

ROBOTS AND AUTOMATION SYSTEMS

Reliable and Fast Part Handling

world of innovation



WITTMANN robots

Leading worldwide with the best technology

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Decades of application experience, innovative developments and more than 65,000 produced units have made the WITTMANN robots what they are today – the best robots for the plastics industry! Well planned detailed solutions and state-of-the-art components allow highest reliability, shortest cycles and long intervals between maintenance.

BUS technology

All sensors/actuators at the robot are directly wired to the intelligent control card under the robot hood.

Advantages

- » Central operation via **TeachBox**.
- » Simple extension; adaptability.

Demolding stroke (X-axis)

A large aluminum extrusion provides a stiff, vibration free foundation. The vertical arm is directly flanged on the cross tube. The linear bearings for horizontal stroke and demolding stroke are positioned in the main carriage next to each other to allow for high speed operation.

Advantages

- » Reduction of vibrations.
- » Most precise insertion/removal.

Powerful servo drive

Servo drives are used on all main axes.

Horizontal stroke (Z-axis)

As elongation cannot be ruled out with longer strokes when using a belt drive, WITTMANN uses racks and pinions as drive components from a Z-stroke of 3 m upwards. By arranging the pinion in a lubrication cage, optimum lubrication and a long lifetime of the drive system are achieved.

Advantage

Expansion of the drive belt is avoided, especially in case of long strokes.

Vertical stroke (Y-axis)

Massive aluminum or steel execution depending on the dimensions of the units. Always driven via rack and pinion drive or drive belt, telescopic axes are driven by a combination of both.

Advantages

- » Torsional stiffness through high-strength construction.
- » B-axes can be directly integrated into the profile.
- » Possibility of placing the compressed air supply and the control lines internally.

Rail guides

Low-maintenance execution for lubrication intervals of about 1 year.

Additional rotational axes (optional)

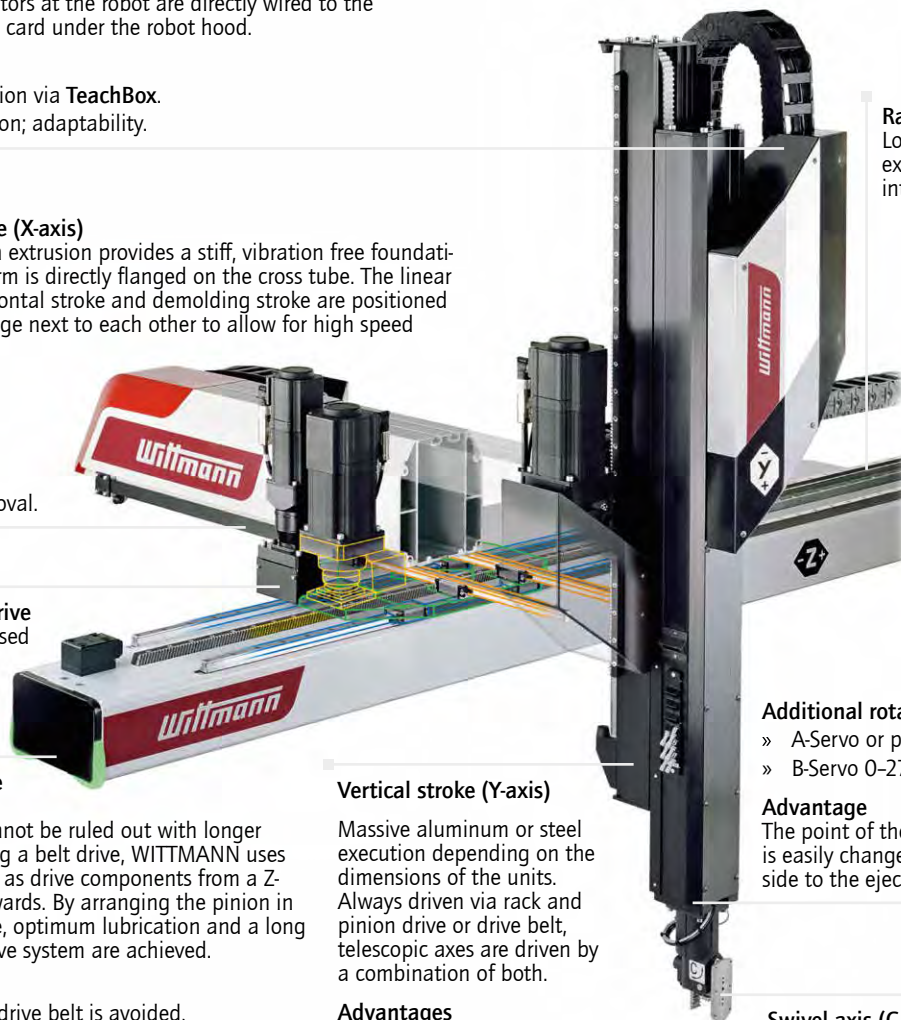
- » A-Servo or pneumatic.
- » B-Servo 0-270°.

Advantage

The point of the removal activity is easily changeable from the nozzle side to the ejection side.

Swivel axis (C-axis)

For nearly all scales equipped with locking bolts. This avoids the deviation when a decrease in pressure occurs.



The innovative robot concept

We have a wide range of robots that will meet the best of any of your design needs.

Kick-forward design

- » No moving parts behind platen.
- » Clearance for obstructions such as dryer hoppers, catwalks, building columns.



Kick-back design

- » Heavier payload.
- » Less overall height.
- » Allows for oversized end-of-arm tool.



Integrated control cabinet

Use of state-of-the-art compact servo modules integrated on the robot itself eliminates the need for an external control cabinet. The integrated control cabinet is mounted behind the horizontal axis for valuable space savings in the molding shop.

- » Space saving.
- » Short motor and encoder cables.
- » Less cables and connections to fail.
- » Highest reliability of robot operation.

The integrated control cabinet allows electrical connection of external I/O-modules via a bus cable for the direct control of all attached peripheral equipment.

WX robot series

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The **WX** series of WITTMANN robots: countless improvements guarantee the highest efficiencies.

- » Rugged design of the robot.
- » Modularity of the robot mechanics and of the drive and control system architecture.
- » The elaborate modular WITTMANN robot design allows for an optimal cost/performance ratio.

Advantages

- » Reinforced profiles for higher load rating and longer durability.
- » **AmbiLED** indicator lamp for simple display of the robot's operating modes.
- » **iVac**: synchronized vacuum for optimizing the consumption of pressurized air.
- » Minimized number of cables in the cable chain through innovative decentralized arrangement of the electronic components.
- » Reduced noise emission through optimized cable chain.
- » Integrated energy storage for higher energy efficiency, creating typical savings of 20%.
- » Integrated connection technology for vacuum/gripper circuits.

Features

AmbiLED indication lamp shows three different operating modes. (Pictures right show the default settings.)

1. Green signal: robot works in automatic mode.
 2. Blue signal: manual intervention is necessary.
 3. Red signal: safety door open.
- » Integrated connection technology for vacuum and gripper circuits.
 - » Optimized cable chain.
 - » Integrated control cabinet for minimizing the space requirements beside the injection molding machine.



Robot control R9



The **R9** control offers the user a comfortable graphical user interface via its **TeachBox** technology. The interaction with the robot is carried out by a capacitive touch-screen panel for robot programming and also via mechanical buttons that feature tactile feedback for movements and status change. Teach programs can be stored internally, on a USB stick or centralized on the customer's computer.

Advantages compared to previous controls:

- » Improved readability through higher resolution of 1,280 x 800, and a 20% bigger screen.
- » Tactile feedback through mechanical buttons for precise positioning.
- » Live 3D animation of the robot on the **TeachBox** screen.
- » Monitoring of force during the robot's insert motion and during the removal of parts (standard feature).
- » Integrated monitoring of the intervals between robot maintenance.
- » With full integration into WITTMANN injection molding machine (IMM), the IMM can also be controlled via the **TeachBox** of the robot.
- » A complete 1:1 copy of the **TeachBox** user interface for computer programming is also available.

Total flexibility

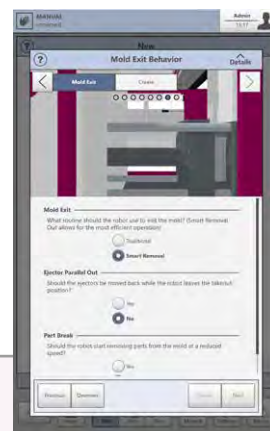
The control system offers two levels of operator interface as standard:

Programs can be created by the use of the new **QuickNew Wizard** function. **QuickNew Wizard** is an animated program editor, which supports the operator during the programming routine. In contrast to the **R8** control, the **R9** version offers more flexibility, including the possibility of visualizing more complex applications in a simplified way.

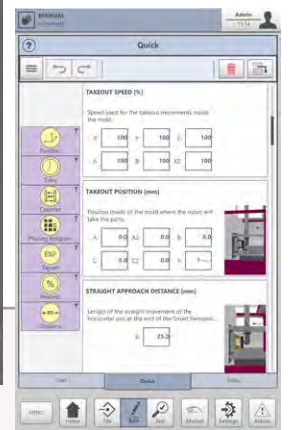
The **TextEditor** is the ultimate free programming tool for the experienced user: This software allows any arbitrary robot sequence to be programmed via simple, intuitive menu navigation. No editorial command codes are needed; the designated functions are executed directly at the robot and are transferred via one keystroke into the program. The naming of the peripheral inputs and outputs, cylinders, grippers, and vacuum cycles facilitates overall readability and also allows for a clearly arranged program structure.

The **QuickEdit** program is used for the simple and fast editing of commands. Beside this, the program also protects the general program syntax. Only values can be manipulated, and no program lines can be changed or deleted by accident.

QuickNew



QuickEdit



Additional functions:

- » OPC UA interface for the connection via intranet or internet to PC or MES.
- » **EcoMode**: automatic optimization of the movement speed outside the mold area for smooth operation of the robot.
- » Integrated monitoring of maintenance intervals, and controlled lubrication systems based on this function.
- » Patented* **SmartRemoval** function: shortest part removal time through acceleration of the vertical arm during mold-opening phase.
- » [***SmartRemoval** Patents: EP 2560802B, US 9387614, CN 102858515]
- » Freely programmable safety areas: the user can define the areas of robot motion in order to avoid collisions with components of the IMM.
- » ACD automatic Anti Collision Detection during manual operations.
- » **iVac**: allows programming of limit values for the vacuum in order to provide faultless part recognition of the end-of-arm-tooling.

TextEditor



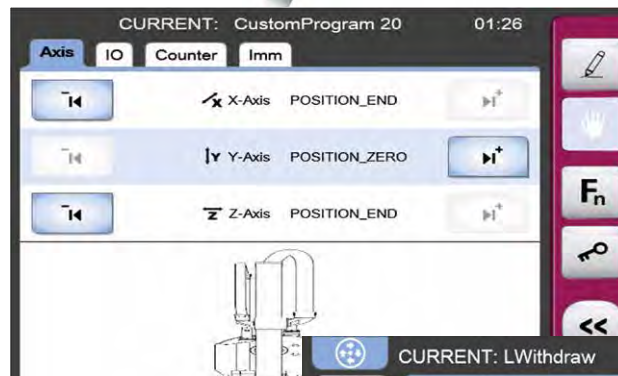
iVac



Sprue picker control Net8

Wittmann

- » For WP80 sprue picker.
- » Easy to use interface with graphical LCD display. Arrangement of buttons and symbols is similar to the CNC TeachBox for easier use by the operators.
- » Simple sequence start.
- » Simple Teach-In programming of the entire program sequence, including all movements, strokes, time settings and molding machine interface.
- » 4 standard program templates for easy setup.
- » Up to 50 individual programs can be taught and stored.
- » Standard molding machine interface (SPI & E12).
- » Full diagnostics with text error messages.
- » Several languages can be chosen.



Small robots

Clamping forces from 20 to 300 tons

In this range, WITTMANN offers mostly robots with fixed demolding axis.

» **W918**

The universal robot providing flexible automation for your current and future requirements on smaller molding machines.

High performance robots featuring servo motor drives for all three main axes.

Optional rotational axes allow additional flexibility.

Extremely smooth operation with lowest noise.

Minimum part removal times are essential for the highest productivity of the automation cell e.g. production of thin wall components. The vertical arms of the **W918** and **W918T** model robots are stiff but lightweight rib-reinforced aluminum profiles, driven via belt by a servo motor, thus reducing the moving mass.

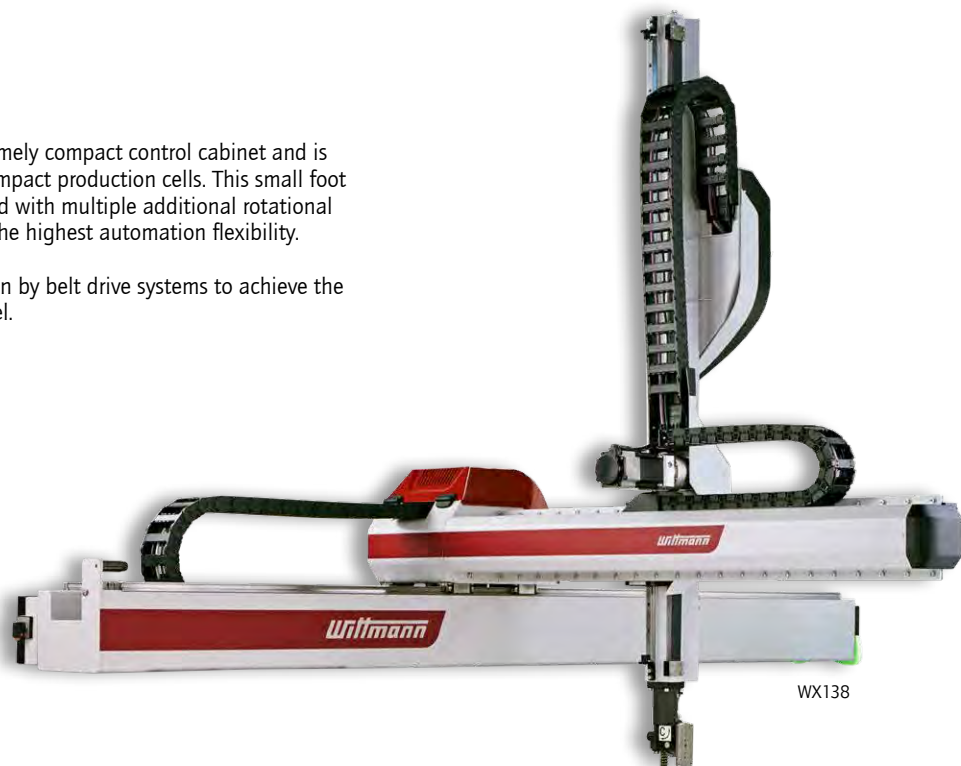


W918

» **WX138**

The **WX138** has an extremely compact control cabinet and is especially suitable for compact production cells. This small footprint robot can be ordered with multiple additional rotational axes in order to provide the highest automation flexibility.

The robot is entirely driven by belt drive systems to achieve the lowest possible noise level.



WX138

Mid-size robots

Clamping forces from 300 to 1,200 tons



Middle series robots are primarily units that are equipped with a moving demolding stroke. In the first line, this is due to the more complex grippers that are used within this range, and also to the need of keeping the overall height of the system rather compact.

- » **W921**
The vertical arm consists of a rigid aluminum extrusion and guided by heavy-duty linear bearings and driven by a servomotor via belt to allow high speeds and short removal times. As a variation of the W921, the W931 model with an extended demolding stroke of up to 800 mm is available.
- » **W923**
Telescopic vertical axis: the gripper is mounted in front of the telescopic arm allowing for a very short length, for minimum overall height and fast movements.
- » **W922**
The vertical axis is based on a highly stiff steel tube. It is equipped with a rack and pinion drive. At strokes from 1,000 to 1,400 mm, this combination enables a payload of up to 15 kg.

- » **WX142**
The vertical arm is a rigid aluminum extrusion with two high load linear bearings and a maximum length of 1,600 mm (63"). Designed for payloads of 30 kg (77 lbs.) and offering a high torque C-axis rotation for placing. A popular robot for insert jobs.

- » **WX143**
Gripper and part weight of 20 kg (44 lbs.) with a maximum vertical stroke of 1,800 mm (71"). Therefore best suited for flexible automation on injection molding machines up to approximately 900 tons.



Large robots

Clamping forces from 1,200 to 5,000 tons

Large units are based nearly exclusively on the technology of the moving X-axis. In the first line, this is due to the massive grippers and additional rotating axes. As parts of automation cells, these units often are working together with more compact models to execute preparation or post-processing steps.

» **WX152**
For greater payload and versatility around molding machines of up to 800 tons of clamping force.

» **WX153**
The larger more substantial main beam and double walled kick stroke extrusion for payloads of 30 kg (66 lbs.) and vertical strokes up to 2,600 mm (102") for palletizing on pallets located on the shop floor.

» **WX163**
For payloads of 40 kg (88 lbs.). The first robot with rack-and-pinion drive and steel profile at the demolding axis. The vertical telescopic axis is composed of a newly developed steel-aluminum combination.

» **WX173**
For payloads of 50 kg (132 lbs.). All main axes are made of steel, thus the highest rigidity is guaranteed. This robot is often used with injection molding machines of 1,600–2,400 t of clamping force.

» **WX183/193**
For payloads of 110 kg (243 lbs.) [WX183] or 130 kg (287 lbs.) [WX193] respectively. The construction elements of the complete robot system is made of steel. This allows for highest stiffness and life expectancy. This unit is especially suitable for the use with large injection molding machines.



WX152



WX163



WX173



WX183

High-speed applications

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» Sonic 108

The latest member of the **Sonic** series is especially suited to molding machines with clamping forces from 50 to 150 t. Typical cycle times for applications with a 2 kg gripper are shorter than four seconds.

» Sonic 142/143

These units are typically used for machines with clamping forces of up to 500 t. The main application fields are in packaging sectors for both food and non-food products. The cycle times for these kinds of applications are normally lower than about nine seconds. The **Sonic 142/143** also offers the possibility of integrating a high-voltage generator in order to help produce products with label decoration (IML).

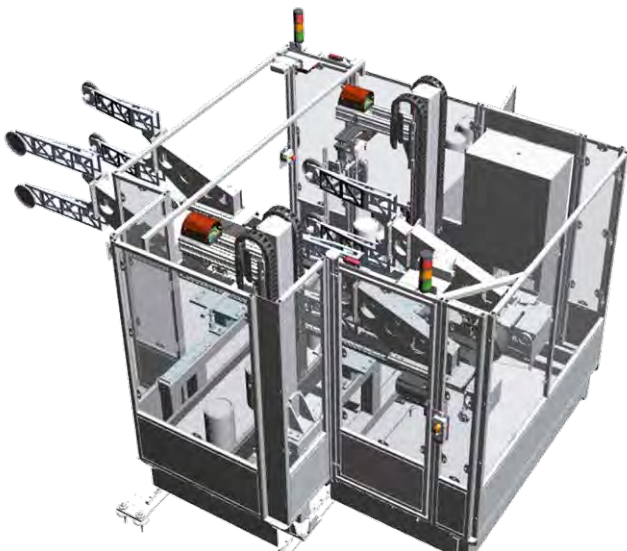
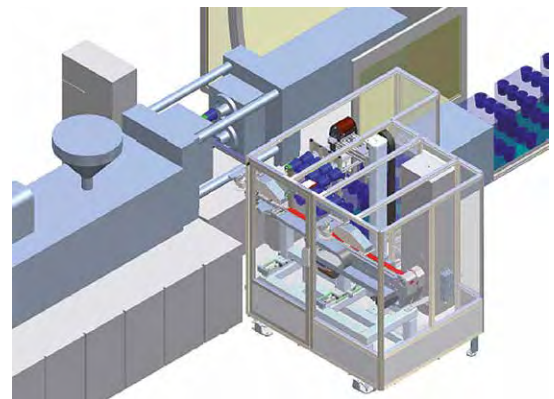


Advantages

- » Highest productivity of the injection molding machine with the shortest cycle.
- » Minimizes all moving masses for the highest acceleration and deceleration.
- » The moving X-axis is further improving the dynamic of the mid-size units.

» W837

The larger **W837** model has been developed for fastest horizontal axis motion on molding machines up to 700 tons clamping force. This side entry robot can handle a payload of up to 50 kg for each horizontal axis.



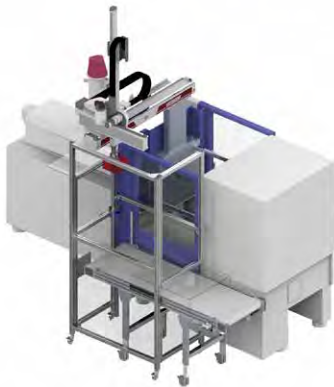
W837, execution with 2 Z-axes

Robots for stack molds

On the one hand, for the automation of stack molds, robots with 2 vertical axes can be used; here, the construction is done over a fixed demolding axis. On the other hand – and for the realization of shortest cycle time –, removal systems can be used that are based on the **W837** unit. In this case, the basic system is executed with 2 horizontal axes that are doing the demolding of the parts.

Automation

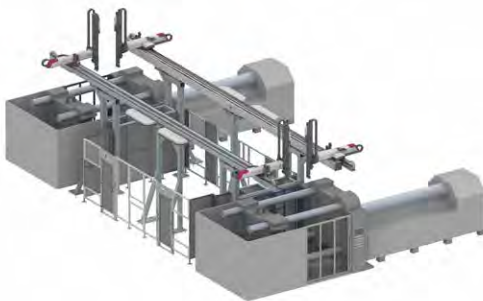
In this field, the WITTMANN customers are focused on the planning and implementation of complete turnkey systems. Here, WITTMANN offers complete automation cells on the basis of horizontal and vertical parts removal units. These systems cover a wide range of use, from rather simple ones to highly complex systems that also include the handling of lids and camera control. The complete product portfolio of WITTMANN is applicable, starting with **Primus** robots for unloading systems, **Sonic** and side-entry robots for high-speed applications up to special solutions with devices of the **WX** series.



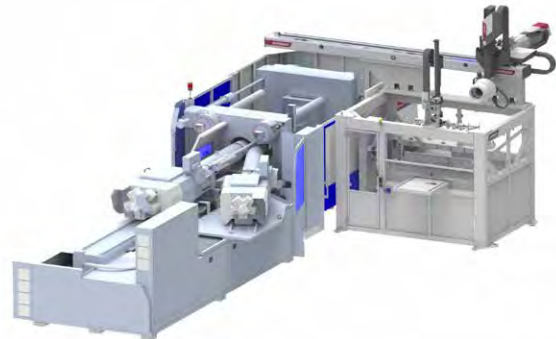
Loading system by a **Primus** robot and adapted protective enclosure with conveyor belt.



Complete automation cell with crate feeding and IMM by WITTMANN.



Double tandem system for part removal from stack and tandem molds.



Top-entry IML system for the production of decorated containers.

For applications with additional degrees of freedom, WITTMANN supplies optional servo rotational axes around all 3 principle axes. Programming with increments of 0.1° ensures extremely fine adjustment.

- » **Servo A-axis**
Allows the wrist flip to independently position the end-of-arm tooling and molded parts, i.e. in the mold area as well as during placement.
- » **Servo B-axis**
Allows rotation of the end-of-arm tooling in the mold area between the fixed and flexible adapter plate and the arbitrary orientation of parts with a flip-down gripper during placement.
- » **Servo C-axis**
Allows removal of molded parts from the moving as well as the fixed mold halves and the arbitrary presentation to downstream equipment.
- » **Advantages**
 - Compact mechanical design minimizes mold open.
 - Highly dynamic servo motors and precise planetary gearboxes enable extremely fast movements.



Primus series

Robots for pick & place applications

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Robots for cost-efficient pick & place applications at clamping forces of 20 to 900 t. – Especially developed by WITTMANN for this purpose of use. These devices are adapted versions of the WX and W9 series respectively.

- » **Primus Series**
Control: **R9 Primus** control with **TeachBox R9**.
- » Servo motor drives for all three main axes.
- » Optimized drives – with regard to using the robot with pick & place applications.
- » Extremely smooth operation with lowest noise.
- » Minimum part removal times are essential for the highest productivity of the automation cell, e.g. when producing thin wall components. The vertical arm is stiff but lightweight ribreinforced aluminum profile, driven via belt by a servo motor, thus reducing the moving mass.



Primus 148T



Primus 116



TeachBox R9

Sprue picker

Clamping forces from 25 to 300 tons

WP80 sprue picker: for the removal of sprues and parts from the injection molding machine. The solid construction allows fast movement with low vibration for precise removal.

- » **X-axis (kick-stroke)**
 - Heavy-duty linear rails and recirculating ball bearings.
 - Swivel base to rotate the arm behind the fixed platen for mold changes and locating pin to precisely reposition arm for part removal.
- » **Y-axis (vertical stroke) 0-550 mm (21.7") or 700 mm (27.6")**
 - Adjustable stroke.
 - Pneumatic shock absorbers.
 - Locking cylinder to prevent the arm from drifting down into the molding in the event of air pressure loss.
 - The Y-axis is also equipped with a heavy-duty switch as an additional interlock before the mold can close. Energy chain for less wear of tubing.
- » **Z-axis (pivot)**
 - Freely adjustable from 45°-95°.
 - Simple changeover from rear side to operator side placement.
- » **B-axis (90° tooling rotation)**
 - Rotation is made automatically when pivoting the Z-axis out of the press.
 - Mechanical sprue gripper with part monitoring.
- » **Mechanical sprue gripper**
 - with part monitoring.
- » **Options**
 - Venturi vacuum with part monitoring.
 - Parts gripper with 4 suction cups.



Net8
sprue picker
control

Technical specifications



	Standard horizontal stroke [Z-axis] ¹	Standard vertical stroke [Y-axis] ¹	Standard demolding stroke [X-axis] ¹	Standard payload ¹	Vertical stroke [single or telescopic]	Second vertical axis	Demolding stroke [fixed or movable axis] ²	Typical Application	Typical application cycle time ³
	[mm]	[mm]	[mm]	[kg]					[s]
Primus 114	1,000–2,000	600–1,000	440	2	single	–	fixed	Pick & Place	8–15 s
W908	1,250–2,500	600–1,000	440	3	single	–	fixed	Automation	> 10 s
Primus 116	1,250–2,500	800–1,200	420–620	5	single	–	fixed	Pick & Place	8–15 s
Primus 116T	1,250–2,500	800–1,200	390–590	5	telescopic	–	fixed	Pick & Place	8–15 s
Primus 116S	1,250–2,000	800–1,200	430	5	single	yes	fixed	Pick & Place	8–15 s
Sonic 108	1,250–2,000	800–1,000	420	2	single	–	fixed	High-speed	< 7 s
W918	1,250–2,500	800–1,200	420–620	6	single	–	fixed	Automation	> 10 s
W918T	1,250–2,500	800–1,000	390–590	6	telescopic	–	fixed	Automation	> 10 s
W921	1,250–5,000	800–1,400	350–550	12	single	–	movable	Automation	> 10 s
W923	1,250–5,000	800–1,400	350–550	12	telescopic	–	movable	Automation	> 10 s
W922	1,250–5,000	1,000–1,400	350–550	15	single	–	movable	Automation	> 10 s
Sonic 131	1,500–2,500	800–1,200	500	3	single	–	movable	High-speed	< 7 s
W928	1,500–5,000	1,200–1,400	905–1,105	12	single	–	fixed	Automation	> 10 s
W928S	1,500–5,000	1,200–1,400	730–930	12	single	yes	fixed	Automation	> 10 s
WX138	1,500–2,500	1,000–1,200	670–970	12	single	–	fixed	Automation	> 10 s
W931	2,000–6,000	1,000–1,400	800	12	single	–	movable	Automation	> 10 s
Primus 126	1,500–6,000	1,000–1,400	500–800	10	single	–	movable	Pick & Place	8–15 s
Primus 126T	1,500–6,000	1,000–1,400	500–800	10	telescopic	–	movable	Pick & Place	8–15 s
Primus 128	1,500–6,000	1,000–1,600	500–800	15	single	–	movable	Pick & Place	8–15 s
Sonic 142	2,000–4,000	1,200–1,600	500–900	7	single	–	movable	High-speed	< 7 s
Sonic 143	2,000–4,000	1,200–1,400	500	5	telescopic	–	movable	High-speed	< 7 s
WX142	2,000–6,000	1,200–1,600	500–900	30	single	–	movable	Automation	> 10 s
WX143	2,000–7,000	1,200–1,800	500–900	20	telescopic	–	movable	Automation	> 10 s
W938T	1,500–4,000	1,400–1,800	900–1,200	15	telescopic	–	fixed	Automation	> 10 s
WX152	2,500–9,000	1,400–1,600	1,200	30	single	–	movable	Automation	> 10 s
Primus 148T	2,500–6,000	1,600–2,000	800–1,200	20	telescopic	–	movable	Pick & Place	8–15 s
WX153	2,500–9,000	1,600–2,600	1,200	30	telescopic	–	movable	Automation	> 10 s
WX163	2,500–9,000	2,000–2,600	1,200–1,500	40	telescopic	–	movable	Automation	> 10 s
WX173	3,000–9,000	2,400–3,000	1,200–2,000	50	telescopic	–	movable	Automation	> 10 s
WX183	3,000–9,000	2,800–3,600	2,000	110	telescopic	–	movable	Automation	> 10 s
WX193	3,000–9,000	2,800–3,600	2,000–3,000	130	telescopic	–	movable	Automation	> 10 s

¹ Special and customized configurations are available.

² Difference between "fixed" and "movable" on page 4.

³ Cycle time for the entire workcell. (IMM + Robot + Automation)

The Wittmann logo is displayed in a stylized, italicized font within a dark red, rounded rectangular shape.

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