameters. This provides ideal conditions for processing engineering plastics into all kinds of high-precision components.
The maximum shotweights (g) are calculated by multiplying the theoretical shot volume (cm³) by the above factor.

<table>
<thead>
<tr>
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<th>Injection unit</th>
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<tbody>
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<td>t</td>
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</tr>
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<td>UP</td>
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Dark grey boxes = thermosets
Base machine
- Regional packages, Europe
- Drop voltage: 230/400V/3p+TN/TT, 50 Hz
- Painting RAL 7047 grey 4 / RAL 5002 ultramarine blue
- Air cooling system for drive unit (up to 300 t), water cooling for feeding zone with solenoid valve (from 400 t)
- One-piece base frame (up to 300 t) with 3 disposal directions
- Two-piece base frame (from 400 t) with 3 disposal directions
- Ejection area – coverage of ejection area according to EN 201
- Machine filled with hydraulic oil HLP32 zinc free according to DIN 51524 T2 / purity level 17/15/12 according to ISO 4406, lubricants according to H2-quality
- Operating manual in printed version incl. user manual on USB flash drive in any EU language according to definition of country incl. type examination certificate TÜV Austria in German incl. protocol: electrical safety according to EN 60204-1
- Injection molding machine according to machinery directive 2006/42/EG incl. declaration of conformity and CE-marking

Clamping unit
- Clamping force and closing and opening forces adjustable
- Mold safety program
- Moving platen supported by positioned linear guides
- Mold platen according to EUROMAP 2, clamping surface metallic bright, rest painted
- Fixing holes for robot on fixed platen as per EUROMAP 18
- Hydraulic multi stroke ejector
- Drive unit SO with speed controlled servo motor for hydraulic pump to increase the energy efficiency, injection axis, dosing axis and clamping axis with energy-efficient and performance optimized direct servo drive
- Servo electric ejector and injection unit movement up to injection unit 1330 (fully electric machine)
- Clamping system with 5-point twin toggle, servo electric direct drive via rack-and-pinion drive
- Servo electric mold height adjustment

Injection unit
- Screw drive by A.C. servo-motor for parallel recovery during cycle
- Plasticizing unit with screw in nitrated steel quality and barrel in AK+ for processing thermoplastics, without grooves, standard nozzle head, 3 zone universal screw, quick acting check valve (3 parts), heater bands up to 350 °C without insulation
- Thermocouple failure monitor
- Maximum temperature supervision
- Plug-in ceramic heater bands
- Temperature control of feed throat integrated
- Injection axis via servo motor and def. hydraulic nozzle contact pressure
- Linear guides in standard design, position sensor with non-contact stroke transducer
- Selectable barrel stand-by temperature
- Decompression before and/or after metering
- Physical units – bar, ccm, mm/s etc.
- Screw protection
- Peripheral screw speed indication
- Linear interpolation of holding pressure set values
- Bar chart for barrel temperature with set value and actual value display
- Selectable injection pressure limitation
- Changeover from injection to holding pressure depending on stroke, time and pressure
- Open nozzle R35
- Splash guard and barrel covering in standard execution according to EN 201, L/D 22 protected via limit switch
- Material hopper 6 litres (MH206) for automatic material feed, sliding device with shut-off function for material with sliding guide

Safety gate
- Covering injection side – maintenance door slidable with sensor
- Safety gate in standard execution, acrylic glass light-blue 309 / frame RAL 5002 ultramarine blue
- Safety gate at operator and non-operator side manually operated
- Safety gate clamping side front and back with maintenance-free locking manually operated

Electrics
- Control zone for nozzle heater band 230 V
- ambiLED status indicator
- Fuse protection for sockets
- Switch cabinet circulating fan for environment temperature to max. 30 °C
- Emergency stop switch button in control panel
- Printer socket
- USB – 1 x operating unit
- 1 Ethernet interface (switch cabinet)
- Printer via USB connection or network

Control system
- Control system UNILOG B8 – 21,5” multi-touch screen (full HD)
- Control panel with selectable haptic keys
- Software for operating hours counter
- Closing/Opening – 5 profile steps
- Ejection forward/back – 3 profile steps
- Nozzle forward/back – 3 profile steps
- Injection/Holding pressure – 10 profile steps
- Screw speed/Back pressure – 6 profile steps
- Parts counter with good/bad part evaluation
- Purging program through open mold
- Stroke zero offset settings
- Start-up program
- Switch over to holding pressure MASTER/SLAVE by injection time, screw stroke/injection volume and injection pressure
- Self-teaching temperature controller
- Display of temperature inside electrical cabinet
- Seven-day timer
- Access authorization via USB interface, password system and RFID authorization system (1 x check card IT-level-15, 1 x token customer level-30 and 1 x token customer service level-20 are included in delivery)
- Freely configurable status bar
- Physical, process-related units
- Automatic dimming
- Logbook with filter function
- User programming system (APS)
- User page
- Note pad function
- Cycle time analysis
- Hardcopy function
- Internal data storage via USB connection or network
- Online language selection
- Online selection of imperial or metric units
- Time monitoring
- BASIC Quality Monitoring (1 freely config. network connection, quality table 1000 storage depth, events protocol (logbook) for 1000 events, actual value graphics with 5 curves, 1 envelope curves monitoring)
- BASIC StepForce – Injection parallel to clamping force build-up
- Injection and Metering integral supervision
- Alarm message via e-mail
- SmartEdit – sequence editor
- QuickSetup – assistance program for initial parameter setting
- Energy consumption monitoring for motors and heating
- Clamp force supervision

...
### OPTIONS

#### Base machine
- Regional packages, country-specific
- Drop 1, special voltage, drop 2
- Handling package with open machine safety gate on non-operator side
- Parts hopper
- Parts chute for separation of good/bad parts or photoelectric ejection check

#### Hydraulics/Pneumatics
- Raw filter in water inlet of cooling incl. adapter with ball valve for oil maintenance on oil tank
- Hydraulic core pull for clamping plate, interface according to EUROMAP 13, incl. or without core pull pressure release
- Pneum. core pull on clamping plate/nozzle plate, incl. pressure regulator
- Hydraulic manifolds for one mold shut-off nozzle or more
- Air valves on nozzle plate/clamping plate
- Compressed air pressure maintenance unit incl. 1 or more way pressure regulation incl. directional exhaust valve with blocking function

#### Clamping unit
- Mold platen according to SPI, JIS, T-slots
- Mold platen incl. cooling channels
- Mold platen chemically nickel-plated
- Manual tie-bar retract device
- Hydraulic ejector in reinforced execution
- Unscrewing device in lieu of ejector
- Double check valve to keep ejector in end-position
- Ejector cross according to EUROMAP/SPI
- Mechanical or pneumatic ejector coupling
- Ejector platen safety
- Mechanical mold safety mechanism

#### Injection unit
- Plasticizing unit AK+ in wear and corrosion resistant execution
- Plasticizing unit AK++ in high wear and corrosion resistant execution
- Plasticizing unit AKCN in wear and corrosion resistant execution, for processing PMMA and ABS
- Plasticizing unit AKTN in wear and corrosion resistant execution, for processing PC
- Grooves in the feeding zone
- Barrier section, screw with mixing section
- Ball type screw tip
- Melt pressure transducer, melt temperature sensor
- Heater bands up to 450 °C
- Plasticizing unit in special execution for LIM, MIM, CIM, PVC
- Barrel insulation
- Open nozzles in special execution
- Needle type shut-off nozzle operated with spring, pneumatically or hydraulically
- Barrel covering and splash guard in special execution
- Vacuum package incl. vacuum pump
- Material hopper in special execution
- Hopper magnet

#### Safety gate
- Safety gate clamping side, rear side and/or operator side elevated, lowered or extended
- Insider package WITTMANN rear side incl. conveyor belt
- Safety gate clamping side electrically operated
- Front side gate safety system for manual part removal incl. clearance of ejector

#### Cooling and conditioning
- Cooling water distributor with/without blow-off valve
- Solenoid valve for cooling water distributor
- Machine cooling by T-piece in inlet pipe
- Filter back flushable/water pressure supervision in inlet pipe
- Distributor block on nozzle plate/clamping plate

#### Electrics
- Temperature control zones for hot runner
- Acoustic element integrated in signal lamp
- Socket combination
- Additional fan in electric switch cabinet for increased environment temperature
- Cabinet air conditioner
- Additional emergency stop switch button
- Interface for robot, conveyor belt, TCU, dosing unit, AIRMOULD®, BFMOLD®, mold surveillance, production data logging system, RJG eDart, Priamus BlueLine, danger zone boundary, ejection in mold middle plate, brushing device, relay signals

#### Control system
- Cavity pressure switch over
- BNC sockets for injection process analysis
- EXPERT Quality Monitoring (4 freely configurable network connections, quality table with 10000 storage depth, events protocol (logbook) for 10000 events, actual value graphic with 16 curves, 4 envelope curves monitoring, SPC charts, trend diagrams)

#### Mold identification
- Special programs on customer request
- HiQ-Cushion® – melt cushion control
- HiQ-Flow® – injection integral control
- HiQ-Melt – monitoring of material quality
- Software Tandemmould, multiple data sets

#### Energy consumption analysis
- Injection compression and venting program
- Initiation of next cycle by closing safety gate
- Special program ejector intermediate stop/ejection of cold slug
- Additional output card/input card, freely programmable
- Integration package WITTMANN 4.0

#### Additional equipment
- Tool kit
- Levelling pads
- Lighting in mold space
- Mold clamping systems in mechanical, electrical or hydraulic execution
- Integration package (robot, feeder, dosing unit, TCU, mold integration)
- WITTMANN BATTENFELD web service during warranty period free of charge
- Remote control package