

SmartPlus 60 – 180 t

Efficiency through proven technology

world of innovation

**PROVEN
TECHNOLOGY**



ECONOMICAL – PROVEN – PRACTICAL

For a wide range of applications

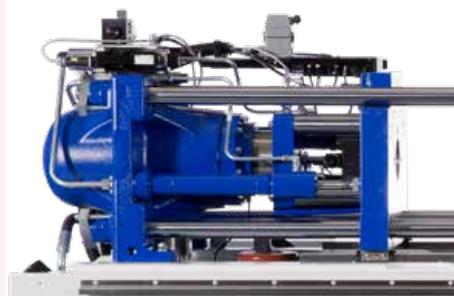
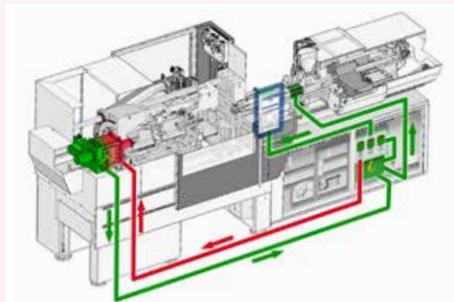
The advantages of the *SmartPlus* for maximum efficiency

- » **Optimal use of production floor space**
compact injection molding machine with proven stability
- » **Reproducible product quality**
through high-precision injection units with 22:1 L/D ratio for optimal material homogeneity
- » **Production-oriented solutions**
through practical equipment options
- » **Top energy efficiency**
through "Drive-on-Demand 2.0" drive system as standard
- » **KERS as additional energy bonus**
through patented energy recovery system
- » **Familiar user interface**
in new UNILOG B8 control system concept with integrated assistance systems
- » **Smart WorkCell**
with WITTMANN auxiliary appliances and the "Plug & Produce" WITTMANN 4.0 integration package
- » **Best price/performance ratio**
through proven components and state-of-the-art technologies

The Series

SmartPlus – clamping forces from 60 to 180 t





SmartPlus

The highlights

- » **Compact, maintenance-friendly plasticizing unit**
All *SmartPlus* plasticizing/injection units are easily accessible, compact and swivel-mounted. All machines come with a wear-resistant plasticizing unit as standard.
- » **"Drive-on-Demand 2.0" hydraulic servo drive**
The standard equipment in all *SmartPlus* machines is a combination of fast-response servo motors with powerful constant displacement pumps. The advantages of this system are maximum dynamism, speed and precision of the machine's movements with simultaneous minimal energy consumption.
- » **KERS – for optimal energy utilization**
In braking movements, the patented KERS (Kinetic Energy Recovery System) for injection molding machines transforms kinetic energy into electrical energy. The electricity thus generated is used inside the machine, for example for barrel heating. KERS further reduces the machine's energy consumption by up to 5%.
- » **Mold-protecting clamping system**
The 4-tie-bar clamping system equipped with central pressure pad force transmission and two diagonally positioned fast-stroke cylinders offers optimal force transmission to the mold, with simultaneous mold protection through above-average platen parallelism (only half of the tolerance stipulated for platen parallelism by EUROMAP 9).
- » **Highly sensitive mold protection**
The machine's moving platen is guided, without coming into contact with the tie-bars, via a stable moving carriage on linear guides and circular roller bearings with ample potential for carrying heavy molds. The minimal rolling friction of the moving platen's guiding system offers optimal conditions for highly sensitive mold protection.

CLAMPING UNIT

Compact and precise

» **Ample space for the mold combined with symmetrical force distribution**

Generously dimensioned clamping plates and a clamping system with symmetrical force distribution all round offer the optimal environment for every mold including all utility connections. [1]

» **Highly sensitive and precise**

In the *SmartPlus* clamping system, the exclusive purpose of the tie-bars is to provide force transmission between the external platens. The moving platen travels without tie-bar contact virtually free of friction on its linear bearings [2]. Optionally, the tie-bars can be pulled and reset in just a few simple steps. [3]

» **Dynamic movements**

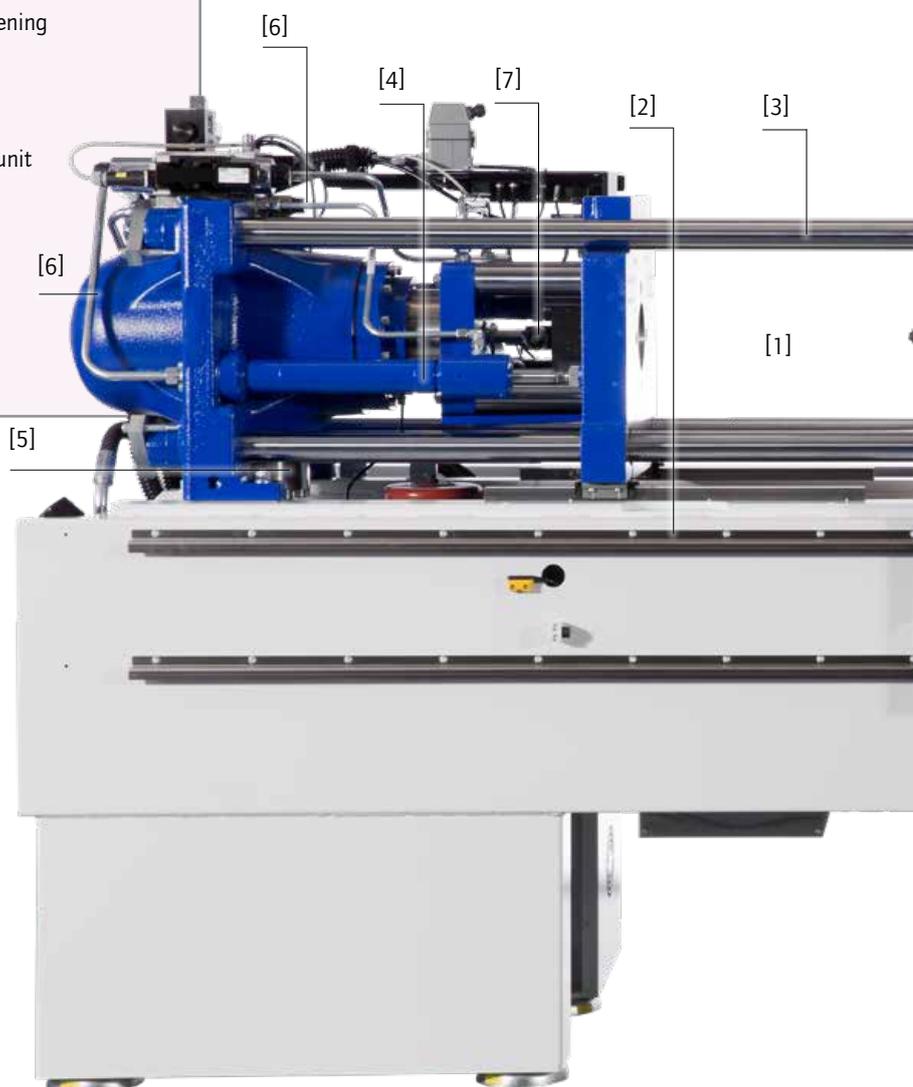
- The moving platen is driven by two diagonally positioned traveling cylinders. [4]
- The combination of the traveling cylinders with a hydraulic differential control system enables dynamic movements by means of a further improved hydraulic system with a proportional valve.
- The traveling cylinders are dimensioned for high opening forces. [4]

» **Compact design for minimal footprint**

Positioning of the suction valve at the bottom of the pressure cylinder shortens the length of the clamping unit to a minimum. [5]

» **Maintenance-friendly and easy to clean**

- Extensive use of hydraulic pipes instead of hoses reduces potential maintenance expenses. [6]
- The ejector area and the platen environment are easily accessible for machine setting. [7]



INJECTION UNIT

Reliable and repeatable

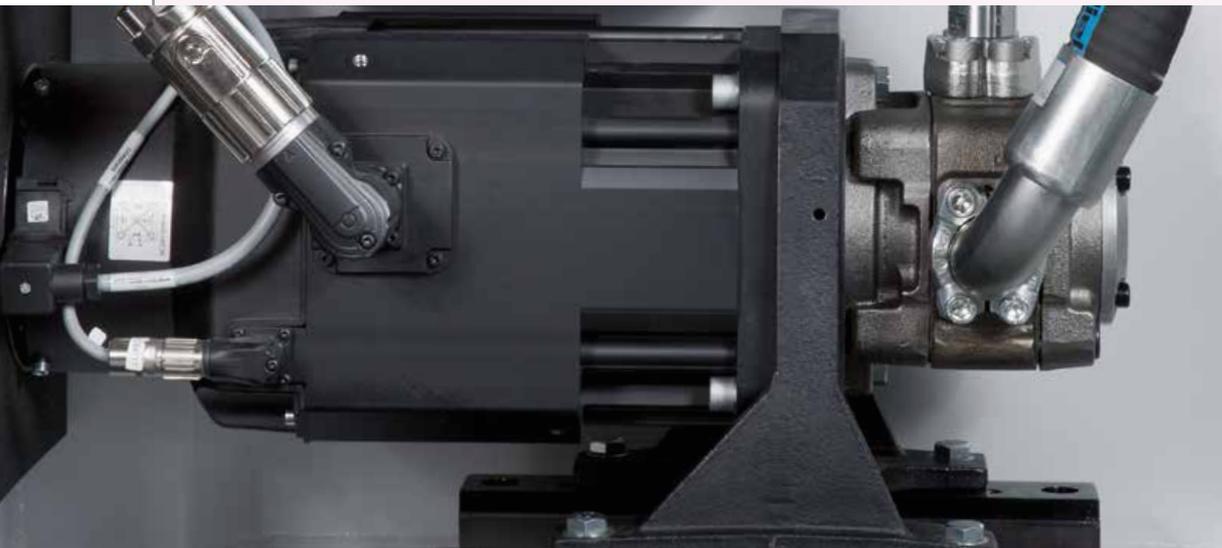
Wittmann

- » **Everything provided for series consistency**
 - All screws > 25 mm have a 22:1 L/D ratio.
 - High repeatability through standardized injection pump control system
 - Moment-free nozzle contact through axis-aligned traveling cylinder positioning [8]
 - Plasticizing barrels can be mounted on different injection units with the same screw diameters.
 - In combination with the WITTMANN BATTENFELD HiQ software modules (optional), sensitive control strategies are available to compensate external impacts such as variations in temperature and/or moisture, regrind or masterbatch content.
- » **Optimal user-friendliness**
 - Free access to the injection unit for easy material loading as well as machine setting and maintenance work
 - All injection units up to size 1000 swivel-mounted (for fast screw and barrel change)



DRIVE TECHNOLOGY

Energy efficiency through „Drive-on-Demand 2.0“



Fast-response, precise, economical

„Drive-on-Demand 2.0“ is the innovative combination of a fast-responding, speed-controlled and air-cooled servo motor with a high-quality constant displacement pump. The fast response speed is further enhanced by a booster unit specially developed in-house, which enables a higher clock frequency. This drive unit is only activated as long as required for movements and pressure generation. During cooling times or cycle breaks for parts handling, the servo drive is switched off and consumes no energy. During operation, „Drive-on-Demand 2.0“ provides the basis for highly dynamically controlled machine movements and short cycle times.

The „Drive-on-Demand 2.0“ system is standard equipment of the *SmartPlus* machine series.

Operating cost-cutting features

- » „Drive-on-Demand 2.0“ cuts energy consumption by up to 35% compared to modern regulating pump systems.
- » Additional energy cost cut by reduction of electric reactive power
- » Lower overall cooling expenses, since oil cooling can normally be dispensed with
- » Reduced maintenance expenses, since the oil quality is preserved longer, due to less thermal load.
- » Lower sound emissions reduce investments required for soundproofing



INTEGRATION PACKAGES

Material flow systemization

Wittmann

Insider

Compact automation solution

The Insider is an ex-works solution to extend a *Plus* injection molding machine into a production cell. In its basic version, the plant cell contains a parts handling device for parts removal, a parts transfer conveyor belt and a protective housing permanently connected with the machine. For the conception of these more complex automation projects, WITTMANN BATTENFELD offers the comprehensive expertise of the entire group of companies.



Ingrinder

More sustainable production

With the Ingrinder, WITTMANN BATTENFELD has created an innovative circular economy system for scrap parts. This product consists of an injection molding system with an integrated sprue picker, granulator and vacuum conveyor with a scrap gate. Through integration of the auxiliaries, the user receives a CE-certified system with a significantly smaller footprint than would be possible for a non-integrated solution.

The granulator and the sprue picker can be operated via the machine's UNILOG B8 control system. This solution can be extended by adding a good/bad part separator.



The advantages

- » Systemization of the material flow
- » Reduction of the production space
- » Minimized robot cycle time
- » Easy access
- » Cost advantages
- » CE certificate included

CE

UNILOG B8

Complex tasks simplified

The proven UNILOG B8 control system logic with the high-performance B8X hardware is the WITTMANN BATTENFELD solution to make the operation of complex processes easy. To this end, the integrated industrial PC has been equipped with an enlarged intuitive touch-screen control surface. The visualization is the interface to the new Windows® 10 IoT operating system, which offers extensive capacity for process control. In addition to the swivel-mounted monitor screen unit, a fixed manual operating panel is installed in the central console.



UNILOG B8

The highlights

- » **Operating logic**
with a high level of self-explanation, oriented on modern communication devices
- » **2 important operating concepts**
 - operating/movement functions with selectable haptic keys
 - process functions on screen (access via RFID, key card or key ring)
- » **Process visualization**
via bright 21.5" multi-touch screen in full HD, laterally swiveling
- » **New screen functions**
 - uniform layout for all WITTMANN appliances
 - operation via gesture control (wiping and zooming via finger movements)
 - container function - screen display partitionable for simultaneous display of two process graphics one above the other
- » **Status visualization**
uniform signal design for the entire WITTMANN Group:
 - headlines on screen with colored status bars and pop-up menus
 - ambiLED display on the machine
- » **Operator assistance**
 - *QuickSetup*: assistance for process parameter setting via an integrated material database with preselection of machine settings
 - extensive help library included

» **SmartEdit**

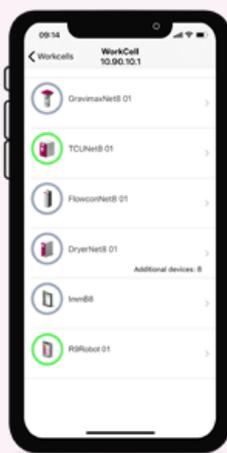
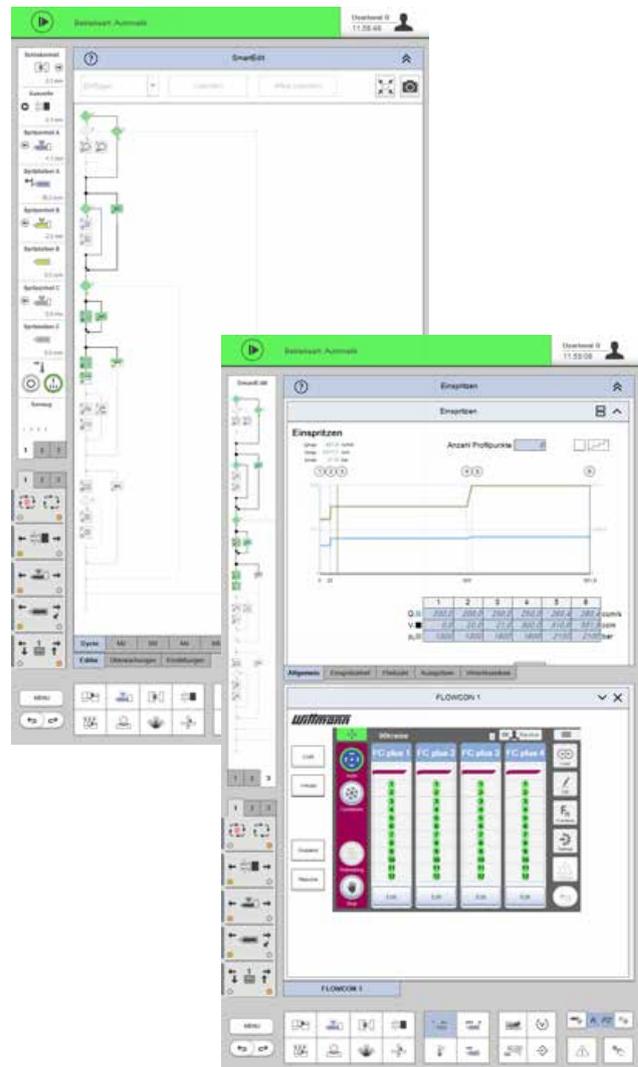
SmartEdit is a visual, icon-based cycle sequence programming facility, which enables direct addition of special functions (core pulls, air valves, etc.) based on a standard process via touch operation on the screen. In this way, a total user-defined sequence can be compiled from a sequence menu. This 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 display ensures clarity
- clear sequence of events through node diagram
- inconsequential alterations in "dry tests"
- fast transfer of theoretical sequence to real operation possible
- automatic sequence calculation based on the parameter setting data set without actual machine movements

» **SmartScreen**

- partitionable screen displays to visualize and operate two different functions simultaneously (e. g. machines and auxiliaries)
- uniform design of the screen pages within the WITTMANN Group
- max. 3 containers can be selected simultaneously for the *SmartScreen* function.
- Alterations of values can be entered directly into the set values profile.



Remote communication

» **QuickLook 4.0**

- Production status checks possible simply and comfortably via a Smartphone:
- operating data and condition of all important appliances in a production cell
 - general overview of the most important production parameters
 - access to operating data, alarm input and user-defined data
 - the production cell overview provides a simple and clear overview of the production cell's overall status and that of its WITTMANN 4.0 appliances.

» **Global online service network**

- Web-Service 24/7: direct internet contact to WITTMANN BATTENFELD service
- Web Training: efficient staff training via the virtual training center

WITTMANN 4.0

Communication in and with production cells

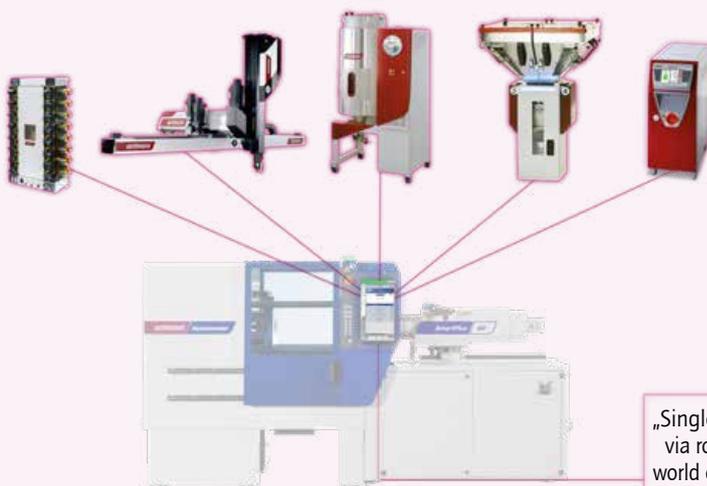
With its communication standard WITTMANN 4.0, the WITTMANN group offers a uniform data transfer platform between injection molding machines and auxiliary equipment from WITTMANN. In case of an appliance change, the corresponding visualizations and settings are loaded automatically via an update function, following the principle of "Plug & Produce".

Integration of auxiliaries under WITTMANN 4.0

- » **WITTMANN WFC 120 flow controllers, GRAVIMAX blenders and ATON dryers**
 - Direct activation and control of the appliances via the machine's control system
 - Shared data storage in the production cell, in the machine and via MES in the network.
- » **WITTMANN robots with R9 control system**
 - Robot operation via the machine's monitor
 - High-speed communication between the machine and the robot to synchronize movements
 - Important machine movements can be set via the R9 robot control system
- » **WITTMANN TEMPRO plus D temperature controllers**
 - Temperature can be set and controlled via the machine's control system
 - All functions can be operated on the appliance as well as 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 customers' requirements, small and medium-sized companies as well as global players are offered a compact MES solution based on TEMI+. With 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.



System WITTMANN 4.0

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

„Single point entry“
via router into the
world of Industry 4.0

TYPICAL APPLICATION EXAMPLES

of the *Plus* series



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TECHNICAL DATA

SmartPlus

Wittmann



COMBINATION OPTIONS

Clamping unit	Injection unit						
	t	130	210	350	525	750	1000
60	•	•					
90		•	•				
120			•	•			
180						•	•

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

Die maximalen Spritzgewichte (g) ergeben sich durch die Multiplikation des rechnerischen Hubvolumens (cm³) mit den obigen Faktoren.

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

Dunkelgraue Felder = Duroplaste

STANDARD

Complete system
Voltage 230/400 V/3p+N-TN/TT, 50 Hz
Colors of paint: RAL 7047 tele grey 4 / RAL 5002 ultramarine blue
Air cooling system for drive and amplifier units, water cooling system open for feed zone and oil cooler with membrane valve
One-piece basic frame with disposal channels in 3 directions
Ejection area – ejector shaft cover complies with EN201
Test run with HLP32 zinc-free hydraulic oil according to DIN 51524 T2 / purity class 17/15/12 according to ISO 4406 (Please note: oil is not included in the delivery), lubricants in H2 quality
Printed operating instructions incl. user manual on USB stick in 1 EU language acc. to country definition, incl. type examination certificate from TÜV Austria in German, with elect. safety protocol acc. to EN 60204-1
IMM in compliance with Machinery Directive 2006/42/EC incl. declaration of conformity and CE mark
Hydraulic system
S0 drive unit with speed-controlled servo motor for hydraulic pump for increased energy efficiency
Hydr. system with oil cooler and temp. controller, oil level monitoring
Fine oil filter with electric contamination indicator
Oil pre-heating of the hydraulic aggregate with closed safety gate
Clamping unit
Clamping force, opening and closing forces all adjustable
Mold safety program
Exact platen parall., low-friction linear guides for clamping plate support
Clamping plates with drillings according to EUROMAP 2, clamping plate surface bright metal, all other surfaces painted
Drillings on fixed platen according to WP80, and EUROMAP 18 for robot
Hydraulic ejector with multiple stroke
Clamp. cylinder piston coated with hard chrome subst., ejector piston rod induction hard. and hard chrome plated, position sensor with linear potentiom.
Injection unit
Hydraulic screw drive system
Injection, holding and back press. pump-contr. with def. nozzle contact press.
Plasticizing unit with screw in nitride steel quality, AK+ barrel for thermo-set processing, without feed zone grooving, standard nozzle head, general purpose 3-zone screw, fast-locking three-part check valve, heater bands up to 350 °C without heat insulation
Thermocouple failure monitor
Maximum temperature monitor
Plug-in ceramic heater bands – heater band multi connector for fast barrel change, nozzle heater band with separate plug
Temperature-controlled feed zone
Swivel device for barrel
Hard chromed injection cylinder piston rods and linear guides as standard, position sensor with linear potentiometer
Lowering of barrel temperature
Decompression before and/or after metering
Input of physical units – bar, cm ³ , mm/s, etc.
Cold start screw protection
Peripheral screw speed indication
Linear interpolation of set holding pressure values
Bar diagram for barrel temp. with set value and control deviation display
Adjustable injection pressure limit
Changeover from injection to holding pressure (depend. on stroke, time and pressure)
Open nozzle R35
Standardized injection and barrel guard according to EN 201, L/D 22, limit-switch monitored
Feed hopper 6 I (MH206) for automatic loading sliding gate with slide guide

Safety gates
Guarding on injection side with screwed-on service gate
Standardized safety gates, Perspex glass light blue309 / frame RAL 5002 ultramarine blue
Manually operated safety gates on operator and non-operator side
Electrics
Nozzle control socket for nozzle heating 230 V
ambiLED status indicator
FI safety switches for sockets
Circulating control cabinet fan for ambient temp. up to max. 30 °C
Emergency stop switch in operating console
Printer socket
1 x USB operating unit
1 x Ethernet -interface (control cabinet)
Printer via USB connection or network
Control system
UNILOG B8 control with 21.5" multi-touch screen in full HD
Operating panel with selectable haptic keys
Hour counter/shot counter software
Closing/opening 5 profile steps
Ejection 3 profile steps
Nozzle movement 3 profile steps
Injection/holding pressure 10 profile steps
Screw speed/back pressure 6 profile steps
Part counter with good/bad parts evaluation
Purging program through open mold
Stroke zero offset settings
Start-up scrap program
MASTER/SLAVE holding pressure changeover dependent on time, stroke/volume and injection pressure
Self-learning temperature controller
Control cabinet temperature indicator
Weekly timer
Access author. via USB interface, password system and RFID author. system (1 x IT level 15 check card, 1 x customer level 30 token and 1 x customer support level 20 token included in the delivery)
Freely configurable status bar
Product-related physical units
Automatic dark switching
Logbook with filter options
User programming system (UPS)
User page
Notebook function
Cycle time analysis
Hardcopy function
Internal data memory, data storage via USB connection or network
Online language switching
Online unit switching
Real time monitoring
BASIC quality monitoring (1 freely config. network drive conn., quality table with 1000 memory depth, event log for 1000 events, actual value graphics with 5 curves, single envelope curve monitoring)
Injection integral monitoring
Metering integral monitoring
Alarm signal via email
SmartEdit – process editor
QuickSetup – assistance program for initial setup
Energy consumption indicator for drive units and barrel heating

Basic machine
Country-specific regional package
Power supply line 1 with special voltage, supply line 2
Handling package with open rear safety gate
Ejection chute
Parts chute (good/bad parts separation)
Hydraulic / pneumatic systems
Coarse filter in flowline to cooling system and connections with ball valves on the oil tank for oil care
Hydraulic core pulls on clamping platen/fixed platen, EUROMAP 13 interface with decompression
Pneumatic core pulls on clamping platen/fixed platen, incl. compressed air regulator
Hydraulic blocks for activating one or several shutoff nozzles in the mold
Air valves on fixed platen/clamping platen
Compressed air service unit with single or multiple pressure control, incl. path ventilation valve with shut-off function
Oil pre-heating of the hydraulic aggregate with open safety gate
Clamping unit
Mold plates with special drillings according to SPI, JIS
Hydraulic ejector in reinforced design
Twin check valve to hold the ejector in end position
Ejector cross according to EUROMAP, SPI, JIS
Mechanical or pneumatic ejector coupling
Ejector plate safety device
Injection unit
Hydraulic screw drive – torque-boosted, high-speed version
Barrel insulation
Open nozzle in special design
Needle shut-off nozzle, with spring or pneumatic activation
Material hopper MH330
UNIFEED

Safety gate
Safety gate on clamping side, operator and/or non-operator side raised or lowered
WITTMANN Insider equipment packages with conveyor belt at the rear
Ingrinder
Cooling
Cooling water flow controller with blow through valve
Shut-off valve for cooling water flow controller
Machine cooling with T piece in water supply line
WFC120 controlled or regulated
Cooling water distribution block on fixed platen / moving platen
Electrics
Temperature control units for hot runners
Acoustic elements integrated in signal lamps
Socket combinations
Additional ventilators in control cabinet for higher ambient temperatures
Control cabinet air conditioner
Additional emergency shut-off sensor
Interface for robots, conveyor belt, temperature controller, blender, mold monitoring, BDE, hazard area delineation, ejector middle plate, potential-free contacts
Control system
BNC connectors for injection process analysis
EXPERT quality monitoring (4 freely configurable network drive connections, quality table with 10000 memory depth, event log for 10000 events, actual value graphics with 16 curves, 4-fold envelope curve monitoring, SPC analysis, trend diagrams)
Special programs to customers' specifications
HiQ Cushion® – melt cushion control
HiQ Flow® – injection integral control
HiQ Melt – material quality monitoring
Energy consumption analysis
Clamping force monitoring
Transfer molding and ventilation programs
Cycle start-up with safety gate closing
Special program with interim ejector shut-off / cold plug purging
Additional exit / entry card, freely programmable
WITTMANN 4.0 integration package
Accessories
Adapter socket for robot
Tool kit
Leveling elements
Integration package (robot, material loader, blender, temperature controller, mold integration)
WITTMANN BATTENFELD Web-Service – free of charge during warranty period
Remote control package

The Wittmann logo is located in the bottom right corner of the page. It consists of the word "Wittmann" in a white, italicized, sans-serif font, set against a dark red, rounded rectangular background.

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