

# ***MacroPower*** 400 – 2000 t

The compact large machine

world of innovation



# POWERFUL – COMPACT – UNIVERSAL

## The benchmark for large machines

### The advantages

- » Small footprint through compact design
- » Generously dimensioned 4 tie-bar/2 platen clamping system
- » Long-stroke system to “release” the tie-bars facilitates lateral insertion of large molds
- » Minimal dry cycle time through synchronized closing of the tie-bar nuts
- » Smooth-running platen movements and sensitive mold protection thanks to linear guides
- » Enhanced user-friendliness with new UNILOG B8 control system including integrated assistance systems
- » Fast through parallel operation of ejector and core pull with platen movement
- » Powerful injection unit with servo valve control
- » With WITTMANN 4.0 central operation of machine and peripherals via B8 monitor screen
- » Positioning of hydraulic system and electric modules for easy servicing
- » Attractive price/size ratio

### The machine series

*MacroPower* standard: 19 clamping force sizes from 400 to 2000 t

*MacroPower E* (electric): 14 clamping force sizes from 400 to 1100 t

*MacroPower COMBIMOULD*: for multi-component injection molding – from 400 to 2000 t





## MacroPower

### The system highlights

- » **Parallel movements are standard, "drive on demand" is an option**

All standard *MacroPower* machines are driven via a modular twin-pump hydraulic system with electrically adjustable delivery pumps. Parallel movements for core pull and ejector are standard. Additional pump stages (optional) increase the number and performance of parallel movements. To optimize energy efficiency, the drive can be powered by an (optional) drive-on-demand servo motor instead of its standard asynchronous motor.

- » **Precise and powerful screw drive**

All *MacroPower* injection units come with hydraulic drive systems as standard. Servo drives for dosing are available as an option. Injection and holding pressure are controlled via a servo valve. Thanks to the system-specific low height of the machine, access to the barrel unit and nozzle for cleaning is easy.

- » **Clamping system – generously dimensioned**

The *MacroPower* clamping system is a 4 tie-bar/ 2 platen system with generously dimensioned mold mounting platens. All four tie-bars each come with a pressure cushion unit and are anchored in the fixed platen of the machine. The tie-bars are position-monitored and guarantee optimal platen parallelism.

- » **QUICKLOCK® clamping system – synchronous, fast**

The power transmission between the fixed and the moving system platen is effected by positive locking via the tie-bars, which are gripped by toothed segment half shells in the moving platen. Short locking times are achieved by synchronized movements of all nuts. Long-stroke cylinders move the platen, which is guided on linear bearings. The pressure cushions serve to build up the clamping force.

- » **Insertion of the mold made easy**

The *MacroPower* clamping system provides a large gap between the ends of the tie-bars and the moving platen, thanks to its standard large platen stroke and the relatively short length of the tie-bars. This allows for lateral insertion and fastening of the molds from the rear of the machine using a crane.

# CLAMPING UNIT

## High functionality with ample mold space

### » Large and flexible

The extensive *MacroPower* system construction kit offers a wide range of combination options from numerous clamping force variants with matching distances between tie-bars, in both standard and XL versions.

### » Sensitive and precise

In the *MacroPower* clamping system, the tie-bars are only used for the force transmission between the mold platens. The moving platen is mounted on a carriage, which travels on high-precision linear bearings along the machine frame. The minimal rolling friction in the linear bearings is the prerequisite for highly sensitive mold protection and high cleanliness.

### » Fast and synchronized

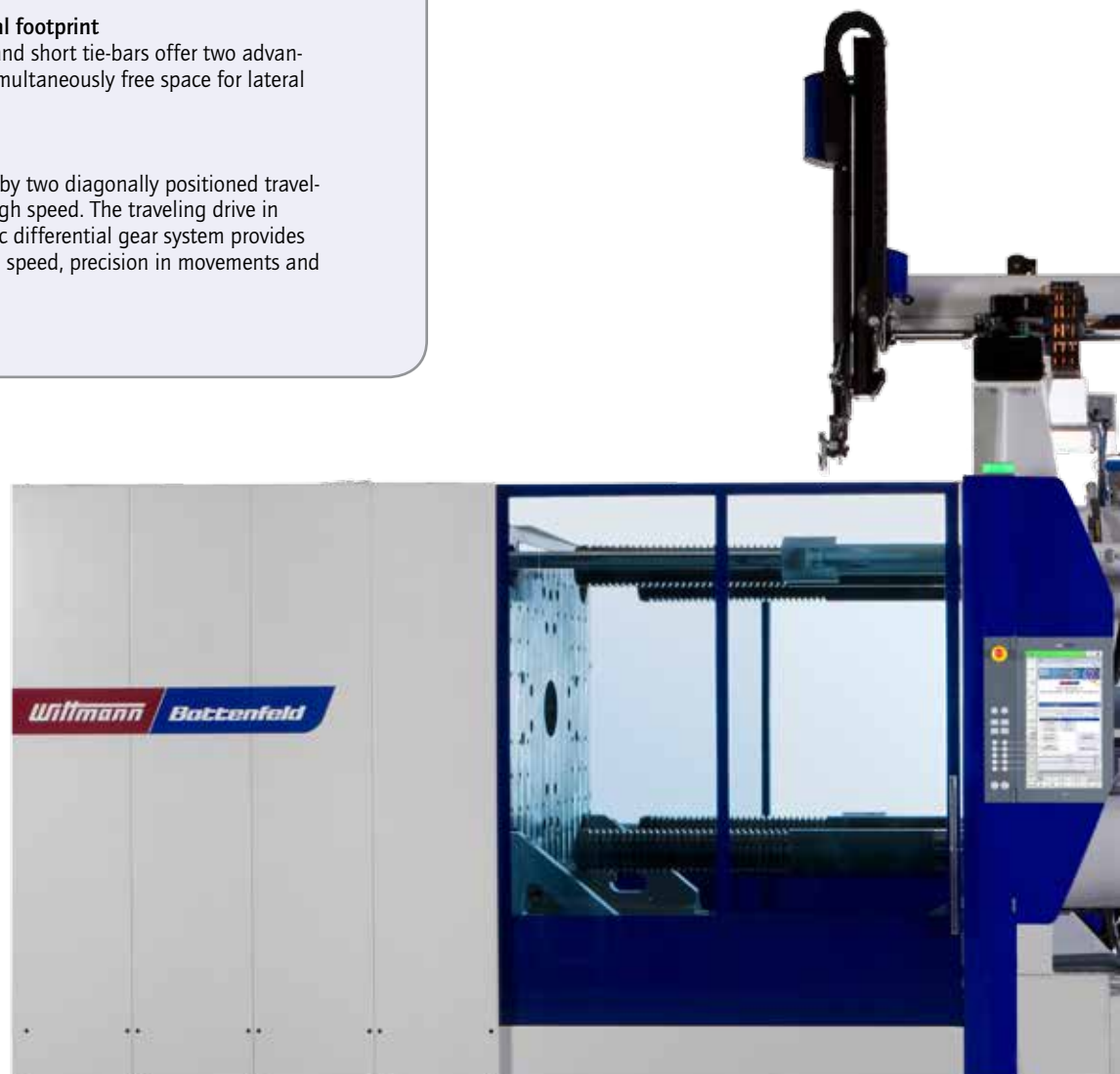
The QUICKLOCK® locking system between the tie-bars and the moving platen consists of four synchronized tooth segment nuts, which are integrated in the moving platen to minimize the machine's footprint.

### » Compact design for minimal footprint

The integrated tie-bar nuts and short tie-bars offer two advantages: short footprint and simultaneously free space for lateral mold insertion.

### » Symmetrical and powerful

The moving platen is driven by two diagonally positioned traveling cylinders designed for high speed. The traveling drive in combination with a hydraulic differential gear system provides the basic conditions for high speed, precision in movements and power.





# INJECTION UNIT

Servo-controlled and precise

**Wittmann**

**Battenfeld**

» **Everything to ensure series consistency**

- All screws come with a 22:1 L/D ratio.
- Direct drive via slow-running hydro motor (servo motor available as an option)
- Maximum repeatability through servo valve cl control for injection and holding pressure
- Moment-free nozzle contact through axial positioning of the traveling cylinders
- Wide range of suitable screws and barrels for various process technologies available
- WITTMANN BATTENFELD HiQ software modules (optional) offer extensive facilities for compensating environmental factors such as fluctuations in temperature, moisture, regrind or masterbatch content.

» **Extremely easy operation and flexibility**

- Free access to the injection unit for easy material feeding, machine setting and servicing
- Maximum maintenance-friendliness thanks to compact design and free accessibility



**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 efficient and modular



## **Fast-responding, precise, efficient**

The hydraulic system comes in a modular design, with up to four electrically adjustable delivery pumps combined with one or two asynchronous three-phase motors. Positioning of the hydraulic blocks close to the consumers reduces line loss and improves the control function. Monitored shut-off valves are installed in the suction pipes to ensure operational safety.

## **Hydraulic system extension levels for parallel functions**

- » H1/S1: twin pump system for parallel movements of ejector and core pull
- » H2/S2: twin pump system with increased drive performance (optional) for parallel movements of ejector and core pull plus faster injection
- » H3/S3: twin pump system with increased drive performance (optional) for several parallel functions
- » H4/S4: twin pump system with increased drive performance (optional) for parallel movements of ejector and core pull and high-speed injection with an accumulator for short cycle times

H version: drive via asynchronous three-phase motor with constant speed

S version: drive via servo motor with variable speed and electrically adjustable delivery pumps (option)

## **High-end hydraulics – drive-on-demand (S version)**

A drive-on-demand system to cut energy consumption is available as an option. Here, a water-cooled, speed-controlled servo motor is combined with an electrically adjustable pump as an alternative to the asynchronous three-phase motor. The advantage of this combination is that the hydraulic system is kept within the range of the system's optimal degree of efficiency, by adjustment of both the motor speed and the pump's displacement volume. In this way, energy savings of up to 35 % and an up to 20 % reduction in idle power can be achieved, depending on the application, and sound emission can be reduced as well.



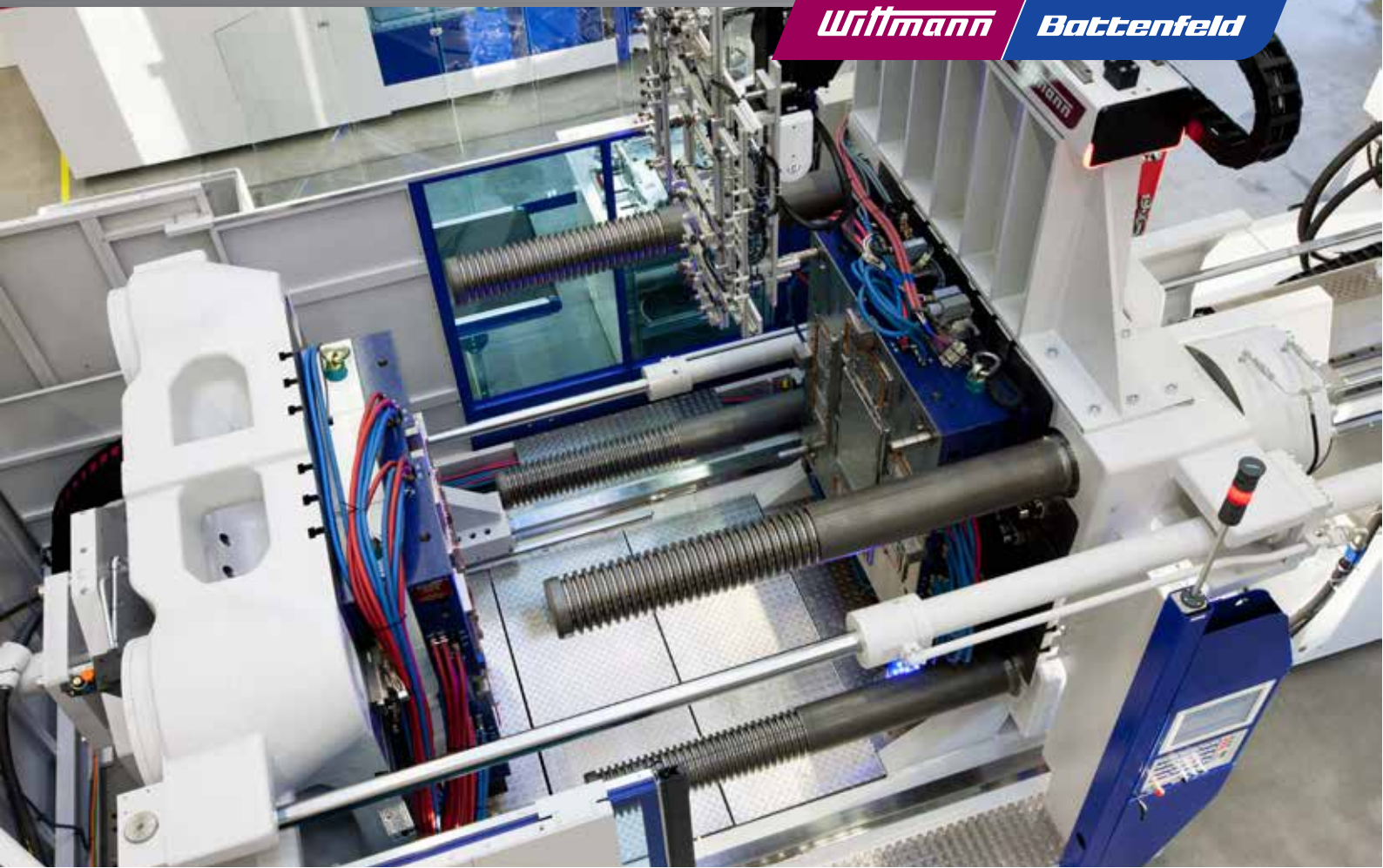


# PRODUCTION CELL

## Customized configuration

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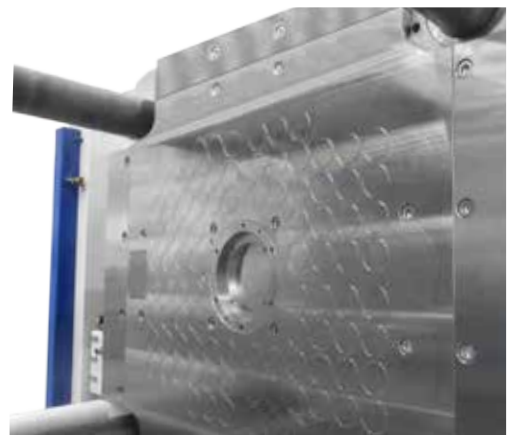
**Battenfeld**



WITTMANN BATTENFELD injection molding machines come with a flexibly adjustable basic modular design. From this basis, the machine can be extended with a wide range of automation equipment into a production cell. This includes primarily devices for fast mold change, fast coupling of complex media connections and the automation of finished parts handling.

### **MacroPower automation options:**

- » **"Handling robot automation module"** with linear or articulated arm robot and logistics peripherals
- » **Mold clamping systems**  
Both hydraulic and magnetic clamping systems are available including all safety monitoring features, if required combined with roller conveyor units for lateral mold transfer.
- » **Automatic mold change system** as fixed carriage and pre-heating station or as a flexibly movable carriage system with docking interface
- » **Combination with WITTMANN peripheral units** via WITTMANN 4.0  
Temperature control or cooling, material feeding, coloring and drying



# UNILOG B8

## Complex matters simplified

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 pivotable 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 units
  - 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
  - *ambiLED*-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

**Wittmann**

**Battenfeld**

## » **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 units 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 units 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

# WITTMANN 4.0

## Communication in and with production cells

With its internal 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.

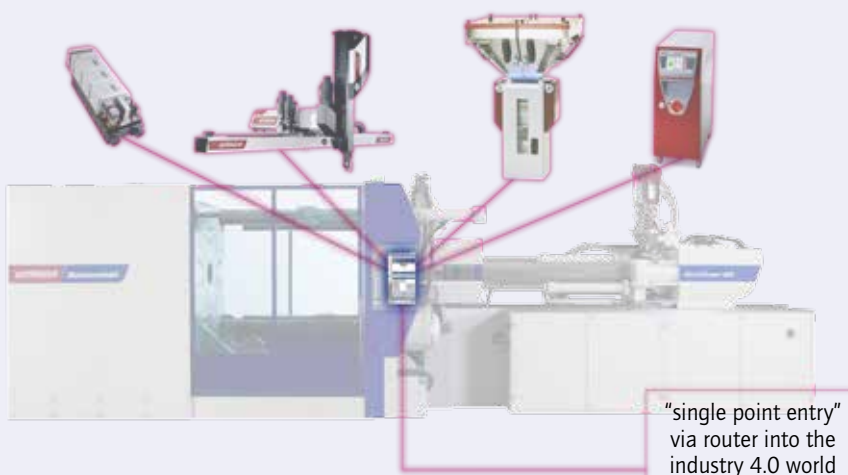
### Connection of peripherals via WITTMANN 4.0

- » **WITTMANN FLOWCON plus water flow regulator and GRAVIMAX blenders**
  - 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

### Production monitoring

- » **SmartMonitoring: process data acquisition via *authentig***

For monitoring of machines or production cells or entire manufacturing areas, WITTMANN BATTENFELD uses the "authentig" MES system (Manufacturing Execution System). In combination with the "SmartMonitoring" module, the current status of an injection molding operation can be visualized also on any machine monitor screen B8 in real time.



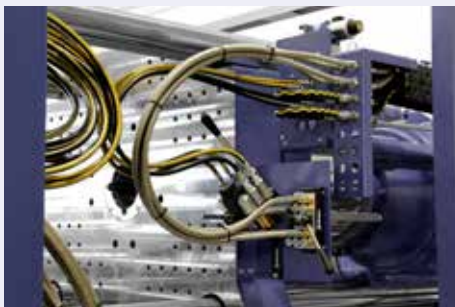
**WITTMANN 4.0 system**  
With WITTMANN 4.0, a machine and its robots and peripherals are transformed into a uniform technical organism, which communicates externally via a specific IP address. A single point entry increases the cyber security significantly.

# OPTIONS

Modular and flexible

**Wittmann**

**Battenfeld**



## **MacroPower**

### The optional highlights

#### » Tie-bar removal device

If the standard platen stroke to release the tie-bars is not sufficient for a mold change, a hydro-mechanical tie-bar removal device integrated in the pressure cushion is available as an option. Removing and pushing back the tie-bars are fully automatic processes taking no more than a few minutes.

#### » Servo-electric plasticizing

As an alternative to screw rotation by a hydro motor, an optional direct drive with a servo motor can be supplied. It reduces energy consumption and offers additional facilities for parallel operation of the clamping and plasticizing units.

#### » Free space for conveyor belt in the small sizes of large machines as standard

In the machines from 400 to 700 t clamping force, the machine frame comes prepared for the installation of a conveyor belt inside the frame for longitudinal transport of molded parts. An optional elevation of the frame to accommodate a conveyor belt for parts transport to the side can also be supplied.

#### » Fast media coupling

In addition to the ergonomically positioned standard connection points for cooling water, air and core pull hydraulics, optional fast coupling units can be installed (individual or system plates), which also accommodate the power connections for the hot runner heating circuits, temperature and pressure sensors and coding signals. The degree of automation can be further increased by adding a quick mold clamping system.

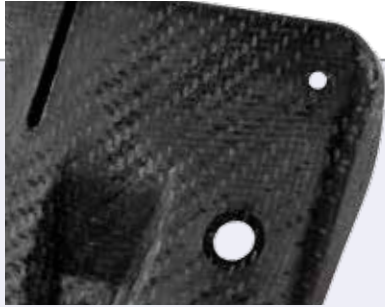
#### » WITTMANN peripherals

The comprehensive range of WITTMANN peripheral units offers appropriate solutions for all secondary processes of injection molding, including parts handling, material feeding and drying, sprue recycling, mold cooling and temperature control. Via the optional WITTMANN 4.0 integration package, all additional appliances can be integrated into the injection molding machine's program sequence according to the "plug & produce" principle.



# APPLICATION TECHNOLOGY

## Outstanding competence



- » **Lightweight construction**  
*MacroPower* machines and WITTMANN handling technology including automation expertise offer ideal conditions for making large composite parts from flat fiber materials and injection-molded carrier structures.



- » **CELLMOULD® – structured foam technology**  
The production of structured foam parts through targeted blending of pressurized nitrogen or carbon dioxide into the plastic melt prior to injection into the mold has been a WITTMANN BATTENFELD core competence based on in-house R & D for more than 30 years.



- » **AIRMOULD® – gas injection process**  
AIRMOULD® is the gas-assisted injection molding process developed by WITTMANN BATTENFELD. Its two variants are the AIRMOULD® internal gas pressure process and the AIRMOULD® CONTOUR external gas pressure process.



- » **COMBIMOULD**  
When two or more plastic materials in different colors or plastic materials with different attributes need to be combined into one component, the *MacroPower* machines can be equipped with additional injection units in V, L, S or HH configuration and rotary tables with servo drives.

Photo: Haidlmair GmbH

# TECHNICAL DATA

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COMBINATIONS OF CLAMPING UNITS/INJECTION UNITS

Clamping unit	Injection unit							
t	1330	2250	3400	5100	8800	12800	16800	19000
400	•	•	•	•				
450	•	•	•	•				
XL 450	•	•	•	•	•			
500	•	•	•	•	•			
550	•	•	•	•	•			
XL 550		•	•	•	•			
650		•	•	•	•			
700		•	•	•	•			
XL 700		•	•	•	•	•		
850		•	•	•	•	•		
900		•	•	•	•	•		
XL 900			•	•	•	•	•	
1000			•	•	•	•	•	
1100			•	•	•	•	•	
1300				•	•	•	•	•
1500				•	•	•	•	•
1600				•	•	•	•	•
1800					•	•	•	•
2000					•	•	•	•

Material	Factor
ABS	0.88
CA	1.02
CAB	0.97
PA	0.91
PC	0.97
PE	0.71
PMMA	0.94
POM	1.15
PP	0.73

The maximum shotweights (g) are calculated by multiplying the theoretical shot volume (cm<sup>3</sup>) by the above factor.

Material	Factor
PP + 20 % Talc	0.85
PP + 40 % Talc	0.98
PP + 20 % GF	0.85
PS	0.91
PVC hard	1.12
PVC soft	1.02
SAN	0.88
SB	0.88
PF	1.3
UP	1.6

Dark grey boxes = thermosets

# MOLD DIMENSIONS

## » Overview mold weights

The *MacroPower* series is laid out for the following maximum mold weights and/or mold torques. If the maximum weight or maximum torque is exceeded, an additional mold support will be necessary. Whenever the values are exceeded, WITTMANN BATTENFELD must be consulted.

$$\begin{aligned} W_m &= 2/3 \times W \\ T_m &= W_s \times \text{max. mold h.} / 3 \\ W_f &= 1/2 \times W \end{aligned}$$

$$\begin{aligned} T_f &= W_f \times \text{max. mold h.} / 4 \\ W_c &= 2/5 \times W \\ W_{\text{max.}} &= W + W_c \end{aligned}$$

Clamping Unit	machine		moveable platen		fixed platen		center platen	
	max. mold weight	max. mold height	max. weight	max. torque	max. weight	max. torque	max. weight	max. total weight
	W (t)	(mm)	W <sub>m</sub> (t)	T <sub>m</sub> (tm)	W <sub>f</sub> (t)	T <sub>f</sub> (tm)	W <sub>c</sub> (t)	W <sub>max</sub> (t)
400, 450	6.5	850	4.3	1.2	3.3	0.7	2.6	9.1
XL 450, 500, 550	8	900	5.3	1.6	4.0	0.9	3.2	11.2
XL 550, 650, 700	10	950	6.7	2.1	5.0	1.2	4.0	14.0
XL 700, 850, 900	12	1000	<b>8.0</b>	<b>2.7</b>	<b>6.0</b>	<b>1.5</b>	4.8	16.8
XL 900, 1000, 1100	19	1200	12.7	5.1	9.5	2.9	7.6	26.6
1300, 1500	30	1400	20.0	9.3	1.0	5.3	12.0	42.0
1600	30	1500	20.0	10.0	15.0	5.6	12.0	42.0
1800, 2000	45	1600	30.0	16	2.5	9.0	18.0	63.0

## » Mold torque calculation examples

*MacroPower* 850 t clamping force  
Mold weight W = 11 t

Mold weight clamping side W<sub>m</sub> = 7 t  
Distance to center of gravity x<sub>m</sub> = 0.3 m

Mold weight on fixed platen side W<sub>f</sub> = 4 t  
Distance to center of gravity x<sub>f</sub> = 0.2 m

T<sub>m</sub> = 7 t x 0.3 m = **2.1 tm**  
T<sub>f</sub> = 4 t x 0.2 m = 0.8 tm

All values within specifications, no additional support required.

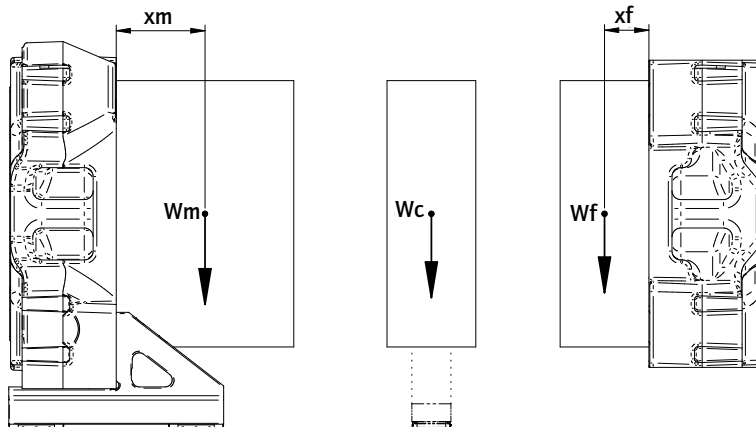
*MacroPower* 850 t clamping force  
Mold weight W = 11 t

Mold weight clamping side W<sub>m</sub> = 8 t  
Distance to center of gravity x<sub>m</sub> = 0.4 m

Mold weight on fixed platen side W<sub>f</sub> = 3 t  
Distance to center of gravity x<sub>f</sub> = 0.2 m

T<sub>m</sub> = 8 t x 0.4 m = **3.2 tm**  
T<sub>f</sub> = 3 t x 0.2 m = 0.6 tm

Value T<sub>m</sub> exceeds specification, additional support required.





# REDUCTIONS IN CLAMPING FORCE

Wittmann

Battenfeld

## » Reductions in clamping force for smaller molds

The *MacroPower* machine series is laid out for minimum mold dimensions as indicated in the technical specifications. Down to the minimum mold size specified, the machine's clamping force can be fully utilized. When smaller molds are used, the clamping force must be reduced, depending on the mold dimensions, according to the overview below. The mold size used must not fall below the minimum mold dimensions specified in the chart.

## » Example of clamping force reduction (chart)

*MacroPower* 850 t clamping force, mold dimensions 700 mm x 800 mm (smaller dimension is relevant). A mold dimension of 700 mm leads to a reduced maximum clamping force of 780 t.

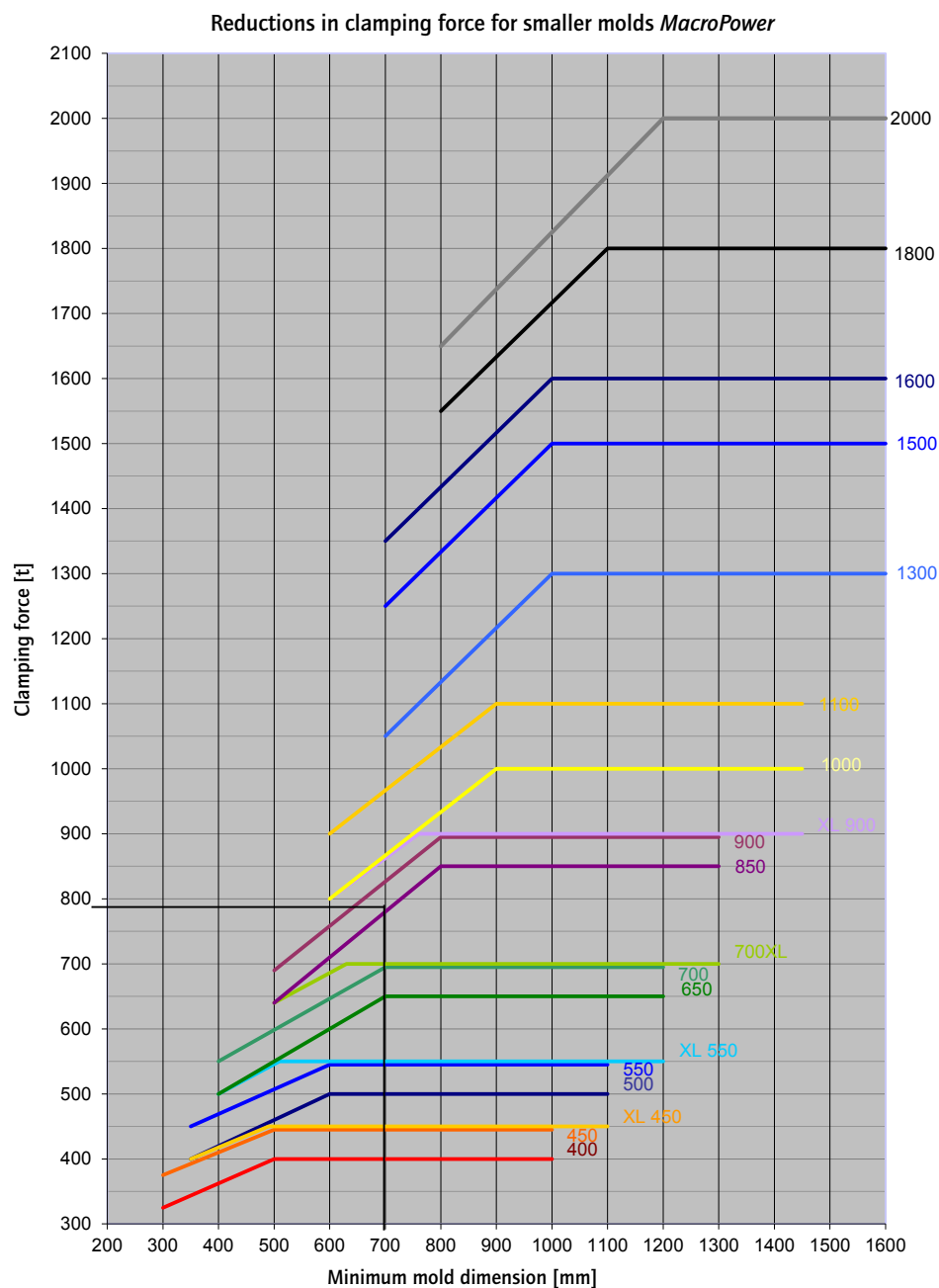
## » Mold parallelism

The *MacroPower* is equipped with high-precision linear guides on the moving platen and therefore guided with extreme accuracy and parallelism across the entire stroke.

Its platen parallelism is within half of EUROMAP 9 tolerance. For correct operation, the maximum parallelism of 0.2 mm with minimum mold dimensions must not be exceeded.

## PLEASE NOTE:

The molds must be inserted symmetrically to both axes of the clamping platens!



# STANDARD

<b>Base machine</b>
Paint RAL 7047 tele grey 4/RAL 5002 ultramarine blue
Two-piece machine frame, clamping unit/injection unit
Built-in control cabinet
<b>Hydraulics</b>
Hydraulic unit with variable pressure and speed axial piston pump
Core pull movement and parallel ejection with double pump
Bypass 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
Lock-up valve with supervision for suction pipe
Oil tank with connections for external oil filtration
Hydraulic pressure displayed
<b>Clamping unit</b>
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
<b>Injection unit</b>
Closed loop controlled injection
Screw L/D=22 with check valve, wear and corrossions resistant screw and 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
Purge guard electrically monitored
Slide device without material hopper, prepared for WITTMANN material feeder
Linear bearings for the injection unit
Selectable barrel stand-by temperature
Decompression before and/or after metering
Physical units like 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
<b>Safety gate</b>
Monitored safety gate electrically controled according to CE on front and rear side
Maintenance-free safety gate locked by electromagnet
Safety gate free for mold change and handling by robot
Safety gate rear side lowered at the top of the upper tie-bar
Safety gate rear side to be opened to max. daylight for easy mold change, from size 850 t

<b>Electrics</b>
Operating voltage 230/400 V-3PH, 50 Hz
ambiLED-status indicator
Fuse protection for sockets
Non-contact stroke transducers
USB 1 x operating units
1 Ethernet interface (switch cabinet)
Printer via USB connection or network
<b>Control system</b>
Control system UNILOG B8 – 21,5" multi-touch screen (full HD)
Control panel with selectable haptic keys
Clamp force display and supervision
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, password system and RFID authorization system
Freely configurable status bar
Physical, process-related units
Automatic dimming
Logbook with filter function
User programming system (APS)
Userpage
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
Operator manual incl. hydr., mech. and electr. schedules online
Time Monitoring
BASIC Quality Monitoring (1 freely configurable network connection, quality table with 1000 storage depth, events protocol (logbook) for 1000 events, actual value graphics with 5 curves, 1 envelope curves monitoring)
Injection integral supervision
Metering integral supervision
Alarm message via e-mail
SmartEdit – sequence editor
QuickSetup – assistance program for initial parameter setting

## Base machine

Non-standard mold height/Opening stroke  
Mounting of fast-stroking cylinder exchanged diagonally  
Machine frame increased

## Hydraulics

Speed controlled servomotor for hydraulic pump to increase the energy efficiency  
Hydraulic accumulator for fast injection incl. loading pump  
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 manifold for Mouldmaster nozzle (controlling 1 nozzle or more, parallelly or sequentially, in the mold)  
Pneumatic manifold for Mouldmaster nozzle (controlling 1 nozzle or more, parallelly or sequentially, in the mold)  
Ejector pressure/speed controlled by P/Q servo valve  
Extra large oil cooler  
Filter in water inlet of oil cooler  
Adapter with ball valve on the oil tank for oil maintenance

## Clamping unit

Support for middle plate or heavy molds  
T-slots in mold platens  
SPI bolt pattern  
Ejector cross in clamping platen as per EUROMAP/SPI  
Maximum ejector force increased  
Ejector platen safety device  
Hydromechanical mold safety mechanism  
Air valve, action initiated (ON) and timer (OFF)  
Tie-bar retract device for upper tie-bar  
Quick mold clamping system electromagnet. or hydr.

## Injection unit

Grooves in the feeding zone of barrel for improved feeding  
High revolution hydraulic screw drive motor  
High torque screw motor in lieu of standard  
High temperature heaterbands (max. 450 °C)  
Barrel insulation (standard up from injection unit 12800)  
Screw drive by a.c. servomotor for parallel plastizising  
Ball type screw tip  
Check valve with carbide insert  
Needle type shut-off nozzle operated with spring, pneumatically or hydraulically  
Pneumatic cross-bolt type shut-off nozzle  
Melt temperature sensor in cylinder head (up to injection unit 8800)  
Pressure transducer for melt pressure switch over  
Open AIRMOULD®-nozzle, pressure controlled  
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  
Injection unit equipped for rigid PVC  
Injection unit equipped for CELLMOULD®  
Slide device with spindle/crank handle adjustment (standard up from injection unit 12800)  
Material hooper volume 60 liters  
Hopper magnet  
Access to material hopper via ladder and platform

## Safety gate

Front side gate safety system for manual part removal  
Electric safety gate at the operator side, standard from size 1000 t  
Safety gate clearance operator side/rear side extended

## 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 and the moving platen  
Cooling water flow rate integrated into control system via FLOWCON plus

## Electrics

Temperature control zone for hot runner  
Special voltage  
Control cabinet cooler  
Additional sockets  
Emergency stop button on rear side  
Signal tower with acustic element  
Temperature control interface digital, serial 20 mA TTY protocol  
CAN-Bus-interface for mold conditioner as per EUROMAP 66-2  
Interface for 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  
RJG eDart interface  
Master interface for danger zone boundary (DZB)  
Interface for full integration of robot incl. Ethernet switch  
Host computer interface/PDA (EUROMAP 63)  
Relays contact parallel to plasticizing  
Machine fault (potential-free contact)  
BNC connectors for injection process analysis  
Interface for vacuum pump

## Control system

Energy consumption analysis  
Integrated Tandemmould  
Switch over to holding pressure by cavity pressure  
Switch over to holding pressure by external signal  
Injection compression program/venting program  
Melt cushion control  
Second injection data setting for automatic start up  
User specific programable set value limits  
Web- and Remote-Service  
HiQ-Cushion – melt cushion control  
HiQ-Flow – injection integral control  
HiQ-Melt – monitoring of material quality

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)

## Additional equipment

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





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