SmartPower 25 – 120 t

The servo hydraulic benchmark

Technology working for you.

Battenfeld
world of innovation
Special features and benefits of the SmartPower 25 – 120 t

The super-compact servo hydraulic machines with an intelligent, energy saving drive system. In these machines, the deceleration energy is also reclaimed and utilized within the machine. Available with clamping forces ranging from 25 to 120 t, these smart servo hydraulic machines are "unlimited" in terms of precision, efficiency and user-friendliness.

The powerful UNILOG B6 control system offers numerous options for process monitoring and documentation. Thanks to its modular design, the SmartPower is extremely versatile and optimally adapted to multi-purpose use.

25 – 120 t

Open drop area

The drop area, left open without bottom plate, enables easy, comfortable parts removal in three directions. It is also possible to insert a conveyor belt into the drop area if desired, or to put the machine in a higher position.
**Injection unit**

The injection units are mounted on linear guides and can be swiveled for servicing. The screw can be removed quickly in just a few easy steps.

All plasticizing units, regardless of their diameter, come with a 22:1 L/D ratio and thus ensure optimal melt homogeneity.

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**Clamping system**

A simple, centralized hydraulic clamping system with fast-stroke cylinders arranged symmetrically in a diagonal position ensures fast, even clamping force build up. The ejector is easily accessible. The hydraulic blocks are integrated in the clamping unit to achieve an extremely high level of control accuracy.

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**Linear guides**

The moving platen is supported by high precision linear guides so that no further adjustments are required to accommodate heavy molds, and sensitive mold protection is ensured as well. Lubrication is minimized, which keeps the mold area perfectly clean.

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**Energy-saving servo drive as standard**

The flexible drive concept, based on a speed-controlled servomotor with a fixed displacement pump, enables short cycle times thanks to its high level of dynamism. Parallel movements can be realized easily with an additional second pump system in servo technology.
Clamping unit SmartPower 25 – 120 t

**Ultimate precision**
- High rigidity and sturdiness.
- Precise platen parallelism maintained during the entire stroke.
- Optimal mold protection through minimized platen deflection and moving platen support by low-maintenance linear guides.
- High repeatability of all parameters.
- Highly sensitive mold protection.

**Compact and user-friendly design**
- Design with extremely short footprint.
- Generously dimensioned clamping platen.
- All components with excellent serviceability and low maintenance requirements.
- Free access to ejector.

**High speed and symmetrical force transmission**
- Fully hydraulic clamping system.
- High opening and closing speed thanks to differential circuit.
- Central transmission of force when moving and under clamping force.
- Short dry cycle times.
A concept for improved parts quality

- Optimized melt homogeneity thanks to a uniform L/D ratio of 22 : 1 and an injection pressure of 2,000 bar with medium-diameter screws.
- Linear guide systems ensure precise axial movements of the injection unit.
- Carriage cylinders positioned opposite each other provide momentum-free nozzle carriage.

Ultimate precision and repeatability

- Compact design with integrated hydraulic block and easy access to all components.
- Direct screw drive via low-speed hydraulic motor with optimal adaptation to individual plasticizing demands.
- Ultimate repeatability thanks to controlled servo-valve. (optional)

Injection units for more flexibility

- Short footprint with two pulling cylinders.
- High injection rates.
- Universal compatibility of barrels with different injection units.

High-performance plasticizing systems

Plasticizing systems for injection molding machines must fulfill many different requirements. By applying a universal L/D ratio of 22 : 1 to the three screw sizes available for each injection unit, the processing window has been optimized to meet rising quality standards. Extremely wear-resistant barrel units are available for processing filled plastic materials.
ServoPower technology

Flexible drive concepts which provide maximum energy efficiency for injection molding systems: ServoPower technology enables savings of up to 35 percent to be achieved for hydraulic machines compared with conventional modern drives with asynchronous motors. Many advantages can be obtained from ServoPower technology for the user, a high level of cost effectiveness is guaranteed, and the use of this technology has practically no upper limit and is consequently extremely interesting for small and large machines.

High degree of functionality through a technically sophisticated design

In ServoPower technology the machine is driven by a highly dynamic, speed-controlled, air-cooled servomotor combined with a fixed displacement pump instead of a conventional AC motor with a constant motor speed and variable capacity pump. During the idle times the system is shut down or completely switched off. This ideally harmonized technology permits significant energy savings of up to 35 percent compared to conventional modern drives.

Energy efficiency given highest priority

ServoPower = reducing energy consumption to a minimum. Not only the optimum consumption level but other advantages with regard to energy efficiency also play a role. The low energy input results in the hydraulic oil being heated less. This reduces the consumption of cooling water and consequently the associated energy consumption. At the same time less of a load is placed on the hydraulic oil, which significantly increases its service life. The noise emissions are also significantly decreased by the use of the ServoPower drive. And last but not least, decreasing the idle power because of the greater efficiency of the servomotor through its 20 % enhanced power factor further reduces electricity costs.

Advantages

- Reduces the power consumption by up to 35 percent.
- Longer service life of the hydraulic oil.
- Lower noise emissions.
- Cutting of the energy costs by reducing the idle power.
- Lower consumption of cooling water.
- Less maintenance effort.
UNILOG B6\(^\circ\) 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.
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.

SmartEdit

With the SmartEdit function, the machine cycle can be visualized and/or created or adjusted as needed. Status information during the ongoing production process shows the exact position within the cycle at any time. Production start-up, progress and shut-down can be visualized and edited in separate diagrams, either vertically or horizontally. Configuration of program sequences for ejectors, core pulls, air valves and robots is also possible. A special feature is the automatic calculation of the automatic process without machine movements on the basis of the current parameter settings.

Energy measurement

Clear visualization of energy consumption is possible with UNILOG B6®. 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, MicroPower and SmartPower machines, available as an option for other models.

Actual value graphics

Various functions 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.
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⁺ 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 Web-Service 24/7: Intelligible pictures of the problem situation on site can be transmitted to the global WITTMANN BATTENFELD support center to enable effective analysis.

SmartMonitoring via authentig

With SmartMonitoring, WITTMANN BATTENFELD offers a process data acquisition software which provides access to a universal database. The new program authentig is applied in cooperation with T.I.G. (Technische Informationssysteme GmbH).

SmartMonitoring makes it possible to obtain an online overview of the entire plant from a B6⁺ monitor.

authentig is an innovative MES (Manufacturing Execution System) offering a unique portfolio of functions. With up to 10 program modules virtually anything is possible in the areas of overview, analysis, production planning and maintenance.

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.
The Insider solution combines the injection molding machine with an automatic parts removal system and a conveyor belt to form a compact, space-saving unit. Custom-built peripheral equipment for preparation and downstream finishing, as well as special equipment such as an integrated light barrier or installation of a second conveyor belt are included in the production program as options. The Insider is available with up to 300 t clamping force as standard and offers processors a number of advantages.

The robust, compact design of the Insider stands the test in a long-term operation through stability and accessibility.

**Space-saving design**
Space requirements are up to 50 per cent below those of conventional automation solutions.

**Improved material flow**
All parts can be removed from the end of the clamping unit. This facilitates the arrangement of several machines in rows.

**Reduced robot cycle times**
Cycle times are reduced by shorter traverse paths and direct depositing of parts on the conveyor belt.

**Easy access in spite of integration**
Thanks to easy removal of the conveyor belt and feeding area, access to the injection molding machine is as comfortable as in machines without automation systems.

**No separate safety barriers**
Since there is no need for separate safety barriers, costs have been reduced, yet all occupational health and safety regulations are complied with.

**CE mark**
The CE mark for certified safety is granted for every machine with an Insider solution, which saves costs for individual inspections.

**Cost-efficient production**
Thanks to the space-saving design of the Insider, not only the material flow on the injection molding machine is improved, but the convenient movement of molded parts to the end of the clamping unit also allows for more favorable positioning of the machines.
Application technology SmartPower 25 – 120 t

**Standard injection molding technology**
Manufacturing of complex products with highest precision and process reliability. Quick, easy production of both standard parts and high-end technical components.

**BFMOLD® – Variotherm technology**
Discover completely new possibilities for injection molding technology with the help of BFMOLD® variothermic mold tempering and benefit from the advantages of this innovative process for extremely efficient production of flat, high-gloss parts with geometries of up to 2.5 D.

**LIM – Liquid Injection Molding**
Thanks to its excellent material attributes, liquid silicone rubber offers a wide processing window for producing LSR parts. Typical applications are gaskets and gasket elements, baby pacifiers, membranes or jet formers for shower heads.

**PIM – Powder Injection Molding**
Powder injection molding (PIM) is a manufacturing process for series production of components made of metallic or ceramic materials. PIM is the ideal process for large-scale production of complex, functional parts that have to meet stringent material requirements.
Technical data SmartPower

![Image of SmartPower machine]
Material Factor

<table>
<thead>
<tr>
<th>Material</th>
<th>Factor</th>
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<tbody>
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<tr>
<td>CA</td>
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</tr>
<tr>
<td>CAB</td>
<td>0.97</td>
</tr>
<tr>
<td>PA</td>
<td>0.91</td>
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<tr>
<td>PC</td>
<td>0.97</td>
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<td>PMMA</td>
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<tr>
<td>POM</td>
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<tr>
<td>PP</td>
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</table>

The maximum shotweights (g) are calculated by multiplying the theoretical shot volume (cm³) by the above factor.

Shot weight conversion table

<table>
<thead>
<tr>
<th>Clamping unit</th>
<th>Injection unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
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</tr>
<tr>
<td>25</td>
<td>•</td>
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<tr>
<td>110</td>
<td>•</td>
</tr>
<tr>
<td>120</td>
<td>•</td>
</tr>
</tbody>
</table>

Dark grey boxes = thermosets

Possible combinations of clamping units/injection units
### Standard features SmartPower UNILOG B6©

#### Machine in general
- Paint: RAL 7047 tele grey / RAL5002 ultramarine blue
- One-piece machine frame
- Built-in control cabinet
- Parts transport on operator side, rear side or axial

#### Hydraulic
- Speed controlled servomotor (ServoPower) for hydraulic pump to increase the energy efficiency
- Oil filtration by fine flow filter with electrical clogging indicator
- Oil level indicator with alarm
- Closed-loop oil temperature control with oil pre-heating
- Oil temperature monitoring
- Oil tank with connections for external oil filtration

#### Clamping unit
- Clamping force adjustable via touchscreen
- Closing and opening speed adjustable
- Closing and opening force adjustable
- Mold safety program
- Moving platen supported by positioned linear guides
- Platen drillings and register rings according to EUROMAP
- Fixing holes for robot on top of the fixed platen as per EUROMAP 18
- Central hydraulic multi-stroke ejector, adjustable

#### Injection unit
- Pump closed loop controlled
- Screw L/D = 22 with check valve, screw nitrated and bimetallic barrel AK+
- Thermocouple failure monitor
- Maximum temperature supervision
- Defined nozzle carriage pressure
- Plug-in ceramic heater bands
- Temperature control of feed throat integrated
- Open nozzle
- Swivelling injection unit
- Hopper 6 l, prepared for WITTMANN loader
- 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
- Changeover from injection to holding pressure depending on stroke, time and pressure

#### Safety gate
- Safety gate with electric monitoring according to CE standard on front and rear side
- Maintenance-free safety gate locked by electromagnet
- Safety gate free for mold change and handling by robot

#### Electrical components
- Operating voltage 230/400 V-3PH, 50 Hz
- Fuse protection for sockets
- Control unit UNILOG B6© with touchscreen and operating system
- Windows
- 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
- Switchover 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
- Access protection via password system
- Freely configurable status bar
- Physical, process-related units
- 15” TFT color screen
- Automatic dimming
- Logbook with filter function
- SmartEdit
- User programming system (APS)
- Userpage
- Note pad function
- Cycle time analysis
- 1 freely configurable network connection
- Hardcopy function
- Internal data storage via USB connection or network
- Online language selection
- Online selection of imperial or metric units
- Operator manual incl. hyd., 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 monitoring
- Injection Integral supervision
- Metering Integral supervision
- Alarm message via E-MAIL
- USB – 2x operating unit
- 1 Ethernet interface (switch cabinet)
- Printer via USB connection or network
## Optional features SmartPower UNILOG B6°

### Base machine option
- Non-standard mold height / Opening stroke

### Hydraulic
- Hydraulic accumulator for fast injection incl. loading pump and parallel ejector movement and core pull movement via double pump
- Core pull movement and parallel ejection incl. fast injection with double pump
- Injection parallel to clamp force build-up
- Hydraulic core pulls. Limit switch function according to EUROMAP 13. Pressure and speeds adjustable
- Core pull pressure release
- Pneumatic core pull
- Hydraulic or pneumatic manifold for Mouldmaster nozzle (controlling 1 nozzle or more parallel in the mold)
- Extra large oil cooler
- Adapter with ball valve on the oil tank for oil maintenance

### Clamping unit
- T-slots in mold platens
- Cooling channels in mold platens
- Nickel plated mold platen
- SPI bolt pattern
- Ejector cross in clamping palate as per EUROMAP / SPI
- Maximum ejector force increased
- Mechanical ejector couple
- Ejector platen safety device
- Mechanical mold safety mechanism
- Unscrewing device with hydro-motor
- Parts chute
- Parts chute for separation of good/bad parts
- Photoelectric ejection check
- Air valve, action initiated (ON) and timer (OFF)
- Manual tie bar retract device
- Quick mold clamping system electromagnet, hyd. or mech.

### Injection unit
- Closed loop injection
- Grooves in the feeding zone of barrel for improved feeding
- High revolution hydraulic screw drive motor
- High torque hydr. screwmotor in lieu of standard
- High temperature heaterbands (max. 450° C)
- Barrel insulation
- Screw drive by a.c. servomotor – for parallel plasticising
- Ball type screw tip
- Check valve with carbide insert
- Needle type shutoff nozzle with spring, pneumatically operated or hydraulically operated
- Melt temperaturesensor in cylinder head
- Pressure transducer for melt pressure switch over
- Open AIRMOULD®- nozzle, pressure controlled
- Wear resistant screw AK
- Wear resistant screw and barrel AKPA for polyamide
- Corrosion resistant screw and barrel AKCN in chrome nitride or AKTN titan nitride
- High wear and corrosion resistant screw and barrel AK ++
- Screw with mixing section or barrier section
- Application package processing thermosets
- Injection unit equipped for rigid PVC
- Liquid silicon unit LIM and 2-component meter mix pump
- Application package processing PIM (MIM / CIM)
- Material hooper volume 29 litres
- Hopper magnet

### Safety gate
- Front side gate safety system for manual part removal
- Automatic safety gate at the operator side
- Initiate next cycle by closing safety gate in semi-auto operation
- Safety gate clearance operator side / rear side extended
- Safety gate lowered at the top of the upper tie bar

### Cooling and conditioning
- Flow controller with temperature gauges
- Shut-off valve for cooling water battery
- Blow out valve for cooling water battery
- Distributor of cooling circuits on the fixed platen of the moving platen
- Machine cooling via cooling water distributor with T-piece

### Electrical components
- Clamping force display and supervision
- Temperature control zone for hot runner
- Non-contact stroke transducers
- Special voltage
- Control cabinet cooler
- Membrane keyboard for manual movements of UNILOG B6°
- Additional socket
- Emergency stop button on rear side
- Energy consumption analysis
- Integrated Tandem mould
- Switch over to holding pressure by cavity pressure
- Switch over to holding pressure by external signal
- Injection compression program / venting program
- Melt cushion control
- Signal tower with acoustic element
- Temperature control interface digital, serial 20 mA TTY protocol
- CAN-Bus-interface for mold conditioner as per EUROMAP 66-2
- Interface BFMOLD® via CAN BUS for WITTMANN D-series
- Interface for AIRMOULD® mobile
- Interface for robots as per EUROMAP 67
- Interface for conveyor belt
- Interface for dosing pump
- RIG eDart interface
- Master interface for danger zone boundary (DZB)
- Interface for fully integration of robot incl. Ethernet switch
- Host computer interface / PDA (EUROMAP 63)
- Relays contact parallel to plasticizing
- Relays contact in case of machine fault
- BNC connectors for injection process analysis
- Interface for brushing device
- Interface for vacuum pump
- Second injection data setting for automatic start up
- User specific programmable set value limits
- Web-service
- Smart Monitoring MES-software package authentic

### Additional equipment
- HiQ package, Europackage, Insider package
- Inline thermography
- Webcam
- Special paint and / or touch-up paint
- Tool kit
- Levelling pads
- Additional manual on USB flash drive
- Lighting in mold space
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