MicroPower 5 – 15 t

Perfect business performance for small and micro parts

Technology working for you.

Battenfeld
world of innovation

Special features of the MicroPower series 5 – 15 t

Cost-efficiency and availability

Apart from unrivalled parts quality, the main benefit of the *MicroPower* lies in its cost-efficiency. Through shorter cycle times and lower material and energy consumption, cost savings between 30 and 50 % can be achieved compared to standard machines.

Flexibility and easy operation

From simple manufacturing of small parts to the production of injection-molded high-precision and micro parts, the consequently improved all-electric *MicroPower* offers optimal solutions thanks to its intelligent machine concept. This concept makes it possible to extend a basic machine model – starting from a simple "general purpose machine" for small parts – to a multi-functional production cell for highly complex micro parts, just by connecting modules.

Outstanding parts quality

The injection unit allows processing of all injectable materials with shot volumes of up to 4 cm^3 and feeding of all common standard granulate sizes. The unique injection process guarantees processing of thermally homogeneous melt – which ensures an
outstanding quality for micro parts.

The range of possible applications includes minute parts with micro and nano structures as well as high-quality medium-sized parts with large numbers of cavities.

Standard clamping unit

The standard version of the *MicroPower* is a high-precision, high-speed, all-electric injection molding machine with every axis driven by its own servo motor.

The finished parts can drop out through the ejection chute or be removed by a simple handling device.

The generous free space around the clamping unit is sufficient to accommodate even highly complex molds.

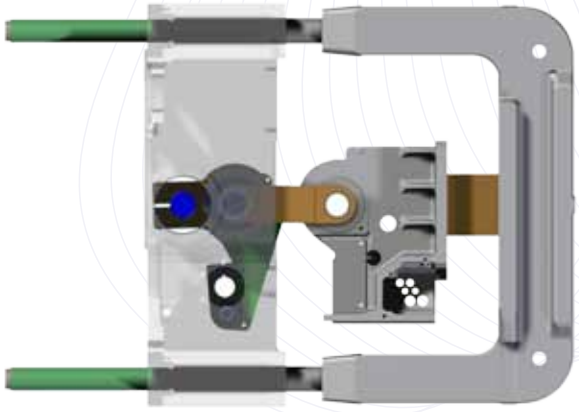
The ejector comes with a servo-electric drive as standard.

Clamping unit with rotary disk module

The rotary disk module allows the use of a second lower mold half. Parts ejection takes place parallel to injection.

This enables a substantial reduction in cycle times and facilitates subsequent production steps.

Production with only one lower mold half on a *MicroPower* with a rotary disk module presents no problems either.



Toggle system

A highly dynamic servo motor and a 5-point toggle absolutely free of play ensure perfectly symmetrical force transmission as well as high-precision guiding.

This in turn ensures highly accurate, repeatable movements and also enables reliable detection of even the smallest parts by the *MicroPower*'s mold protection system.

Flexible free space

The base of the *MicroPower* consists of a central rectangular main beam, on which the injection and clamping units are mounted – disconnected from traction.

In this way generous space is provided inside the machine for lateral connection of further standard modules to the base, such as a camera system, a W8VS2 WITTMANN robot or customized automation solutions, thus extending the *MicroPower* to a complete production cell.

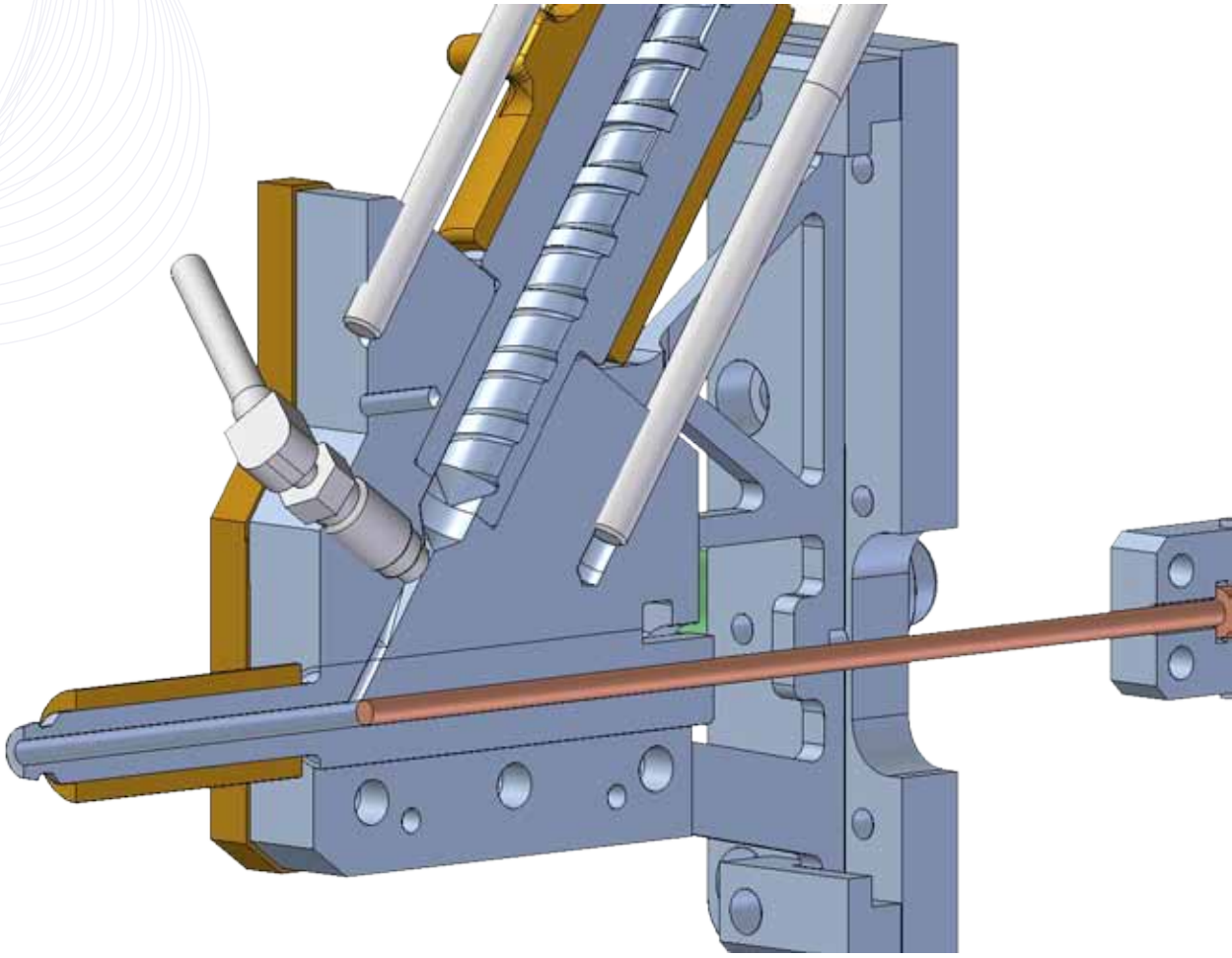
Injection unit MicroPower 5 – 15 t

Injection unit – outstanding quality, stable and accurate

The injection unit of the *MicroPower* can be regarded as the benchmark in micro system technology. It is able to inject thermally homogeneous melt with minimal flow paths.

The highly dynamic plunger injection process ensures that even maximum pressures can be realized in the cavity with perfect repeatability. The injection aggregate also reduces the melt cushions and the sprue to an absolute minimum.

This technology offers a wide processing window, with the help of which high process stability can be reached very quickly. Not only small parts, but also micro parts and parts with nanostructures can be manufactured cost-efficiently and with repeatability in a minimum of time.



The main benefits:

- Wider processing window.
- Higher dimensional stability of parts.
- Less warpage of parts.
- Less degradation of plastic materials.
- Less rejects.
- More stable production.

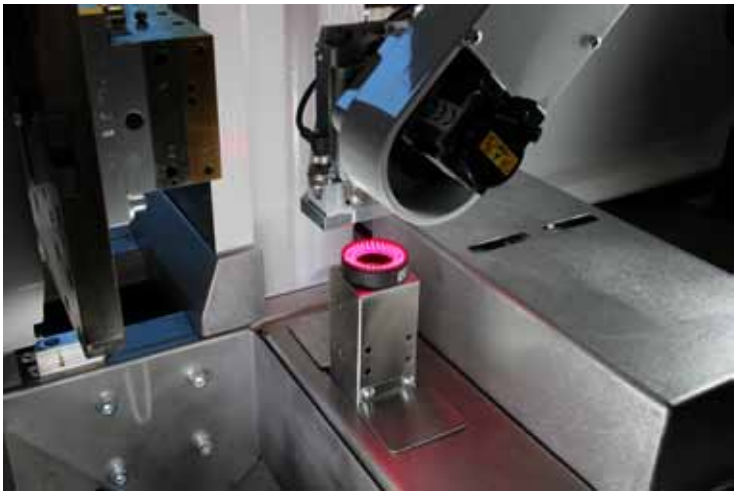
Range of processible materials:

- Standard plastics (e. g. PP, PE).
- Engineering plastics (e. g. POM, PA, ABS, PBT, PC).
- Elastomers (e. g. TPE, TPU).
- Teflon (e. g. PFA, PTFE).
- Powder (e. g. MIM, CIM).
- Bioplastics (e. g. PDLL, PLA).
- Liquid silicone (e. g. LSR).

Peripheral equipment – an uncompromisingly holistic approach

WITTMANN BATTENFELD as a system supplier of cost-efficient solutions all from a single source has also adapted the entire range of peripheral equipment to the production of small and micro parts, from material feeding devices and material dryers for small volumes and throughputs to tempering systems with corresponding performance levels.

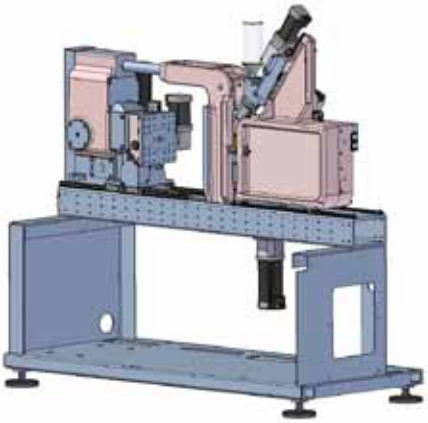
For automation, a flexible vertical robot has been developed for small parts. With the all-electric W8VS2 Scara robot, the injection-molded parts can be removed and further processed with high dynamism and precision. Even demanding tasks such as insertion and over-molding technology are possible with these robots. In combination with the handling system, a quality assurance camera system is also available for optical parts inspection.

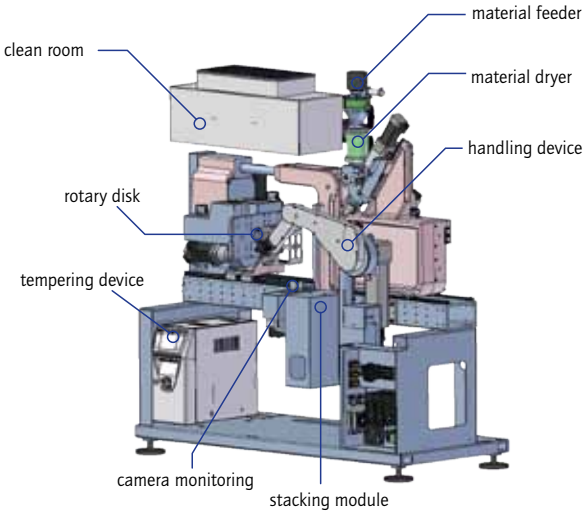


The clean room-compatible design and a clean room module which enable class 6 clean room environment according to ISO 14644-1, are optimal for medical applications.

Small injection-molded parts may stick even to the ejectors or to the mold, due to their low weight and electrostatic charges. They also attract particles from the surrounding atmosphere. To prevent this, the ionization package provides a facility for electrical discharge. A stacking module for depositing injection-molded parts separated according to cavities is also available. A decisive advantage is the ability to operate the entire range of peripheral equipment via the machine's UNILOG B6^{P} control system.

MicroPower – multifunctional production cell





MicroPower – the cutting edge by holistic approach

With its *MicroPower* machine series, WITTMANN BATTENFELD demonstrates its more than 20 years of expertise in the production of all-electric injection molding machines. The *MicroPower* is not only setting benchmarks. It also offers the advantages of extreme cost-efficiency, precision, flexibility and user-friendliness. The *MicroPower* represents another successful and substantial increase of customer benefit in injection-molding of small, high-precision and micro parts.

Customer benefit – top-quality parts, inexpensive and flexible

Fast and precise:

- Precise and powerful.
- Absolute repeatability of the injection process.
- Parallel movements of all axes.

Cost- and energy-efficient, economizing on resources:

- Cycle times shortened by up to 50 %.
- Up to 90 % of material saved in sprue.
- Up to 60 % less energy consumption thanks to suitable manufacturing equipment.
- Less rejects through optimal process.
- Shorter start-up time to reaching stable injection parameters.

Clean and quiet:

- Clean mold space free of grease through linear guides and encased toggle bearings.
- Perfect suitability for clean room and medical applications.
- Easy access to all components and generous free space.

Compact and flexible:

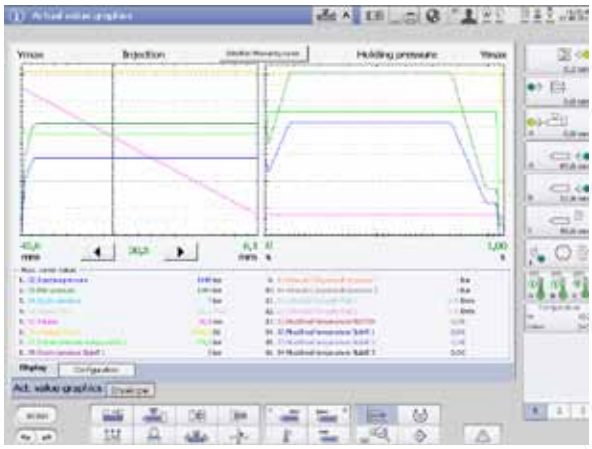
- Individually extendable to a complete production cell.
- Perfect suitability for clean room and medical applications.
- Integration of WITTMANN peripheral equipment such as robots, dryers and tempering devices inside the machine frame.

The UNILOG B6^{P} control system generation

UNILOG B6^{P} is the name of the new control system generation that is setting benchmarks in user-friendliness, speed and precision. It is used across the entire product portfolio. A powerful system concept optimally geared to the requirements of hydraulics/sensor technology ensures fast, accurate movements along all axes of the machine. Precise analysis of all important process parameters provides the user with the control required for demanding applications.

- Operating system Windows
- 15" TFT color screen with unlimited touch screen functionality for operation and display.
- 2 rows of soft keys to select machine functions.
- Freely configurable status bar for all machine operating functions.
- Access authorization via password system and USB flash drive, complete events protocol, quality table, online support system, envelope curves monitoring, cycle time analysis, alarm message via Email and other functions.
- The complete machine documentation including all operation manuals, spare parts drawings and parts lists can also be retrieved. In addition, users can integrate their own PDF files and make them available to machine operators.
- USB interfaces are available on the operating unit to connect peripheral equipment such as a printer, keyboard or USB flash drive, or they may be used as an access control system in combination with the integrated password system. Two Ethernet interfaces are installed in the control cabinet at the rear.
- Optional: Manual operating panel with 48 membrane keys to operate the machine's axes and optional equipment and 10 membrane keys with luminous rings are available for the basic machine functions (drive, operation modes, heaters). Space for 7 additional optional mechanical switches/keys.
- Optional: HiQ package with SPC chart, trend diagram and further recording possibilities.

Control elements



Actual value graphics

Important process factors can be clearly and concisely visualized. All data processing and monitoring functions are covered by a single control system.

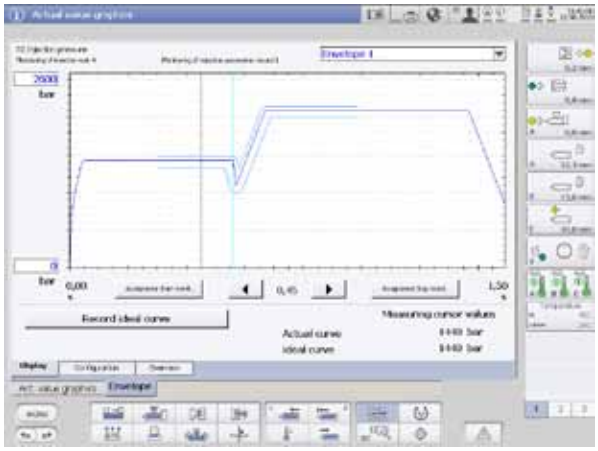
Open interfaces facilitate access, simplify operation and integration in customers' networks.

Energy measurement

Clear visualization of energy consumption is possible with UNILOG B6^{P} Various modes of operation can be displayed as required in terms of cycle time or material consumption.

Consequently, the machine's energy- and cost-efficiency with regard to energy consumption can also be evaluated and calculated by means of accurate process analyses.

Included as standard with *EcoPower* and *MicroPower* machines, available as an option for other models.



Quality monitoring

With up to four (HiQ package up to 16) envelope curves, the monitoring parameters are optimally adapted to the individual process.

An ideal curve serves as monitoring reference within the tolerance margin. Whenever the tolerance margin is exceeded, an alarm is triggered and the faulty part automatically sorted out.

Every parameter can be visualized via the quality table and evaluated by means of an SPC chart.

Cycle time analysis

The purpose of cycle time analysis is to record and optimize all movements. It is a fast and simple method of defining the optimal cycle.

The ideal cycle is stored as part of the mold data set and can be retrieved for the next production run of the mold. This enables quick recognition and correction of any process deviations.

Integration and communication

Robot control

WITTMANN robots are operated simply and flexibly via the machine's monitor screen, no switch-over is necessary between machine and robot control.

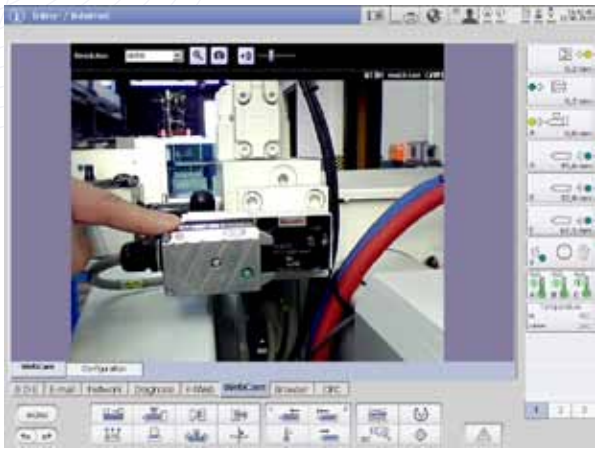
The total overview is given on one screen. The control system of the robot itself is still placed directly on the robot.

Communication takes place via a CAN bus system, the EUROMAP interface remains free.

Webcam

A webcam is integrated in the injection molding machine to visualize production monitoring.
This makes it possible to display areas on the B6^{P} control system that are normally not open to view, such as robot-assisted part deposition or the mold area.

The integrated webcam is used in particular also for 24/7 Web-Service. Intelligible pictures of the problem situation on site can be transmitted to our global support center to enable effective analysis.



Process data acquisition via K4

We offer BATTENFELD K4, a process data acquisition software that provides access to a central database. Centralized data administration runs on a server and is also directly integrated in the UNILOG B6^{P}. Thus the plant's entire machinery can be monitored and all machine data accessed via every machine control system.

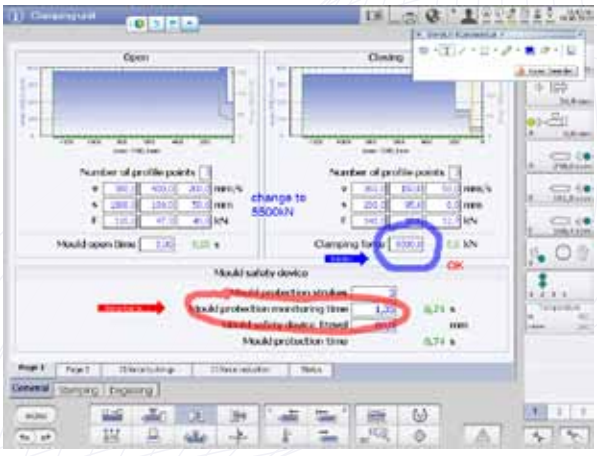
K4 is an innovative MES (Manufacturing Execution System) and provides a unique scope of functions. It not only offers machine parameter settings and quality assurance, but also maintenance records, preliminary and final costing, order-related staff work time logging and hall layout, as well as innumerable evaluation options including open item management, everything covered by and available from a single system.

Web-Service 24/7

WITTMANN BATTENFELD meets the plastics industry's demand for 24/7 availability with a global network of experts.

With the help of the web service center, experienced service engineers establish a direct link to the customer's injection molding machine via the Internet.

In this way, actual service tasks on the machines are performed quickly and flexibly, which ensures optimal productivity and conservation of value.

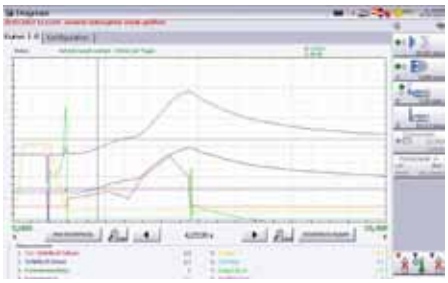


Application technology MicroPower 5 – 15 t

The machines of the *MicroPower* series feature maximum precision, availability and reproducibility. Moreover, cost-efficiency is ensured by their fast cycles. Other benefits are low noise level and cleanness. This enables the *MicroPower* to meet the most stringent demands in numerous applications. The *MicroPower* is ideally suited for medical technology, industrial and high-precision components, automotive parts, lifestyle products and more.

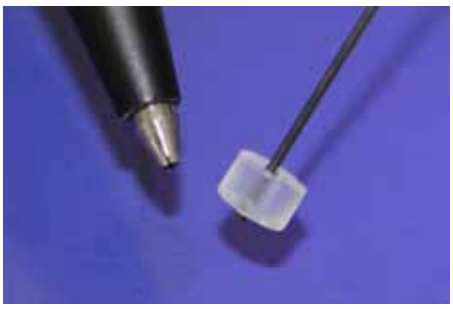
High-precision embossing – „Hi-Q Shaping"

Hi-Q Shaping is an innovative embossing process which allows highly dynamic and accurate regulation of the embossing pressure via the clamping stroke on the basis of mold temperature or cavity pressure, depending on the specific process. It enables a drastic reduction in material tension and orientation as well as warpage thanks to considerably lower shear rates.



Liquid silicone processing

Flexibility thanks to rapid changeover from thermoplastic to LSR injection unit, combined with ultimate precision and reproducibility even in LSR applications.



2C technology

By connecting two standard machines with each other, it is possible to insert-mold 2C parts, for example overmold hard with soft components.

Photo: courtesy of mikrotechnik Freudenreich GmbH & Co. KG

Reel to reel overmolding

Metal and plastics overmolded on a continuous band. More or less a technology of the future with production according to the principle of a conveyor belt line.

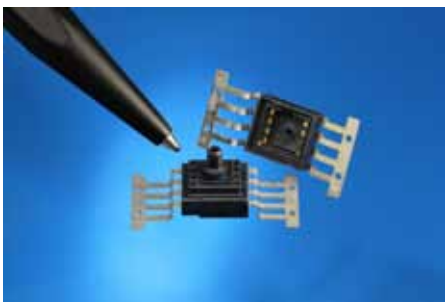


Photo: courtesy of mikrotechnik Freudenreich GmbH & Co. KG

Powder injection molding (metal/ceramic)

The *MicroPower* enables processing of standard materials, from feedstock to exotic compounds.

Photo: courtesy of Frauenhofer IFAM

Insert technology

Cost-efficiency thanks to a modular machine concept and consequently maximum flexibility even in standard versions with an integrated Scara robot.

Photo: courtesy of Micro Systems (UK) Limited

Microstructures

Microstructures – micrometers are crucial for functionality. Functional surfaces – products with potential.

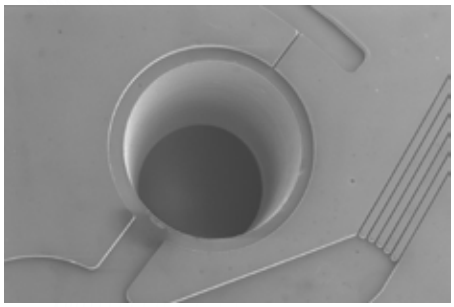


Photo: courtesy of IMTEK©

High-temperature applications

Ideal for both high-temperature plastics and high-tech materials.

Photo: courtesy of Kleiss Gears Inc.

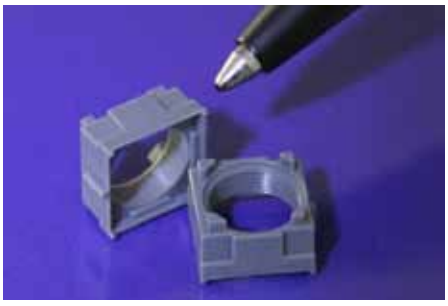
Medical technology

Gentle processing of materials such as bioresorbable plastics. Fully automatic production in clean room environment.

Photo: courtesy of Euroortodoncia

Technical micro injection molding

Efficient, low-cost production of small and micro parts, such as producing a screw thread in parts with the help of an integrated unscrewing device.



Sprue engineering

Small quantities of sprue create faster cycles, and the resulting cut in material consumption enables higher production output and greater profitability.

Standard features MicroPower – UNILOG B6P

Machine in general

- Paint RAL7047 tele grey 4/ RAL5002 ultramarine blue
- Rectangular main beam on one-piece base frame
- Built-in control cabinet
- Part transp. on operator side, or parallel to machine axis
- Drillings for peripheral equipment – like robot, camera, etc. – operator sided on rectangular main beam

Clamping unit

- Clamping system: 5-point toggle with servo electrical direct drive
- Servo-electric mold height adjustment
- Clamping and opening forces for mold safety system adjustable
- Mold safety program with envelope curves monitoring for optimal mold cover
- Precise platen parallelism with low-maintenance moving platen support
- Platen drillings metrical as per EUROMAP
- Clamping force displayed on screen
- Clamping force monitoring incl. display via screen
- Servo electric ejector
- Mechanical ejector couple

Injection unit

- Servo closed loop control
- Increased injection performance
- Screw drive by 3-phase servo motor, screw speed continuously adjustable via screen
- Barrel, screw, distributor block and injection nozzle in hot-work tool steel, injection piston TIN coated
- Thermocouple failure monitor
- Plug-in ceramic heater bands
- Open nozzle
- Quick removal for injection nozzle and cylinder
- Hopper of V2A stainless steel can be shut and emptied
- Linear bearings for the injection unit
- 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

Safety gate

- Maintenance-free safety gate locked by electromagnet
- Monitored safety gate according to CE
- Safety gate on the rear side

Cooling and conditioning

- Watercooling with open cooling system
- Feeding zone with controlled cooling system

Additional Equipment

- Operating instructions
- User manual

Electrical components

- Operating voltage 230/400 V-3PH, 50 Hz
- Common voltage supply for drive and heat
- Separate voltage supply for drive and heat USA/CDN
- Control unit UNILOG B6P with touchscreen, operating system Windows
- Software for operating hours counter
- Closing/opening – 5 profile steps
- Ejection forward/back – 3 profile steps
- Injection/holding pressure – 10 profile steps
- Injection parallel to clamp force build-up
- Screw speed/back pressure – 6 profile steps
- Parts counter with good/bad part evaluation
- Purging program
- Stroke zero offset settings
- Start-up program
- Adjustable injection pressure limitation
- Switchover to holding press. MASTER/SLAVE by injection time, screw stroke/ injection vol. and injection pressure
- Self-teaching temperature controller
- Display of temperature inside electrical cabinet
- Seven-day timer
- Access authorization via USB interface
- Access protection via password system
- Freely configurable status bar
- Physical, process-related units
- 15" TFT color screen – touch screen
- Energy consumption monitoring for motors and heating
- Automatic dimming
- Logbook with filter function
- User programming system „APS"
- Cycle time analysis
- Energy measurement displayed
- 1 freely configurable network connections
- Freely configurable screen pages „user page"
- Notepad function
- Hardcopy function
- Internal data storage via USB connection or network
- Online language selection
- Online selection of imerial or metric units
- Operator manual incl. hydr., mech. and el. schedules online
- Time monitoring
- Quality table, 1,000 storage depth
- Events protocol (logbook) for 1,000 events
- Actual value graphics with 5 curves
- 1 Envelope curves monitorings
- Injection integral supervision
- Metering integral supervision
- Alarm message via Email
- USB – 2 x operating unit
- 2 Ethernet interfaces
- Printer via USB connection or network

Optional features MicroPower – UNILOG B6^{P}

Machine in general

- Servo electric rotary table
- Mechanical mold safety mechanism
- SPI bolt pattern
- Ejector platen safety device as per EUROMAP 13
- Parts chute for separation of good/bad parts
- Nickel plated platen in lieu of standard
- Air valve, action initiated (ON) and timer (OFF)
- Non-standard layout of fastening bores in clamping/nozzle platen
- Cooling channels in the mold mounting plate
- Turning-out device with servo motor, installed on ejector plate

Injection unit

- Grooves in the feeding zone of barrel for improved feeding
- High temperature heaterbands up to 450° C
- Barrel insulation
- Enter block with additional connection for nitrogen supply in lieu of standard
- Wear and corrosion resistant injection unit AK+
- Equipment package for liquid silicone
- Equipment package for PIM (MIN/CIM)
- Equipment package for technical plastics (PC, PMMA, ABS)
- Equipment package for bioresorbable materials
- Screw in special geometry for PIM (MIM/CIM) execution in addition
- Screw in special geometry for biodegradable material in addition
- Screw in spezial geometrie for technical plastics in addition
- Conversion kit injection unit reduction to size 3 in AK+
- Vacuum package: vacuum pump incl. interface, vacuum valve, vacuum sensor
- Material hopper in DURAN glas design, 0.6 litres in volume
- Connecting flange for customer-supplied hopper drier or drying unit
- Equipment packages available in lieu of standard and/or in addition

Safety gate

- Pneumatic safety gate at the operator side
- Initiate next cycle by closing safety gate in semi-auto operation
- Front side safety system for manual part removal

Pneumatic

- Pneumatic maintenance unit incl. pressure regulation
- Pneumatic core pullers incl. pressure regulator
- Additional compressed-air controller

Cooling and conditioning

- Watercooling with closed cooling system
- Hosting of cooling circuits on the fixed platen of the moving platen
- Integrated WITTMANN temperating units and dryer
- Cooling circuits 2x additionally without shut-off valve

Granulat dryer/feeder

- Integrated WITTMANN dryer/dew point sensor
- Integrated WITTMANN feeder

Robot/handling unit

- W8VS2 WITTMANN Vertical Scara Robot with 3 servo axis
- Teachbox R8.2
- Additional valve
- Additional vacuum circuit (Venturi)
- Additional vacuum circuit (Venturi with blow-off function)
- I/O expansion control cabinet (8I/8O)
- Interface for COGNEX camera
- Adapter for gripper plate (EOAT) with crash sensor

Cleanroom/quality control/deposit

- Sprue cut-off appliance with air nozzle
- Cleanroom filter with fan
- Cleanroom – air conditioning unit
- Quality control standard
- User monitor for quality control
- Deposit unit standard
- Ionisation standard
- Ionisation for part deposit

Electrical components

- Temperature control zone for hot runner
- Special voltage
- Control cabinet cooler
- Manual board
- Interface for handling equipment
- Energy consumption analysis
- Switch over to holding pressure by cavity or melt pressure
- Switch over to holding pressure by external signal
- Injection compression and venting sequences
- Audible alarm
- Analog temperature control interface
- Temperature control interface digital, serial 20 mA TTY protocol
- CAN-Bus-interface for mold conditioner as per EUROMAP 66-2
- Interface for WITTMANN dryer integrated
- Interface for WITTMANN temperating units integrated
- Interface for sprue cut-off appliance
- Interface for robots as per EUROMAP 67
- Interface for robots as per EUROMAP 67 with additional signals for rotary table
- Adaptor from EUROMAP 67 to EUROMAP 12
- Interface for conveyor belt
- Interface for fully integration of robot incl. Ethernet switch
- Host computer interface/PDA (EUROMAP 63)
- Relays contact parallel to plasticizing
- Kistler module for cavity pressure dependent switchover
- BNC connectors for injection process analysis
- Machine fault (potential-free contact)
- Interface for vacuum pump
- Second injection data setting for automatic start up
- Web- and remote service
- Part inlay monitoring via vacuum
- Variotherm processing package
- Signal tower on the machine
- Injection compression program
- Extended injection compression program
- Gate start special program
- Special program according to customer specification
- User specific limiting input value system
- Program in US dimensions
- Special network form (IT network); isolating transformer required
- Isolating transformer for IT network
- CEE socket 16 A
- Protection of the socket circuits via residual-current-operating circuit breaker with 30 mA conventional tripping current
- Additional emergency-stop button, mounted on the rear of the machine
- Add. screen text not according to EU (max. 2 languages in addition to German)
- Second injection parameter record for lower mold allocation or injection parameter change-over during start-up phase
- Interface for metering unit
- Interface evacuation with software (incl. vacuum valves for rotary table)
- Interface for freely configurable mold monitoring
- RJG eDart interface
- HiQ-Package

Additional Equipment

- Special paint and/or touch-up paint
- Tool kit
- Levelling pads
- Lighting in mold space
- Set labels in special colour
- Distance blocks 100 mm for leveling mounts
- Spare parts package

Technology working for you.

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