**VPower 120 – 160 t R**
For flexible assembly injection molding

world of innovation
ERGONOMICAL – FLEXIBLE – HIGHLY EFFICIENT
More productivity through optimal ergonomic design

The advantages of the VPower R

» Innovative 2-tie-bar rotary table machine concept
» Reduced footprint compared to predecessor models
» Servo-driven rotary tables for 2-, 3- and 4-station applications
» Low, ergonomic working height
» Injection unit convertible to horizontal or vertical positioning
» Ultimate mold protection through homogeneous force transmission (UNIFORCE) in the mold clamping area
» Easy access to media supply connections below the rotary table
» Optimal energy efficiency with servo-electric and servo-hydraulic drives
» Self-explanatory touch screen operation of the UNILOG B8 control system
» Prepared for conversion into a production cell with the WITTMANN 4.0 “plug & produce” integration package

The machine series

VPower R: 2 rotary table diameters – 120 to 160 t clamping force*

*more models and rotary table sizes in planning
VPower R
The system highlights

» Rotary table clamping unit without central tie-bar
A distinctive feature of the VPower is its optimally accessible rotary table system which, unlike its predecessor model, has dispensed with a central tie-bar in the rotation center. The servo-driven rotary table has been combined with a 2-tie-bar portal clamping unit equipped with two traveling cylinders positioned on the outside for fast opening and closing.

» 2-tie-bar clamping unit modeled on nature
The design of the clamping unit has followed a model from nature to make it both rigid and light. The new UNIFORCE compensation plate system between the horizontal beams and the mold clamping area also provides an unprecedentedly even and gentle force transmission to the mold.

» Fast rotary tables
VPower rotary tables are currently available with diameters of 1300 and 1600 mm and combined with servo-electric drives for short rotation times and high-precision positioning. A central lubrication system for all moving parts and seals to prevent penetration of liquids or particles provides highest possible operational safety.

» Media supply connection points at the rotary table center
The tie-bar-less rotation center provides ample space for the installation of cooling water, hydraulic oil, compressed air and power supply connections under the rotary table. The connections to the molds can be led through the center of the rotary table either via direct tubing or via an oscillating or rotary distributor.

» General convertibility from H to V injection and vice versa
The modular VPower concept consisting of clamping units of variable sizes and a compact drive model across all sizes is the prerequisite for a minimal footprint. The installation points for the injection units are designed to enable easy conversion of the injection unit from horizontal to vertical configuration and vice versa.
The clamping system of the VPower machine series has incorporated in its technology proven, stress-optimized design elements from nature. It takes the form of a 2-tie-bar portal system offering well-balanced force transmission combined with light weight. The movements are carried out via two low-volume fast-stroking cylinders, while the clamping force is applied via two pulling high-pressure cylinders inside the frame base and the crosshead.

NEW: UNIFORCE compensation plate system for maximum mold protection

A new feature is a UNIFORCE compensation plate system between the frame crosshead and the mold platen, which neutralizes the flexural deformation effect on the clamping area, caused by the force transmission, thus ensuring a so far unparalleled, even force distribution on the mold to reduce wear.

The advantages

- Ample space and symmetrical force distribution
- Symmetrical and evenly distributed force transmission across the clamping area ensures maximum protection of the molds.
- Deformation of the rotary table and the mold platens reduced to a minimum
ROTARY TABLES
Fast and precise

» All rotary tables are equipped with servo drives for short rotation times.
» Available for either oscillating 2-station operation or rotating 2-, 3-, or 4-station operation
» Precise positioning through electronic rotation angle control
» Dynamic, highly accurate end position control
» End position definition through indexing
» Low height and thus overall ergonomically favorable working height of the clamping unit
» All rotary tables come with a central opening for insertion of cable and/or tube connections (only for oscillating operation), or a rotating conduit for media connections.
» Rotary union for up to 9 media circuits (temperature control, pneumatics, hydraulics) as well as power circuits and sensors are available on an optional basis.
» Central greasing for bearings, gears and low-friction sliding areas
» Fully sealed circumference of the rotary table to prevent penetration of liquids and particles

Extension options
» Additional media circuits
» Customized ejector positioning
» Installation of magnetic mold platens
» Data transmission modules
INJECTION UNIT
Versatile horizontal – vertical

Proven plasticizing technology
» All screws from 25 mm upwards come with a 22:1 L/D ratio.
» All injection aggregates offer a wide range of injection pressures (from 3000 bar for the smallest and up to about 1600 bar for the largest screw diameters).
» Moment-free nozzle contact through axial positioning of the traveling cylinders for the plasticizing aggregate
» Barrels can be inserted into different injection aggregates when the screw diameter is identical.
» Easy access to the nozzle thanks to diagonally arranged traveling cylinders for the nozzle
» 650 mm nozzle stroke for easy removal of the barrel
» Freely height-adjustable horizontal injection unit with (manual or electric) path measurement system and easy nozzle centering
» Aggregate support via linear guides
» Integrated injection block close to the injection unit
» Aggregate in V configuration free of obstruction by structural components at the front (hopper on the right), thus minimal risk of collision with automation equipment
» In combination with the WITTMANN BATTENFELD HiQ software modules (optional), sensitive adjustment strategies are available for compensation of external influencing factors such as temperature, moisture content, proportion of regrind or Masterbatch.

Anti-wear options
In addition to the high-quality standard finish, an extensive range of optional versions with extra anti-wear and/or anti-corrosion protection is available. Pre-defined option packages and a selection matrix facilitate the choice of the right version.
INJECTION UNIT
Flexibly horizontal or vertical

Versatile convertibility between H and V injection

The clamping units in various sizes are combined with a compact drive module consisting of a frame which houses hydraulic pumps and servo-electric drives and an electric control cabinet. This combination facilitates a minimal footprint.

The installation points for the injection units are designed to enable quick and easy conversion from horizontal to vertical configuration and vice versa, for example to meet varying production requirements. Of course, 2- or 3-color versions with two or three injection units are also available.

Retrofitting of second injection unit possible

The machine's drive system is laid out for operation with one injection unit as standard. But the VPower R can also be ordered ex works with the extension option for operation with 2 aggregates for 2-component injection molding. This enables easy retrofitting of the second plasticizing unit within a very short time.
DRIVE TECHNOLOGY
Energy efficiency through “drive-on-demand”

Responsive, precise, thrifty
“Drive-on-demand” is the innovative combination consisting of a responsive, speed-controlled, air-cooled servo motor and a fixed displacement pump. This drive unit is only activated when required for movements and pressure generation. During cooling periods or cycle breaks for parts handling, the servo drive is switched off and consumes no energy. During operation, “drive-on-demand” is the basis for highly dynamic, controlled machine movements and short cycle times.

As in the SmartPower machine series, the “drive-on-demand” system is also installed in the VPower machines as standard, which means that this series already complies with the EU Energy Efficiency Directive 2020.

The Highlights
» The VPower is equipped with a servo-hydraulic twin pump system as standard, to enable parallel movements of the opening and ejector strokes.
» Through encapsulation and sound insulation of the motor/pump compartment, the drive unit features extremely low noise emission (65 dBA).
» The highly effective fine filtration of the hydraulic oil in the main flow channel ensures long-term high precision.
The efficiency of assembly injection molding is largely determined by the efficiency of insert handling. Thanks to their fundamentally re-designed clamping unit, VPower injection molding machines offer an unprecedented level of accessibility and ergonomic operation. This facilitates and increases productivity in parts handling by operating staff and reduces the necessary expense for connection of handling robots.

**Many years of automation expertise**
With its extensive product portfolio of peripheral equipment and injection molding machines, WITTMANN BATTENFELD is able to supply from its own resources seamlessly integrated production cells consisting of an injection molding machine, handling automation and peripherals. WITTMANN BATTENFELD can also draw on decades of experience in injection molding automation.
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 pivotal 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 appliances
– 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

» **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 appliances 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 appliances 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
With its 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, GRAVIMAX blenders and ATON dryers**
  - 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 R8 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 R8 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

**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 the customer’s requirements, small and medium-sized companies are offered a compact MES solution based on TEMI+. For large-scale and globally active companies, our cooperation partner is MPDV Microlab GmbH, a leading MES service provider. Due to 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.

**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.
OPTIONEN
Modular and flexible

VPower
The optional highlights

» Servo-electric plasticizing
   As an alternative to the standard hydro motor drive for the rotation of the screw, a direct drive powered by a servo motor is available as an option. It reduces energy consumption and also offers extended scope for parallel operation of the clamping and plasticizing units.

» 2-component machine
   The drive unit of the VPower provides the basic prerequisites for operation with 2 aggregates. If the machine has been prepared for the 2-component operation, it can either be ordered as a 2-component injection molding machine ex works, or be retrofitted with a second plasticizing unit later.

» Media distributor rotary operation
   Rotary union distributing various media and electrical signals are available for 3- and 4-station rotary table machines. This type of media distributor offers numerous adjustment options for the hydraulic and pneumatic systems, air supply connections and electrical signals.

» Pivotable control terminal
   For the installation and set-up of complex molds on the rotary table, it is of advantage for the machine operator to keep the molds in view while programming the control system. For this purpose, a pivotable and rotatable control terminal is available as an option instead of the standard fixed terminal.

» Peripherals from WITTMANN
   The extensive range of WITTMANN peripheral appliances offers suitable solutions for all secondary processes of injection molding, from parts handling, material transport and material drying to sprue recycling and mold cooling. With the optional WITTMANN 4.0 integration package, all additional appliances can be integrated into the production cell according to the “plug & produce” principle.
APPLICATION TECHNOLOGY
Competence above standard

» Insert molding of complex electrical structures
Embedding complex conductor tracks in plastic is a traditional assembly molding task. The metal structures are centered inside the mold by retractable fixing pins. Towards the end of the injection process, the pins are pulled back via the core pull function and the remaining holes are filled.

» Metal/plastic assembly injection molding
Another traditional assembly application is insert molding of metal bushing or threaded inserts. Through insert molding, a positive-locking connection is created which is normally superior to downstream joining by ultrasound or hot pressing.

» Combinations of plastic with plastic
Assembly injection molding is not limited to combinations of plastic with metal, but can also be realized by insert molding of a prefabricated plastic part.

» Multi-component addition injection molding
Application example for the assembly of a molded part through sequential addition of plastic components in consecutive injection molding stations, as illustrated here by an automobile rain sensor part consisting of 4 components.
TECHNICAL DATA VPower

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

<table>
<thead>
<tr>
<th>Material</th>
<th>Factor</th>
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<tbody>
<tr>
<td>AB5</td>
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<tr>
<td>CA</td>
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<tr>
<td>CAB</td>
<td>0.97</td>
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<tr>
<td>PA</td>
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<tr>
<td>PC</td>
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<td>PE</td>
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<td>PMMA</td>
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<td>POM</td>
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<td>PP</td>
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<table>
<thead>
<tr>
<th>Material</th>
<th>Factor</th>
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<tbody>
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<td>PP + 20 % Talc</td>
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<tr>
<td>PP + 40 % Talc</td>
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<tr>
<td>PP + 20 % GF</td>
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<td>PS</td>
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<tr>
<td>PVC hard</td>
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<tr>
<td>PVC soft</td>
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<tr>
<td>SAN</td>
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<tr>
<td>SB</td>
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<tr>
<td>PF</td>
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<td>UP</td>
<td>1.6</td>
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Dark grey boxes = thermosets

<table>
<thead>
<tr>
<th>Clamping unit</th>
<th>Rotary table</th>
<th>Injection unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>120 R</td>
<td>130</td>
<td>•</td>
</tr>
<tr>
<td>120 R</td>
<td>1600</td>
<td>•</td>
</tr>
<tr>
<td>160 R</td>
<td>1300</td>
<td>•</td>
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<tr>
<td>160 R</td>
<td>1600</td>
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COMBINATIONS

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<th>mm</th>
<th>130</th>
<th>210</th>
<th>350</th>
<th>525</th>
<th>750</th>
<th>1000 H</th>
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</thead>
<tbody>
<tr>
<td>120 R</td>
<td>1300</td>
<td>•</td>
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<td>120 R</td>
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<td>160 R</td>
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<td>160 R</td>
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</table>
STANDARD

**Base machine**
- Drop – voltage 230/400 V / 3p+N-TN/TT, 50 Hz
- Painting RAL 7047 tele grey 4 / RAL 5002 ultramarine blue
- Air cooling system for drive unit, water cooling for feeding zone and oil cooler with solenoid valve
- Test-run with hydraulic oil HLP32 zinc free according to DIN 51524 T2 / purity level 17/15/12 according to ISO 4406 (attention: oils are not included in delivery), lubricants according to H2 quality
- Printed operating manual incl. user manual on USB flash drive in any EU language acc. to definition of country incl. type examination certificate TÜV Austria in German incl. protocol: electrical safety acc. to EN 60204-1

**Injection molding machine according to machinery directive 2006/42/EU incl. declaration of conformity and CE-marking**

**Hydraulics**
- Drive unit 50 with speed controlled servo motor for hydraulic pump to increase the energy efficiency incl. add. pump with speed-controlled servo motor for indexing the rotary table, core pull movement or parallel ejection
- Hydraulics with oil cooler controlled in water inlet of cooling, oil level
- Monitoring, oil filtration with electrical clogging indicator
- Oil preheating of hydraulic drive

**Clamping unit**
- Clamping force and closing and opening forces adjustable
- Mold safety program
- Exact platen parallelism with low-friction linear guides.
- Mold platen according to EUROMAP 2, clamping surface metallic bright, rest painted
- Rotary table servo motor drive for 2 stations, oscillating 108°, rotary speed adjustable via touch screen
- Final positioning by means of the hydraulic index cylinder
- Stainless steel cladding of rotary table
- Rotary table on sliding plates: bronze with graphite inclusions
- Central lubrication for rotary table sliding plates and gear ring
- Hydr. ejector in operating position, adjustable via several ejector programs
- Clamping cylinder plunger induction hardened and hard chrome-plated, ejector piston hard chrome-plated, position sensor contactless
- Electromech. mold safety mechanism with electr. monitoring
- Pre-selection of active mold lower parts (1 or 2) for production process

**Injection unit**
- Horizontal or vertical injection unit
- Horizontal injection unit offers automatic height adjustability
- Splash guard
- Hydraulic screw drive
- Injection, holding and back press. contr. with defined nozzle carriage press.
- Plasticizing unit AK+, L/D=22, 3-zone universal screw, 3-parts check valve, heater bands up to 350 °C w/o insulation
- Thermocouple failure monitor
- Maximum temperature supervision
- Plug-in ceramic heater bands
- Temperature control of feed throat integrated
- Injection cylinder plunger hard chrome-plated and position sensor contactless
- 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 inject. to holding pressure dep. on stroke, time & pressure

**Open nozzle R35**
- Splash guard and barrel covering in standard execution according to EN201, L/D 22 protected via transporter switch
- Material hopper 6 l (MH1206) for automatic material feed, sliding device with shut-off function for material with sliding guide

**Safety gate**
- Covering injection side – maintenance door screwed together
- Safety gate with maintenance door left, right and behind electr. and hydr. monitors, plexiglas lightblue 309 / frame RAL 5002 ultramarine blue
- Infrared light curtain in operating station

**Electrics**
- Control zone for nozzle heater band 230 V
- ambilLED-status indicator
- Fuse protection for sockets
- Switch cabinet cooling – circ. fan for environment temperature to 30 °C
- Emergency stop switch button
- Printer socket
- USB – 1 x operating unit
- 1 Ethernet interface (switch cabinet)
- Printer via USB connection or network

**Control system**
- Control system UNILOG B8 – 21,5” multi-touch screen (full HD)
- Pivotable control panel with selectable haptic keys
- Software for operating hours counter
- Closing/Open – 5 profile steps
- Ejection – 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, 2-station application
- 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 (1 x check card IT-level-15, 1 x token customer level-30 and 1 x token customer service level-20 are included in delivery)
- Freely configurable status bar
- Physical, process-related units
- Automatic dimming
- Logbook with filter function
- User programming system (APS)
- Userpage and note pad function
- Cycle time analysis
- Hardcopy function
- Internal data storage via USB connection or network
- Online language selection and online selection of imperial or metric units
- 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 envol. curves monitoring)
- Injection, metering and demolding integral supervision
- Alarm message via e-mail
- QuickSetup – assistance program for initial parameter setting
- Energy consumption monitoring for motors and heating
- Dynamic visualization of the mold table, mold, injection, insert and removal status as well as mold configuration
- Preselection of single or multiple insert or removal processes
**OPTION**

<table>
<thead>
<tr>
<th>Base machine</th>
<th>Safety gate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional packages, country-specific</td>
<td>Extended execution for manual part removal</td>
</tr>
<tr>
<td>Special voltages</td>
<td>Add. light curtain for clamping unit or 3rd operation station protection</td>
</tr>
<tr>
<td>Special vanishing</td>
<td>Special protection cage for the construction of automation systems incl.</td>
</tr>
<tr>
<td>Handling pack, with parted safety gate and/or, deactiv. light curtain</td>
<td>required mechanical and electrical interfaces</td>
</tr>
<tr>
<td>Parts chute for separation of good/bad parts or photoelectric ejection check</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydraulics/Pneumatics</th>
<th>Cooling</th>
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</thead>
<tbody>
<tr>
<td>Drive unit S2 with speed controlled servo motor for hyd. pump incl. add.</td>
<td>Manual cooling water distributor, flow and temperature monitoring or</td>
</tr>
<tr>
<td>pump for core pull movement, parall. ejection and rapid injection</td>
<td>with flow control, w/o blow-off valve</td>
</tr>
<tr>
<td>Hydraulics with increased oil cooler</td>
<td>Solenoid valve for cooling water distributor</td>
</tr>
<tr>
<td>Raw filter in water inlet of cooling incl. adapter with ball valve for oil</td>
<td>Machine cooling by T-piece in inlet pipe</td>
</tr>
<tr>
<td>maintenance on oil tank w/o bypass filter unit</td>
<td>Filter back flushable/water pressure supervision in inlet pipe</td>
</tr>
<tr>
<td>Hydraulic core pull for clamping plate, interface according to EUROMAP</td>
<td>Rotary distributor for conditioning, hyd. and pneum. for rotary application,</td>
</tr>
<tr>
<td>13, incl. or without core pull pressure release</td>
<td>w/o elect. signal transmission, contactless, w/o slipping transmission up</td>
</tr>
<tr>
<td>Pneum. core pull and air valves on clamping plate/rotary table, incl.</td>
<td>to 10 A power section</td>
</tr>
<tr>
<td>pressure regulator</td>
<td></td>
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<tr>
<td>Hydraulic manifolds for one mold shut-off nozzle or more</td>
<td></td>
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<tr>
<td>Compressed air pressure maintenance unit incl. 1 or more way pressure</td>
<td></td>
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<tr>
<td>regulation incl. directional exhaust valve with blocking function</td>
<td></td>
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<tr>
<td>Vacuum equipment on clamping plate/rotary table</td>
<td></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Clamping unit</th>
<th>Electrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mold platen according to SPI, IJS, T-slots</td>
<td>Temperature control zones for hot runner</td>
</tr>
<tr>
<td>Mold platen incl. cooling channels and temperature regulation</td>
<td>Acoustic element integrated in signal lamp</td>
</tr>
<tr>
<td>Rotary table for 3 and 4 station application 120° or 90°</td>
<td>Socket combination</td>
</tr>
<tr>
<td>Mold platen/rotary table chemically nickel-plated</td>
<td>Add. fan in electr. switch cabinet for increased environment temperature</td>
</tr>
<tr>
<td>Mold installation dimension on customer request</td>
<td>Cabinet air conditioner</td>
</tr>
<tr>
<td>Hydraulic ejector replaceable, 3 and 4 station application</td>
<td>Additional emergency stop switch button</td>
</tr>
<tr>
<td>Add. hydraulic ejector on clamping plate</td>
<td></td>
</tr>
<tr>
<td>Double check valve to keep ejector in end-position</td>
<td></td>
</tr>
<tr>
<td>Electric ejector with holding brake</td>
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<tr>
<td>Ejector cross according to EUROMAP/SPI</td>
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</tr>
<tr>
<td>Mechanical or pneumatic ejector coupling</td>
<td></td>
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<tr>
<td>Ejector platen safety</td>
<td></td>
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<tr>
<td>Ejector back up while in two-hand operation</td>
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<thead>
<tr>
<th>Injection unit</th>
<th>Control system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injection unit convertible (H/V) for alternative operation</td>
<td>Cavity pressure switchover</td>
</tr>
<tr>
<td>High torque hydraulic screw drive/high revolution hydraulic screw drive</td>
<td>BNC sockets for injection process analysis</td>
</tr>
<tr>
<td>Screw drive by servo motor for parallel recovery</td>
<td></td>
</tr>
<tr>
<td>Injection, holding and back pressure controlled via servo valve</td>
<td>EXPERT Quality Monitoring (4 freely configurable network connections,</td>
</tr>
<tr>
<td>Check valve to hold screw in position after end of dosing</td>
<td>quality table with 10000 storage depth, events protocol (logbook) for</td>
</tr>
<tr>
<td>Corrosion resistance injection unit</td>
<td>10000 events, actual value graphic with 16 curves, 4 envelope curves</td>
</tr>
<tr>
<td>Plasticizing unit Ak+, Ak++, AKCN, AKTN</td>
<td>monitoring, SPC charts, trend diagrams)</td>
</tr>
<tr>
<td>Barrier section, screw with mixing section w/o grooves</td>
<td></td>
</tr>
<tr>
<td>Ball type screw tip</td>
<td>Mold identification</td>
</tr>
<tr>
<td>Melt pressure transducer, melt temperature sensor</td>
<td>Special programs on customer request</td>
</tr>
<tr>
<td>Heater bands up to 450 °C</td>
<td>HiQ-Cushion – melt cushion control</td>
</tr>
<tr>
<td>Special plasticizing unit for LIM, MIM, CIM, Duroplast, PVC</td>
<td>HiQ-Flow – injection integral control</td>
</tr>
<tr>
<td>Barrel insulation</td>
<td>HiQ-Melt – monitoring of material quality</td>
</tr>
<tr>
<td>Open nozzles in special execution</td>
<td>HiQ-Packing – holding pressure speed limitation</td>
</tr>
<tr>
<td>Open ARMOMOULD®-nozzles</td>
<td>Energy consumption analysis</td>
</tr>
<tr>
<td>Needle type shut-off nozzle operated with spring, pneumatically or hydraulically</td>
<td>Clamp force supervision</td>
</tr>
<tr>
<td>Barrel covering and splash guard in special execution</td>
<td>Special programs on customer request</td>
</tr>
<tr>
<td>Pneum. purging guard for H- and V-injection unit</td>
<td>Purge of cold plug</td>
</tr>
<tr>
<td>Purging function via open mold on customer request incl. purging tray w/o</td>
<td>Additional output card/input card, freely programmable</td>
</tr>
<tr>
<td>monitoring</td>
<td></td>
</tr>
<tr>
<td>Material hopper in special execution w/o pneum. shut and emptying function w/o magnet in material hopper</td>
<td>Integration package WITTMANN 4.0</td>
</tr>
<tr>
<td>Unifeed</td>
<td>Control panel free-standing or mounted on a pivotable arm</td>
</tr>
<tr>
<td>Mixing and dosing units</td>
<td></td>
</tr>
<tr>
<td>Vacuum package incl. vacuum pump</td>
<td></td>
</tr>
</tbody>
</table>

**Additional equipment**

- **Tool kit**
- **Levelling pads**
- **Lighting in mold space**
- **Mold clamping systems in mechanical, electrical or hydraulic execution**
- **Platform for safe access to the injection unit in V-position incl. protection with transponder switch**
- **Integration package (robot, feeder, dosing unit, TCU, mold integration)**
- **WITTMANN BATTENFELD web service during warranty period free of charge**
- **Remote control package**