



Vacuum Automation

# Solutions for the battery industry



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# Schmalz: Vacuum Technology for Intelligent Automation and Ergonomic Handling

**1500**  
**employees**  
working hard for our customers.

**19**  
**locations**  
for outstanding customer service worldwide.

**9**  
**percent**  
of our revenue is invested in innovative ideas and new products.

**580**  
**copyrights**  
are proof of our groundbreaking innovations.



## *Schmalz is the Market Leader in Vacuum Automation and Ergonomic Handling Systems.*

The wide range of products in the Vacuum Automation unit includes individual components such as suction cups and vacuum generators, as well as complete gripping systems and clamping solutions for holding workpieces, for example in CNC machining centers. The Handling Systems unit offers innovative handling solutions with vacuum lifters and crane systems for industrial and handicraft applications.

Our products are used in different applications for example in the logistics industry, the automotive industry, the electronics sector and in furniture production.

With comprehensive consulting, a focus on innovation and first-class quality, Schmalz offers its customers long-lasting benefits. Schmalz's intelligent solutions make production and logistics processes more flexible and efficient, while also preparing them for the increasing trend toward digitalization.

### Vacuum Automation



Components



Systems



Clamping solutions

### Handling Systems

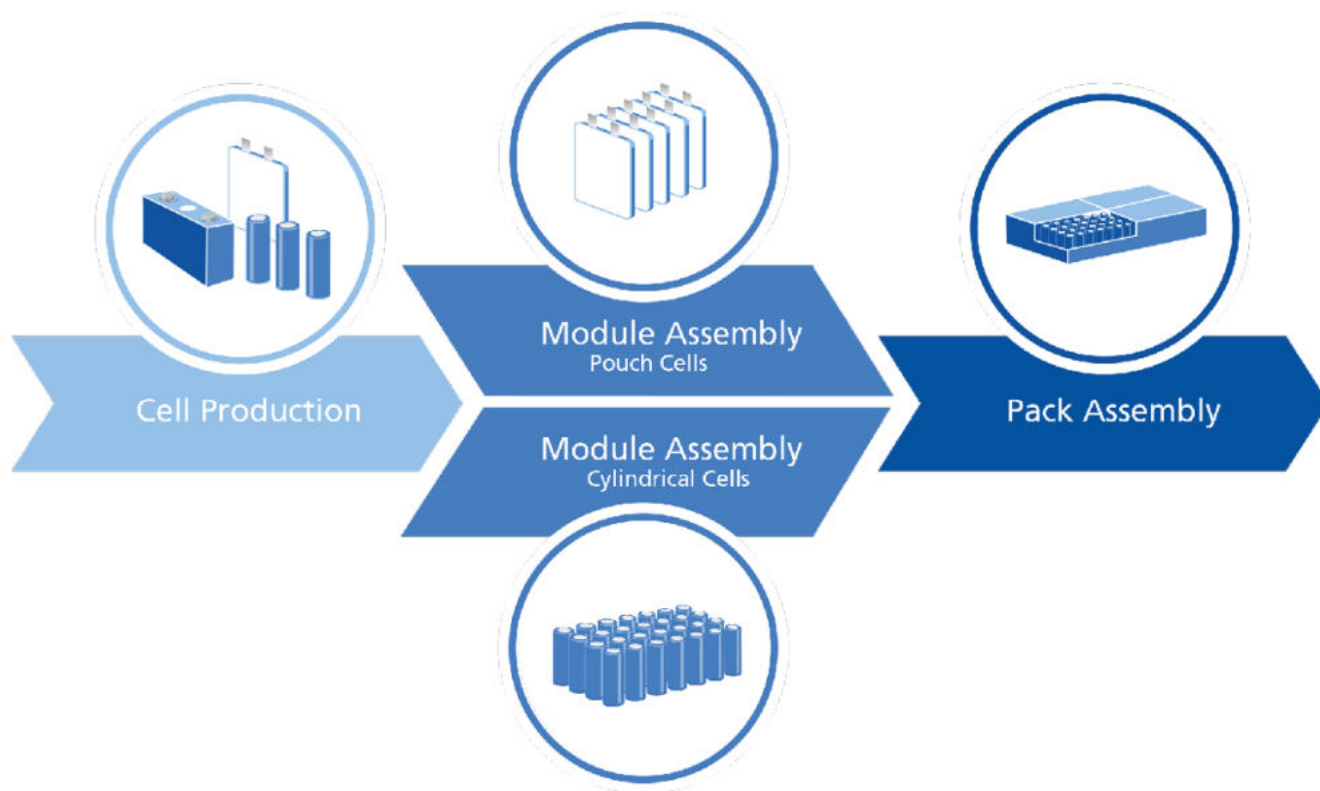


Vacuum lifters and crane systems

# Vacuum technology for the battery industry

The rapidly growing share of electric vehicles is leading to a very high demand for lithium-ion batteries. In order to meet the demand for long ranges, the quality and performance requirements for batteries and their production processes are also constantly increasing. Vacuum components from Schmalz meet the high demands of the industry and are used in automated cell production and module assembly. In addition to automation technology, Schmalz also offers vacuum lifters and crane systems for the ergonomic and safe handling of heavy battery modules.

## PROCESS STEPS AND VACUUM SOLUTIONS IN BATTERY PRODUCTION



Handling of electrodes and separators in cell production



Handling of pouch cells in module assembly



Handling of round cells in module assembly



Handling of battery modules in the pack assembly

# Cell production

Handling of electrodes and separators in cell production

## REQUIREMENTS AND SOLUTIONS



Special gripper STGG for handling anodes

### Highly dynamic Pick & Place

- Special gripper STGG for fast and precise Pick & Place of thin electrodes and separators
- Increased productivity through fastest handling with highest position accuracy

### Gentle gripping

- Gripper Vacuum generator for high volume flow and gentle vacuum
- Full-surface gripping of the films for minimum surface pressure with high lateral force



Special gripper STGG for handling semi stacks

### Contamination-free handling

- High volume flow prevents particle residues on the electrodes
- Special gripper with pneumatic vacuum generation for use in clean rooms

### Safe electrostatic discharge

- Flow gripper with ESD-compliant contact surfaces for discharging electrostatic charge
- Reliable stacking and destacking of thinnest separators

## SELECTED PRODUCTS

### Thin Glass Grippers STGG



[WWW.SCHMALZ.COM/STGG](http://WWW.SCHMALZ.COM/STGG)

### Flow Grippers SCG



[WWW.SCHMALZ.COM/SCG](http://WWW.SCHMALZ.COM/SCG)

### Floating Suction Cups SBS



[WWW.SCHMALZ.COM/SBS](http://WWW.SCHMALZ.COM/SBS)

### Vacuum Blowers SB

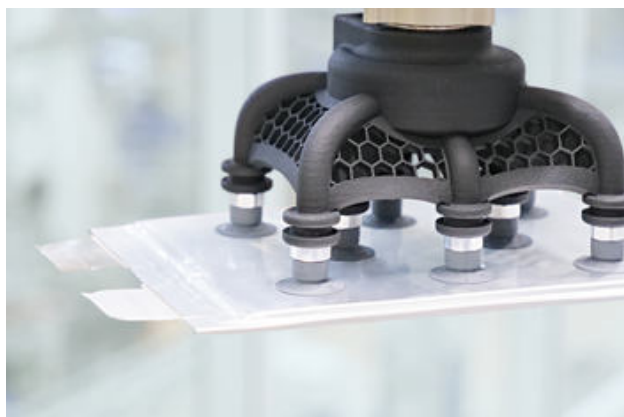


[WWW.SCHMALZ.COM/SB](http://WWW.SCHMALZ.COM/SB)

# Module installation

Handling of pouch cells in module assembly

## REQUIREMENTS AND SOLUTIONS



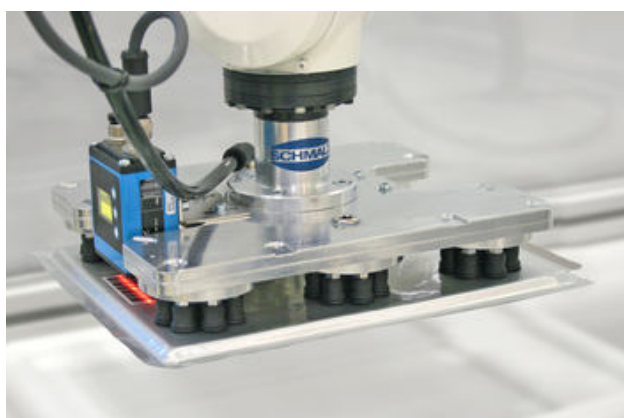
Lightweight gripper SLG with structured suction pads SGPN for gentle handling of pouch cells

### Format flexible gripper solutions

- Individually configurable gripper SLG for workpiece-specific design
- Internal or external vacuum generators for versatile use

### Deformation-free gripping

- Structured vacuum cups SFF and SFB1 for gripping without deep drawing
- Vacuum generator with eco nozzle technology and gentle vacuum



Customer-specific vacuum grippers for the safe pickup and positioning of pouch cells in various formats

### Electrolyte-resistant suction cups

- Chemical-resistant suction materials FPM and EPDM
- Increased productivity due to long service life of the suction cups

### Safe and intelligent solutions

- Vacuum generators with air-saving function maintain the vacuum in case of power failure
- Customer-specific function integration, e.g. redundant vacuum generation or workpiece recognition

## SELECTED PRODUCTS

### Suction Cups SFF / SFB1



[WWW.SCHMALZ.COM/SFF-SFB1](http://WWW.SCHMALZ.COM/SFF-SFB1)

### Vacuum End Effectors VEE



[WWW.SCHMALZ.COM/VEE](http://WWW.SCHMALZ.COM/VEE)

### Spring Plungers FSTIm



[WWW.SCHMALZ.COM/FSTIM](http://WWW.SCHMALZ.COM/FSTIM)

### Compact Ejectors SCPMb / SCPMc / SCPMi



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# Module assembly

Handling of round cells in module assembly

## REQUIREMENTS AND SOLUTIONS



Customer-specific grippers, adapted to the size and quantity of the round cells

### Configurable grippers

- Grippers are configured depending on cell diameter, number (up to 24 round cells) and arrangement
- Individual gripper solution possible from batch size one using the latest 3D printing technology

### Integrated vacuum generation

- High flow rate for fast evacuation and short cycle times
- Ejector module with safety valve for maintaining vacuum in case of power failure



Magnetic gripper for handling hard case steel cells

### Secure gripping

- Magnetic gripper with high holding forces for handling battery cells in steel housings
- Holding elements for the longitudinal gripping of round cells

### Gripping directly on the battery terminals

- HT1 suction cup material for gripping the terminals without leaving marks
- Vacuum suction cup as insulator for charged cells

## SELECTED PRODUCTS

### Magnetic Grippers SGM-HP/-HT



[WWW.SCHMALZ.COM/SGM-HP-HT](http://WWW.SCHMALZ.COM/SGM-HP-HT)

### Bellows Suction Cups FSGA (1.5 Folds)



[WWW.SCHMALZ.COM/FSGA](http://WWW.SCHMALZ.COM/FSGA)

### Vacuum End Effectors VEE



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### Spring Plungers FSTIm



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# Pack Assembly

Handling of battery modules in the pack assembly

## REQUIREMENTS AND SOLUTIONS



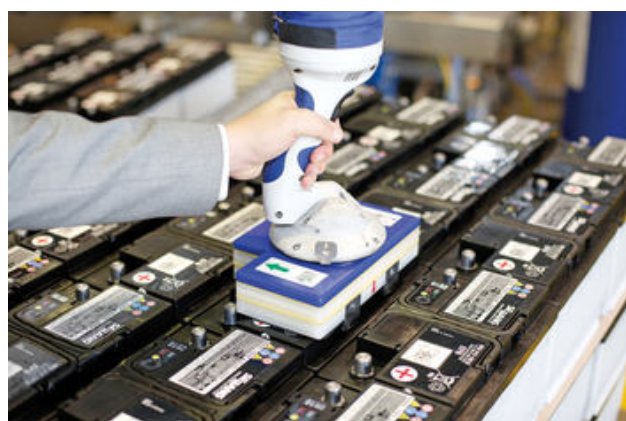
Large-area gripper FQE for handling housing parts

### Secure gripping

- Large-area gripper for safe handling of large structured housing parts, even with cutouts
- High holding forces for heavy workpieces

### Flexible configuration

- Size of the gripper can be selected depending on the workpiece
- Vacuum suction cups for long maintenance intervals or sealing foam for handling heavily structured surfaces



JumboFlex for manual handling of battery modules

### Precise handling

- Intuitive lowering and lifting of the load via the central one-finger control.
- Quick-change adapter for fast, tool-free gripper change.

### Ergonomic and safe handling

- Ergonomic and easy handling for goods up to 50 kg
- Optionally with Safety+. Particularly safe due to two-hand operation for removal. Adjustable, reduced lowering speed, e.g. for sensitive components

## SELECTED PRODUCTS

Large-area gripping systems FQE

Area Gripping Systems FMP

Vacuum tube lifter JumboFlex Aluminum crane systems SRA



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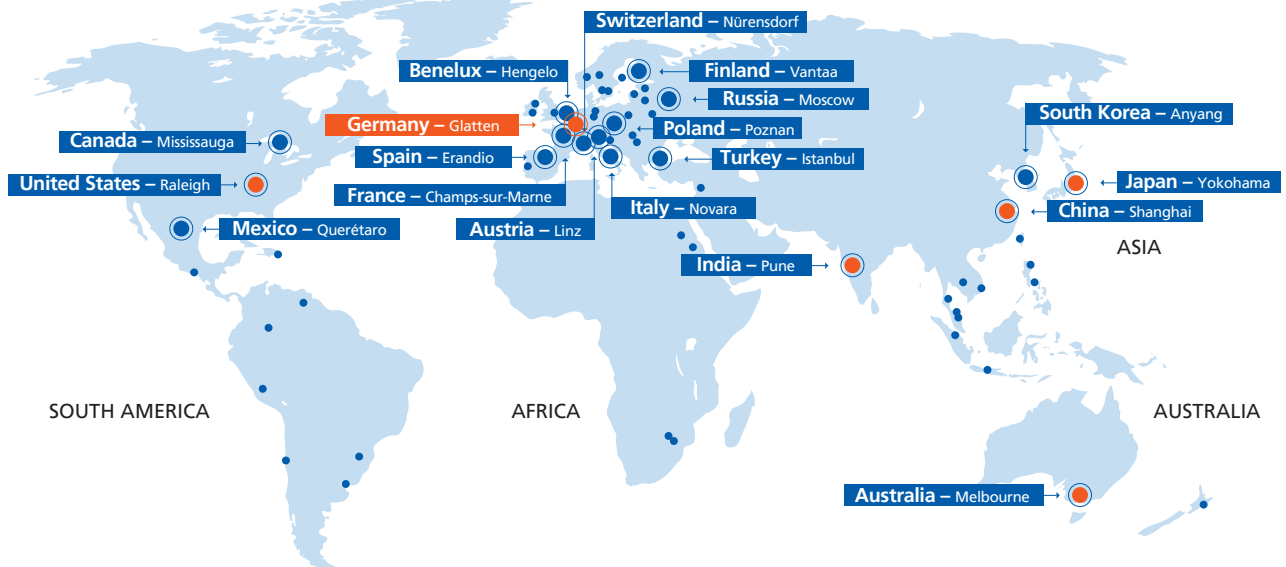


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## Vacuum Automation

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