Innovative Vacuum for Automation

Vacuum Gripping Systems
Area and Layer Gripping Systems
Suction Spiders
Consistent customer orientation and groundbreaking innovations, excellent quality and comprehensive consulting competence make Schmalz the world’s leading partner for vacuum technology in automation, handling and clamping applications.

As a company that acts globally and offers innovative products and services, we provide our customers with efficient solutions tailored precisely to their particular applications’ requirements. We inspire our customers everywhere where production processes are designed more efficiently through the use of vacuum technology.

With our certifications, including ISO 9001 for quality management, ISO 14001 for environmental management and ISO 50001 for energy management, we guarantee our partners standardized and sustainable processes.

Schmalz Media Center

See our vacuum gripping systems in action. The Schmalz Media Center will take you with few clicks to the application examples in your industry segment – user-friendly, informative and practical.

Lights, Camera, Action!
Just scan the QR code with your smartphone, select an industry segment and play the video.
Vacuum Gripping Systems from Schmalz

Schmalz – Your Partner for System Solutions

Industry Solutions

Vacuum Gripping Systems in Use

Area Gripping Systems

Vacuum Area Gripping Systems FXP / FMP
Flexibility and Power

Vacuum Area Gripping Systems SBX
Very Robust Grippers for the Timber and Woodworking Industry

Layer Gripping Systems

Vacuum Layer Gripping Systems SPZ
High-Performance Palletizers for Warehousing and Intralogistics

Suction Spiders

Vacuum Suction Spiders SSP
Custom Made Solutions for End-of-Arm-Tooling

Contact
“Our system consultants and designers have extensive knowledge in the field of vacuum technology, combined with decades of experience in the international mechanical and plant engineering. Entrust your automation task to us: we understand your requirements.”

Peter Gröning
Head of Business Development and System House Vacuum Gripping Systems

Schmalz – Your Partner for System Solutions

Schmalz is a competent and experienced partner for vacuum system solutions for automation. With first-class products, extensive experience and custom made services, a Schmalz system helps you to minimize costs throughout the entire life cycle – whether you utilize Schmalz for the efficient procurement of individual components or you seek full project management for the creation of turn-key solutions.

Services with Added Value Throughout the Entire Life Cycle

<table>
<thead>
<tr>
<th>Consultation and System Design</th>
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<th>System Construction and Tests</th>
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Consultation and System Design
- Qualified consultation with assistance from an experienced project manager
- Consideration of application-specific requirements and customer processes
- Resource efficient system design

Engineering
- No design time required on your side
- Future-proof solution in accordance with the latest technological standards
- Vacuum technology efficiently combined with mechatronic solutions

System Construction and Tests
- Professional and service-friendly construction of the gripping system
- Use of high-quality and standardized components
- Safety and functionality verified through tests with the original workpieces

Procurement and Logistics
- Fast delivery through single sourcing
- Elimination of time required for procurement of individual components and associated logistics

Mounting and Installation
- Professional mounting at the operation site and support during process integration on request

Start of Operations and Training
- Hand-over of a fully functional system
- Professional on-site training for your employees
- Comprehensive documentation

Operation and Service
- Optional solutions for process monitoring ensure smooth operation and high availability
- Fast service for replacement parts
Exceptional in Automation
From the Components to Your Custom Gripping System

Innovative Vacuum Components
A gripping system is only as good as its individual parts. Benefit from the widest range of vacuum components on the market:
- Optimally coordinated individual components from a single supplier, from suction pads, to vacuum generators, to system monitoring units
- Numerous products specially developed for specific industries
- Integrated state-of-the-art technology for energy and process control
- Modularity ensured through standardized interfaces and connection systems

Knowledge Through Experience
You can rely on our expertise, obtained from over 30 years of experience in the area of vacuum technology:
- Our system consultants engage in a dialog with you on site to help develop the solution
- Specialist industry managers know and understand the processes and requirements specific to your industry
- Our approximately 400 registered and granted industrial property rights demonstrate our talent for innovation and our capability for developing solutions
- Transfer of knowledge in customer seminars at the Schmalz Academy

System Solutions from Schmalz Minimize Total Costs of Ownership
Reduction of the total costs of ownership through optimally coordinated systems:
- Custom-tailored implementation of your requirements
- Schmalz assumes responsibility for the system
- Concurrent engineering generates mutual transfer of knowledge
- Outsourcing of vacuum expertise combined with mechatronic system expertise
- Schmalz acts as an extended workbench
- Conservation of your resources and the ability to focus on your core competencies
- Active support during start of operations and on-site service

Comparison of the total costs of ownership of a Schmalz system solution with those for a system designed by the customer: Our system experience helps you to optimize productivity and operating costs (e.g. for energy consumption, maintenance and spare parts) throughout the entire duration of operation.
Vacuum gripping systems from Schmalz are used in a wide variety of industries to ensure efficient process automation. Our many years of experience and our close relationship with our customers mean we know your processes. That allows us to produce products to meet the highest industry requirements. Our range of solutions stretches from flexible, easy integrate universal grippers to complex, custom-designed system solutions.
Whether for gentle handling of furniture parts or powerful gripping of unplaned boards and planks, vacuum gripping systems from Schmalz can be used to automate handling processes in woodworking and furniture production.

Wood

Powerful and Secure Handling Under Demanding Operating Conditions

Vacuum suction spider SSP being used for handling wooden boards

Vacuum area gripping system FMP being used to handle structured wooden boards

Vacuum area gripping system SBX for handling layers of wooden boards

Vacuum area gripping system FMP in a double gripper configuration being used to handle construction timber

Schmalz Nestling Gripper SPZ-NG for destacking complete layers of workpieces during nested manufacturing

www.schmalz.com/applications
Packaging

Flexible Solutions for Case Packing and End-of-Line Palletizing

Packaging processes demand flexibility, fast acceleration and short cycle time. A custom-designed vacuum gripping system from Schmalz allows you to dynamically palletize and de-palletize a wide range of packaging, including bending boxes, shrink-wrapped packages, bags and cans.
Logistics

Efficient Palletizing, Layer by Layer
Distribution logistics involve transporting countless goods around the globe every day. Schmalz palletizers are employed at transfer points to palletize and depalletize them in complete layers. Even workpieces which can hardly be gripped by vacuum are manageable thanks to innovative gripping technology.
Automotive and Sheet Metal

Intelligent Vacuum for Automation with Added Value for Processes

Body shop, shell construction, vehicle assembly – aside from sheet metal handling Schmalz gripping systems are used in automobile manufacturing to handle many other materials such as plastics, glass and carbon fiber. Intelligent systems allow you to optimize cycle times, energy consumption and availability.
Construction materials | Vacuum layer gripping system SPZ being used to handle bricks and pallets

Solar | Vacuum suction spider SSP being used to handle module glass

Other Industry Solutions

From Universal to Custom – Gripper Solutions for Virtually any Application
Vacuum gripping systems from Schmalz are used in many other industries to ensure flexible and economical automation processes: from versatile universal grippers to custom specific solutions designed for the customer.

Composites | Vacuum area gripping system FXP being used to handle molded CFRP parts

Construction materials | Vacuum layer gripping system SPZ being used to handle clinker bricks

Construction materials | Vacuum suction spider SSP being used to handle and separate porous sheets of insulation

www.schmalz.com/applications
Everything firmly in its grip – The area grippers from Schmalz’ FXP / FMP series are truly versatile products that are setting new standards in process reliability, energy efficiency and availability in the area of automated vacuum handling.

Schmalz has developed the vacuum area gripping system SBX for particularly rugged applications in the timber and wood-working industry (from p. 28).
Vacuum Area Gripping Systems FXP / FMP

Flexibility and Power

Application
- Universal gripper for handling workpieces regardless of size, geometry, material and surface
- Handling of workpieces made from various materials, such as wood (coated or unplaned), packaging (boxes, bags or cans), metal sheets, glass, plastics, CFRP, etc.
- Handling of porous workpieces and workpieces with gaps
- Handling of workpieces with an undefined pick-up position
- Ideal for use on robots due to its low weight

Highlights

86 % More Power
A benchmark test indicates that the FXP / FMP series from Schmalz generates an 86 % higher suction force on average than comparable grippers on the market. This is due to innovate features such as vacuum boosters, leak-free check valves and sealing foam with high suction cell density.

Suction force depending on the workpiece

Unique Flexibility
Handling of workpieces wider than 20 mm, regardless of material, geometry, surface and position

Low Weight
Maximum acceleration within the process and reducing system costs by use of smaller robots

Minimal Maintenance
Easy retooling of flow technology and fast replacement of sealing elements

High Energy Efficiency
Optimization of the flow ensures that energy is used more efficiently, which permanently reduces operating costs

Low Sound Level
Low-noise operation with a sound level of only 74 dB(A)
Vacuum Area Gripping Systems FXP / FMP

Modular Design with Individually Adapted Vacuum Generation

FXP: Integrated Vacuum Generation
As a unit that is ready for connection, the area gripping system FXP is equipped with a plug-in ejector for vacuum generation. It can be individually configured and quickly retooled in case of changing application conditions. The modular design ensures easy maintenance and enables the integration of additional functions for energy and process optimization directly in the gripper.

Aluminum base section
- High stiffness and low weight
- Lateral T-slots for fixation of sensors
- Integrated air duct for separation
- Variable gripper length possible

End cover with integrated functions
- Compressed air connection, vacuum gauge as well as optional vacuum switch and control valve

Silencer

Vacuum booster
- Faster evacuation due to reduced inner volume
- Maximum power is reached instantly

Valve film
- For quickly changing the valve type and size
- Self-cleaning effect

Vacuum generation
- Plug-in ejector

Sealing elements
- Fig. shows suction pads with push-in function
- Also available with sealing foam with optimized adhesive film

Integrated Plug-in Ejector
- Optimized ejector performance: with comparatively low maximum vacuum, the ejector generates a high volume flow and thus provides high holding forces, especially for applications with porous workpieces
- Fast evacuation and high suction flow even at low vacuum values
- Control valves integrated into the end cover for controlling the suction and blow off functions (optional)
- Silencer for reducing the sound level to 74 dB(A)
- Ready to connect unit, easy to clean

Patent pending in several countries

www.schmalz.com/fxp-fmp
Vacuum Area Gripping Systems FXP / FMP
Modular Design with Individually Adapted Vacuum Generation

FMP: External Vacuum Generation
The area gripping system FMP has the same modular design as the type FXP, but is equipped with a connection piece for external vacuum generators. It is therefore suitable for use in combination with powerful pumps and blowers.

Connection piece for external vacuum generators

- Allows use of an electrical vacuum generator (blower or pump)
- Suitable for handling very porous or warped workpieces due to high flow rate

Valve film and sealing element
- Fig. shows sealing foam

Connection Piece for External Vacuum Generation

Selection Aid

<table>
<thead>
<tr>
<th>Application features</th>
<th>FXP</th>
<th>FMP</th>
</tr>
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<tbody>
<tr>
<td>Minimization of interfering edges caused by hoses and attached vacuum generator</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Easy mounting and quick connection of the gripper</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Minimal system costs (investment costs including vacuum generation, hoses and controller)</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Minimal operating costs (because of the option of electrical vacuum generation), especially for applications with multiple grippers</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Handling of highly porous workpieces</td>
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<td>✔</td>
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</table>
Vacuum Area Gripping Systems FXP / FMP

Innovative Valve Technology

Valve type and size can be changed easily and quickly in case of changing requirements

Check Valves SVK
- Ball valves integrated in the base section for closing off uncovered suction cells
- Leak-free integrated, resulting in a higher vacuum as well as improved energy efficiency and holding force
- Valve film with clover shape for high flow rate and quick picking up and blowing off
- Proper functioning ensured even with unplanned surfaces

Flow Restrictions SW
- Valve film with integrated flow restrictors to minimize leakage losses due to uncovered suction cells
- Suitable for swiveling operations and high accelerations
- Different flow diameters available (optional)

The higher nominal flow of the SVK valve type allows it to achieve significantly shorter blow off times than the SW type can (values in fig. measured at a gripper length of 442 mm)

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Selection Aid

![Blow off times](image)
- Smooth and airtight workpieces (e.g. metal sheets, glasses, coated wood, etc.)
- Narrow and round workpieces (sections, pipes, etc.)
- Porous workpieces (cardboard, sacks, uncoated wood, etc.)

<table>
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<tr>
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<th>SW</th>
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<tr>
<td>Smooth and airtight workpieces (e.g. metal sheets, glass, coated wood)</td>
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<td>✔</td>
</tr>
<tr>
<td>Porous workpieces (e.g. boxes, sacks, uncoated wood)</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Structured surfaces</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Workpieces with low of gripper coverage (e.g. pipes, sections)</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Minimum cycle times (active blow off)</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Optimization of energy efficiency</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Swiveling movements &gt; 45°</td>
<td>✔</td>
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The valve type SVK achieves a higher suction force than the SW in case of porous workpieces and low degree of gripper coverage

www.schmalz.com/fxp-fmp
Vacuum Area Gripping Systems FXP / FMP
Flexible, Quick-Change Sealing Elements

Sealing foam and suction pads can be changed quickly and easily due to the optimized adhesive film and the push-in function

Sealing Foam with Quick-Change Adhesive Film
- Optimal adjustment capabilities
- Quick rebound for short cycle times
- Replaceable without adhesive residue and without the need to clean the sheet
- Intended for workpieces wider than 20 mm
  (in the design with 5 suction rows, on request)
- With optional filter mat

Suction Pads with Push-in Function
- Optimal height compensation and damping effect
- Quick replacement due to the push-in mechanism
- Diameters 20 mm and 40 mm
- Made from FDA-compliant silicone
- With optional insert filter

Selection Aid

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<td>Elongated workpieces such as strips, sections, boards</td>
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<td>Workpieces with rough and structured surface</td>
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<tr>
<td>Handling of smaller product layers such as jars (open or closed) and cans with a continuous edge</td>
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Additional Functions, Compactly Integrated

End Cover with Integrated Functions
Minimization of system costs and installation times through integration of:
- Compressed air connection for ejector supply (type FXP)
- Control valves for switching the suction and blow off functions on/off (optional for type FXP-S)
- Connection for the blow off and separation functions
- Option to attach a vacuum gauge or vacuum switch

Sealing foam and suction pads can be changed quickly and easily due to the optimized adhesive film and the push-in function

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Vacuum Area Gripping Systems FXP / FMP

Product Specifications

Note on Configuration
Tests with the original workpieces are necessary to ensure that the area gripping system functions properly. We will gladly conduct these for you in our test center in order to find the best solution for your application.

Designation Code
Designation code explained using the example of: FXP-S-SVK 442 5R36 SPB2-20P

<table>
<thead>
<tr>
<th>Type</th>
<th>S*</th>
<th>SVK</th>
<th>442</th>
<th>5R</th>
<th>36</th>
<th>SPB2-20P</th>
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<tbody>
<tr>
<td>FXP  (Integrated vacuum generation)</td>
<td>S  Control valves</td>
<td>SVK Check valves</td>
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<td>FMP  (External vacuum generation)</td>
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<td>5 suction rows</td>
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<td></td>
<td>3R</td>
<td>3 suction rows</td>
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</table>

*Integrated Control Valves (Optional)
- Control of vacuum on/off (24V DC, normally open) and blow off on/off (24V DC, normally closed)
- Integrated in the end cover of the type FXP
- Electrical connection: M12 plug (4-pole)
- Part number on request

Service and Practical Tips
- Lift capacity and handling safety can be increased for uneven workpieces and rough surfaces by pressing down on them firmly (foam and suction pads should ideally be compressed by 50 %) and by using jointed and spring-loaded level compensation for the area gripping system
- The service life of the sealing foam is 3 to 12 months (depending on the application, when setting down and lifting linearly)
- The service life of the suction pad is 6 to 12 months (depending on the application, when setting down and lifting linearly)
- Six-month maintenance intervals of the area gripping system are recommended
Vacuum Area Gripping Systems FXP / FMP
Design with Sealing Foam (Height = 20 mm)

Ordering Data for Area Gripping Systems

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<thead>
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Ordering Data for Sealing Foam (Spare Part)

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Technical Data

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<th>Max. degree of evacuation [%]</th>
<th>Suction force** [N]</th>
<th>Weight [kg]</th>
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*Customer-specific gripper dimensions on request

Technical Data

* Specified in standard liters/min, permissible operating pressure (flowing pressure measured directly at ejector entry): 5...7 bar. Optimum compressed air flowing pressure: 5.8 bar
** Practically determined values for handling a typical workpiece (wooden board with textured surface, gripper completely covered by the workpiece, -0.25 bar system vacuum, without safety factor). They provide benchmarks for approximate layout. We recommend to perform suction tests with the original workpiece to ensure functionality.
*** The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135% of the specified suction flow

Note: A special foam for vacuum applications is used. Other foam heights and types (e.g. oil-resistant and temperature-resistant foams) on request

Sound level: 74 dB(A)
Vacuum Area Gripping Systems FXP / FMP
Design with Sealing Foam (Height = 20 mm)

**Design Data FXP**

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Note: Two ejectors/silencer box covers are used for the 1,234 mm and 1,432 mm lengths. Type FXP requires compressed air hose 12/9 mm

**Design Data FMP**

<table>
<thead>
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<td>5.5</td>
<td>46</td>
<td>1,432</td>
<td>1,394</td>
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Note: Vacuum hose with internal diameter equal to dimension D required
Vacuum Area Gripping Systems FXP / FMP

Design with Suction Pads (Ø = 20 mm)

### Ordering Data for Area Gripping Systems

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*Customer-specific gripper dimensions on request

### Ordering Data for Suction Pads (Spare Parts)

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Note: Other suction pad types (construction, material, diameter) available on request

### Technical Data

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<th>Max. suction flow [l/min]</th>
<th>Max. degree of evacuation [%]</th>
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Sound level: 74 dB(A)

* Specified in standard liters/min. permissible operating pressure (flowing pressure measured directly at ejector entry): 5...7 bar. Optimum compressed air flowing pressure: 5.8 bar

** Practically determined values for handling a typical workpiece (cardboard box, bulging and with textured surface, gripper completely covered by the workpiece, -0.25 bar system vacuum, without safety factor). They provide benchmarks for approximate layout. We recommend to perform suction tests with the original workpiece to ensure functionality.

*** The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

www.schmalz.com/xfp-fmp
Vacuum Area Gripping Systems FXP / FMP

Design with Suction Pads (Ø = 20 mm)

**Design Data FXP**

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
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<td>FXP-SVK 640 SR36 SPB2-20P</td>
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<td>FXP-SVK 838 SR36 SPB2-20P</td>
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<td>FMP-SVK 1432 SR36 SPB2-20P</td>
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*Permissible dimensional tolerances for elastomer parts according to DIN ISO 3302-1 M3

Note: Two ejectors/silencer box covers are used for the 1,234 mm and 1,432 mm lengths. Type FXP requires compressed air hose 12/9 mm

**Design Data FMP**

<table>
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<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
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</thead>
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<td>B</td>
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<tr>
<td>FMP-SVK 442 SR36 SPB2-20P</td>
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<tr>
<td>FMP-SVK 640 SR36 SPB2-20P</td>
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*Permissible dimensional tolerances for elastomer parts according to DIN ISO 3302-1 M3

Note: Vacuum hose with internal diameter equal to dimension D required

www.schmalz.com/fxp-fmp
Vacuum Area Gripping Systems FXP / FMP
Design with Suction Pads (Ø = 40 mm)

Ordering Data for Area Gripping Systems

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*Customer-specific gripper dimensions on request

Ordering Data for Suction Pads (Spare Parts)

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Note: Other suction pad types (construction, material, diameter) available on request

Technical Data

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<th>Max. suction flow [l/min]</th>
<th>Max. degree of evacuation [%]</th>
<th>Suction force** [N]</th>
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Sound level: 74 dB(A)

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<th>Type</th>
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<th>Suction force** [N]</th>
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</table>

*Specified in standard liters/min. permissible operating pressure (flowing pressure measured directly at ejector entry): 5...7 bar. Optimum compressed air flowing pressure: 5.8 bar
**Practically determined values for handling a typical workpiece (cardboard box, bulging and with textured surface, gripper completely covered by the workpiece, -0.25 bar system vacuum, without safety factor). They provide benchmarks for approximate layout. We recommend to perform suction tests with the original workpiece to ensure functionality.
***The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

1 www.schmalz.com/fxp-fmp
Vacuum Area Gripping Systems FXP / FMP

Design with Suction Pads (Ø = 40 mm)

### Design Data FXP

![Diagram of FXP design data](image)

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
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<th>B3</th>
<th>H</th>
<th>H1</th>
<th>H2*</th>
<th>H3</th>
<th>H4</th>
<th>H5</th>
<th>L</th>
<th>L2</th>
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*Permissible dimensional tolerances for elastomer parts according to DIN ISO 3302-1 M3
Note: Two ejectors/silencer box covers are used for the 1,234 mm and 1,432 mm lengths. Type FXP requires compressed air hose 12/9 mm

### Design Data FMP

![Diagram of FMP design data](image)

<table>
<thead>
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<th>Type</th>
<th>Dimensions [mm]</th>
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<th>D</th>
<th>H</th>
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<th>H2*</th>
<th>H3</th>
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</table>

*Permissible dimensional tolerances for elastomer parts according to DIN ISO 3302-1 M3
Note: Vacuum hose with internal diameter equal to dimension D required
Vacuum Area Gripping Systems FXP / FMP

Accessories

Vacuum Switch
- Detection of the required vacuum and start of cycle by part present signal
- Optimization of cycle times
- Part number 10.06.02.00343

Separation Function
- Separation of porous workpieces (e.g. boxes, MDF/particle boards) during destacking
- Active initiation of an adjustable, targeted compressed air pulse
- Part number on request

Sensor Kit
- For workpiece and position detection
- Optimization of cycle times and increase in process reliability
- Includes attachment bracket
- Part number on request

Attachment Kit Sliding Block
- 4 sliding blocks
- 4 screws (M8x16)
- Part number 10.01.21.00243

Attachment Kit Flange Plate
- 1 flange plate
- Includes sliding block attachment kit
- Part number 10.01.21.01291

Attachment Kit Double Flange Plate
- 1 double flange plate
- Includes sliding block attachment kit
- Part number 10.01.21.00244

Attachment Kit Spring-Loaded Level Compensation
- 1 spring plunger (50 mm stroke) with jointed mounting
- Includes flange plate attachment kit
- Part number 10.01.21.02407

Attachment Kit Flexible Level Compensation
- 1 spring plunger (50 mm stroke) with spherical bearing
- Maximum flexibility for uneven workpieces
- Self-centering and therefore no jamming
- Part number on request

Cover Strip for T-Slots
- Positive-locking cover for the T-slots
- Easy cleaning
- Cable duct possible
- Available by the meter
- Part number 26.07.03.00002

Integrated Control Valves (for Type FXP-S)
- For switching vacuum and blow off on/off
- Minimum suction and blow off times
- Electrical connection via M12 plug (4-pole)
- Part number on request

Solenoid Valve (for FMP Type)
- For switching blow off on/off
- Fast evacuation and minimization of cycle times
- Can be flange-mounted on the gripper
- Part number 10.01.21.02405

Sensor Kit
- For workpiece and position detection
- Optimization of cycle times and increase in process reliability
- Includes attachment bracket
- Part number on request
Vacuum Area Gripping Systems FX / FM

Design with Sealing Foam (Height = 10 mm)

The Small and Flexible Gripper
- For use in packaging processes for handling a wide range of products, e.g. filling boxes
- Ideal for integration in packaging machines (e.g. case packers) due to its compact dimensions and low weight
- For use on vacuum suction spiders for handling bending workpieces such as metal sheets and veneer
- FX type with integrated vacuum generation (ejector)
- FM type with connection for external vacuum generation

Ordering Data

<table>
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<th>Part number</th>
<th>Sealing foam (spare part)**</th>
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</tr>
</tbody>
</table>

*Gripping system with blow off function for fast depositing of workpieces
**Other foam heights and types on request
Note: Noise reduction possible by using an additional silencer (FX 120x60)

Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Number  of suction cells</th>
<th>Air consumption* [l/min]</th>
<th>Max. suction flow [l/min]</th>
<th>Max. degree of evacuation [%]</th>
<th>Suction force** [N]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-SW 120x60</td>
<td>10</td>
<td>117</td>
<td>69</td>
<td>80</td>
<td>98</td>
<td>0.70</td>
</tr>
<tr>
<td>FX-SW 120x60 SEA*</td>
<td>10</td>
<td>117</td>
<td>69</td>
<td>80</td>
<td>98</td>
<td>0.80</td>
</tr>
<tr>
<td>FM-SW 76x22</td>
<td>26</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>40</td>
<td>0.06</td>
</tr>
<tr>
<td>FM-SW 120x60</td>
<td>10</td>
<td>***</td>
<td>***</td>
<td>***</td>
<td>98</td>
<td>0.50</td>
</tr>
</tbody>
</table>

*For compressed air with 5 bar input pressure
**At -0.6 bar and with the gripper fully covered by a rigid workpiece
***Depending on the external vacuum generation

Design Data

FX-SW 120x60 SEA

FM-SW 76x22

FM-SW 120x60

The hose coupling is omitted for version FX-SW 120x60

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>FX-SW 120x60</td>
<td>60</td>
</tr>
<tr>
<td>FX-SW 120x60 SEA*</td>
<td>60</td>
</tr>
<tr>
<td>FM-SW 76x22</td>
<td>22</td>
</tr>
<tr>
<td>FM-SW 120x60</td>
<td>60</td>
</tr>
</tbody>
</table>

Note: The type FX requires an 8/6 mm compressed air hose; the type FM requires an 8/6 mm vacuum hose
Vacuum Area Gripping Systems FX / FM

Design with Suction Pads (Ø = 12 mm)

Ordering Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
<th>Suction pad (spare part)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-SW 120x60 20 FSG12</td>
<td>10.01.11.02009</td>
<td>10.01.06.00558</td>
</tr>
<tr>
<td>FX-SW 120x60 20 FSG12 SEA*</td>
<td>10.01.11.02008</td>
<td>10.01.06.00558</td>
</tr>
<tr>
<td>FM-SW 120x60 20 FSG12</td>
<td>10.01.11.02010</td>
<td>10.01.06.00558</td>
</tr>
</tbody>
</table>

*Gripping system with blow off function for fast depositing of workpieces
**Other suction pad types (construction, material) available on request

Note: Noise reduction possible by using an additional silencer (FX 120x60)

Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of suction pads</th>
<th>Air consumption* [l/min]</th>
<th>Max. suction flow [l/min]</th>
<th>Max. degree of evacuation [%]</th>
<th>Suction force** [N]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX-SW 120x60 20 FSG12</td>
<td>14</td>
<td>117</td>
<td>69</td>
<td>80</td>
<td>12.6</td>
<td>1.0</td>
</tr>
<tr>
<td>FX-SW 120x60 20 FSG12 SEA*</td>
<td>14</td>
<td>117</td>
<td>69</td>
<td>80</td>
<td>12.6</td>
<td>1.1</td>
</tr>
<tr>
<td>FM-SW 120x60 20 FSG12</td>
<td>14</td>
<td>-**</td>
<td>-**</td>
<td>-**</td>
<td>12.6</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*For compressed air with 5 bar input pressure
**At -0.6 bar and with the gripper fully covered by a rigid workpiece
***Depending on the external vacuum generation

Design Data

![FX-SW 120x60 20 FSG12](image1)
![FX-SW 120x60 20 FSG12 SEA](image2)
![FM-SW 120x60 20 FSG12](image3)

<table>
<thead>
<tr>
<th>Type</th>
<th>Dimensions [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
</tr>
<tr>
<td>FX-SW 120x60 20 FSG12</td>
<td>60</td>
</tr>
<tr>
<td>FX-SW 120x60 20 FSG12 SEA*</td>
<td>60</td>
</tr>
<tr>
<td>FM-SW 120x60 20 FSG12</td>
<td>60</td>
</tr>
</tbody>
</table>

Note: The FX type requires an 8/6 mm compressed air hose; the FM type requires an 8/6 mm vacuum hose

www.schmalz.com/fx-fm
Vacuum Area Gripping Systems SBX
Very Robust Grippers for the Timber and Woodworking Industry

Application
• Robust gripper for powerful handling of lumber, planed or glued timber, sheet materials, construction timber, pallets and crate elements
• Handling of naturally growing materials with knots or cracks or with warped, rough surfaces
• Ideal for the rough application conditions in saw mills or in woodworking and furniture construction
• Also suitable for unstacking and transporting workpieces in layers when in the double gripper configuration
• Ideal for operation with industrial robots and gantries due to its low weight and compact dimensions

Design

Aluminum base section
• Integrated vacuum reservoir
• High stiffness and low weight

Compact valve unit
• With control valves, vacuum gauge, electrical and pneumatic connections
• Easily removed and therefore maintenance-friendly

Vacuum generation
• Multi-stage ejector
• Connection for external vacuum generators as an option

Dust filter

Sealing foam
• Rebounds quickly and is resistant to wear due to the sandwich design
• Quick-change adhesive film

Your Benefits
• Extra high holding force for extremely porous and warped workpieces
• Automatic switching off of uncovered suction cells in order to sustain maximum system pressure
• Fast vacuum generation to minimize cycle times
• Maintenance-friendly due to compact valve unit and quick-change sealing foam
• Easy system integration due to pluggable connections
• Adaptation of the area gripper to the particular application case
Vacuum Area Gripping Systems SBX

Types

**SBX 200 with Vacuum Generation**
- Multi-stage ejector SEM 150 with dust filter
- Vacuum generation directly at the gripper ensures fast evacuation
- Easy mounting and installation without the need to connect additional hoses
- Ejector and dust filter can be optionally integrated into the base section

**SBX 200 for External Vacuum Generation**
- Connection piece for external vacuum generator
- Use of electrical vacuum generators (blower or pump) to achieve high flow rates and vacuums up to -0.8 bar
- Low operating costs due to electrical vacuum generation

**SBX 400 for External Vacuum Generation**
- Double gripper design for maximum holding forces
- Increased hit rate due to offset suction cell grid, thus particularly suited for thin workpieces
- Use of electrical vacuum generators (blower or pump) to achieve high flow rates and vacuums up to -0.8 bar
Vacuum Area Gripping Systems SBX

Accessories

Quick-Change Plate
• Quick and easy changing of the sealing plate using quick-release clamp
• Allows soaked or frozen sealing plates to be used again after drying

Water Removal System
• Reliably removes any water that is sucked into the gripper
• Increased process reliability for wet workpieces
• Basic version: manually operated valve
• Advanced version: electrically operated valve

Heating System
• The area gripper is slightly heated by a heating system
• Prevents moisture from freezing on the gripper when temperatures are low in outdoor applications

Gripper Segmentation
• Sectioning of the gripper into multiple suction zones that can be adjusted as needed and asynchronously controlled
• Prevents intermediate layers from being picked up inadvertently
• Min. zone size of 315 mm (for standard grid)

Spring-Loaded Level Compensation
• Quick mounting on beams and gantries
• Jointed / spring-loaded design for optimal height compensation and gentle setting down on the workpiece

Flexible Level Compensation
• Spring plunger with spherical bearing
• Maximum flexibility for extremely uneven layers of workpieces
• Responsive in all directions
• Self-centering and therefore no jamming

Designation Code
Designation code explained using the example of: SBX-C 1040x200 35 25 SEM-150

<table>
<thead>
<tr>
<th>SBX</th>
<th>C</th>
<th>1040x200</th>
<th>35</th>
<th>25</th>
<th>SEM-150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Version</td>
<td>Length x width [mm]</td>
<td>Suction cell grid distance [mm]</td>
<td>Foam height [mm]</td>
<td>Vacuum generation</td>
</tr>
<tr>
<td>SBX</td>
<td>C With compact valve unit</td>
<td>1,040 x 200</td>
<td>35</td>
<td>25</td>
<td>SEM-150 Multi-stage ejector</td>
</tr>
<tr>
<td>SBX</td>
<td>C With compact valve unit</td>
<td>1,040 x 200</td>
<td>35</td>
<td>25</td>
<td>SEM-150 Multi-stage ejector</td>
</tr>
</tbody>
</table>

- External vacuum generation (pump or blower)
Vacuum Area Gripping Systems SBX

Product Specifications

Ordering Data

<table>
<thead>
<tr>
<th>Type*</th>
<th>Part number</th>
<th>Gripping system</th>
<th>Sealing plate** (spare part)</th>
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<tbody>
<tr>
<td>SBX-C 1040x200 35 25 SEM-150</td>
<td>10.01.20.01000</td>
<td>10.01.20.01006</td>
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<tr>
<td>SBX-C 1250x200 35 25 SEM-150</td>
<td>10.01.20.01001</td>
<td>10.01.20.00438</td>
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<tr>
<td>SBX-C 1040x200 35 25</td>
<td>10.01.20.01002</td>
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<td>SBX-C 1250x200 35 25</td>
<td>10.01.20.01003</td>
<td>10.01.20.00438</td>
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<tr>
<td>SBX-C 1040x400 35 25</td>
<td>10.01.20.01004</td>
<td>10.01.20.01007</td>
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</tr>
<tr>
<td>SBX-C 1250x400 35 25</td>
<td>10.01.20.01005</td>
<td>10.01.20.00440</td>
<td></td>
</tr>
</tbody>
</table>

* Customer-specific gripper dimensions on request
** Other foam heights and foam types on request

Technical Data

<table>
<thead>
<tr>
<th>Type</th>
<th>Vacuum generation</th>
<th>Number of suction cells</th>
<th>Air consumption [l/min]</th>
<th>Max. suction flow [l/min]</th>
<th>Max. degree of evacuation [%]</th>
<th>Suction force** [N]</th>
<th>Weight [kg]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SBX-C 1040x200 35 25 SEM-150*</td>
<td>Ejector</td>
<td>29</td>
<td>640</td>
<td>1,400</td>
<td>80</td>
<td>2,400</td>
<td>25</td>
</tr>
<tr>
<td>SBX-C 1250x200 35 25 SEM-150*</td>
<td>Ejector</td>
<td>35</td>
<td>640</td>
<td>1,400</td>
<td>80</td>
<td>3,000</td>
<td>28</td>
</tr>
<tr>
<td>SBX-C 1040x200 35 25</td>
<td>Blower / Pump</td>
<td>29</td>
<td>.***</td>
<td>.***</td>
<td>.***</td>
<td>2,400</td>
<td>23</td>
</tr>
<tr>
<td>SBX-C 1250x200 35 25</td>
<td>Blower / Pump</td>
<td>35</td>
<td>.***</td>
<td>.***</td>
<td>.***</td>
<td>3,000</td>
<td>26</td>
</tr>
<tr>
<td>SBX-C 1040x400 35 25</td>
<td>Blower / Pump</td>
<td>57</td>
<td>.***</td>
<td>.***</td>
<td>.***</td>
<td>4,500</td>
<td>46</td>
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<tr>
<td>SBX-C 1250x400 35 25</td>
<td>Blower / Pump</td>
<td>69</td>
<td>.***</td>
<td>.***</td>
<td>.***</td>
<td>5,900</td>
<td>52</td>
</tr>
</tbody>
</table>

*Sound level 78 dB(A)
** At -0.25 bar and with full gripper coverage
*** Depending on the external vacuum generation

Design Data

SBX with vacuum generator (SEM-150)

SBX with connection for external vacuum generator

Note: Type SBX-C ... SEM-150 requires compressed air hose 15/9 mm. Type SBX-C requires vacuum hose 71/60 mm

www.schmalz.com/sbx
Together with capable palletizing robots and gantries, vacuum layer gripping systems from Schmalz increase the production output in the automated handling of products in various industries. Individually planned systems guarantee an optimal process integration and ensure a quick return on investment.

Vacuum Layer Gripping Systems

High-Performance Palletizers for Warehousing and Intralogistics
Vacuum Layer Gripping Systems SPZ
Grips Everything that Comes Along

Application
- Palletizing and de-palletizing of layers of various goods
- Use in warehouse logistics and intralogistics
- Handling of layers with gaps, mixed layers, intermediate layers, pallets, cardboard packaging and film packaging
- Palletizing and de-palletizing partial pallets by the combination of vacuum technology and mechanical gripping support

Design

Flange connection
- Spring-loaded level compensation (floating attachment) to all common robots and gantries

Control modules
- For common bus systems available; decentral control

Basic body / suction box
- Height adjustable by servomotor (optional)

Suction area
- With suction pads

Vacuum valves
- For suction area / global vacuum

Mechanical gripping modules
- Servomotor-driven (pneumatically as an option)

Venting valve
- For generating a global vacuum

External vacuum generation (not shown)
- Individually selected from the Schmalz program

Your Benefits
- Secure and damage free gripping of various layer sizes and layer patterns
- Higher throughput due to process acceleration
- No gripper changeover and set-up times when performing job changes
- Innovative gripping concept with mechanical support and global vacuum for additional holding force
- Use in the freezer industry sector in areas down to -30 °C (optional)
- Skilled system design according to individual requirements

www.schmalz.com/spz
Vacuum Layer Gripping Systems SPZ

Types and Gripping Technology

Basic Configurations
The layer gripping system SPZ is available in three basic configurations, differing in their gripping technology.

- **SPZ with Vacuum Suction Area**
  - Sealing foam for homogenous and intrinsically stable product layers, such as jars and cans
  - Suction pads for flexible workpieces

- **SPZ-M with Mechanical Gripping Support**
  - Additional stabilization of instable and porous product layers, such as cardboard boxes and beverage trays

- **SPZ-M-C with Global Vacuum**
  - Maximum holding force for product layers that cannot be “sucked” (e.g. mixed layers and layers with gaps)

Industry-Specific Versions
Schmalz has developed specific layer gripping systems for typical applications of particular industries.

- **SPZ Glass** | Palletizing and de-palletizing of jars and cans
- **SPZ Packaging** | Palletizing and de-palletizing of cardboard boxes, beverage trays etc.
- **SPZ Logistics** | Handling of various product layers in warehousing and intralogistics
- **SPZ Nesting** | De-stacking of cut-optimized wooden or metal sheets in a single handling process
Vacuum Layer Gripping Systems SPZ

Product Specifications

Innovative Expansion Options
In order to optimize cycle times, energy consumption and process safety, the layer gripping systems can be equipped with various additional features and thus be adapted to process-specific requirements.

• Sensor Unit
  Optimization of cycle times and increased process safety due to vacuum detection and parts control

• Energy Saving Version
  Reduced energy consumption due to workpiece and process-dependent blower regulation (by frequency converter)

• Collision Detection
  Avoidance of damages on the workpieces and system standstills due to floating attachment with collision monitoring

• Intermediate Layer Separation
  Process-safe separation of various intermediate layers

• Deep-Freezing Version
  Suitable for use at temperatures down to -30 °C

• Mechanical Pallet Gripping Arms
  Safe handling of one or more palettes, servomotor-driven

Technical Data

Every layer gripping system can be adapted to individual requirements. The following data are therefore reference values and may vary depending on the application. Suction tests with original workpieces are always required to ensure functionality. We perform these in our test center individually for your application.

<table>
<thead>
<tr>
<th>Type</th>
<th>Gripping technology</th>
<th>Gripper dimensions* [mm]</th>
<th>Gripper weight [kg]</th>
<th>Max. layer weight [kg]</th>
<th>Pallet size** [mm]</th>
<th>Temperature operating range [°C]</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPZ</td>
<td>Vacuum suction area</td>
<td>approx. 1,250x850x275</td>
<td>approx. 90</td>
<td>250</td>
<td>Euro (1,200x800)</td>
<td>+5 to +40</td>
</tr>
<tr>
<td>SPZ-M</td>
<td>Mech. gripping support</td>
<td>approx. 2,100x1,000x1,000</td>
<td>approx. 390</td>
<td>250</td>
<td>Industry (1,200x1,000)</td>
<td>(down to -30 on request)</td>
</tr>
<tr>
<td>SPZ-M-C</td>
<td>Global vacuum ***</td>
<td>approx. 2,100x1,800x1,000</td>
<td>approx. 390</td>
<td>250</td>
<td>US (1,015 x 1,215)</td>
<td></td>
</tr>
</tbody>
</table>

*Gripper dimensions may vary depending on the pallet size
**Special sizes on request
***Type SPZ-M-C can be optionally equipped without suction area. Handling of the workpieces is then performed by the mechanical gripping and the global vacuum

The energy savings are dependent on many factors (cycle, handling process, safety factor, porosity of workpiece, etc.) and must always be determined individually.
You supply the robot, and we take care of the gripping technology. Selecting from a range of more than 3,500 standard components, our application engineers develop, design and build future-proof solutions to meet your individual requirements.

**Vacuum Suction Spiders**

Custom Made Solutions for End-of-Arm-Tooling

You supply the robot, and we take care of the gripping technology. Selecting from a range of more than 3,500 standard components, our application engineers develop, design and build future-proof solutions to meet your individual requirements.
Vacuum Suction Spiders SSP
Robot Grippers Made-to-Measure

Application
- Automation of handling tasks in manufacturing, assembly and quality control processes
- Linking robots in presses and bending centers
- Automating plastic injection molding machines, deep drawing machines, machining centers for wood and plastics, water jet machines, laser machines and punching machines
- Order picking in storage and distribution centers on industrial robots or gantries
- Handling of metal sections, blanks, stone, sheet materials, car body parts, glass and ceramic components, etc.

Design
The figure shows the basic design of the suction spider SSP. On request, individual configurations with many extensions are possible.

Flange module
- For connection to common robots and gantries
- Rigid or spring-loaded level compensator (floating attachment)

Aluminum main beam
- High stiffness and low weight
- Integrated vacuum distribution and reservoir

Valve technology

Vacuum generation
- Individually selected from the Schmalz program

Gripper connection
- Rigid or spring-loaded and jointed level compensator
- For optimal height adjustment

Your Benefits
- Modular system with standardized and harmonized components
- Flexible adaptation to customer-specific requirements
- Combination of different gripping technologies (vacuum, mechanics, magnetics etc.) possible
- Low intrinsic weight due to basic components made of aluminum, steel pipe and plastics
- Minimization of cycle times
- Enhanced process safety due to integrated system monitoring and sensor technology
- Intelligent valve modules for unused suction pads
Vacuum Suction Spiders SSP

Individual Configuration

Customer-Specific Versions
Vacuum suction spider from Schmalz can be custom configured.

Innovative Expansion Options

- **Sensor Unit**
  Optimization of cycle times and increased process safety due to vacuum detection and parts control

- **Energy Saving Version**
  Reduced energy consumption due to workpiece and process dependent regulation of the vacuum generator

- **Separation Function**
  Safe separation of porous workpieces such as chipboards

- **Peeling Unit**
  Reliable separation of smooth and airtight workpieces such as sheets of glass

- **Plug & Play Function**
  Electrical terminal box with multi-pin connection plugs enables quick and easy installation

Vacuum End Effectors VEE for the Packaging Industry
System components for quick and cost-effective designing of vacuum end effectors for high-speed packaging processes:
- Perfectly coordinated individual components
- Lightweight design for high-speed applications
- Online configurator minimizes designing effort
- Max. lift capacity 2,000 g

www.schmalz.com/vee
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