

SmartPrimus B8X 60 – 180 t

Efficiency through proven technology

world of innovation



ECONOMICAL – PROVEN – PRACTICAL

For a wide range of applications

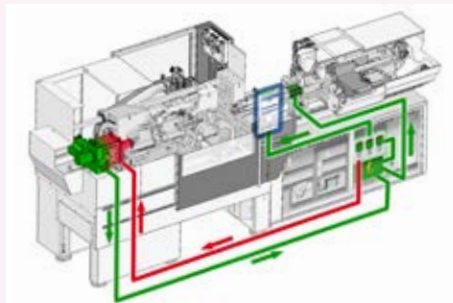
The advantages of the SmartPrimus for maximum efficiency

- » **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 as standard, optionally expandable
- » **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 B8X 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

SmartPrimus – clamping forces from 60 to 180 t





SmartPrimus

The highlights

- » **Compact, maintenance-friendly plasticizing unit**
All SmartPrimus 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 SmartPrimus 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 SmartPrimus 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**

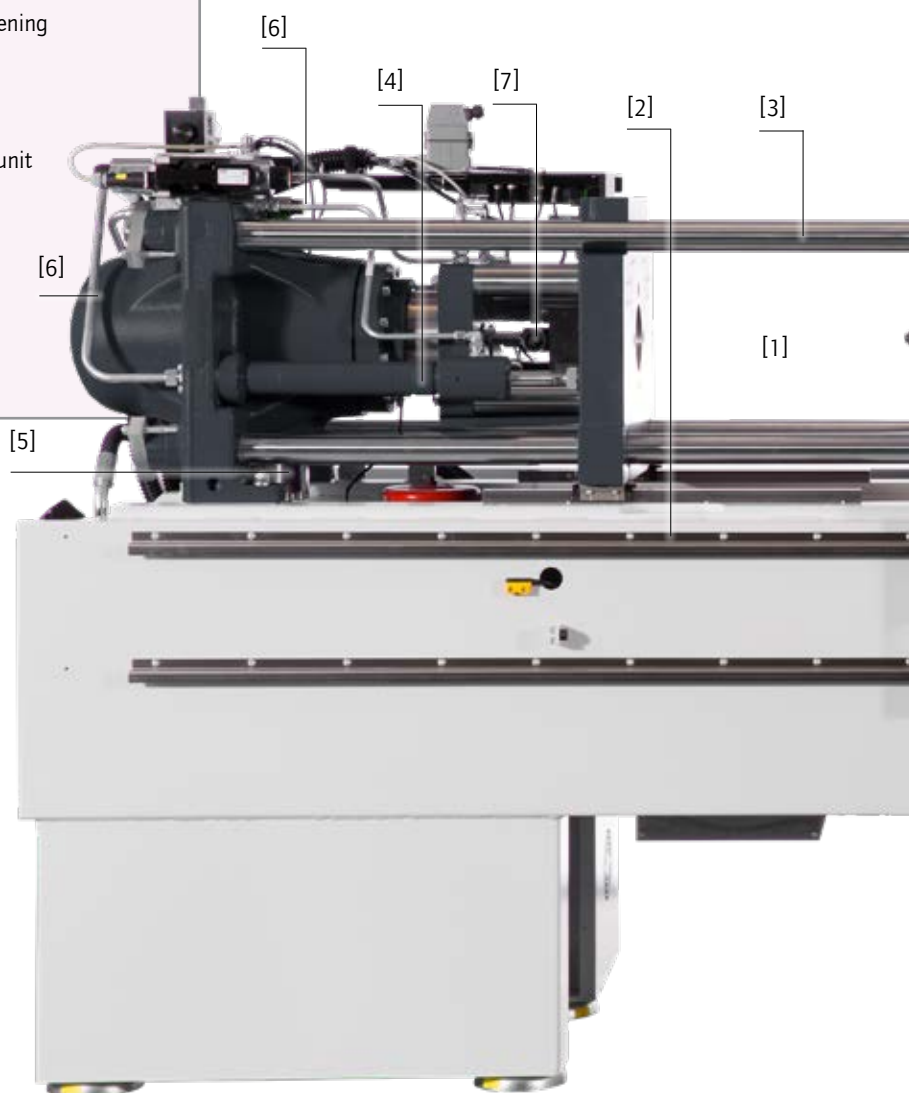
- The moving platen is driven by two diagonally positioned traveling cylinders. [4]
- The combination of the traveling cylinders with a hydraulic differential control system enables dynamic movements by means of a further improved hydraulic system with a proportional valve.
- The traveling cylinders 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 SmartPrimus 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 sound-proofing



PRIMUS SERIES

Optional highlights

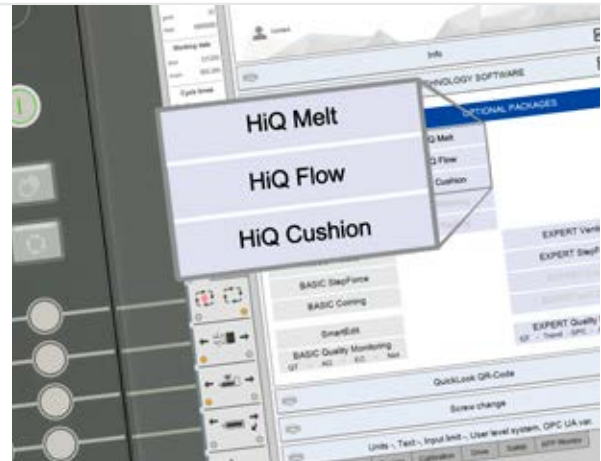
Wittmann

HiQ packages

Compensating material fluctuations

Viscosity fluctuations of the plastic melt and/or the closing behavior of the checkvalve have a significant influence on the quality of the molded part. This is precisely where WITTMANN BATTENFELD's application software comes in, more widely known as HiQ packages. These deal to a varying extent with monitoring, documentation and regulation of the injection molding machine.

The HiQ packages are add-ons to the existing Unilog B8X machine control software. They provide additional features to grant machine operators more insights into the process and to facilitate operation of the equipment as well.



Numerous interface extensions

Standardized interfaces are a fundamental prerequisite for successful comprehensive introduction of Industry 4.0 technologies. On the basis of the OPC UA industrial M2M communication protocol and under the umbrella of EUROMAP, the plastics industry is developing standards for a vast range of different types of communication.

The WITTMANN Group plays a leading role in their development and standardization, and offers the following standard communication options between the individual appliances of a production cell and an MES system in a variety and consistency which is unique in the world:

- » EUROMAP 63, 77, 82.1, 82.3
- » OPC UA



WITTMANN auxiliaries

For a fully integrated production cell

The comprehensive range of WITTMANN auxiliary appliances offers appropriate solutions for all secondary injection molding processes, from parts handling, material transport and drying all the way to sprue recycling and mold cooling. Via the optional Wittmann 4.0 integration package, all additional appliances can be integrated into the production cell in line with the "Plug & Produce" principle.



UNILOG B8X

Complex tasks simplified

The proven Unilog B8X control system logic with the high-performance 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 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 B8X

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**

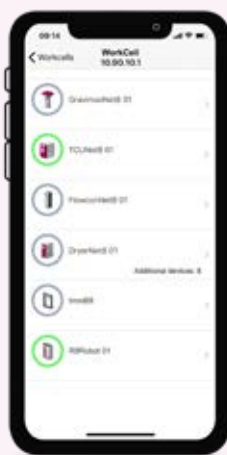
SmartEdit is a visual, icon-based cycle sequence programming facility, which enables direct addition of special functions (core pulls, air valves, etc.) based on a standard process via touch operation on the screen. In this way, a total user-defined sequence can be compiled from a sequence menu. This 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

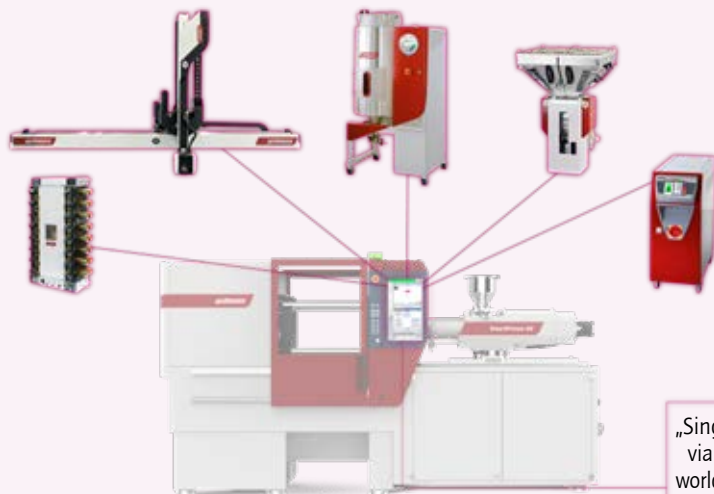
With its communication standard Wittmann 4.0, the WITTMANN group offers a uniform data transfer platform between injection molding machines and auxiliary equipment from WITTMANN. In case of an appliance change, the corresponding visualizations and settings are loaded automatically via an update function,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

TYPICAL APPLICATION EXAMPLES

of the Primus series

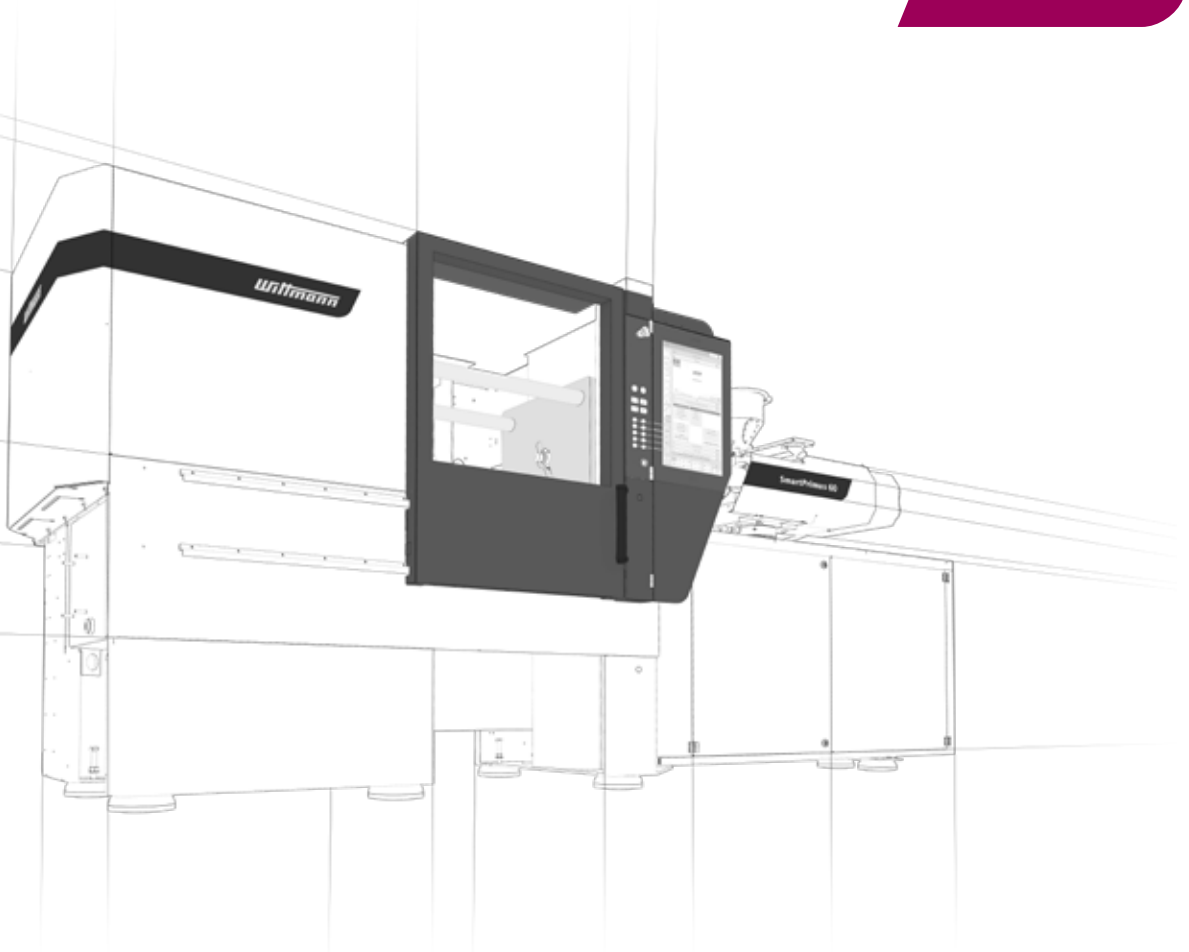


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TECHNICAL DATA

SmartPrimus

COMBINATION OPTIONS

Clamping unit t	Injection unit					
	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

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

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

STANDARD

Complete system
Voltage 230/400 V/3p+N-TN/TT, 50 Hz
Paint RAL 7047 tele grey 4 / RAL 7016 anthracite / RAL 3004 crimson
Air cooling system for drive and amplifier units, water cooling system open for feed zone and oil cooler (< 90 t) with membrane valve
One-piece basic frame with disposal channels in 3 directions
Ejection area - ejection shaft cover according to EN ISO 20430 incl. interface for ejection flap control
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 including user manual on USB stick
Injection moulding machine according to machinery directive 2006/42/EG incl. declaration of conformity and CE-marking
Levelling pads
Hydraulic system/pneumatic systems/temperature control
S0 drive unit with speed-controlled servo motor for hydraulic pump for increased energy efficiency
Oil level monitoring
Fine oil filter with electric contamination indicator
Oil pre-heating of the hydraulic aggregate
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 EUROMAP 18 for robot
Hydraulic ejector with multiple stroke
Clamping cylinder piston hard chrome-plated, ejector piston rod induction hard. and hard chrome plated, position sensor with linear potentiometer
Injection unit
Hydraulic screw drive system
Injection, holding and back press. pump-contr. with def. nozzle contact press.
Plasticizing unit AK+ for thermoset processing, 3-zone universal screw, flow-optimized check valve, heater bands up to 350 °C with heat insulation of feed zone grooving
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
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, split
Standardized injection and barrel guard according to EN ISO 20430, L/D 22, limit-switch monitored
Feed hopper 6 l (MH206) for autom. loading sliding gate with slide guide

Safety gates
Guarding on injection side with screwed-on service gate
Standardized safety gates, Perspex glass clear / frame RAL 3004 crimson
Manually operated safety gates on operator and non-operator side
Bedienschutztür mit elektrischer Überwachung nach CE auf Vorder- und Rückseite
Wartungsfreie Schutzgitterverriegelung über Elektromagnet
Schutzgitter oben offen für einfachen Werkzeugeinbau und Roboterentnahme
Electrics
Nozzle control socket 230 V
AmbiLED status indicator
Circulating control cabinet fan for ambient temp. up to max. 30 °C
Emergency stop switch in operating console
1 x USB operating unit USB-Anschluss an Bedieneinheit für Drucker oder Netzwerk
1 x Ethernet -interface (control cabinet)
Wittmann 4.0 integration package BASIS bestehend aus: Router zur Integration bzw. Absicherung der Spritzgießmaschinenzelle in dem Produktionsnetzwerk
Control system
Unilog B8X 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 via 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 control
Injection and metering integral supervision
Alarm signal via email
SmartEdit – process editor
QuickSetup – assistance program for initial setup
Energy consumption indicator for drive units and barrel heating
2 outputs, freely programmable

Basic machine

Handling package with open rear safety gate

Ejection chute w/o 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

Pneum. core pulls on clamping platen

Hydr. blocks for activating two or several shutoff nozzles in the mold

Hydraulic core pull for clamping plate, interface according to EUROMAP 13

Pneumatic manifolds for one mold shut-off nozzle

Air valves on nozzle plate/clamping plate

Compressed air pressure maintenance unit incl. 1 or more way pressure regulation incl. directional exhaust valve with blocking function

Clamping unit

Mold plates with special drillings according to SPI, JIS

Twin check valve to hold the ejector in end position

Ejector cross according to EUROMAP, SPI, JIS

Mechanical ejector coupling

Injection unit

High torque hydraulic screw drive

Safety gate

Safety gate on clamping side, operator and/or non-operator side raised or lowered

Cooling

Cooling water flow controller w/o blow through valve

Shut-off valve for cooling water flow controller

Machine cooling by T-piece in inlet pipe

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, BDE, hazard area delineation

Control system

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)

Energy consumption analysis

Transfer molding and ventilation programs

Cycle start-up with safety gate closing

Additional exit / entry card, freely programmable

Wittmann 4.0 integration package

Accessories

Tool kit

WITTMANN BATTENFELD Web-Service - free of charge during warranty period

Remote control package

The Wittmann logo is displayed in a stylized, italicized font within a magenta-colored rounded rectangular shape.

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