

Vacuum Components

Catalog 2016 / 2017

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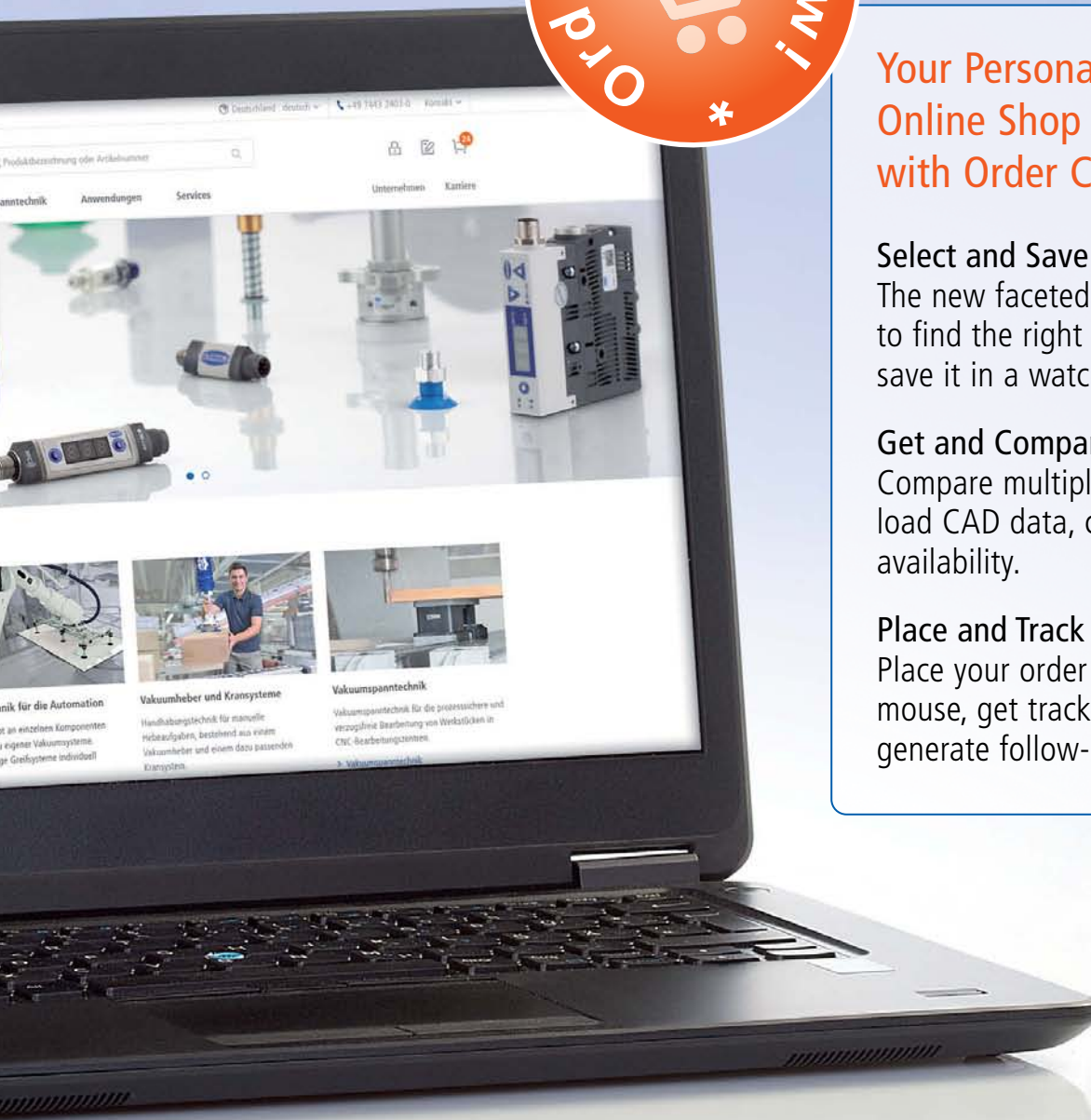
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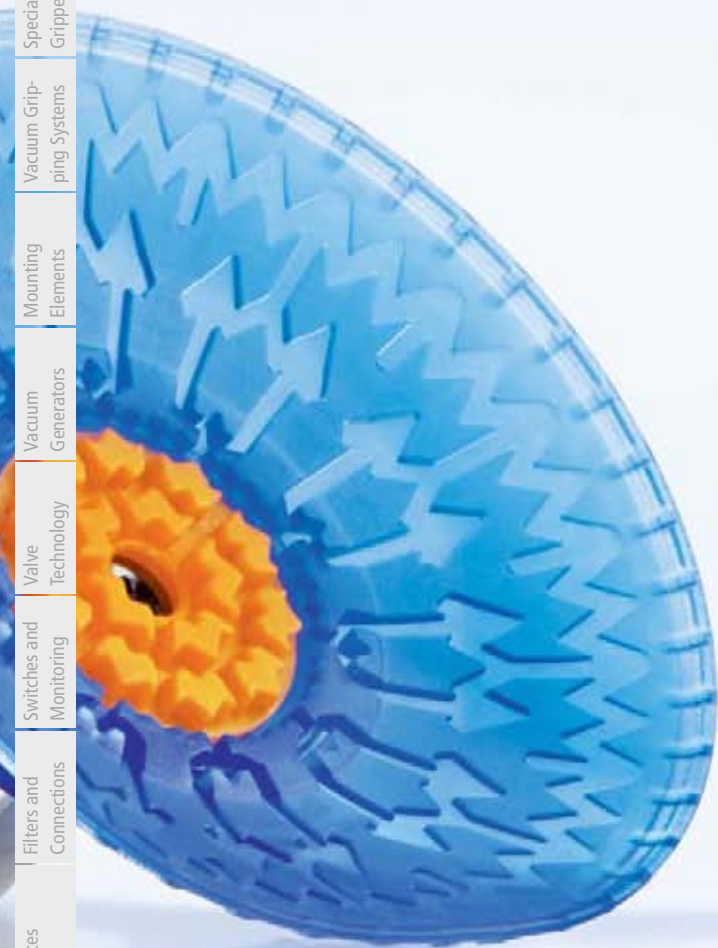
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Schmalz - The Company



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.



Dr. Dipl.-Ing. Kurt Schmalz



Dipl.-Ing. Wolfgang Schmalz

Our Purpose

We are committed to maintaining a fair partnership with our customers and suppliers – one that is beneficial for all parties.

As a family-run company, all our actions and decisions are formed by the principle of sustainability. We are able to retain our freedom to manage the company as an independent entity, by combining economic success with environmental and social commitment.

As our customers and suppliers, you can therefore rest assured that we are the right choice for a long-term partnership. Our customers associate Schmalz with energy-efficient solutions and services, advanced technology, and premium quality. As pioneers in vacuum technology, we continue to push the boundaries of possibility in this area. We identify trends, come up with market-driven innovations and set the standards. That lets us give our customers active support on route to Industry 4.0, for instance: we offer a variety of intelligent vacuum solutions which make processes more productive, efficient and flexible.

Our company is driven by the innovative spirit of our employees coupled with the expertise we have gained from more than 30 years' experience in the field of vacuum technology. Actively helping our company to be ready for change is therefore a matter close to our heart. We invest in technologies of the future and have also positioned ourselves successfully with our own branches in the most important international growth markets. Our employees derive their dedication and loyalty as well as their motivation for outstanding performance from a modern corporate culture and the opportunity to share in our economic success.

You also can engage in a partnership that brings real competitive advantages in the long term – place your trust in Schmalz vacuum technology.

Dr. Dipl.-Ing. Kurt Schmalz
Managing Director

Dipl.-Ing. Wolfgang Schmalz
Managing Director



Schmalz

The World of Vacuum Technology

Schmalz is one of the leading suppliers in the fields of automation, handling and clamping technology and offers innovative and efficient vacuum solutions to customers in numerous different industries.

Facts and Figures

- Founded:** 1910 by Johannes Schmalz
- Market position:** Leading global supplier of vacuum technology in the fields of automation, handling and clamping technology
- Business areas:** Vacuum Components
 Vacuum Gripping Systems
 Vacuum Handling Systems
 Vacuum Clamping Systems
- Employees:** More than 1,000 worldwide; 13% of staff in Germany are trainees
- Innovation figures:** Around 450 industrial rights registered and granted
 8.5% (of revenue) invested in research and development
- Branches:** In 17 countries worldwide
- Sales partners:** In over 60 countries worldwide
- Certifications:** DIN ISO 9001 (quality management) since 1994
 DIN ISO 14001 (environmental management) since 1997
 DIN ISO 50001 (energy management) since 2012
 AEO C (authorized economic operator, customs simplifications) since 2012

International Sales Network

On-site Expertise in Over 80 Countries



● Schmalz Headquarters

J. Schmalz GmbH
Aacher Strasse 29
72293 Glatten
Tel +49 7443 2403-0
Fax +49 7443 2403-259
schmalz@schmalz.de

● Schmalz Subsidiaries

Canada

Schmalz Vacuum Technology Ltd.
17-3190 Ridgeway Drive
ON L5L 5S8 Mississauga
Ontario
Tel +1 905 569 9520
Fax +1 905 569 8256
schmalz@schmalz.ca

China

Schmalz (Shanghai) Co. Ltd.
No. 1 Chunquan Road
201210 Pudong, Shanghai
Tel +86 21 510999 33
Fax +86 21 503988 82
schmalz@schmalz.net.cn

Finland

Oy Schmalz Ab
Hakkilankaari 2
01380 VANTAA
Tel +358 10 231 2011
Fax +358 9 85746 94
schmalz@schmalz.fi

France

Schmalz S.A.S.
Le Prométhée
65 Avenue du Général de Gaulle
77420 Champs-sur-Marne
Tel +33 1 6473 1730
Fax +33 1 6006 6371
schmalz@schmalz.fr

● Schmalz Sales Partners

You can find the Schmalz sales partner in your country at
www.schmalz.com/salesnetwork

India

Schmalz India Pvt. Ltd.
EL – 38 'J' Block MIDC
Bhosari
411026 Pune
Tel +91 20 4072 5500
Fax +91 20 4072 5588
schmalz@schmalz.co.in

Italy

Schmalz S.r.l. a Socio Unico
Via delle Americhe 1
28100 Novara
Tel +39 0321 621 510
Fax +39 0321 621 714
schmalz@schmalz.it

Japan

Schmalz K.K.
3595 Ikonobe-cho
Tsuzuki-ku
224-0053 Yokohama
Tel +81 45 308-9940
Fax +81 45 308-9941
schmalz@schmalz.co.jp

Mexico

Schmalz S. de R.L. de C.V.
Pirineos 500, Bodega 18
Parque Industrial Benito Juarez
Micro Parque Santiago II
76120 Querétaro
Tel +52 442 209 5218
schmalz@schmalz.com.mx

The Netherlands

Schmalz B.V.
Lansinkesweg 4
7553 AE Hengelo
Tel +31 74 25557 57
Fax +31 74 25557 58
schmalz@schmalz.nl

Poland

Schmalz Sp.z.o.o.
Ul. Kobaltowa 4
Zlotniki
62-002 Suchy Las (Poznan)
Tel +48 22 460 49 72
Fax +48 22 460 49 79
schmalz@schmalz.pl

Russia

Schmalz Representation
ul. 26 Bakinskikh Komissarov, 9
Office 109
119571, Moscow
Tel +7 495 96712 48
Fax +7 495 96712 49
schmalz@schmalz.ru

South Korea

Schmalz Co. Ltd.
Room 728
775-1 Janghang 2-dong
IlsandongGu
Goyang KyungkiDo
Tel +82 31 816 2403
Fax +82 31 816 2404
schmalz@schmalz.co.kr

Spain

Schmalz S.A.
Avda. Ribera de Axpe, 49
P.A.E. UDONDO-Edificio B-Nave 2
48950 Erandio (Vizcaya)
Tel +34 94 480 5585
Fax +34 94 480 7264
schmalz@schmalz.es

Switzerland

Schmalz GmbH
Eigentalsstrasse 1
8309 Nürensdorf
Tel +41 44 88875 25
Fax +41 44 88875 29
schmalz@schmalz.ch

Turkey

Schmalz Vakum
San. ve Tic. Ltd. Şti.
Aydınlı Mah. Patlayıcı
Maddeler Yolu
Dumankaya Botanik A-89
34953 - TUZLA - İSTANBUL
Tel +90 216 34001 21
Fax +90 216 34001 24
schmalz@schmalz.com.tr

United States

Schmalz Inc.
5850 Oak Forest Drive
Raleigh, NC 27616
Tel +1 919 713 0880
Fax +1 919 713 0883
schmalz@schmalz.us

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

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Company headquarters and main production facilities in Glatten (in the Black Forest) Germany

Efficiency and Sustainability

You can see Sustainability in Practice in our Products



Schmalz sees sustainability as a holistic system of economic success, ecological responsibility and social engagement. Numerous sustainability measures have been combined to develop the Schmalz ecoSYSTEM. This ecoSYSTEM encompasses long-term stability, resource-efficient products and processes, and fairness towards customers, employees, suppliers and society.

Schmalz goals and cornerstones of sustainable management are:

Economy

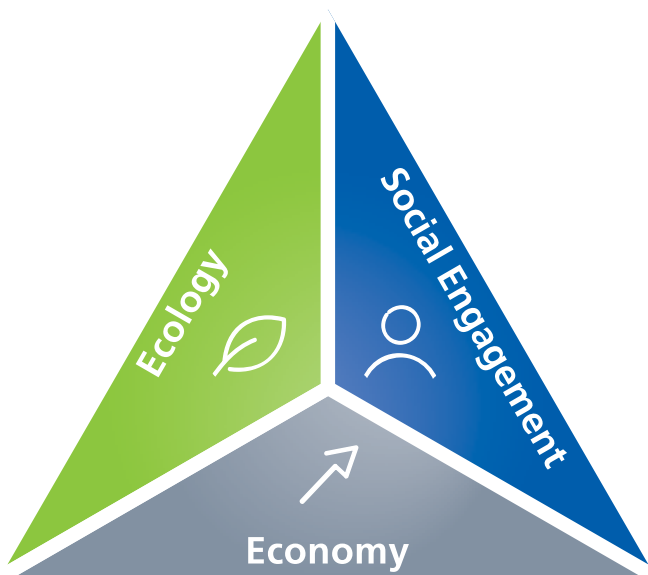
- A solid financial base is important to Schmalz because it allows the family business to retain its independence and freedom in the long term.

Ecology and Conservation of Resources

- Schmalz is a positive energy company that generates more electricity and heat from renewable sources than it uses.
- Schmalz's production is CO₂-neutral to help the environment with an overall reduction of CO₂ emissions.
- Schmalz develops, produces and sells products with significantly lower CO₂ emissions over the entire product life than comparable products on the market.
- Schmalz takes numerous environmental protection measures and uses targeted communication to inspire others to follow its example.

Social Commitment

- Schmalz offers excellent working conditions and comprehensive benefits to attract and retain skilled workers.
- Schmalz supports the region it's based in and is actively involved in networks.



Holistic system of economic, ecological and social practices

Sustainable Product Creation

Design features play an important role in today's sustainable product creation. For example, the materials and production techniques used and the energy that is later required are already determined during the development phase of a product. That allows us to determine the major factors that impact our product carbon footprint before the production phase begins. Schmalz places a special emphasis on using low energy materials and production processes. Furthermore, clearly defined environmental targets are included in our functional specifications for new product developments.

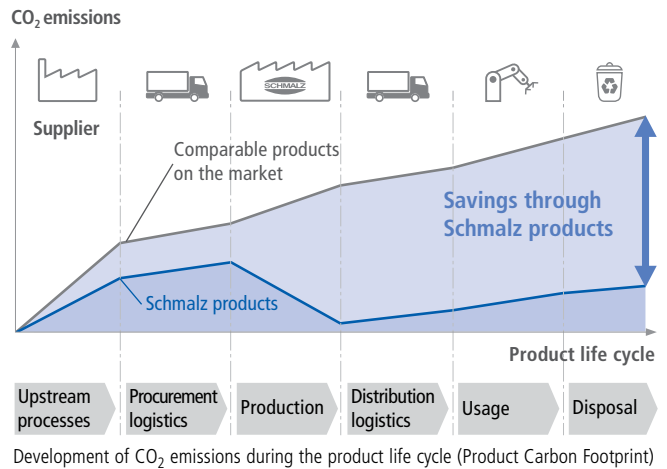
Schmalz views the manufacturing of a product as all of the processes that can be attributed to the value-creation process, including upstream processes. With this in mind, Schmalz audits its suppliers and integrates its most important partners directly into its own production process. This makes it possible to purchase parts that already have a low CO₂ impact. On the procurement side, Schmalz increasingly relies on regional suppliers. This eliminates unnecessary CO₂ production through shortest possible delivery distance. Schmalz uses CO₂-neutral shipping methods such as GoGreen shipping from DHL to transport the product to the customer.



The design of the recyclable SAOXM automotive suction cup

Example: Vacuum Generator with Automatic Air-Saving Function

A minimum vacuum level is needed to ensure that a vacuum can reliably handle workpieces. Vacuum generators with an integrated automatic air-saving function automatically switch off their suction function as soon as this level is reached. Vacuum generation is not reactivated until the next handling cycle or until the vacuum drops below the defined minimum vacuum level. Using this type of vacuum generator reduces energy consumption by up to 80 %. Using a gripper equipped with this function for the automated handling of metal sheets reduces CO₂ emissions by around 730 kg per year.



Development of CO₂ emissions during the product life cycle (Product Carbon Footprint)

Efficiency in Product Operation

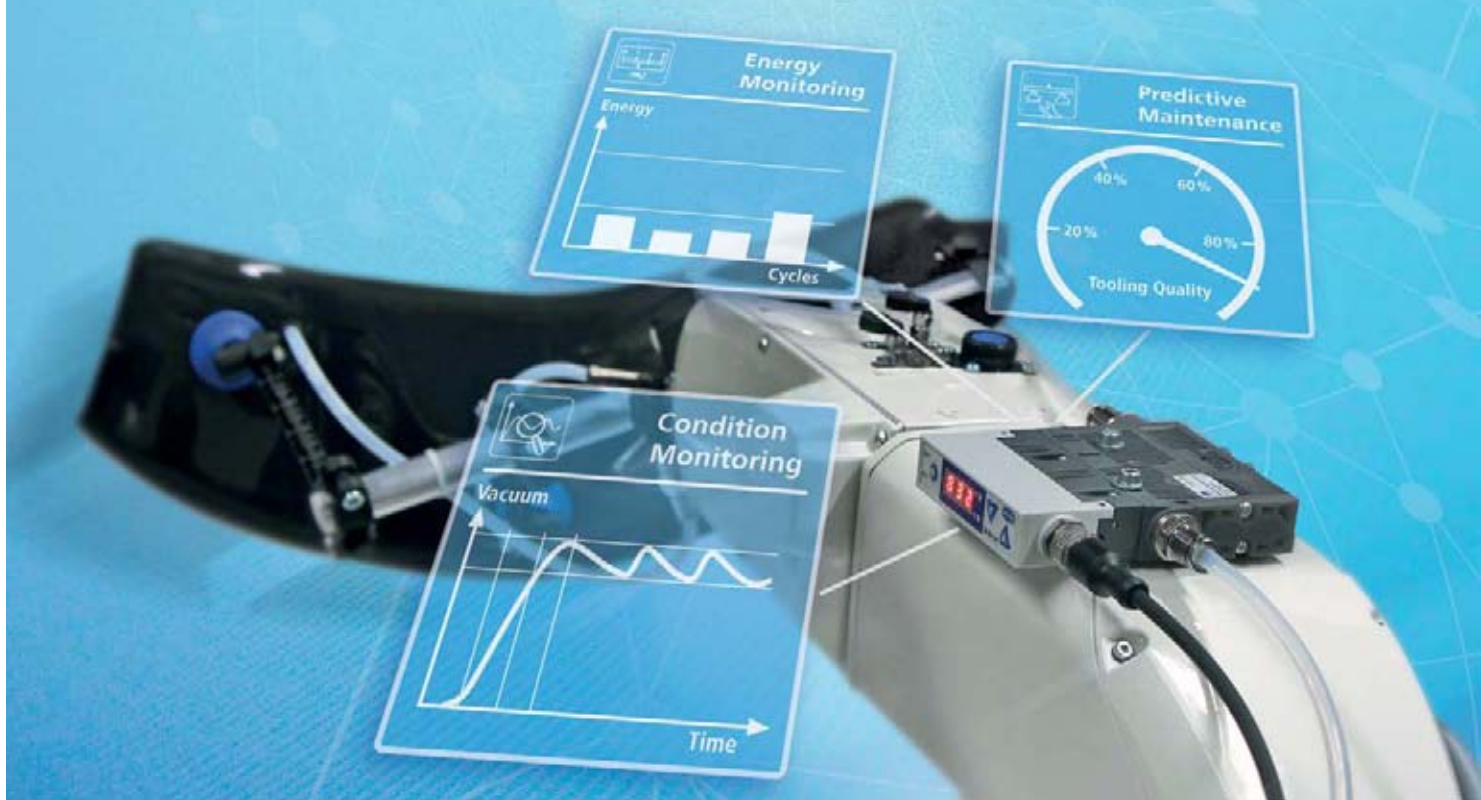
When operating products in the field of vacuum technology, it is especially important to use the resources of compressed air and electricity in an efficient manner. For example, Schmalz designs its compact ejectors in a way that only the amount of compressed air is consumed that is needed for the actual handling operation. This way energy consumption during downtime is prevented.

Using the Product after the Utilization Phase

To complete the product life cycle in an efficient way, Schmalz focuses on a modular system when the product is first created. For instance, the elastomer part on special suction cups can easily be separated from the aluminum connecting part. Since the elastomer is a part that is subject to wear and tear, it can be replaced without having to purchase a completely new suction cup.

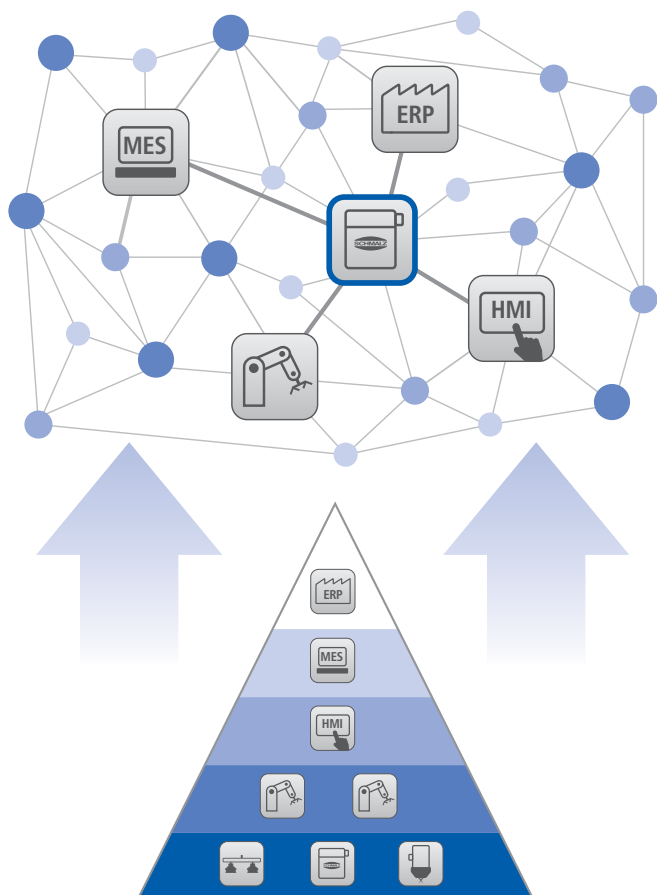


Ejector core with eco nozzle technology and integrated automatic air-saving function



Vacuum Solutions for Industry 4.0

Intelligent Process Communication for Transparent and Efficient Production



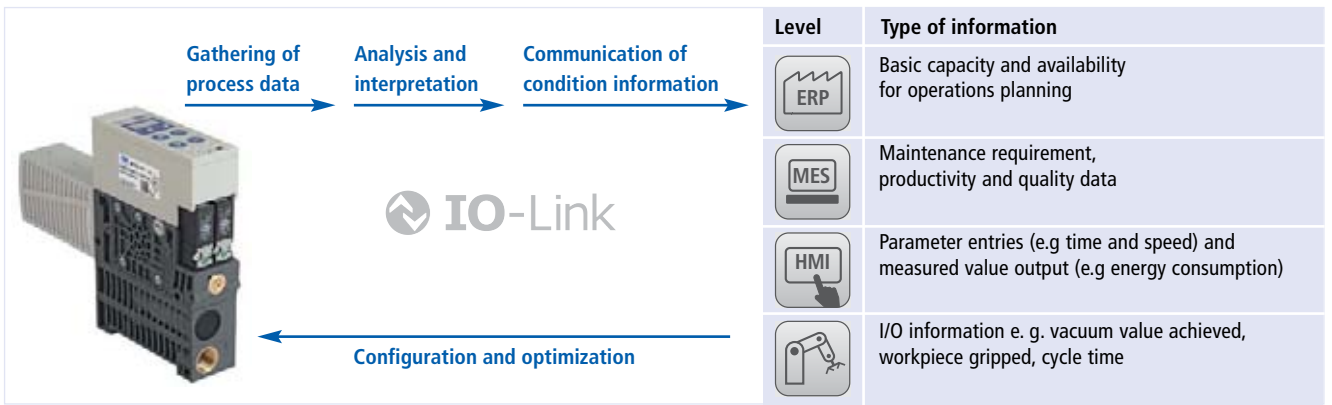
In the future, the strict hierarchical structure of automation pyramids will increasingly become replaced by a fully networked automation cloud

Intelligent Communication within Production

Networking in production means the gradual break up of hierarchical information structures. An automation cloud is formed in which intelligent devices and services interact with one another and organize themselves via an IO-Link. Intelligent products allow for communication with the user's control systems in order to adjust all process parameters for energy efficient operation.

Our Smart Field Devices Understand Industry 4.0

Vacuum generators like the SXPi/SXMPi compact ejector are becoming central to such a cloud. With the aid of their diagnostic and forecasting functions, they derive information regarding the condition of the unit and detect subtle changes or imminent malfunctions. This helps to prevent machine downtime and increase system availability.



An example of intelligent process communication in the X-Pump SXPi/SXMPi compact ejector

Energy and Process Control Data as the Basis of Industry 4.0

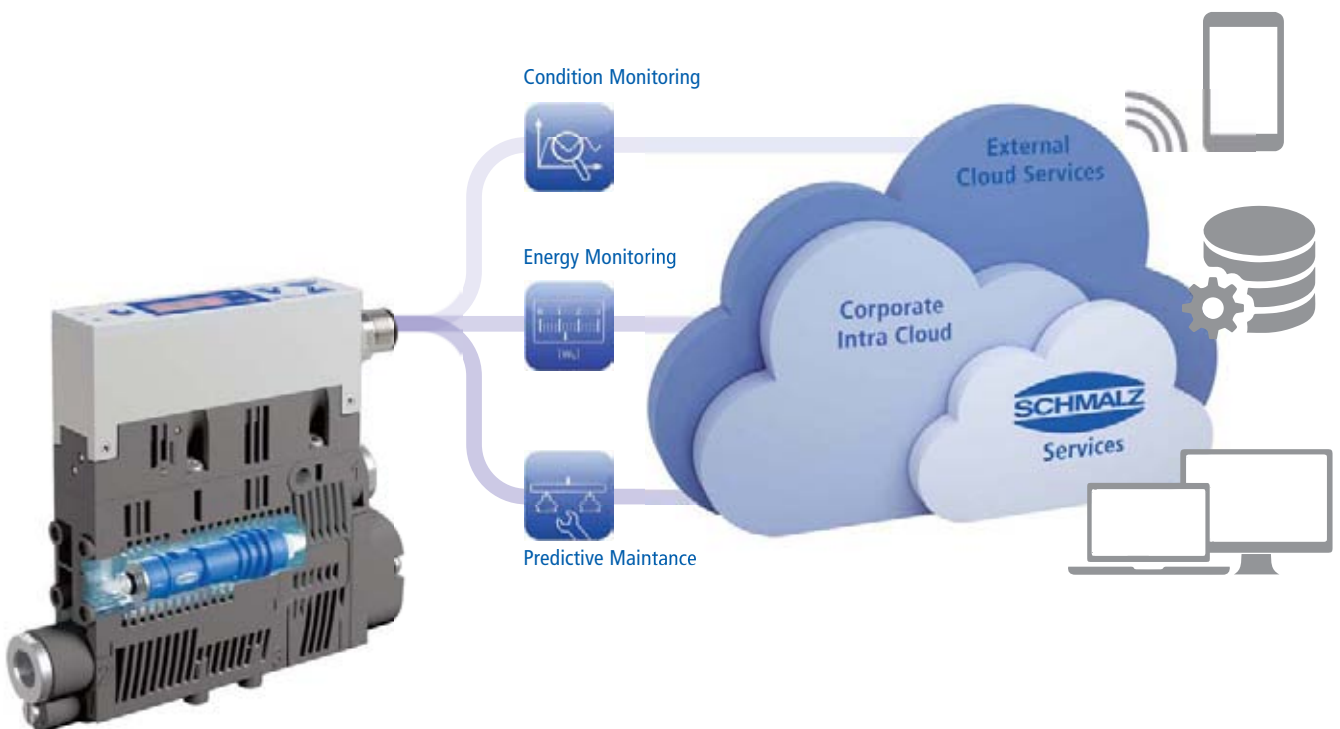
The basis for intelligent functions is that all of the relevant process data is available in real time. Schmalz provides an entire range of so-called smart field devices for this purpose: They are fitted with comprehensive energy and process control functions, they gather and interpret data and make it available to the network. This allows Schmalz to support its customers to gear up for Industry 4.0 – the switch to the intelligent factory.

The Visibility and Added Benefit of Intelligence in Schmalz Vacuum Ejectors

The in-built intelligence in the Schmalz compact ejectors allows for both efficient product operation and efficient control of the whole process. All of the parameters that are relevant to energy and performance throughout the vacuum system are recorded,

monitored, aggregated and analyzed via IO-Link here. Compatible systems and services connected through IO-Link, such as intra clouds or cloud services, are used to make the information visible in the different integration stages and output channels.

This enables a higher degree of transparency and productivity in automated processes. The energy monitoring function guarantees optimal energy consumption throughout the system. The system status is monitored using condition monitoring, which increases system availability substantially. Finally the predictive maintenance module improves the performance of the gripper system.



Data aggregation / status communication

Integration / preparation for a variety of channels

Output in customer interfaces and systems

Communication via IO-Link provides a range of opportunities to make the data from Schmalz intelligent ejectors visible and usable



Vacuum Components

Nowadays, vacuum components perform much more than just one basic function. Suction cups and vacuum generators, for example are the key to boosting efficiency: not only in the product itself thanks to the high level of energy efficiency, but also in the process. This is achieved by intelligent ejectors that calculate system states and data, communicate across networks and contribute to the monitoring and control of the entire process. Schmalz vacuum components enable major increases in productivity in automated

processes. In all areas of automation technology, Schmalz customers benefit from expert systems consulting and groundbreaking innovative solutions.

Our specialists' expertise guarantees efficient and economical solutions for the automation of a process; from the individual components to the complex gripping system, all the way through to the particular customer-specific application.

Vacuum Suction Cups



Special Grippers



Area Gripping Systems and End Effectors



Mounting Elements



Vacuum Generators



Valve Technology

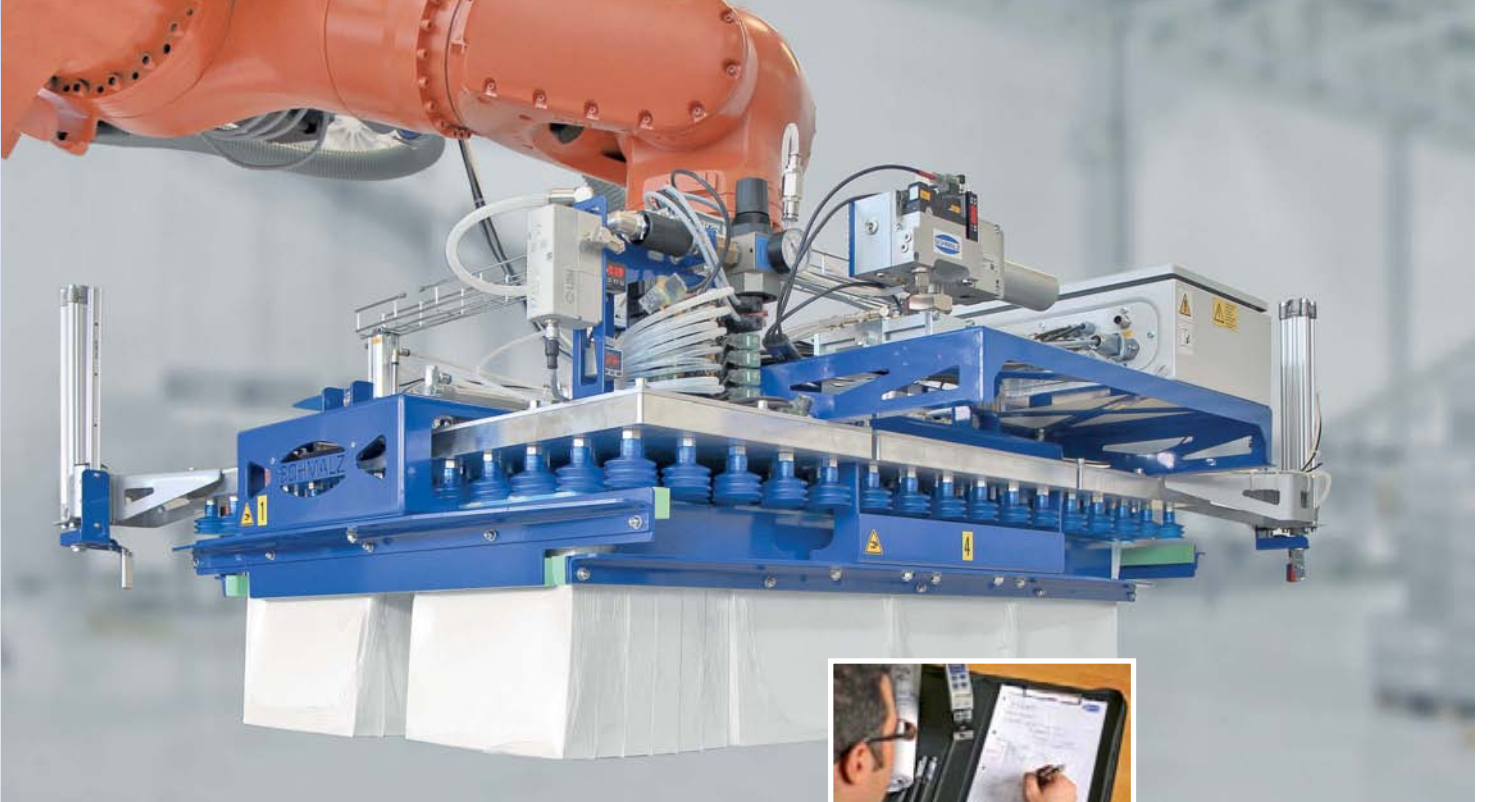


Switches and Monitoring



Filters and Connections





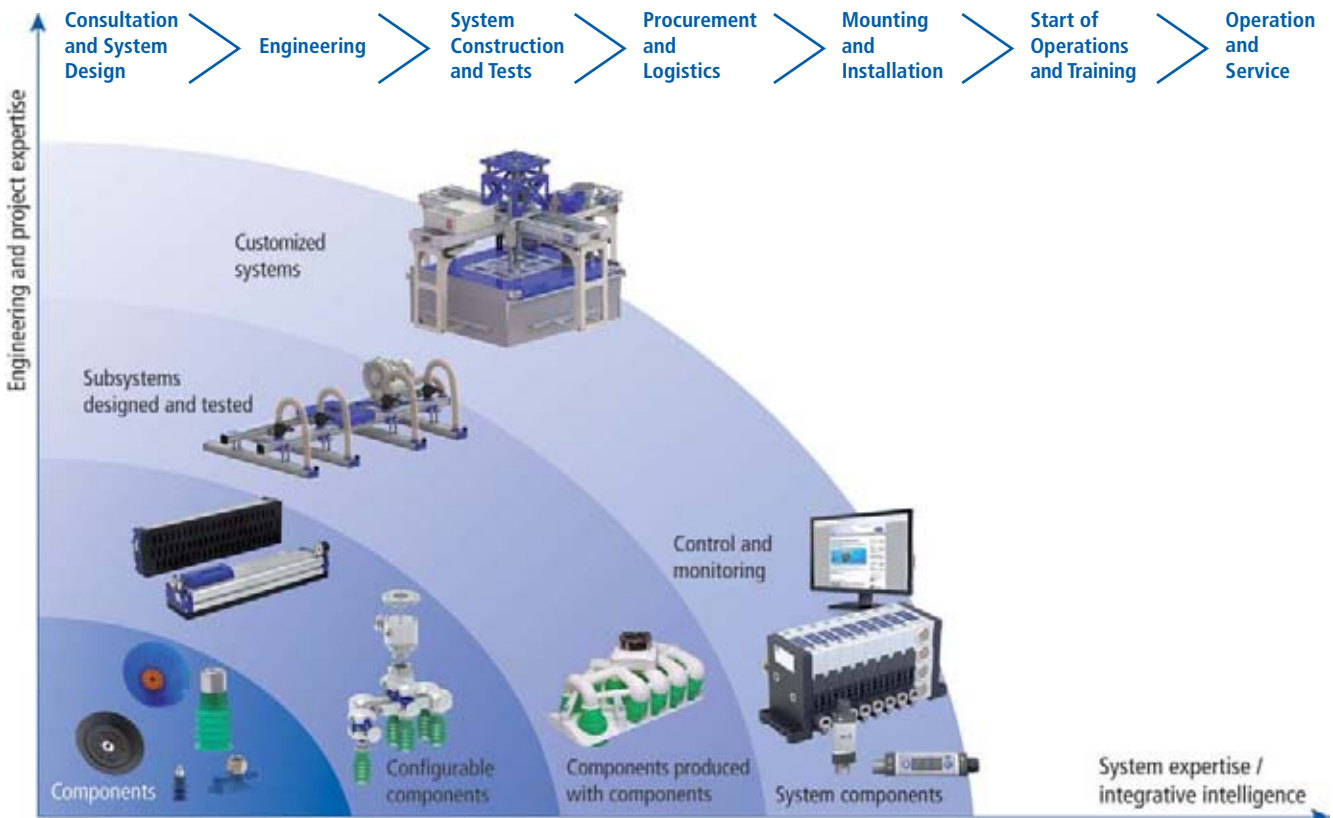
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Vacuum Gripping Systems

Our system consultants and designers have comprehensive expertise in the field of vacuum technology, as well as decades of experience in international mechanical and plant engineering.

Service with Added Value Throughout the Entire Life Cycle
 Schmalz is an expert and experienced partner for system solutions in the vacuum automation field. Whether you utilize Schmalz for the efficient procurement of individual components or for project management for the creation of turn-key solutions:

First-class products, extensive experience and tailor-made services ensure you get the added value of a Schmalz system. This will allow you to minimize costs throughout the entire life cycle of your system.





Vacuum Handling Systems

In many production, assembly and logistics processes people play a vital role thanks to the intuitive and flexible way in which they work. Schmalz vacuum lifting devices help to ensure an ergonomic workplace. They help prevent health problems caused by lifting and moving heavy loads.

Schmalz offers vacuum lifting devices with perfectly tailored aluminum crane systems. This means the crane systems are particularly responsive and support ergonomic work with the vacuum lifting device. Schmalz vacuum handling systems simplify production processes through easy and efficient handling.

Vacuum Tube Lifters Jumbo



For frequent and rapid lifting and movement of workpieces up to 300 kg. For handling workpieces like cardboard boxes, crates, sacks, barrels or buckets.

Vacuum Lifting Devices VacuMaster



Move loads of several tons safely and ergonomically, for instance, when loading and unloading CNC machining centers in sheet metal, wood, plastic or glass processing.

Crane System



Perfectly coordinated and customized light crane systems and jib cranes optimize the internal material flow.

Workshop Equipment



Damage-free and space-saving storage and manual clamping systems – all kinds of solutions, from transport trolleys to workbenches for mobile use.



Vacuum Clamping Systems

Schmalz vacuum clamping systems increase efficiency in production processes with CNC machining centers. Innovative ideas, numerous national and international industrial rights, system variety and proximity to customers make Schmalz the leading provider of vacuum clamping technology worldwide. We are the system supplier for leading international manufacturers.

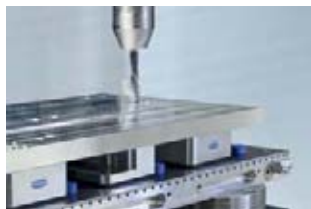
These manufacturers equip their CNC machining centers in their production facilities with Schmalz clamping systems as standard to achieve maximum productivity. Whether you need initial equipment, retrofit solutions or spare parts – Schmalz offers a large selection of high-quality clamping equipment for your application.

Clamping Technology for Wood Working



High-quality clamping equipment for wood working increases flexibility and reduces set-up times – from original equipment to retrofitting.

Clamping Technology for Metal and Plastics



Clamping solutions for precise, reliable and damage-free setup and assembly processes in CNC production.

Clamping Technology for Glass Working



Efficient clamping systems for positioning and securing objects quickly and safely in (partially) automated glass processing.

3D Clamping Systems



3D clamping systems and vacuum clamping devices for partially automated processing of 3D free-form surfaces with complex geometry.

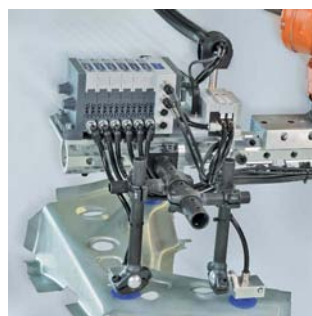


Industry Solutions

At Home in Many Industries Worldwide

Schmalz customers benefit from expert systems consulting and groundbreaking, innovative solutions in all areas of automation technology. The Schmalz vacuum components include everything you need to develop a fully operational vacuum system. The wide product range of vacuum components corresponds to the specific requirements of a wide variety of industry sectors. We focus on the industries below:

In the catalog, the industry-specific suitability of each product is indicated using symbols. The index at the end of the catalog can assist you in finding appropriate items for your relevant industry sector.



METAL Sheet Metal / Automotive

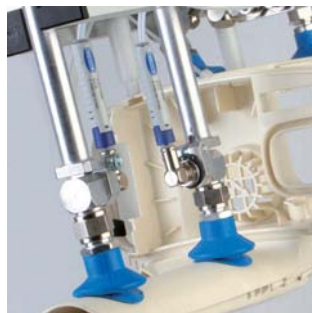
- Fast Cycle Times and High Operational Reliability**
- Special suction cups for highly dynamic sheet metal handling, even with oiled metal sheets
 - Vacuum generators with integrated energy and process control: energy monitoring for optimized energy consumption, condition monitoring for maximum system availability, predictive maintenance for enhanced gripping system performance and quality
 - Optimized mounting elements for the requirements of the automotive industry



Glass

Mark-Free and Secure Handling

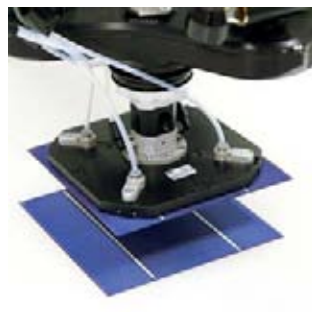
- Suction cups especially for handling flat, smooth or hot and thin workpieces
- Suction plates made from special materials for use in areas with high UV and ozone levels



Plastics

Removal of Hot Plastics Leaving Few Marks

- Special suction cup tools for requirements such as temperature resistance, workpiece painting and mark-free workpieces
- Vacuum generator minimized in size for highly dynamic handling



Solar

Extremely Fast, Accurate and Gentle Handling

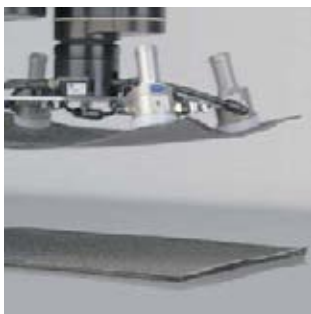
- Wafer grippers for careful, fast and accurate handling of photovoltaic components
- Suction cups in various materials and shapes
- Special grippers for low-contact and gentle handling



Packaging

Packaging and Handling Products with Minimal Cycle Times

- Specialized range of suction cups with a large variety of materials and shapes for a wide range of packaging and products
- Wide variety of vacuum generators for various process requirements
- Modular system for quick and cost-effective design of vacuum end effectors
- Vacuum layer gripping systems for palletizing and commissioning packaged products



Composite

Handling of Permeable Composite Materials

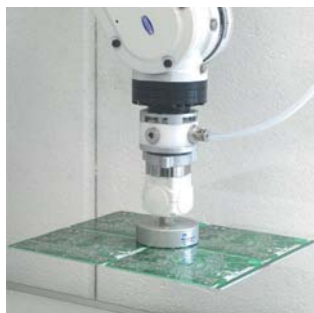
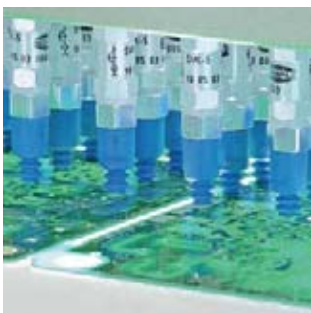
- Special grippers with integrated vacuum generation and a high flow rate for secure gripping of porous materials such as carbon composites
- Needle grippers for handling non-rigid and unstable materials and materials that are difficult to grip using suction
- Suction cups in various shapes and materials for handling pre-pregs, dry materials and hardened components



Wood

Handling of Workpieces with a Variety of Surfaces under Difficult Operating Conditions

- Suction cups for handling and separating permeable workpieces
- Filters for protecting vacuum systems from contamination
- Vacuum gripping systems for moving wooden boards, furniture parts, pallets or entire layers of boards



Electronics

Clean and Flexible Handling

- Suction cup range in a wide variety of materials and diameters- for every processing step in the production of electronics
- Vacuum generator with integrated system monitoring for increasing process reliability
- Small vacuum components minimized in size for highly dynamic handling



Battery

Handling of Electrodes, Separators and Battery Cells without Causing any Damage

- Special grippers for lithium ion batteries
- Ideal marking behavior confirmed in contamination tests of the FRAUNHOFER IPA
- Careful, fast and accurate handling of battery components and cells

Overview of Section 2



Vacuum Knowledge

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Seminars and training

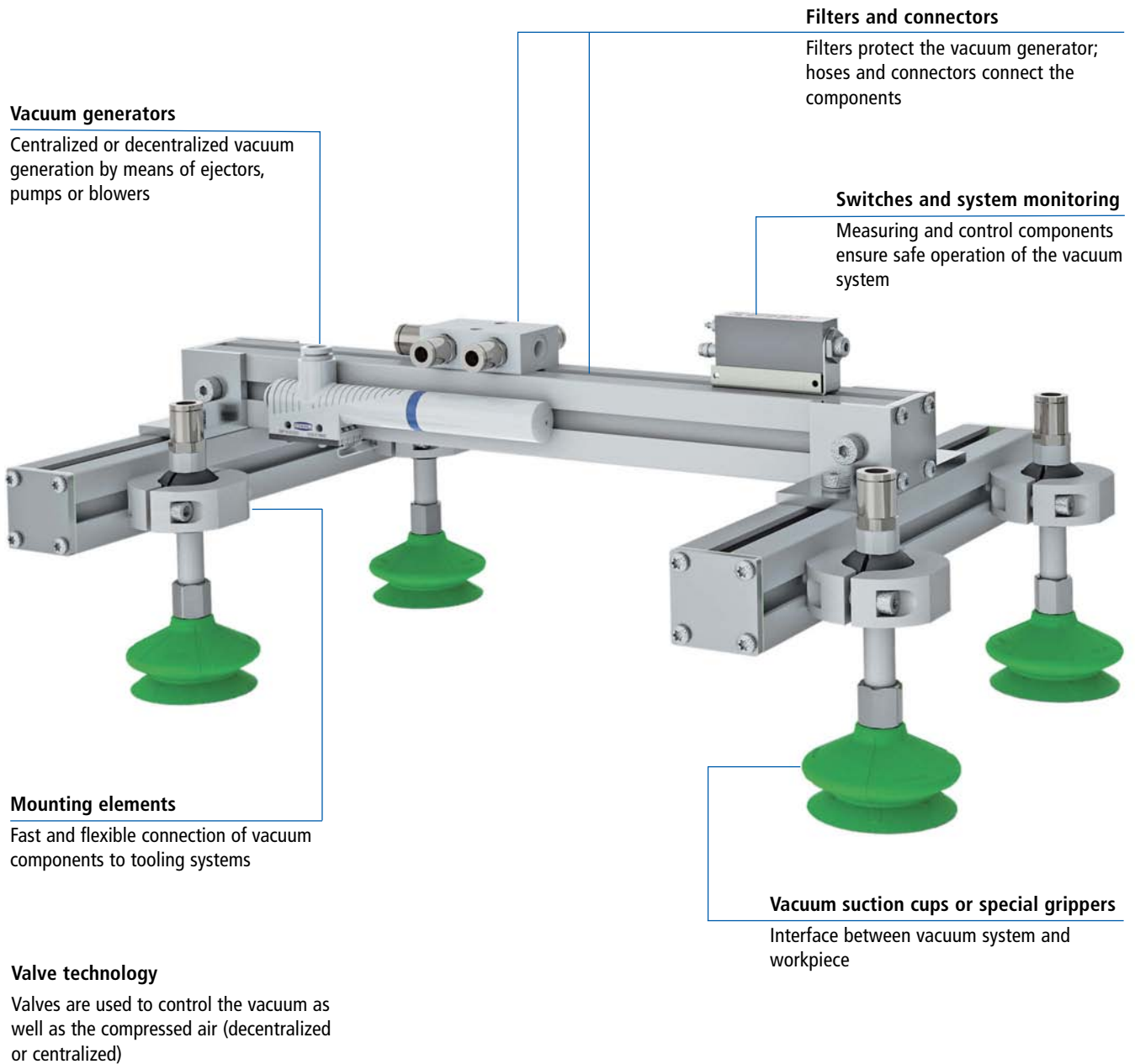
Schmalz offers customized training, seminars and courses at the Schmalz Academy. Customers benefit from our comprehensive expertise and all our years of experience as vacuum specialists. You will find more details in the chapter "Services".

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Overview of a Vacuum System

Vacuum systems are used as grippers in automated applications. Customers benefit from the comprehensive component program of Schmalz, the vacuum specialist, when designing a vacuum system.

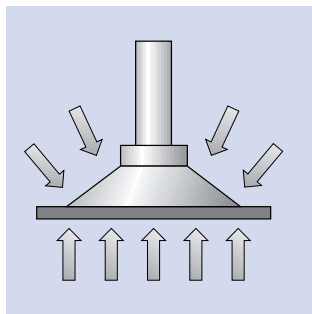


Vacuum Suction Cups



Vacuum suction cups are the link between the workpiece and the handling system. They consist of the suction cup (elastomer part) and a connecting element.

The holding force of the suction cups increases proportionally with the difference between the ambient pressure and the pressure inside the cup.



Suction cups are used to grip and move workpieces in a plant or on a robot. A suction cup does not attach itself to the surface of a workpiece. Instead, the ambient air pressure (atmospheric pressure) presses the suction cup against the workpiece as soon as the ambient pressure is greater than the pressure between the suction cup and the workpiece.

The holding force of a suction cup is calculated with the formula:

$$F = \Delta p \times A$$

F = Holding force

Δp = Difference between ambient pressure and pressure of the system

A = Effective suction area (the effective area of a suction cup under vacuum)

This means the holding force is proportional to the pressure difference and the suction area. The greater the difference between ambient pressure and pressure in the suction cup or the larger the effective suction area, the greater the holding force. The force can vary depending on a change of the pressure difference and area parameters.

This pressure difference is achieved by connecting the suction cup to a vacuum generator, which evacuates the air from the space between the cup and the workpiece. If the suction cup is in contact with the surface of the workpiece, no air can enter it from the sides and a vacuum is generated.

Suction Cup Shapes

Suction cups from Schmalz can be divided into universal suction cups and suction cups for special applications. Universal suction cups cover a wide range of requirements. Suction cups for special applications were developed to meet the requirements of individual

industries. They may be characterized by special properties, such as the handling of thin-walled and greasy body panels in the sheet metal industry or of porous and structured workpieces in the wood industry.

The Vacuum System and its Components

The following shapes are generally distinguished:

- Flat suction cups
- Bellows suction cups

Each suction cup shape offers advantages that are reinforced and optimized by the combination with a suitable material. The available suction cup materials are described in detail in the section "Suction Cup Materials".

Flat Suction Cups

Flat suction cups are particularly suited for handling workpieces with flatly or slightly curved surfaces. Flat suction cups can be evacuated quickly due to their flat shape and low inner volume, therefore they can grip the workpiece in a very short time and can withstand the forces which result from fast movement of the object during handling.

Advantages of flat suction cups

- Large variety of different suction cup materials and shapes (round, oval, steep or flat leveling sealing lip)
- Flat shape and low inner volume result in minimum evacuation times
- Good stability of the suction cup allows high shear forces and positioning accuracy while workpieces are picked up

Typical areas of application

- Handling of smooth to lightly rough workpieces, such as sheet metal plates, cardboard, glass plates, plastic parts and wooden boards
- In automated processes with short cycle times



Bellows Suction Cups

Bellows suction cups are used when it is necessary to compensate for varying workpiece heights, to handle parts with uneven surfaces or fragile parts. The bellows make this suction cup especially flexible and adaptable.

Advantages of bellows suction cups

- Good adaptation to uneven surfaces
- Lift effect while picking up
- Compensation of differences in height
- Fragile workpieces are picked up gently

Typical areas of application

- Handling of curved or uneven workpieces, such as body panels, tubes, cardboard, etc.
- Handling of fragile workpieces, such as electronic components, injection molded plastic parts, etc.
- Handling of non-rigid or flexible workpieces, such as packaged or shrink wrapped products



Suction Cup Materials

Application and ambient conditions are important for the selection of the right suction cup and the appropriate material. Abrasion resistance, oil resistance and food safety are often required of a suction cup. These requirements can be met by selecting the appropriate material.

Schmalz develops its suction cup materials in-house with new materials being developed, tested and optimized in our own Plastics Competence Center. To help you find your suction cups for the proper use and environmental condition quickly, offers in the chapter "Vacuum Suction Cups" a selection aid, which is sorted according to specific materials and application areas. This gives you a quick and simple overview.

Storage and Cleaning of Suction Cups

Observe the following information regarding storage and cleaning for the sensitive elastomer part of the suction cup: Store suction cups in a cool place (between 0° C and 15° C, max. 25° C) that is dark, dry, low in dust and offers protection from the weather, ozone and drafts, as well as stress. The effects of ozone, light (especially UV), heat, oxygen, humidity, as well as mechanical influences, can reduce the service life of the suction cup.

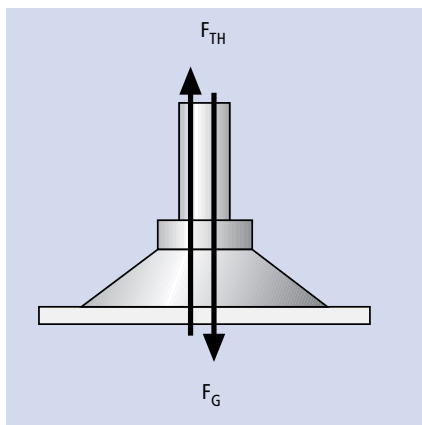
Clean suction cups with soap and warm water, and dry them at room temperature.

Technical Data of Suction Cups

Certain calculations are required for the selection of individual components when designing a vacuum system. The specified values are based on a vacuum level of -0.6 bar as well as a dry or lubricated workpiece surface. They are given without a safety factor. Depending on the operating conditions, one should keep in mind reductions that may occur due to friction or if a vacuum level is not reached (e.g. due to porous workpieces).

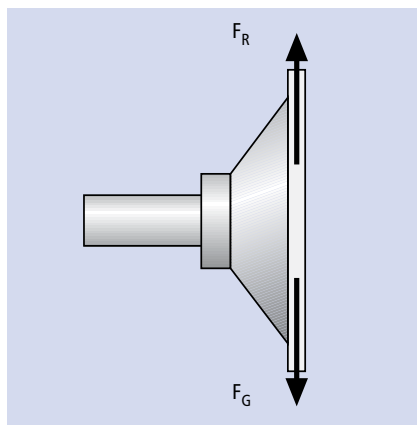
The most important technical data of the suction cups are explained below.

Theoretical suction force



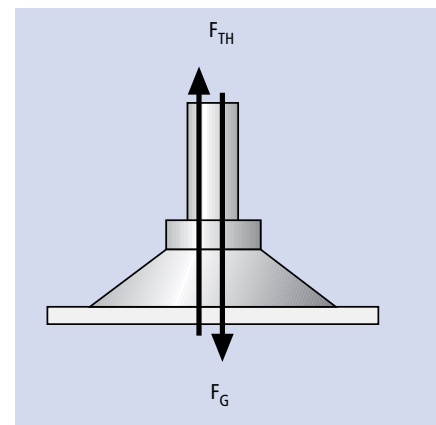
The theoretical suction force is the force acting perpendicular to the surface. The specifications in the catalog are calculated values in newtons.

Shear force



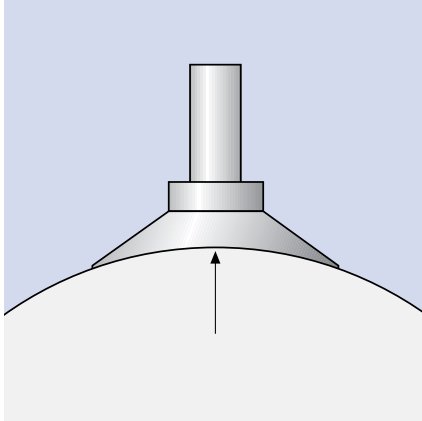
The shear force is the force acting tangentially to the surface. The specifications in the catalog are measured values in newtons.

Tearing force



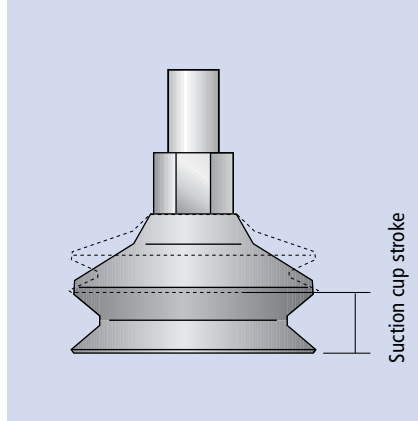
The tearing force is the maximum suction power with the suction cup is torn by an airtight, flat, smooth workpiece. The data are measured values without safety factor and serve as a clue to the max. possible load.

Minimum radius of curvature of the workpiece



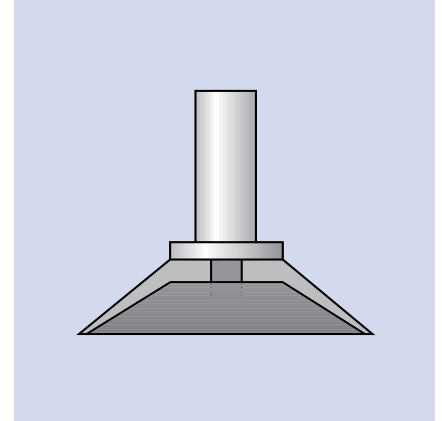
Indicates the radius up to which the workpiece can be gripped securely with the respective suction cup.

Suction cup stroke



Refers to the suction cup's stroke (z) that occurs during evacuation of the suction cup.

Inner volume



The inner volume indicates the volume of a body that has to be evacuated to pick up a workpiece. It is used to determine the total volume of the gripper system and is included when calculating evacuation times.

Design of the Suction Cup

The design of the suction cup always depends on the actual application. For this reason, various physical values must be calculated and determined before the correct suction cup can be selected.

Later in this chapter the design of a vacuum system is described in more detail based on a calculation example.

Friction coefficient

The friction coefficient " μ " describes the relationship between friction force and normal force. It is not possible to specify generally valid values of the friction coefficient between the suction cup and the workpiece. It has to be determined correctly through trials with the condition of the workpiece surface (rough/dry/moist/oily) or the properties of the suction cup (shape/sealing lip/sealing edge/suction cup material/Shore hardness) having a major influence.

Calculation of the holding forces

The calculation of holding forces can only be about theoretical values. In practical applications, many factors, such as the size and shape of the suction cup, the surface finish and the rigidity of the workpiece (deformation) play a decisive role. That is the reason why we recommend a safety factor (S) of at least 2. The German accident prevention regulation, UVV, prescribes a binding safety factor of 1.5. When swiveling workpieces during the handling task, a safety factor of 2.5 or higher has to be used, in order to cope with the resulting turning forces.

The holding force of a suction cup is the product of:

$$F = \Delta p \times A$$

F = Holding force (without safety factor, purely static)

Δp = Difference between ambient pressure and pressure of the system

A = Effective suction area (the effective area of a suction cup under vacuum)

Diameter of the suction cup

The holding force of a suction cup depends on its effective diameter. The condition of the workpiece and the number of suction cups are also crucial for the holding force that a vacuum system can generate.

The required diameter can be determined with the aid of the following formula:

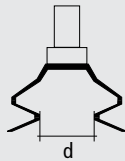
For horizontal pick-up:

$$d = 1.12 \times \sqrt{\frac{m \times S}{P_U \times n}}$$

For vertical pick-up:

$$d = 1.12 \times \sqrt{\frac{m \times S}{P_U \times n \times \mu}}$$

d = Suction cup diameter in cm
(with double lip \approx internal diameter, with bellows suction cup = inner diameter of sealing lip)



m = Weight of the workpiece in kg
 P_U = Vacuum in bar
 n = Number of suction cups
 μ = Friction coefficient
 S = Safety factor

Calculation example for horizontal pick-up:

$$d = 1.12 \times \sqrt{\frac{50 \text{ kg} \times 2}{0.4 \text{ bar} \times 4}}$$

$$d = 8.85 \text{ cm}$$

Plastic sheet: m = 50 kg
 Vacuum: P_U = -0.4 bar
 Number of suction cups: n = 4
 Measured friction coefficient: μ = 0.5
 Safety factor: S = 2

A sensible selection is the suction cup PFYN 95 with a nominal diameter of 95 mm.

Calculation example for vertical pick-up:

$$d = 1.12 \times \sqrt{\frac{50 \text{ kg} \times 2}{0.4 \text{ bar} \times 4 \times 0.5}}$$

$$d = 12.5 \text{ cm}$$

Plastic sheet: m = 50 kg
 Vacuum: P_U = -0.4 bar
 Number of suction cups: n = 4
 Measured friction coefficient: μ = 0.5
 Safety factor: S = 2

A sensible selection is the suction cup PFYN 150 with a nominal diameter of 150 mm.

Suction rate or required volume flow [∇]

The volume flow that generates the vacuum is important for the suction force. The workpiece material is the principal factor for the required volume flow.

The table shows typical values for the volume flow or suction rate depending on the diameter of the suction cup with smooth and air-tight surface.

Typical value (with smooth, air-tight surfaces)			
Suction cup Ø	Suction area A [cm ²]	Volume flow [m ³ /h]	∇ [l/min]
up to 60 mm	28	0.5	8.3
up to 120 mm	113	1.0	16.6
up to 215 mm	363	2.0	33.3
up to 450 mm	1,540	4.0	66.6

Important:

Conduct suction trials for porous parts.

Special Grippers



Special grippers are used in applications in which regular suction cups cannot be used. Special grippers are used to handle wafers, films, paper, fragile workpieces or textile fiber composites. They serve as a connection element between the workpiece and the handling system just like the suction cup.

Schmalz separates special grippers into the following series:

- Floating suction cups
- Magnetic grippers
- Needle grippers
- Wafer grippers
- Composite grippers
- Thin glass grippers

Floating Suction Cups

Floating suction cups are pneumatically operated special grippers with integrated vacuum generation. They operate on the Bernoulli principle and work as a low-contact system. The workpiece "floats" on an air cushion at the gripper surface. This makes the floating suction cup ideally suited for the handling of very sensitive products. The high volume flow can compensate for leakage, when handling porous workpieces.

Advantages of floating suction cups:

- Low-contact handling
- High volume flow
- Safe separation of thin, porous workpieces
- Integrated vacuum generation

Typical areas of application:

- Handling of fiber composites, paper, film, wood veneer, printed circuit boards, wafers and solar cells
- Separation of thin, porous workpieces



Magnetic Grippers

Magnetic grippers provide safe gripping of ferromagnetic workpieces by using the magnetic field of an integrated permanent magnet. The magnet is moved with compressed air to activate and deactivate gripping. Magnetic grippers are operated with pneumatic valves. The gripper does not require a voltage source for this purpose.

Advantages of magnetic grippers:

- Safe gripping with a permanent magnet is possible without voltage source
- Control of permanent magnet with compressed air and vacuum

Typical areas of application:

- Handling of ferromagnetic workpieces
- Handling of blanks and perforated plates as well as sheet metal parts with drilled holes/breakouts or complex shapes
- Support of vacuum gripping system in highly dynamic handling of sheet metal parts



Needle Grippers

The needles are pressed into the workpiece and herewith the gripping process is realized. The needles are ejected pneumatically. The needles are extended at an angle to ensure reliable gripping of the workpieces. Once the gripping process is complete, the needles are retracted either through spring force or pneumatically.

Advantages of needle grippers:

- Safe handling of non-rigid materials or materials with an unstable shape
- Different shapes for unique operating conditions
- Selectable needle diameters and adjustable strokes

Typical areas of application:

- Handling of porous and/or non-rigid workpieces, such as textiles, insulating and foam materials, fiber composites such as carbon and glass fiber, fleece or felts, carpets, filters, fabric, styrofoam as well as metal foams



Thin glass gripper

The thin glass gripper is a special gripper for the extremely dynamic and gentle handling of sensitive workpieces in automated or semi-automated processes. It reduces the dynamic and static forces on workpiece through the optimized dimensioning and distribution of suction positions.

Benefits of thin glass grippers:

- Significant reduction in damage rate for the thinnest workpieces (less than 0.1 mm thick)
- Full-surface gripping with low vacuum level
- Suction area made from mark-free PEEK to avoid glass surface contamination

Typical areas of application:

- Thin glass grippers are used in the manufacture of TFT displays, smartphones or tablets. The special gripper is also suitable for contamination-free handling without compromising downstream processes such as coating.



Wafer Grippers

Wafer grippers are ideally suited for the handling of sensitive parts, especially photovoltaic components such as wafers and cells. The wafer gripper is equipped with an integrated vacuum generator. The high volume flow and the moderate vacuum level allows gentle handling of workpieces.

Advantages of wafer grippers:

- Extremely fast and accurate handling; implements cycle times of less than one second
- High volume flow with low air consumption
- Integrated vacuum generation, including blow-off function
- Many accessories for perfect matching to different process steps in photovoltaics industry

Typical areas of application:

- Handling of photovoltaics components also under cleanroom conditions
- Handling of fragile workpieces
- Handling of porous, permeable workpieces



Composite Grippers

Composite grippers are mainly used for handling fragile workpieces. They are operated pneumatically and have an integrated vacuum generator.

Due to their high volume flow and the moderate vacuum level, composite grippers are ideally suited for handling fragile components.

Advantages of composite grippers

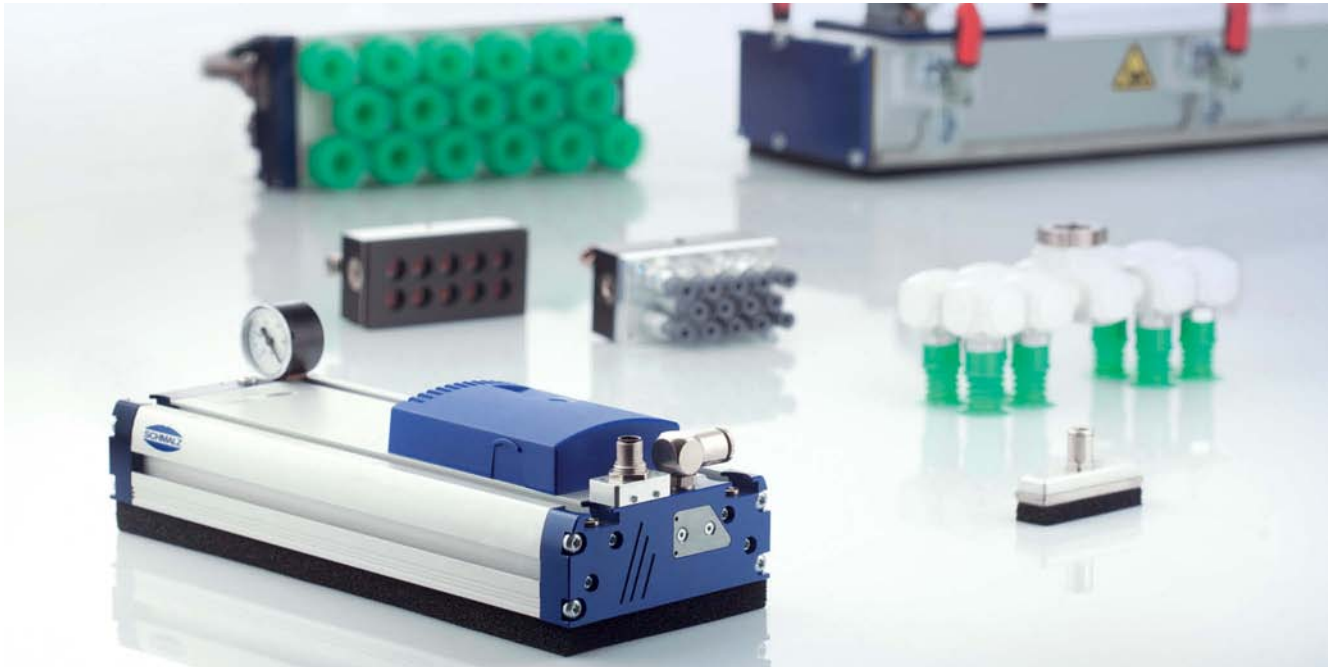
- Secure gripping, also for porous materials or workpiece that only partially cover the suction surface
- Short cycle times and accurate positioning
- Integrated vacuum generation, including blow-off function
- High volume flow

Typical areas of application

- Handling of fiber composites, such as carbon fiber reinforced composites
- Handling of electrodes, separators and battery cells
- Handling of extremely thin, sensitive components
- Handling of porous, permeable workpieces
- Handling of blank circuit boards



Area grippers and Vacuum End Effectors



The Schmalz area grippers are used in various robot applications due to their lightweight design. The area grippers have a modular design that allows them to be adapted and constructed quickly and easily to meet different customer requirements.

The universal grippers are suitable for a wide range of applications in handling workpieces:

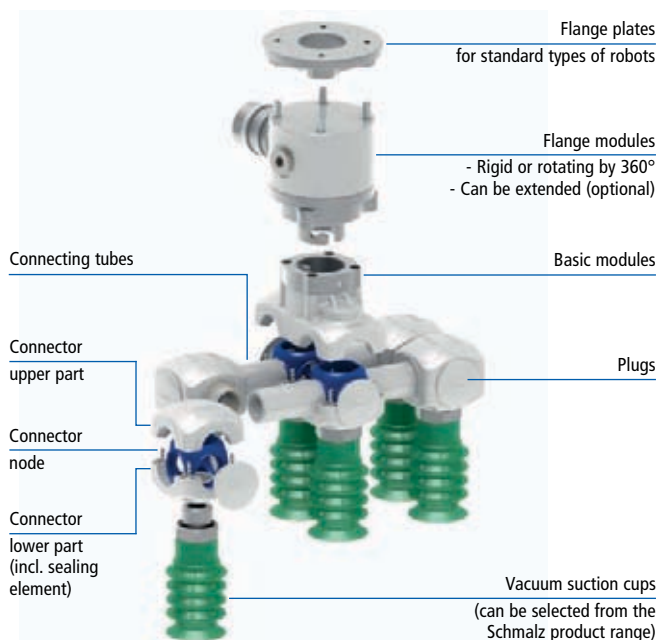
- With different geometries and surfaces
- With porous properties and gaps
- Independent from their size and weight
- With an undefined pick-up position

Vacuum End Effectors

The Schmalz modular system for vacuum end effectors (VEE) allows fast, flexible configuration of end effectors for different processes.

A wide selection of combinations of vacuum feed and zones, connection elements and suction cup connections is available to create the matching end effector.

The VEE online configurator helps you to create a tailored made Vacuum End Effector solution in just a few mouse clicks.



- Schmalz - The Company
- Vacuum Knowledge
- Vacuum Suction Cups
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
- Valve Technology
- Switches and Monitoring
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Mounting Elements



Schmalz offers a broad product range of mounting elements to integrate grippers (suction cups or special grippers) into gripping systems.

The following mounting elements can basically be distinguished:

- Spring plunger
- Sections, crossbeams and connectors
- Jointed mountings
- Holders and adapters

Products from Schmalz are listed in the chapter "Mounting Elements".

Sections, crossbeams and connectors

These elements are used to build the basic structure of a vacuum gripping system. To reduce the number of hoses, you can build the sections as vacuum distributors with end covers and sealing frames.

Holders and adapters

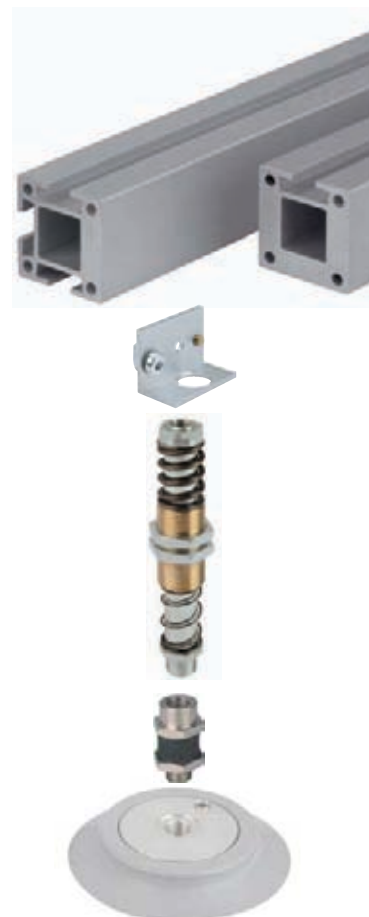
The suction cups are attached to the basic structure or the traverse with holders and adapters. Different types of aluminium sections or square and round tubes are available.

Spring plunger

Spring plungers are used to compensate height differences of workpieces. They also cushion the impact of the suction cup and allow handling of fragile workpieces.

Jointed mountings

Jointed mountings provide a better adaption of the suction cup to the workpiece due to the design of Flexolink FLK and ball joint KGL that can be swiveled in all directions.



Vacuum Generators



Vacuum generators provide the vacuum level that is required for the handling task. The vacuum is created either pneumatically or electrically.

Pneumatic vacuum generators implement short cycle times and can be integrated directly into the system due to their compact and lightweight design.

Electrical vacuum generators are used in applications when compressed air is not available or if very high suction capacities are required.

Pneumatic vacuum generators

- Ejectors

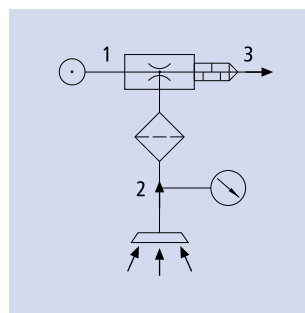
Electrical vacuum generators

- Pumps
- Vacuum Blowers

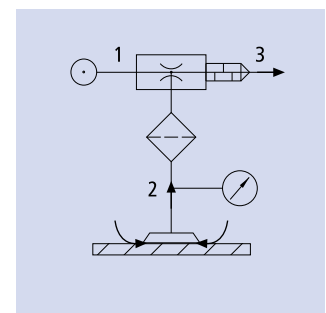
Important:

The nominal suction rate of all vacuum generators is given in l/min or m³/h. The values are based on an ambient pressure of 1,013 mbar (sea level) and an ambient temperature of 20°C.

The maximum suction rate therefore indicates the volume flow that the vacuum generator evacuates from the environment (free flow).



Free pick flow



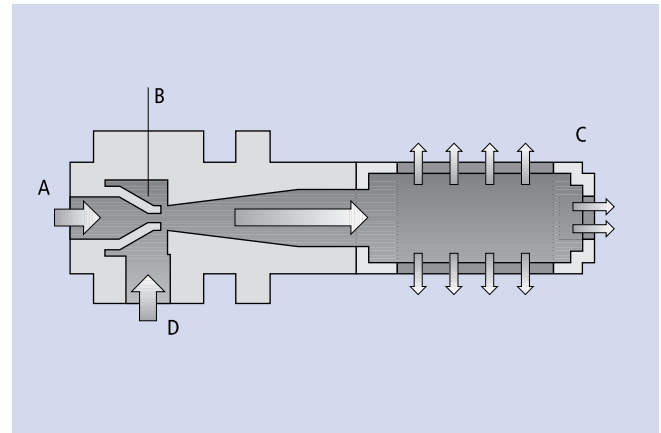
Additional suction while workpiece is picked up

- Schmalz - The Company
- Vacuum Knowledge**
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Vacuum Ejectors

Ejectors work on the Venturi principle; they are divided into single-stage ejectors and ejectors featuring eco-nozzle technology. The compressed air is supplied through connection (A) to ejectors. It flows through the venturi nozzle (B). The air is accelerated and compressed during this process. After passing through the nozzle, the accelerated air slows down once again and a vacuum is created. Air is drawn in this way through the vacuum connection (D). The aspirated air and the compressed air escape through the silencer (C).

With ejectors featuring eco-nozzle technology, the vacuum passes through several venturi nozzles arranged in a row. The volumes of the individual nozzles add up to form a total suction rate.



Principle of operation of a single-stage ejector

Advantages of ejectors

- Compact shape
- Low weight
- Fast vacuum generation
- No flexible parts, resulting in low maintenance and low wear
- Choose an installation position
- No heat generation

Typical areas of application

- Industrial robot applications in all industries, such as feeder applications in the automotive industry

We distinguish between three basic types of ejectors:

Ejector modules



- Ejector modules featuring eco-nozzle technology for efficient vacuum generation and high suction rate with minimal air consumption
- For use in the packaging industry, e.g. in carton erectors for direct installation without separate housing

Basic ejectors



- Vacuum generators without valve control and system monitoring with high maximum vacuum level
- Used mainly to handle air-tight workpieces

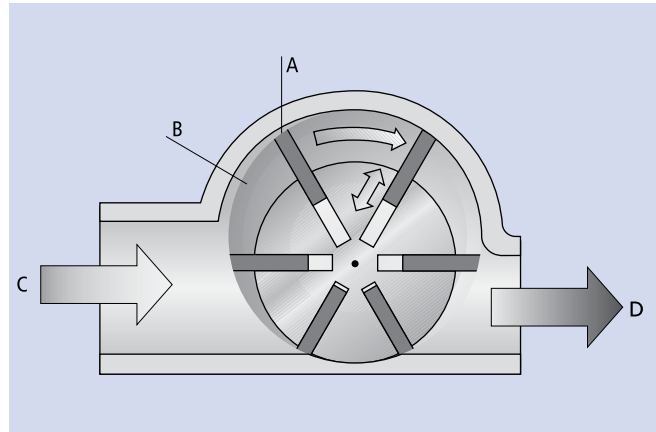
Compact ejectors



- Vacuum generator with integrated valve technology. System monitoring and IO-Link technology are available as selected variants
- Control of pick-up and blow-off feasible without external valves
- Optional with integrated air-saving regulation
- Used in fully automatic handling systems (e.g. sheet metal processing, automotive industry, robot applications)

Vacuum Pumps

Vacuum pumps include an eccentrically mounted impeller with lamellas (A) which are pressed against the walls of the housing by centrifugal force and thus provide a seal. As the impeller rotates, the size of each chamber (B) varies. As the chamber becomes larger, the air in it expands and the pressure drops, resulting in a partial vacuum. The air is drawn in through the inlet (C), compressed, and ejected through the outlet (D).



Functional principle vacuum pump

Due to their high compression factor, pumps generate a very high vacuum and, according to the type, have a very high suction capacity.

Advantages of vacuum pumps

- High vacuum with high evacuation volume
- Central vacuum generation

Typical areas of application

- As central vacuum generation in gantry handling systems
- In manual vacuum handling systems
- In packaging machines

We distinguish between three basic types of vacuum pumps:

Dry-running pumps



- Universal vacuum pumps requiring little maintenance
- Used mainly as central vacuum generator in large gripping systems for handling air-tight workpieces

Oil-lubricated pumps



- Vacuum pump with extremely high vacuum level (up to 95% vacuum)
- Used in handling systems with an emphasis on low noise and low maintenance as well as high vacuum, for handling air-tight workpieces

Water-ring pumps



- Vacuum pump requiring little maintenance with internal water cooling for handling air-tight workpieces
- Used especially in areas with high demands on ambient air (e.g. packaging in the food industry)

Vacuum Blowers

The blades (A) transport, accelerate and compress the air on the momentum principle. The air is dragged by the blades in this case. A vacuum is created at the suction end (B) this way. The compressed air (exhaust air) escapes through the outlet opening (C).

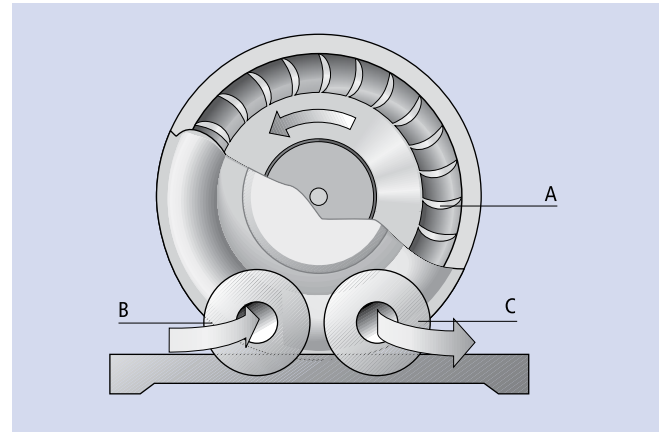
Blowers provide a very high suction rate due to the large air channel volume and specially shaped blades.

Advantages of vacuum blowers

- Enormous suction rate
- High leakage compensation
- Evacuation of large volumes in a short time

Typical areas of application

- Handling of porous workpieces, such as cardboard, insulation material, chipboards or bags



Functional principle vacuum blower

We distinguish between two basic types of vacuum blowers:

Vacuum blowers



- Vacuum blowers are either directly driven or frequency-regulated
- Used especially for handling porous workpieces (chipboards, bags, etc.)
- Frequency-controlled blowers can be customized by controlling the motor speed and respectively the suction rate

Vacuum blowers with reversing



- Vacuum blower with electro-pneumatic reversing for control of suction, blowing and neutral position
- Used for handling air-tight workpieces that are picked up and deposited quickly

Valve Technology



Valves are used to control vacuum as well as compressed air. They can increase process safety in vacuum gripping systems.

The following functional principles can be distinguished:

- Solenoid valves for vacuum and compressed air
- Check valves and flow restrictors; touch valves
- Manual valves for vacuum and compressed air

Solenoid Valves

Solenoid valves are used to control the flow of vacuum and compressed air. The valves themselves are controlled with the aid of electrical signals. Solenoid valves are available in various nominal sizes, permitting selection of a valve which precisely matches the customer-specific requirements. They are available with direct control as well as with pneumatic pilot operation.



Check Valves, Flow Restrictors and Touch Valves

Check valves and flow restrictors, as well as touch valves, increase the process safety and efficiency in a vacuum system.

Check valves interrupt the flow as soon as a certain volume flow has been reached. This will turn off any suction cups in the gripper system that may not be covered completely. The system vacuum will remain intact.

Flow restrictors reduce the flow cross-section in the vacuum system and are mainly used in gripper systems for handling porous workpieces. By reducing the flow cross-section, the system vacuum remains intact even if the suction cups are not covered.

Touch valves open the suction channel with a spring-mounted plunger when a workpiece is present at the suction cup. When the suction cup is occupied (= workpiece present), the line for the vacuum is opened. Touch valves do not protect the system from partially occupied suction cups.



Non-Return Valves

Non-return valves seal the vacuum system against leakage, for example, in the event of a vacuum failure caused by a power outage. Thus, gripped workpieces are prevented from falling off the gripping system.



Manual Valves

Manual valves are used for manual activation or deactivation of vacuum or compressed air circuits or of individual suction cups in lifting equipment. The valves are available as 2/2-way or 3/2-way valves.



Switches and System Monitoring



Devices for system monitoring are important for the safe operation of a vacuum system. Schmalz offers measuring as well as control components for this purpose.

We distinguish between the following components for system monitoring and control:

- Mechanical vacuum switches
- Vacuum and pressure sensor
- Electronic vacuum and pressure switches
- Measuring and control components

Components for system monitoring are used in all areas of automated handling applications, for example, in feeder systems in the automotive industry, in the plastics industry, as well as in other applications in order to increase process safety.

Mechanical Vacuum Switches

Vacuum switches are available in mechanical and electronic types. In the mechanical versions, the existing vacuum is measured by using a membrane and a microswitch (electromechanical design), or a valve (pneumatic design) is activated. In the electronic version, the vacuum is measured by a piezoresistive sensor and a switching signal (analog or digital) is output. In the pneumatic version no electrical connections are required.



Vacuum and Pressure Sensor

Analog vacuum and pressure sensors are characterized by their compact design. They serve the nearby query directly in the process with the suction cup. They are ideal for the output of part-presence signals. With analog switching outputs, the output voltage is proportional to the applied pressure or vacuum.



Electronic Vacuum and Pressure Switches

With electronic vacuum and pressure switches, the vacuum is measured by a piezoresistive sensor and a (digital) switching signal is output.

Electronic vacuum and pressure switches are operated in the measuring range from -1 to 10 bar. The switches with a digital display offer a user friendly operation process. The switching points and hysteresis are fully programmable by a foil keypad. They are used under high requirements on switching- and repeatability accuracy and to realize short switching times. Vacuum and pressure switches with a teach button are ideal for quick and easy programming of switching points.



Measuring and Control Components

Vacuum regulators can be adjusted mechanically. They guarantee a precise setting with high repeatability. Vacuum regulators compensate for pressure differences of vacuum generators caused by their design.

Pressure-reduction valves are used to set a specific output pressure when the pressure on the input end (input pressure) is higher than necessary.

Manometers The manometers measure provide the vacuum value in an analog or digital way. They can be used for all vacuum applications because of their standardized dimensions and connections.



Filters and Connectors



Vacuum systems are protected by the use of filters. The filters protect the vacuum generator from contamination. Suction cups and vacuum generators are connected with each other by hoses and connectors.

Schmalz offers the following products:

- Vacuum filters
- Vacuum distributors
- Hoses and connectors

Vacuum Filters

Filters are used to protect the vacuum generator or the valve in dusty environments. The filters are installed in the system between the suction cup and the vacuum generator or the valve.

Vacuum filters are often installed as central filter in the system. The vacuum filters have a degree of separation of almost 100%.

Vacuum cup filters are installed as decentralized filters directly in the vacuum line at the suction cup. Vacuum cup filters are used with light to medium contamination.

Inline filters are installed as decentralized filters directly in the vacuum line at the suction cup. Inline filters are used with small flows and light contamination.



Vacuum Distributor

The vacuum distributors can be used with centralized or decentralized vacuum generation. In systems with decentralized vacuum generation, compressed air is distributed to the individual ejectors by the distributor. In systems with centralized vacuum generation, the vacuum is distributed from the vacuum generator to the individual suction cups by the distributor.



Hoses and Connectors

Schmalz offers all hoses and connections that are needed to set up a functioning vacuum system. The products range from vacuum hoses to plug-in screw unions and sealing rings, all the way to hose clamps.



Definition of Vacuum

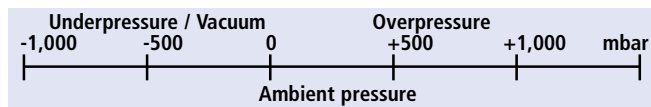
Vacuum is the term for air pressures which lie below normal atmospheric pressure. The ambient pressure is 1,013 mbar at sea level and decreases with elevation.

The form of the vacuum depends on the application in vacuum technology. A relatively small vacuum, the low vacuum, is sufficient for vacuum handling.

The pressure of the low vacuum ranges from 1 mbar to 1,013 mbar (ambient pressure at sea level).

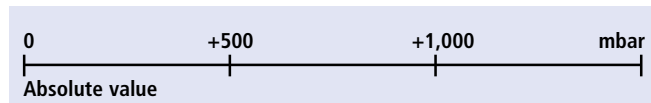
Specification as relative value

In vacuum technology, the vacuum is specified as a relative value which means the vacuum is specified in relation to the ambient pressure. Such vacuum values always have a negative sign, because the ambient pressure is used as the reference point, which is defined as 0 mbar.



Specification as absolute value

In science, a vacuum is specified as an absolute value. The reference point is absolute zero, which means space void of air (e.g. outer space). This means the vacuum value is always positive.



The following table shows the comparison values between absolute and relative pressure.

Vacuum/pressure conversion table								
Absolute pressure [mbar]	Relative vacuum	bar	N/cm ²	kPa	atm, kp/cm ²	mm H ₂ O	Torr; mm Hg	in Hg
900	10%	-0.101	-1.01	-10.1	-0.103	-1,030	-76	-3
800	20%	-0.203	-2.03	-20.3	-0.207	-2,070	-152	-6
700	30%	-0.304	-3.04	-30.4	-0.310	-3,100	-228	-9
600	40%	-0.405	-4.05	-40.5	-0.413	-4,130	-304	-12
500	50%	-0.507	-5.07	-50.7	-0.517	-5,170	-380	-15
400	60%	-0.608	-6.08	-60.8	-0.620	-6,200	-456	-18
300	70%	-0.709	-7.09	-70.9	-0.723	-7,230	-532	-21
200	80%	-0.811	-8.11	-81.1	-0.827	-8,270	-608	-24
100	90%	-0.912	-9.12	-91.2	-0.930	-9,300	-684	-27

At the end of this chapter you will find additional conversion and unit tables.

Measurement Units for Vacuum Data

The units pascal [Pa], kilopascal [kPa], bar [bar] and millibar [mbar] are most widely used in vacuum technology as units for pressure. The units are converted as follows:

$$0.001 \text{ bar} = 0.1 \text{ kPa} = 1 \text{ mbar} = 100 \text{ Pa}$$

In this catalog, all absolute pressure values are given in bar or mbar, all relative values in %. The % value is typical for a relative indication of the efficiency of a vacuum generator. Other units are used internationally. Some of them are included in the following table.

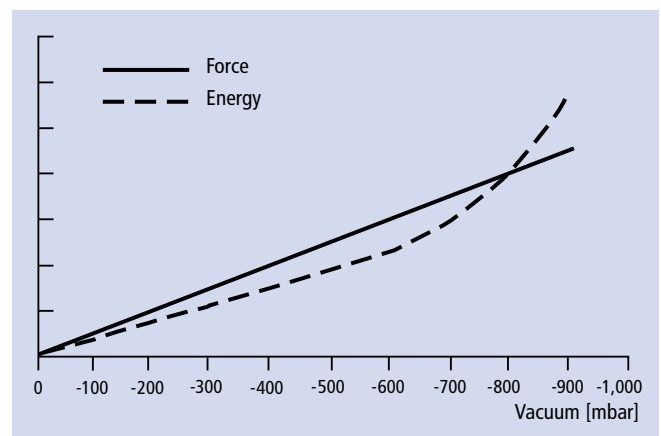
Vacuum/pressure conversion table							
	bar	N/cm ²	kPa	atm, kp/cm ²	mm H ₂ O	Torr; mm Hg	in Hg
bar	1.00000	10.00000	100.0000	1.01970	10,197.00	750.0600	29.5400
N/cm ²	0.10000	1.00000	10.0000	0.10190	1,019.70	75.0060	2.9540
kPa	0.01000	0.10000	1.0000	0.01020	101.97	7.5006	0.2954
atm, kp/cm ²	0.98070	9.80700	98.0700	1.00000	10,332.00	735.5600	28.9700
mm H ₂ O	0.00010	0.00100	0.0100	0.00000	1.00	0.0740	0.0030
Torr; mm Hg	0.00133	0.01333	0.1333	0.00136	13.60	1.0000	0.0394
in Hg	0.03380	0.33850	3.8850	0.03446	345.40	25.2500	1.0000

At the end of this chapter you will find additional conversion and unit tables.

Energy Required for Vacuum Generation

The energy required for vacuum generation increases disproportionately to the attained vacuum. Increasing the vacuum from -600 mbar to -900 mbar, for example, increases the holding force by a factor of 1.5, but the evacuation time and the energy needed to achieve this vacuum value increases by a factor of 3.

This means that only the vacuum required should be generated in the working area to keep the energy expenditure and the operating costs at a minimum.



Common working areas

- for air-tight surface (e.g. metal, plastics, etc.): -600 to -800 mbar vacuum
- for porous materials (e.g. cardboard boxes, particle boards, MDF sheets, etc.): -200 to -400 mbar vacuum; in this range the necessary holding force is generated by increasing the suction rate and the suction area.

Important:

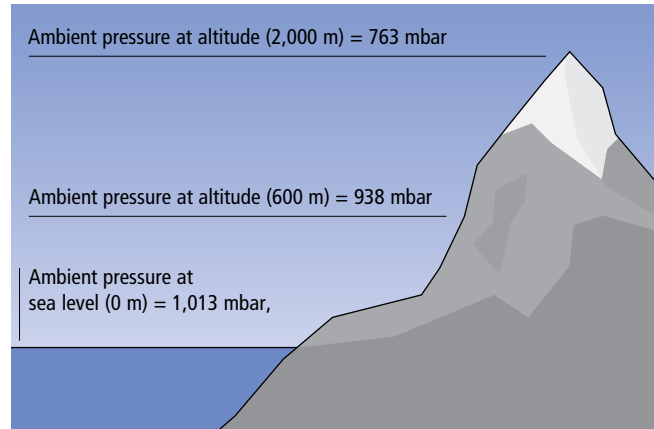
In this catalog, the holding forces of the suction cups are always specified at an efficient vacuum level of -600 mbar.

The Atmosphere and its Effects on Vacuum Technology

The air pressure (ambient pressure) depends on the elevation of the location as well as the temperature at that site. As shown in the diagram, the air pressure at sea level is 1,013 mbar. At an elevation of 600 m (location of the J. Schmalz GmbH in Glatten, Germany) air pressure is reduced to 938 mbar. At a height of 2,000 m, the air pressure is only 763 mbar.

This pressure loss also has an effect on working with a vacuum. The pressure drop with increasing height also reduces the maximum pressure difference that can be attained and therefore the maximum holding force. Per 100 m increase in elevation, the air pressure drops by about 12.5 mbar.

A vacuum generator that generates an 80% vacuum, achieves a vacuum value of -810 mbar at sea level (ambient pressure = 1,013 mbar); at 2,000 m (ambient pressure = 763 mbar) a vacuum generator only achieves -610 mbar. The possible holding force of a vacuum suction cup drops proportionally to the vacuum value that can be attained. This means the application at sea level presents the best case scenario.



Important:

All data in this catalog refer to an ambient pressure of 1,013 mbar and an ambient temperature of 20°C.

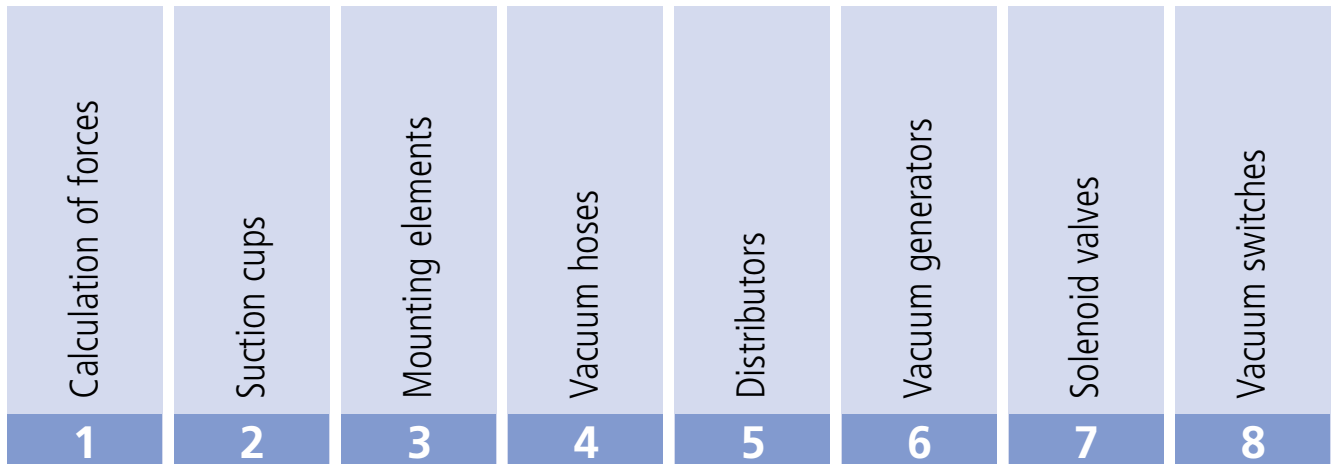
- Schmalz - The Company
- Vacuum Knowledge**
- Vacuum Suction Cups
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
- Valve Technology
- Switches and Monitoring
- Filters and Connections
- Services
- Contact
- Index of Products

Approach to System Design

The implementation from theory to practice is shown with a system design based on an example. The Schmalz Calculator offers helpful support during the system design and is available for free download at www.schmalz.com/calculator

Important:

All relevant to a calculation values can be found on the product pages under the "Specifications".



Flowchart for system design

The following calculations are based on this application:

Workpiece

Material:	Steel sheets, stacked on a pallet
Surface:	Smooth, level, dry
Dimensions:	Length: max. 2,500 mm
	Width: max. 1,250 mm
	Thickness: max. 2.5 mm
	Weight: approx. 60 kg

Handling system

Used system:	Gantry handling system
Existing compressed air:	8 bar
Control voltage:	DC 24 V
Working sequence:	Horizontal Pick & Place
	A steel sheet is picked up from a pallet, lifted, transported horizontally and deposited in a machining center.
Max. acceleration:	X, Y axis: 5 m/s ² Z axis: 5 m/s ²
Cycle time:	30 s
Scheduled time:	for pick-up: < 1s
	for releasing: < 1s

Weight Calculation of a Workpiece

It is important to determine the weight (m) of the workpiece to continue with additional calculations. It is calculated based on the following formula:

$$m = L \times B \times H \times \rho$$

m = Weight [kg]
L = Length [m]
B = Width [m]
H = Height [m]
 ρ = Density [kg/m³]

Our example:

m = 2.5 m x 1.25 m x 0.0025 m x 7,850 kg/m³
m = 61.33 kg

Theoretical Holding Force of a Suction Cup

To calculate the theoretical holding force, we show and describe the three most important and most frequently occurring load cases (handling sequences).

Important:

For the following, simplified representations of the load cases the calculation must be based on the worst load case with the highest, theoretical holding force. This is the only way to ensure that the suction cup grips the workpiece safely during the entire handling process.

Safety factor S:

The safety factor S must be adjusted in accordance with the condition of workpiece surface. The safety factor has a minimum value of 1.5 for smooth and dense workpieces. A safety factor of 2.0 or greater must be used for critical, heterogeneous, porous, rough or oiled workpieces.

Friction coefficient μ :

The friction coefficient μ describes the relationship between friction force and normal force. We cannot issue generally valid specifications for the friction coefficient between suction cup and workpiece. The friction coefficient μ therefore has to be determined correctly through tests.

The following can be used as reference values.

= 0.2 ... 0.3 for wet surfaces
= 0.5 for wood, metal, glass, stone, etc.
= 0.6 for rough surfaces

Calculation for oiled surfaces:

For standard suction cups without specified lateral force, the recommended reference value is $\mu = 0.1$ to 0.3. To obtain a more precise value, tests must be completed on the original workpiece.

For suction cups that have an explicitly specified lateral force on a dry or oiled surface, the friction coefficient μ can be calculated using the following formula:

$$\mu = F_R / F_N$$

Lateral force on a dry or oiled surface/suction force

The calculated μ value can then be used in the formula of the respective load case (I to III).

Load case I – Suction cup horizontal, direction of force horizontal

The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is lifted up vertically and transported horizontally. The acceleration is 5 m/s².

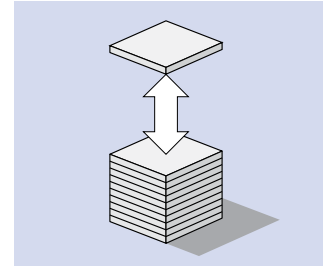
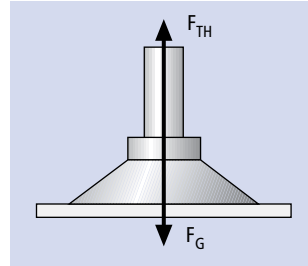
$$F_{TH} = m \times (g + a) \times S$$

F_{TH} = theoretical holding force [N]
 m = Weight [kg]
 g = Gravity [9.81 m/s²]
 a = Acceleration [m/s²] of the system
 S = Safety factor

Our example:

$$F_{TH} = 61.33 \text{ kg} \times (9.81 \text{ m/s}^2 + 5 \text{ m/s}^2 / 0.5) \times 1.5$$

$$F_{TH} = 1,363 \text{ N}$$



The suction cups land on a workpiece vertically that is to be lifted up.

Load case II – Suction cup horizontal, direction of force horizontal

The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is lifted up vertically and transported horizontally. The acceleration is 5 m/s².

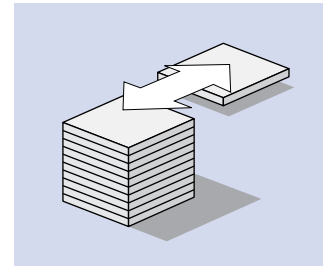
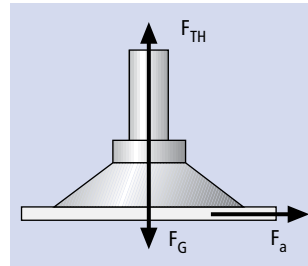
$$F_{TH} = m \times (g + a/\mu) \times S$$

F_{TH} = theoretical holding force [N]
 F_a = Acceleration force = $m \times a$
 m = Weight [kg]
 g = Gravity [9.81 m/s²]
 a = Acceleration [m/s²] of the system
 μ = Friction coefficient
 S = Safety factor

Our example:

$$F_{TH} = 61.33 \text{ kg} \times (9.81 \text{ m/s}^2 + 5 \text{ m/s}^2 / 0.5) \times 1.5$$

$$F_{TH} = 1,822 \text{ N}$$



The suction cups land on a workpiece horizontally that is to be moved to the side.

Load case III – Suction cup vertical, direction of force vertical

Description of load case: The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is picked up from a pallet and moved with a rotary motion at an acceleration of 5 m/s².

$$F_{TH} = (m/\mu) \times (g + a) \times S$$

F_{TH} = theoretical holding force [N]
 m = Weight [kg]
 g = Gravity [9.81 m/s²]
 a = Acceleration [m/s²] of the plant
 μ = Friction coefficient
 S = Safety factor

Our example:

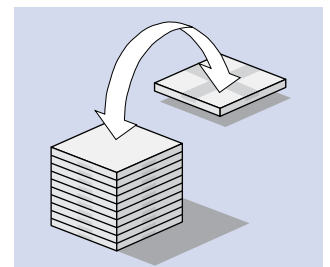
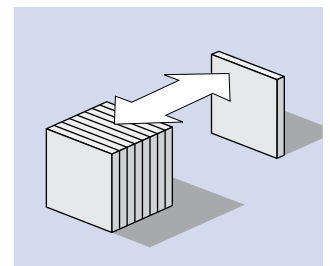
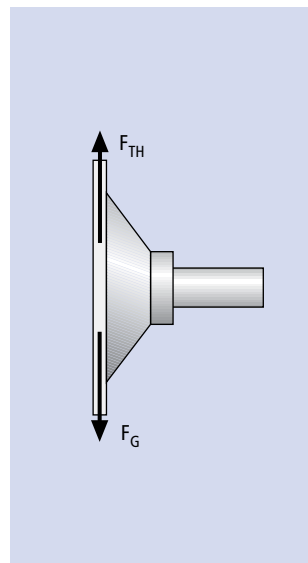
$$F_{TH} = (61.33 \text{ kg} / 0.5) \times (9.81 \text{ m/s}^2 + 5 \text{ m/s}^2) \times 2$$

$$F_{TH} = 3,633 \text{ N}$$

Comparison:

For our scenario, the workpiece is lifted off a pallet, moved to the side and placed on a machining center. The rotary motion from load case III is not needed in this application, therefore one only needs to consider the result from load case II.

The result in this case is a maximum theoretical holding force (F_{TH}) of 1,822 N. This theoretical holding force acts on the suction cup during horizontal transport of the workpiece.



The following calculations are based on this value to safely solve the task.

Suction Cup Selection

The calculated theoretical holding force corresponds to the force that the suction cups must create to handle the workpiece safely. To select the suction cups, one must also take the ambient conditions and the application into consideration. The selection of the suction cups usually takes place based on the following criteria:

Application: Multi-shift operation, service life, chemically aggressive environment, temperature, etc.

Material: Suction cups made of different materials are available to meet the requirements, such as those particularly suited for smooth or rough surfaces, oily or very fragile workpieces, anti-static suction cups for electronic components, suction cups leaving few marks for fragile plastic parts, etc.

Surface: Depending on the condition of the surface, we recommend suction cups in specific shapes. You can select from flat or bellows suction cups with different sealing lips and sealing edges in different shapes and geometries.



For this example we choose:

Flat suction cup of the type PFYN made of Perbunan NBR

This suction cup is a cost-efficient solution for handling smooth, level workpieces.

To solve the example, the calculated theoretical holding force can be applied by one suction cup or distributed among several suction cups. The number of suction cups used depends on the respective application.

For the steel sheet (2,500 x 1,250 mm) from the present case, one would usually use six or eight suction cups. The most important criterion for the number of suction cups in this example, is the flexing of the steel sheet during transport. Depending on the number of used suction cups, the required diameter of these suction cups changes.

Calculation of suction force F_S [N] for individual suction cup

$$F_S = F_{TH} / n$$

F_S = Suction force
 F_{TH} = Theoretical holding force
 n = Number of suction cups

Our example: $F_S = 1,822 \text{ N} / 6$
 $F_S = 304 \text{ N}$

According to the technical data for the suction cup PFYN, one needs 6 x PFYN 95 NBR with a diameter of 95 mm and a suction force of 350 N each.

$$F_S = 1,822 \text{ N} / 8$$

$$F_S = 228 \text{ N}$$

According to the technical data for the suction cup PFYN, one needs 8 x PFYN 80 NBR with a diameter of 80 mm and a suction force of 260 N each.

For this example we choose:

Six suction cups of type PFYN 95 NBR

With a sheet thickness of 2.5 mm, six suction cups ensure a secure sheet pick.

Mounting Element Selection

The mounting of the suction cups is usually selected according to customer requirements. But there may be compelling reasons for a particular type of mounting:

Uneven or inclined surfaces

The suction cup must be able to adapt to the incline:

> Joint mounting

Different heights/thicknesses

To compensate for height difference, one needs a spring-supported mounting:

> Spring plunger

In this case, the steel sheets are stacked on a pallet. If the sheets are larger than the pallet, one must assume that the ends of the sheets are hanging down. This means the suction cups must be able to compensate for height differences and inclines.



For this example we choose:

Joint Flexolink FLK 1/4" – 1/4" female thread

Optimum flexibility of suction cups for inclined workpiece surfaces.

Spring plunger FSTE 1/4" – 75 stroke

Greatest stroke because of sheets hanging down from pallet, 1/4" thread for connection to selected joint mounting Flexolink FLK.

Note:

Make sure when you select the mounting elements that these can be screwed onto the suction cups, which means the threads have to match. This also ensures maintaining the carrying capacities. The different mounting options and technical data are listed in the chapter "Mounting Elements".

Vacuum Hose Selection

The vacuum hoses are selected to match the size of the volume flows as well as the size of the suction cups. The table "Technical data" includes a recommendation for a hose cross section on the respective page of the suction cup and the ejector. The different hoses are listed in the chapter "Filters and Connectors".

For this example we choose:

Vacuum hose VSL 8/6 with an internal diameter of 6 mm

See table "Technical data" for the suction cup of type PFYN 95 NBR used in this example.



Distributor Selection

The distributor has to match the used hose diameter and the number of suction cups.

Example:

The hose VSL 8/6 has an outside diameter of 8 mm and an internal diameter of 6 mm. Six suction cups are used.

For this example we choose:

Plug-in screw unions STV-GE G1/4-AG 8 for the hose VSL 8/6 with outside diameter 8 mm and internal diameter 6 mm as well as 1/4" thread matching the female thread of the distributor.

Plug-in screw union STV-GE G3/8-AG 8 fits the spring plunger.

Distributor VTR G3/8-IG 9xG1/4 with one input (3/8" thread) and nine outputs (1/4" thread).

Three **sealing screws VRS-SB G1/4-AG** to close the three open outputs.



Vacuum Generator Selection

The selection of the matching vacuum generator (ejector, pump or blower) is determined by several factors:

- Type of workpieces: porous, air-tight
- Energy supply options: a lower case electricity, compressed air
- Restrictions for size and weight
- Maintaining cycle times
 - short cycle times: Ejector
 - Long transport distances: Pump or blower



For this example we choose:

Ejector to generate vacuum.

Because the workpiece in this case is air-tight, you can create a simple and lightweight structure while implementing short pick-up and release times.

Suction rate of vacuum generator

The diameter of the suction cup determines the suction rate that a vacuum generator has to apply to evacuate the suction cup. Based on experience and measurements with system designs, we recommend a selection based on the following table:

Suction capacity as a function of suction cup diameter		
Suction cup Ø	Suction capacity V_S	
Up to 60 mm	0.5 m ³ /h	8.3 l/min
Up to 120 mm	1.0 m ³ /h	16.6 l/min
Up to 215 mm	2.0 m ³ /h	33.3 l/min
Up to 450 mm	4.0 m ³ /h	66.6 l/min

Note:

The specified values apply regardless of the type of vacuum generation. The recommended suction ratio applies per suction cup and only for smooth, air-tight surfaces. For porous, permeable workpieces we recommend conducting a corresponding suction trial with the original workpiece.

Calculation of the suction rate V [m³/h, l/min], that the vacuum generator has to apply

$$V = n \times V_S$$

n = Number of suction cups

V_S = Required suction rate for an individual suction cup [m³/h, l/min]

Example: $V = 6 \times 16.6$ l/min
 $V = 99.6$ l/min

For this example we choose:

Compact ejector SCPi 20 with a suction rate of 140 l/min.

The compact ejector offers valves for control of the "suction" and "blow off" functions as well as system monitoring for ensuring process safety during handling. The compact ejector SCPi is also equipped with IO-Link Technology. It makes the various diagnostic functions visible and usable on the control level. This increases system availability and makes automation processes even more efficient.

Valve Technology Selection

In this case we are using a compact ejector with integrated valve technology. In other cases we need solenoid valves to switch the function "Vacuum on/off". They are usually used when pumps or blowers are used as vacuum generators.

The selection of the valves is based on the following criteria:

- Suction rate of vacuum generator
- Control voltage
- Operating principle of the valve (NO/NC)

The nominal flow of the solenoid valve may not be less than the suction ratio of the vacuum generator.



Calculation of the nominal size of the valve:

$$V_V = V_{VE}$$

V_V = Nominal flow of valve [m³/h, l/min]

V_{VE} = Existing suction rate of vacuum generator [m³/h, l/min]

Example: $V_V = 140 \text{ l/min} = 8.4 \text{ m}^3/\text{h}$

For this example we choose:

The used compact ejector of type SCPi 20 is equipped with solenoid valves which eliminates the need for separate valves. A solenoid valve of type EMV-10 with a nominal flow of 20 m³/h would also be sufficient for the function Suction ON/OFF.

Vacuum Switch Selection

Vacuum switches and manometers are usually selected based on the existing requirements regarding functionality and switching frequency.

The following functions are available:

- Adjustable switching point
- Hysteresis fixed or adjustable
- Signal output digital and/or analog
- Function LED
- Display with input keyboard
- Vacuum connection M5-IG, M8-AG, flange or tube insert
- Supply and signal connection with cable or M8 plug

The available versions with their respective technical data are explained in the chapter "Switches and System Monitoring".

For this example we choose:

The used compact ejector of the type SCPi 20 is equipped with an integrated system monitoring (digital output signals). There is no need for an additional vacuum switch.



Calculation of Evacuation Times

The entire volume that has to be evacuated is required to calculate the efficiency of the vacuum system.

$$V_G = V_1 + V_2 + V_3 + V_4 + V_5 + \dots$$

V_G = Volume to be evacuated [m³]

V_1 = Volume of suction cups [m³]

V_2 = Volume of mounting elements [m³]

V_3 = Volume of vacuum hoses [m³]

V_4 = Volume of distributor [m³]

V_5 = Volume of prefilter (if necessary) [m³]

V_6 = Volume of solenoid valve (if necessary) [m³]

...

Example:

$$V_G = 6 \times 35 \text{ cm}^3 + 6 \times 9.5 \text{ cm}^3 + 6 \times 43 \text{ cm}^3 + 1 \times 38.5 \text{ cm}^3$$

$$V_G = 564 \text{ cm}^3 = 0.000564 \text{ m}^3$$

Calculation of evacuation time t [h]

$$t = (V_G \times \ln(P_a/P_e) \times 1.3) / V$$

V_G = Volume to be evacuated [m³]

\ln = Natural logarithm

P_a = Absolute start pressure [1,013 mbar]

P_e = Absolute final pressure [mbar]

V = Suction rate of vacuum generator [m³/h]

Example:

$$t = (0.000564 \text{ m}^3 \times \ln(1,013 \text{ mbar} / 400 \text{ mbar}) \times 1.3) / 8.4 \text{ m}^3$$

$$t = 0.0000811 \text{ h} = 0.29 \text{ s}$$

60% = 400 mbar absolute

Test with Original Parts

A complete and energy-efficient vacuum system has been assembled from the Schmalz vacuum components. You should still conduct tests with original sample workpieces. The theoretical system design gives you a feeling for the size of the system. Schmalz has its own test center in which we conduct practical tests.

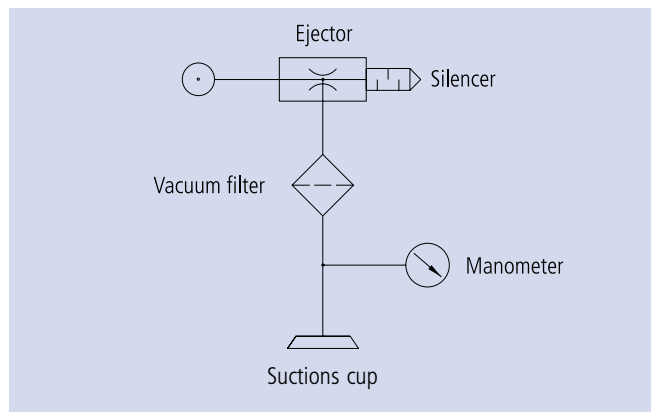
We will be glad to assist you with our expertise and many years of experience, from planning all the way to commissioning of your vacuum system. A comprehensive range of trainings and seminars rounds off our program.

Symbols in Vacuum Technology

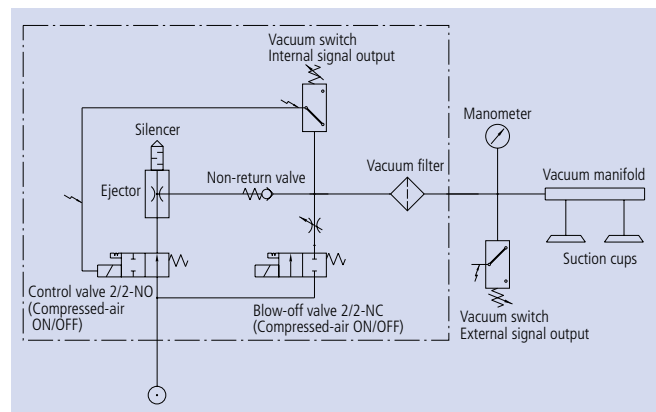
Circuit diagrams and function charts are used in vacuum technology to visualize vacuum systems. These diagrams/charts include symbols for certain components or modules. The following overview represents the most important and common symbols of vacuum components from Schmalz.

	Valve (general)		Vacuum/pressure switch		Special suction cup		Ejector, single-stage
	Ball cock, two-way		Check valve		Flat suction cup with single lip		Ejector, multi-stage
	Ball cock, three-way		Pressure-limiter valve		Flat suction cup with double lip		Silencer
	Manual slide valve, three-way		Non-return valve		Flat suction cup with sealing profile		Vacuum blower
	Solenoid valve, 3/2-way		Touch valve		Bellows suction cup		Vacuum pump
	Solenoid valve, 3/2-way, pneumatic pilot operation		Flow restrictor		Spring plunger		Vacuum regulator
	Filter				Flexolink, ball joint		Hose
	Manometer				Sealing cord		Reservoir
					Adapter nipple		

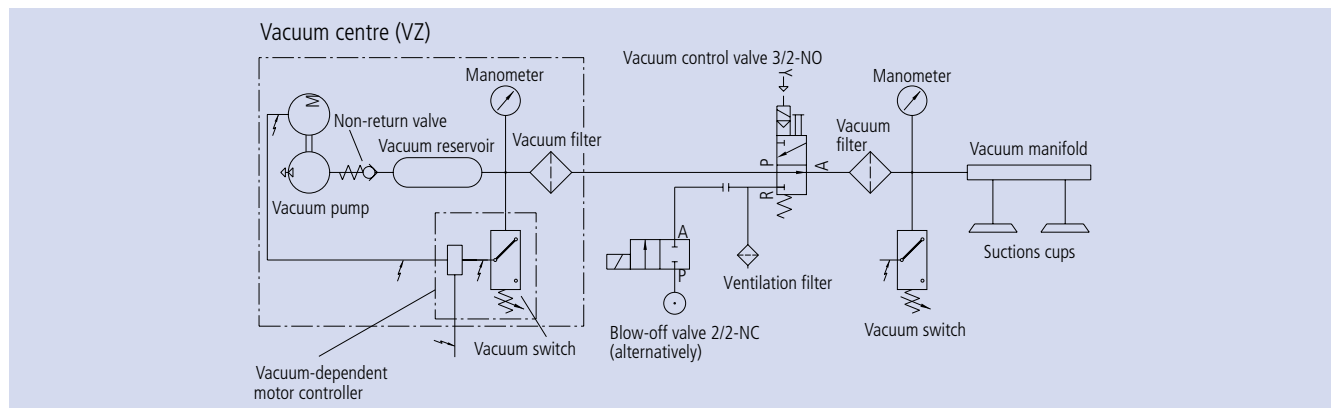
Circuit diagrams for all relevant vacuum components are available in the operating instructions online at www.schmalz.com/operating-instructions. Examples of vacuum circuit diagrams:



Example: Vacuum circuit with basic ejector



Example: Vacuum circuit with controlled compact ejector



Example: Vacuum circuit with vacuum center and vacuum-controlled motor circuit

Units and Symbols

Dimensions and volume

Parameter	Symbol	Unit in Schmalz catalog
Length	L	mm, m
Width	W	mm, m
Height	H	mm, m
Diameter	d	mm, m
Volume	V	m ³ , l

Force

Parameter	Symbol	Unit in Schmalz catalog
Force	F	N, kg x m/s ²
Theoretical holding force	F _{TH}	N
Acceleration	F _a	N
Tear-off force	F _A	N
Weight	G	N
Friction coefficient	μ	-

Temperature

Parameter	Symbol	Unit in Schmalz catalog
Temperature	t	°C

Vacuum values

Parameter	Symbol	Unit in Schmalz catalog
Pressure, absolute	p	mbar, bar
Pressure difference	Δp	mbar, bar
Initial pressure	P _a	mbar, bar
Final pressure	P _e	mbar, bar
Negative pressure / vacuum	P _u	mbar, bar
Suction rate	V	l/min, m ³ /h
Required suction rate	V _S	l/min, m ³ /h
Nominal flow of solenoid valve	V _V	l/min, m ³ /h
Present suction rate of vacuum generator	V _{VE}	l/min, m ³ /h
Total volume to be evacuated	V _G	m ³ , l

Weight

Parameter	Symbol	Unit in Schmalz catalog
Mass	m	g, kg
Density	ρ	kg/m ³

Time

Parameter	Symbol	Unit in Schmalz catalog
Duration, evacuation time	t	ms, s, min, h
Speed	v	m/s
Acceleration	a, g	m/s ² , g

Electrical and magnetic values

Parameter	Symbol	Unit in Schmalz catalog
Voltage	U	V
Strength of current	I	A

Other information

Parameter	Symbol	Unit in Schmalz catalog
Safety factor	S	-
Quantity of suction cups	n	-
Natural logarithm	ln	-
Noise level / sound pressure level	L _p	dB

Conversion tables

Length

	m	ft	in
1 m	1.000	3.281	39.370
1 ft (foot)	0.305	1.000	12.000
1 in (inch)	0.025	0.083	1.000

Mass

	kg	lb	oz
1 kg	1	2.20	35.27
1 lb (pound)	0.45	1	16
1 oz (ounce)	0.03	0.06	1

Temperature

	K	°C	°F
1 Kelvin	1	-272.15	-457.87
1 °Celsius	274.15	1	33.8
1 °Fahrenheit	255.93	-17.22	1

Suction rate

	m ³ /s	l/s	m ³ /h	l/min
m ³ /s	1	1,000	3,600	60,000
l/s	10 ⁻³	1	3.6	60
m ³ /h	2.78 x 10 ⁻⁴	0.278	1	16.67
l/min	1.67 x 10 ⁻⁵	1.67 x 10 ⁻²	0.06	1

Pressure

	bar	N/cm ²	kPa	mbar
1 bar	1	10	100	10 ³
1 N/cm ²	0.1	1	10	100
1 kPa	0.01	0.1	1	10
1 mbar	10 ⁻³	0.01	0.1	1

Volume

	m ³	cm ³	l
m ³	1	1 x 10 ⁶	1,000
cm ³	1 x 10 ⁻⁶	1	1 x 10 ⁻³
l	1 x 10 ⁻³	1,000	1

Vacuum ranges

	Absolute pressure in mbar	Mean free path of atoms*
Low vacuum	1,000 – 1	68 nm – 0,1 mm
Medium vacuum	1 – 10 ⁻³	0.1 mm – 100 mm
High vacuum	10 ⁻³ – 10 ⁻⁷	100 mm – 1 km
Ultra high vacuum	< 10 ⁻⁷	> 1 km

*The number density of molecules for a temperature of 20 °C

Thread

Thread designation	External diameter in mm	Bead wire diameter in mm	Pitch in mm
Metric ISO thread			
M3	3.00	2.5	0.50
M4	4.00	3.2	0.70
M5	5.00	4.1	0.80
M6	6.00	4.9	1.00
M8	8.00	6.6	1.25
M10	10.00	8.4	1.50
M12	12.00	10.1	1.75
Metric ISO fine thread			
M14x1.5	14.00	14.9	1.00
M16x1	16.00	18.4	1.50
M20x1.5	20.00	28.4	1.50
M30x1.5	30.00		
Pipe thread			
G½	9.73	8.5	0.91
G¾	13.16	11.4	1.34
G1	16.66	14.9	1.34
G1½	21.00	18.6	1.81
G2	26.44	24.1	1.81
G3	33.25	30.3	2.31
G4	41.91	39.0	2.31
G5	47.80	44.8	2.31
G6	59.61	56.6	2.31
G8	75.18	72.2	2.31

Abrasion resistance

The abrasion resistance refers to the resistance of suction cups (elastomer part) against mechanical stress, especially friction. It is determined by the material properties of the suction cup as well as its shape.

Absolute pressure

The absolute pressure refers to the absolute zero point, or a space completely empty of molecules. In an absolute vacuum there is a pressure of 0 bar. A relative vacuum of -600 mbar corresponds to an absolute pressure of 400 mbar.

Air-saving function

Air-saving function refers to the ejector's air-saving function during the handling procedure. Once the ejector reaches a particular vacuum value, the evacuation process is interrupted. If the vacuum drops below a defined value, the ejector starts evacuating again. The air-saving function can therefore increase the energy and economic efficiency of a vacuum system.

Ambient pressure (atmospheric pressure)

Ambient pressure refers to the hydrostatic pressure that exists at any given point. Ambient pressure is also known as atmospheric pressure. The standard atmospheric pressure at sea level is 1,013 mbar. The ambient pressure drops with increasing altitude. At an altitude of 600 m (the location of J. Schmalz GmbH in Glatten, Germany) the ambient pressure is reduced to 938 mbar. The ambient pressure has a direct influence on the maximum vacuum value that can be reached.

Bernoulli's principle

Bernoulli's principle describes the drop in pressure of a fluid when it passes from a narrow section to a much wider section. In practice, this happens in the form of a direct transition into an open space. To prevent the vacuum collapsing, the fluid is diverted to the side.

Centralized vacuum system

In a centralized vacuum system, the vacuum is generated with a central vacuum source for more than one suction cups.

Check valve

The check valve is the valve that automatically monitors volume flow. If the volume flow exceeds a defined value, the valve closes automatically; for example, when suction cups are not being used.

Control pressure range

The control pressure range is the range between the lowest and highest permissible control pressures.

Cycle time

The cycle time refers to the time taken for a repetitive process to complete one cycle.

Decentralized vacuum system

In a decentralized vacuum system, a vacuum is generated directly at each individual vacuum suction cup. Positioning vacuum generation directly at the suction cup allows for short pick-up and depositing times.

Evacuation time

The evacuation time refers to the time it takes to evacuate a certain volume to reach a required vacuum value.

Flow resistance

Flow resistance refers to a reduced flow cross-section in a vacuum line. The resistance reduces the volume flow that can pass through a line.

Friction coefficient

The friction coefficient [μ] refers to the relationship between friction force and normal force (contact force between suction cup and workpiece). The friction coefficient is not specified by a unit.

High vacuum

A high vacuum describes any vacuum in which there is an absolute pressure of 10^{-7} to 10^{-3} mbar. High vacuums are used, for example, in electron tubes and particle accelerators.

Holding force

Holding force refers to the force that can be exerted by a suction cup to grip a workpiece. It is calculated by multiplying the pressure difference by the effective suction area of the suction cup ($F = \Delta p \times A$). The holding force of a suction cup is thus influenced by underpressure and the suction area. It is a theoretical value, specified without safety factors. It is usual to state the holding force of a suction cup with a relative vacuum of 60%.

Hysteresis

Hysteresis refers to a pressure difference between two switching points, and thus defines the state of the output signal. The respective output signal changes when either the upper or lower limit value of the hysteresis is reached. Using the example of a vacuum switch: When the vacuum reaches a specified value, the signal changes to "ON". If the vacuum drops below a defined value, the signal switches to "OFF". Hysteresis is mainly used to control the air-saving function of ejectors.

Idle position of NC valve

The idle position of an NC valve refers to the position of the valve when it is not actuated, i.e. "closed" (normally closed).

Idle position of NO valve

The idle position of an NO valve refers to the position of the valve when it is not actuated, i.e. "open" (normally open).

Inner volume

The inner volume indicates the volume of the body that has to be evacuated during a suction procedure. For example, the inner volume of a suction cup has an effect on the evacuation time.

Leakage

Leakage refers to a leak within the vacuum system. This can be caused by missing or faulty sealing elements, or by the porosity of the workpiece being processed.

Load case

Load case refers to the handling task, or the process of handling a workpiece.

Load case I – Suction cup horizontal, direction of force vertical
Load case II – Suction cup horizontal, direction of force horizontal
Load case III – Suction cup vertical, direction of force vertical

Low vacuum

A low vacuum describes any vacuum in which there is an absolute pressure of 1 mbar up to atmospheric pressure (1,013 mbar). Examples of applications for a low vacuum include light bulbs and vacuum cleaners. Vacuum handling technology also uses values in the low vacuum range because these can be generated economically to create high suction power and short cycle times.

Medium vacuum

A medium vacuum describes any vacuum in which there is an absolute pressure between 0.001 mbar and 1 mbar. Medium vacuums are used, for example, in low-pressure gas-filled lights.

Nominal flow

Nominal flow refers to the maximum flow through a certain diameter (nominal diameter). The nominal flow is given in l/min or m³/h.

Normal force

Normal force is the force component acting perpendicular to a surface. Every force acting on a surface can be divided into normal force and shear force (see "Shear force"). Based on the normal force, the friction force can be calculated using the friction coefficient for a material pairing. The result indicates the friction force between two surfaces, for example between a suction cup and a workpiece. Normal force is measured in Newton [N].

NPN – Switching output

NPN switching output refers to the configuration of a switching output in cases where the load is connected to the positive pole of the operating voltage source. The output transistor of the vacuum switch connects the active device through to the operating voltage, allowing current to flow through the consuming device.

Minimum radius of curvature

The minimum radius of curvature refers to the smallest radius that a suction cup can securely grip. For round suction cups, this refers to a sphere, while for oval suction cups it refers to a cylinder.

Operating temperature

The operating temperature is the temperature range in which a product can be deployed or run.

Overpressure resistance

Overpressure resistance refers to the maximum pressure that a body (for example, a reservoir or vacuum filter) can resist.

PNP Switching output

PNP switching output refers to the configuration of a switching output in cases where the load has a permanent connection to the operating voltage source. The output transistor of the vacuum switch connects the active device to the positive pole, allowing current to flow through the consuming device.

Recovery time

The recovery time is the period in which the product is not being used or is not subject to significant work loads. The product can recover during this time.

Reference pressure

Reference pressure is the pressure referred to by a sensor. Vacuum switches, for example, have a connection for reference air.

Relative pressure

Relative pressure refers to the value of pressure in relation to the prevalent ambient pressure. The vacuum is given using negative values. Relative pressure has a pressure of 0 mbar as a reference point. An absolute pressure of 400 mbar corresponds to a relative pressure of -600 mbar. In the field of vacuum handling, it is also common to state the values in percentages: -600 mbar corresponds to a vacuum of 60%.

Reversing valve

A reversing valve is a type of changeover valve used in a blower. The valve supplies the system alternately with overpressure and underpressure. The valve thus controls the suction, blow-off and neutral setting in the vacuum system.

Shear force

Shear force is the force acting tangentially to a surface and indicates how much friction can be transferred between the suction cup and workpiece. Shear force is given in Newton [N].

Shore hardness

Shore hardness refers to the hardness of elastomers and plastics. It is a standardized material property for the hardness of materials.

Standard liter

A standard liter is the measurement of a gas occupying a liter at 20 °C and 1,013 mbar (standard state).

Standard pressure

Standard pressure is the pressure in the atmosphere under standard conditions. In both technology and the natural sciences, this is 1,013 mbar at 0 °C. The values in the Schmalz catalog refer to a temperature of 20 °C

Standard temperature

Standard temperature is the temperature under standard conditions. The values in the Schmalz catalog refer to a temperature of 20 °C.

Suction force

See "Holding force"

Suction cup stroke

The suction cup stroke refers to the stroke effect that is created by the suction cup when picking up a workpiece. The stroke value indicates the maximum contraction of the suction cup.

Suction power

See "Suction rate"

Suction rate

Suction rate refers to the suction power of a vacuum generator. This value indicates the volume that can be evacuated by a vacuum generator in a certain time. The suction rate is given in l/min or m³/h.

Switching point

The switching point refers to a point at which a switch changes the state of the output signal. If, for example, a programmed vacuum value is reached on a vacuum switch, the output signal switches to "ON" and there is voltage at the switch output. The initial position of the signal can be set to either NC (opener) or NO (closer).

Vacuum

A vacuum is a pressure range lower than that of the ambient pressure. The vacuum value is divided into various classes; refer to "High Vacuum", "Medium Vacuum" and "Low Vacuum".

Ventilation time

The ventilation time refers to the time it takes to dissipate vacuum in a system. This defines the time it takes to release a workpiece. The ventilation of a suction cup can take place either atmospherically or actively by a compressed air pulse (active blow off).

Venturi principle

The Venturi principle describes the correlation between dynamic

and static air pressure when air flows through a tube. At the narrowest section, the dynamic pressure is at a maximum, while the static pressure is at a minimum. Since the same volume is flowing through the tube, the velocity increases in proportion to the cross sections. Because of this differential pressure, a vacuum can be created and air can be drawn in by using Venturi nozzles with a side inlet port. Vacuum generators based on this principle are called ejectors.

Volume flow

Volume flow refers to the volume of a medium that flows through a cross section within a certain amount of time. Volume flow is given in l/min or m³/h.

Workpiece temperature

The workpiece temperature is the temperature of a processed workpiece. This temperature can influence the selection of a suitable suction cup material.

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Vacuum Suction Cups

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	Material of the Suction Cup	72
Vacuum Suction Cups (Universal)		
Flat Suction Cups (Round)		
	Flat Suction Cups PFYN <ul style="list-style-type: none"> • Diameter: 1 to 200 mm • Material: FPM, HT1, NBR, PU, SI • Antistatic and non-marking variants • Connect. nipple plugged into elastomer part 	<p>Round universal suction cup available in various materials for a wide range of requirements; especially for workpieces with even, smooth surfaces.</p>
	Flat Suction Cups PFYN VU1 <ul style="list-style-type: none"> • Diameter: 15 to 95 mm • Material: VU1 • Connection nipple plugged into elastomer part 	<p>Extremely wear-resistant Vulkollan suction cup for high loads and a long service life in multi-shift operation.</p>
	Flat Suction Cups SGAN <ul style="list-style-type: none"> • Diameter: 7 to 16 mm • Material: SI, PU • Connection nipple plugged into elastomer part 	<p>Suction cup with soft sealing lip for handling fragile workpieces such as CDs, veneers, wafers and solar cells even in multi-shift operation with short cycle times.</p>
	Suction Plates SPU <ul style="list-style-type: none"> • Diameter: 100 to 400 mm • Material: NBR, SI • Support plate made of aluminum 	<p>Round suction plate for smooth and slightly rough workpieces; optionally with peeling insert for separation of sheets, with touch valve or with steep sealing lip.</p>
	Suction Plates SPK <ul style="list-style-type: none"> • Diameter: 55 to 250 mm • Material sealing lip: EPDM • Support plate made of aluminum 	<p>Round suction plate with adaptable sealing edge for rough and textured workpieces.</p>

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Flat Suction Cups (Oval)			
	Flat Suction Cups SGON		99
	<ul style="list-style-type: none"> • Dimensions: 4 x 2 to 90 x 30 mm • Material: HT1, NBR, SI • Cups of the size 24 x 8 and larger are additionally secured with a two-ear clamp to prevent rotation 	Oval flat suction cup with maximum suction force particularly on narrow, elongated workpieces such as sections and pipes, for example.	
	Suction Plates SPLO		106
	<ul style="list-style-type: none"> • Dimensions: 60 x 20 to 370 x 80 mm • Material: NBR • Support plate vulcanized to elastomer part 	Oval flat suction cup with aluminum support plate for narrow, elongated workpieces such as sections and pipes, for example.	
Bellows Suction Cups (Round)			
	Bellows Suction Cups FSGA (1.5 Folds)		110
	<ul style="list-style-type: none"> • Diameter: 6 to 78 mm • Material: HT1, NBR, NK, SI • Connection nipple plugged into elastomer part 	Round universal suction cup with 1.5 folds, available in various materials for a wide range of requirements.	
	Bellows Suction Cups FSGA VU1 (1.5 Folds)		116
	<ul style="list-style-type: none"> • Diameter: 30 to 110 mm • Material: VU1 • Connection nipple plugged into elastomer part 	Extremely wear-resistant Vulkollan bellows suction cup with 1.5 folds for high loads and long service life in multi-shift operation.	
	Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm		121
	<ul style="list-style-type: none"> • Diameter: 110 and 150 mm • Material: NBR, SI • Support plate screwed to elastomer part 	Round suction cup with 1.5 folds and large diameter for large, heavy, but fragile workpieces; with attached connection plate.	
	Bellows Suction Cups FSGPL (1.5 Folds)		124
	<ul style="list-style-type: none"> • Diameter: 100 to 250 mm • Material: HT1, NBR • Support plate vulcanized to elastomer part 	Round suction cup with 1.5 folds, large diameter, very soft sealing lip and supports on the underside; with vulcanized bonded steel support plate.	

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	<p>Bellows Suction Cups FSG (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 3 to 88 mm • Material: HT1, NBR, NBR-AS, NK, SI, SI-AS • Connection nipple plugged into elastomer part 		127
	<p>Bellows Suction Cups FSG VU1 (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 30 to 85 mm • Material: VU1 • Connection nipple plugged into elastomer part 		134
	<p>Bellows Suction Cups FSGB (3.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 25 mm • Material: NBR, SI • Connection nipple plugged into elastomer part 		137
<p>Bellows Suction Cups (Oval)</p>			
	<p>Bellows Suction Cups FSGAO (1.5 Folds)</p> <ul style="list-style-type: none"> • Dimensions: 95 x 40 and 140 x 65 mm • Material: VU1 • Connection plate screwed to elastomer part 		140
<p>Vacuum Suction Cups for Special Applications</p>			
<p>Suction Cups for Handling Sheet Metal</p>			
	<p>Bell-Shaped Suction Cups SAXM</p> <ul style="list-style-type: none"> • Diameter: 20 to 115 mm • Material: ED • Connection element modular 		143
	<p>Bell-Shaped Suction Cups SAOXM (Oval)</p> <ul style="list-style-type: none"> • Dimensions: 60 x 20 to 100 x 40 mm • Material: ED • Connection nipple modular 		151















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Schmalz - The Company		<p>Flat Suction Cups SAF</p> <ul style="list-style-type: none"> • Diameter: 30 to 125 mm • Material: NBR • Connection nipple vulcanized to elastomer part 		<p>Round flat suction cup with low internal volume and very high horizontal and vertical holding forces even with oiled workpieces.</p>	159
Vacuum Knowledge		<p>Bellows Suction Cups SAB (1.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 22 to 125 mm • Material: NBR • Connection nipple vulcanized to elastomer part 		<p>Round suction cup with 1.5 folds for extremely curved and thin-walled sheet metal; very high horizontal and vertical holding forces and high suction cup stroke.</p>	163
Vacuum Suction Cups		<p>Flat Suction Cups SAOF (Oval)</p> <ul style="list-style-type: none"> • Dimensions: 50 x 16 to 140 x 70 mm • Material: NBR • Connection nipple vulcanized to elastomer part 		<p>Oval suction cup with low inner volume for elongated sheet metal such as sections, pipes or ribbing; very high horizontal and vertical holding forces.</p>	167
Special Grippers		<p>Bellows Suction Cups SAOB (Oval, 1.5 Folds)</p> <ul style="list-style-type: none"> • Dimensions: 60 x 30 to 140 x 70 mm • Material: NBR • Connection nipple vulcanized to elastomer part 		<p>Oval suction cup with 1.5 folds for elongated, curved, thin-walled sheet metal such as pipes or ribbing; very high horizontal and vertical holding forces and high suction cup stroke.</p>	171
Vacuum Gripping Systems		<p>Bell-Shaped Suction Cups SAOG (Oval)</p> <ul style="list-style-type: none"> • Dimensions: 60 x 20 to 95 x 40 mm • Material: NBR • Connection nipple vulcanized to elastomer part 		<p>Oval bell-shaped suction cup for elongated, thin-walled sheet metal; very good adjustment to convex curves.</p>	175
Mounting Elements		<p>Bellows Suction Cups SAB2 P (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 20 mm • Material: NBR, HT1 • Push-in function 		<p>Round bellows suction cup with 2.5 folds for strongly curved or thin-walled sheet metal parts. Push-in suction cup neck for direct mounting.</p>	179
Vacuum Generators	<p>Suction Cups for Handling Wood</p>				
Vacuum Technology		<p>Flat Suction Cups SHFN</p> <ul style="list-style-type: none"> • Diameter: 50 to 85 mm • Material: NK • Connection nipple plugged into elastomer part or support plate vulcanized to elastomer part 		<p>Round suction cup with internal sealing edge for sealing on rough, slightly textured surfaces.</p>	182
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	<p>Suction Plates SHF</p> <ul style="list-style-type: none"> • Diameter: 125 to 210 mm • Material: NK • Supporting plate securely clipped to elastomer part 		<p>Round suction cup with large diameter and internal, double sealing edge for sealing on rough, slightly textured surfaces.</p>	187
	<p>Suction Plates SPC</p> <ul style="list-style-type: none"> • Diameter: 160 to 400 mm • Material: NBR • Supporting plate securely clipped to elastomer part 		<p>Round suction cup with double sealing edge and compressed air connection for handling and separation of workpieces that are porous and subject to through-suction.</p>	190
<p>Suction Cups for Packaging</p>				
	<p>Flat Suction Cups SPF</p> <ul style="list-style-type: none"> • Diameter: 10 to 60 mm • Material: ED • Connection element modular 		<p>Round flat suction cup with support ribs, reinforced basic body, low internal volume and flexible sealing lip for handling rigid packaging.</p>	193
	<p>Bellows Suction Cups SPB1 (1.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 10 to 80 mm • Material: ED • Connection element modular 		<p>Round bellows suction cup with 1.5 folds, reinforced basic body, large suction cup stroke and damping effect for handling semi-rigid packaging.</p>	199
	<p>Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)</p> <ul style="list-style-type: none"> • Dimensions: 60x20 and 100x40 mm • Material: ED • Connection element modular 		<p>Oval bellows suction cup with 1.5 folds, reinforced basic body, damping effect and large suction stroke for handling rigid packaging.</p>	205
	<p>Bellows Suction Cups SPB2 (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 20 to 50 mm • Material: ED • Connection nipple modular 		<p>Round bellows suction cup with 2.5 folds and reinforced basic body, damping effect as well as large suction stroke for use in carton and tray erectors.</p>	209
	<p>Bellows Suction Cups SPB2 P (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 20 and 40 mm • Material: SI (use in the food and beverage industry) • Push-in function 		<p>Round, push-in bellows suction cup with 2.5 folds and a soft fold geometry, flexible sealing lip and a large suction cup stroke for handling curved, non-rigid packaging.</p>	214

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Vacuum Knowledge		<p>Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)</p> <ul style="list-style-type: none"> • Dimensions: 35 x 15 to 80 x 35 mm • Material: SI (suitable for applications in the food industry) 		<p>Oval bellows suction cup with 1.5 folds for dynamically handling bags and film packaging products in flow-wrap packaging processes.</p>	225
Vacuum Suction Cups		<p>Bellows Suction Cups SPB2f (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 30 to 50 mm • Material: SI (use in the food and beverage industry) 		<p>Round bellows suction cup with 2.5 folds for dynamically handling bags that have an extremely large number of folds and are not very full or packaging filled with liquid. Integrated stabilizer ensures additional bag stabilization.</p>	229
Special Grippers		<p>Bellows Suction Cups SPB4f (4.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 30 to 50 mm • Material: SI, SI-HD (suitable for applications in the food industry) • Modular connection nipple or push-in function 		<p>Round bellows suction cup with 4.5 folds for handling of bags with extreme wrinkling, low filling level or liquid filled packaging. Integrated stabilizer ensures additional stabilization of the bag.</p>	235
Vacuum Gripping Systems		<p>Bellows Suction Cups FGA PVC (1.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 13 to 22 mm • Material: PVC (suitable for applications in the food industry) 		<p>Round bellows suction cup with 1.5 folds for non-rigid and unstable outer packaging.</p>	241
Mounting Elements		<p>Bellows Suction Cups FG PVC (2.5 Folds)</p> <ul style="list-style-type: none"> • Diameter: 18 to 50 mm • Material: PVC (suitable for applications in the food industry) 		<p>Round bellows suction cup with 2.5 folds with high suction cup stroke and damping effect for non-rigid and unstable outer packaging.</p>	245
Vacuum Generators		<p>Bellows Suction Cups FSGB-R (Rectangular)</p> <ul style="list-style-type: none"> • Dimensions: 52 x 25 to 80 x 50 mm • Material: NBR, SI • Connection plate screwed to elastomer part 		<p>Rectangular bellows suction cup with 2.5 and 3.5 folds for square, non-rigid and unstable outer packaging.</p>	249
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	Suction Plates SGF		261
	Bellows Suction Cups SAB HT1 (1.5 Folds)		264
	Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)		268
Suction Cups for High-Temperature Applications			
	Flat Suction Cups SAF HT2		271

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Vacuum Suction Cups		Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)		280
Special Grippers		Suction Plates for High-Temperature SPL-HT FPM-F		283
Vacuum Gripping Systems		Suction Plates for High-Temperature SPL-HT		286
Mounting Elements	Suction Cups for Handling Composites			
Vacuum Generators		Suction Plates SPL POM-NBR		288
Valve Technology	<ul style="list-style-type: none"> • Diameter: 40 to 115 mm • Material sealing ring: NBR • Support plate made of aluminum 			
Switches and Monitoring	<p>Round suction plate with adaptable sealing ring for handling flexible materials such as prepreg or semi-finished products of fiber composite material.</p>			

Overview of Section 3



Vacuum Suction Cups

At a Glance

Suction Cups for Handling CDs/DVDs			
	Suction Cups SGR and SGH		290
	<ul style="list-style-type: none"> • Diameter: 17 to 36 mm • Material: SI • Different sizes and shapes 	Ring shaped suction cup with maximum suction force with minimal space requirements on common optical storage media such as CDs, DVDs or Blu-ray DVDs.	
Sealing Profiles			
	Sealing Cords DI-SCHN		291
	<ul style="list-style-type: none"> • Diameter: 6 to 12 mm • Cross-sections: 8 x 1 to 25 x 20 mm 	Sealing profiles with various dimensions for producing individual suction plates.	
	Sealing Profiles DI-PROF		293
	<ul style="list-style-type: none"> • Cross-sections: 21 x 11 to 53 x 32 mm 	Sealing profiles made from two components for individual production of suction plates for extremely rough and textured surfaces.	
Accessories Vacuum Suction Cups			
	Filter Discs FD		297
	<ul style="list-style-type: none"> • Diameter: 16 to 55 mm • For suction cup type: FGA, FG • Material: PE 	The filter plate stops the tool from being sucked in to the suction cup.	
	Suction Cup Inserts SPI PEEK		300
	<ul style="list-style-type: none"> • Diameter: 6 to 32 mm • Material: PEEK • For suction cup type: FGA, FG 	Cup inserts SPI made of PEEK for bellows suction cups FGA and FG for gentle and mark free gripping and depositing of smooth workpieces.	
	Suction Cup Covers SU		303
	<ul style="list-style-type: none"> • Diameter: 30 to 360 mm • For suction cups and suction plates 	Suction cup cover for handling delicate, flat and smooth workpieces (non-marking).	

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Vacuum Suction Cups

At a Glance



Protection Covers PC



306

- Diameter: 125 to 400 mm
- Protection of suction cups and suction plates

Protection cover PC to protect the suction plates from environmental influences and aging during storage or when suction plates are not in use.



Sealing Rings DR-MOS SI



308

- Diameter: 20/10 x 2 to 88/64 x 5 mm
- For suction cup type: FGA, FG
- Material: SI

Sealing ring made from special foam for optimally sealing structured surfaces.

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Vacuum Suction Cups



Selection by Applications

UNIVERSAL Universal Suction Cup

Shape		Family	Suction area	Page	
Round		PFYN	Ø 1 mm – 200 mm	74	
		PFYN VU1	Ø 15 mm – 95 mm	84	
		SGAN	Ø 7 mm – 16 mm	88	
		SPU	Ø 100 mm – 400 mm	92	
		SPK	Ø 55 mm – 250 mm	96	
		FSGA	Ø 6 mm – 78 mm	110	
		FSGA VU1	Ø 30 mm – 110 mm	116	
		FSGA 110	Ø 110 mm – 150 mm	121	
		FSGPL	Ø 100 mm – 250 mm	124	
		FSG	Ø 3 mm – 88 mm	127	
		FSG VU1	Ø 30 mm – 85 mm	134	
		FSGB	Ø 25 mm	137	
		Oval	SGON	4 x 2 – 90 x 30	99
			SPL0	60 x 20 – 370 x 80	106
	FSGAO	95 x 40 – 140 x 65	140		

PACKAGING Suction Cups for Packaging

Shape		Family	Suction area	Page
Round		SPF	Ø 10 mm – 60 mm	193
		SPG	Ø 33 mm	253
		1,5 SPB1	Ø 10 mm – 80 mm	199
		FGA PVC	Ø 13 mm – 22 mm	241
		2,5 SPB2	Ø 20 mm – 50 mm	209
		SPB2 P	Ø 20 mm – 40 mm	214
		SPB2f	Ø 30 mm – 50 mm	229
		FG PVC	Ø 18 mm – 50 mm	245
		4,5 SPB4	Ø 20 mm – 50 mm	217
		SPB4f	Ø 30 mm – 50 mm	235
		Oval	1,5 SPOB1	60 x 20 – 100 x 40
SPOB1f	35 x 15 – 80 x 35		225	
Rectangular		2,5 FSGB-R	52 x 25 – 80 x 50	249
		3,5 FSGB-R	52 x 25 – 80 x 50	249

METAL Suction Cups for Handling Sheet Metal

Shape		Family	Suction area	Page
Round		SAF	Ø 30 mm – 125 mm	159
		SAXM	Ø 20 mm – 115 mm	143
		SAB	Ø 22 mm – 125 mm	163
		SAB2 P	Ø 20 mm	179
Oval		SAOF	50 x 16 – 140 x 70	167
		SAOXM	60 x 20 – 100 x 40	151
		SAOG	60 x 20 – 95 x 40	175
		SAOB	60 x 30 – 140 x 70	171

HIGH-TEMP. Suction Cups for High-Temperature Applications

Shape		Family	Suction area	Page
Round		SAF HT2	Ø 30 mm – 60 mm	271
		SPL-HT FMP-F	Ø 90 mm – 190 mm	283
		SPL-HT	Ø 35 mm – 140 mm	286
		SAB HT2	Ø 22 mm – 80 mm	274
Oval		SAOF HT2	60 x 23 – 100 x 50	277
		SAOB HT2	60 x 30 – 80 x 40	280

WOOD Suction Cups for Handling Wood

Shape		Family	Suction area	Page
Round		SHFN	Ø 50 mm – 85 mm	182
		SHF	Ø 125 mm – 210 mm	187
		SPC	Ø 160 mm – 250 mm	190

CD/DVD Suction Cups for Handling CDs/DVDs

Shape		Family	Suction area	Page
Round/Half-round		SGR/SGH	Ø 17 mm – 36 mm	290

PLASTICS Suction Cups for Plastic Films and Paper

Shape		Family	Suction area	Page
Round		SGPN	Ø 15 mm – 40 mm	256

COMPOSITE Composite Grippers

Shape		Family	Suction area	Page
Round		SPL-POM NBR	Ø 40 mm – 115 mm	288

GLASS Suction Cups for Handling Glass

Shape		Family	Suction area	Page
Round		SGF	Ø 125 mm – 400 mm	261
		1,5 SAB HT1	Ø 22 mm – 125 mm	164
Oval		SAOB HT1	60 x 30 – 140 x 70	268

Flat suction cups

Bell-shaped suction cups

Bellows suction cups (1.5/2.5/3.5/4.5 folds)

Vacuum Suction Cups



Material of the Suction Cup

Material Overview

Description	Abbreviation	NBR	NBR-AS	SI (SI-HD)	SI-AS	NK	HT1
	Chemical designation / trade name	Nitrile caoutchuc (AS = antistatic)		Silicone caoutchuc (AS = antistatic)		Natural rubber	High temperature material
	Color / coding	black, gray, blue, light blue	black with blue dot	nature (trans-lucid), green	black with red dot	gray, light brown	blue
Chemical resistance	General weathering resistance	●●	●●	●●●	●●●	●●	●●●
	Ozone resistance	●	●	●●●●	●●●●	●	●●●●
	Oil resistance	●●●●	●●●●	●●	●●	●	●●●●
	Fuel resistance	●●	●●	●	●	●	●●
	Alcohol resistance, ethanol 96%	●●●●	●●●	●●●●	●●●	●●●●	●●●●
	Solvents resistance	●●	●●	●●	●●	●	●●
	General resistance to acids	●	●	●●	●●	●●	●
	Bases resistance	●	●	●●	●●	●	●
	Steam resistance	●●	●●	●●	●●	●	●●●
Mechanical characteristics	Wear resistance	●●	●●	●(●)	●	●●	●●●
	Resistance to permanent deformation	●●	●●	●●	●●	●●●	●●
	Tensile strength	●●	●●	●	●	●●	●●
	Specific resistance in [$\Omega \times \text{cm}$]	–	10^3 to 10^6 ¹⁾	–	10^3 to 10^6 ¹⁾	–	–
	Shore hardness to DIN ISO 7619	40 to 80 ± 5	55 ± 5	40 to 70 ± 5 ²⁾ (65 ± 5)	55 ± 5	35 to 55 ± 5	60 ± 5
Temperature resistance ³⁾	Short-term in °C (< 30 sec.)	-30° to +120°	-30° to +120°	-40° to +220°	-35° to +220°	-35° to +120°	-25° to +170°
	Longer-term in °C	-10° to +70°	-10° to +70°	-30° to +180°	-20° to +180°	-25° to +80°	-10° to +140°
Further characteristics	Target industry	Universal	(Universal), Electronics	Packaging	Packaging, Electronics	Wood, Packaging	Plastics, Glass
	Food grade according to CFR 21 §177.2600 FDA			✓			
	Leaving few marks						✓
	Absence of PWIS (paint-wetting impairment substances)	NBR-60, NBR-45					✓
	Cleanroom suitability	on request	on request	●●●(●)	on request	on request	●●●

¹⁾ Depending on size and geometry

²⁾ After-bake of silicone 4 h/200 °C = ~+5 Shore A

³⁾ Approximate value: depends on ambient temperature, application force, recovery time and wall thickness of suction cup

●●●● Excellent

●●● Very good

●● Good

● Poor to satisfactory

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Vacuum Suction Cups



Material of the Suction Cup

Material Overview							
HT2	ED	PU	VU1	PVC	FPM	EPDM	EPDM-MOS
High-temperature material	Elastodur	Polyurethane	Vulkollan® 4)	Polyvinylchloride	Fluor-caoutchuc	Ethylene-propylene-caoutchuc	Foam rubber made of Ethylene-propylene-caoutchuc
black	green, blue	blue	dark green	blue (translucid)	black with white dot	grey	black
●●●●	●●●	●●●	●●●	●●	●●●●	●●●●	●●●●
●●●●	●●●	●●●	●●●	●●●	●●●●	●●●●	●●●●
●●●●	●●●	●●●	●●●	●●●	●●●●	●● ⁵⁾	●● ⁵⁾
●●●●	●●	●●	●●	●	●●●●	●	●●
●●	●●●	●●●●	●●●●	●	●●	●●●●	●●●●
●●●	●	●	●	●	●●●	●●	●●
●●●	●	●	●	●●	●●●	●●●	●●●
●●	●	●	●	●●	●●	●●●	●●●
●●	●	●	●	●●●	●●	●●●	●●●
●	●●●(●)	●●●●	●●●●	●●●	●	●●	●
●●	●	●	●●	●	●●	●●	●●
●●	●●●(●)	●●●	●●●●	●●	●●	●●	●
-	-	-	-	-	-	-	-
65 ± 5	60 to 85 ± 5	55 ± 5	72 ± 5	50 ± 5	65 ± 5	55 ± 5	~15 ⁶⁾
-10° to +250°	-40° to +100°	-40° to +130°	-40° to +100°	-30° to +65°	-10° to +250°	-35° to +130°	-35° to +100°
-5° to +200°	-25° to +80°	-30° to +100°	-30° to +80°	-15° to +50°	-5° to +200°	-25° to +100°	-25° to +70°
Glass, Solar, Metal	Packaging, Metal	Packaging	Metal, Packaging, Glass, Wood	Packaging	Glass, Solar, Metal	Glass	Metal, Wood
				✓			
	✓				✓		
	ED-85						
●●●	●●●(●)	on request	on request	on request	●●●	on request	on request

⁴⁾Vulkollan® is a registered trademark of Bayer AG

⁵⁾With slight oil wetting

⁶⁾Varies, for technical reasons, for foam rubber

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Flat Suction Cups (Round)



Flat Suction Cups PFYN

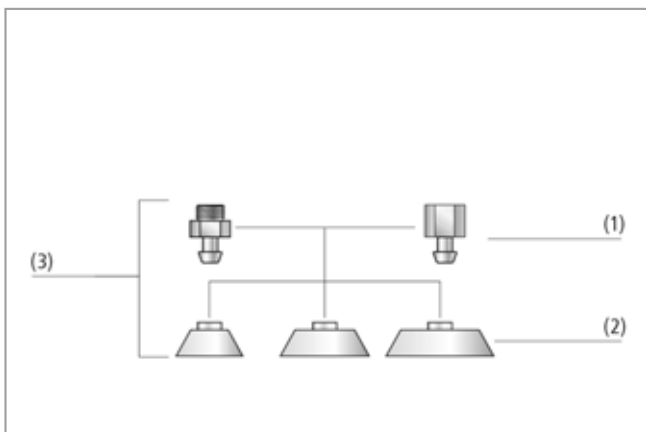
Suction area (\emptyset) from 1 mm to 200 mm



Suitable for Industry Specific Applications



Flat suction cups PFYN



System design flat suction cups PFYN



Flat suction cups PFYN being used for handling plastic boards

Applications

- Round, flat suction cup for handling of flat workpieces with smooth or slightly rough surfaces
- Handling of hot workpieces (HT1, SI)
- Low-marking and antistatic handling of sensitive workpieces (HT1 and AS versions)

Design

- Robust, wear-resistant suction cup PFYN (3) with single sealing lip, consisting of suction cup PFG (2) and connection nipple (1)
- Nipple plugged in on cups up to 50 mm in diameter
- Nipple screwed into a metal inlay (vulcanized to the cup) on cups with a diameter of 60 mm or more
- Within each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...

- Different materials
- Wide range of diameters
- Optimum shape
- Low internal volume
- Supports on the bottom

Your Benefits...

- > Suction cups for a wide range of applications (high temperatures, antistatic, low-marking, resistance to chemicals)
- > Wide range of versions for different sizes and types of workpieces
- > High suction forces with small dimensions
- > For very short cycle times
- > No permanent deformation of thin-walled workpieces

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Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm



Designation Code Flat Suction Cups PFYN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example PFYN 20 NBR-55 G1/8-AG:			
PFYN	20	NBR-55	G1/8-AG
PFYN	1 to 200	FPM-65 (mark-free) HT1-60 NBR-55 NBR-AS-55 (antistatic) PU-55 SI-55 SI-AS-55 (antistatic)	M3-AG (AG = male (M)) M5-AG M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG G1/2-IG



Ordering Data Flat Suction Cups PFYN

Suction cup PFYN (elastomer part + connection nipple) is delivered unassembled (diameters of 120 mm and more are assembled). The delivery consists of:

- Suction cup of type PFG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup PFG, connection nipple SA-NIP

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Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm

Flat Suction Cups PFYN

Type	Suction cup material * / hardness in Shore A						
	FPM-65	HT1-60	NBR-55	NBR-AS-55	PU-55	SI-55	SI-AS-55
PFYN 1 M3-AG	-	-	10.01.01.00274	10.01.01.10375	-	10.01.01.00280	-
PFYN 1.5 M3-AG	-	-	10.01.01.00275	10.01.01.10376	-	10.01.01.00281	-
PFYN 2 M3-AG	-	10.01.01.13000	10.01.01.00276	10.01.01.10377	-	10.01.01.00282	10.01.01.10391
PFYN 3.5 M3-AG	10.01.01.00295	10.01.01.12982	10.01.01.00277	10.01.01.10378	-	10.01.01.00283	10.01.01.10392
PFYN 5 M5-AG	10.01.01.00179	10.01.01.11130	10.01.01.00137	10.01.01.10379	-	10.01.01.00151	10.01.01.10393
PFYN 5 M5-IG	10.01.01.00123	10.01.01.11144	10.01.01.00081	10.01.01.10345	-	10.01.01.00095	10.01.01.10357
PFYN 6 M5-AG	10.01.01.00180	10.01.01.11131	10.01.01.00138	10.01.01.10380	-	10.01.01.00152	10.01.01.10394
PFYN 6 M5-IG	10.01.01.00124	10.01.01.11145	10.01.01.00082	10.01.01.10346	-	10.01.01.00096	10.01.01.10358
PFYN 8 M5-AG	10.01.01.00181	10.01.01.11132	10.01.01.00139	10.01.01.10381	10.01.01.00167	10.01.01.00153	10.01.01.10395
PFYN 8 M5-IG	10.01.01.00125	10.01.01.11146	10.01.01.00083	10.01.01.10347	10.01.01.00111	10.01.01.00097	10.01.01.10359
PFYN 10 M5-AG	10.01.01.00182	10.01.01.11133	10.01.01.00140	10.01.01.10382	10.01.01.00168	10.01.01.00154	10.01.01.10396
PFYN 10 M5-IG	10.01.01.00126	10.01.01.11147	10.01.01.00084	10.01.01.10348	10.01.01.00112	10.01.01.00098	10.01.01.10360
PFYN 10 G1/8-AG	10.01.01.00297	10.01.01.11134	10.01.01.00279	10.01.01.10383	10.01.01.00291	10.01.01.00285	10.01.01.10397
PFYN 10 G1/8-IG	10.01.01.00273	10.01.01.11148	10.01.01.00255	10.01.01.10349	10.01.01.00267	10.01.01.00261	10.01.01.10361
PFYN 15 G1/8-AG	10.01.01.00183	10.01.01.11135	10.01.01.00141	10.01.01.10384	10.01.01.00169	10.01.01.00155	10.01.01.10398
PFYN 15 G1/8-IG	10.01.01.00127	10.01.01.11149	10.01.01.00085	10.01.01.10350	10.01.01.00113	10.01.01.00099	10.01.01.10362
PFYN 20 G1/8-AG	10.01.01.00184	10.01.01.11136	10.01.01.00142	10.01.01.10385	10.01.01.00170	10.01.01.00156	-
PFYN 20 G1/8-IG	10.01.01.00128	10.01.01.11150	10.01.01.00086	10.01.01.10351	10.01.01.00114	10.01.01.00100	-
PFYN 25 G1/8-AG	10.01.01.00185	10.01.01.11137	10.01.01.00143	10.01.01.10386	10.01.01.00171	10.01.01.00157	-
PFYN 25 G1/8-IG	10.01.01.00129	10.01.01.11151	10.01.01.00087	10.01.01.10352	10.01.01.00115	10.01.01.00101	-
PFYN 30 G1/8-AG	10.01.01.00186	10.01.01.11138	10.01.01.00144	10.01.01.10387	10.01.01.00172	10.01.01.00158	-
PFYN 30 G1/8-IG	10.01.01.00130	10.01.01.11152	10.01.01.00088	10.01.01.10353	10.01.01.00116	10.01.01.00102	-
PFYN 35 G1/8-AG	10.01.01.00187	10.01.01.11139	10.01.01.00145	10.01.01.10388	10.01.01.00173	10.01.01.00159	-
PFYN 35 G1/8-IG	10.01.01.00131	10.01.01.11153	10.01.01.00089	10.01.01.10354	10.01.01.00117	10.01.01.00103	-
PFYN 40 G1/8-AG	10.01.01.00188	10.01.01.11140	10.01.01.00146	10.01.01.10389	10.01.01.00174	10.01.01.00160	-
PFYN 40 G1/8-IG	10.01.01.00132	10.01.01.11154	10.01.01.00090	10.01.01.10355	10.01.01.00118	10.01.01.00104	-
PFYN 50 G1/8-AG	10.01.01.00189	10.01.01.11141	10.01.01.00147	10.01.01.10390	10.01.01.00175	10.01.01.00161	-
PFYN 50 G1/8-IG	10.01.01.00133	10.01.01.11155	10.01.01.00091	10.01.01.10356	10.01.01.00119	10.01.01.00105	-
PFYN 60 G1/4-AG	10.01.01.00190	10.01.01.11142	10.01.01.00148	-	10.01.01.00176	10.01.01.00162	-
PFYN 60 G1/4-IG	10.01.01.00134	10.01.01.11156	10.01.01.00092	-	10.01.01.00120	10.01.01.00106	-
PFYN 80 G1/4-AG	10.01.01.00191	10.01.01.11143	10.01.01.00149	-	10.01.01.00177	10.01.01.00163	-
PFYN 80 G1/4-IG	10.01.01.00135	10.01.01.11157	10.01.01.00093	-	10.01.01.00121	10.01.01.00107	-
PFYN 95 G1/4-AG	10.01.01.00192	-	10.01.01.00150	-	10.01.01.00178	10.01.01.00164	-
PFYN 95 G1/4-IG	10.01.01.00136	-	10.01.01.00094	-	10.01.01.00122	10.01.01.00108	-
PFYN 120 G1/2-IG	10.01.01.12052	-	10.01.01.00337	-	-	10.01.01.00338	-
PFYN 150 G1/2-IG	-	-	10.01.01.00339	-	-	10.01.01.00340	-
PFYN 200 G1/2-IG	-	-	10.01.01.00341	-	-	10.01.01.00342	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm

Ordering Data Spare Parts Flat Suction Cups

Type	Suction cup material * / hardness in Shore A						
	FPM-65	HT1-60	NBR-55	NBR-AS-55	PU-55	SI-55	SI-AS-55
PFG 1	-	-	10.01.01.00001	10.01.01.10335	-	10.01.01.00021	-
PFG 1.5	-	-	10.01.01.00002	10.01.01.10336	-	10.01.01.00022	-
PFG 2	-	10.01.01.12967	10.01.01.00003	10.01.01.10063	-	10.01.01.00023	10.01.01.10050
PFG 3.5	10.01.01.00064	10.01.01.12981	10.01.01.00004	10.01.01.10042	-	10.01.01.00024	10.01.01.00752
PFG 5	10.01.01.00067	10.01.01.11158	10.01.01.00007	10.01.01.10064	-	10.01.01.00027	10.01.01.10051
PFG 6	10.01.01.00068	10.01.01.11159	10.01.01.00008	10.01.01.10065	-	10.01.01.00028	10.01.01.00626
PFG 8	10.01.01.00069	10.01.01.11160	10.01.01.00009	10.01.01.10043	10.01.01.00049	10.01.01.00029	10.01.01.00647
PFG 10	10.01.01.00070	10.01.01.11161	10.01.01.00010	10.01.01.10066	10.01.01.00050	10.01.01.00030	10.01.01.00701
PFG 15	10.01.01.00071	10.01.01.11162	10.01.01.00011	10.01.01.10067	10.01.01.00051	10.01.01.00031	10.01.01.00627
PFG 20	10.01.01.00072	10.01.01.11163	10.01.01.00012	10.01.01.10337	10.01.01.00052	10.01.01.00032	-
PFG 25	10.01.01.00073	10.01.01.11164	10.01.01.00013	10.01.01.10338	10.01.01.00053	10.01.01.00033	-
PFG 30	10.01.01.00074	10.01.01.11165	10.01.01.00014	10.01.01.10339	10.01.01.00054	10.01.01.00034	-
PFG 35	10.01.01.00075	10.01.01.11166	10.01.01.00015	10.01.01.10340	10.01.01.00055	10.01.01.00035	-
PFG 40	10.01.01.00076	10.01.01.11167	10.01.01.00016	10.01.01.10341	10.01.01.00056	10.01.01.00036	-
PFG 50	10.01.01.00077	10.01.01.11168	10.01.01.00017	10.01.01.10342	10.01.01.00057	10.01.01.00037	-
PFG 60	10.01.01.00078	10.01.01.11169	10.01.01.00018	-	10.01.01.00058	10.01.01.00038	-
PFG 80	10.01.01.00079	10.01.01.11170	10.01.01.00019	-	10.01.01.00059	10.01.01.00039	-
PFG 95	10.01.01.00080	10.01.01.13160	10.01.01.00020	-	10.01.01.00060	10.01.01.00040	-
PFG 120	10.01.01.00389	-	10.01.01.00331	-	-	10.01.01.00332	-
PFG 150	-	10.01.01.13445	10.01.01.00333	-	-	10.01.01.00334	-
PFG 200	-	-	10.01.01.00335	-	-	10.01.01.00336	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Connection Nipples

Type	Connection nipples [AG]		Connection nipples [IG]	
PFYN 1 M3	SA-NIP N001 M3-AG	10.01.01.00315	-	-
PFYN 1.5 M3	SA-NIP N002 M3-AG	10.01.01.00314	-	-
PFYN 2 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-
PFYN 3.5 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-
PFYN 5 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 6 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 8 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 10 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 10 G1/8	SA-NIP N004 G1/8-AG	10.01.01.03528	SA-NIP N004 G1/8-IG	10.01.01.03520
PFYN 15 G1/8	SA-NIP N005 G1/8-AG	10.01.01.03529	SA-NIP N005 G1/8-IG	10.01.01.03521
PFYN 20 G1/8	SA-NIP N006 G1/8-AG	10.01.01.03530	SA-NIP N006 G1/8-IG	10.01.01.03522
PFYN 25 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 30 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 35 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 40 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 50 G1/8	SA-NIP N008 G1/8-AG	10.01.01.03532	SA-NIP N008 G1/8-IG	10.01.01.03524
PFYN 60 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 80 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 95 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 120 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796
PFYN 150 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796
PFYN 200 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796

Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm

Technical Data Flat Suction Cups PFYN

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
PFYN 1	0.03	0.001	2	2	N 001
PFYN 1.5	0.06	0.001	2	2	N 002
PFYN 2	0.12	0.001	2	2	N 003
PFYN 3.5	0.42	0.002	8	2	N 003
PFYN 5	0.75	0.005	8	2	N 004
PFYN 6	1.20	0.008	8	2	N 004
PFYN 8	2.30	0.030	10	2	N 004
PFYN 10	4.00	0.070	13	2	N 004
PFYN 15	9.00	0.400	13	4	N 005
PFYN 20	15.50	0.800	20	4	N 006
PFYN 25	26.50	1.300	25	4	N 007
PFYN 30	34.00	1.300	40	4	N 007
PFYN 35	44.00	2.700	50	4	N 007
PFYN 40	57.70	3.800	50	4	N 007
PFYN 50	91.00	7.000	75	4	N 008
PFYN 60	125.00	10.000	100	6	N 009
PFYN 80	260.00	25.000	150	6	N 009
PFYN 95	350.00	35.000	200	6	N 009
PFYN 120	540.00	77.800	300	9	N 010
PFYN 150	842.00	176.300	300	9	N 010
PFYN 200	1498.00	427.000	400	9	N 010

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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Flat Suction Cups (Round)

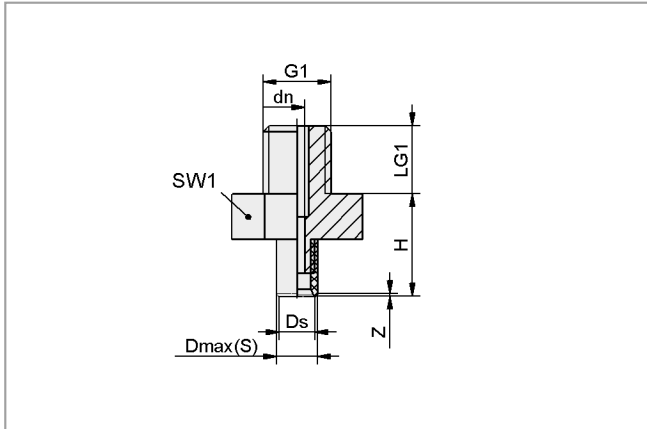


Flat Suction Cups PFYN

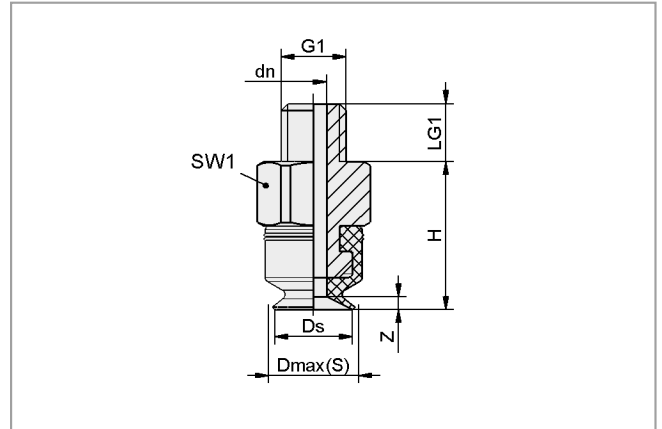
Suction area (\emptyset) from 1 mm to 200 mm



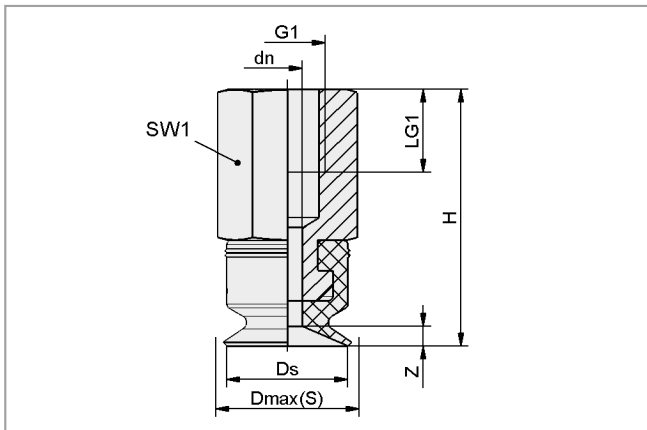
Design Data Flat Suction Cups PFYN



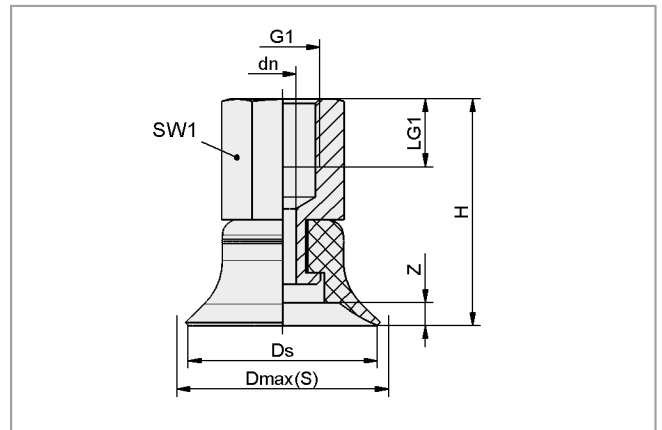
PFYN 1 to 1.5 AG



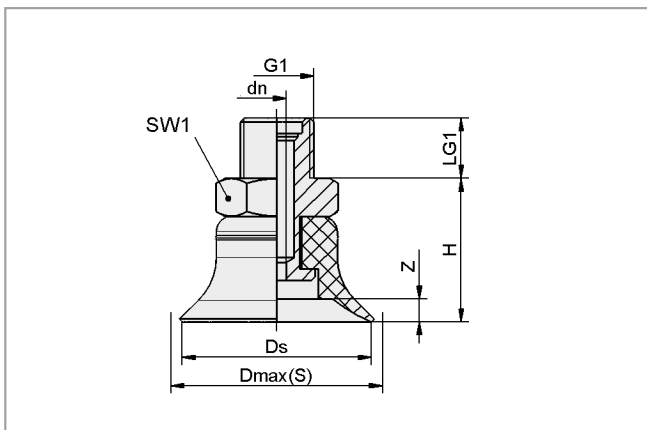
PFYN 2 to 10 AG



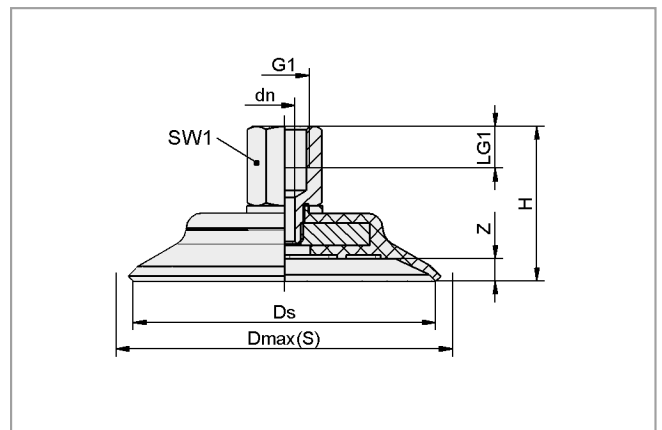
PFYN 5 to 10 IG



PFYN 15 to 50 IG



PFYN 15 to 50 AG



PFYN 60 to 95 IG

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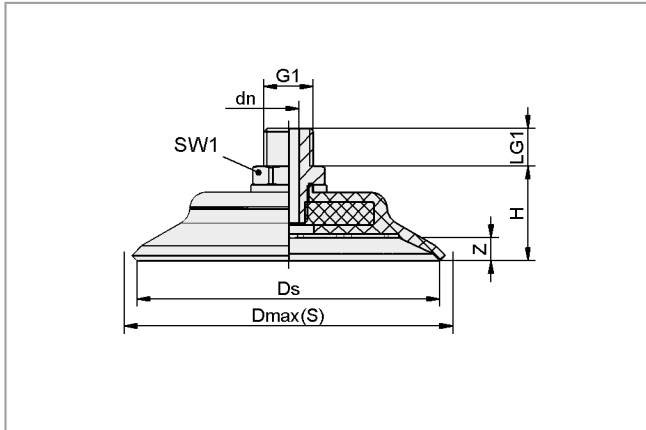
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Flat Suction Cups (Round)

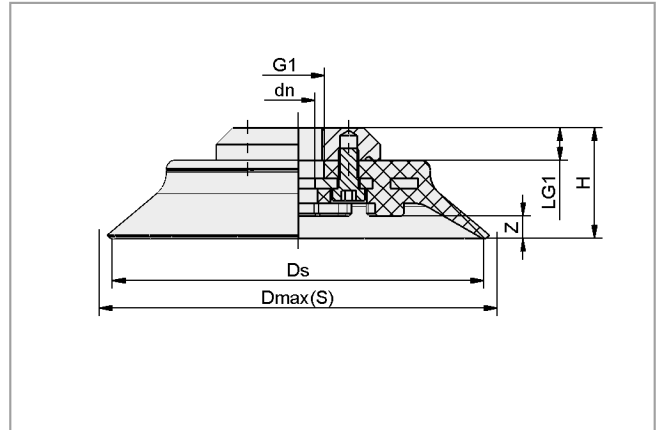


Flat Suction Cups PFYN

Suction area (\emptyset) from 1 mm to 200 mm



PFYN 60 to 95 AG



PFYN 120 to 200 IG

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Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm



Design Data Flat Suction Cups PFYN

Type	Dimensions in mm*							
	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
PFYN 1 M3-AG	0.4	1.2	1.0	M3-M	3.6	3.0	5	0.1
PFYN 1.5 M3-AG	0.7	1.8	1.5	M3-M	4.5	3.0	5	0.1
PFYN 2 M3-AG	1.0	2.5	2.0	M3-M	6.0	3.0	5	0.5
PFYN 3.5 M3-AG	1.0	4.0	3.5	M3-M	6.0	3.0	5	0.5
PFYN 5 M5-AG	1.5	5.5	5.0	M5-M	11.5	4.5	8	0.9
PFYN 5 M5-IG	1.5	5.5	5.0	M5-F	16.5	5.5	8	0.9
PFYN 6 M5-AG	2.0	6.5	6.0	M5-M	11.5	4.5	8	1.0
PFYN 6 M5-IG	2.0	6.5	6.0	M5-F	16.5	5.5	8	1.0
PFYN 8 M5-AG	2.0	9.0	8.0	M5-M	12.0	4.5	8	1.3
PFYN 8 M5-IG	2.0	9.0	8.0	M5-F	17.0	5.5	8	1.3
PFYN 10 M5-AG	2.0	11.5	10.0	M5-M	12.5	4.5	8	1.4
PFYN 10 M5-IG	2.0	11.5	10.0	M5-F	17.5	5.5	8	1.4
PFYN 10 G1/8-AG	2.0	11.5	10.0	G1/8"-M	12.5	8.0	14	1.4
PFYN 10 G1/8-IG	2.0	11.5	10.0	G1/8"-F	23.5	9.0	14	1.4
PFYN 15 G1/8-AG	2.0	17.5	15.0	G1/8"-M	13.0	8.0	14	1.9
PFYN 15 G1/8-IG	2.0	17.5	15.0	G1/8"-F	24.0	9.0	14	1.9
PFYN 20 G1/8-AG	2.0	23.0	20.0	G1/8"-M	15.0	8.0	14	2.2
PFYN 20 G1/8-IG	2.0	23.0	20.0	G1/8"-F	26.0	9.0	14	2.2
PFYN 25 G1/8-AG	2.4	27.5	25.0	G1/8"-M	19.0	8.0	14	3.0
PFYN 25 G1/8-IG	3.5	27.5	25.0	G1/8"-F	30.0	9.0	14	3.0
PFYN 30 G1/8-AG	2.4	31.5	28.8	G1/8"-M	17.0	8.0	14	2.0
PFYN 30 G1/8-IG	3.5	31.5	28.8	G1/8"-F	28.0	9.0	14	2.0
PFYN 35 G1/8-AG	2.4	38.0	35.0	G1/8"-M	19.0	8.0	14	3.0
PFYN 35 G1/8-IG	3.5	38.0	35.0	G1/8"-F	30.0	9.0	14	3.0
PFYN 40 G1/8-AG	2.4	43.0	40.0	G1/8"-M	19.0	8.0	14	3.5
PFYN 40 G1/8-IG	3.5	43.0	40.0	G1/8"-F	30.0	9.0	14	3.5
PFYN 50 G1/8-AG	2.4	53.5	50.0	G1/8"-M	20.0	8.0	14	4.0
PFYN 50 G1/8-IG	3.5	53.5	50.0	G1/8"-F	31.0	9.0	14	4.0
PFYN 60 G1/4-AG	5.5	64.0	60.0	G1/4"-M	23.0	10.0	17	4.7
PFYN 60 G1/4-IG	5.5	64.0	60.0	G1/4"-F	39.0	11.0	17	4.7
PFYN 80 G1/4-AG	5.5	86.0	80.0	G1/4"-M	25.0	10.0	17	6.0
PFYN 80 G1/4-IG	5.5	86.0	80.0	G1/4"-F	41.0	11.0	17	6.0
PFYN 95 G1/4-AG	5.5	102.0	95.0	G1/4"-M	25.5	10.0	17	6.0
PFYN 95 G1/4-IG	5.5	102.0	95.0	G1/4"-F	41.5	11.0	17	6.0
PFYN 120 G1/2-IG	13.5	124.0	120.0	G1/2"-F	36.5	13.0	-	6.0
PFYN 150 G1/2-IG	13.5	158.0	147.5	G1/2"-F	45.5	13.0	-	9.0
PFYN 200 G1/2-IG	13.5	222.0	193.0	G1/2"-F	50.5	13.0	-	13.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Flat Suction Cups (Round)

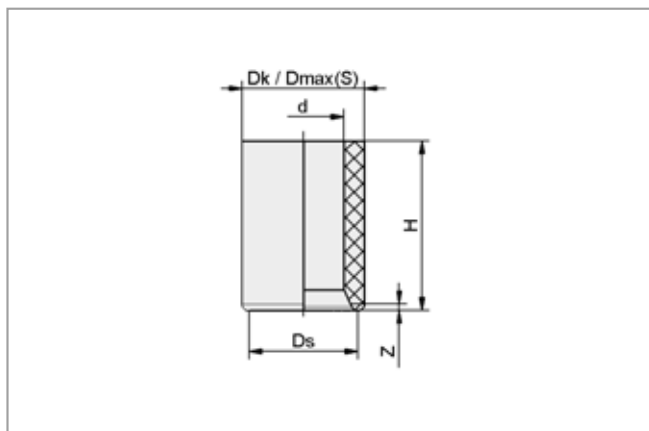


Flat Suction Cups PFYN

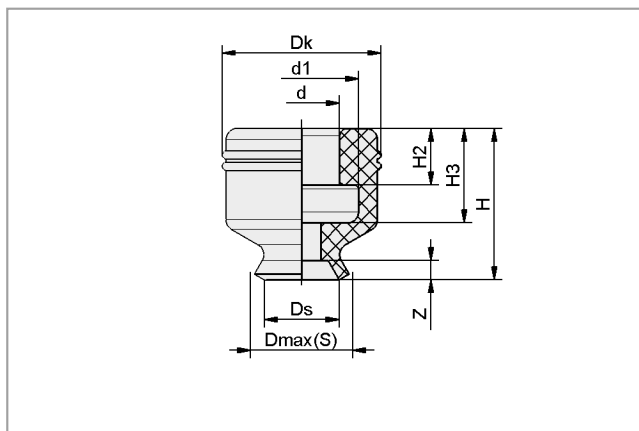
Suction area (\emptyset) from 1 mm to 200 mm



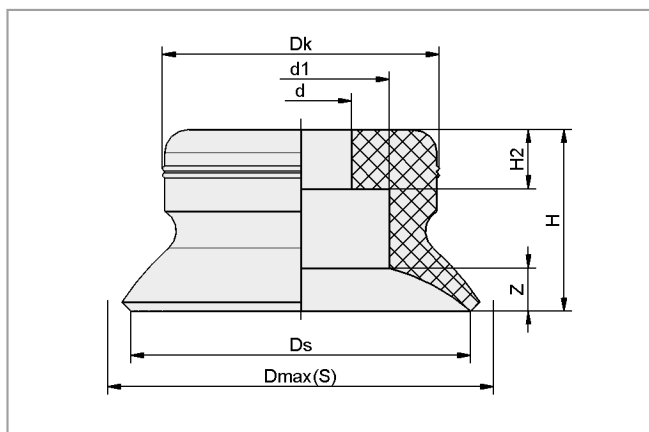
Design Data Flat Suction Cups PFG - Spare Parts for PFYN



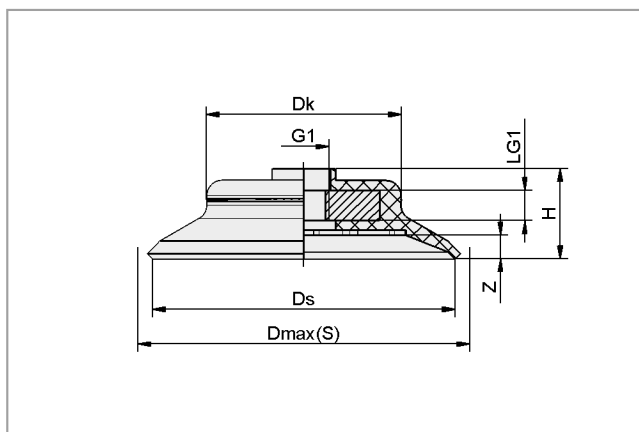
PFG 1 to 1.5



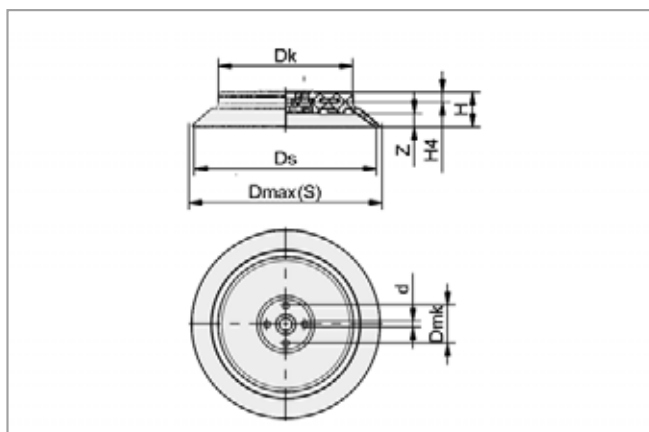
PFG 2 to 10



PFG 15 to PFG 50



PFG 60 to PFG 95



PFG 120 to 200

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Flat Suction Cups (Round)



Flat Suction Cups PFYN

Suction area (Ø) from 1 mm to 200 mm



Design Data Flat Suction Cups PFG - Spare Parts for PFYN

Type	Dimensions in mm*												
	d	d1	Dk	Dmax(S)**	Dmk	Ds	G1	H	H2	H3	H4	LG1	Z (Stroke)
PFG 1	0.8	-	1.2	1.2	-	1.0	-	1.6	-	-	-	-	0.1
PFG 1.5	1.2	-	1.8	1.8	-	1.5	-	2.5	-	-	-	-	0.1
PFG 2	2.0	3.0	4.2	3.0	-	2.0	-	4.0	1.5	2.5	-	-	0.5
PFG 3.5	2.0	3.0	4.2	4.0	-	3.5	-	4.0	1.5	2.5	-	-	0.5
PFG 5	4.0	6.0	7.7	5.5	-	5.0	-	6.5	2.0	4.0	-	-	0.9
PFG 6	4.0	6.0	7.7	6.5	-	6.0	-	6.5	2.0	4.0	-	-	1.0
PFG 8	4.0	6.0	8.2	9.0	-	8.0	-	7.0	2.0	4.0	-	-	1.3
PFG 10	4.0	6.0	8.7	11.5	-	10.0	-	7.5	2.0	4.0	-	-	1.4
PFG 15	4.5	7.8	12.2	17.5	-	15.0	-	8.0	2.6	-	-	-	1.9
PFG 20	4.5	11.0	15.2	23.0	-	20.0	-	10.0	4.5	-	-	-	2.2
PFG 25	6.0	11.0	16.2	27.5	-	25.0	-	14.0	7.0	-	-	-	3.0
PFG 30	6.0	11.0	15.1	31.5	-	28.8	-	12.0	7.0	-	-	-	2.0
PFG 35	6.0	11.0	20.5	38.0	-	35.0	-	14.0	7.0	-	-	-	3.0
PFG 40	6.0	11.0	24.3	43.0	-	40.0	-	14.0	7.0	-	-	-	3.5
PFG 50	8.0	20.0	29.1	53.5	-	50.0	-	15.0	7.0	-	-	-	4.0
PFG 60	-	-	38.7	64.0	-	60.0	M10x1.25-F	18.0	-	-	-	6	4.7
PFG 80	-	-	52.3	86.0	-	80.0	M10x1.25-F	20.5	-	-	-	6	6.0
PFG 95	-	-	68.2	102.0	-	95.0	M10x1.25-F	19.0	-	-	-	6	6.0
PFG 120	7.3	-	89.5	124.0	40	120.0	-	23.5	-	-	8.5	-	6.0
PFG 150	7.0	-	104.5	158.0	40	147.5	-	31.0	-	-	11.0	-	9.0
PFG 200	7.0	-	142.5	222.0	40	193.0	-	37.0	-	-	11.0	-	13.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Flat Suction Cups (Round)



Flat Suction Cups PFYN VU1

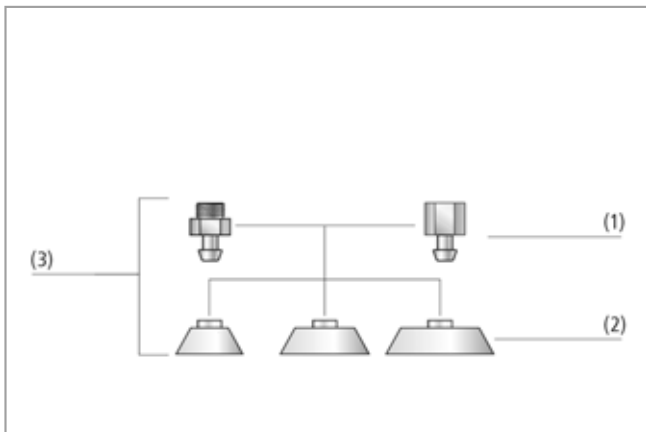
Suction area (Ø) from 15 mm to 95 mm



Suitable for Industry Specific Applications



Flat suction cups PFYN VU1



System design flat suction cups PFYN VU1



Flat suction cups PFYN VU1 being used for handling large sheet metal parts

Applications

- Round, flat suction cup for applications in multi-shift operations with very shortcycle times
- Handling of oily metal sheets (automobile production), cardboard and sheets of wood
- Handling of extremely abrasive workpieces such as rough cardboard sheets

Design

- Robust, wear-resistant suction cup PFYN (3) with single sealing lip, consisting of suction cup PFG (2), made of Vulkollan VU1, and connection nipple (1)
- Suction cup with positive connection to nipple which withstands even very high loading
- Within each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...

- Material Vulkollan VU1, very resistant to tearing
- Good resistance to chemicals
- Very low wear, about 10 - 12 mm³ to DIN 53516
- Supports on the bottom
- Temperature resistance: -40 °C to +80 °C, short-term resistance up to +100 °C

Your Benefits...

- > Extremely wear-resistant suction cup for very high loads and a long lifetime
- > Unaffected by oil (handling of sheet metal)
- > Lifetime up to 20 times higher, compared to standard NBR
- > No permanent deformation of thin-walled workpieces
- > Suitable for use at very low and high temperatures

Flat Suction Cups (Round)



Flat Suction Cups PFYN VU1

Suction area (Ø) from 15 mm to 95 mm

Designation Code Flat Suction Cups PFYN VU1

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example PFYN 80 VU1-72 G1/4-IG:			
PFYN	80	VU1-72	G1/4-IG
PFYN	15 to 95	VU1-72	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering data Flat Suction Cups PFYN VU1

Suction cup PFYN VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:

- Suction cup of type PFG VU 1 – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup PFG VU1, connection nipple SA-NIP

Flat Suction Cups PFYN VU1

Type*	Connection			
	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F
PFYN 15 VU1-72	-	-	10.01.01.00556	10.01.01.00557
PFYN 30 VU1-72	-	-	10.01.01.00550	10.01.01.00558
PFYN 50 VU1-72	10.01.01.00521	10.01.01.00547	-	-
PFYN 60 VU1-72	10.01.01.00608	10.01.01.00609	-	-
PFYN 80 VU1-72	10.01.01.00522	10.01.01.00524	-	-
PFYN 95 VU1-72	10.01.01.00523	10.01.01.00525	-	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Flat Suction Cups

Type*	Flat suction cup (round)	
PFYN 15 VU1-72	PFG 15 VU1-72 N005	10.01.01.00555
PFYN 30 VU1-72	PFG 30 VU1-72 N007	10.01.01.00549
PFYN 50 VU1-72	PFG 50 VU1-72 N011	10.01.01.00424
PFYN 60 VU1-72	PFG 60 VU1-72 N011	10.01.01.00606
PFYN 80 VU1-72	PFG 80 VU1-72 N012	10.01.01.00426
PFYN 95 VU1-72	PFG 95 VU1-72 N012	10.01.01.00430

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Flat Suction Cups (Round)



Flat Suction Cups PFYN VU1

Suction area (\emptyset) from 15 mm to 95 mm



Ordering Data Spare Parts Connection Nipples

Type	Connection nipple	
PFYN 15 VU1-72 G1/8-AG	SA-NIP N005 G1/8-AG DN200	10.01.01.03529
PFYN 15 VU1-72 G1/8-IG	SA-NIP N005 G1/8-IG DN200	10.01.01.03521
PFYN 30 VU1-72 G1/8-AG	SA-NIP N007 G1/8-AG DN240	10.01.01.03531
PFYN 30 VU1-72 G1/8-IG	SA-NIP N007 G1/8-IG DN350	10.01.01.03523
PFYN 50 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
PFYN 50 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
PFYN 60 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
PFYN 60 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
PFYN 80 VU1-72 G1/4-AG	SA-NIP N012 G1/4-AG DN500	10.01.01.10664
PFYN 80 VU1-72 G1/4-IG	SA-NIP N012 G1/4-IG DN600	10.01.01.00528
PFYN 95 VU1-72 G1/4-AG	SA-NIP N012 G1/4-AG DN500	10.01.01.10664
PFYN 95 VU1-72 G1/4-IG	SA-NIP N012 G1/4-IG DN600	10.01.01.00528



Technical Data Flat Suction Cups PFYN VU1

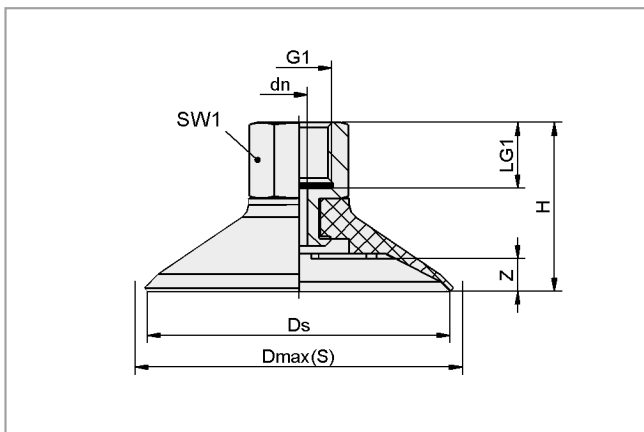
Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
PFYN 15 VU1-72	8.5	0.5	13	4	N 005
PFYN 30 VU1-72	32.0	1.7	30	4	N 007
PFYN 50 VU1-72	95.0	6.0	75	6	N 011
PFYN 60 VU1-72	130.0	15.0	75	6	N 011
PFYN 80 VU1-72	260.0	30.0	100	6	N 012
PFYN 95 VU1-72	350.0	42.0	140	6	N 012

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

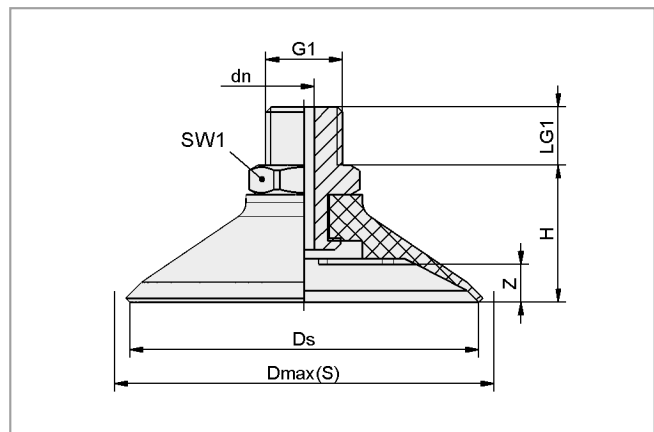
**The recommended hose diameter refers to a hose length of approx. 2 m



Design Data Flat Suction Cups PFYN VU1



PFYN 15 to 95 VU1 IG



PFYN 15 to 95 VU1 AG

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Flat Suction Cups (Round)



Flat Suction Cups PFYN VU1

Suction area (\emptyset) from 15 mm to 95 mm



Design Data Flat Suction Cups PFYN VU1

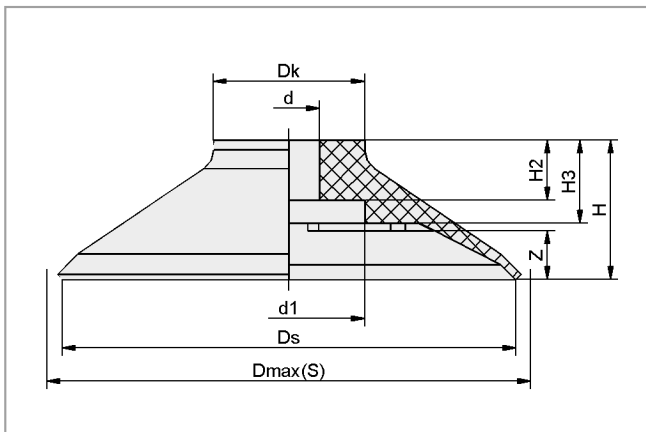
Type	Dimensions in mm*								
	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)	
PFYN 15 VU1-72 G1/8-AG	2.0	17.5	14.5	G1/8"-M	14.5	8	14	1.5	
PFYN 15 VU1-72 G1/8-IG	2.0	17.5	14.5	G1/8"-F	25.5	9	14	1.5	
PFYN 30 VU1-72 G1/8-AG	2.0	31.5	30.0	G1/8"-M	18.0	8	14	3.0	
PFYN 30 VU1-72 G1/8-IG	2.0	31.5	30.0	G1/8"-F	29.0	9	14	3.0	
PFYN 50 VU1-72 G1/4-AG	3.5	53.0	50.0	G1/4"-M	22.0	10	17	4.5	
PFYN 50 VU1-72 G1/4-IG	3.5	53.0	50.0	G1/4"-F	32.0	12	17	4.5	
PFYN 60 VU1-72 G1/4-AG	3.5	67.0	60.0	G1/4"-M	23.5	10	17	6.0	
PFYN 60 VU1-72 G1/4-IG	3.5	67.0	60.0	G1/4"-F	33.5	12	17	6.0	
PFYN 80 VU1-72 G1/4-AG	6.0	86.0	80.0	G1/4"-M	30.0	10	22	6.0	
PFYN 80 VU1-72 G1/4-IG	6.0	86.0	80.0	G1/4"-F	40.0	12	22	6.0	
PFYN 95 VU1-72 G1/4-AG	6.0	101.0	95.0	G1/4"-M	30.0	10	22	6.0	
PFYN 95 VU1-72 G1/4-IG	6.0	101.0	95.0	G1/4"-F	40.0	12	22	6.0	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum



Design Data Flat Suction Cups PFG VU1 - Spare Parts for PFYN VU1



PFG VU1

Type	Dimensions in mm*								
	d	d1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
PFG 15 VU1-72	4.5	8.5	11.5	17.0	14.5	9.5	2.5	4.5	1.5
PFG 30 VU1-72	6.0	11.0	16.0	31.5	29.0	13.0	7.0	7.0	3.0
PFG 50 VU1-72	8.0	13.0	18.0	53.0	49.0	17.0	8.0	11.0	4.5
PFG 60 VU1-72	8.0	20.0	20.0	67.0	60.0	18.5	8.0	11.0	6.0
PFG 80 VU1-72	12.0	25.0	52.3	86.0	80.0	25.0	12.0	17.5	6.0
PFG 95 VU1-72	12.0	25.0	31.0	101.0	95.0	25.0	12.0	16.5	6.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Flat Suction Cups (Round)



Flat Suction Cups SGAN

Suction area (\emptyset) from 7 mm to 16 mm



Suitable for Industry Specific Applications



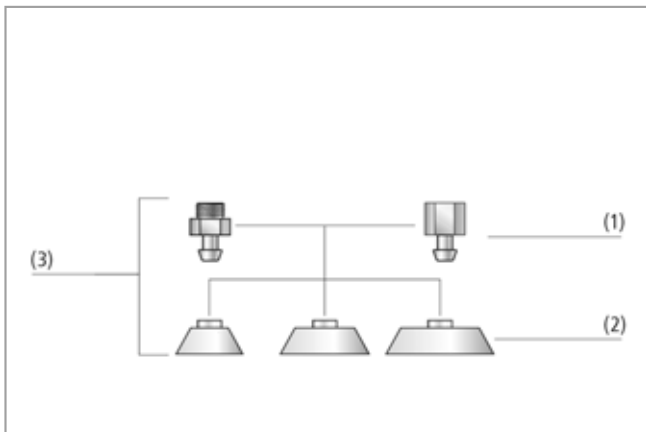
Flat suction cups SGAN

Applications

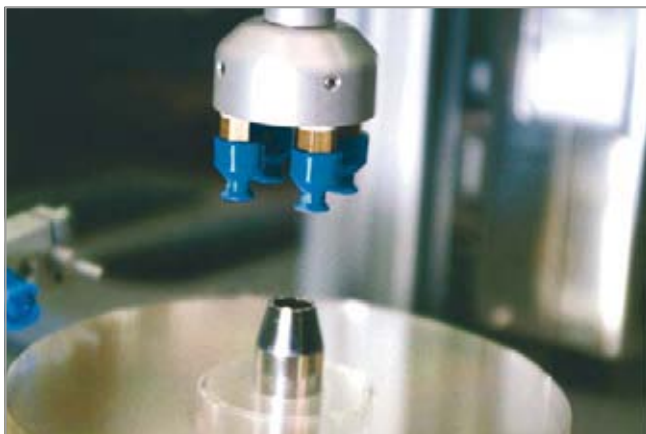
- Round and flat suction cup for handling of CDs and DVDs, wood veneers, wafers and solar cells

Design

- Robust and wear-resistant suction cup SGAN (3) with single sealing lip, consisting of suction cup SGA (2) and connection nipple (1)
- Connection nipple is plugged in on cups of all sizes
- With each nipple family, the replacement cups and nipples can be combined as desired



System design flat suction cups SGAN



Flat suction cups SGAN being used for handling CDs and DVDs

Our Highlights...

- Soft, flexible sealing lip
- Special material: silicone SI
- Special material: polyurethane PU
- Optimum shape

Your Benefits...

- > For sensitive workpieces, such as CDs
- > Very suitable for particularly high and low temperatures
- > Long lifetime, high resistance to wear
- > Particularly suitable for multi-shift operations with very short cycle times

Flat Suction Cups (Round)



Flat Suction Cups SGAN

Suction area (Ø) from 7 mm to 16 mm

Designation Code Flat Suction Cups SGAN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGAN 13 PU-60 G1/8-IG:			
SGAN	13	PU-60	G1/8-IG
SGAN	7	PU-60	M5-AG (AG = male (M))
	9	SI-55	M5-IG (IG = female (F))
	13		G1/8-AG
	16		G1/8-IG

Ordering Data Flat Suction Cups SGAN

Suction cup SGAN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type SGA – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup SGA, connection nipple SA-NIP

Flat Suction Cups SGAN

Type	Suction cup material * / hardness in Shore A	
	PU-60	SI-55
SGAN 7 M5-AG	10.01.01.00800	10.01.01.00798
SGAN 7 M5-IG	10.01.01.00799	10.01.01.00797
SGAN 9 M5-AG	10.01.01.00804	10.01.01.00802
SGAN 9 M5-IG	10.01.01.00803	10.01.01.00801
SGAN 13 G1/8-AG	10.01.01.00808	10.01.01.00806
SGAN 13 G1/8-IG	10.01.01.00807	10.01.01.00805
SGAN 16 G1/8-AG	10.01.01.00812	10.01.01.00810
SGAN 16 G1/8-IG	10.01.01.00811	10.01.01.00809

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Flat Suction Cups and Connection Nipples

Type*	Polyurethane PU	Silicone SI	Type	Connection nipple	
SGA 7	10.01.01.00570	10.01.01.00347	SGAN 7 M5-AG	SA-NIP N028 M5-AG DN200	10.01.01.00753
SGA 9	10.01.01.00569	10.01.01.00348	SGAN 7 M5-IG	SA-NIP N028 M5-IG DN200	10.01.01.00813
SGA 13	10.01.01.00571	10.01.01.00349	SGAN 9 M5-AG	SA-NIP N028 M5-AG DN200	10.01.01.00753
SGA 16	10.01.01.00572	10.01.01.00452	SGAN 9 M5-IG	SA-NIP N028 M5-IG DN200	10.01.01.00813
			SGAN 13 G1/8-AG	SA-NIP N029 G1/8-AG DN350	10.01.01.00816
			SGAN 13 G1/8-IG	SA-NIP N029 G1/8-IG DN350	10.01.01.00815
			SGAN 16 G1/8-AG	SA-NIP N029 G1/8-AG DN350	10.01.01.00816
			SGAN 16 G1/8-IG	SA-NIP N029 G1/8-IG DN350	10.01.01.00815

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Flat Suction Cups (Round)



Flat Suction Cups SGAN

Suction area (\emptyset) from 7 mm to 16 mm

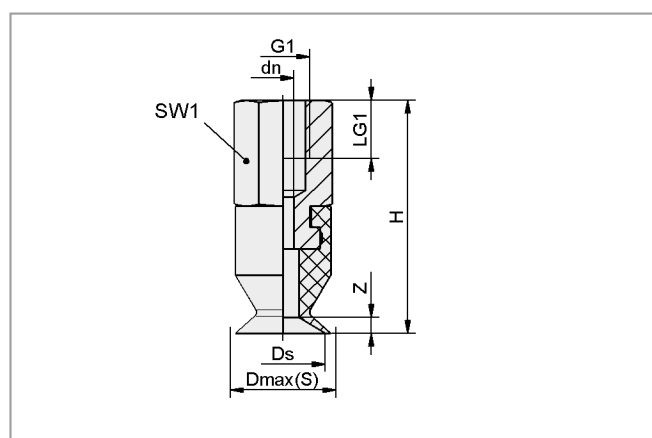
Technical Data Flat Suction Cups SGAN

Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
SGAN 7	1.6	0.186	8	2	N 028
SGAN 9	2.1	0.000	10	2	N 028
SGAN 13	4.7	0.441	13	4	N 029
SGAN 16	6.9	0.607	15	4	N 029

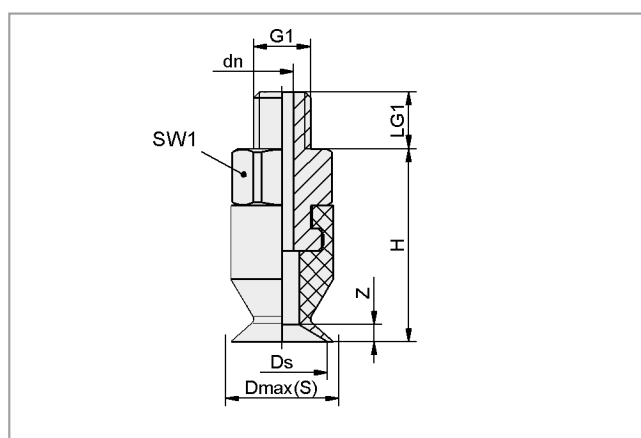
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Cups SGAN



SGAN 7 to 16 IG



SGAN 7 to 16 AG

Type	Dimensions in mm*							
	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z Stroke
SGAN 7 M5-AG	2.0	8	7	M5-M	17	5.0	8	1.0
SGAN 7 M5-IG	2.0	8	7	M5-F	22	5.5	8	1.0
SGAN 9 M5-AG	2.0	9	8	M5-M	17	5.0	8	1.5
SGAN 9 M5-IG	2.0	9	8	M5-F	22	5.5	8	1.5
SGAN 13 G1/8-AG	3.0	14	12	G1/8"-M	17	8.0	14	2.0
SGAN 13 G1/8-IG	3.0	14	12	G1/8"-F	25	8.0	14	2.0
SGAN 16 G1/8-AG	3.0	18	15	G1/8"-M	17	8.0	14	2.0
SGAN 16 G1/8-IG	3.0	18	15	G1/8"-F	25	8.0	14	2.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Flat Suction Cups (Round)

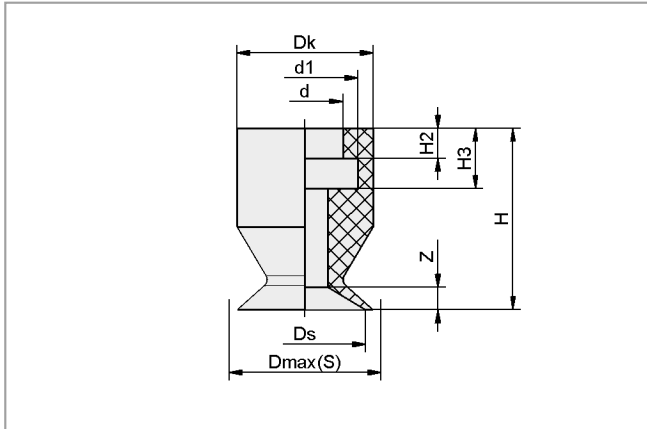


Flat Suction Cups SGAN

Suction area (\emptyset) from 7 mm to 16 mm



Design Data Flat Suction Cups SGA - Spare Parts for SGAN



SGA 7 to 16

Type	Dimensions in mm*									
	d	d1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)	
SGA 7	5	7	9	8	7	12.0	2.0	4.0	1.0	
SGA 9	5	7	9	9	8	12.0	2.0	4.0	1.5	
SGA 13	9	12	15	14	12	11.5	1.8	3.6	2.0	
SGA 16	9	12	16	18	15	12.0	2.0	4.0	2.0	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Flat Suction Cups (Round)



Suction Plates SPU

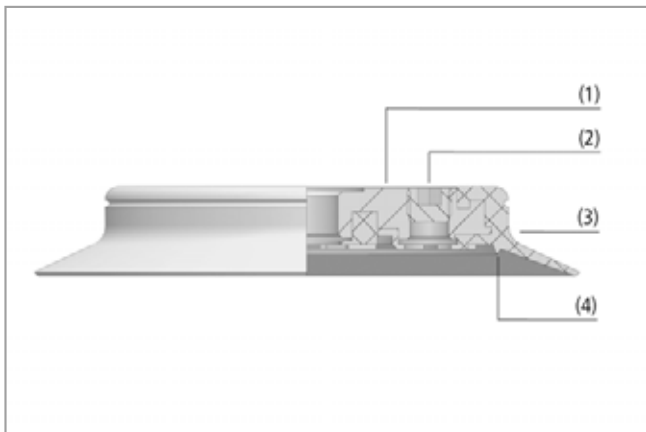
Suction area (\emptyset) from 100 mm to 400 mm



Suitable for Industry Specific Applications



Suction plates SPU



System design suction plates SPU

Applications

- Round suction plate for handling of smooth, flat workpieces
- Series SPU B with thicker sealing lip: handling of workpieces with a slightly rough surface, such as wood or scaly metal sheets
- Series SPU AE with integrated peeling insert: handling of thin metal sheets (approx. 1.0 - 2.5 mm); overcomes the self-adhesion between the sheets
- Series SPU TV with touch valve: deactivation of unused suction cups to prevent the entry of unwanted air

Design

- Suction cup SPU consisting of sealing ring (3) and aluminum support plate (1)
- Sealing ring clipped securely onto support plate with positive locking
- Internal sealing edge (4) for better sealing on slightly rough surfaces
- Side vacuum connector (2) normally sealed with a plug (glued into position for extra safety)
- Series SPU TV: touch valve already installed
- Series SPU AE: peeling insert on the bottom side already installed
- When worn, the seal can be replaced separately

Our Highlights...

- Supports on the bottom
- Low internal volume
- Wide range of diameters
- Optimum shape

Your Benefits...

- > No permanent deformation of thin-walled workpieces
- > Very short cycle times
- > Wide range of versions for many different workpieces
- > High suction force in spite of small dimensions



Suction plates SPU being used for handling coated chipboards

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Flat Suction Cups (Round)



Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

Designation Code Suction Plates SPU

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example SPU 160 NBR-55 G1/2-IG TV:				
SPU	160	NBR-55	G1/2-IG	TV
SPU	100 to 400	NBR-55 SI-60	G1/4-IG (IG = female (F)) G1/2-IG	AE peeling insert B steep sealing lip TV touch valve

Ordering Data Suction Plates SPU

Suction plate SPU (sealing ring + support plate) is delivered assembled. The assembly consists of:

- Sealing ring of type DR-SPU – elastomer part, available in various diameters
- Aluminium support plate, available with various threads
- Optional product addition: touch valve, steep sealing lip, peeling insert

Available spare parts: sealing ring DR-SPU, touch valve

Suction Plates SPU

Type	Suction cup material * / hardness in Shore A	
	NBR-55	SI-60
SPU 100 G1/4-IG	10.01.01.01107	10.01.01.01108
SPU 125 G1/4-IG	10.01.01.01102	10.01.01.01103
SPU 125 G1/4-IG TV	10.01.01.01157	10.01.01.01158
SPU 125 G1/4-IG AE	10.01.01.01159	10.01.01.01160
SPU 160 G1/2-IG	10.01.01.01116	10.01.01.01117
SPU 160 G1/2-IG TV	10.01.01.01153	10.01.01.01154
SPU 160 G1/2-IG AE	10.01.01.01155	10.01.01.01156
SPU 210 G1/2-IG	10.01.01.01092	10.01.01.01093
SPU 210 G1/2-IG B	10.01.01.10552	-
SPU 210 G1/2-IG TV	10.01.01.01149	10.01.01.01150
SPU 210 G1/2-IG AE	10.01.01.01151	10.01.01.01152
SPU 250 G1/2-IG	10.01.01.01097	10.01.01.01098
SPU 250 G1/2-IG B	10.01.01.10589	-
SPU 250 G1/2-IG TV	10.01.01.01209	10.01.01.01210
SPU 300 G1/2-IG	10.01.01.01134	10.01.01.01135
SPU 360 G1/2-IG B	10.01.01.10588	-
SPU 400 G1/2-IG	10.01.01.01138	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Flat Suction Cups (Round)



Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

Ordering Data Spare Parts Suction Plates

Type	Suction cup material * / hardness in Shore A	
	Nitrile rubber NBR	Silicone SI
DR-SPU 100	10.01.01.01104	10.01.01.01105
DR-SPU 125	10.01.01.01099	10.01.01.01100
DR-SPU 160	10.01.01.01111	10.01.01.01112
DR-SPU 210	10.01.01.01089	10.01.01.01090
DR-SPU 210 B	10.01.01.10502	-
DR-SPU 250	10.01.01.01094	10.01.01.01095
DR-SPU 250 B	10.01.01.10579	-
DR-SPU 300	10.01.01.01131	10.01.01.01132
DR-SPU 360 B	10.01.01.10584	-
DR-SPU 400	10.01.01.01136	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Sensing Valve

Type	Sensing valve
SPU 125 G1/4-IG TV	10.05.10.00061
SPU 160 G1/2-IG TV	10.05.10.00061
SPU 210 G1/2-IG TV	10.05.10.00061
SPU 250 G1/2-IG TV	10.05.10.00038

Technical Data Suction Plates SPU

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SPU 100 G1/4-IG	425	185	44	130	9
SPU 125 G1/4-IG	660	365	76	220	9
SPU 125 G1/4-IG TV	660	365	75	220	9
SPU 125 G1/4-IG AE	660	365	77	-	9
SPU 160 G1/2-IG	1090	600	142	350	12
SPU 160 G1/2-IG TV	1090	600	142	350	9
SPU 160 G1/2-IG AE	1090	600	151	-	12
SPU 210 G1/2-IG	1870	1250	226	750	12
SPU 210 G1/2-IG B	1870	1190	321	750	12
SPU 210 G1/2-IG TV	1870	1250	192	750	9
SPU 210 G1/2-IG AE	1870	1250	194	-	12
SPU 250 G1/2-IG	2650	1940	370	2200	12
SPU 250 G1/2-IG B	2650	1940	512	1500	12
SPU 250 G1/2-IG TV	2650	1940	371	2200	12
SPU 300 G1/2-IG	3810	3010	491	3500	12
SPU 360 G1/2-IG B	5500	4730	1289	3000	12
SPU 400 G1/2-IG	6780	5870	890	6500	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**Suction force referred to the sealing-edge diameter d2

***The recommended hose diameter refers to a hose length of approx. 2 m

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Flat Suction Cups (Round)

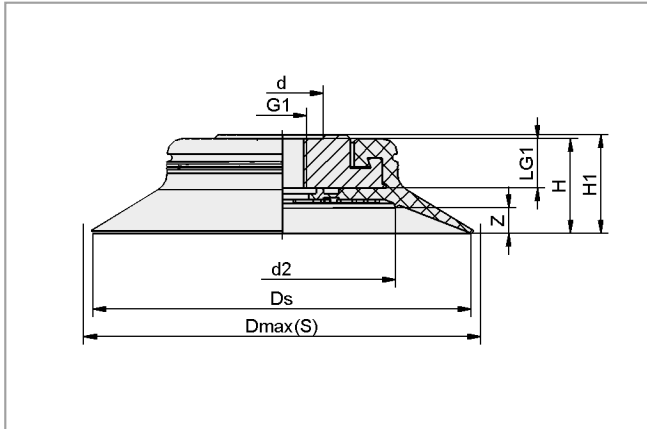


Suction Plates SPU

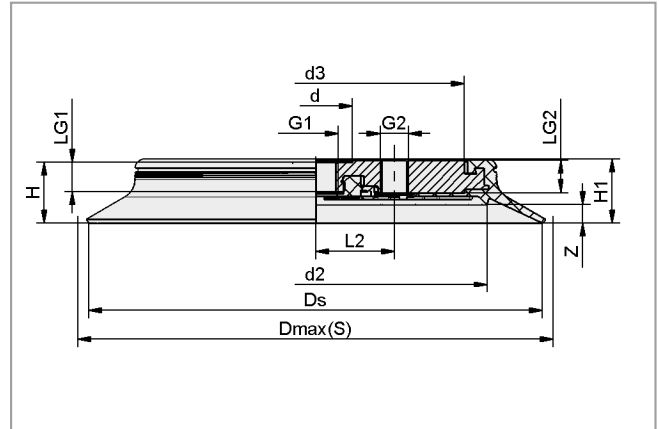
Suction area (Ø) from 100 mm to 400 mm



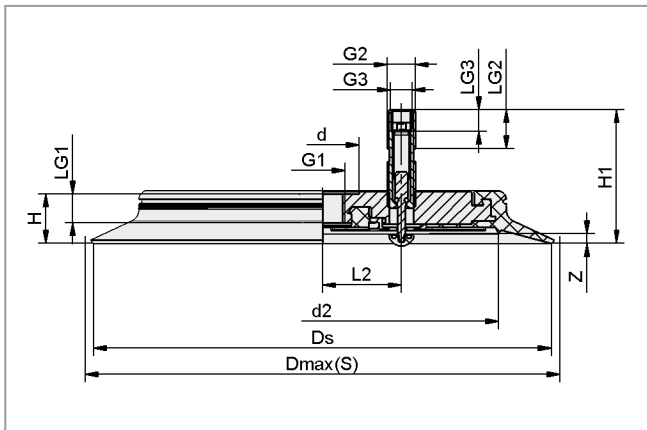
Design Data Suction Plates SPU



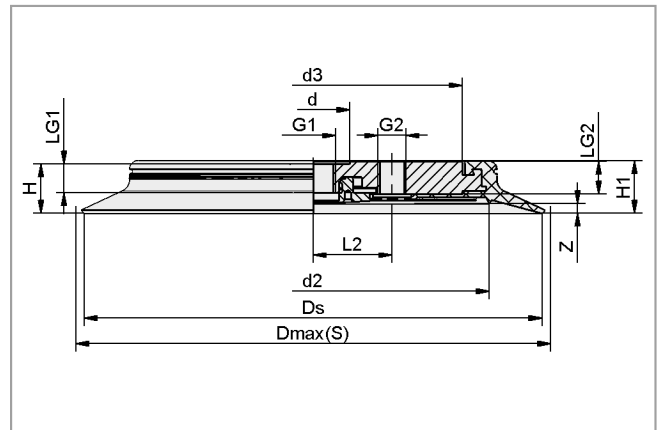
SPU 100



SPU 125 to 400 (B)



SPU 125 to 250 TV



SPU 125 to 210 AE

Type	Dimensions in mm*														
	d	d2	d3	Dmax(S)**	Ds	G1	G2	G3	H	H1	L2	LG1	LG2	LG3	Z (Stroke)
SPU 100 G1/4-IG	22	60	-	108.0	100	G1/4"-F	-	-	25.0	26.0	-	13.0	-	-	7
SPU 125 G1/4-IG	22	83	61.0	132.0	125	G1/4"-F	G1/4"-F	-	25.0	26.0	22.0	13.0	14	-	7
SPU 125 G1/4-IG TV	22	83	-	132.0	125	G1/4"-F	G1/4"-M	G1/8"-F	25.0	62.0	22.0	13.0	36	7	7
SPU 125 G1/4-IG AE	22	83	61.0	132.0	125	G1/4"-F	G1/4"-F	-	25.0	26.0	22.0	13.0	14	-	7
SPU 160 G1/2-IG	34	113	88.0	170.0	160	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	7
SPU 160 G1/2-IG TV	34	113	-	170.0	160	G1/2"-F	G1/4"-M	G1/8"-F	25.0	62.0	36.5	13.5	18	10	7
SPU 160 G1/2-IG AE	34	113	88.0	170.0	160	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	7
SPU 210 G1/2-IG	34	163	138.0	220.0	210	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	5
SPU 210 G1/2-IG B	34	159	138.0	220.0	210	G1/2"-F	G1/4"-F	-	29.0	29.5	36.5	13.5	15	-	10
SPU 210 G1/2-IG TV	34	163	-	220.0	210	G1/2"-F	G1/4"-M	G1/8"-F	25.0	62.0	36.5	13.5	38	10	5
SPU 210 G1/2-IG AE	34	163	138.0	220.0	210	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	5
SPU 250 G1/2-IG	34	203	178.0	265.0	250	G1/2"-F	G1/2"-F	-	25.0	26.5	76.0	13.5	15	-	7
SPU 250 G1/2-IG B	34	203	178.0	265.0	250	G1/2"-F	G1/2"-F	-	29.0	30.0	76.0	13.5	15	-	11
SPU 250 G1/2-IG TV	34	203	-	265.0	250	G1/2"-F	G1/2"-M	G3/8"-F	25.0	65.5	76.0	13.5	39	12	7
SPU 300 G1/2-IG	34	253	226.5	320.0	300	G1/2"-F	G1/2"-F	-	25.0	26.5	76.0	13.5	15	-	6
SPU 360 G1/2-IG B	-	309	275.0	385.0	360	G1/2"-F	G1/2"-F	-	35.0	35.5	86.0	17.0	17	-	12
SPU 400 G1/2-IG	-	349	315.0	430.0	400	G1/2"-F	G1/2"-F	-	28.5	29.0	86.0	15.5	17	-	6

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece

by the vacuum

Flat Suction Cups (Round)



Suction Plates SPK

Suction area (Ø) from 55 mm to 250 mm



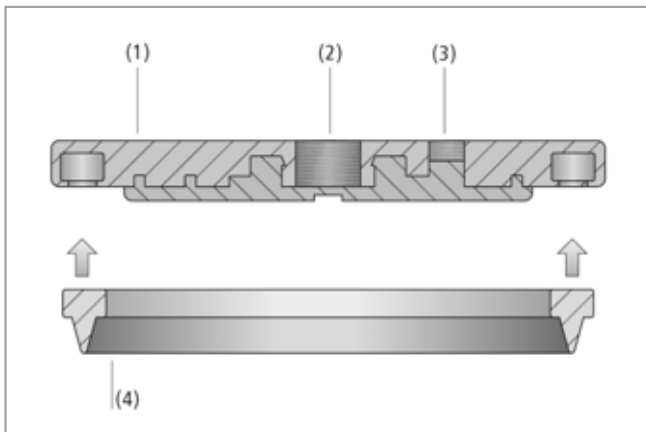
Suitable for Industry Specific Applications



Suction plates SPK

Applications

- Round suction plate for handling of objects with very rough or structured surfaces (such as ornamental glass, checker plate, broken natural stone, etc.)
- Deactivation of unused suction plates by touch valves (accessory)



System design suction plates SPK

Design

- Robust and wear-resistant suction plate SPK, consisting of flexible MOS sealing ring (4) made of EPDM and aluminium base plate (1)
- Sealing ring without seams
- Sealing ring is securely clipped into the base plate
- When worn, the sealing ring can be replaced separately
- Lower side of base plate with elastomer insert to prevent damage to workpieces
- Threaded hole for vacuum connection (2) or touch valve (3) (off-centre) sealed with a plug in the factory
- Touch valve can be ordered as an accessory and is easily mounted, use medium-strength locking compound



Suction plates SPK being used for handling corrugated sheet metal

Our Highlights...

- Sealing lip made of flexible EPDM
- Sealing ring clipped securely into the mounting plate
- Support on the bottom
- Low intrinsic volume
- Wide range of different diameters

Your Benefits...

- > Optimal adaptation to structured surfaces
- > Quick replacement of the sealing element
- > No permanent deformation of thin-walled workpieces
- > Very short cycle times
- > Wide range of cups for handling different workpieces

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Flat Suction Cups (Round)



Suction Plates SPK

Suction area (Ø) from 55 mm to 250 mm

Designation Code Suction Plates SPK

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPK 110 MOS EPDM-15 G1/2-IG:			
SPK	110	MOS EPDM-15	G1/2-IG
SPK	55 to 250	MOS EPDM-15	G1/4-IG (IG = female (F)) G1/2-IG

Ordering Data Suction Plates SPK

Suction plate SPK (sealing ring + support plate) is delivered assembled. The assembly consists of:

- Sealing ring of type DR-SPK – elastomer part, available in various diameters
- Aluminium support plate, available with various threads

Available spare parts: sealing ring DR-SPK

Available accessories: touch valve

Suction Plates SPK

Type	Part Number
SPK 55 MOS EPDM-15 G1/4-IG	10.01.01.12060
SPK 80 MOS EPDM-15 G1/4-IG	10.01.01.12061
SPK 110 MOS EPDM-15 G1/2-IG	10.01.01.12062
SPK 160 MOS EPDM-15 G1/2-IG	10.01.01.12063
SPK 200 MOS EPDM-15 G1/2-IG	10.01.01.12064
SPK 250 MOS EPDM-15 G1/2-IG	10.01.01.12065

Ordering Data Spare Parts And Accessories Suction Plates SPK

Type	Sealing ring DR-SPK	Sensing valve
SPK 55 MOS EPDM-15 G1/4-IG	10.01.01.12072	-
SPK 80 MOS EPDM-15 G1/4-IG	10.01.01.12073	10.05.10.00061
SPK 110 MOS EPDM-15 G1/2-IG	10.01.01.12074	10.05.10.00061
SPK 160 MOS EPDM-15 G1/2-IG	10.01.01.12075	10.05.10.00061
SPK 200 MOS EPDM-15 G1/2-IG	10.01.01.12076	10.05.10.00038
SPK 250 MOS EPDM-15 G1/2-IG	10.01.01.12077	-

Technical Data Suction Plates SPK

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
SPK 55 MOS EPDM-15 G1/4-IG	121	12	250	9
SPK 80 MOS EPDM-15 G1/4-IG	256	21	400	9
SPK 110 MOS EPDM-15 G1/2-IG	471	67	500	12
SPK 160 MOS EPDM-15 G1/2-IG	1060	129	1000	12
SPK 200 MOS EPDM-15 G1/2-IG	1700	199	1600	12
SPK 250 MOS EPDM-15 G1/2-IG	2714	291	2600	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Flat Suction Cups (Round)

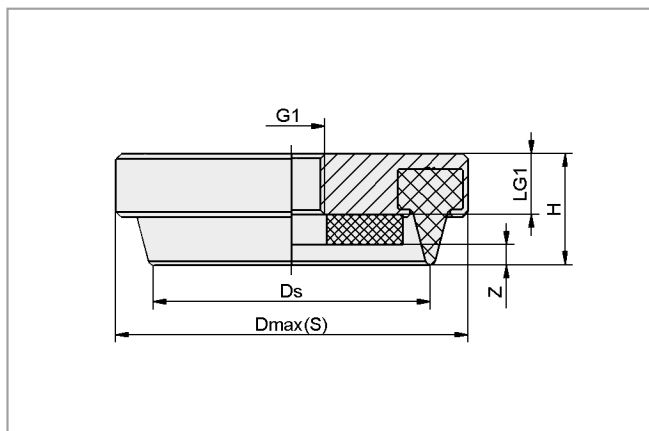


Suction Plates SPK

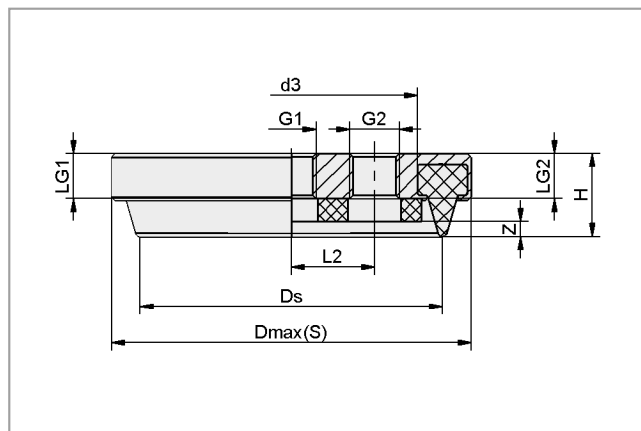
Suction area (\emptyset) from 55 mm to 250 mm



Design Data Suction Plates SPK



SPK 55



SPK 80 to 250

Type	Dimensions in mm*									
	d3	Dmax(S)**	Ds	G1	G2***	H	LG1	LG2	L2	Z (Stroke)
SPK 55 MOS EPDM-15 G1/4-IG	-	70.0	55	G1/4"-F	-	22.0	11.5	-	-	4
SPK 80 MOS EPDM-15 G1/4-IG	66.8	95.2	80	G1/4"-F	G1/4"-F	22.0	11.5	11.5	22.0	4
SPK 110 MOS EPDM-15 G1/2-IG	96.0	130.0	110	G1/2"-F	G1/4"-F	25.5	14.5	14.5	36.5	6
SPK 160 MOS EPDM-15 G1/2-IG	148.0	179.0	159	G1/2"-F	G1/4"-F	25.5	14.5	14.5	36.5	6
SPK 200 MOS EPDM-15 G1/2-IG	185.0	219.0	199	G1/2"-F	G1/2"-F	25.5	14.5	14.5	76.0	6
SPK 250 MOS EPDM-15 G1/2-IG	235.0	269.0	249	G1/2"-F	G1/2"-F	25.5	14.5	14.5	76.0	6

*Acceptable dimensional tolerances for rubber sealings concerning to DIN 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

***A plug is fitted in this connection in the factory

Flat Suction Cups (Oval)



Flat Suction Cups SGON

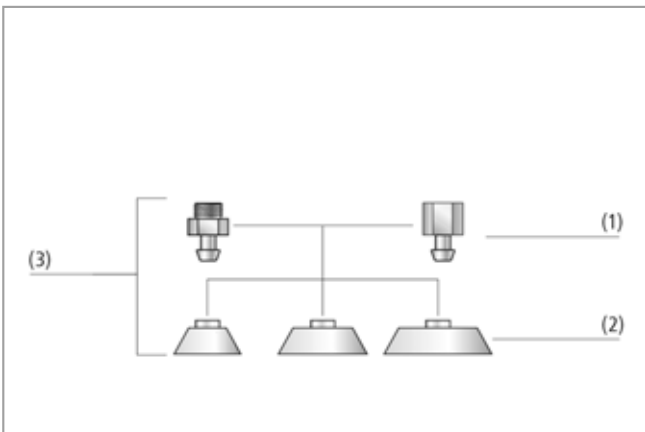
Suction area (LxW) from 4 x 2 mm to 90 x 30 mm



Suitable for Industry Specific Applications



Flat suction cups SGON



System design flat suction cups SGON

Applications

- Oval and flat suction cup for handling of narrow workpieces, including curved objects, such as sections, pipes, packaging materials
- Handling of frame elements, such as doors and windows
- Considerably higher suction force than round, flat suction cups when handling narrow workpieces

Design

- Robust, wear-resistant suction cup SGON (3) with single sealing lip, consisting of suction cup SGO (2) and connection nipple (1)
- Nipple plugged into cup
- Cups of the size 24x8 mm and larger are additionally secured with a two-ear clamp to prevent rotation
- Within each nipple family, the replacement cups and nipples can be combined as desired



Flat suction cups SGON being used for handling blister packaging

Our Highlights...

- Oval, flat suction cup
- Cups of the size 24x8 mm and larger additionally secured with a two-ear clamp
- Optimum shape
- Supports on the bottom

Your Benefits...

- > For long (sections, pipes) or flat workpieces with bars
- > Protection against unwanted rotation during use
- > High suction force in spite of small dimensions
- > No permanent deformation of thin-walled workpieces

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Flat Suction Cups (Oval)



Flat Suction Cups SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Designation Code Flat Suction Cups SGON

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SGON 30x10 SI-60 G1/8-IG:			
SGON	30x10	SI-60	G1/8-IG
SGON	4x2 to 90x30	HT1-60 NBR-55 NBR-60 NBR-70 NBR-AS-55 (antistatic) NBR-AS-60 (antistatic) SI-60 SI-65 SI-70	M3-AG (AG = male (M)) M5-AG M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Flat Suction Cups SGON

Suction cup SGON (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type SGO – elastomer part, available in various dimensions (LxW) and materials
- Connection nipple of type SA-NIP – available with various threads
- cups of the size 24 x 8 mm and larger are delivered with a two-ear clamp

Available spare parts: suction cup SGO, connection nipple SA-NIP, two-ear clamp

Flat Suction Cups (Oval)



Flat Suction Cups SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Flat Suction Cups SGON

Type	Suction cup material * / hardness in Shore A				
	HT1-60	NBR-55	NBR-60	NBR-70	NBR-AS-55
SGON 4x2 M3-AG	10.01.05.00404	-	10.01.01.00564	-	-
SGON 7x3.5 M3-AG	10.01.05.00405	-	10.01.01.00489	-	-
SGON 12x4 M5-AG	10.01.05.00406	10.01.05.00236	-	-	10.01.05.00238
SGON 15x5 M5-AG	10.01.05.00407	-	10.01.05.00106	-	-
SGON 15x5 M5-IG	10.01.05.00418	-	10.01.05.00105	-	-
SGON 18x6 M5-AG	10.01.05.00408	-	10.01.05.00104	-	-
SGON 18x6 M5-IG	10.01.05.00419	-	10.01.05.00103	-	-
SGON 24x8 G1/8-AG	10.01.05.00409	-	10.01.05.00102	-	-
SGON 24x8 G1/8-IG	10.01.05.00420	-	10.01.05.00101	-	-
SGON 30x10 G1/8-AG	10.01.05.00410	-	10.01.05.00100	-	-
SGON 30x10 G1/8-IG	10.01.05.00421	-	10.01.05.00099	-	-
SGON 45x15 G1/4-AG	10.01.05.00411	-	10.01.05.00098	-	-
SGON 45x15 G1/4-IG	10.01.05.00422	-	10.01.05.00097	-	-
SGON 60x20 G1/4-AG	10.01.05.00412	-	10.01.05.00096	-	-
SGON 60x20 G1/4-IG	10.01.05.00423	-	10.01.05.00095	-	-
SGON 75x25 G1/4-AG	10.01.05.00413	-	10.01.05.00094	-	-
SGON 75x25 G1/4-IG	10.01.05.00424	-	10.01.05.00093	-	-
SGON 90x30 G1/4-AG	-	-	-	10.01.05.00092	-
SGON 90x30 G1/4-IG	-	-	-	10.01.05.00091	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Type	Suction cup material * / hardness in Shore A			
	NBR-AS-60	SI-60	SI-65	SI-70
SGON 4x2 M3-AG	-	10.01.01.00565	-	-
SGON 7x3.5 M3-AG	10.01.05.00228	10.01.01.00567	-	-
SGON 12x4 M5-AG	-	-	10.01.01.00221	-
SGON 15x5 M5-AG	10.01.05.00229	10.01.05.00120	-	-
SGON 15x5 M5-IG	-	10.01.05.00119	-	-
SGON 18x6 M5-AG	10.01.05.00230	10.01.05.00118	-	-
SGON 18x6 M5-IG	-	10.01.05.00117	-	-
SGON 24x8 G1/8-AG	10.01.05.00231	10.01.05.00088	-	-
SGON 24x8 G1/8-IG	-	10.01.05.00087	-	-
SGON 30x10 G1/8-AG	-	10.01.05.00116	-	-
SGON 30x10 G1/8-IG	-	10.01.05.00115	-	-
SGON 45x15 G1/4-AG	-	10.01.05.00114	-	-
SGON 45x15 G1/4-IG	-	10.01.05.00113	-	-
SGON 60x20 G1/4-AG	-	10.01.05.00112	-	-
SGON 60x20 G1/4-IG	-	10.01.05.00111	-	-
SGON 75x25 G1/4-AG	-	10.01.05.00110	-	-
SGON 75x25 G1/4-IG	-	10.01.05.00109	-	-
SGON 90x30 G1/4-AG	-	-	-	10.01.05.00108
SGON 90x30 G1/4-IG	-	-	-	10.01.05.00107

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Flat Suction Cups (Oval)



Flat Suction Cups SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Ordering Data Spare Parts Flat Suction Cups

Type	Suction cup material * / hardness in Shore A				
	FPM-50	HT1-60	NBR-55	NBR-60	NBR-70
SGO 4x2	-	10.01.05.00426	-	10.01.01.00456	-
SGO 7x3.5	-	10.01.05.00427	-	10.01.01.00488	-
SGO 12x4	-	10.01.05.00428	10.01.05.00235	-	-
SGO 15x5	-	10.01.05.00429	-	10.01.05.00071	-
SGO 18x6	-	10.01.05.00430	-	10.01.05.00072	-
SGO 24x8	-	10.01.05.00437	-	10.01.05.00151	-
SGO 30x10	10.01.05.00848	10.01.05.00438	-	10.01.05.00152	-
SGO 45x15	-	10.01.05.00439	-	10.01.05.00153	-
SGO 60x20	-	10.01.05.00440	-	10.01.05.00154	-
SGO 75x25	-	10.01.05.00441	-	10.01.05.00155	-
SGO 90x30	-	-	-	-	10.01.05.00156

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Type	Suction cup material * / hardness in Shore A				
	NBR-AS-55	NBR-AS-60	SI-60	SI-65	SI-70
SGO 4x2	-	-	10.01.01.00463	-	-
SGO 7x3.5	-	10.01.05.00224	10.01.01.00464	-	-
SGO 12x4	10.01.05.00237	-	-	10.01.01.00222	-
SGO 15x5	-	10.01.05.00225	10.01.05.00079	-	-
SGO 18x6	-	10.01.05.00226	10.01.05.00080	-	-
SGO 24x8	-	10.01.05.00739	10.01.05.00157	-	-
SGO 30x10	-	-	10.01.05.00158	-	-
SGO 45x15	-	-	10.01.05.00159	-	-
SGO 60x20	-	-	10.01.05.00160	-	-
SGO 75x25	-	-	10.01.05.00161	-	-
SGO 90x30	-	-	-	-	10.01.05.00162

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Suction Cup Nipples

Type	Connection nipples [AG]		Connection nipples [IG]		two-ear clamp*	
SGON 4x2 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-	-	-
SGON 7x3.5 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-	-	-
SGON 12x4 M5	SA-NIP N020 M5-AG	10.01.01.00312	-	-	-	-
SGON 15x5 M5	SA-NIP N021 M5-AG	10.01.05.00126	SA-NIP N021 M5-IG	10.01.05.00125	-	-
SGON 18x6 M5	SA-NIP N021 M5-AG	10.01.05.00126	SA-NIP N021 M5-IG	10.01.05.00125	-	-
SGON 24x8 G1/8	SA-NIP N022 G1/8-AG	10.01.05.00124	SA-NIP N022 G1/8-IG	10.01.05.00123	ZOKL 11-13	10.07.10.00032
SGON 30x10 G1/8	SA-NIP N022 G1/8-AG	10.01.05.00124	SA-NIP N022 G1/8-IG	10.01.05.00123	ZOKL 11-13	10.07.10.00032
SGON 45x15 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 60x20 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 75x25 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 90x30 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033

*In the case of replacement cup SGO, the two-ear terminal is included

Flat Suction Cups (Oval)



Flat Suction Cups SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Technical Data Flat Suction Cups SGON

Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter [mm]**	Nipple family
SGON 4x2	0.42	0.018	1	2	N 003
SGON 7x3.5	1.00	0.029	3	2	N 003
SGON 12x4	1.80	0.173	3	2	N 020
SGON 15x5	3.10	0.175	4	2	N 021
SGON 18x6	4.50	0.205	4	2	N 021
SGON 24x8	8.00	0.327	8	4	N 022
SGON 30x10	12.20	0.516	8	4	N 022
SGON 45x15	28.20	2.306	10	6	N 023
SGON 60x20	50.10	3.611	20	6	N 023
SGON 75x25	78.30	5.860	30	6	N 023
SGON 90x30	112.60	9.473	35	6	N 023

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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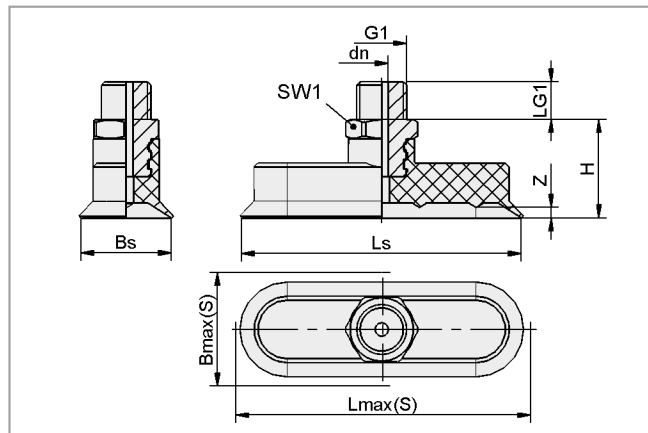
Flat Suction Cups (Oval)



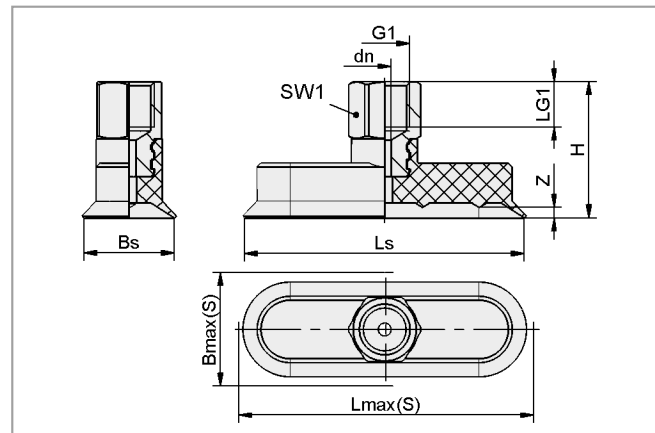
Flat Suction Cups SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Design Data Flat Suction Cups SGON



SGON 4x2 to 90x30 AG



SGON 15x5 to 90x30 IG

Type	Dimensions in mm*									
	Bmax(S)**	Bs	dn	G1	H	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)
SGON 4x2 M3-AG	2.5	2.0	1.0	M3-M	8	3.0	4.5	4.0	5	0.5
SGON 7x3.5 M3-AG	4.5	3.5	1.0	M3-M	8	3.0	7.5	7.0	5	0.8
SGON 12x4 M5-AG	5.0	3.9	1.5	M5-M	18	4.5	13.0	11.9	8	0.5
SGON 15x5 M5-AG	5.5	5.0	2.0	M5-M	17	5.0	15.5	15.0	8	0.7
SGON 15x5 M5-IG	5.5	5.0	2.0	M5-F	22	5.5	15.5	15.0	8	0.7
SGON 18x6 M5-AG	7.0	6.0	2.0	M5-M	17	5.0	18.5	18.0	8	0.8
SGON 18x6 M5-IG	7.0	6.0	2.0	M5-F	22	5.5	18.5	18.0	8	0.8
SGON 24x8 G1/8-AG	9.0	8.0	3.5	G1/8"-M	17	8.0	24.5	24.0	14	1.0
SGON 24x8 G1/8-IG	9.0	8.0	3.5	G1/8"-F	25	9.0	24.5	24.0	14	1.0
SGON 30x10 G1/8-AG	11.5	9.4	3.5	G1/8"-M	17	8.0	30.5	29.4	14	1.5
SGON 30x10 G1/8-IG	11.5	9.4	3.5	G1/8"-F	25	9.0	30.5	29.4	14	1.5
SGON 45x15 G1/4-AG	16.5	14.4	3.5	G1/4"-M	26	10.0	46.0	44.4	17	2.0
SGON 45x15 G1/4-IG	16.5	14.4	3.5	G1/4"-F	36	12.0	46.0	44.4	17	2.0
SGON 60x20 G1/4-AG	22.0	19.0	3.5	G1/4"-M	26	10.0	61.0	59.0	17	2.5
SGON 60x20 G1/4-IG	22.0	20.0	3.5	G1/4"-F	36	12.0	61.0	60.0	17	2.5
SGON 75x25 G1/4-AG	27.5	25.0	3.5	G1/4"-M	26	10.0	77.0	75.0	17	2.8
SGON 75x25 G1/4-IG	27.5	25.0	3.5	G1/4"-F	36	12.0	77.0	75.0	17	2.8
SGON 90x30 G1/4-AG	33.0	30.0	3.5	G1/4"-M	26	10.0	92.5	90.0	17	3.5
SGON 90x30 G1/4-IG	33.0	30.0	3.5	G1/4"-F	36	12.0	92.5	90.0	17	3.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Flat Suction Cups (Oval)

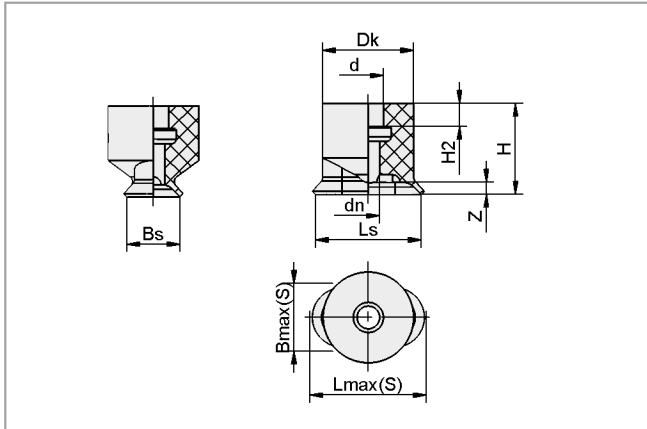


Flat Suction Cups SGON

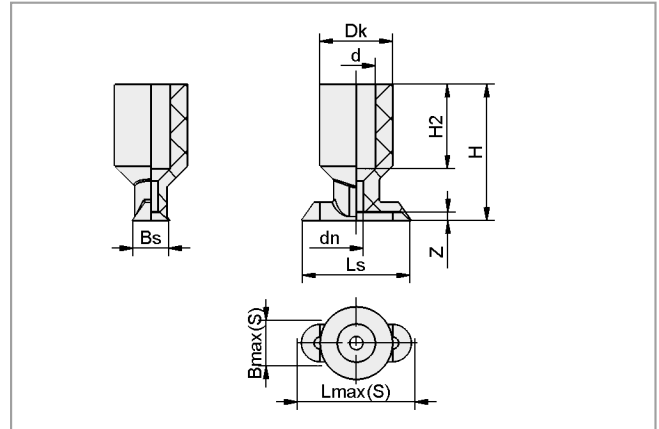
Suction area (LxW) from 4 x 2 mm to 90 x 30 mm



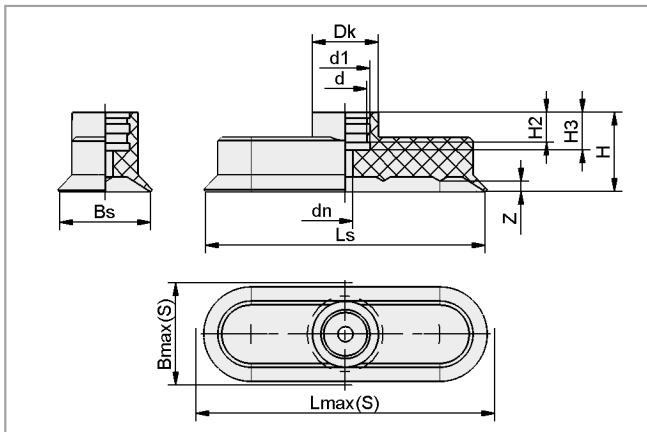
Design Data Flat Suction Cups SGO - Spare Parts for SGON



SGO 4x2 and 7x3.5



SGO 12x4



SGO 15x5 to 90x30

Type	Dimensions in mm*											
	Bmax(S)**	Bs	d	dn	d1	Dk	H	H2	H3	Lmax(S)**	Ls	Z (Stroke)
SGO 4x2	2.5	2.0	2.0	1.2	-	6.0	6	1.5	-	4.5	4.0	0.5
SGO 7x3.5	4.5	3.5	2.0	1.5	-	6.0	6	1.5	-	7.5	7.0	0.8
SGO 12x4	5.0	4.0	4.2	1.5	-	8.0	15	9.3	-	13.0	12.0	0.5
SGO 15x5	5.5	4.6	4.5	1.2	6	8.5	12	3.0	5.5	15.5	14.6	0.7
SGO 18x6	7.0	5.6	4.5	1.5	6	8.5	12	3.0	5.5	18.5	17.6	0.8
SGO 24x8	9.0	7.6	5.5	1.5	7	11.5	12	3.0	5.5	24.5	23.6	1.0
SGO 30x10	11.5	9.4	5.5	2.5	7	11.5	12	3.0	5.5	30.5	29.4	1.5
SGO 45x15	16.5	14.4	11.5	3.0	13	15.5	21	8.0	10.0	46.0	44.4	2.0
SGO 60x20	22.0	19.0	11.5	4.0	13	15.5	21	8.0	10.0	61.0	59.0	2.5
SGO 75x25	27.5	24.0	11.5	4.0	13	17.5	21	8.0	10.0	77.0	74.0	2.8
SGO 90x30	33.0	29.0	11.5	4.0	13	17.5	21	8.0	10.0	92.5	89.0	3.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Flat Suction Cups (Oval)



Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm



Suitable for Industry Specific Applications



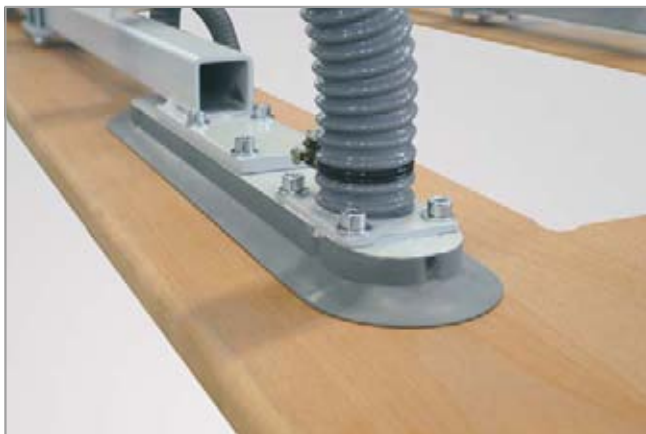
Suction plates SPLO

Applications

- Oval suction plate for handling of long, narrow workpieces such as sections or door and window frames
- Considerably higher suction force than round, flat suction cups with long, narrow workpieces
- SPLO 100x32-TV and SPLO 300x100-TV available with touch valve to detect presence of workpieces
- SPLO 100x30 to SPLO 300x100 with long sealing lip for handling very curved workpieces

Design

- Robust and wear-resistant suction plate with single sealing lip
- Sealing lip vulcanized to support plate
- SPLO 100x32-TV and SPLO 300x100-TV with touch valve
- Sealing lip made of NBR for minimum marking of workpieces



Suction plates SPLO mounted on a manually guided vacuum lifting device

Our Highlights...

- Oval, flat suction plate
- Support plate made of steel/ aluminum with sealing lip vulcanized to it
- Sealing lip made of NBR
- Various sizes and shapes
- Supports on the bottom

Your Benefits...

- > Handling of long, narrow workpieces, also curved workpieces (such as sections)
- > Capable of handling heavy loads; flexible mounting facilities
- > Little marking, even of sensitive surfaces
- > Wide range of cups for many different workpieces
- > No permanent deformation of thin-walled workpieces



Suction plates SPLO being used for handling wooden doors

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Flat Suction Cups (Oval)



Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

Designation Code Suction Plates SPLO

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread	Product addition
Example SPLO 60x20 NBR-55 G1/8-IG:				
SPLO	60x20	NBR-55	G1/8-IG	
SPLO	60x20 to 370x80	NBR-55	G1/8-IG (IG = female (F)) G1/4-IG	TV touch valve

Ordering Data Suction Plates SPLO

Suction plate SPLO, available in various diameters and optional with touch valve, is delivered with support plate vulcanized to elastomer part.

Suction Plates SPLO

Type*	Part Number
SPLO 60x20 NBR-55 G1/8-IG	10.01.05.00001
SPLO 100x32 NBR-55 G1/4-IG	10.01.05.00002
SPLO 100x32 NBR-55 TV	10.01.05.00003
SPLO 100x30 NBR-55	10.01.05.00182
SPLO 200x30 NBR-55	10.01.05.00183
SPLO 300x30 NBR-55	10.01.05.00184
SPLO 150x55 NBR-55	10.01.05.00046
SPLO 200x55 NBR-55	10.01.05.00004
SPLO 250x55 NBR-55	10.01.05.00186
SPLO 300x55 NBR-55	10.01.05.00187
SPLO 300x100 NBR-55	10.01.05.00050
SPLO 300x100 NBR-55 TV	10.01.05.00188
SPLO 370x80 NBR-55	10.01.05.00006

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Suction Plates SPLO

Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)
SPLO 60x20 NBR-55 G1/8-IG	50	3	15
SPLO 100x32 NBR-55 G1/4-IG	134	11	50
SPLO 100x32 NBR-55 TV	134	11	50
SPLO 100x30 NBR-55	126	10	25
SPLO 200x30 NBR-55	260	24	30
SPLO 300x30 NBR-55	400	32	30
SPLO 150x55 NBR-55	340	60	75
SPLO 200x55 NBR-55	465	80	50
SPLO 250x55 NBR-55	590	83	50
SPLO 300x55 NBR-55	710	93	50
SPLO 300x100 NBR-55	1250	256	175
SPLO 300x100 NBR-55 TV	1250	256	175
SPLO 370x80 NBR-55	1270	194	100

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

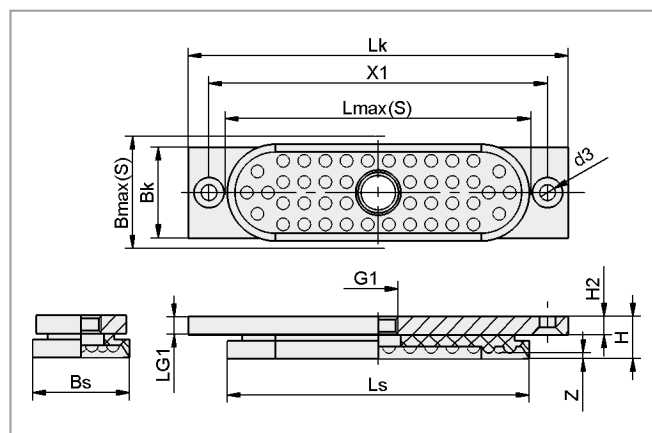
Flat Suction Cups (Oval)



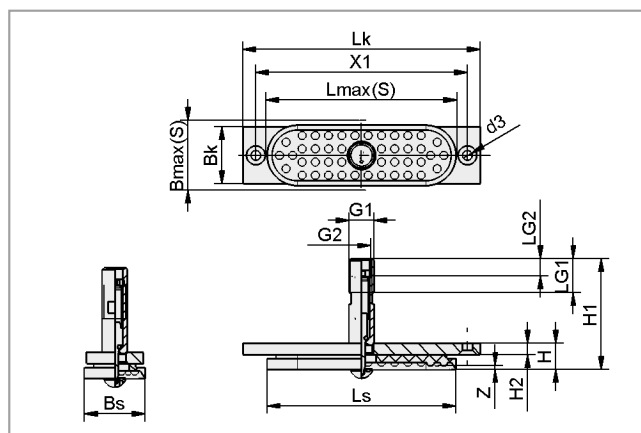
Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

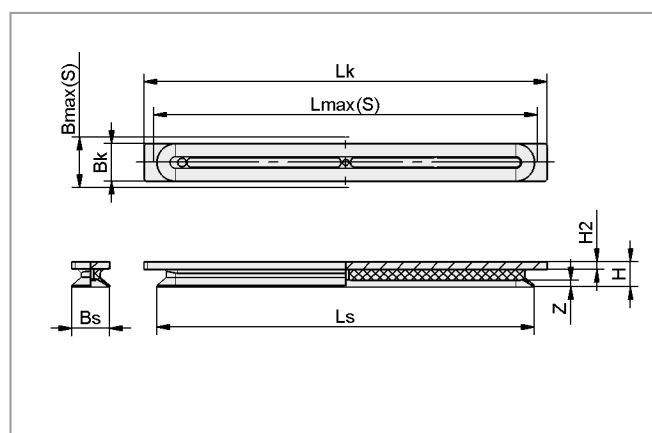
Design Data Suction Plates SPLO



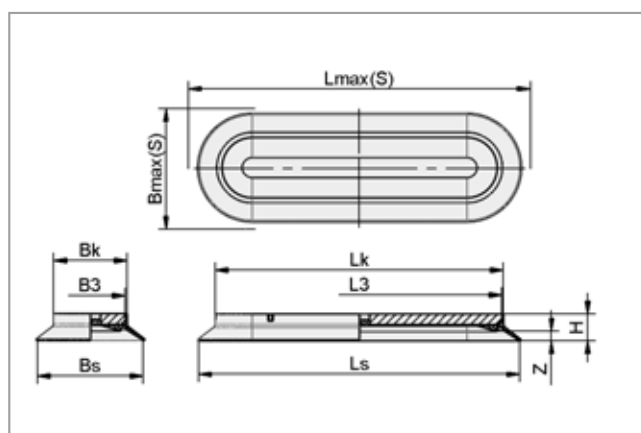
SPLO 60x20 and 100x32



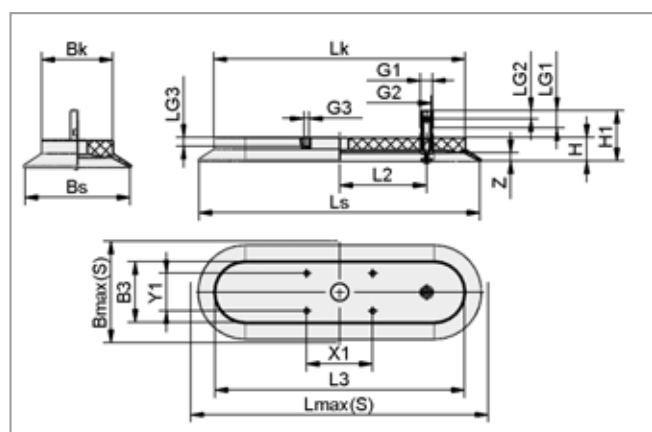
SPLO 100x32 TV



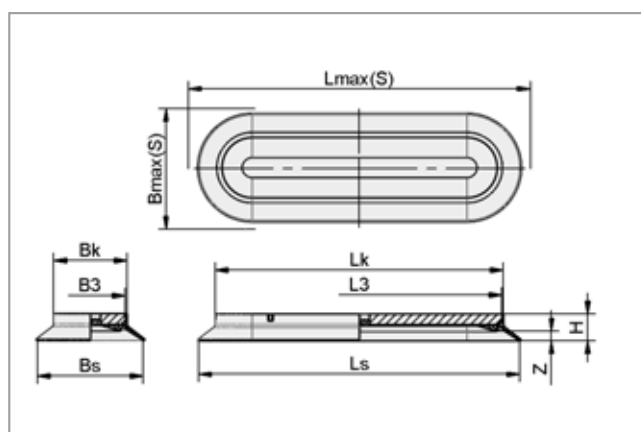
SPLO 100x30, 200x30 and 300x30



SPLO 150x55, 200x55, 250x55, 300x55 and 370x80



SPLO 300x100 TV



SPLO 300x100

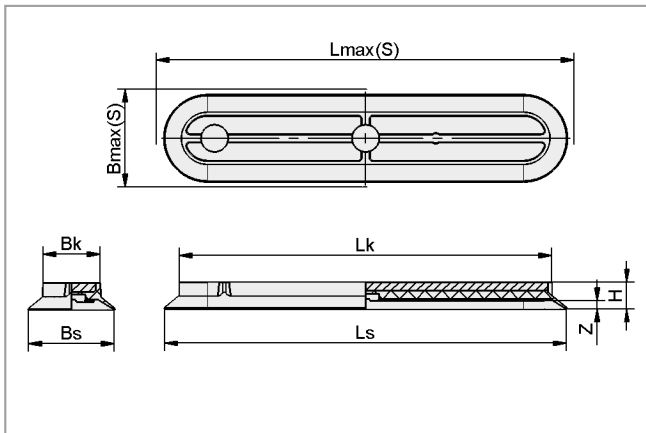
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Flat Suction Cups (Oval)



Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm



SPLO 370x80



Design Data Suction Plates SPLO

Type	Dimensions in mm*										
	Bk	Bmax(S)**	Bs	B3	d3	G1	G2	G3	H	H1	H2
SPLO 60x20 NBR-55 G1/8-IG	20.0	21.0	19.0	-	4.5	G1/8"-F	-	-	12.5	-	6
SPLO 100x32 NBR-55 G1/4-IG	30.0	34.0	27.0	-	5.3	G1/4"-F	-	-	14.0	-	6
SPLO 100x32 NBR-55 TV	30.0	34.0	32.0	-	5.3	G1/4"-M	G1/8"-F	-	14.0	54.0	6
SPLO 100x30 NBR-55	30.0	33.5	29.3	-	-	-	-	-	20.0	-	6
SPLO 200x30 NBR-55	30.0	32.0	29.2	-	-	-	-	-	20.0	-	6
SPLO 300x30 NBR-55	30.0	33.0	30.0	-	-	-	-	-	20.0	-	6
SPLO 150x55 NBR-55	32.0	61.0	52.3	29.0	-	-	-	-	19.4	-	-
SPLO 200x55 NBR-55	31.0	62.0	50.7	26.0	-	-	-	-	22.0	-	-
SPLO 250x55 NBR-55	31.5	58.0	47.6	29.0	-	-	-	-	22.0	-	-
SPLO 300x55 NBR-55	31.0	60.0	51.4	28.0	-	-	-	-	19.0	-	-
SPLO 300x100 NBR-55	67.7	108.0	98.0	65.0	-	-	-	-	25.0	-	-
SPLO 300x100 NBR-55 TV	67.7	108.0	98.0	65.0	-	G1/4"-M	G1/8"-F	M6-F	25.0	53.5	-
SPLO 370x80 NBR-55	53.0	86.0	79.4	45.0	-	-	-	-	25.0	-	-

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Type	Dimensions in mm*										
	LG1	LG2	LG3	Lk	Lmax(S)**	Ls	L2	L3	X1	Y1	Z (Stroke)
SPLO 60x20 NBR-55 G1/8-IG	6	-	-	75.0	61.0	59.0	-	-	65	-	1
SPLO 100x32 NBR-55 G1/4-IG	6	-	-	125.8	102.0	100.0	-	-	112	-	2
SPLO 100x32 NBR-55 TV	18	9	-	125.8	125.8	100.0	-	-	112	-	2
SPLO 100x30 NBR-55	-	-	-	120.0	120.0	98.6	-	-	-	-	5
SPLO 200x30 NBR-55	-	-	-	220.0	203.0	200.0	-	-	-	-	5
SPLO 300x30 NBR-55	-	-	-	320.0	304.0	300.0	-	-	-	-	5
SPLO 150x55 NBR-55	-	-	-	126.5	157.0	147.0	-	124.0	-	-	8
SPLO 200x55 NBR-55	-	-	-	178.0	208.0	197.7	-	171.0	-	-	8
SPLO 250x55 NBR-55	-	-	-	226.0	255.0	243.0	-	224.5	-	-	8
SPLO 300x55 NBR-55	-	-	-	277.0	305.0	296.4	-	273.0	-	-	7
SPLO 300x100 NBR-55	-	-	-	266.7	308.0	297.0	-	264.0	-	-	9
SPLO 300x100 NBR-55 TV	13	10	9	266.7	308.0	297.0	92.0	264.0	70	40.0	9
SPLO 370x80 NBR-55	-	-	-	344.9	376.0	372.4	-	338.0	-	-	8

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 6 mm to 78 mm



Suitable for Industry Specific Applications



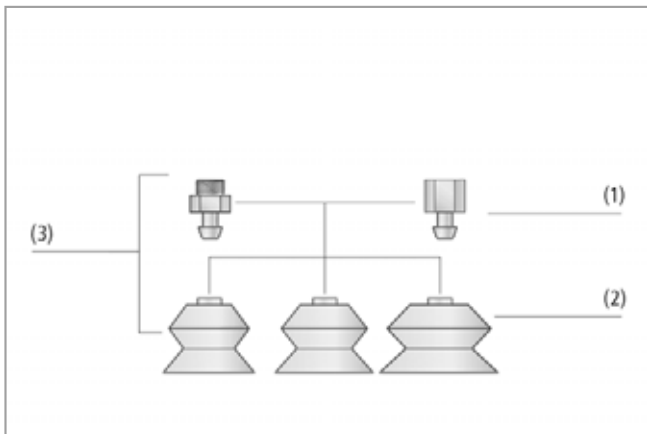
Bellows suction cups FSGA (1.5 folds)

Applications

- Round, bellows suction cup with 1.5 folds for handling of extremely sensitive workpieces (optimum damping effect due to folds and smooth sealing lip)
- Handling of workpieces with uneven surfaces, such as pipes (folds permit optimal adaptation to concave and convex surfaces)

Design

- Robust, wear-resistant suction cup FSGA (3) with single sealing lip, consisting of suction cup FGA (2) with 1.5 folds and connection nipple (1)
- All nipples are plugged in
- Suction cups with a diameter of 25 mm or more with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired



System design bellows suction cups FSGA (1.5 folds)



Bellows suction cups FSGA being used for handling cardboard boxes

Our Highlights...

- Wide range of diameters and materials
- Soft, tapered sealing lip
- 1.5 folds
- Very stiff top fold
- Supports on the bottom (diameter > 25 mm)

Your Benefits...

- > For a wide range of different workpieces
- > Very good adaptation to curved or uneven workpiece surfaces
- > High suction force and optimum damping effect during placement on workpieces
- > Good resistance to horizontal forces at high acceleration values
- > No permanent deformation of thin-walled workpieces

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Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 6 mm to 78 mm

Designation Code Bellows Suction Cups FSGA (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGA 14 HT1-60 G1/8-IG:			
FSGA	14	HT1-60	G1/8-IG
FSGA	6	HT1-60	M5-AG (AG = male (M))
	to	NBR-55	G1/8-AG
	78	NK-45	G1/8-IG (IG = female (F))
		SI-55	G1/4-AG
			G1/4-IG

Ordering Data Bellows Suction Cups FSGA (1.5 Folds)

Suction cup FSGA (elastomer part + connection nipple) is delivered unassembled (diameters of 33 mm and more are assembled). The delivery consists of:

- Suction cup of type FGA – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FGA, connection nipple SA-NIP

Bellows Suction Cups FSGA (1.5 Folds)

Type	Suction cup material * / hardness in Shore A			
	HT1-60	NBR-55	NK-45	SI-55
FSGA 6 M5-AG	10.01.06.02996	10.01.06.02994	-	10.01.06.02995
FSGA 6 M5-IG	10.01.06.03000	10.01.06.02998	-	10.01.06.02999
FSGA 11 G1/8-AG	10.01.06.01226	10.01.06.00075	10.01.06.00408	10.01.06.00085
FSGA 11 G1/8-IG	10.01.06.01232	10.01.06.00061	10.01.06.00407	10.01.06.00068
FSGA 11 M5-AG	10.01.06.01227	10.01.06.00076	10.01.06.00406	10.01.06.00086
FSGA 14 G1/8-AG	10.01.06.00932	10.01.06.00381	10.01.06.00387	10.01.06.00384
FSGA 14 G1/8-IG	10.01.06.00948	10.01.06.00380	10.01.06.00386	10.01.06.00383
FSGA 14 M5-AG	10.01.06.00933	10.01.06.00379	10.01.06.00385	10.01.06.00382
FSGA 16 G1/8-AG	10.01.06.01228	10.01.06.00077	10.01.06.00411	10.01.06.00087
FSGA 16 G1/8-IG	10.01.06.01233	10.01.06.00062	10.01.06.00410	10.01.06.00069
FSGA 16 M5-AG	10.01.06.01229	10.01.06.00078	10.01.06.00409	10.01.06.00088
FSGA 20 G1/8-AG	10.01.06.00936	10.01.06.00390	10.01.06.00396	10.01.06.00393
FSGA 20 G1/8-IG	10.01.06.00952	10.01.06.00389	10.01.06.00395	10.01.06.00392
FSGA 20 M5-AG	10.01.06.00937	10.01.06.00388	10.01.06.00394	10.01.06.00391
FSGA 22 G1/8-AG	10.01.06.01230	10.01.06.00079	10.01.06.00414	10.01.06.00089
FSGA 22 G1/8-IG	10.01.06.01234	10.01.06.00063	10.01.06.00413	10.01.06.00070
FSGA 22 M5-AG	10.01.06.01231	10.01.06.00080	10.01.06.00412	10.01.06.00090
FSGA 25 G1/8-AG	10.01.06.00940	10.01.06.00399	10.01.06.00405	10.01.06.00402
FSGA 25 G1/8-IG	10.01.06.00956	10.01.06.00398	10.01.06.00404	10.01.06.00401
FSGA 33 G1/4-AG	10.01.06.00941	10.01.06.00081	10.01.06.00330	10.01.06.00091
FSGA 33 G1/4-IG	10.01.06.00957	10.01.06.00064	10.01.06.00415	10.01.06.00071
FSGA 43 G1/4-AG	10.01.06.00942	10.01.06.00082	10.01.06.00418	10.01.06.00092
FSGA 43 G1/4-IG	10.01.06.00958	10.01.06.00065	10.01.06.00417	10.01.06.00072
FSGA 53 G1/4-AG	10.01.06.00943	10.01.06.00083	10.01.06.00326	10.01.06.00093
FSGA 53 G1/4-IG	10.01.06.00977	10.01.06.00066	10.01.06.00419	10.01.06.00073
FSGA 63 G1/4-AG	10.01.06.02476	10.01.06.00685	10.01.06.00687	10.01.06.00686
FSGA 63 G1/4-IG	10.01.06.02477	10.01.06.00691	10.01.06.00693	10.01.06.00692
FSGA 78 G1/4-AG	10.01.06.02478	10.01.06.00084	10.01.06.00340	10.01.06.00094
FSGA 78 G1/4-IG	10.01.06.02479	10.01.06.00067	10.01.06.00421	10.01.06.00074

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 6 mm to 78 mm

Ordering Data Spare Parts Bellows Suction Cups

Type	Suction cup material * / hardness in Shore A			
	HT1-60	NBR-55	NK-45	SI-55
FGA 6	10.01.06.02603	10.01.06.02981	-	10.01.06.01571
FGA 11	10.01.06.01247	10.01.06.00095	10.01.06.00423	10.01.06.00098
FGA 14	10.01.06.00868	10.01.06.00370	10.01.06.00372	10.01.06.00371
FGA 16	10.01.06.01248	10.01.06.00096	10.01.06.00424	10.01.06.00099
FGA 20	10.01.06.00870	10.01.06.00373	10.01.06.00375	10.01.06.00374
FGA 22	10.01.06.01249	10.01.06.00097	10.01.06.00425	10.01.06.00100
FGA 25	10.01.06.00872	10.01.06.00376	10.01.06.00378	10.01.06.00377
FGA 33	10.01.06.00873	10.01.06.00130	10.01.06.00426	10.01.06.00126
FGA 43	10.01.06.00874	10.01.06.00131	10.01.06.00427	10.01.06.00127
FGA 53	10.01.06.00875	10.01.06.00132	10.01.06.00428	10.01.06.00128
FGA 63	10.01.06.02473	10.01.06.00688	10.01.06.00690	10.01.06.00689
FGA 78	10.01.06.02474	10.01.06.00133	10.01.06.00429	10.01.06.00129

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Connection Nipples

Type	Connection nipples [AG]		Connection nipples [IG]	
	SA-NIP	Part No.	SA-NIP	Part No.
FSGA 6 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
FSGA 11 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 11 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 16 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 16 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 22 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 22 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 33 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 43 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 53 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 63 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 78 G1/4	SA-NIP N019 G1/4-AG	10.01.06.01959	SA-NIP N019 G1/4-IG	10.01.06.01960



Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds)

Suction area (Ø) from 6 mm to 78 mm

Technical Data Bellows Suction Cups FSGA (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***	Nipple family
FSGA 6	0.40	1.4	0.111	2	4	N 004
FSGA 11	0.95	3.8	0.225	10	4	N 016
FSGA 14	1.20	5.0	0.420	13	4	N 016
FSGA 16	2.30	6.7	0.750	20	4	N 016
FSGA 20	4.70	10.7	1.150	30	4	N 016
FSGA 22	5.70	15.2	1.400	25	4	N 016
FSGA 25	5.30	17.3	3.150	20	4	N 016
FSGA 33	13.60	39.6	4.750	40	6	N 018
FSGA 43	22.80	64.5	11.445	60	6	N 018
FSGA 53	51.30	95.0	26.488	75	6	N 018
FSGA 63	85.00	135.0	43.829	75	6	N 018
FSGA 78	137.40	218.0	75.583	70	6	N 019

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

***The recommended hose diameter refers to a hose length of approx. 2 m

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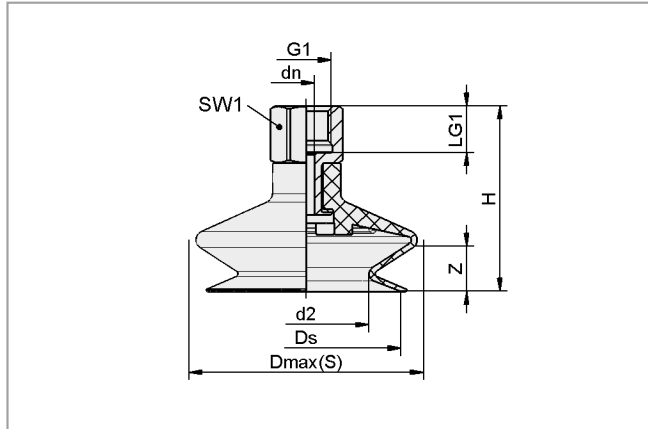
Bellows Suction Cups (Round)



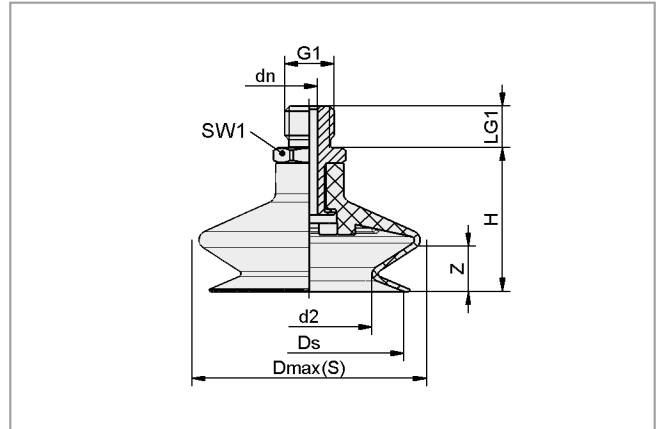
Bellows Suction Cups FSGA (1.5 Folds)

Suction area (\emptyset) from 6 mm to 78 mm

Design Data Bellows Suction Cups FSGA (1.5 Folds)



FSGA 6 to 78 IG



FSGA 6 to 78 AG

Type	Dimensions in mm*								
	d2	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGA 6 M5-AG	3.0	2.0	8.0	5.7	M5-M	14.0	4.5	8	2
FSGA 6 M5-IG	3.0	2.0	8.0	5.7	M5-F	19.0	5.5	8	2
FSGA 11 G1/8-AG	5.1	3.5	13.0	10.4	G1/8"-M	22.0	7.5	14	4
FSGA 11 G1/8-IG	5.1	3.5	13.0	10.4	G1/8"-F	28.0	8.0	14	4
FSGA 11 M5-AG	5.1	2.5	13.0	10.4	M5-M	21.0	5.0	7	4
FSGA 14 G1/8-AG	5.0	3.5	14.5	12.5	G1/8"-M	21.5	7.5	14	5
FSGA 14 G1/8-IG	5.0	3.5	14.5	12.5	G1/8"-F	27.5	8.0	14	5
FSGA 14 M5-AG	5.0	2.5	14.5	12.5	M5-M	20.5	5.0	7	5
FSGA 16 G1/8-AG	8.4	3.5	18.5	15.6	G1/8"-M	25.2	7.5	14	7
FSGA 16 G1/8-IG	8.4	3.5	18.5	15.6	G1/8"-F	31.2	8.0	14	7
FSGA 16 M5-AG	8.4	2.5	18.5	15.6	M5-M	24.2	5.0	7	7
FSGA 20 G1/8-AG	11.0	3.5	21.0	18.1	G1/8"-M	21.2	7.5	14	5
FSGA 20 G1/8-IG	11.0	3.5	21.0	18.1	G1/8"-F	27.2	8.0	14	5
FSGA 20 M5-AG	11.0	2.5	21.0	18.1	M5-M	20.2	5.0	7	5
FSGA 22 G1/8-AG	11.7	3.5	25.0	21.5	G1/8"-M	25.0	7.5	14	6
FSGA 22 G1/8-IG	11.7	3.5	25.0	21.5	G1/8"-F	31.0	8.0	14	6
FSGA 22 M5-AG	11.7	2.5	25.0	21.5	M5-M	24.0	5.0	7	6
FSGA 25 G1/8-AG	9.9	3.5	26.5	22.5	G1/8"-M	29.0	7.5	14	9
FSGA 25 G1/8-IG	9.9	3.5	26.5	22.5	G1/8"-F	35.0	8.0	14	9
FSGA 33 G1/4-AG	17.0	4.4	38.0	30.0	G1/4"-M	31.0	11.0	17	9
FSGA 33 G1/4-IG	17.0	4.4	38.0	30.0	G1/4"-F	42.0	12.0	17	9
FSGA 43 G1/4-AG	21.9	4.4	47.5	38.0	G1/4"-M	31.6	11.0	17	10
FSGA 43 G1/4-IG	21.9	4.4	47.5	38.0	G1/4"-F	42.6	12.0	17	10
FSGA 53 G1/4-AG	33.0	4.4	60.0	50.0	G1/4"-M	38.0	11.0	17	12
FSGA 53 G1/4-IG	33.0	4.4	60.0	50.0	G1/4"-F	49.0	12.0	17	12
FSGA 63 G1/4-AG	44.5	4.4	68.0	60.0	G1/4"-M	38.0	11.0	17	14
FSGA 63 G1/4-IG	44.5	4.4	68.0	60.0	G1/4"-F	49.0	12.0	17	14
FSGA 78 G1/4-AG	54.0	8.2	84.5	74.0	G1/4"-M	53.0	11.0	21	14
FSGA 78 G1/4-IG	54.0	8.2	84.5	74.0	G1/4"-F	62.0	12.0	21	14

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)

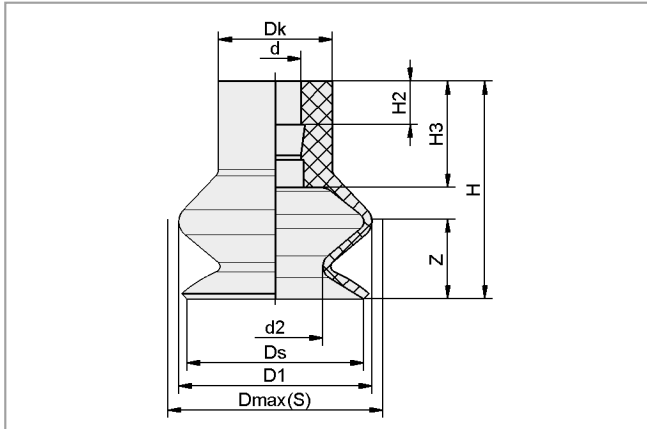


Bellows Suction Cups FSGA (1.5 Folds)

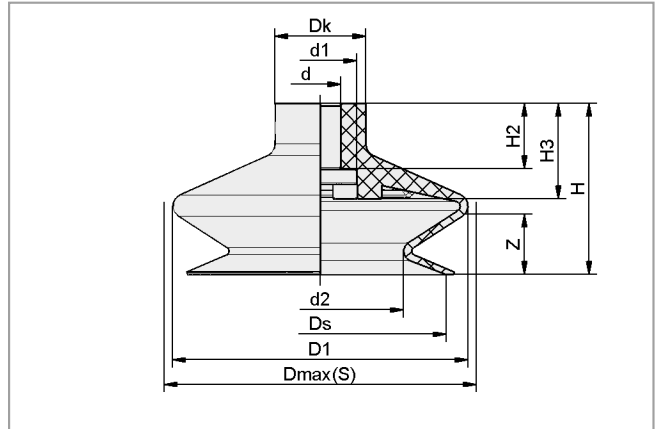
Suction area (\emptyset) from 6 mm to 78 mm



Design Data Bellows Suction Cups FGA - Spare Parts for FSGA



FGA 11 to 25



FGA 6, 33 to 78

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
FGA 6	3.7	5.8	3.0	7.5	7	8.0	5.7	9.0	2.0	3.2	2
FGA 11	4.5	-	5.1	12.0	10	13.0	10.4	16.0	3.8	9.3	4
FGA 14	4.5	-	5.0	13.7	10	14.5	12.5	15.5	3.8	8.5	5
FGA 16	4.5	-	8.4	17.0	10	18.5	15.6	19.2	3.8	9.4	7
FGA 20	4.5	-	11.0	19.9	10	21.0	18.1	15.2	3.8	8.7	5
FGA 22	4.5	-	11.7	24.2	10	25.0	21.5	19.0	3.8	9.1	6
FGA 25	4.5	-	9.9	25.0	10	26.5	22.5	23.0	3.8	8.9	9
FGA 33	8.0	16.0	17.0	36.0	18	38.0	30.0	27.0	13.0	14.0	9
FGA 43	8.0	14.5	21.9	45.9	18	47.5	38.0	27.6	13.0	17.1	10
FGA 53	8.0	14.5	33.0	58.6	18	60.0	50.0	34.0	13.0	19.0	12
FGA 63	8.0	14.5	44.5	67.0	18	68.0	60.0	34.0	13.0	18.8	14
FGA 78	11.8	21.8	54.0	83.0	25	84.5	74.0	47.0	19.7	31.4	14

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)



Bellows Suction Cups FSGA VU1 (1.5 Folds)

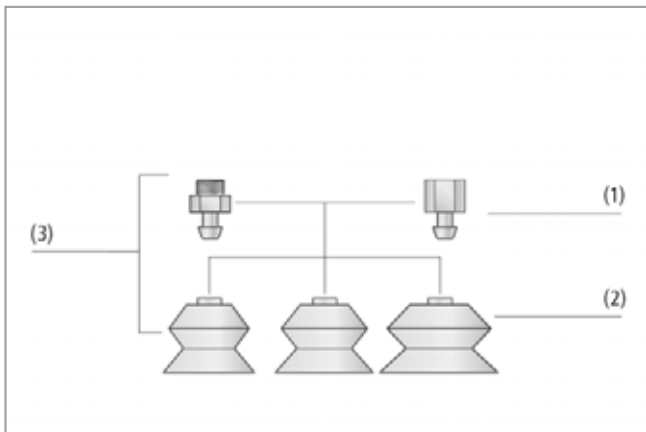
Suction area (\emptyset) from 30 mm to 110 mm



Suitable for Industry Specific Applications



Bellows suction cups FSGA VU1 (1.5 folds)



System design bellows suction cups FSGA VU1 (1.5 folds)



Bellows suction cups FSGA VU1 being used for handling cardboard boxes

Applications

- Round bellows suction cup with 1.5 folds for hard use in multi-shift operations with very short cycle times
- Handling of workpieces with very abrasive surfaces such as rough cardboard sheets
- Suction cup with special slot: for handling oily metal sheets (better resistance to lateral forces)
- Suction cup without special slot: for handling cardboard, wood and similar materials

Design

- Robust, wear-resistant suction cup FSGA (3) with single sealing lip, consisting of suction cup FGA (2) (Vulkollan VU1) with 1.5 folds and connection nipple (1)
- Suction cup connected positively to nipple; no turning even when handling heavy loads
- Suction cups with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion: approx. 10 - 12 mm³ to DIN 53516
- Supports on the bottom
- Very stiff top fold

Your Benefits...

- > Very wear-resistant suction cup for very high loads and a long lifetime
- > Unaffected by oil (handling of sheet metal)
- > Lifetime up to 20 times higher compared to standard NBR
- > No permanent deformation of thin-walled workpieces
- > Good resistance to horizontal forces at high acceleration forces

Bellows Suction Cups (Round)



Bellows Suction Cups FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

Designation Code Bellows Suction Cups FSGA VU1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example FSGA 60 VU1-72 G1/4-IG:				
FSGA	60	VU1-72	G1/4-IG	
FSGA	30 to 110	VU1-72	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/2-IG	ON oil slot

Ordering Data Bellows Suction Cups FSGA VU1 (1.5 Folds)

Suction cup FSGA VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:

- Suction cup of type FGA VU1 – elastomer part, available in various diameters, optional with oil groove
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FGA VU1, connection nipple SA-NIP

Bellows Suction Cups FSGA VU1 (1.5 Folds)

Type*	Connection		
	G1/2"-F	G1/4"-M	G1/4"-F
FSGA 30 VU1-72	-	10.01.06.00197	10.01.06.00169
FSGA 40 VU1-72 ON	-	10.01.06.00306	10.01.06.00299
FSGA 50 VU1-72 ON	-	10.01.06.00307	10.01.06.00300
FSGA 60 VU1-72	-	10.01.06.00242	10.01.06.00240
FSGA 60 VU1-72 ON	-	10.01.06.00198	10.01.06.00172
FSGA 85 VU1-72	-	10.01.06.00243	10.01.06.00241
FSGA 85 VU1-72 ON	-	10.01.06.00199	10.01.06.00170
FSGA 110 VU1-72 ON	10.01.06.00497	-	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Bellows Suction Cups (Round)



Bellows Suction Cups FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

Ordering Data Spare Parts Bellows Suction Cups And Connection Nipples

Type*	Bellows suction cup (round)
FGA 30 VU1-72	10.01.06.00177
FGA 40 VU1-72 ON	10.01.06.00301
FGA 50 VU1-72 ON	10.01.06.00302
FGA 60 VU1-72	10.01.06.00178
FGA 60 VU1-72 ON	10.01.06.00207
FGA 85 VU1-72	10.01.06.00179
FGA 85 VU1-72 ON	10.01.06.00190
FGA 110 VU1-72 ON	10.01.06.00492

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Type	Connection nipple	
FSGA 30 VU1-72 G1/4-AG	SA-NIP N013 G1/4-AG DN350	10.01.06.00183
FSGA 30 VU1-72 G1/4-IG	SA-NIP N013 G1/4-IG DN350	10.01.06.00180
FSGA 40 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
FSGA 40 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
FSGA 50 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
FSGA 50 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
FSGA 60 VU1-72 G1/4-AG	SA-NIP N014 G1/4-AG DN600	10.01.06.00184
FSGA 60 VU1-72 G1/4-IG	SA-NIP N014 G1/4-IG DN600	10.01.06.00181
FSGA 85 VU1-72 G1/4-AG	SA-NIP N015 G1/4-AG DN600	10.01.06.00185
FSGA 85 VU1-72 G1/4-IG	SA-NIP N015 G1/4-IG DN600	10.01.06.00182
FSGA 110 VU1-72 G1/2-IG	SA-SCHE 77 G1/2-IG FSGA	10.01.06.00593

Technical Data Bellows Suction Cups FSGA VU1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
FSGA 30 VU1-72	13.5	32	5.8	25	6	N 013
FSGA 40 VU1-72	33.0	56	11.3	30	6	N 011
FSGA 50 VU1-72	52.0	88	22.6	40	6	N 011
FSGA 60 VU1-72	75.0	120	31.0	50	6	N 014
FSGA 85 VU1-72	140.0	250	75.9	80	6	N 015
FSGA 110 VU1-72	295.0	420	350.0	100	9	N 037

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Cups (Round)

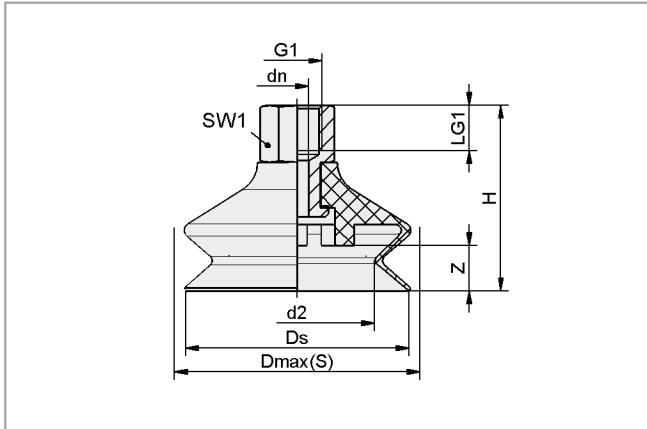


Bellows Suction Cups FSGA VU1 (1.5 Folds)

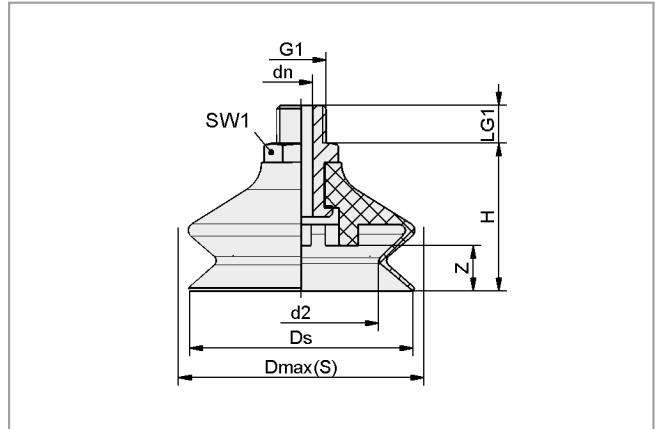
Suction area (\emptyset) from 30 mm to 110 mm



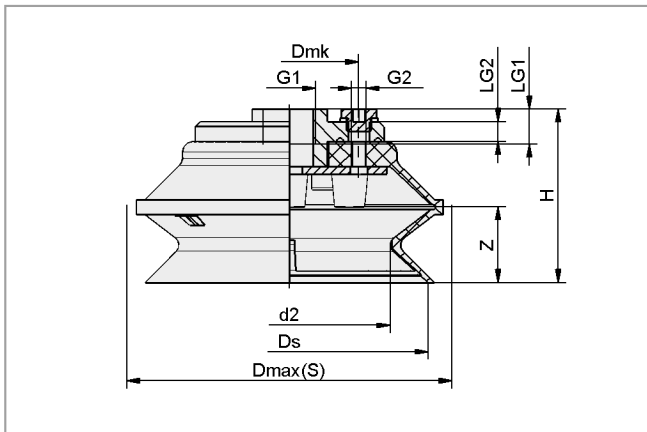
Design Data Bellows Suction Cups FSGA VU1 (1.5 Folds)



FSGA 30 to 85 VU1 IG



FSGA 30 to 85 VU1 AG



FSGA 110 VU1 IG

Type	Dimensions in mm*											
	d2	Dmax(S)**	D mk	dn	Ds	G1	G2	H	LG1	LG2	SW1	Z (Stroke)
FSGA 30 VU1-72 G1/4-AG	17.0	31.5	-	3.5	29	G1/4"-M	-	32.0	10	-	17	8.5
FSGA 30 VU1-72 G1/4-IG	17.0	31.5	-	3.5	29	G1/4"-F	-	42.0	12	-	17	8.5
FSGA 40 VU1-72 G1/4-AG	26.8	42.5	-	3.5	38	G1/4"-M	-	31.0	10	-	17	12.8
FSGA 40 VU1-72 G1/4-IG	26.8	42.5	-	3.5	38	G1/4"-F	-	41.0	12	-	17	12.8
FSGA 50 VU1-72 G1/4-AG	33.5	53.0	-	3.5	47	G1/4"-M	-	37.5	10	-	17	14.5
FSGA 50 VU1-72 G1/4-IG	33.5	53.0	-	3.5	47	G1/4"-F	-	47.5	12	-	17	14.5
FSGA 60 VU1-72 G1/4-AG	40.0	61.5	-	6.0	57	G1/4"-M	-	39.0	10	-	17	12.5
FSGA 60 VU1-72 G1/4-IG	40.0	61.5	-	6.0	57	G1/4"-F	-	49.0	12	-	17	12.5
FSGA 85 VU1-72 G1/4-AG	50.2	86.5	-	6.0	83	G1/4"-M	-	52.0	10	-	22	15.0
FSGA 85 VU1-72 G1/4-IG	50.2	86.5	-	6.0	83	G1/4"-F	-	62.0	12	-	22	15.0
FSGA 110 VU1-72 G1/2-IG	80.0	127.0	55.0	-	110	G1/2"-F	G1/8"-F	69.0	14	8	-	30.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Bellows Suction Cups (Round)

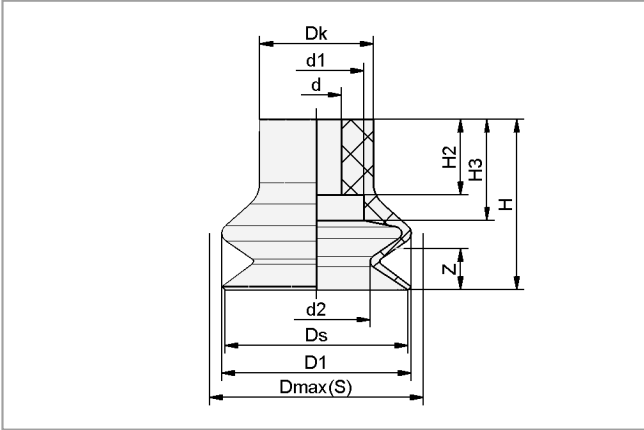


Bellows Suction Cups FSGA VU1 (1.5 Folds)

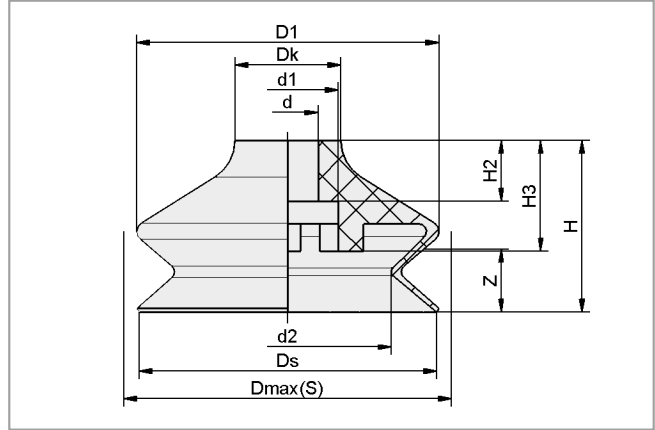
Suction area (\emptyset) from 30 mm to 110 mm



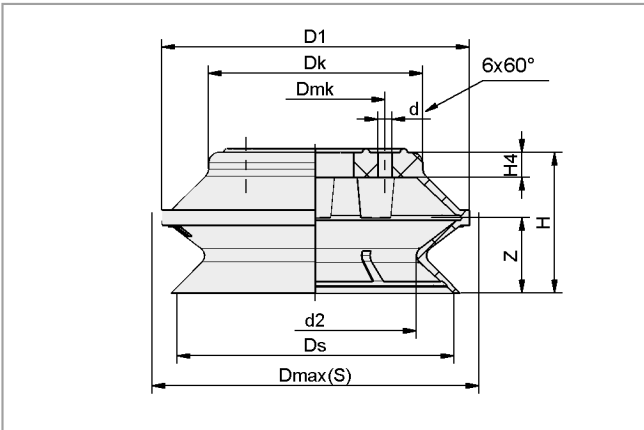
Design Data Bellows Suction Cups FGA VU1 - spare parts for FSGA VU1



FGA 30 VU1



FGA 40 to 85 VU1



FGA 110 VU1

Type	Dimensions in mm*												
	d	d1	d2	D1	Dk	Ds	Dmax(S)**	D mk	H	H2	H3	H4	Z (Stroke)
FGA 30 VU1-72	8	15.0	17.0	30	18.0	29	32	-	27.0	12	16.0	-	8.5
FGA 40 VU1-72	8	13.6	26.8	40	14.0	38	43	-	27.0	8	15.0	-	12.8
FGA 50 VU1-72	8	13.6	33.5	50	17.5	47	53	-	32.5	8	17.8	-	14.5
FGA 60 VU1-72	12	20.0	41.0	60	21.0	59	62	-	34.0	12	22.0	-	12.0
FGA 85 VU1-72	12	25.0	55.0	85	25.0	82	87	-	47.0	20	25.0	-	15.0
FGA 110 VU1-72	6	-	80.0	120	85.0	110	127	40.0	56.0	-	-	8.0	30.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Suction area (Ø) 110 mm and 150 mm



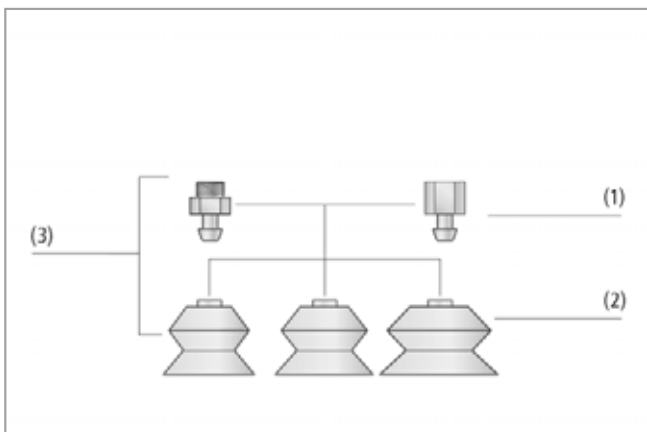
Suitable for Industry Specific Applications



Bellows suction cups FSGA (1.5 folds) from Ø110 mm

Applications

- Round bellows suction cup with 1.5 folds for handling of cardboard, sheet metal and wood
- Handling of large and heavy workpieces which are easily damaged (optimal adaptation to convex surfaces)



System design bellows suction cups FSGA (1.5 folds)

Design

- Robust and hard-wearing suction cup FSGA (3) with single sealing lip, consisting of suction cup FGA (2) with 1.5 folds and connection plate (1)
- Connection plate is screwed to suction cup FGA. Suction cup FGA can be replaced separately when worn
- Suction cups with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired



Bellows suction cups FSGA being used for handling pressed wooden boards

Our Highlights...

- Large diameter
- Soft, tapered sealing lip
- 1.5 folds
- Very stiff top fold
- Supports on the bottom

Your Benefits...

- > Handling of large, heavy workpieces which are easily damaged
- > Very good adaptation to curved workpiece surfaces
- > High suction force and optimum damping effect during placement on workpiece
- > Good resistance to horizontal forces at high acceleration values
- > No permanent deformation of thin-walled workpieces

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Bellows Suction Cups (Round)



Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Suction area (Ø) 110 mm and 150 mm

Designation Code Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGA 110 NBR-70 G1/2-IG:			
FSGA	110	NBR-70	G1/2-IG
FSGA	110	NBR-70	G1/2-IG (IG = female (F))
	150	SI-55	
		SI-70	

Ordering Data Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Suction cup FSGA (elastomer part + connection nipple) is delivered assembled. The assembly consists of:

- Suction cup of type FGA – elastomer part, available in the diameters 110 mm and 150 mm and various materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FGA, connection nipple SA-NIP

Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Type	Suction cup material * / hardness in Shore A		
	NBR-70	SI-55	SI-70
FSGA 110 G1/2-IG	10.01.06.00118	10.01.06.00119	-
FSGA 150 G1/2-IG	10.01.06.00120	-	10.01.06.00121

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Bellows Suction Cups and Connection Nipples

Type*	Nitrile rubber NBR	Silicone SI	Type	Connection nipple	
FGA 110	10.01.06.00114	10.01.06.00115	FSGA 110 G1/2-IG	SA-NIP N010 G1/2-IG	10.01.01.00796
FGA 150	10.01.06.00116	10.01.06.00117	FSGA 150 G1/2-IG	SA-NIP N010 G1/2-IG	10.01.01.00796

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
FSGA 110 G1/2-IG	280	570	330	85	12	N 010
FSGA 150 G1/2-IG	570	1000	800	250	12	N 010

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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Bellows Suction Cups (Round)

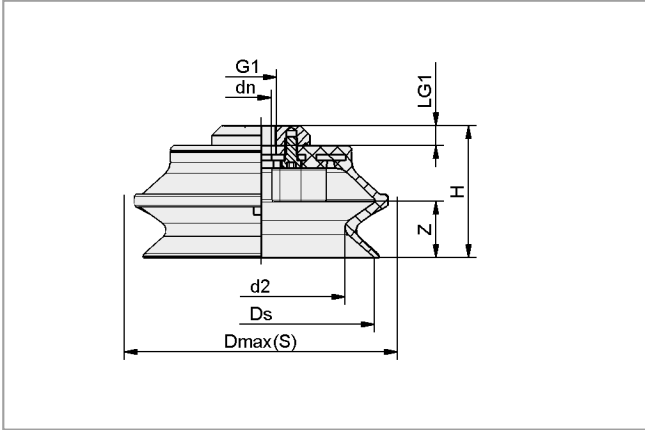


Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm

Suction area (Ø) 110 mm and 150 mm



Design Data Bellows Suction Cups FSGA (1.5 Folds) from Ø110 mm



FSGA 110 to 150

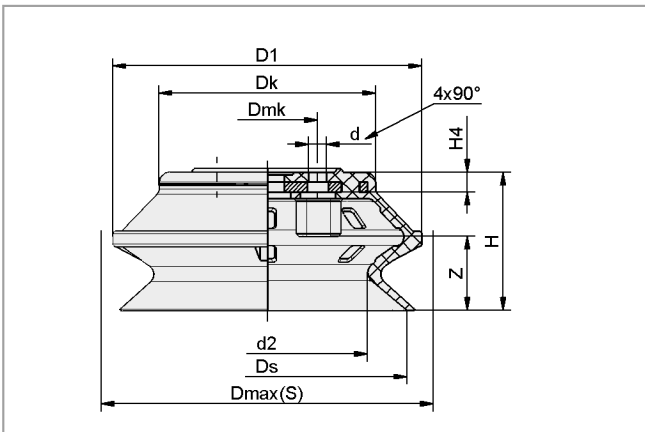
Type	Dimensions in mm*								
	d2	dn	Dmax(S)**	Ds	G1	H	LG1	Z (Stroke)	
FSGA 110 G1/2-IG	80	13.5	130	111	G1/2"-F	69.5	13	29.0	
FSGA 150 G1/2-IG	111	13.5	177	150	G1/2"-F	88.5	13	37.5	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum



Design Data Bellows Suction Cups FGA from Ø110 - Spare Parts for FSGA



FGA 110 to 150

Type	Dimensions in mm*									
	d	d2	D1	Dmk	Dmax(S)**	Dk	Ds	H	H4	Z (Stroke)
FGA 110	7	80	123	40	130	86	111	55	8	29.5
FGA 150	7	111	168	40	177	120	150	74	10	37.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)



Bellows Suction Cups FSGPL (1.5 Folds)

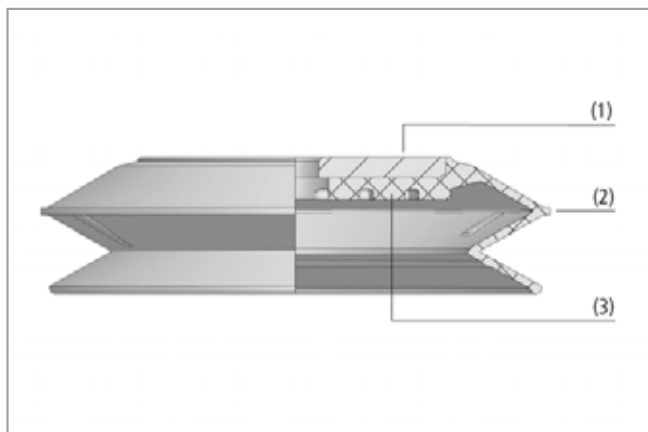
Suction area (\emptyset) from 100 mm to 250 mm



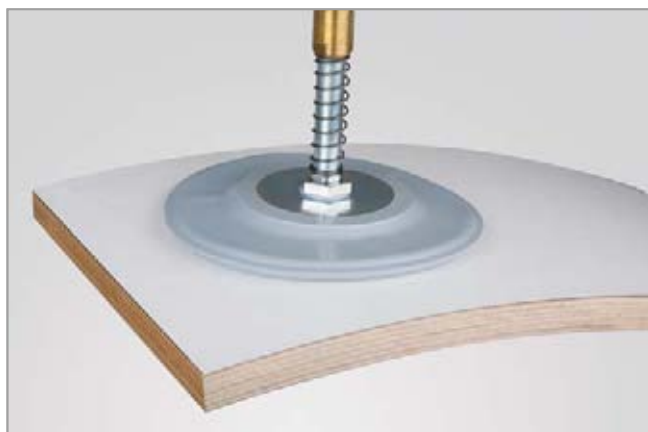
Suitable for Industry Specific Applications



Bellows suction cups FSGPL (1.5 folds)



System design bellows suction cups FSGPL (1.5 folds)



Bellows suction cups FSGPL being used for handling coated wood

Applications

- Round, bellows suction cup with 1.5 folds for handling of cardboard, sheet metal, wood and ceramics
- Handling of workpieces with uneven surfaces (optimal adaptation due to smooth sealing lip)

Design

- Suction cup FSGPL with 1.5 folds (2) and vulcanized mounting plate (1)
- Steel mounting plate with female thread
- Lower side of mounting plate covered with an elastomer coating (3)
- Optionally available without threaded hole

Our Highlights...

- Large diameter
- Very soft, tapered sealing lip
- 1.5 folds
- Elastomer supports on the bottom

Your Benefits...

- > For use with large, heavy but also sensitive workpieces
- > Good adaptation to curved workpiece surfaces
- > High suction force and damping effect during placement on workpiece
- > No permanent deformation or breakage of easily damaged workpieces

Bellows Suction Cups (Round)



Bellows Suction Cups FSGPL (1.5 Folds)

Suction area (Ø) from 100 mm to 250 mm

Designation Code Bellows Suction Cups FSGPL (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGPL 200 NBR-55 G1/2-IG:			
FSGPL	200	NBR-55	G1/2-IG
FSGPL	100	HT1-60	G1/2-IG (IG = female (F))
	120	NBR-55	
	150		
	200		
	250		

Ordering Data Bellows Suction Cups FSGPL (1.5 Folds)

Suction cup FSGPL, available in various diameters, is delivered with support plate vulcanized to elastomer part.

Bellows Suction Cups FSGPL (1.5 Folds)

Type	Suction cup material * / hardness in Shore A	
	HT1-60	NBR-55
FSGPL 100 G1/2-IG	10.01.06.03150	10.01.06.02932
FSGPL 120 G1/2-IG	10.01.06.03151	10.01.06.02933
FSGPL 150 G1/2-IG	10.01.06.03145	10.01.06.00101
FSGPL 200 G1/2-IG	10.01.06.03146	10.01.06.00102
FSGPL 250 G1/2-IG	10.01.06.03421	10.01.06.00103

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups FSGPL (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**
FSGPL 100	150	250	150	100	12
FSGPL 120	280	400	295	150	12
FSGPL 150	370	600	449	250	12
FSGPL 200	850	950	877	350	12
FSGPL 250	1610	2000	1677	500	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Cups (Round)

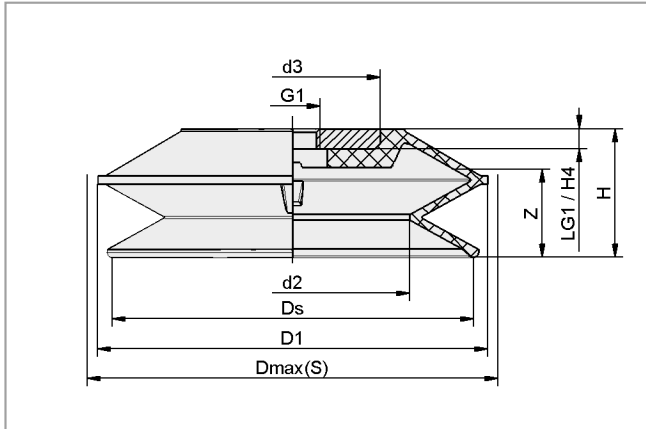


Bellows Suction Cups FSGPL (1.5 Folds)

Suction area (\emptyset) from 100 mm to 250 mm



Design Data Bellows Suction Cups FSGPL (1.5 Folds)



FSGPL 100 to 250

Type	Dimensions in mm*									
	d2	d3	D1	Dmax(S)**	Ds	G1***	H	H4	LG1	Z (Stroke)
FSGPL 100 G1/2-IG	57.2	44.0	101	106.5	96.1	G1/2"-F	43.3	8	8	29.1
FSGPL 120 G1/2-IG	79.3	69.4	128	135.0	118.2	G1/2"-F	51.0	8	8	35.7
FSGPL 150 G1/2-IG	93.0	69.4	155	160.0	143.5	G1/2"-F	51.0	8	8	35.7
FSGPL 200 G1/2-IG	137.0	119.4	202	208.0	191.0	G1/2"-F	54.0	8	8	37.2
FSGPL 250 G1/2-IG	186.0	167.0	250	256.0	239.3	G1/2"-F	60.0	8	8	43.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

***Mounting plate optionally available without drilled holes

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Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 3 mm to 88 mm



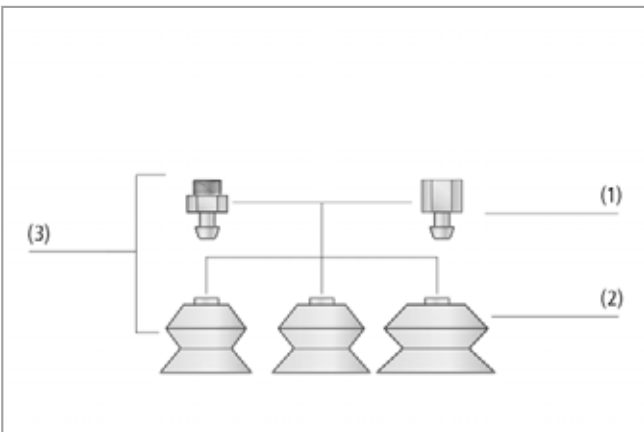
Suitable for Industry Specific Applications



Bellows suction cups FSG (2.5 folds)

Applications

- Round, bellows suction cup with 2.5 folds for handling of extremely sensitive workpieces (optimum damping effect)
- Handling of workpieces with extremely uneven surfaces, such as pipes (optimal adaptation to concave and convex surfaces)
- Internal support (from diameter 52 mm) prevents workpiece from being pulled in
- Special design of the folds permits use in systems with very short cycle times



System design bellows suction cups FSG (2.5 folds)

Design

- Robust, wear-resistant suction cup FSG (3) with single sealing lip, consisting of suction cup FG (2) with 2.5 folds and connection nipple (1)
- All nipples are plugged in
- Suction cups with a diameter of 52 mm or more with supports on the bottom
- With each nipple family, the replacement cups and nipples can be combined as desired



Bellows suction cups FSG being used for handling hot plastic parts

Our Highlights...

- Wide range of diameters and materials
- 2.5 folds
- Soft, flexible folds
- Soft, tapered sealing lip
- Supports on the bottom (diameter from 52 mm)

Your Benefits...

- > Wide range of workpiece shapes and sizes
- > High suction force and optimum damping effect during placement on workpieces
- > Very high stroke of suction cup
- > Very good adaptation to curved workpiece surfaces
- > No permanent deformation of thin-walled workpieces

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Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 3 mm to 88 mm

Designation Code Bellows Suction Cups FSG (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSG 18 SI-55 G1/8-IG:			
FSG	18	SI-55	G1/8-IG
FSG	3 to 88	HT1-60 NBR-55 NBR-AS-55 NK-45 SI-55 SI-AS-55	M5-AG (AG = male (M)) M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Bellows Suction Cups FSG (2.5 Folds)

Suction cup FSG (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type FG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FG, connection nipple SA-NIP

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Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 3 mm to 88 mm

Bellows Suction Cups FSG (2.5 Folds)

Type	Suction cup material * / hardness in Shore A					
	HT1-60	NBR-55	NBR-AS-55	NK-45	SI-55	SI-AS-55
FSG 3 M3-AG	10.01.06.03711	10.01.06.03712	10.01.06.03714	-	10.01.06.03713	10.01.06.03715
FSG 3 M5-AG	10.01.06.03716	10.01.06.03717	10.01.06.03719	-	10.01.06.03718	10.01.06.03720
FSG 4 M5-AG	10.01.06.02968	10.01.06.02964	10.01.06.03073	-	10.01.06.02966	-
FSG 4 M5-IG	10.01.06.02969	10.01.06.02965	10.01.06.03074	-	10.01.06.02967	-
FSG 5 M5-AG	10.01.06.01235	10.01.06.00663	-	-	10.01.06.00665	-
FSG 5 M5-IG	10.01.06.01242	10.01.06.00662	-	-	10.01.06.00664	-
FSG 7 G1/8-AG	10.01.06.01236	10.01.06.00020	-	-	10.01.06.00034	-
FSG 7 G1/8-IG	10.01.06.01243	10.01.06.00001	-	-	10.01.06.00010	-
FSG 7 M5-AG	10.01.06.01237	10.01.06.00021	-	-	10.01.06.00035	-
FSG 9 G1/8-AG	10.01.06.00962	10.01.06.00022	-	10.01.06.00432	10.01.06.00036	-
FSG 9 G1/8-IG	10.01.06.00978	10.01.06.00002	-	10.01.06.00431	10.01.06.00011	-
FSG 9 M5-AG	10.01.06.00963	10.01.06.00023	-	10.01.06.00430	10.01.06.00037	-
FSG 12 G1/8-AG	10.01.06.01238	10.01.06.00562	-	10.01.06.00564	10.01.06.00563	-
FSG 12 G1/8-IG	10.01.06.01244	10.01.06.00559	-	10.01.06.00561	10.01.06.00560	-
FSG 12 M5-AG	10.01.06.01255	10.01.06.00565	-	10.01.06.00567	10.01.06.00566	-
FSG 14 G1/8-AG	10.01.06.00966	10.01.06.00024	-	10.01.06.00435	10.01.06.00038	-
FSG 14 G1/8-IG	10.01.06.00982	10.01.06.00003	-	10.01.06.00434	10.01.06.00012	-
FSG 14 M5-AG	10.01.06.00967	10.01.06.00025	-	10.01.06.00433	10.01.06.00039	-
FSG 18 G1/8-AG	10.01.06.00968	10.01.06.00026	-	10.01.06.00438	10.01.06.00040	-
FSG 18 G1/8-IG	10.01.06.00984	10.01.06.00004	-	10.01.06.00437	10.01.06.00013	-
FSG 18 M5-AG	10.01.06.00969	10.01.06.00027	-	10.01.06.00436	10.01.06.00041	-
FSG 20 G1/8-AG	10.01.06.01239	10.01.06.00028	-	10.01.06.00441	10.01.06.00042	-
FSG 20 G1/8-IG	10.01.06.01245	10.01.06.00005	-	10.01.06.00440	10.01.06.00014	-
FSG 20 M5-AG	10.01.06.01240	10.01.06.00029	-	10.01.06.00439	10.01.06.00043	-
FSG 25 G1/8-AG	10.01.06.00972	10.01.06.00334	-	10.01.06.00443	10.01.06.00337	-
FSG 25 G1/8-IG	10.01.06.00988	10.01.06.00333	-	10.01.06.00442	10.01.06.00336	-
FSG 32 G1/4-AG	10.01.06.01241	10.01.06.00030	-	10.01.06.00445	10.01.06.00044	-
FSG 32 G1/4-IG	10.01.06.01246	10.01.06.00006	-	10.01.06.00444	10.01.06.00015	-
FSG 42 G1/4-AG	10.01.06.00974	10.01.06.00031	-	10.01.06.00447	10.01.06.00045	-
FSG 42 G1/4-IG	10.01.06.00990	10.01.06.00007	-	10.01.06.00446	10.01.06.00016	-
FSG 52 G1/4-AG	10.01.06.02387	10.01.06.00582	-	10.01.06.02385	10.01.06.00586	-
FSG 52 G1/4-IG	10.01.06.02388	10.01.06.00584	-	10.01.06.02386	10.01.06.00587	-
FSG 62 G1/4-AG	10.01.06.02480	10.01.06.00032	-	10.01.06.00449	10.01.06.00046	-
FSG 62 G1/4-IG	10.01.06.02481	10.01.06.00008	-	10.01.06.00448	10.01.06.00017	-
FSG 88 G1/4-AG	-	10.01.06.00033	-	10.01.06.00451	10.01.06.00047	-
FSG 88 G1/4-IG	-	10.01.06.00009	-	10.01.06.00450	10.01.06.00018	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 3 mm to 88 mm

Ordering Data Bellows Suction Cups FG (2.5 Folds) - Spare Parts for FSG

Type	Suction cup material * / hardness in Shore A					
	HT1-60	NBR-55	NBR-AS-55	NK-45	SI-55	SI-AS-55
FG 3	10.01.06.03639	10.01.06.03704	10.01.06.03706	-	10.01.06.03705	10.01.06.03707
FG 4	10.01.06.02930	10.01.06.02962	10.01.06.03067	-	10.01.06.02963	10.01.06.03277
FG 5	10.01.06.01250	10.01.06.00640	10.01.06.00641	-	10.01.06.00642	10.01.06.00643
FG 7	10.01.06.01251	10.01.06.00050	-	-	10.01.06.00055	10.01.06.00508
FG 9	10.01.06.00878	10.01.06.00051	10.01.06.03259	10.01.06.00452	10.01.06.00056	10.01.06.03260
FG 12	10.01.06.01252	10.01.06.00557	-	10.01.06.00558	10.01.06.00549	10.01.06.03360
FG 14	10.01.06.00880	10.01.06.00052	-	10.01.06.00453	10.01.06.00057	10.01.06.03394
FG 18	10.01.06.00881	10.01.06.00053	10.01.06.03400	10.01.06.00454	10.01.06.00058	-
FG 20	10.01.06.01253	10.01.06.00054	-	10.01.06.00455	10.01.06.00059	-
FG 25	10.01.06.00883	10.01.06.00335	-	10.01.06.00456	10.01.06.00338	-
FG 32	10.01.06.01254	10.01.06.00140	-	10.01.06.00457	10.01.06.00144	-
FG 42	10.01.06.00885	10.01.06.00141	-	10.01.06.00458	10.01.06.00145	-
FG 52	10.01.06.02365	10.01.06.00583	-	10.01.06.02382	10.01.06.00585	-
FG 62	10.01.06.02475	10.01.06.00142	-	10.01.06.00459	10.01.06.00146	-
FG 88	-	10.01.06.00143	-	10.01.06.00460	10.01.06.00147	-

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Connection Nipples

Type	Connection nipples [AG]		Connection nipples [IG]	
FSG 3 M3	SA-NIP N055 M3-AG	10.01.01.00313	-	-
FSG 3 M5	SA-NIP N055 M5-AG	10.01.01.13084	-	-
FSG 4 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 5 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 7 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 7 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 9 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 9 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 12 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 12 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 18 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 18 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	SA-NIP N016 M5-IG	10.01.06.03384
FSG 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 32 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 42 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 52 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 62 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 88 G1/4	SA-NIP N019 G1/4-AG	10.01.06.01959	SA-NIP N019 G1/4-IG	10.01.06.01960

Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (\emptyset) from 3 mm to 88 mm

Technical Data Bellows Suction Cups FSG (2.5 Folds)

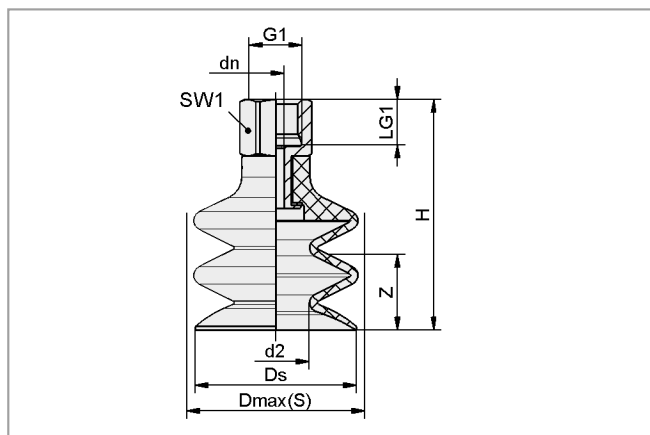
Type	Suction force [N]*	Pull-off force [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***	Nipple family
FSG 3	0,2	0,4	0,022	4	2	N 055
FSG 4	0,3	0,6	0,053	4	2	N 017
FSG 5	0,1	0,8	0,033	8	2	N 017
FSG 7	0,1	0,9	0,043	8	4	N 016
FSG 9	0,7	2,3	0,150	10	4	N 016
FSG 12	0,9	3,5	0,600	13	4	N 016
FSG 14	1,2	5,7	0,975	15	4	N 016
FSG 18	2,3	8,5	1,350	20	4	N 016
FSG 20	3,8	12,1	2,000	30	4	N 016
FSG 25	4,5	19,0	5,400	30	4	N 016
FSG 32	12,0	36,9	10,000	35	6	N 018
FSG 42	13,6	44,0	19,786	75	6	N 018
FSG 52	27,0	96,0	37,587	75	6	N 018
FSG 62	39,6	137,0	72,500	75	6	N 018
FSG 88	45,2	286,0	143,668	100	9	N 019

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

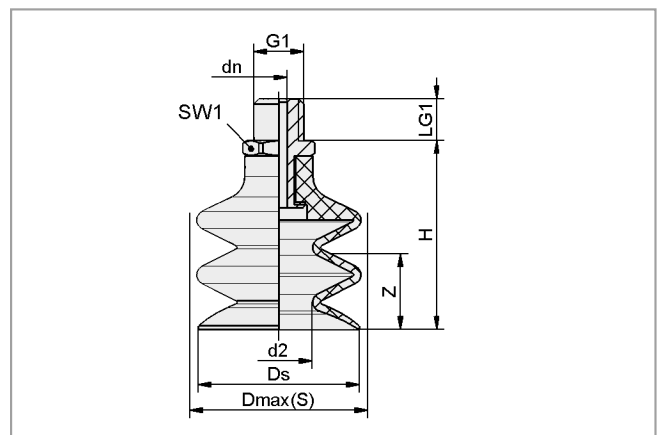
**The pull-off force of the versions made of natural rubber is reduced by about 40%

***The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Bellows Suction Cups FSG (2.5 Folds)



FSG 3 to 88 IG



FSG 3 to 88 AG

Bellows Suction Cups (Round)



Bellows Suction Cups FSG (2.5 Folds)

Suction area (Ø) from 3 mm to 88 mm

Design Data Bellows Suction Cups FSG (2.5 Folds)

Type	Dimensions in mm*								
	d2	dn	Ds	Dmax(S)**	G1	H	LG1	SW1	Z (Stroke)
FSG 3 M3-AG	1.8	0.7	3.0	4.0	M3-M	8.7	3.0	5	2
FSG 3 M5-AG	1.8	0.7	3.0	4.0	M5-M	10.2	4.5	7	2
FSG 4 M5-AG	2.4	2.0	3.8	7.0	M5-M	19.0	5.0	8	2
FSG 4 M5-IG	2.4	2.0	3.8	7.0	M5-F	24.0	5.5	8	2
FSG 5 M5-AG	2.6	2.0	5.0	7.0	M5-M	19.0	5.0	8	2
FSG 5 M5-IG	2.6	2.0	5.0	7.0	M5-F	24.0	5.5	8	2
FSG 7 G1/8-AG	1.8	3.5	5.9	9.0	G1/8"-M	20.0	7.5	14	3
FSG 7 G1/8-IG	1.8	3.5	5.9	9.0	G1/8"-F	26.0	8.5	14	3
FSG 7 M5-AG	1.8	2.5	5.9	9.0	M5-M	19.0	5.0	7	3
FSG 9 G1/8-AG	4.1	3.5	9.0	9.5	G1/8"-M	21.0	7.5	14	3
FSG 9 G1/8-IG	4.1	3.5	9.0	9.5	G1/8"-F	27.0	8.5	14	3
FSG 9 M5-AG	4.1	2.5	9.0	9.5	M5-M	20.0	5.0	7	3
FSG 12 G1/8-AG	5.0	3.5	12.0	13.0	G1/8"-M	27.0	7.5	14	7
FSG 12 G1/8-IG	5.0	3.5	12.0	13.0	G1/8"-F	33.0	8.5	14	7
FSG 12 M5-AG	5.0	2.5	12.0	13.0	M5-M	26.0	5.0	7	7
FSG 14 G1/8-AG	5.4	3.5	14.5	15.5	G1/8"-M	28.8	7.5	14	9
FSG 14 G1/8-IG	5.4	3.5	14.5	15.5	G1/8"-F	34.8	8.5	14	9
FSG 14 M5-AG	5.4	2.5	14.5	15.5	M5-M	27.8	5.0	7	9
FSG 18 G1/8-AG	8.0	3.5	17.2	19.0	G1/8"-M	28.6	7.5	14	9
FSG 18 G1/8-IG	8.0	3.5	17.2	19.0	G1/8"-F	34.6	8.0	14	9
FSG 18 M5-AG	8.0	2.5	17.2	19.0	M5-M	27.6	5.0	7	9
FSG 20 G1/8-AG	10.5	3.5	20.0	21.0	G1/8"-M	28.1	7.5	14	9
FSG 20 G1/8-IG	10.5	3.5	20.0	21.0	G1/8"-F	34.1	8.0	14	9
FSG 20 M5-AG	10.5	2.5	20.0	21.0	M5-M	27.1	5.0	7	9
FSG 25 G1/8-AG	10.0	3.5	23.0	26.0	G1/8"-M	40.0	7.5	14	18
FSG 25 G1/8-IG	10.0	3.5	23.0	26.0	G1/8"-F	46.0	8.0	14	18
FSG 32 G1/4-AG	16.0	4.4	32.0	33.5	G1/4"-M	41.5	11.0	17	15
FSG 32 G1/4-IG	16.0	4.4	32.0	33.5	G1/4"-F	52.5	12.0	17	15
FSG 42 G1/4-AG	17.8	4.4	42.6	45.0	G1/4"-M	50.0	11.0	17	20
FSG 42 G1/4-IG	17.8	4.4	42.6	45.0	G1/4"-F	61.0	12.0	17	20
FSG 52 G1/4-AG	24.6	4.4	52.5	55.0	G1/4"-M	52.7	11.0	17	25
FSG 52 G1/4-IG	24.6	4.4	52.5	55.0	G1/4"-F	63.7	12.0	17	25
FSG 62 G1/4-AG	29.5	4.4	62.2	65.0	G1/4"-M	58.0	11.0	17	29
FSG 62 G1/4-IG	29.5	4.4	62.2	65.0	G1/4"-F	69.0	12.0	17	29
FSG 88 G1/4-AG	29.3	8.2	89.0	95.5	G1/4"-M	92.5	11.0	21	34
FSG 88 G1/4-IG	29.3	8.2	89.0	95.5	G1/4"-F	101.5	12.0	21	34

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)

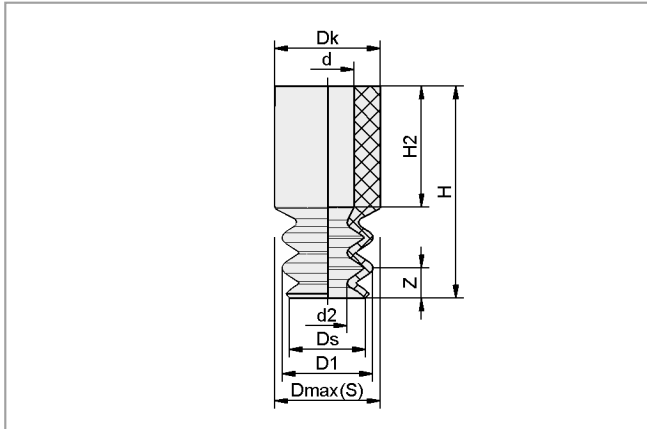


Bellows Suction Cups FSG (2.5 Folds)

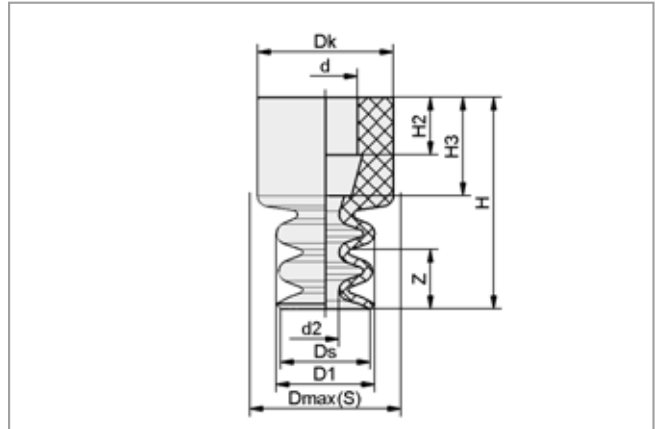
Suction area (\emptyset) from 3 mm to 88 mm



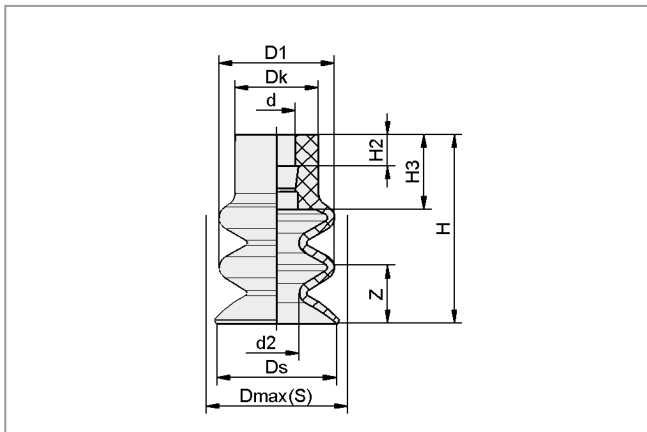
Design Data Bellows Suction Cups FG (2.5 Folds) - Spare Parts for FSG



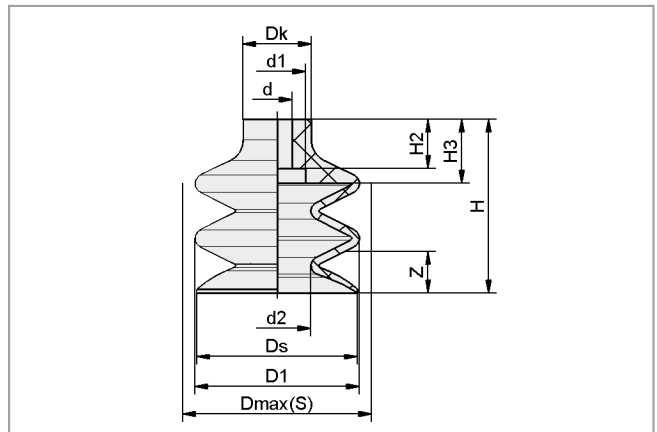
FG 5, 52, 62



FG 3, 4, 7, 9



FG 12 to 25



FG 32 to 88

Type	Dimensions in mm*									
	d	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
FG 3	1.7	1.8	3.6	4	4.0	3.0	6.7	2.1	-	1
FG 4	3.5	2.4	5.1	7	7.0	3.8	14.0	3.9	7.0	2
FG 5	3.5	2.6	6.0	7	7.0	5.0	14.0	8.0	-	2
FG 7	4.5	1.8	6.5	9	9.0	5.9	14.0	3.8	6.5	3
FG 9	4.5	4.1	8.9	9	9.5	9.0	15.0	3.8	8.2	3
FG 12	4.5	5.0	12.0	10	13.0	12.0	21.0	3.8	6.5	7
FG 14	4.5	5.4	13.9	10	15.5	14.5	22.8	3.8	6.5	9
FG 18	4.5	8.0	17.8	10	19.0	17.2	22.6	3.8	6.5	9
FG 20	4.5	10.5	20.0	10	21.0	20.0	22.1	3.8	6.5	9
FG 25	4.5	10.0	25.0	10	26.0	23.0	34.0	3.8	6.5	18
FG 32	8.0	16.0	32.4	18	33.5	32.0	37.5	13.0	17.0	15
FG 42	8.0	17.8	43.5	18	45.0	42.6	46.0	13.0	17.0	20
FG 52	8.0	24.6	52.0	18	55.0	52.5	48.7	13.0	-	25
FG 62	8.0	29.5	62.0	18	65.0	62.2	54.0	13.0	-	29
FG 88	11.7	29.3	88.2	25	95.5	89.0	86.5	19.7	26.0	34

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)



Bellows Suction Cups FSG VU1 (2.5 Folds)

Suction area (\emptyset) from 30 mm to 85 mm



Suitable for Industry Specific Applications



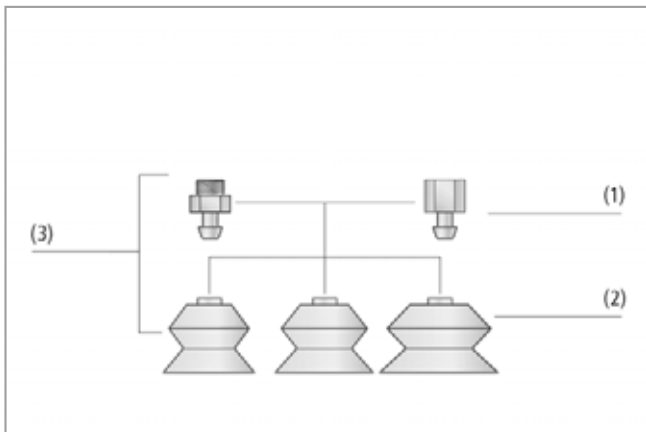
Bellows suction cups FSG VU1 (2.5 folds)

Applications

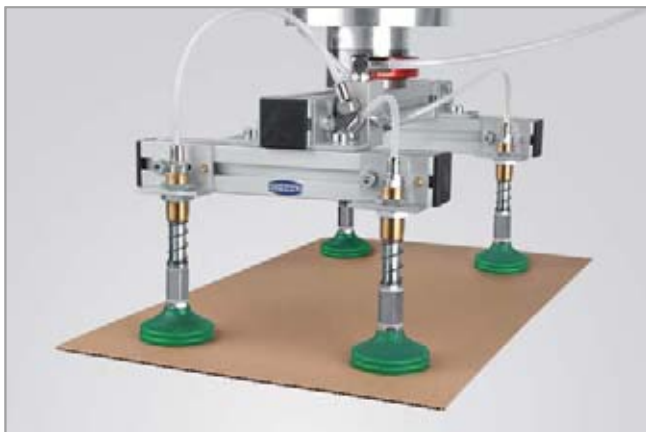
- Round bellows suction cup with 2.5 folds for hard use in multi-shift operations with very short cycle times
- Handling of workpieces with very abrasive surfaces
- Suction cup with special groove: for handling oily metal sheets (better handling of lateral forces)
- Suction cup without special groove: for handling cardboard, wood and similar materials

Design

- Robust and wear-resistant suction cup FSG (3) with single sealing lip, consisting of suction cup FG (2) (Vulkollan VU1) with 2.5 folds and connection nipple (1)
- Suction cup positively connected to nipple to prevent turning, even when lifting heavy loads
- With each nipple family, the replacement cups and nipples can be combined as desired



System design bellows suction cups FSG VU1 (2.5 folds)



Bellows suction cups FSG VU1 being used for handling corrugated cardboard

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion, approx. 10 - 12 mm³ to DIN 53516
- Supports on the bottom
- Very stiff top fold

Your Benefits...

- > Very wear-resistant suction cup for very high loading and a long lifetime
- > Unaffected by oil (handling of sheet metal)
- > Lifetime up to 20 times longer compared to standard NBR
- > No permanent deformation of thin-walled workpieces
- > Good resistance to horizontal forces at high acceleration values

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Bellows Suction Cups (Round)



Bellows Suction Cups FSG VU1 (2.5 Folds)

Suction area (Ø) from 30 mm to 85 mm

Designation Code Bellows Suction Cups FSG VU1 (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example FSG 60 VU1-72 G1/4-AG:				
FSG	60	VU1-72	G1/4-AG	
FSG	30	VU1-72	G1/4-AG (AG = male (M))	ON oil slot
	60		G1/4-IG (IG = female (F))	
	85			

Ordering Data Bellows Suction Cups FSG VU1 (2.5 Folds)

Suction cup FSG VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:

- Suction cup of type FG VU1 – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FG VU1, connection nipple SA-NIP

Bellows Suction Cups FSG VU1 (2.5 Folds)

Type*	Connection	
	G1/4"-M	G1/4"-F
FSG 30 VU1-72	10.01.06.00200	10.01.06.00166
FSG 60 VU1-72	10.01.06.00238	10.01.06.00236
FSG 60 VU1-72 ON	10.01.06.00201	10.01.06.00171
FSG 85 VU1-72	10.01.06.00239	10.01.06.00237
FSG 85 VU1-72 ON	10.01.06.00202	10.01.06.00167

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Bellows Suction Cups And Connection Nipples

Type*	Bellows suction cup (round)	Type	Connection nipple	
FG 30 VU1-72	10.01.06.00173	FSG 30 VU1-72 G1/4-AG	SA-NIP N013 G1/4-AG DN350	10.01.06.00183
FG 60 VU1-72	10.01.06.00174	FSG 30 VU1-72 G1/4-IG	SA-NIP N013 G1/4-IG DN350	10.01.06.00180
FG 60 VU1-72 ON	10.01.06.00208	FSG 60 VU1-72 G1/4-AG	SA-NIP N014 G1/4-AG DN600	10.01.06.00184
FG 85 VU1-72	10.01.06.00175	FSG 60 VU1-72 G1/4-IG	SA-NIP N014 G1/4-IG DN600	10.01.06.00181
FG 85 VU1-72 ON	10.01.06.00209	FSG 85 VU1-72 G1/4-AG	SA-NIP N015 G1/4-AG DN600	10.01.06.00185
		FSG 85 VU1-72 G1/4-IG	SA-NIP N015 G1/4-IG DN600	10.01.06.00182

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups FSG VU1 (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
FSG 30 VU1-72	13.5	32	9	25	6	N 013
FSG 60 VU1-72	61.0	100	67	50	6	N 014
FSG 85 VU1-72	120.0	250	202	60	6	N 015

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

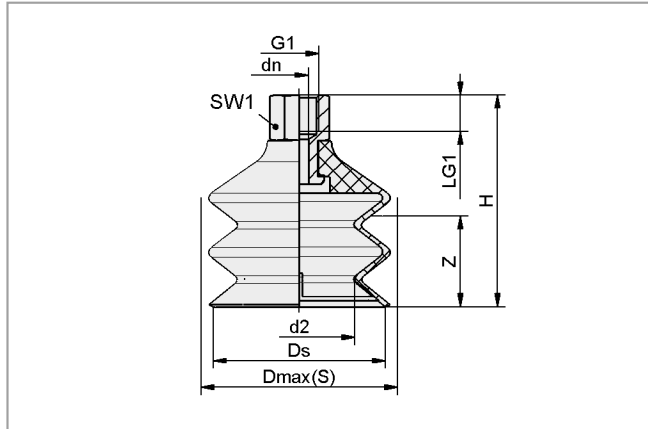
Bellows Suction Cups (Round)



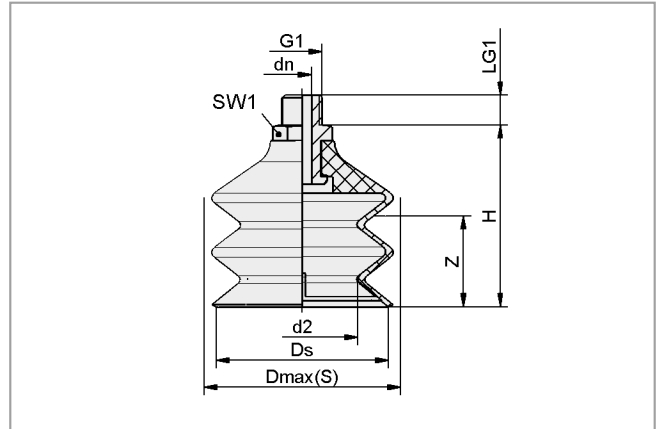
Bellows Suction Cups FSG VU1 (2.5 Folds)

Suction area (\emptyset) from 30 mm to 85 mm

Design Data Bellows Suction Cups FSG VU1 (2.5 Folds)



FSG 30 to 85 VU1 IG



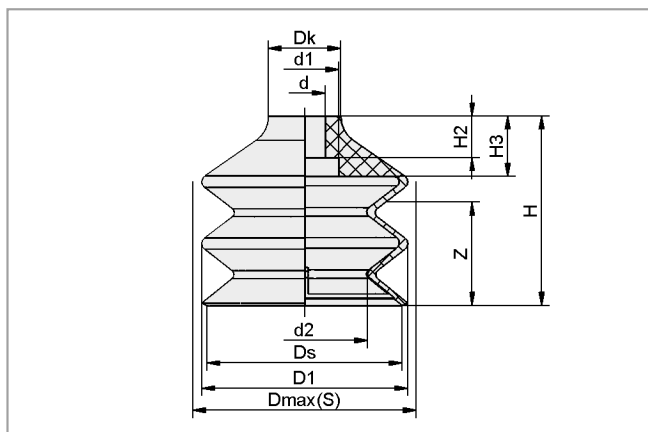
FSG 30 to 85 VU1 AG

Type	Dimensions in mm*									
	d2	dn	Ds	Dmax(S)**	G1	H	LG1	SW1	Z (Stroke)	
FSG 30 VU1-72 G1/4-AG	15	3.5	29.0	31.5	G1/4"-M	45	10	17	15	
FSG 30 VU1-72 G1/4-IG	15	3.5	29.0	31.5	G1/4"-F	55	12	17	15	
FSG 60 VU1-72 G1/4-AG	36	6.0	59.0	62.5	G1/4"-M	60	10	17	30	
FSG 60 VU1-72 G1/4-IG	36	6.0	59.0	62.5	G1/4"-F	70	12	17	30	
FSG 85 VU1-72 G1/4-AG	51	6.0	80.2	90.0	G1/4"-M	90	10	22	38	
FSG 85 VU1-72 G1/4-IG	51	6.0	80.2	90.0	G1/4"-F	100	12	22	38	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Bellows Suction Cups FG VU1 - Spare Parts for FSG VU1



FG 30 to 85 VU1

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
FG 30 VU1-72	8	15	15	30	18	31.5	29.0	40	12	16	15
FG 60 VU1-72	12	20	36	60	21	62.5	59.0	55	12	18	30
FG 85 VU1-72	12	25	51	85	25	90.0	80.2	85	20	27	38

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Bellows Suction Cups (Round)



Bellows Suction Cups FSGB (3.5 Folds)

Suction area (Ø) 25 mm



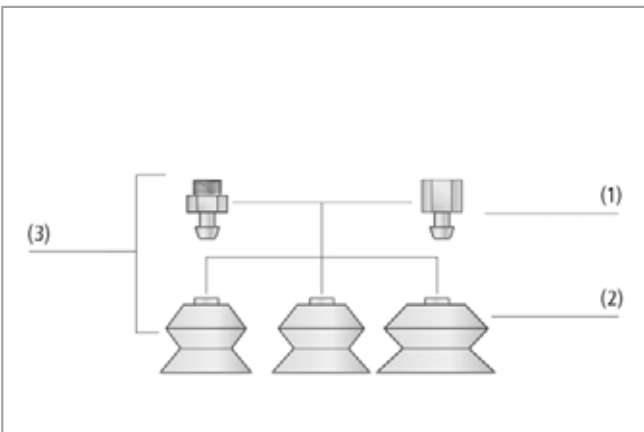
Suitable for Industry Specific Applications



Bellows suction cups FSGB (3.5 folds)

Applications

- Round, bellows suction cup with 3.5 folds for handling of easily damaged workpieces due to optimum damping effect, big stroke and smooth sealing lip
- Handling of very uneven workpieces, such as pipes (folds permit optimal adaptation to convex surfaces)
- Handling of workpieces which have to be lifted as carefully as possible (suction cup has very long stroke)



System design bellows suction cups FSGB (3.5 folds)

Design

- Robust, wear-resistant suction cup FSGB (3) with single sealing lip, consisting of suction cup FGB (2) with 3.5 folds and connection nipple (1)
- Nipple is plugged into suction cup
- With each nipple family, the replacement cups and nipples can be combined as desired



Bellows suction cups FSGB being used for handling pipes

Our Highlights...

- 3.5 folds
- Soft, tapered sealing lip
- Soft, flexible folds

Your Benefits...

- > High suction force and extremely good damping effect during placement on easily damaged workpieces
- > Very good adaptation to curved workpiece surfaces
- > Very long suction cup stroke; excellent compensation for varying workpiece heights

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Bellows Suction Cups (Round)



Bellows Suction Cups FSGB (3.5 Folds)

Suction area (Ø) 25 mm

Designation Code Bellows Suction Cups FSGB (3.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGB 25 SI-55 G1/8-IG:			
FSGB	25	SI-55	G1/8-IG
FSGB	25	NBR-55	G1/8-AG (AG = male (M))
		SI-55	G1/8-IG (IG = female (F))

Ordering Data Bellows Suction Cups FSGB (3.5 Folds)

Suction cup FSGB (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type FGB – elastomer part, available in various materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup FGB, connection nipple SA-NIP

Bellows Suction Cups FSGB (3.5 Folds)

Type	Suction cup material * / hardness in Shore A	
	NBR-55	SI-55
FSGB 25 G1/8-AG	10.01.06.00112	10.01.06.00113
FSGB 25 G1/8-IG	10.01.06.00110	10.01.06.00111

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Bellows Suction Cups and Connection Nipples

Type*	Nitrile rubber NBR	Silicone SI	Type	Connection nipple	
FSGB 25	10.01.06.00109	10.01.06.00108	FSGB 25 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
			FSGB 25 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups FSGB (3.5 Folds)

Type	Suction force [N]*	Pull-off force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
FSGB 25	5	20	7.1	25	4	N 016

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor.

**The recommended hose diameter refers to a hose length of approx. 2 m.

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Bellows Suction Cups (Round)

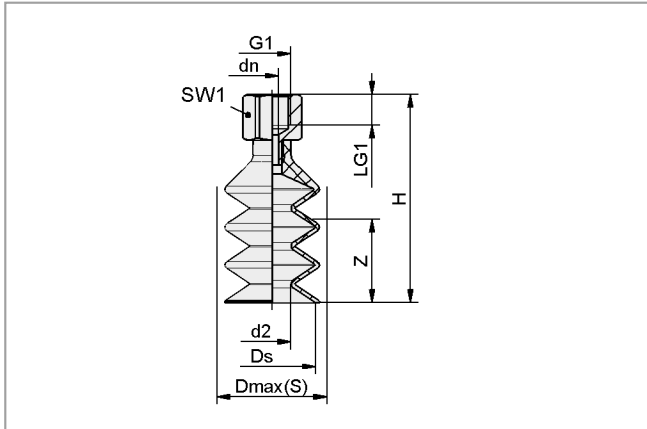


Bellows Suction Cups FSGB (3.5 Folds)

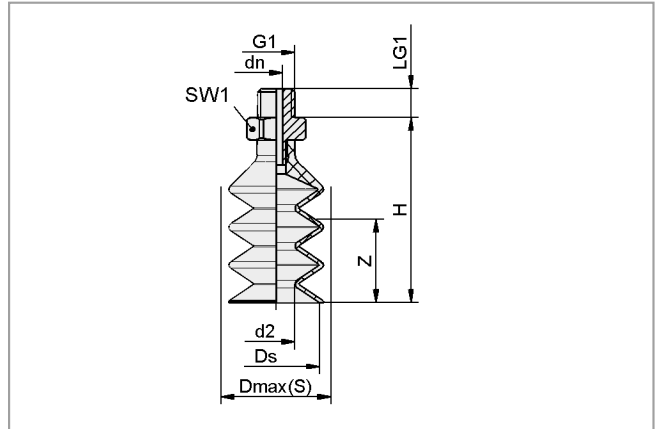
Suction area (\emptyset) 25 mm



Design Data Bellows Suction Cups FSGB (3.5 Folds)



FSGB 25 IG



FSGB 25 AG

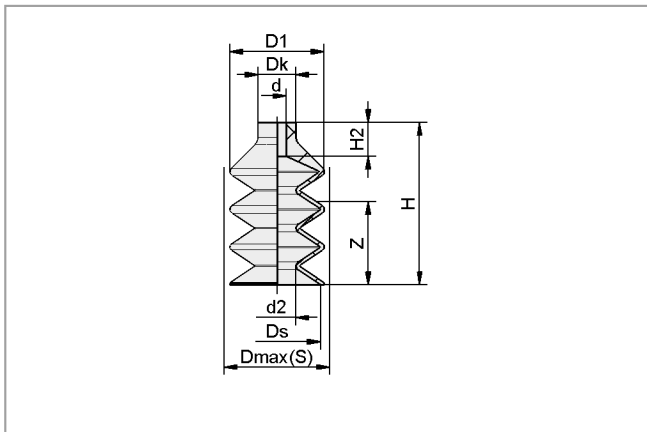
Type	Dimensions in mm*								
	d2	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGB 25 G1/8-AG	10	3.5	27	23	G1/8"-M	51	7.5	14	22
FSGB 25 G1/8-IG	10	3.5	27	23	G1/8"-F	57	8.5	14	22

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum



Design Data Bellows Suction Cups FGB - Spare Parts for FSGB



FGB 25

Type	Dimensions in mm*								
	d	d2	D1	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)
FGB 25	5	10	25	10	27	23	43	9	22

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Bellows Suction Cups (Oval)



Bellows Suction Cups FSGAO (1.5 Folds)

Suction area (LxW) from 95 x 40 mm and 140 x 65 mm



Suitable for Industry Specific Applications

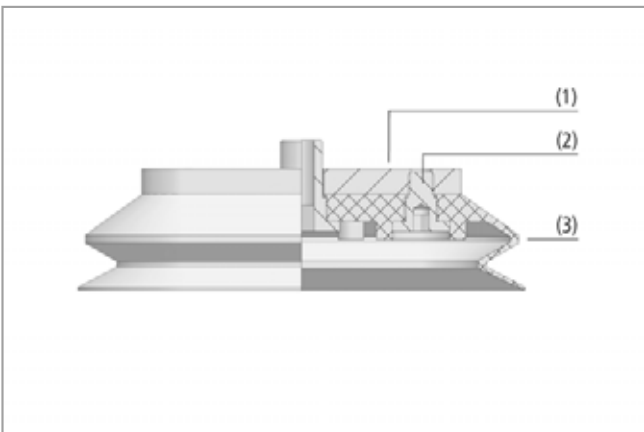
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Bellows suction cups FSGAO (1.5 folds)

Applications

- Oval bellows suction cup with 1.5 folds for use in multi-shift operations with very short cycle times
- Handling of oily and narrow, curved metal sheet
- Handling of cardboard, wood and similar materials under rough operating conditions
- Handling of workpieces with extremely abrasive surfaces such as rough cardboard sheets



System design bellows suction cups FSGAO (1.5 folds)

Design

- Suction cup FSGAO, consisting of suction cup FGAO (Vulkollan VU1) with 1.5 folds (3) and connection plate (1)
- Connection plate screwed (2) to suction cup and capable of handling very heavy loads
- The suction cup can be replaced separately when worn



Bellows suction cups FSGAO being used for handling metal beams

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion: approx. 10 - 12 mm³ to DIN 53516
- 1.5 folds

Your Benefits...

- > Very wear-resistant suction cup for heavy loads and a long lifetime
- > Unaffected by oil (handling of sheet-metal parts)
- > Lifetime up to 20 times longer compared to standard NBR
- > High suction force and optimum damping effected during placement on the workpiece

Bellows Suction Cups (Oval)



Bellows Suction Cups FSGAO (1.5 Folds)

Suction area (LxW) from 95 x 40 mm and 140 x 65 mm

Designation Code Bellows Suction Cups FSGAO (1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example FSGAO 95x40 VU1-72 G1/8-AG:			
FSGAO	95x40	VU1-72	G1/8-AG
FSGAO	95x40	VU1-72	G1/8-AG (AG = male (M))
	140x65		G1/4-AG

Ordering Data Bellows Suction Cups FSGAO (1.5 Folds)

Suction cup FSGAO (elastomer part + support plate) is delivered assembled. The assembly consists of:

- Suction cup of type FGAO – elastomer part, available in various dimensions (LxW)
- Aluminium support plate

Available spare parts: suction cup FGAO

Bellows Suction Cups FSGAO (1.5 Folds)

Type*	Part Number
FSGAO 95x40 VU1-72 G1/8-AG	10.01.06.00503
FSGAO 140x65 VU1-72 G1/4-AG	10.01.06.00498

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Bellows Suction Cups

Type*	Article No.
FGAO 95x40 VU1-72 N038	10.01.06.00499
FGAO 140x65 VU1-72 N039	10.01.06.00468

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups FSGAO (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Nipple family
FSGAO 95x40 VU1-72 G1/8-AG	95	110	38	20	9	N 038
FSGAO 140x65 VU1-72 G1/4-AG	225	255	114	30	9	N 039

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor.

**The recommended hose diameter refers to a hose length of approx. 2 m

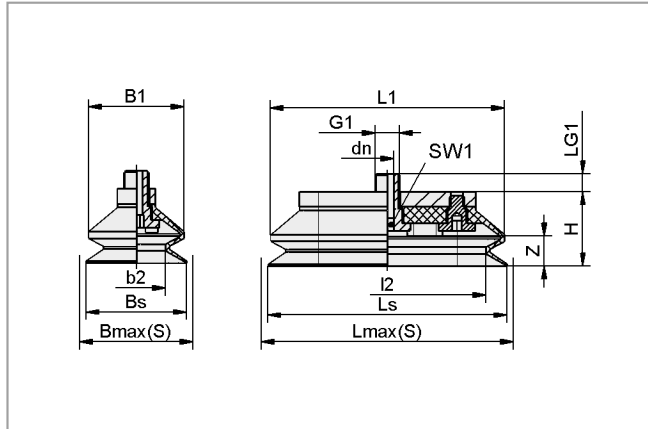
Bellows Suction Cups (Oval)



Bellows Suction Cups FSGAO (1.5 Folds)

Suction area (LxW) from 95 x 40 mm and 140 x 65 mm

Design Data Bellows Suction Cups FSGAO (1.5 Folds)



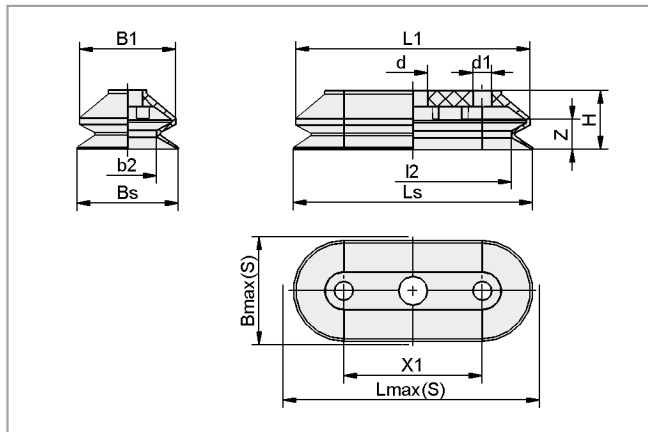
FSGAO 95x40 to 140x65 VU1

Type	Dimensions in mm*													
	b2	B1	Bmax(S)**	Bs	dn	G1	H	LG1	l2	L1	Lmax(S)**	Ls	SW1	Z (Stroke)
FSGAO 95x40 VU1-72 G1/8-AG	23	38	42.5	40	5	G1/8"-M	30	8	78	93	97	95.0	4	12
FSGAO 140x65 VU1-72 G1/4-AG	36	65	68.5	65	8	G1/4"-M	38	10	111	140	142	140.0	8	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Bellows Suction Cups FGAO - Spare Parts for FSGAO



FGAO 95x40 to 140x65 VU1

Type	Dimensions in mm*												
	b2	B1	Bmax(S)**	Bs	d	d1	H	L1	l2	Lmax(S)**	Ls	X1	Z (Stroke)
FGAO 95x40 VU1-72 N038	23	38	42.5	40	11.5	7.5	23.5	93.0	78	97	95	55	12
FGAO 140x65 VU1-72 N039	36	65	68.5	65	15.5	9.5	30.0	140.0	111	142	140	75	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAXM

Suction area (Ø) from 20 mm to 115 mm



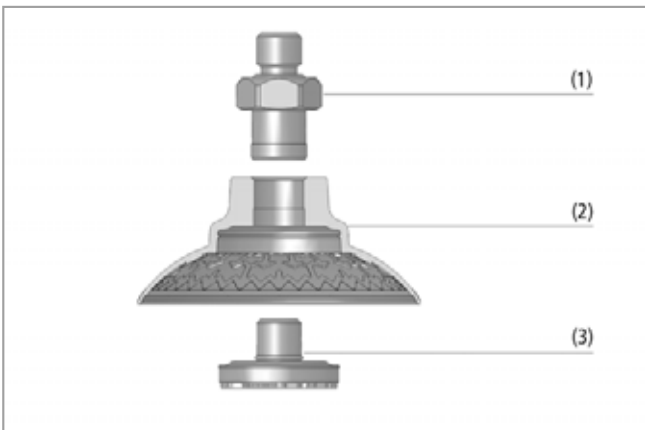
Suitable for Industry Specific Applications



Bell-shaped suction cups SAXM

Applications

- High-speed suction cups with demands for highest holding and shear forces for fast handling of sheet metal and car body parts
- Handling of workpieces with oily surfaces
- Loading and unloading CNC metal and laser cutting machines
- Handling of blanks at destackers
- Handling of workpieces with convex surfaces



System design bell-shaped suction cups SAXM

Design

- Round bell-shaped suction cup (2) with flexible sealing lip, optimum internal structure, special oil groove and inner support
- Wear-resistant material Elastodur of suction cup (ED-85) and friction disc (ED-65)
- Two-part Schmalz connector (SC) consisting of connector upper part (1) and lower part including a friction disc (3)
- Connector upper part with protection against lose
- Connection elements with male thread have an integrated seal on the thread
- Available as mounted suction cup or as individual parts



Bell-shaped suction cups SAXM for handling formed sheet metal parts

Our Highlights...

- Significantly increased stroke of suction cup
- Optimum internal structure
- Large-area, structured inner support
- Innovative material ED
- Environmental friendly, modular design

Your Benefits...

- > Very good adjustment to different workpiece outlines
- > Highest transmission of holding forces and adaptation of shear forces, especially on oily sheet metal
- > Avoidance of deep-drawing, even with thin sheets
- > Highly wear-resistant, resistant to the effects of ozone and aggressive draw oils
- > Minimum costs, quick replacement of individual components, 100% recyclable

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Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAXM

Suction area (\emptyset) from 20 mm to 115 mm

Designation Code Bell-Shaped Suction Cups SAXM

Abbreviated designation	Suction area \emptyset in mm	Material and Shore hardness	Connection thread
Example SAXM 20 ED-85 G1/4-IG:			
SAXM	20	ED-85	G1/4-IG
SAXM	20 to 115	ED-85	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-AG M10-AG M14x1.5-AG NPT3/8-IG RA rectangular adapter

Ordering Data Bell-Shaped Suction Cups SAXM

Bell-shaped suction cup SAXM (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Bell-shaped suction cup of type SAXM (step 1) – elastomer part, available in various diameters
- Connector upper part (step 2) – available with various threads
- Connector lower part (step 3) – including molded friction disc

Bell-shaped Suction Cup SAXM (Assembled)

Type*	Connection						
	G1/4"-M	G1/4"-F	G3/8"-M	M10-M	M14x1.5-M	NPT3/8-F	Rectangular adapter
SAXM 20 ED-85	10.01.19.00101	10.01.19.00080	10.01.19.00102	10.01.19.00098	10.01.19.00099	10.01.19.00103	10.01.19.00100
SAXM 30 ED-85	10.01.19.00049	10.01.19.00014	10.01.19.00050	10.01.19.00016	10.01.19.00017	10.01.19.00063	10.01.19.00018
SAXM 40 ED-85	10.01.19.00051	10.01.19.00019	10.01.19.00052	10.01.19.00021	10.01.19.00022	10.01.19.00064	10.01.19.00023
SAXM 50 ED-85	10.01.19.00053	10.01.19.00024	10.01.19.00054	10.01.19.00026	10.01.19.00027	10.01.19.00065	10.01.19.00028
SAXM 60 ED-85	10.01.19.00055	10.01.19.00029	10.01.19.00056	10.01.19.00031	10.01.19.00032	10.01.19.00066	10.01.19.00033
SAXM 80 ED-85	10.01.19.00057	10.01.19.00034	10.01.19.00058	10.01.19.00036	10.01.19.00037	10.01.19.00067	10.01.19.00038
SAXM 100 ED-85	10.01.19.00059	10.01.19.00039	10.01.19.00060	10.01.19.00041	10.01.19.00042	10.01.19.00068	10.01.19.00043
SAXM 115 ED-85	10.01.19.00061	10.01.19.00044	10.01.19.00062	10.01.19.00046	10.01.19.00047	10.01.19.00069	10.01.19.00048

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 1: Bell-shaped Suction Cup SAXM (Single Component)

Type*	Part Number
SAXM 20 ED-85 SC045	10.01.19.00003
SAXM 30 ED-85 SC045	10.01.19.00004
SAXM 40 ED-85 SC045	10.01.19.00005
SAXM 50 ED-85 SC055	10.01.19.00006
SAXM 60 ED-85 SC055	10.01.19.00007
SAXM 80 ED-85 SC055	10.01.19.00008
SAXM 100 ED-85 SC065	10.01.19.00009
SAXM 115 ED-85 SC065	10.01.19.00010

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAXM

Suction area (Ø) from 20 mm to 115 mm

Step 2: Connector Upper Part (Single Component)

Type	SAXM 20...40	SAXM 50...80	SAXM 100...115
SC-A 045 G1/4-AG L	10.01.06.02818	-	-
SC-A 055 G1/4-AG L	-	10.01.06.02821	-
SC-A 065 G1/4-AG L	-	-	10.01.06.02824
SC-A 045 G1/4-IG L	10.01.06.02736	-	-
SC-A 055 G1/4-IG L	-	10.01.06.02742	-
SC-A 065 G1/4-IG L	-	-	10.01.06.02774
SC-A 045 G3/8-AG L	10.01.06.02807	-	-
SC-A 055 G3/8-AG L	-	10.01.06.02809	-
SC-A 065 G3/8-AG L	-	-	10.01.06.02810
SC-A 045 M10x1.5-AG L	10.01.06.02819	-	-
SC-A 055 M10x1.5-AG L	-	10.01.06.02822	-
SC-A 065 M10x1.5-AG L	-	-	10.01.06.02825
SC-A 045 M14x1.5-AG L	10.01.06.02820	-	-
SC-A 055 M14x1.5-AG L	-	10.01.06.02823	-
SC-A 065 M14x1.5-AG L	-	-	10.01.06.02826
SC-A 045 NPT3/8-IG L	10.01.06.02939	-	-
SC-A 055 NPT3/8-IG L	-	10.01.06.02941	-
SC-A 065 NPT3/8-IG L	-	-	10.01.06.02943
SC-A 045 RA L	10.01.06.02813	-	-
SC-A 055 RA L	-	10.01.06.02815	-
SC-A 065 RA L	-	-	10.01.06.02817

Step 3: Connector Lower Part (Single Component)

Type	SAXM 20...40	SAXM 50...80	SAXM 100...115
SC-S 045 FDC-L	10.01.06.02803	-	-
SC-S 055 FDC-L	-	10.01.06.02804	-
SC-S 065 FDC-L	-	-	10.01.06.02805

Technical Data Bell-Shaped Suction Cups SAXM

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAXM 20 ED-85 SC045	20	15	20	2.7	20	5
SAXM 30 ED-85 SC045	39	32	41	4.5	18	5
SAXM 40 ED-85 SC045	69	38	71	8.3	25	5
SAXM 50 ED-85 SC055	109	58	110	18.0	25	6
SAXM 60 ED-85 SC055	154	85	155	27.7	30	6
SAXM 80 ED-85 SC055	270	150	269	55.5	33	6
SAXM 100 ED-85 SC065	412	230	414	104.1	40	6
SAXM 115 ED-85 SC065	549	320	584	150.1	50	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

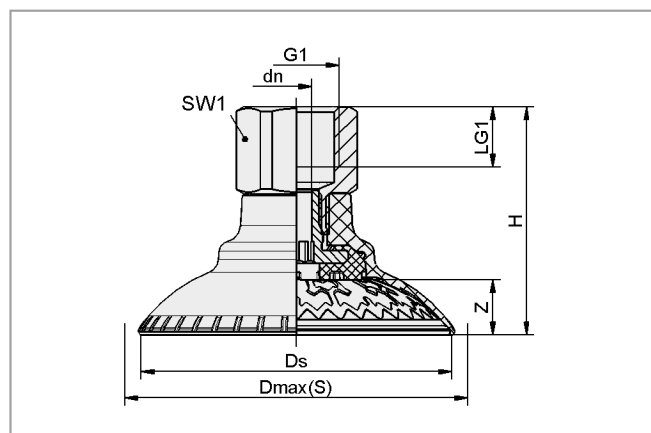
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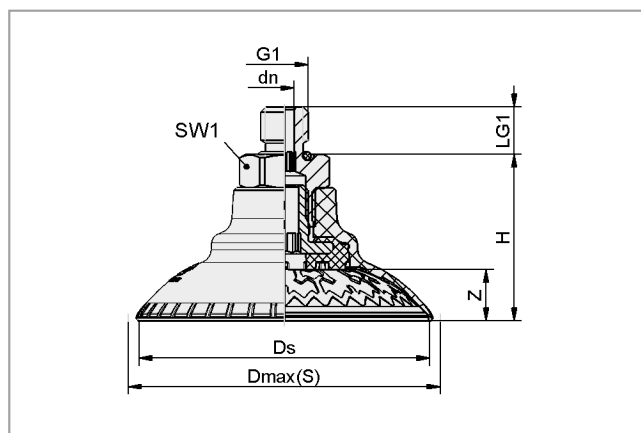
Bell-Shaped Suction Cups SAXM

Suction area (\emptyset) from 20 mm to 115 mm

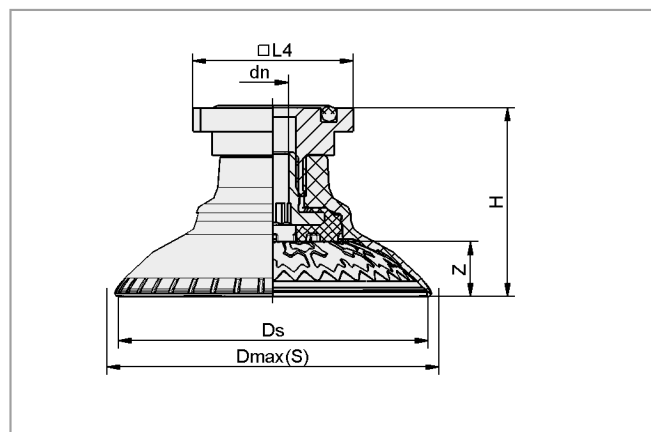
Design Data Bell-Shaped Suction Cups SAXM (Assembled)



SAXM 20 to 115 IG



SAXM 20 to 115 AG



SAXM 20 to 115 RA

Type	Dimensions in mm*								
	dn	Dmax(S)**	Ds	G1	H	LG1	L4	SW1	Z (Stroke)
SAXM 20 ED-85 G1/4-AG	5	26.0	21.8	G1/4"-M	24	10	-	17	3.0
SAXM 20 ED-85 G1/4-IG	5	26.0	21.8	G1/4"-F	34	12	-	17	3.0
SAXM 20 ED-85 G3/8-AG	5	26.0	21.8	G3/8"-M	24	10	-	22	3.0
SAXM 20 ED-85 M10-AG	4	26.0	21.8	M10-M	24	10	-	17	3.0
SAXM 20 ED-85 M14x1.5-AG	5	26.0	21.8	M14x1.5-M	24	10	-	17	3.0
SAXM 20 ED-85 NPT3/8-IG	5	26.0	21.8	NPT3/8-F	34	14	-	22	3.0
SAXM 20 ED-85 RA	5	26.0	21.8	-	26	-	31.8	-	3.0
SAXM 30 ED-85 G1/4-AG	5	35.2	31.6	G1/4"-M	25	10	-	17	4.3
SAXM 30 ED-85 G1/4-IG	5	35.2	31.6	G1/4"-F	35	12	-	17	4.3
SAXM 30 ED-85 G3/8-AG	5	35.2	31.6	G3/8"-M	26	10	-	22	4.3
SAXM 30 ED-85 M10-AG	4	35.2	31.6	M10-M	25	10	-	17	4.3
SAXM 30 ED-85 NPT3/8-IG	5	35.2	31.6	NPT3/8-F	35	14	-	22	4.3
SAXM 30 ED-85 M14x1.5-AG	5	35.2	31.6	M14x1.5-M	25	10	-	17	4.3
SAXM 30 ED-85 RA	5	35.2	31.6	-	27	-	31.8	-	4.3

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAXM

Suction area (Ø) from 20 mm to 115 mm



Design Data Bell-Shaped Suction Cups SAXM (Assembled)

Type	Dimensions in mm*								
	dn	Dmax(S)**	Ds	G1	H	LG1	L4	SW1	Z (Stroke)
SAXM 40 ED-85 G1/4-AG	5	45.4	41.3	G1/4"-M	28	10	-	17	6.9
SAXM 40 ED-85 G1/4-IG	5	45.4	41.3	G1/4"-F	38	12	-	17	6.9
SAXM 40 ED-85 G3/8-AG	5	45.4	41.3	G3/8"-M	28	10	-	22	6.9
SAXM 40 ED-85 M10-AG	4	45.4	41.3	M10-M	28	10	-	17	6.9
SAXM 40 ED-85 M14x1.5-AG	5	45.4	41.3	M14x1.5-M	28	10	-	17	6.9
SAXM 40 ED-85 NPT3/8-IG	5	45.4	41.3	NPT3/8-F	38	14	-	22	6.9
SAXM 40 ED-85 RA	5	45.4	41.3	-	30	-	31.8	-	6.9
SAXM 50 ED-85 G1/4-AG	6	58.4	51.5	G1/4"-M	33	10	-	17	8.4
SAXM 50 ED-85 G1/4-IG	6	58.4	51.5	G1/4"-F	43	12	-	17	8.4
SAXM 50 ED-85 G3/8-AG	6	58.4	51.5	G3/8"-M	33	10	-	22	8.4
SAXM 50 ED-85 M10-AG	4	58.4	51.5	M10-M	33	10	-	17	8.4
SAXM 50 ED-85 M14x1.5-AG	6	58.4	51.5	M14x1.5-M	33	10	-	17	8.4
SAXM 50 ED-85 NPT3/8-IG	6	58.4	51.5	NPT3/8-F	43	14	-	22	8.4
SAXM 50 ED-85 RA	6	58.4	51.5	-	35	-	31.8	-	8.4
SAXM 60 ED-85 G1/4-AG	6	69.7	61.5	G1/4"-M	35	10	-	17	10.9
SAXM 60 ED-85 G1/4-IG	6	69.7	61.5	G1/4"-F	45	12	-	17	10.9
SAXM 60 ED-85 G3/8-AG	6	69.7	61.5	G3/8"-M	36	10	-	22	10.9
SAXM 60 ED-85 M10-AG	4	69.7	61.5	M10-M	35	10	-	17	10.9
SAXM 60 ED-85 M14x1.5-AG	6	69.7	61.5	M14x1.5-M	35	10	-	17	10.9
SAXM 60 ED-85 NPT3/8-IG	6	69.7	61.5	NPT3/8-F	45	14	-	22	10.9
SAXM 60 ED-85 RA	6	69.7	61.5	-	38	-	31.8	-	10.9
SAXM 80 ED-85 G1/4-AG	6	92.2	81.0	G1/4"-M	38	10	-	17	13.9
SAXM 80 ED-85 G1/4-IG	6	92.2	81.0	G1/4"-F	48	12	-	17	13.9
SAXM 80 ED-85 G3/8-AG	6	92.2	81.0	G3/8"-M	39	10	-	22	13.9
SAXM 80 ED-85 M10-AG	4	92.2	81.0	M10-M	38	10	-	17	13.9
SAXM 80 ED-85 M14x1.5-AG	6	92.2	81.0	M14x1.5-M	38	10	-	17	13.9
SAXM 80 ED-85 NPT3/8-IG	6	92.2	81.0	NPT3/8-F	48	14	-	22	13.9
SAXM 80 ED-85 RA	6	92.2	81.0	-	41	-	31.8	-	13.9
SAXM 100 ED-85 G1/4-AG	6	111.1	99.7	G1/4"-M	47	10	-	22	17.1
SAXM 100 ED-85 G1/4-IG	6	111.1	99.7	G1/4"-F	57	12	-	22	17.1
SAXM 100 ED-85 G3/8-AG	6	111.1	99.7	G3/8"-M	47	10	-	22	17.1
SAXM 100 ED-85 M10-AG	4	111.1	99.7	M10-M	47	10	-	22	17.1
SAXM 100 ED-85 M14x1.5-AG	6	111.1	99.7	M14x1.5-M	47	10	-	22	17.1
SAXM 100 ED-85 NPT3/8-IG	6	111.1	99.7	NPT3/8-F	57	14	-	22	17.1
SAXM 100 ED-85 RA	6	111.1	99.7	-	49	-	31.8	-	17.1
SAXM 115 ED-85 G1/4-AG	6	129.4	115.2	G1/4"-M	50	10	-	22	20.0
SAXM 115 ED-85 G1/4-IG	6	129.4	115.2	G1/4"-F	60	12	-	22	20.0
SAXM 115 ED-85 G3/8-AG	6	129.4	115.2	G3/8"-M	50	10	-	22	20.0
SAXM 115 ED-85 M10-AG	4	129.4	115.2	M10-M	50	10	-	22	20.0
SAXM 115 ED-85 M14x1.5-AG	6	129.4	115.2	M14x1.5-M	50	10	-	22	20.0
SAXM 115 ED-85 NPT3/8-IG	6	129.4	115.2	NPT3/8-F	60	14	-	22	20.0
SAXM 115 ED-85 RA	6	129.4	115.2	-	52	-	31.8	-	20.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for Handling Sheet Metal

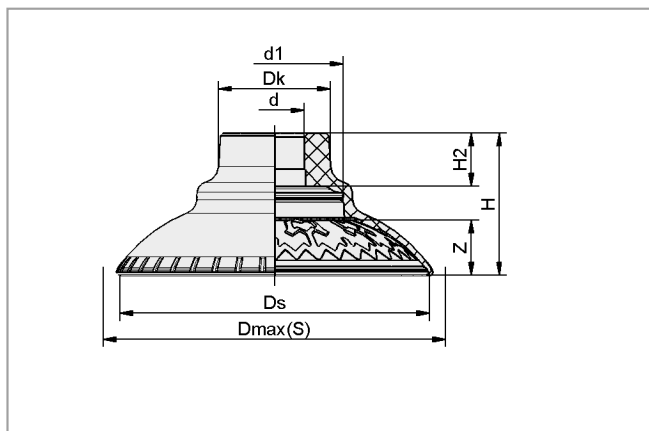


Bell-Shaped Suction Cups SAXM

Suction area (\emptyset) from 20 mm to 115 mm



Design Data Bell-Shaped Suction Cup SAXM (Single Component)



SAXM 20 to 115

Type	Dimensions in mm*							
	d	d1	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)
SAXM 20 ED-85 SC045	9.7	15.3	19.5	26.0	21.8	17	7.0	3.0
SAXM 30 ED-85 SC045	9.7	15.6	19.2	35.2	31.6	18	7.0	4.3
SAXM 40 ED-85 SC045	9.7	15.6	19.2	45.4	41.3	21	7.0	6.9
SAXM 50 ED-85 SC055	11.8	27.6	22.2	58.4	51.5	26	10.5	8.4
SAXM 60 ED-85 SC055	11.8	27.6	22.2	69.7	61.5	28	10.5	10.9
SAXM 80 ED-85 SC055	11.8	27.6	22.0	92.2	81.0	31	10.5	13.9
SAXM 100 ED-85 SC065	14.0	39.6	25.6	111.1	99.7	39	14.3	17.1
SAXM 115 ED-85 SC065	14.0	39.6	28.9	129.4	115.2	42	14.3	20.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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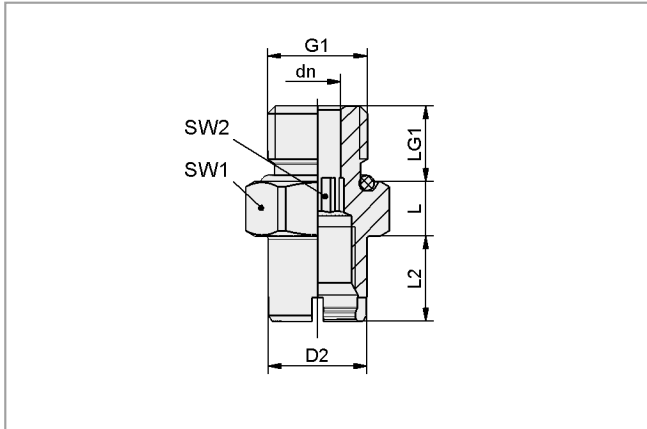


Bell-Shaped Suction Cups SAXM

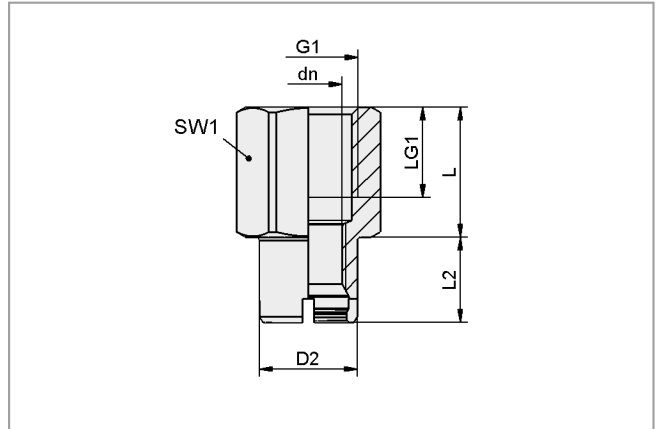
Suction area (\emptyset) from 20 mm to 115 mm



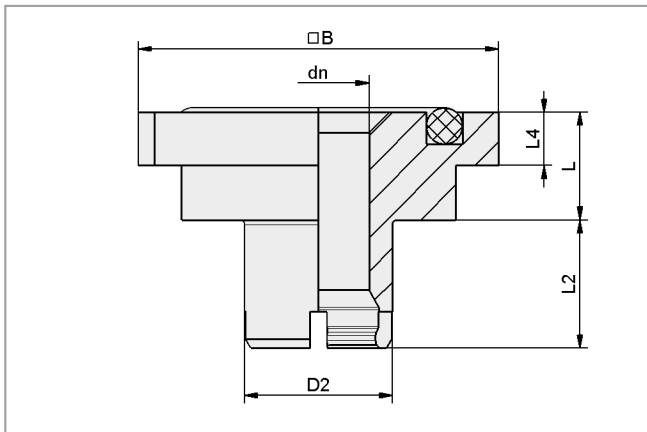
Design Data Connector Upper Part (Single Component)



SC-A...AG



SC-A...IG



SC-A...RA

Type	Dimensions in mm									
	B	dn	D2	G1	L	L2	L4	LG1	SW1	SW2
SC-A 045 G1/4-AG L	-	5.1	10.5	G1/4"-M	7.2	7.8	-	10	17	5
SC-A 055 G1/4-AG L	-	6.1	13.0	G1/4"-M	7.2	11.3	-	10	17	6
SC-A 065 G1/4-AG L	-	6.1	15.0	G1/4"-M	8.0	15.1	-	10	22	6
SC-A 045 G1/4-IG L	-	6.9	10.5	G1/4"-F	17.2	7.8	-	12	17	-
SC-A 055 G1/4-IG L	-	8.9	13.0	G1/4"-F	17.2	11.3	-	12	17	-
SC-A 065 G1/4-IG L	-	8.9	15.0	G1/4"-F	18.0	15.1	-	12	22	-
SC-A 045 G3/8-AG L	-	5.1	10.5	G3/8"-M	7.7	7.8	-	10	22	5
SC-A 055 G3/8-AG L	-	6.1	13.0	G3/8"-M	7.7	11.3	-	10	22	6
SC-A 065 G3/8-AG L	-	6.1	15.0	G3/8"-M	8.0	15.1	-	10	22	6
SC-A 045 M10-AG L	-	4.1	10.5	M10-M	7.2	7.8	-	10	17	4
SC-A 055 M10-AG L	-	4.1	13.0	M10-M	7.2	11.3	-	10	17	4
SC-A 065 M10-AG L	-	4.1	15.0	M10-M	8.0	15.1	-	10	22	4
SC-A 045 M14x1.5-AG L	-	5.1	10.5	M14x1.5-M	7.2	7.8	-	10	17	5
SC-A 055 M14x1.5-AG L	-	6.1	13.0	M14x1.5-M	7.2	11.3	-	10	17	6
SC-A 065 M14x1.5-AG L	-	6.1	15.0	M14x1.5-M	8.0	15.1	-	10	22	6
SC-A 045 NPT3/8-IG L	-	6.9	10.5	NPT3/8-F	17.2	7.8	-	14	22	-
SC-A 055 NPT3/8-IG L	-	8.9	13.0	NPT3/8-F	17.2	11.3	-	14	22	-
SC-A 065 NPT3/8-IG L	-	8.9	15.0	NPT3/8-F	18.0	15.1	-	14	22	-
SC-A 045 RA L	31.8	6.9	10.5	-	9.5	7.8	4.7	-	-	-
SC-A 055 RA L	31.8	8.9	13.0	-	9.5	11.3	4.7	-	-	-
SC-A 065 RA L	31.8	8.9	15.0	-	9.5	15.1	4.7	-	-	-

Suction Cups for Handling Sheet Metal

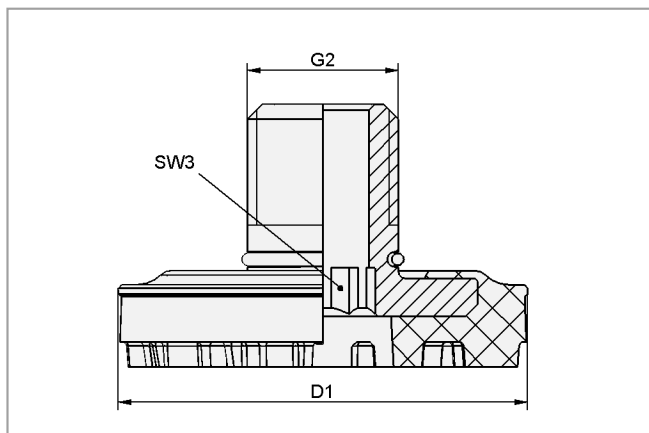


Bell-Shaped Suction Cups SAXM

Suction area (\emptyset) from 20 mm to 115 mm



Design Data Connector Lower Part (Single Component)



SC-S 045...065

Type	Dimensions in mm		
	D1	G2	SW3
SC-S 045 FDC-L	15	M8x1-M	5
SC-S 055 FDC-L	28	M10x1-M	6
SC-S 065 FDC-L	39	M10x1-M	6

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Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAOXM (Oval)

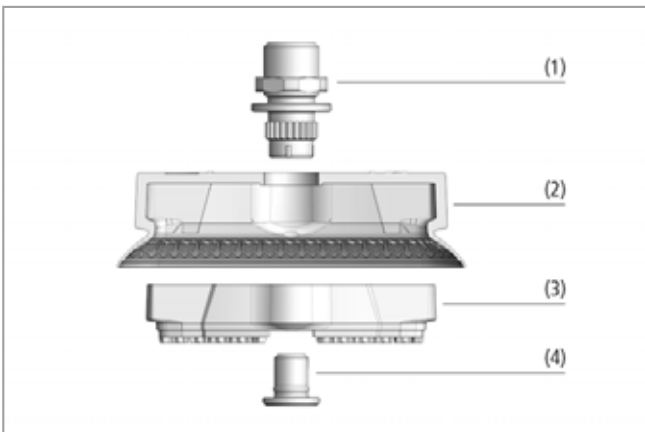
Suction area (LxW) 60 x 20 mm to 100 x 40 mm



Suitable for Industry Specific Applications



Bell-shaped suction cups SAOXM (oval)



System design bell-shaped suction cups SAOXM (oval)

Applications

- Oval high-speed suction cup for applications with demands for highest holding forces and shear forces especially for narrow metal sheets and car body parts
- Handling of long workpieces, workpieces with internal ribbing and reinforcing plates
- Handling of workpieces with oily surfaces
- Loading and unloading CNC metal and laser cutting machines
- Handling of workpieces with convex surfaces

Design

- Oval bell-shaped suction cup (2) with flexible sealing lip and optimum inner structure
- Wear-resistant material Elastodur of suction cup (ED-85) and friction disc (ED-65)
- Insert (3) with friction disc for reinforcing the suction cup
- Two-piece, reusable Schmalz Connector (SC) consisting of an upper part (1) and a lower part (4)
- Upper part of the connector with anti-rotation guard
- Lower part of the connector with anti-loosening guard
- Available as assembled suction cup or as individual parts



Bell-shaped suction cups SAOXM for handling formed sheet metal parts

Our Highlights...

- Very high suction cup stroke
- Optimized internal structure
- Large-surface, structured inner support
- Innovative material Elastodur ED
- Environmentally friendly, modular design

Your Benefits...

- > Optimum adjustability for different workpiece contours
- > Extremely high absorption of holding and lateral forces, especially on oily sheet metal
- > Avoiding of deep-drawing, even with thin sheets
- > Extremely wear-resistant, resistant to the effects of ozone and aggressive drawing oils
- > Minimum cost, quick replacement of individual components, 100 % recyclable

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Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm

Designation Code Bell-Shaped Suction Cups SAOXM (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOXM 60x20 ED-85 G1/4-IG:			
SAOXM	60x20	ED-85	G1/4-IG
SAOXM	60x20	ED-85	G1/4-IG (IG = female (F))
	80x30		G1/4-AG (AG = male (M))
	100x40		G3/8-IG
			G3/8-AG
			M10x-AG
			M14x1.5-AG
			NPT3/8-IG
			RA rectangular adapter

Ordering Data Bell-Shaped Suction Cups SAOXM (Oval)

Bell-shaped suction cup SAOXM (elastomer part with insert including friction disc + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Bell-shaped suction cup of type SAOXM (step 1) – elastomer part, available in various dimensions
- Insert (step 2) – including moulded on friction disc
- Connector upper part (step 3) – available with various threads
- Connector lower part (step 4)

Bell-Shaped Suction Cups SAOXM (Oval) (Assembled)

Type	Connection			
	G1/4"-M	G1/4"-F	G3/8"-M	G3/8"-F
SAOXM 60x20 ED-85	10.01.24.00033	10.01.24.00013	10.01.24.00036	10.01.24.00017
SAOXM 80x30 ED-85	10.01.24.00034	10.01.24.00014	10.01.24.00037	10.01.24.00018
SAOXM 100x40 ED-85	10.01.24.00035	10.01.24.00015	10.01.24.00038	10.01.24.00019

Type	Connection			
	M10-M	M14x1.5-M	NPT3/8-F	Rectangular adapter
SAOXM 60x20 ED-85	10.01.24.00025	10.01.24.00029	10.01.24.00042	10.01.24.00021
SAOXM 80x30 ED-85	10.01.24.00026	10.01.24.00030	10.01.24.00043	10.01.24.00022
SAOXM 100x40 ED-85	10.01.24.00027	10.01.24.00031	10.01.24.00044	10.01.24.00023

Step 1: Bell-Shaped Suction Cups SAOXM (Oval) (Single Component)

Type	Part Number
SAOXM 60x20 ED-85 SC045-AR	10.01.24.00001
SAOXM 80x30 ED-85 SC045-AR	10.01.24.00002
SAOXM 100x40 ED-85 SC055-AR	10.01.24.00003

Step 2: Insert (Single Component)

Type	SAOXM 60x20	SAOXM 80x30	SAOXM 100x40
SC-I 045 AR-FDC	10.01.24.00009	10.01.24.00010	-
SC-I 055 AR-FDC	-	-	10.01.24.00011

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Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm

Step 3: Connector Upper Part (Single Component)

Type	SAOXM 60x20	SAOXM 80x30	SAOXM 100x40
SC-A 045-AR G1/4-AG L	10.01.06.03131	10.01.06.03131	-
SC-A 045-AR G1/4-IG L	10.01.06.03130	10.01.06.03130	-
SC-A 045-AR G3/8-AG L	10.01.06.03133	10.01.06.03133	-
SC-A 045-AR G3/8-IG L	10.01.06.03132	10.01.06.03132	-
SC-A 045-AR M10x1.5-AG L	10.01.06.03136	10.01.06.03136	-
SC-A 045-AR M14x1.5-AG L	10.01.06.03137	10.01.06.03137	-
SC-A 045-AR NPT3/8-IG L	10.01.06.03140	10.01.06.03140	-
SC-A 045-AR RA L	10.01.06.03135	10.01.06.03135	-
SC-A 055-AR G1/4-AG L	-	-	10.01.06.03165
SC-A 055-AR G1/4-IG L	-	-	10.01.06.03164
SC-A 055-AR G3/8-AG L	-	-	10.01.06.03167
SC-A 055-AR G3/8-IG L	-	-	10.01.06.03166
SC-A 055-AR M10x1.5-AG L	-	-	10.01.06.03170
SC-A 055-AR M14x1.5-AG L	-	-	10.01.06.03171
SC-A 055-AR NPT3/8-IG L	-	-	10.01.06.03174
SC-A 055-AR RA L	-	-	10.01.06.03169

Step 4: Connector Lower Part (Single Component)

Type	SAOXM 60x20	SAOXM 80x30	SAOXM 100x40
SC-S 045 L	10.01.06.02740	10.01.06.02740	-
SC-S 055 L	-	-	10.01.06.02746

Technical Data Bell-Shaped Suction Cups SAOXM (Oval)

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOXM 60x20 ED-85	56	44	62	5	10	4
SAOXM 80x30 ED-85	105	110	134	13	20	4
SAOXM 100x40 ED-85	173	135	156	24	32	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values

***The recommended hose diameter refers to a hose length of approx. 2 m

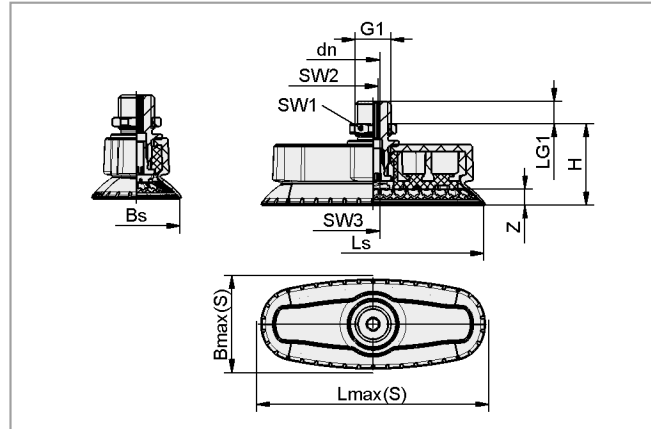
Suction Cups for Handling Sheet Metal



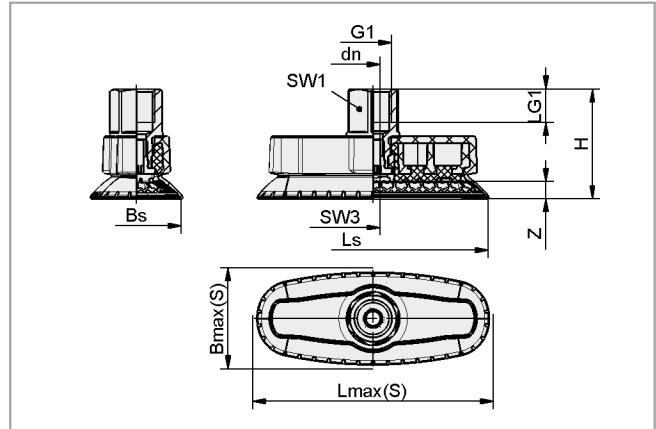
Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm

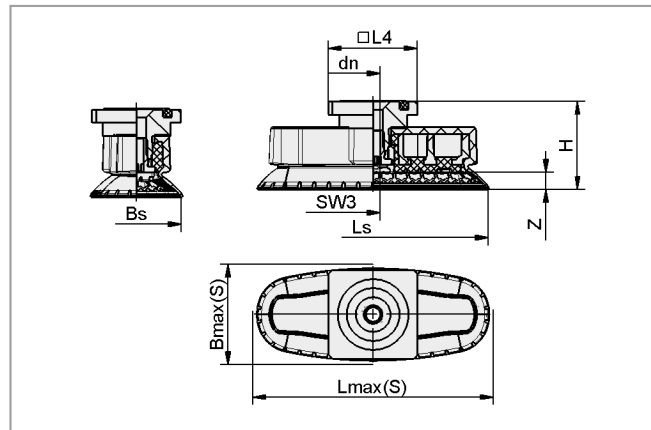
Design Data Bell-Shaped Suction Cups SAOXM (Oval) (Assembled)



SAOXM...AG (male)



SAOXM...IG (female)



SAOXM...RA

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Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm

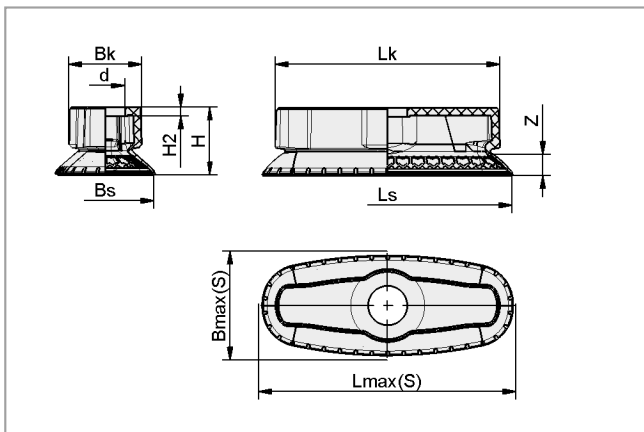
Design Data Bell-Shaped Suction Cups SAOXM (Oval) (Assembled)

Type	Dimensions in mm*												
	Bmax(S)**	Bs	dn	G1	H	LG1	Lmax(S)**	Ls	L4	SW	SW	SW	Z (Stroke)
SAOXM 60x20 ED-85 G1/4-AG	24.0	18.7	4.1	G1/4"-M	29.8	8	67	61.8	-	17	4	5	5
SAOXM 60x20 ED-85 G1/4-IG	24.0	18.7	5.1	G1/4"-F	38.5	12	67	61.8	-	17	-	5	5
SAOXM 60x20 ED-85 G3/8-AG	24.0	18.7	4.1	G3/8"-M	29.8	8	67	61.8	-	19	4	5	5
SAOXM 60x20 ED-85 G3/8-IG	24.0	18.7	5.1	G3/8"-F	38.5	12	67	61.8	-	22	-	5	5
SAOXM 60x20 ED-85 M10-AG	24.0	18.7	4.1	M10-M	31.3	8	67	61.8	-	16	4	5	5
SAOXM 60x20 ED-85 M14x1.5-AG	24.0	18.7	4.1	M14x1.5-M	31.3	8	67	61.8	-	22	4	5	5
SAOXM 60x20 ED-85 NPT3/8-IG	24.0	18.7	5.1	NPT3/8-F	38.5	14	67	61.8	-	22	-	5	5
SAOXM 60x20 ED-85 RA	24.0	18.7	5.1	-	30.8	-	67	61.8	31.8	-	-	5	5
SAOXM 80x30 ED-85 G1/4-AG	41.5	31.9	4.1	G1/4"-M	30.3	8	88	82.1	-	17	4	5	6
SAOXM 80x30 ED-85 G1/4-IG	41.5	31.9	5.1	G1/4"-F	39.1	12	88	82.1	-	17	-	5	6
SAOXM 80x30 ED-85 G3/8-AG	41.5	31.9	4.1	G3/8"-M	30.3	8	88	82.1	-	19	4	5	6
SAOXM 80x30 ED-85 G3/8-IG	41.5	31.9	5.1	G3/8"-F	39.1	12	88	82.1	-	22	-	5	6
SAOXM 80x30 ED-85 M10-AG	41.5	31.9	4.1	M10-M	31.8	8	88	82.1	-	16	4	5	6
SAOXM 80x30 ED-85 M14x1.5-AG	41.5	31.9	4.1	M14x1.5-M	31.8	8	88	82.1	-	22	4	5	6
SAOXM 80x30 ED-85 NPT3/8-IG	41.5	31.9	5.1	NPT3/8-F	39.1	14	88	82.1	-	22	-	5	6
SAOXM 80x30 ED-85 RA	41.5	31.9	5.1	-	31.4	-	88	82.1	31.8	-	-	5	6
SAOXM 100x40 ED-85 G1/4-AG	51.0	41.6	5.1	G1/4"-M	37.7	8	109	101.8	-	17	5	6	7
SAOXM 100x40 ED-85 G1/4-IG	51.0	41.6	6.1	G1/4"-F	45.7	12	109	101.8	-	17	-	6	7
SAOXM 100x40 ED-85 G3/8-AG	51.0	41.6	5.1	G3/8"-M	37.7	8	109	101.8	-	19	5	6	7
SAOXM 100x40 ED-85 G3/8-IG	51.0	41.6	6.1	G3/8"-F	45.7	12	109	101.8	-	22	-	6	7
SAOXM 100x40 ED-85 M10-AG	51.0	41.6	4.1	M10-M	37.7	8	109	101.8	-	16	4	6	7
SAOXM 100x40 ED-85 M14x1.5-AG	51.0	41.6	5.1	M14x1.5-M	39.2	8	109	101.8	-	22	5	6	7
SAOXM 100x40 ED-85 NPT3/8-IG	51.0	41.6	6.1	NPT3/8-F	45.7	15	109	101.8	-	22	-	6	7
SAOXM 100x40 ED-85 RA	51.0	41.6	6.1	-	38.2	-	109	101.8	31.8	-	-	6	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Bell-Shaped Suction Cups SAOXM (without Connection Element) (Single Component)



SAOXM...

Type	Dimensions in mm*									
	Bk	Bmax(S)**	Bs	d	H	H2	Lk	Lmax(S)**	Ls	Z (Stroke)
SAOXM 60x20 ED-85 SC045-AR	20.0	24.0	18.7	12.8	21.9	3	60.0	67	61.8	5
SAOXM 80x30 ED-85 SC045-AR	24.1	41.5	31.9	12.8	22.4	3	74.3	88	82.1	6
SAOXM 100x40 ED-85 SC055-AR	32.3	51.0	41.6	15.2	29.3	3	89.9	109	101.8	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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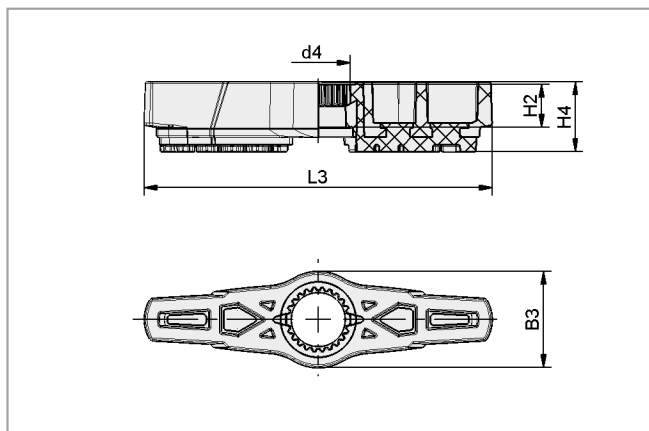


Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm



Design Data Insert SAOXM (Single Component)



SC-I...AR-FDC

Type	Dimensions in mm					
	For suction cup type	B3	d4	H2	H4	L3
SC-I 045 AR-FDC	SAOXM 60x20	16.0	12.7	9	13.9	55.8
SC-I 045 AR-FDC	SAOXM 80x30	19.1	12.7	9	13.9	69.0
SC-I 055 AR-FDC	SAOXM 100x40	27.3	18.6	12	14.5	84.3

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Suction Cups for Handling Sheet Metal

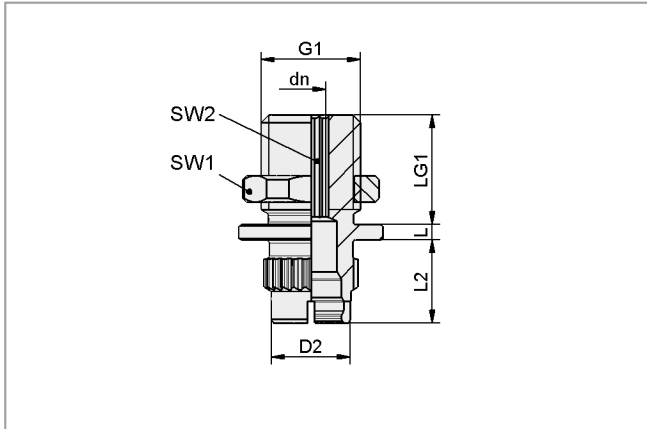


Bell-Shaped Suction Cups SAOXM (Oval)

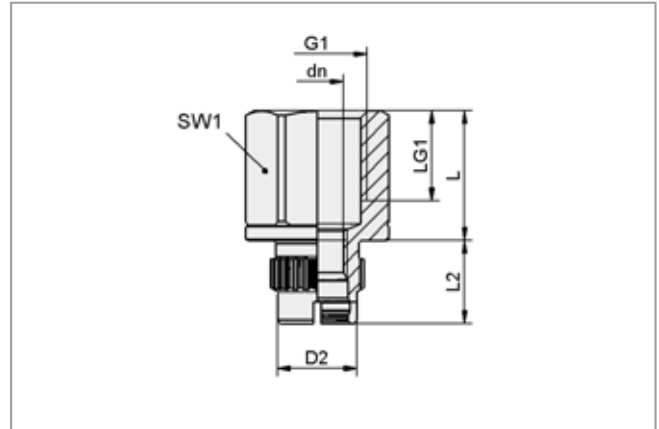
Suction area (LxW) 60 x 20 mm to 100 x 40 mm



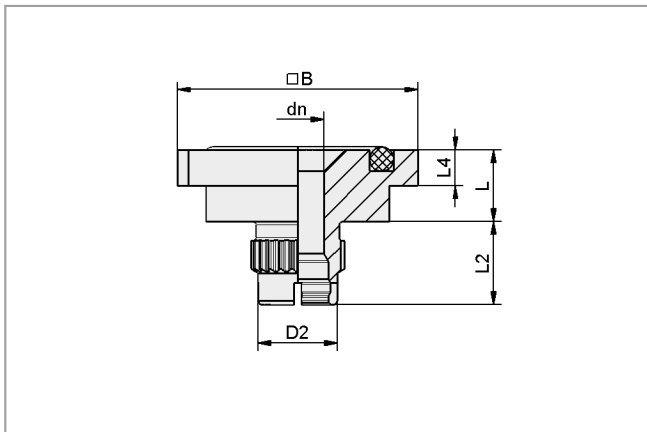
Design Data Connector Upper Part SAOXM (Single Component)



SC-A...AG (male)



SC-A...IG (female)



SC-A...RA

Type	Dimensions in mm									
	B	dn	D2	G1	L	L2	L4	LG1	SW1	SW2
SC-A 045-AR G1/4-AG L	-	4.1	10.5	G1/4"-M	2.0	11	-	14.5	17	4
SC-A 045-AR G1/4-IG L	-	6.9	10.5	G1/4"-F	17.2	11	-	14.8	17	-
SC-A 045-AR G3/8-AG L	-	4.1	10.5	G3/8"-M	2.0	11	-	14.5	19	4
SC-A 045-AR G3/8-IG L	-	6.9	10.5	G3/8"-F	17.2	11	-	12.0	22	-
SC-A 045-AR M10-AG L	-	4.1	10.5	M10-M	3.5	11	-	14.5	16	4
SC-A 045-AR M14x1.5-AG L	-	4.1	10.5	M14x1.5-M	2.0	11	-	16.0	22	4
SC-A 045-AR NPT3/8-IG L	-	6.9	10.5	NPT3/8-F	17.2	11	-	14.0	22	-
SC-A 045-AR RA L	31.8	6.9	10.5	-	9.5	11	4.7	-	-	-
SC-A 055-AR G1/4-AG L	-	5.1	13.0	G1/4"-M	2.5	15	-	14.5	17	5
SC-A 055-AR G1/4-IG L	-	8.9	13.0	G1/4"-F	17.0	15	-	14.8	17	-
SC-A 055-AR G3/8-AG L	-	5.1	13.0	G3/8"-M	2.5	15	-	14.5	19	5
SC-A 055-AR G3/8-IG L	-	8.9	13.0	G3/8"-F	17.0	15	-	12.0	22	-
SC-A 055-AR M10-AG L	-	4.1	13.0	M10-M	2.5	15	-	14.5	16	4
SC-A 055-AR M14x1.5-AG L	-	5.1	13.0	M14x1.5-M	2.5	15	-	16.0	22	5
SC-A 055-AR NPT3/8-IG L	-	8.9	13.0	NPT3/8-F	17.0	15	-	14.0	22	-
SC-A 055-AR RA L	31.8	8.9	13.0	-	9.5	15	4.7	-	-	-

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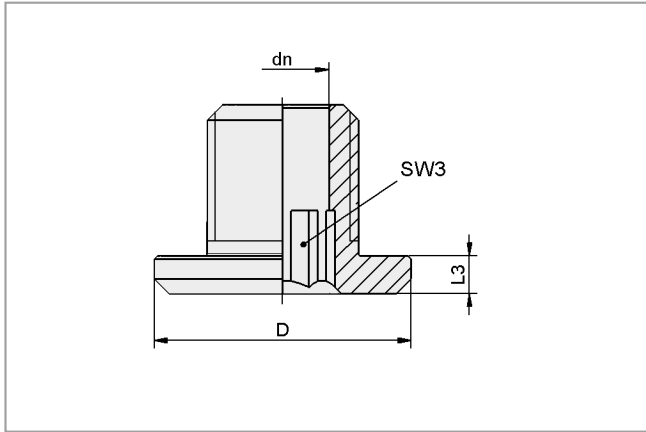


Bell-Shaped Suction Cups SAOXM (Oval)

Suction area (LxW) 60 x 20 mm to 100 x 40 mm



Design Data Connector Lower Part SAOXM (Single Component)



SC-S...L

Type	Dimensions in mm			
	dn	D	L3	SW3
SC-S 045 L	5.1	13	2	5
SC-S 055 L	6.1	21	3	6

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Suction Cups for Handling Sheet Metal



Flat Suction Cups SAF

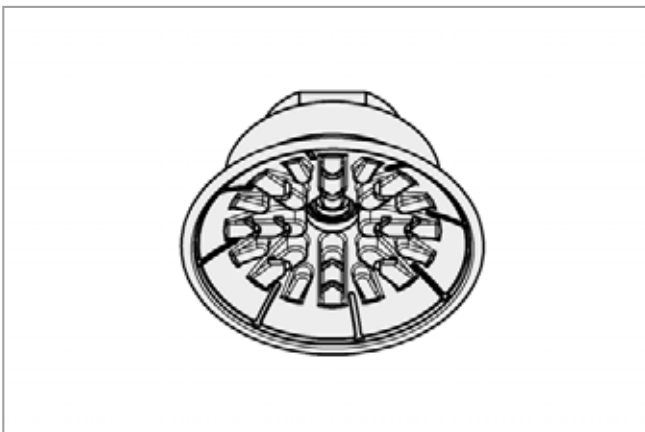
Suction area (Ø) from 30 mm to 125 mm



Suitable for Industry Specific Applications



Flat suction cups SAF



System design flat suction cups SAF

Applications

- Round, flat suction cup for dynamic handling of metal sheets with very short cycle times
- Handling of thin steel sheets and aluminum sheets without deformation
- For use in feeder systems for press lines in the automobile industry
- Special slot on the bottom prevents oily sheets from slipping, permitting precise positioning in stamping presses etc.

Design

- Robust and wear-resistant suction cup SAF made of NBR with single sealing lip, special slot and inner support
- Suction cup SAF vulcanized to the connection nipple (very high strength)
- Suction cup available with various connection types
- Available in two material hardness values (45 Shore, 60 Shore)



Flat suction cups SAF being used for handling sheet metal parts

Our Highlights...

- Wide range of diameters
- Large-area structured inner support
- Soft and flexible sealing lip
- Various material hardness values
- Nipple vulcanized to the suction cup

Your Benefits...

- > For a wide range of workpiece sizes and shapes
- > No deep-drawing of the workpiece; capable of handling high lateral forces, even on oily metal sheets
- > Excellent sealing, even on slightly curved surfaces
- > Optimum adaptation to varying workpieces
- > Prevention of machine damages and downtimes as the result of lost suction cups

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Flat Suction Cups SAF

Suction area (\emptyset) from 30 mm to 125 mm

Designation Code Flat Suction Cups SAF

Abbreviated designation	Suction area \emptyset in mm	Material and Shore hardness	Connection thread
Example SAF 80 NBR-60 G3/8-IG:			
SAF	80	NBR-60	G3/8-IG
SAF	30 to 125	NBR-45 NBR-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Flat Suction Cups SAF

Suction cup SAF, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Cups SAF

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10-M	M14x1.5-M	Rect. adapter
SAF 30 NBR-60	10.01.01.10646	10.01.01.10506	10.01.01.10705	10.01.01.10713	10.01.01.10730	10.01.01.10790
SAF 30 NBR-45	10.01.01.11421	10.01.01.11400	10.01.01.11420	10.01.01.11425	10.01.01.11426	10.01.01.11423
SAF 40 NBR-60	10.01.01.10647	10.01.01.10508	10.01.01.10708	10.01.01.10716	10.01.01.10733	10.01.01.10793
SAF 40 NBR-45	10.01.01.11430	10.01.01.11401	10.01.01.11431	10.01.01.11435	10.01.01.11436	10.01.01.11433
SAF 50 NBR-60	10.01.01.10635	10.01.01.10688	10.01.01.10510	10.01.01.10719	10.01.01.10736	10.01.01.10796
SAF 50 NBR-45	10.01.01.11440	10.01.01.11441	10.01.01.11402	10.01.01.11444	10.01.01.11445	10.01.01.11442
SAF 60 NBR-60	10.01.01.10622	10.01.01.10689	10.01.01.10512	10.01.01.10721	10.01.01.10739	10.01.01.10799
SAF 60 NBR-45	10.01.01.11450	10.01.01.11451	10.01.01.11403	10.01.01.11454	10.01.01.11455	10.01.01.11452
SAF 80 NBR-60	10.01.01.10623	10.01.01.10690	10.01.01.10514	10.01.01.10724	10.01.01.10742	10.01.01.10802
SAF 80 NBR-45	10.01.01.11460	10.01.01.11461	10.01.01.11404	10.01.01.11466	10.01.01.11467	10.01.01.11464
SAF 100 NBR-60	10.01.01.10624	10.01.01.10691	10.01.01.10516	10.01.01.10726	10.01.01.10745	10.01.01.10805
SAF 100 NBR-45	10.01.01.11470	10.01.01.11471	10.01.01.11405	10.01.01.11476	10.01.01.11477	10.01.01.11474
SAF 125 NBR-60	10.01.01.10666	10.01.01.10692	10.01.01.10518	10.01.01.10728	10.01.01.10748	10.01.01.10808
SAF 125 NBR-45	10.01.01.11480	10.01.01.11481	10.01.01.11406	10.01.01.11485	10.01.01.11486	10.01.01.11483

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Flat Suction Cups SAF

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SAF 30	38	30	28	2.7	40	4
SAF 40	69	52	50	5.3	50	4
SAF 50	100	80	76	9.5	65	4
SAF 60	150	105	85	16.7	75	6
SAF 80	272	205	180	36.7	100	6
SAF 100	430	310	300	59.9	135	6
SAF 125	660	475	400	119.0	165	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

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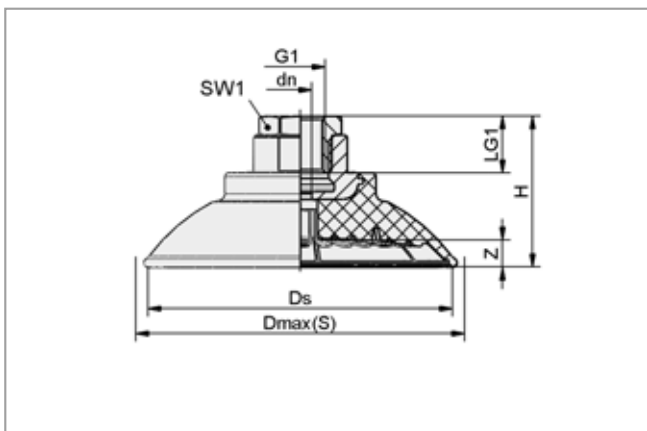


Flat Suction Cups SAF

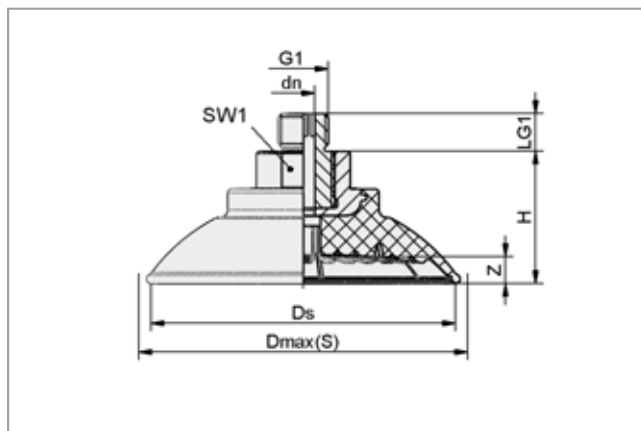
Suction area (\varnothing) from 30 mm to 125 mm



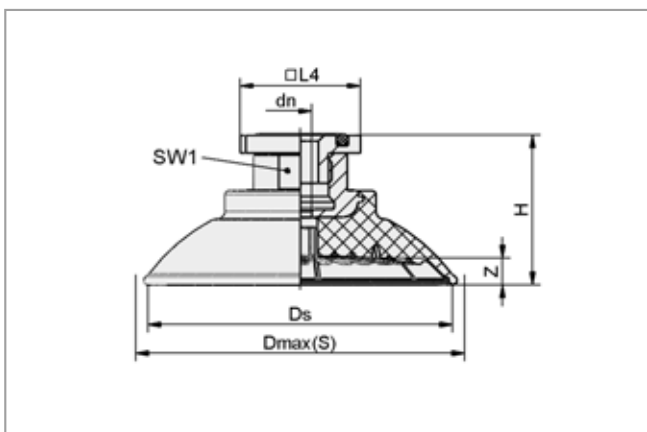
Design Data Flat Suction Cups SAF



SAF 30 to 125 IG



SAF 30 to 125 AG



SAF 30 to 125 RA (rectangular adapter)

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Flat Suction Cups SAF

Suction area (Ø) from 30 mm to 125 mm

Design Data Flat Suction Cups SAF

Type	Dimensions in mm*								
	Dmax(S)**	dn	Ds	G1	H	LG1	L4	SW1	Z (Stroke)
SAF 30 G1/4-AG	34	4	31	G1/4"-M	20.0	10	-	17	3.0
SAF 30 G1/4-IG	34	4	31	G1/4"-F	20.0	12	-	17	3.0
SAF 30 G3/8-IG	34	4	31	G3/8"-F	36.0	9	-	22	3.0
SAF 30 M10x1.5-AG	34	4	31	M10-M	20.0	12	-	17	3.0
SAF 30 M14x1.5-AG	34	4	31	M14x1.5-M	20.0	12	-	17	3.0
SAF 30 RA	34	4	31	-	23.2	-	32	17	3.0
SAF 40 G1/4-AG	46	4	41	G1/4"-M	22.0	10	-	17	4.0
SAF 40 G1/4-IG	46	4	41	G1/4"-F	22.0	12	-	17	4.0
SAF 40 G3/8-IG	46	4	41	G3/8"-F	38.0	9	-	22	4.0
SAF 40 M10x1.5-AG	46	4	41	M10-M	22.0	12	-	17	4.0
SAF 40 M14x1.5-AG	46	4	41	M14x1.5-M	22.0	12	-	17	4.0
SAF 40 RA	46	4	41	-	25.0	-	32	17	4.0
SAF 50 G1/4-AG	56	6	50	G1/4"-M	28.0	10	-	22	5.0
SAF 50 G1/4-IG	56	6	50	G1/4"-F	33.0	15	-	22	5.0
SAF 50 G3/8-IG	56	6	50	G3/8"-F	28.0	15	-	22	5.0
SAF 50 M10x1.5-AG	56	4	50	M10-M	28.0	12	-	22	5.0
SAF 50 M14x1.5-AG	56	6	50	M14x1.5-M	28.0	12	-	22	5.0
SAF 50 RA	56	6	50	-	27.5	-	32	22	5.0
SAF 60 G1/4-AG	67	6	61	G1/4"-M	31.0	10	-	22	6.0
SAF 60 G1/4-IG	67	6	61	G1/4"-F	36.0	15	-	22	6.0
SAF 60 G3/8-IG	67	6	61	G3/8"-F	31.0	15	-	22	6.0
SAF 60 M10x1.5-AG	67	4	61	M10-M	31.0	12	-	22	6.0
SAF 60 M14x1.5-AG	67	6	61	M14x1.5-M	31.0	12	-	22	6.0
SAF 60 RA	67	6	61	-	30.5	-	32	22	6.0
SAF 80 G1/4-AG	89	6	83	G1/4"-M	35.0	10	-	22	7.6
SAF 80 G1/4-IG	89	6	83	G1/4"-F	40.0	20	-	22	7.6
SAF 80 G3/8-IG	89	6	83	G3/8"-F	35.0	15	-	22	7.6
SAF 80 M10x1.5-AG	89	4	83	M10-M	35.0	12	-	22	7.6
SAF 80 M14x1.5-AG	89	6	83	M14x1.5-M	35.0	12	-	22	7.6
SAF 80 RA	89	6	83	-	34.5	-	32	22	7.6
SAF 100 G1/4-AG	110	6	103	G1/4"-M	36.0	10	-	22	9.5
SAF 100 G1/4-IG	110	6	103	G1/4"-F	41.0	20	-	22	9.5
SAF 100 G3/8-IG	110	6	103	G3/8"-F	36.0	15	-	22	9.5
SAF 100 M10x1.5-AG	110	4	103	M10-M	36.0	12	-	22	9.5
SAF 100 M14x1.5-AG	110	6	103	M14x1.5-M	36.0	12	-	22	9.5
SAF 100 RA	110	6	103	-	35.5	-	32	22	9.5
SAF 125 G1/4-AG	135	6	128	G1/4"-M	43.0	10	-	22	12.5
SAF 125 G1/4-IG	135	6	128	G1/4"-F	48.0	20	-	22	12.5
SAF 125 G3/8-IG	135	9	128	G3/8"-F	43.0	15	-	22	12.5
SAF 125 M10x1.5-AG	135	4	128	M10-M	43.0	12	-	22	12.5
SAF 125 M14x1.5-AG	135	6	128	M14x1.5-M	43.0	12	-	22	12.5
SAF 125 RA	135	9	128	-	42.5	-	32	22	12.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Sheet Metal



Bellows Suction Cups SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm



Suitable for Industry Specific Applications



Bellows suction cups SAB (1.5 folds)



System design bellows suction cups SAB (1.5 folds)



Bellows suction cups SAB being used for handling car bodywork parts

Applications

- Round, bellows suction cup with 1.5 folds for dynamic handling of metal sheets (short cycle times)
- Handling of thin steel sheets and aluminum sheets without deformation
- Handling of pre-shaped metal sheet parts, since bellows shape permits optimum adaptation
- For use e.g. in feeder systems for press lines in the automobile industry
- Special slot on the bottom of the cup prevents the oily metal sheets from slipping and permits precise positioning in punching presses etc.

Design

- Robust and wear-resistant suction cup SAB with 1.5 folds, made of NBR, special slot and inner support
- Suction cup SAB vulcanized to the connection nipple (very high strength)
- Suction cups available with various connection types

Our Highlights...

- Wide range of diameters
- 1.5 folds
- Stiff top fold
- Large, structured inner support
- Nipple vulcanized to cup

Your Benefits...

- > For a wide range of workpiece sizes and shapes
- > Optimum adaptation and sealing to curved workpieces, very good damping during placement on workpiece
- > Good resistance to horizontal forces and lateral acceleration
- > No deep-drawing of the workpiece; capable of handling high lateral forces even on oily metal sheets
- > Prevention of machine damage and downtimes due to lost suction cups

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Bellows Suction Cups SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

Designation Code Bellows Suction Cups SAB (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAB 30 NBR-60 G1/4-AG:			
SAB	30	NBR-60	G1/4-AG
SAB	22 to 125	NBR-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Bellows Suction Cups SAB (1.5 Folds)

Suction cup SAB, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Cups SAB (1.5 Folds)

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10-M	M14x1.5-M	Rectangular adapt.
SAB 22 NBR-60	10.01.06.01653	10.01.06.01533	10.01.06.01650	10.01.06.01654	10.01.06.01655	10.01.06.01663
SAB 30 NBR-60	10.01.06.01197	10.01.06.01196	10.01.06.01198	10.01.06.01200	10.01.06.01201	10.01.06.01203
SAB 40 NBR-60	10.01.06.00803	10.01.06.00670	10.01.06.00924	10.01.06.00994	10.01.06.01006	10.01.06.01054
SAB 50 NBR-60	10.01.06.00804	10.01.06.00851	10.01.06.00672	10.01.06.00996	10.01.06.01008	10.01.06.01055
SAB 60 NBR-60	10.01.06.00805	10.01.06.00852	10.01.06.00674	10.01.06.00998	10.01.06.01010	10.01.06.01056
SAB 80 NBR-60	10.01.06.00806	10.01.06.00850	10.01.06.00676	10.01.06.01000	10.01.06.01012	10.01.06.01057
SAB 100 NBR-60	10.01.06.00807	10.01.06.00853	10.01.06.00678	10.01.06.01002	10.01.06.01014	10.01.06.01058
SAB 125 NBR-60	10.01.06.00825	10.01.06.00854	10.01.06.00680	10.01.06.01004	10.01.06.01016	10.01.06.01059

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups SAB (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SAB 22 NBR-60	16	24	18	6	2.5	20	4
SAB 30 NBR-60	22	33	30	13	5.7	40	4
SAB 40 NBR-60	38	59	36	33	8.7	40	4
SAB 50 NBR-60	53	87	55	52	16.1	50	4
SAB 60 NBR-60	82	130	82	77	28.8	65	6
SAB 80 NBR-60	135	221	145	140	67.6	75	6
SAB 100 NBR-60	190	357	220	214	115.0	90	6
SAB 125 NBR-60	250	558	352	335	220.0	140	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Handling Sheet Metal

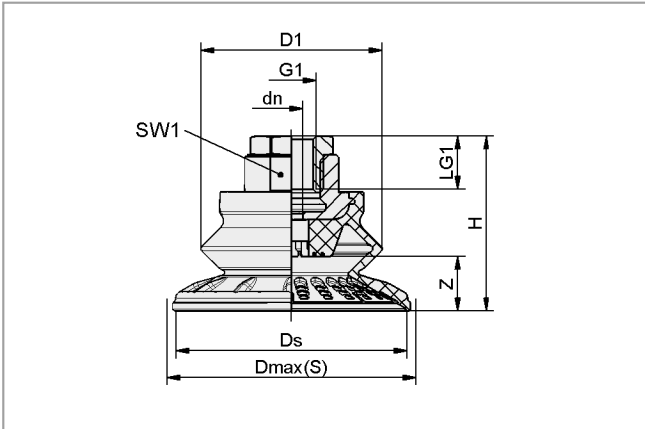


Bellows Suction Cups SAB (1.5 Folds)

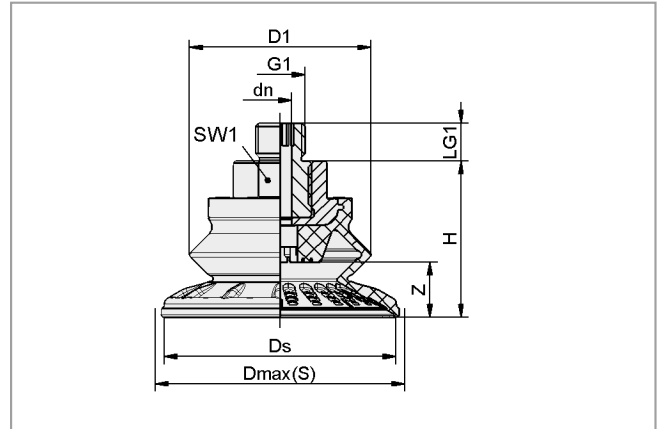
Suction area (\emptyset) from 22 mm to 125 mm



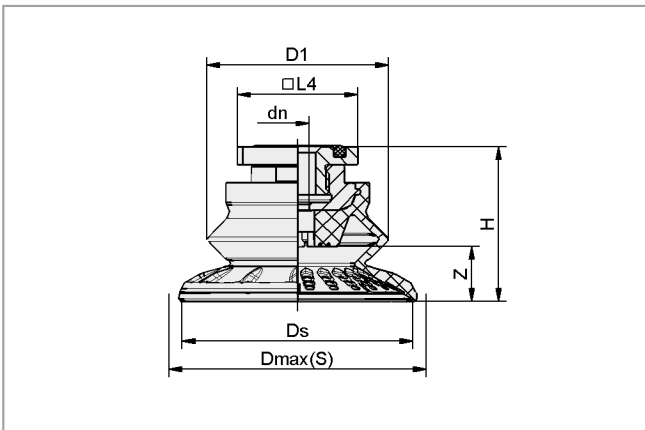
Design Data Bellows Suction Cups SAB (1.5 Folds)



SAB 22 to 125 IG (female)



SAB 22 to 125 AG (male)



SAB 22 to 125 RA (rectangular adapter)

Suction Cups for Handling Sheet Metal



Bellows Suction Cups SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

Design Data Bellows Suction Cups SAB (1.5 Folds)

Type	Dimensions in mm*									
	D1	dn	Ds	Dmax(S)**	G1	H	LG1	L4	SW1	Z (Stroke)
SAB 22 NBR-60 G1/4-AG	22	3.5	21	24	G1/4"-M	25.0	10.0	-	16	5.8
SAB 22 NBR-60 G1/4-IG	22	3.5	21	24	G1/4"-F	25.0	12.0	-	16	5.8
SAB 22 NBR-60 G3/8-IG	22	3.5	21	24	G3/8"-F	41.0	9.5	-	22	5.8
SAB 22 NBR-60 M10x1.5-AG	22	3.5	21	24	M10-M	25.0	12.0	-	16	5.8
SAB 22 NBR-60 M14x1.5-AG	22	3.5	21	24	M14x1.5-M	25.0	12.0	-	16	5.8
SAB 22 NBR-60 RA	22	3.5	21	24	-	28.2	-	31.8	-	5.8
SAB 30 NBR-60 G1/4-AG	32	4.0	31	34	G1/4"-M	28.0	10.0	-	17	9.0
SAB 30 NBR-60 G1/4-IG	32	4.0	31	34	G1/4"-F	28.0	12.0	-	17	9.0
SAB 30 NBR-60 G3/8-IG	32	4.0	31	34	G3/8"-F	44.0	9.5	-	22	9.0
SAB 30 NBR-60 M10x1.5-AG	32	4.0	31	34	M10-M	28.0	12.0	-	17	9.0
SAB 30 NBR-60 M14x1.5-AG	32	4.0	31	34	M14x1.5-M	28.0	12.0	-	17	9.0
SAB 30 NBR-60 RA	32	4.0	31	34	-	31.2	-	31.8	-	9.0
SAB 40 NBR-60 G1/4-AG	32	4.0	40	45	G1/4"-M	28.8	10.0	-	17	10.0
SAB 40 NBR-60 G1/4-IG	32	4.0	40	45	G1/4"-F	28.8	12.0	-	17	10.0
SAB 40 NBR-60 G3/8-IG	32	4.0	40	45	G3/8"-F	44.8	9.5	-	22	10.0
SAB 40 NBR-60 M10x1.5-AG	32	4.0	40	45	M10-M	28.8	12.0	-	17	10.0
SAB 40 NBR-60 M14x1.5-AG	32	4.0	40	45	M14x1.5-M	28.8	12.0	-	17	10.0
SAB 40 NBR-60 RA	32	4.0	40	45	-	31.2	-	31.8	-	10.0
SAB 50 NBR-60 G1/4-AG	40	6.0	50	56	G1/4"-M	36.9	10.0	-	22	11.5
SAB 50 NBR-60 G1/4-IG	40	6.0	50	56	G1/4"-F	42.0	20.0	-	22	11.5
SAB 50 NBR-60 G3/8-IG	40	6.0	50	56	G3/8"-F	36.9	15.0	-	22	11.5
SAB 50 NBR-60 M10x1.5-AG	40	4.0	50	56	M10-M	36.9	12.0	-	22	11.5
SAB 50 NBR-60 M14x1.5-AG	40	6.0	50	56	M14x1.5-M	36.9	12.0	-	22	11.5
SAB 50 NBR-60 RA	40	6.0	50	56	-	36.6	-	31.8	-	11.5
SAB 60 NBR-60 G1/4-AG	48	6.0	61	67	G1/4"-M	41.3	10.0	-	22	14.5
SAB 60 NBR-60 G1/4-IG	48	6.0	61	67	G1/4"-F	46.3	20.0	-	22	14.5
SAB 60 NBR-60 G3/8-IG	48	6.0	61	67	G3/8"-F	41.3	15.0	-	22	14.5
SAB 60 NBR-60 M10x1.5-AG	48	4.0	61	67	M10-M	41.3	12.0	-	22	14.5
SAB 60 NBR-60 M14x1.5-AG	48	6.0	61	67	M14x1.5-M	41.3	12.0	-	22	14.5
SAB 60 NBR-60 RA	48	6.0	61	67	-	41.0	-	31.8	-	14.5
SAB 80 NBR-60 G1/4-AG	64	6.0	81	89	G1/4"-M	49.9	10.0	-	22	22.1
SAB 80 NBR-60 G1/4-IG	64	6.0	81	89	G1/4"-F	54.9	20.0	-	22	22.1
SAB 80 NBR-60 G3/8-IG	64	6.0	81	89	G3/8"-F	49.9	15.0	-	22	22.1
SAB 80 NBR-60 M10x1.5-AG	64	4.0	81	89	M10-M	49.9	12.0	-	22	22.1
SAB 80 NBR-60 M14x1.5-AG	64	6.0	81	89	M14x1.5-M	49.9	12.0	-	22	22.1
SAB 80 NBR-60 RA	64	6.0	81	89	-	49.6	-	31.8	-	22.1
SAB 100 NBR-60 G1/4-AG	77	6.0	101	110	G1/4"-M	56.6	10.0	-	22	25.8
SAB 100 NBR-60 G1/4-IG	77	6.0	101	110	G1/4"-F	61.8	20.0	-	22	25.8
SAB 100 NBR-60 G3/8-IG	77	6.0	101	110	G3/8"-F	56.6	15.0	-	22	25.8
SAB 100 NBR-60 M10x1.5-AG	77	4.0	101	110	M10-M	56.6	12.0	-	22	25.8
SAB 100 NBR-60 M14x1.5-AG	77	6.0	101	110	M14x1.5-M	56.6	12.0	-	22	25.8
SAB 100 NBR-60 RA	77	6.0	101	110	-	56.3	-	31.8	-	25.8
SAB 125 NBR-60 G1/4-AG	94	6.0	126	135	G1/4"-M	67.8	10.0	-	22	32.0
SAB 125 NBR-60 G1/4-IG	94	6.0	126	135	G1/4"-F	72.8	20.0	-	22	32.0
SAB 125 NBR-60 G3/8-IG	94	9.0	126	135	G3/8"-F	67.8	15.0	-	22	32.0
SAB 125 NBR-60 M10x1.5-AG	94	4.0	126	135	M10-M	67.8	12.0	-	22	32.0
SAB 125 NBR-60 M14x1.5-AG	94	6.0	126	135	M14x1.5-M	67.8	12.0	-	22	32.0
SAB 125 NBR-60 RA	94	6.0	126	135	-	67.5	-	31.8	-	32.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Sheet Metal



Flat Suction Cups SAOF (Oval)

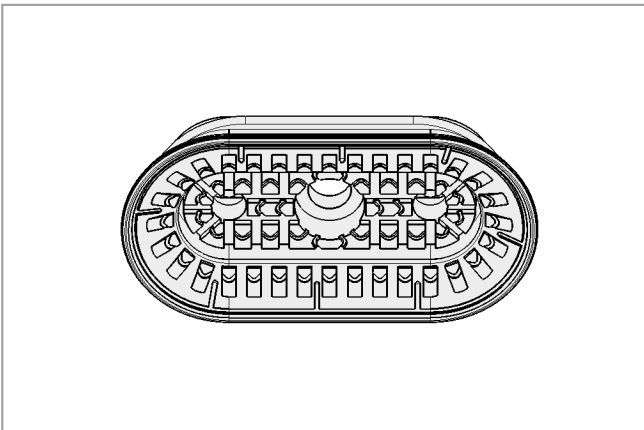
Suction area (LxW) from 50 x 16 mm to 140 x 70 mm



Suitable for Industry Specific Applications



Flat suction cups SAOF (oval)



System design flat suction cups SAOF (oval)



Flat suction cups SAOF being used for handling pressed sheet-metal parts

Applications

- Oval, flat suction cup for dynamic handling of metal sheets with short cycle times
- Handling of thin steel sheets and aluminum sheets without deformation or deep-drawing
- For use e.g. in feeder systems for press lines in the automobile industry
- Handling of long, narrow metal sheet parts, e.g. reinforcing ribs and plates
- Slot on the bottom prevents oily sheets from slipping and permits precise positioning in stamping presses etc.

Design

- Robust, wear-resistant oval suction cup SAOF made of NBR with single sealing lip, special slot and inner support
- Connection nipple glued to the suction cup with a reinforcing element (very high strength)
- Suction cup available with various connection types
- Available in two material hardness values (45 Shore, 60 Shore)

Our Highlights...

- Wide range of sizes
- Large, structured inner support
- Flat, oval suction cup
- Soft and flexible sealing lip
- Nipple vulcanized to suction cup

Your Benefits...

- > For a wide range of workpiece sizes and shapes
- > No deep-drawing of the workpiece; capable of handling high lateral forces, even on oily metal sheets
- > Handling of long, narrow workpieces (sections, tubes) or flat workpieces with bars
- > Good sealing, even on slightly curved surfaces
- > Prevention of machine damage and downtimes as the result of lost suction cups

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Flat Suction Cups SAOF (Oval)

Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

Designation Code Flat Suction Cups SAOF (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOF 80x40 NBR-60 G1/4-IG:			
SAOF	80x40	NBR-60	G1/4-IG
SAOF	50x16 to 140x70	NBR-45 NBR-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Flat Suction Cups SAOF (Oval)

Suction cup SAOF, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Cups SAOF (Oval)

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10-M	M14x1.5-M	Rectangular adap.
SAOF 50x16 NBR-60	10.01.05.00521	10.01.05.00511	10.01.05.00518	10.01.05.00527	10.01.05.00530	10.01.05.00515
SAOF 50x16 NBR-45	10.01.05.00550	10.01.05.00551	10.01.05.00553	10.01.05.00555	10.01.05.00556	10.01.05.00554
SAOF 60x23 NBR-60	10.01.05.00376	10.01.05.00367	10.01.05.00370	10.01.05.00382	10.01.05.00385	10.01.05.00373
SAOF 60x23 NBR-45	10.01.05.00559	10.01.05.00560	10.01.05.00562	10.01.05.00564	10.01.05.00565	10.01.05.00563
SAOF 90x30 NBR-60	10.01.05.00311	10.01.05.00266	10.01.05.00290	10.01.05.00326	10.01.05.00341	10.01.05.00296
SAOF 90x30 NBR-45	10.01.05.00568	10.01.05.00569	10.01.05.00570	10.01.05.00572	10.01.05.00573	10.01.05.00571
SAOF 80x40 NBR-60	10.01.05.00314	10.01.05.00269	10.01.05.00293	10.01.05.00329	10.01.05.00344	10.01.05.00299
SAOF 80x40 NBR-45	10.01.05.00577	10.01.05.00578	10.01.05.00579	10.01.05.00581	10.01.05.00582	10.01.05.00580
SAOF 100x50 NBR-60	10.01.05.00317	10.01.05.00281	10.01.05.00272	10.01.05.00332	10.01.05.00347	10.01.05.00302
SAOF 100x50 NBR-45	10.01.05.00586	10.01.05.00587	10.01.05.00588	10.01.05.00590	10.01.05.00591	10.01.05.00589
SAOF 120x60 NBR-60	10.01.05.00320	10.01.05.00284	10.01.05.00275	10.01.05.00335	10.01.05.00350	10.01.05.00305
SAOF 120x60 NBR-45	10.01.05.00594	10.01.05.00595	10.01.05.00596	10.01.05.00598	10.01.05.00599	10.01.05.00597
SAOF 140x70 NBR-60	10.01.05.00323	10.01.05.00287	10.01.05.00278	10.01.05.00338	10.01.05.00353	10.01.05.00308
SAOF 140x70 NBR-45	10.01.05.00603	10.01.05.00604	10.01.05.00605	10.01.05.00607	10.01.05.00608	10.01.05.00606

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Flat Suction Cups SAOF (Oval)

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SAOF 50x16	31	24	12	2.3	8	4
SAOF 60x23	57	37	33	3.9	20	4
SAOF 90x30	122	96	64	10.1	40	4
SAOF 80x40	140	110	100	11.7	50	4
SAOF 100x50	217	181	121	21.8	75	6
SAOF 120x60	312	254	170	39.9	75	6
SAOF 140x70	425	344	230	57.3	90	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

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Suction Cups for Handling Sheet Metal

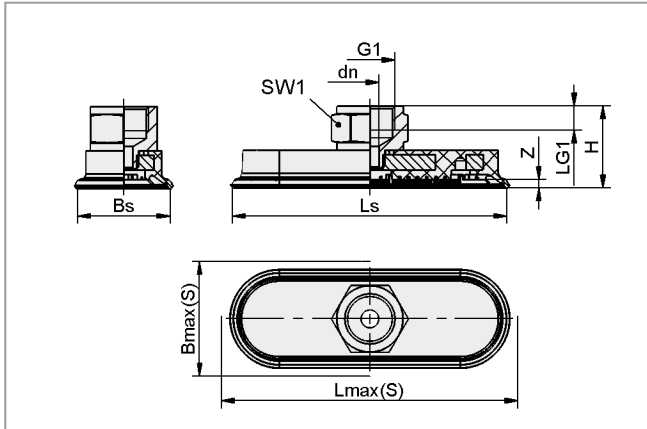


Flat Suction Cups SAOF (Oval)

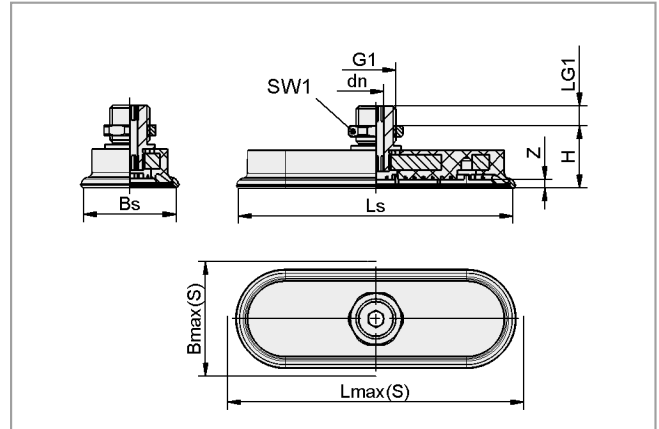
Suction area (LxW) from 50 x 16 mm to 140 x 70 mm



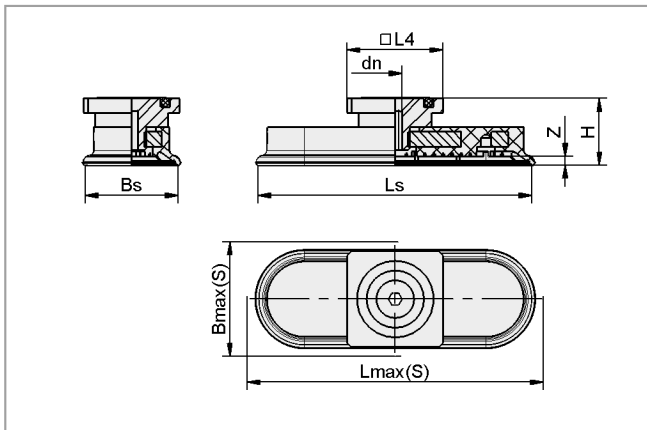
Design Data Flat Suction Cups SAOF (Oval)



SAOF 50x16 to 140x70 IG



SAOF 50x16 to 140x70 AG



SAOF 50x16 to 140x70 RA (rectangular adapter)

Suction Cups for Handling Sheet Metal



Flat Suction Cups SAOF (Oval)

Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

Design Data Flat Suction Cups SAOF (Oval)

Type	Dimensions in mm*										
	Bmax(S)**	Bs	dn	G1	H	L4	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)
SAOF 50x16 G1/4-AG	18	14.6	5	G1/4"-M	26	-	8	52	48.6	17	3
SAOF 50x16 G1/4-IG	18	14.6	6	G1/4"-F	33	-	8	52	48.6	17	3
SAOF 50x16 G3/8-IG	18	14.6	6	G3/8"-F	34	-	9	52	48.6	22	3
SAOF 50x16 M10x1.5-AG	18	14.6	4	M10-M	26	-	10	52	48.6	16	3
SAOF 50x16 M14x1.5-AG	18	14.6	5	M14x1.5-M	28	-	10	52	48.6	22	3
SAOF 50x16 RA	18	14.6	4	-	29	32	-	52	48.6	-	3
SAOF 60x23 G1/4-AG	25	21.6	5	G1/4"-M	18	-	8	64	60.6	17	3
SAOF 60x23 G1/4-IG	25	21.6	6	G1/4"-F	26	-	8	64	60.6	17	3
SAOF 60x23 G3/8-IG	25	21.6	6	G3/8"-F	26	-	9	64	60.6	22	3
SAOF 60x23 M10x1.5-AG	25	21.6	4	M10-M	18	-	10	64	60.6	16	3
SAOF 60x23 M14x1.5-AG	25	21.6	5	M14x1.5-M	20	-	10	64	60.6	22	3
SAOF 60x23 RA	25	21.6	4	-	21	32	-	64	60.6	-	3
SAOF 90x30 G1/4-AG	34	30.6	5	G1/4"-M	19	-	8	94	90.6	17	3
SAOF 90x30 G1/4-IG	34	30.6	6	G1/4"-F	26	-	8	94	90.6	17	3
SAOF 90x30 G3/8-IG	34	30.6	6	G3/8"-F	27	-	9	94	90.6	22	3
SAOF 90x30 M10x1.5-AG	34	30.6	4	M10-M	19	-	10	94	90.6	17	3
SAOF 90x30 M14x1.5-AG	34	30.6	5	M14x1.5-M	21	-	10	94	90.6	22	3
SAOF 90x30 RA	34	30.6	4	-	22	32	-	94	90.6	-	3
SAOF 80x40 G1/4-AG	43	38.6	5	G1/4"-M	20	-	8	85	80.6	17	4
SAOF 80x40 G1/4-IG	43	38.6	6	G1/4"-F	28	-	8	85	80.6	17	4
SAOF 80x40 G3/8-IG	43	38.6	6	G3/8"-F	28	-	9	85	80.6	22	4
SAOF 80x40 M10x1.5-AG	43	38.6	4	M10-M	20	-	10	85	80.6	17	4
SAOF 80x40 M14x1.5-AG	43	38.6	5	M14x1.5-M	22	-	10	85	80.6	22	4
SAOF 80x40 RA	43	38.6	4	-	23	32	-	85	80.6	-	4
SAOF 100x50 G1/4-AG	54	48.1	6	G1/4"-M	22	-	8	106	101.1	17	5
SAOF 100x50 G1/4-IG	54	48.1	8	G1/4"-F	30	-	8	106	101.1	17	5
SAOF 100x50 G3/8-IG	54	48.1	8	G3/8"-F	31	-	9	106	101.1	22	5
SAOF 100x50 M10x1.5-AG	54	48.1	4	M10-M	22	-	10	106	101.1	17	5
SAOF 100x50 M14x1.5-AG	54	48.1	6	M14x1.5-M	24	-	10	106	101.1	22	5
SAOF 100x50 RA	54	48.1	6	-	25	32	-	106	101.1	-	5
SAOF 120x60 G1/4-AG	65	57.6	6	G1/4"-M	24	-	8	128	126.6	17	6
SAOF 120x60 G1/4-IG	65	57.6	8	G1/4"-F	32	-	8	128	126.6	17	6
SAOF 120x60 G3/8-IG	65	57.6	8	G3/8"-F	33	-	9	128	126.6	22	6
SAOF 120x60 M10x1.5-AG	65	57.6	4	M10-M	24	-	10	128	126.6	17	6
SAOF 120x60 M14x1.5-AG	65	57.6	6	M14x1.5-M	26	-	10	128	126.6	22	6
SAOF 120x60 RA	65	57.6	6	-	27	32	-	128	126.6	-	6
SAOF 140x70 G1/4-AG	76	67.6	6	G1/4"-M	25	-	8	149	140.6	17	7
SAOF 140x70 G1/4-IG	76	67.6	8	G1/4"-F	33	-	8	149	140.6	17	7
SAOF 140x70 G3/8-IG	76	67.6	8	G3/8"-F	34	-	9	149	140.6	22	7
SAOF 140x70 M10x1.5-AG	76	67.6	4	M10-M	25	-	10	149	140.6	17	7
SAOF 140x70 M14x1.5-AG	76	67.6	6	M14x1.5-M	27	-	10	149	140.6	22	7
SAOF 140x70 RA	76	67.6	6	-	28	32	-	149	140.6	-	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Sheet Metal



Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm



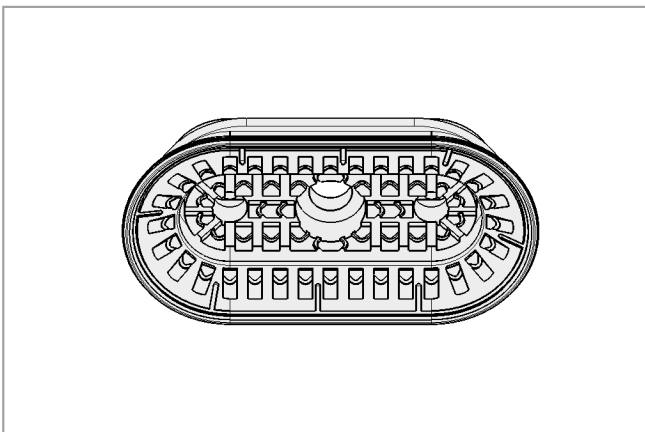
Suitable for Industry Specific Applications



Bellows suction cups SAOB (oval, 1.5 folds)

Applications

- Oval bellows suction cup with 1.5 folds for dynamic handling of long, narrow workpieces e.g. reinforcing ribs and plates
- Handling of thin steel sheets and aluminum sheets without deformation or deep-drawing
- For use e.g. in feeder systems for press lines in the automobile industry
- Slot on the bottom prevents the oily sheets from slipping and permits precise positioning in stamping presses etc.



System design bellows suction cups SAOB (oval, 1.5 folds)

Design

- Robust, wear-resistant oval suction cup SAOB with 1.5 folds made of NBR, single sealing lip, special slot and inner support
- Connection nipple glued to the suction cup with a reinforcing element (very high strength)
- Suction cups available with various connection types



Bellows suction cups SAOB being used for handling car bodywork components

Our Highlights...

- 1.5 folds
- Large, structured inner support
- Wide range of sizes
- Stiff top fold
- Soft and flexible sealing lip

Your Benefits...

- > For long, narrow workpieces and for stamped bodywork components
- > No deep-drawing of the workpiece and handling of very high lateral forces, even with oily metal sheets
- > For a wide range of workpiece sizes and shapes
- > Resistance to lateral forces and high horizontal accelerations
- > Good sealing, even on slightly curved surfaces

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Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Designation Code Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOB 60x30 NBR-60 RA:			
SAOB	60x30	NBR-60	RA
SAOB	60x30	NBR-60	G1/4-AG (AG = male (M))
	80x40		G1/4-IG (IG = female (F))
	110x55		G3/8-IG
	140x70		M10-AG
			M14x1.5-AG
			RA rectangular adapter

Ordering Data Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Suction cup SAOB, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10-M	M14x1.5-M	Rectangular adapt.
SAOB 60x30 NBR-60	10.01.06.00916	10.01.06.00891	10.01.06.00904	10.01.06.01024	10.01.06.01032	10.01.06.00908
SAOB 80x40 NBR-60	10.01.06.00918	10.01.06.00893	10.01.06.00906	10.01.06.01026	10.01.06.01034	10.01.06.00910
SAOB 110x55 NBR-60	10.01.06.00920	10.01.06.00900	10.01.06.00895	10.01.06.01028	10.01.06.01036	10.01.06.00912
SAOB 140x70 NBR-60	10.01.06.00922	10.01.06.00902	10.01.06.00897	10.01.06.01030	10.01.06.01038	10.01.06.00914

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SAOB 60x30 NBR-60	38	70	73	42	10.5	18	4
SAOB 80x40 NBR-60	65	132	153	74	21.8	25	6
SAOB 110x55 NBR-60	110	234	299	124	53.1	50	6
SAOB 140x70 NBR-60	165	355	473	246	106.0	70	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Handling Sheet Metal

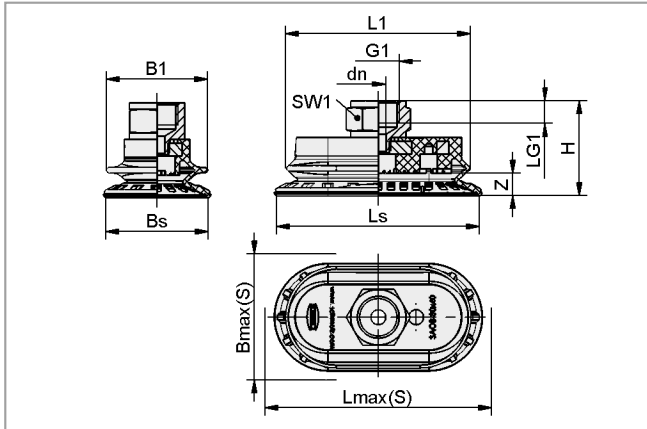


Bellows Suction Cups SAOB (Oval, 1.5 Folds)

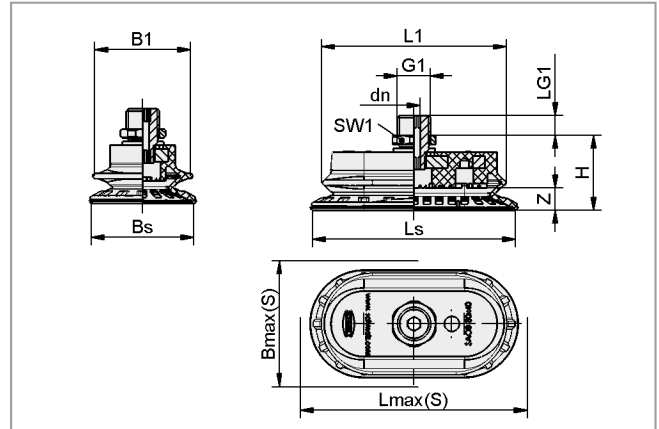
Suction area (LxW) from 60 x 30 mm to 140 x 70 mm



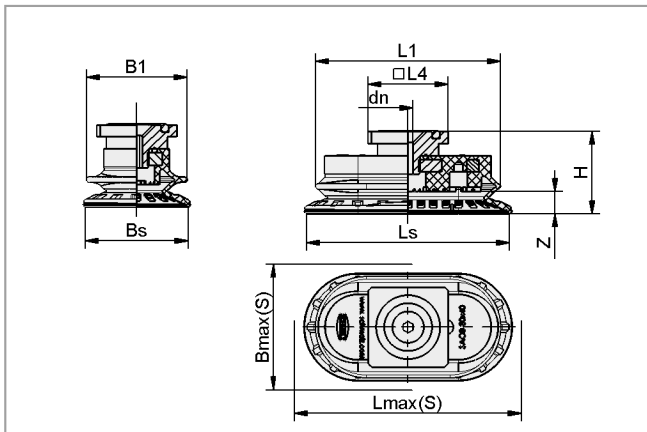
Design Data Bellows Suction Cups SAOB (Oval, 1.5 Folds)



SAOB 60x30 to 140x70 IG (female)



SAOB 60x30 and 140x70 AG (male)



SAOB 60x30 to 140x70 RA (rectangular adapter)

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Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Design Data Bellows Suction Cups SAOB (Oval, 1.5 Folds)

Type	Dimensions in mm*												
	B1	Bmax(S)**	Bs	dn	G1	H	L1	L4	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)
SAOB 60x30 NBR-60 G1/4-AG	31	33	30.6	5	G1/4"-M	27.0	56	-	8	63.0	60.6	17	7.0
SAOB 60x30 NBR-60 G1/4-IG	31	33	30.6	6	G1/4"-F	34.5	56	-	8	63.0	60.6	17	7.0
SAOB 60x30 NBR-60 G3/8-IG	31	33	30.6	6	G3/8"-F	35.0	56	-	9	63.0	60.6	22	7.0
SAOB 60x30 NBR-60 M10x1.5-AG	31	33	30.6	4	M10-M	27.0	56	-	10	63.0	60.6	17	7.0
SAOB 60x30 NBR-60 M14x1.5-AG	31	33	30.6	5	M14x1.5-M	29.0	56	-	10	63.0	60.6	22	7.0
SAOB 60x30 NBR-60 RA	31	33	30.6	4	-	30.0	56	31.8	-	63.0	60.6	-	7.0
SAOB 80x40 NBR-60 G1/4-AG	40	43	40.6	5	G1/4"-M	29.7	73	-	8	83.0	80.6	17	9.0
SAOB 80x40 NBR-60 G1/4-IG	40	43	40.6	6	G1/4"-F	37.2	73	-	8	83.0	80.6	17	9.0
SAOB 80x40 NBR-60 G3/8-IG	40	43	40.6	6	G3/8"-F	37.7	73	-	9	83.0	80.6	22	9.0
SAOB 80x40 NBR-60 M10x1.5-AG	40	43	40.6	4	M10-M	29.7	73	-	10	83.0	80.6	17	9.0
SAOB 80x40 NBR-60 M14x1.5-AG	40	43	40.6	5	M14x1.5-M	31.7	73	-	10	83.0	80.6	22	9.0
SAOB 80x40 NBR-60 RA	40	43	40.6	4	-	32.7	73	31.8	-	83.0	80.6	-	9.0
SAOB 110x55 NBR-60 G1/4-AG	53	59	55.1	6	G1/4"-M	35.5	99	-	8	114.0	110.1	17	12.0
SAOB 110x55 NBR-60 G1/4-IG	53	59	55.1	8	G1/4"-F	43.0	99	-	8	114.0	110.1	17	12.0
SAOB 110x55 NBR-60 G3/8-IG	53	59	55.1	8	G3/8"-F	43.5	99	-	9	114.0	110.1	22	12.0
SAOB 110x55 NBR-60 M10x1.5-AG	53	59	55.1	4	M10-M	35.5	99	-	10	114.0	110.1	17	12.0
SAOB 110x55 NBR-60 M14x1.5-AG	53	59	55.1	6	M14x1.5-M	37.5	99	-	10	114.0	110.1	22	12.0
SAOB 110x55 NBR-60 RA	53	59	55.1	6	-	38.5	99	31.8	-	114.0	110.1	-	12.0
SAOB 140x70 NBR-60 G1/4-AG	67	75	70.1	6	G1/4"-M	39.5	126	-	8	146.0	141.1	17	16.5
SAOB 140x70 NBR-60 G1/4-IG	67	75	70.1	8	G1/4"-F	47.0	126	-	8	146.0	141.1	17	16.5
SAOB 140x70 NBR-60 G3/8-IG	67	75	70.1	8	G3/8"-F	47.5	126	-	9	146.0	141.1	22	16.5
SAOB 140x70 NBR-60 M10x1.5-AG	67	75	70.1	4	M10-M	39.5	126	-	10	146.0	141.1	17	16.5
SAOB 140x70 NBR-60 M14x1.5-AG	67	75	70.1	6	M14x1.5-M	41.5	126	-	10	146.0	141.1	22	16.5
SAOB 140x70 NBR-60 RA	67	75	70.1	6	-	42.5	126	31.8	-	146.0	141.1	-	16.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Sheet Metal



Bell-Shaped Suction Cups SAOG (Oval)

Suction area (LxW) from 60 x 20 mm to 95 x 40 mm



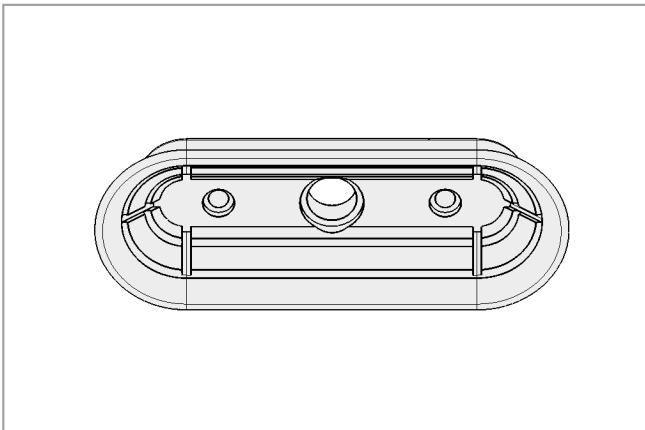
Suitable for Industry Specific Applications



Bell-shaped suction cups SAOG (oval)

Applications

- Oval bell-shaped suction cup for handling of long, oiled workpieces with extremely small curved radii
- Very dynamic handling of metal sheets (short cycle times)
- Inner support for deformation-free handling of thin steel sheets and aluminum sheets or deep-drawing
- Usage in feeder systems for press lines in the automobile industry
- Slot lot on the bottom prevents oily sheets from slipping; permits precise positioning in stamping presses etc.



System design bell-shaped suction cups SAOG (oval)

Design

- Oval, bell-shaped suction cup with single sealing lip, special slot and inner support
- Suction cups made of NBR material, hardness 45 Shore



Bell-shaped suction cups SAOG being used for handling very curved sheet metal parts

Our Highlights...

- Oval, bell-shape
- Material NBR, material hardness 45 Shore
- Wide range of connection elements

Your Benefits...

- > Optimum adaptation to narrow, very curved workpieces
- > Adaptation to workpieces with small curved radii
- > Mounting on all common load cross-beams and feeder systems possible

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Bell-Shaped Suction Cups SAOG (Oval)

Suction area (LxW) from 60 x 20 mm to 95 x 40 mm

Designation Code Bell-Shaped Suction Cups SAOG (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOG 60x20 NBR-45 RA:			
SAOG	60x20	NBR-45	RA
SAOG	60x20	NBR-45	G1/4-AG (AG = male (M))
	80x30		G1/4-IG (IG = female (F))
	95x40		G3/8-AG
			G3/8-IG
			M10-AG
			M14x1.5-AG
			RA rectangular adapter

Ordering Data Bell-Shaped Suction Cups SAOG (Oval)

Suction cup SAOG, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bell-Shaped Suction Cups SAOG (Oval)

Type*	Connection						
	G1/4"-M	G1/4"-F	G3/8"-M	G3/8"-F	M10-M	M14x1.5-M	Rectangular adapter
SAOG 60x20 NBR-45	10.01.01.11755	10.01.01.11754	10.01.01.11758	10.01.01.11757	10.01.01.11760	10.01.01.11761	10.01.01.11762
SAOG 80x30 NBR-45	10.01.01.11659	10.01.01.11649	10.01.01.11651	10.01.01.11614	10.01.01.11653	10.01.01.11655	10.01.01.11668
SAOG 95x40 NBR-45	10.01.01.11660	10.01.01.11650	10.01.01.11652	10.01.01.11615	10.01.01.11654	10.01.01.11656	10.01.01.11669

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Bell-Shaped Suction Cups SAOG (Oval)

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOG 60x20 NBR-45	56	35	10	4.9	13	4
SAOG 80x30 NBR-45	105	65	45	13.2	20	4
SAOG 95x40 NBR-45	165	97	68	26.9	25	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

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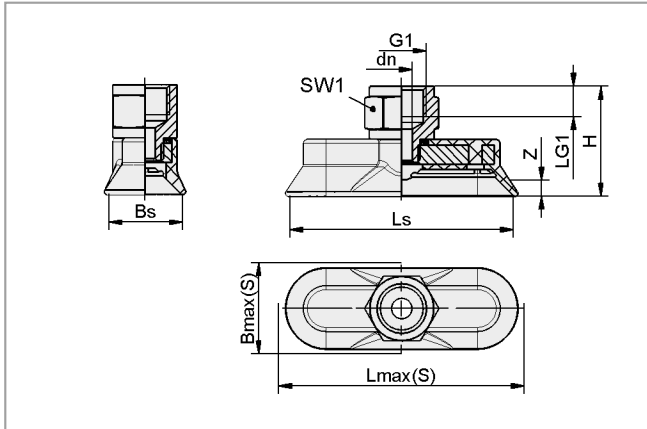


Bell-Shaped Suction Cups SAOG (Oval)

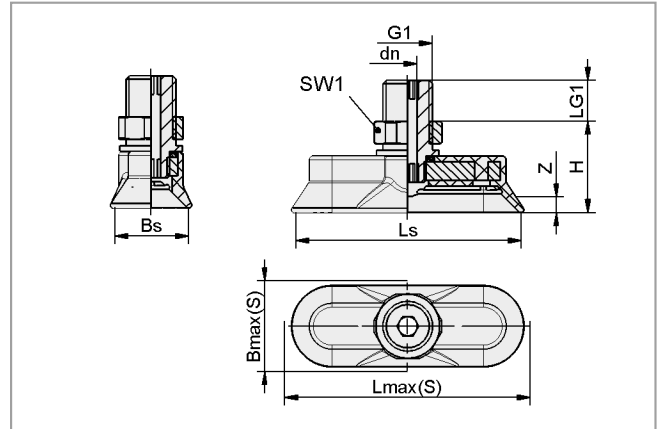
Suction area (LxW) from 60 x 20 mm to 95 x 40 mm



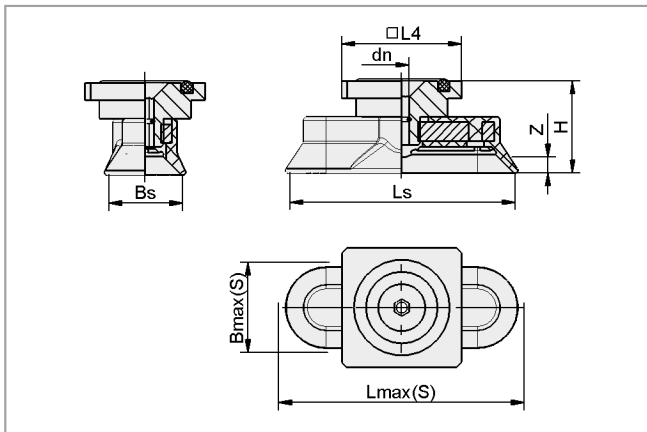
Design Data Bell-Shaped Suction Cups SAOG (Oval)



SAOG 60x20 to 95x40 IG



SAOG 60x20 to 95x40 AG



SAOG 60x20 to 95x40 RA (rectangular adapter)

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Bell-Shaped Suction Cups SAOG (Oval)

Suction area (LxW) from 60 x 20 mm to 95 x 40 mm

Design Data Bell-Shaped Suction Cups SAOG (Oval)

Type	Dimensions in mm*											
	Bmax(S)**	Bs	dn	G1	H	L4	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)	
SAOG 60x20 NBR-45 G1/4-AG	26	20	5	G1/4"-M	24.5	-	10.5	66	60	17	4.5	
SAOG 60x20 NBR-45 G1/4-IG	26	20	6	G1/4"-F	29.0	-	8.0	66	60	17	4.5	
SAOG 60x20 NBR-45 G3/8-AG	26	20	5	G3/8"-M	21.0	-	8.0	66	60	22	4.5	
SAOG 60x20 NBR-45 G3/8-IG	26	20	6	G3/8"-F	29.5	-	9.0	66	60	22	4.5	
SAOG 60x20 NBR-45 M10x1.5-AG	26	20	4	M10-M	21.5	-	10.0	66	60	16	4.5	
SAOG 60x20 NBR-45 M14x1.5-AG	26	20	5	M14x1.5-M	23.5	-	10.0	66	60	22	4.5	
SAOG 60x20 NBR-45 RA	26	20	4	-	24.5	31.8	-	66	60	-	4.5	
SAOG 80x30 NBR-45 G1/4-AG	36	30	5	G1/4"-M	27.5	-	10.5	86	80	17	10.0	
SAOG 80x30 NBR-45 G1/4-IG	36	30	6	G1/4"-F	32.0	-	8.0	86	80	17	10.0	
SAOG 80x30 NBR-45 G3/8-AG	36	30	5	G3/8"-M	24.0	-	8.0	86	80	22	10.0	
SAOG 80x30 NBR-45 G3/8-IG	36	30	6	G3/8"-F	32.5	-	9.0	86	80	22	10.0	
SAOG 80x30 NBR-45 M10x1.5-AG	36	30	4	M10-M	24.5	-	10.0	86	80	16	10.0	
SAOG 80x30 NBR-45 M14x1.5-AG	36	30	5	M14x1.5-M	26.5	-	10.0	86	80	22	10.0	
SAOG 80x30 NBR-45 RA	36	30	4	-	27.5	31.8	-	86	80	-	10.0	
SAOG 95x40 NBR-45 G1/4-AG	46	40	5	G1/4"-M	30.5	-	10.5	102	95	17	6.0	
SAOG 95x40 NBR-45 G1/4-IG	46	40	6	G1/4"-F	35.0	-	8.0	102	95	17	6.0	
SAOG 95x40 NBR-45 G3/8-AG	46	40	5	G3/8"-M	27.0	-	8.0	102	95	22	6.0	
SAOG 95x40 NBR-45 G3/8-IG	46	40	6	G3/8"-F	35.5	-	9.0	102	95	22	6.0	
SAOG 95x40 NBR-45 M10x1.5-AG	46	40	4	M10-M	27.5	-	10.0	102	95	16	6.0	
SAOG 95x40 NBR-45 M14x1.5-AG	46	40	5	M14x1.5-M	29.5	-	10.0	102	95	22	6.0	
SAOG 95x40 NBR-45 RA	46	40	4	-	30.5	31.8	-	102	95	-	6.0	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimensions of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for Handling Sheet Metal



Bellows Suction Cups SAB2 P (2.5 Folds)

Suction area (Ø) 20 mm



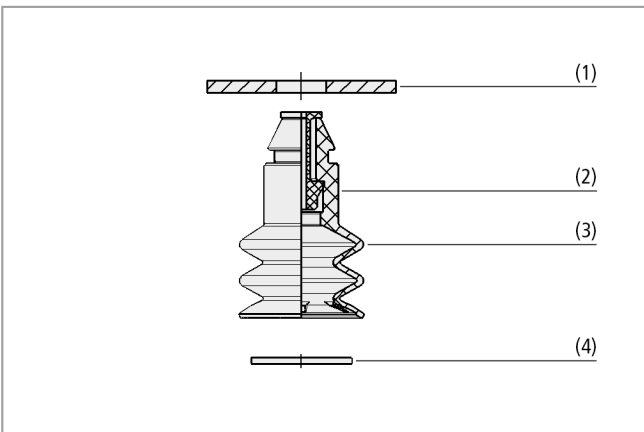
Suitable for Industry Specific Applications



Bellows suction cups SPB2 P (2.5 Folds)

Applications

- Round bellows suction cups with 2.5 folds for handling sheet metal parts such as in CNC metal and laser cutting machines
- Applications with requirements for high holding forces and resistance to lateral forces even on oiled and contaminated workpiece surfaces
- Use in area gripping systems and "suction cup carpets"; optional integration of flow restrictor to reduce leakage occurring at partial occupancy



System design bellows suction cups SPB2 P (2.5 Folds)

Design

- Round bellows suction cups SAB2 P (3) with 2.5 folds and radial ribs and sealing lip with sealing edge
- Machine side existing hole for tool-free assembly through push-in function (1)
- Optional integration of flow restrictor (2) to reduce leakage occurring at partial occupancy
- Optional integration of a filter (4) as a prefilter (120 micron filtration rating)



Bellows suction cups SAB2 P for handling sheet metal parts

Our Highlights...

- Tool-free installation by push-in function
- Optimized sealing lip with radial ribs and sealing edge
- Soft bellows with big stroke at low restoring force
- Two different materials NBR and HT1

Your Benefits...

- > Quick installation and removal of the suction cups
- > High suction power even when used in rough environmental conditions (e.g. oil, chips or dirt)
- > Use in area gripping systems and "suction cup carpets"; compensation of height differences and damping effect
- > High wear and ozone resistance (NBR) and no marks (HT1)

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Bellows Suction Cups SAB2 P (2.5 Folds)

Suction area (Ø) 20 mm

Designation Code Bellows Suction Cups SAB2 P (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Product addition
Example SAB2 20 HT1-60 P:			
SAB2	20	HT1-60	P
SAB2	20	HT1-60 NBR-60	P push-in function

Ordering Data Bellows Suction Cups SAB2 P (2.5 Folds)

Suction cup SAB2 P is delivered as a ready-to-connect-component. Available in materials HT1 and NBR.

Available accessories: filter screen, flow restrictor

Bellows Suction Cups SAB2 P (2.5 Folds)

Type	Suction cup material * / hardness in Shore A	
	HT1-60	NBR-60
SAB2 20 P	10.01.06.03235	10.01.06.03263

Ordering Data Accessories Bellows Suction Cups SAB2 P (2.5 Folds)

Type	Flow resistance				
	SW 80	SW 100	SW 130	SW 150	Filter screen
SAB2 20 P	10.05.04.00090	10.05.04.00091	10.05.04.00092	10.05.04.00093	10.01.06.02565

Technical Data Bellows Suction Cups SAB2 P (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Min. curve radius [mm] (convex)	Volume [cm ³]
SAB2 20 P	4.7	13	20	2.6

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include safety factors

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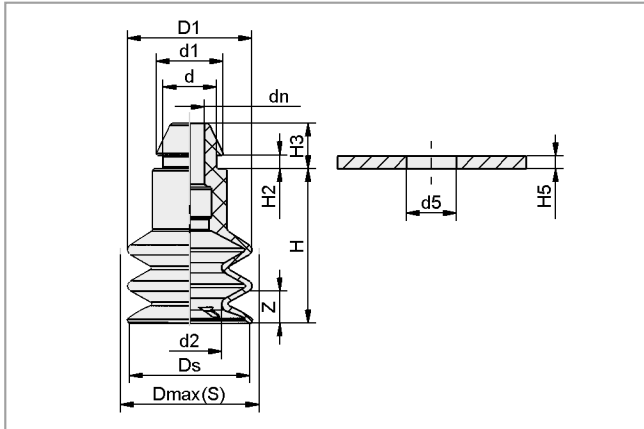


Bellows Suction Cups SAB2 P (2.5 Folds)

Suction area (Ø) 20 mm



Design Data Bellows Suction Cups SAB2 P (2.5 Folds)



SAB2 P

Type	Dimensions in mm*												
	d	d1	d2	d5	D1	Dmax(S)**	dn	Ds	H	H2	H3	H5	Z (Stroke)
SAB2 20 HT1-60 P	8.5	10.6	10	7.9	19.7	20.5	4.7	19.1	24.5	2.2	7.2	2	9
SAB2 20 NBR-60 P	8.5	10.6	10	7.9	19.7	20.5	4.7	19.1	24.5	2.2	7.2	2	9

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Flat Suction Cups SHFN

Suction area (Ø) from 50 mm to 85 mm



Suitable for Industry Specific Applications

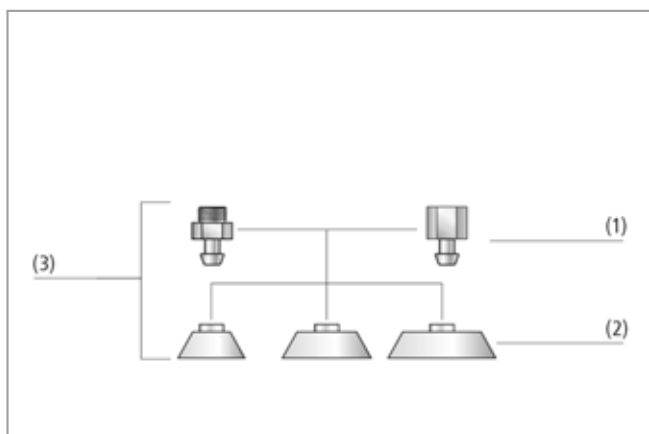


Flat suction cups SHFN

Applications

- Round, flat suction cup for handling of furniture parts, parquet flooring, laminated and unlaminated chipboard, etc.
- Version with vulcanized insert, for vacuum systems in rough operating conditions, where the suction cups are not always fully covered or may be placed directly on the edge of the workpiece
- Handling of objects with very rough surfaces with sealing ring made of special foam

Design



System design flat suction cups SHFN

- Adaptable suction cup SHFN (3), consisting of cup SHF (2) and connection nipple (1)
- Nipple plugged into cup; version SHFN...E with nipple screwed into vulcanized insert
- Ribs on the upper surface of the cup for higher stability on the version without vulcanized insert
- Optionally available with sealing ring made of special foam and/or with touch valve
- Individual deactivation of unused suction cups with optional touch valve to prevent entry of air



Flat suction cups SHFN being used for handling chipboards

Our Highlights...

- Soft sealing lip
- Sealing lip with inner sealing edge
- Specifically structured lower surface of cup
- Version SHFN...E with insert
- Dirt filter (optional)
- Sealing ring made of special foam (optional)

Your Benefits...

- > Optimal adaptation to uneven workpiece surfaces
- > Very good sealing on rough and smooth surfaces
- > Suitable for highly dynamic operations and short cycle times
- > Increased stability in rough operating conditions
- > Usage in dusty surroundings
- > Suitable for workpieces with very rough surfaces

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Flat Suction Cups SHFN

Suction area (Ø) from 50 mm to 85 mm

Designation Code Flat Suction Cups SHFN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Type of construction	Product addition
Example SHFN 50 NK-45 G1/4-AG:					
SHFN	50	NK-45	G1/4-AG		
SHFN	50	NK-45	G1/4-AG (AG = male (M))	- pluggable metal inlay	MOS sealing ring, made of special foam
	70		G1/4-IG (IG = female (F))	E vulcanized metal inlay	TV touch valve
	85				

Ordering Data Flat Suction Cups SHFN

Suction cup SHFN (elastomer part + connection nipple) is delivered assembled. The assembly consists of:

- Suction cup of type SHF – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads
- Optional product addition: sealing ring and touch valve

Available spare parts: suction cup SHF, connection nipple SA-NIP, sealing ring

Available accessories: touch valve, filter screen

Flat Suction Cups SHFN

Type	Connection nipple			
	SHFN G1/4"-AG	SHFN...E G1/4"-AG	SHFN G1/4"-IG	SHFN...E G1/4"-IG
SHFN 50 NK-45	10.01.01.11693	-	10.01.01.11694	-
SHFN 50 NK-45 MOS	10.01.01.11695	-	10.01.01.11696	-
SHFN 50 NK-45 TV	10.01.01.11699	-	-	-
SHFN 50 NK-45 MOS-TV	10.01.01.11700	-	-	-
SHFN 70 NK-45	10.01.01.11689	10.01.01.12197	10.01.01.11690	10.01.01.12216
SHFN 70 NK-45 MOS	10.01.01.11691	10.01.01.12217	10.01.01.11692	10.01.01.12218
SHFN 70 NK-45 TV	10.01.01.11697	10.01.01.12221	-	-
SHFN 70 NK-45 MOS-TV	10.01.01.11698	10.01.01.12222	-	-
SHFN 85 NK-45	10.01.01.11775	10.01.01.12210	10.01.01.11776	10.01.01.12211
SHFN 85 NK-45 MOS	10.01.01.11777	10.01.01.12212	10.01.01.11778	10.01.01.12213
SHFN 85 NK-45 TV	10.01.01.11779	10.01.01.12224	-	-
SHFN 85 NK-45 MOS-TV	10.01.01.11780	10.01.01.12225	-	-

Suction Cups for Handling Wood



Flat Suction Cups SHFN

Suction area (\emptyset) from 50 mm to 85 mm

Ordering Data Spare Parts And Accessories Flat Suction Cups SHFN

Type	Flat suction cup (round) SHF	Sealing ring made of special foam material	Connection nipples SA-NIP	Sensing valve	Filter screen (round)
SHFN 50 NK-45 G1/4-AG	10.01.01.11687	-	10.01.01.11772	-	10.07.01.00211
SHFN 50 NK-45 G1/4-IG	10.01.01.11687	-	10.01.01.11822	-	10.07.01.00211
SHFN 50 NK-45 G1/4-AG MOS	10.01.01.11688	10.01.06.01679	10.01.01.11772	-	10.07.01.00211
SHFN 50 NK-45 G1/4-IG MOS	10.01.01.11688	10.01.06.01679	10.01.01.11822	-	10.07.01.00211
SHFN 50 NK-45 G1/4-AG TV	10.01.01.11687	-	-	10.05.10.00058	-
SHFN 50 NK-45 G1/4-AG MOS-TV	10.01.01.11688	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG	10.01.01.11682	-	10.01.01.11772	-	10.07.01.00211
SHFN 70 NK-45 G1/4-IG	10.01.01.11682	-	10.01.01.11822	-	10.07.01.00211
SHFN 70 NK-45 G1/4-AG E	10.01.01.12165	-	10.01.01.12194	-	10.05.03.00023
SHFN 70 NK-45 G1/4-IG E	10.01.01.12165	-	10.01.01.12192	-	10.05.03.00023
SHFN 70 NK-45 G1/4-AG MOS	10.01.01.11686	10.01.06.01678	10.01.01.11772	-	10.07.01.00211
SHFN 70 NK-45 G1/4-IG MOS	10.01.01.11686	10.01.06.01678	10.01.01.11822	-	10.07.01.00211
SHFN 70 NK-45 G1/4-AG E MOS	10.01.01.12215	10.01.06.01678	10.01.01.12194	-	10.05.03.00023
SHFN 70 NK-45 G1/4-IG E MOS	10.01.01.12215	10.01.06.01678	10.01.01.12192	-	10.05.03.00023
SHFN 70 NK-45 G1/4-AG TV	10.01.01.11682	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG E TV	10.01.01.12165	-	-	10.05.10.00065	-
SHFN 70 NK-45 G1/4-AG MOS-TV	10.01.01.11686	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG E MOS-TV	10.01.01.12215	10.01.06.01678	-	10.05.10.00065	-
SHFN 85 NK-45 G1/4-AG	10.01.01.11773	-	10.01.01.11772	-	10.07.01.00211
SHFN 85 NK-45 G1/4-IG	10.01.01.11773	-	10.01.01.11822	-	10.07.01.00211
SHFN 85 NK-45 G1/4-AG E	10.01.01.12209	-	10.01.01.12194	-	10.05.03.00023
SHFN 85 NK-45 G1/4-IG E	10.01.01.12209	-	10.01.01.12192	-	10.05.03.00023
SHFN 85 NK-45 G1/4-AG MOS	10.01.01.11774	10.01.06.01720	10.01.01.11772	-	10.07.01.00211
SHFN 85 NK-45 G1/4-IG MOS	10.01.01.11774	10.01.06.01720	10.01.01.11822	-	10.07.01.00211
SHFN 85 NK-45 G1/4-AG E MOS	10.01.01.12223	-	10.01.01.12194	-	10.05.03.00023
SHFN 85 NK-45 G1/4-IG E MOS	10.01.01.12223	-	10.01.01.12192	-	10.05.03.00023
SHFN 85 NK-45 G1/4-AG TV	10.01.01.11773	-	-	10.05.10.00058	-
SHFN 85 NK-45 G1/4-AG E TV	10.01.01.12209	-	-	10.05.10.00065	-
SHFN 85 NK-45 G1/4-AG MOS-TV	10.01.01.11774	10.01.06.01720	-	10.05.10.00058	-
SHFN 85 NK-45 G1/4-AG E MOS-TV	10.01.01.12223	10.01.06.01720	-	10.05.10.00065	-

Technical Data Flat Suction Cups SHFN

Type*	Suction force Ds [N]**	Suction force d2 [N]**	Lateral force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]****	Nipple family
SHFN 50 NK-45	110	40	95	7.3	41	4	N 041
SHFN 50 NK-45 TV	110	40	95	7.3	41	4	N 041
SHFN 70 NK-45	200	100	145	16.0	95	6	N 041
SHFN 70 NK-45 E	200	100	145	16.0	95	6	N 009
SHFN 70 NK-45 TV	200	100	145	16.0	95	6	N 041
SHFN 70 NK-45 E TV	200	100	145	16.0	95	6	N 009
SHFN 85 NK-45	300	175	210	25.0	176	6	N 041
SHFN 85 NK-45 E	300	175	210	25.0	176	6	N 009
SHFN 85 NK-45 TV	300	175	210	25.0	176	6	N 041
SHFN 85 NK-45 E TV	300	175	210	25.0	176	6	N 009

*Note: For technical data on the sensing valves, see Chapter "Valve Technology"

**The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

***Suction force referred to the sealing-edge diameter d2

****The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Handling Wood

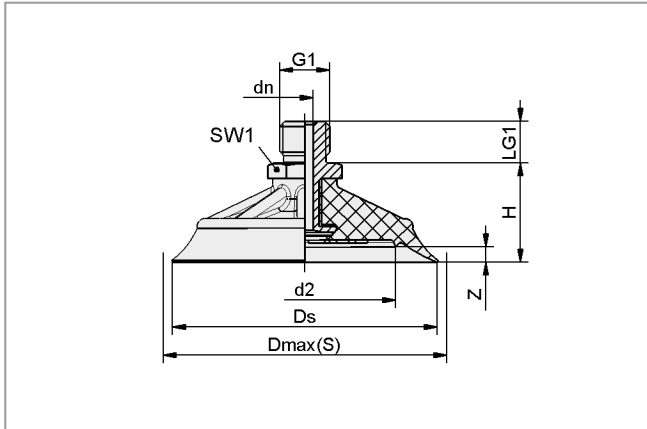


Flat Suction Cups SHFN

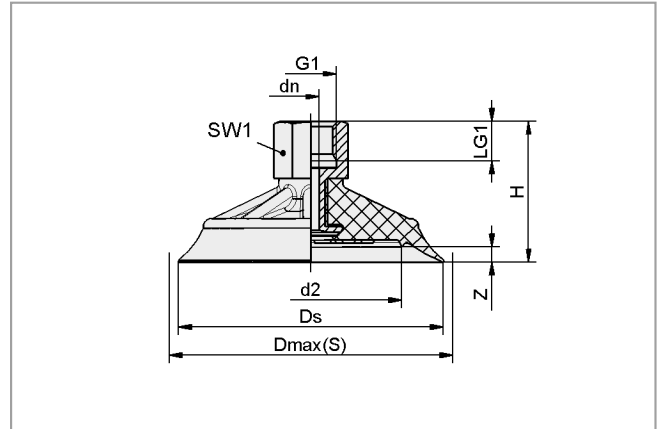
Suction area (\emptyset) from 50 mm to 85 mm



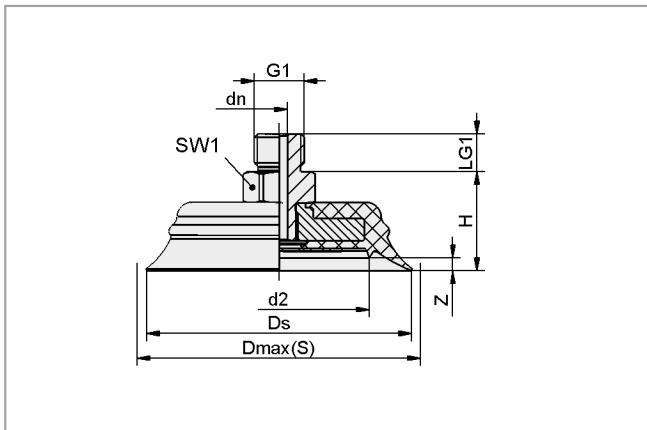
Design Data Flat Suction Cups SHFN



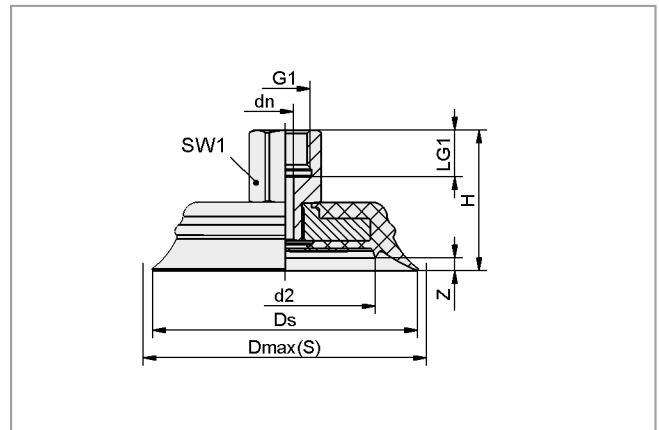
SHFN 50 to 85 G1/4-AG (TV)



SHFN 50 to 85 G1/4-IG



SHFN 70 to 85 G1/4-AG E (TV)



SHFN 70 to 85 G1/4-IG E

Type	Dimensions in mm*									
	d2	Dmax(S)**	dn	Ds	G1	H	LG1	SW1	Z (Stroke)	
SHFN 50 NK-45 G1/4-AG	30	55.0	4.4	52	G1/4"-M	26.2	11	17	3	
SHFN 50 NK-45 G1/4-IG	30	55.0	4.4	52	G1/4"-F	37.2	11	17	3	
SHFN 50 NK-45 G1/4-AG TV	30	55.0	4.4	52	G1/4"-M	32.2	11	17	3	
SHFN 70 NK-45 G1/4-AG	48	74.0	4.4	70	G1/4"-M	26.2	11	17	4	
SHFN 70 NK-45 G1/4-AG E	48	74.0	4.4	70	G1/4"-M	26.2	10	17	4	
SHFN 70 NK-45 G1/4-IG	48	74.0	4.4	70	G1/4"-F	37.2	11	17	4	
SHFN 70 NK-45 G1/4-IG E	48	74.0	4.4	70	G1/4"-F	37.2	12	17	4	
SHFN 70 NK-45 G1/4-AG TV	48	74.0	4.4	70	G1/4"-M	32.2	11	17	4	
SHFN 70 NK-45 G1/4-AG E TV	48	74.0	4.4	70	G1/4"-M	33.4	10	17	4	
SHFN 85 NK-45 G1/4-AG	62	89.0	4.4	85	G1/4"-M	26.2	11	17	4	
SHFN 85 NK-45 G1/4-AG E	62	89.0	4.4	85	G1/4"-M	26.2	10	17	4	
SHFN 85 NK-45 G1/4-IG	62	89.0	4.4	85	G1/4"-F	37.2	11	17	4	
SHFN 85 NK-45 G1/4-IG E	62	89.0	4.4	85	G1/4"-F	37.2	12	17	4	
SHFN 85 NK-45 G1/4-AG TV	62	89.0	4.4	85	G1/4"-M	32.2	11	17	4	
SHFN 85 NK-45 G1/4-AG E TV	62	89.0	4.4	85	G1/4"-M	33.4	10	17	4	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Wood

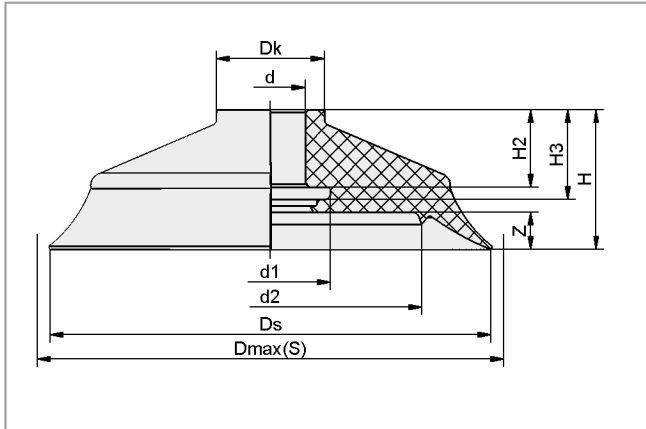


Flat Suction Cups SHFN

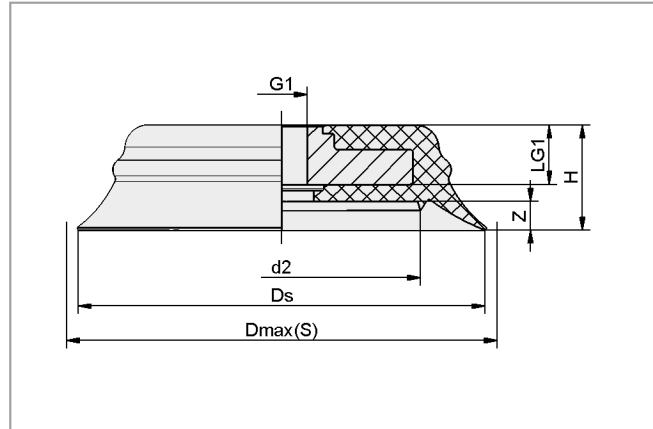
Suction area (\emptyset) from 50 mm to 85 mm



Design Data Flat Suction Cups SHF - Spare Parts for SHFN



SHF 50 to 85



SHF 70 E to 85 E

Type	Dimensions in mm*											
	d	d1	d2	Dk	Dmax(S)**	Ds	G1	H	H2	H3	LG1	Z (Stroke)
SHF 50 NK-45	7.5	17	30	17	55	52	-	22.2	12.8	14.3	-	3
SHF 70 NK-45	7.5	17	48	17	74	70	-	22.2	12.8	14.3	-	4
SHF 70 NK-45 E	-	-	48	-	74	70	M10x1.25-F	18.1	-	-	10	4
SHF 85 NK-45	7.5	17	62	17	89	85	-	22.2	12.8	14.3	-	4
SHF 85 NK-45 E	-	-	62	-	89	85	M10x1.25-F	18.1	-	-	10	4

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for Handling Wood



Suction Plates SHF

Suction area (Ø) from 125 mm to 210 mm



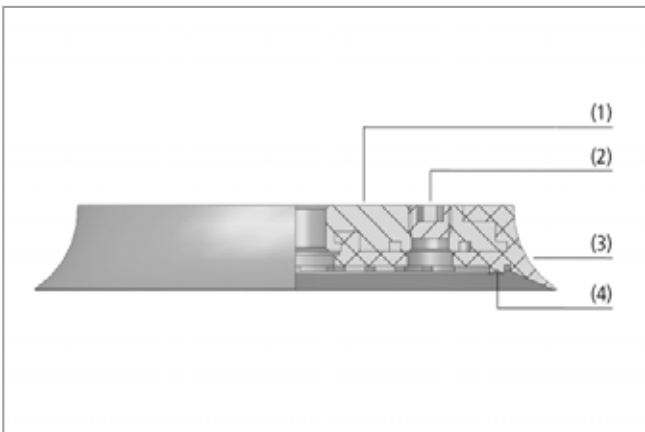
Suitable for Industry Specific Applications



Suction plates SHF

Applications

- Round suction plate for handling of sheets, furniture elements, parquet and similar large, flat workpieces
- Handling of wooden parts with rough surfaces



System design suction plates SHF

Design

- Suction plate SHF, consisting of sealing ring (3) and aluminum mounting plate (1)
- Connection (2) on the side, normally sealed with a screw plug (glued into position for extra safety)
- Sealing ring clipped securely to mounting plate (can be changed without tools)
- Double internal sealing edge (4) for better sealing to rough surfaces
- Optional touch valve can be ordered separately (use medium-strength locking compound for installation)
- Filter screen available optionally



Suction plates SHF being used for handling pressed wooden boards

Our Highlights...

- Soft sealing lip
- Double internal sealing edge
- Specifically structured lower surface
- Modular design

Your Benefits...

- > Optimal adaptation to uneven workpiece surfaces
- > Very good sealing on rough and smooth surfaces
- > Highly dynamic movement and short cycle times
- > Gasket can be changed quickly without tools

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Suction Cups for Handling Wood



Suction Plates SHF

Suction area (Ø) from 125 mm to 210 mm

Designation Code Suction Plates SHF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SHF 210 NK-45 G1/2-IG:			
SHF	210	NK-45	G1/2-IG
SHF	125	NK-45	G1/4-IG (IG = female (F))
	160		G1/2-IG
	210		

Ordering Data Suction Plates SHF

Suction plate SHF (sealing ring + support plate) is delivered assembled. The assembly consists of:

- Sealing ring of type DR-SHF – elastomer part, available in various diameters
- Aluminium support plate – available with various threads

Available spare parts: sealing ring DR-SHF

Available accessories: touch valve, filter screen

Suction Plates SHF

Type*	Part Number
SHF 125 NK-45 G1/4-IG	10.01.01.11788
SHF 160 NK-45 G1/2-IG	10.01.01.12025
SHF 210 NK-45 G1/2-IG	10.01.01.11814

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts And Accessories Suction Plates SHF

Type	Sealing ring DR-SHF	Filter screen (center)	Filter screen (outside)	Sensing valve
SHF 125 NK-45 G1/4-IG	10.01.01.11783	10.07.01.00215	10.07.01.00215	10.05.10.00061
SHF 160 NK-45 G1/2-IG	10.01.01.12023	10.07.01.00110	10.07.01.00215	10.05.10.00061
SHF 210 NK-45 G1/2-IG	10.01.01.11809	10.07.01.00110	10.07.01.00215	10.05.10.00061

Technical Data Suction Plates SHF

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SHF 125 G1/4-IG	625	290	70	305	9
SHF 160 G1/2-IG	1025	580	117	500	12
SHF 210 G1/2-IG	1770	1160	224	885	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**Suction force referred to the sealing-edge diameter d2

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Handling Wood

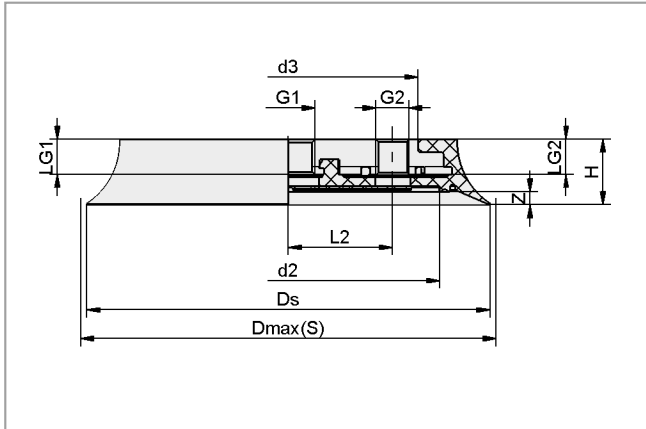


Suction Plates SHF

Suction area (\emptyset) from 125 mm to 210 mm



Design Data Suction Plates SHF



SHF 125 to 210

Type*	Dimensions in mm**											
	d2	d3	Dmax(S)***	Ds	G1	G2****	H	L2	LG1	LG2	Z (Stroke)	
SHF 125 G1/4-IG	85	70	133	125	G1/4"-F	G1/4"-F	26	26.5	14	12.8	6	
SHF 160 G1/2-IG	120	103	168	160	G1/2"-F	G1/4"-F	26	41.4	14	12.8	6	
SHF 210 G1/2-IG	170	134	218	210	G1/2"-F	G1/4"-F	26	52.8	14	12.8	6	

*The connection dimensions for the sensing valve can be found under "Sensing valves TV/TVN" in Section "Valve technology"

**Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

***External dimension of the suction cup when it is pressed against the workpiece by the vacuum

****A plug is fitted in this connection in the factory

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Suction Cups for Handling Wood



Suction Plates SPC

Suction area (\emptyset) from 160 mm to 250 mm



Suitable for Industry Specific Applications



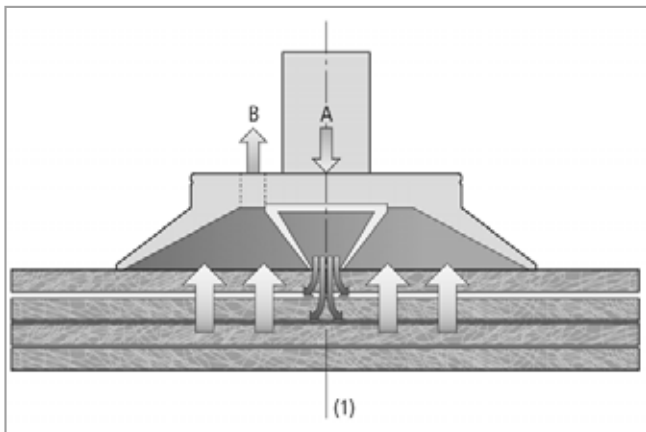
Suction plates SPC

Applications

- Round suction plate for handling and separation of flat, porous workpieces, including those with a "suck-through" effect
- Separation of workpieces by injection of a throttled flow of compressed air into a separate area of the suction cup

Design

- Robust, wear-resistant suction cup SPC with double sealing lip, consisting of two seals (inner and outer) and aluminium support plate
- Seals are clipped securely into the support plate with specially shaped sections
- Inner seal separates the central cell for the flow of compressed air from the vacuum area
- When worn, the seals can be replaced separately; the aluminium supporting plate can be re-used
- The support plate has one threaded hole in the center (for connection of the compressed air A) for the separation (1) and a second threaded hole towards the edge (for connection of the vacuum B) for gripping
- Series SPC-TV with touch valve: deactivation of unused suction cups to prevent the entry of unwanted air



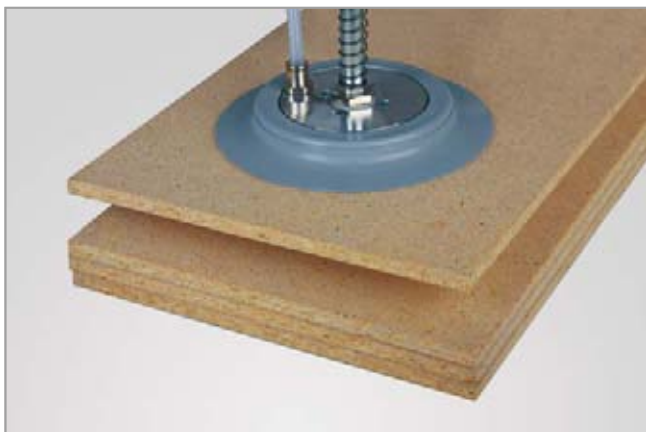
System design suction plates SPC

Our Highlights...

- Double sealing lip
- Separation function by applying a compressed air pulse
- Low internal volume
- Optimum shape

Your Benefits...

- > Special suction cup for flat, porous workpieces, such as sheets of MDF, hardboard
- > Prevents porous workpieces from sticking together; overcomes the self-adhesion during unstacking of sheets
- > Very short cycle times
- > High suction forces in spite of small dimensions



Suction plates SPC being used for separation of chipboards

Suction Cups for Handling Wood



Suction Plates SPC

Suction area (Ø) from 160 mm to 250 mm

Designation Code Suction Plates SPC

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example SPC 160 NBR-55 G1/2-IG TV:				
SPC	160	NBR-55	G1/2-IG	TV
SPC	160 210 250	NBR-55	G1/2-IG (IG = female (F))	TV touch valve

Ordering Data Suction Plates SPC

Suction plate SPC (sealing ring + support plate) is delivered assembled. The assembly consists of:

- Outer and inner sealing ring of type DR-SPC – elastomer part, available in various diameters
- Aluminium support plate – available with various threads
- Optional product range supplement – touch valve

Available spare parts: sealing ring DR-SPC, touch valve

Suction Plates SPC

Type*	Part Number
SPC 160 NBR-55 G1/2-IG	10.01.01.01185
SPC 160 NBR-55 G1/2-IG TV	10.01.01.01186
SPC 210 NBR-55 G1/2-IG	10.01.01.01187
SPC 210 NBR-55 G1/2-IG TV	10.01.01.01188
SPC 250 NBR-55 G1/2-IG	10.01.01.01189
SPC 250 NBR-55 G1/2-IG TV	10.01.01.01211

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Suction Plates And Sensing Valve

Type	Outer sealing ring	Inner sealing ring	Sensing valve
SPC 160 NBR-55 G1/2-IG (TV)	10.01.01.01190	10.01.01.11371	10.05.10.00061
SPC 210 NBR-55 G1/2-IG (TV)	10.01.01.01191	10.01.01.11371	10.05.10.00061
SPC 250 NBR-55 G1/2-IG (TV)	10.01.01.01192	10.01.01.11371	10.05.10.00038

Technical Data Suction Plates SPC

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Recommended internal hose diameter d [mm]***
SPC 160 NBR-55 G1/2-IG	975	475	156	12
SPC 160 NBR-55 G1/2-IG TV	975	475	156	9
SPC 210 NBR-55 G1/2-IG	1760	1125	193	12
SPC 210 NBR-55 G1/2-IG TV	1760	1125	193	9
SPC 250 NBR-55 G1/2-IG	2540	1815	388	12
SPC 250 NBR-55 G1/2-IG TV	2540	1815	388	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**Suction force referred to the sealing-edge diameter d2

***The recommended hose diameter refers to a hose length of approx. 2 m

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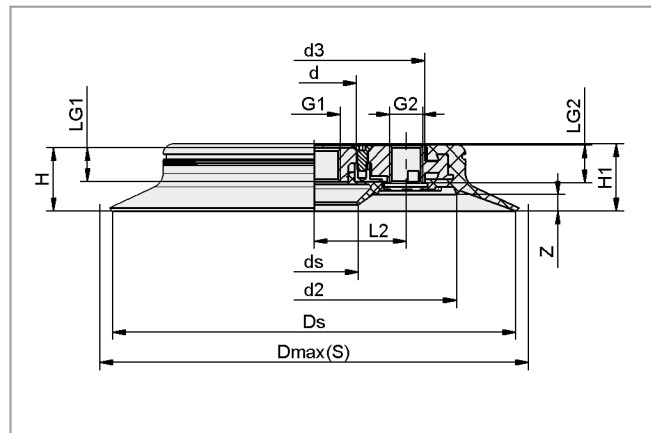
Suction Cups for Handling Wood



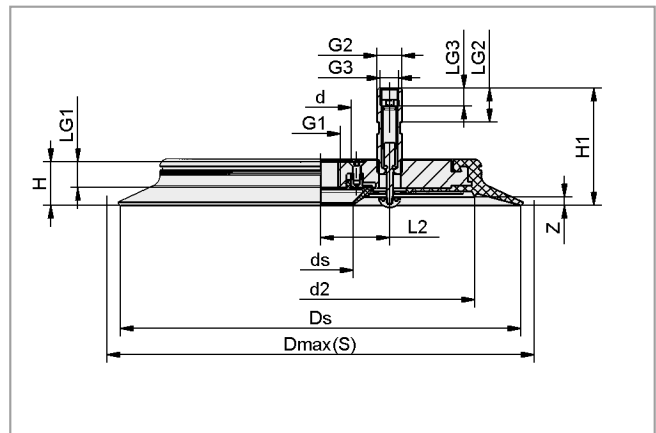
Suction Plates SPC

Suction area (\emptyset) from 160 mm to 250 mm

Design Data Suction Plates SPC



SPC 160 to 250



SPC 160 to 250 TV

Type	Dimensions in mm*									
	d	d2	d3	ds	Dmax(S)**	Ds	G1	G2		
SPC 160 NBR-55 G1/2-IG	34	113	88.0	33.5	162.5	160	G1/2"-F	G1/4"-F		
SPC 160 NBR-55 G1/2-IG TV	34	113	-	33.5	162.5	160	G1/2"-F	G1/4"-M		
SPC 210 NBR-55 G1/2-IG	34	163	138.0	33.5	215.0	210	G1/2"-F	G1/4"-F		
SPC 210 NBR-55 G1/2-IG TV	34	163	-	33.5	215.0	210	G1/2"-F	G1/4"-M		
SPC 250 NBR-55 G1/2-IG	34	203	178.0	33.5	252.5	250	G1/2"-F	G1/2"-F		
SPC 250 NBR-55 G1/2-IG TV	34	203	-	33.5	252.5	250	G1/2"-F	G1/2"-M		

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Type	Dimensions in mm*							
	G3	H	H1	L2	LG1	LG2	LG3	Z (Stroke)
SPC 160 NBR-55 G1/2-IG	-	25	26.5	36.5	13.5	15	-	7
SPC 160 NBR-55 G1/2-IG TV	G1/8"-F	25	62.0	36.5	13.5	18	6	7
SPC 210 NBR-55 G1/2-IG	-	23	24.5	36.5	13.5	15	-	5
SPC 210 NBR-55 G1/2-IG TV	G1/8"-F	23	62.0	36.5	13.5	18	10	5
SPC 250 NBR-55 G1/2-IG	-	25	26.5	76.0	13.5	15	-	7
SPC 250 NBR-55 G1/2-IG TV	G1/8"-F	25	67.0	76.0	13.5	16	12	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging



Flat Suction Cups SPF

Suction area (Ø) from 10 to 60 mm



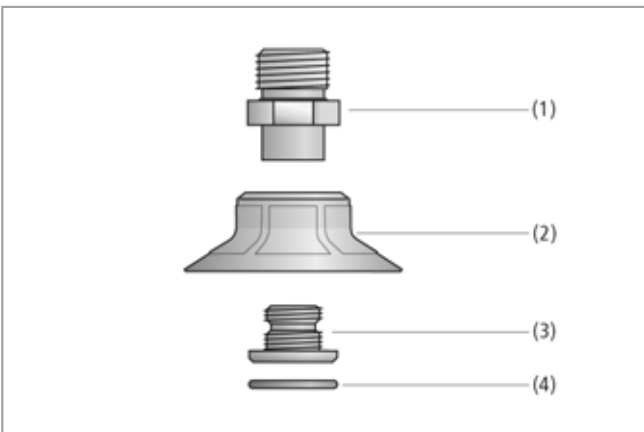
Suitable for Industry Specific Applications



Flat suction cups SPF

Applications

- Round, flat suction cup for usage in cardboard box and tray erectors
- Handling of cardboard and rigid packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction cups with excellent sealing and low wear



System design flat suction cups SPF

Design

- Round flat suction cup SPF (2) with soft, flexible sealing lip and supporting studs on the suction surface
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element for quick change of suction cup
- Starting at 40 mm diameter with a 2-piece connection element: consisting of machine-side component (1) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter (filter pore size 250 µm)
- All connection elements with male thread are equipped with integrated sealing



Flat suction cups SPF being used in packaging machines

Our Highlights...

- Flexible, adaptable sealing lip
- Robust, reinforced main body
- Supporting studs on the suction surface
- Wear-proof and abrasion-proof material Elastodur ED-65

Your Benefits...

- > Excellent sealing when used on cardboard and rigid packaging
- > High intrinsic stability of the suction cup
- > Maximum effective diameter for high suction force
- > Very low wear, approx. 3 times higher compared to NBR

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Flat Suction Cups SPF

Suction area (Ø) from 10 to 60 mm

Designation Code Flat Suction Cups SPF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Type connection element
Example SPF-20 ED-65 SC040:			
SPF	20	ED-65	SC040
SPF	10 to 60	ED-65	SC030 SC040 SC050

Ordering Data Flat Suction Cups SPF

Suction cup SPF (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPF (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen

Flat Suction Cups SPF (Mounted)

Type*	Part Number
SPF 10 ED-65 M5-IG	10.01.01.13254
SPF 15 ED-65 G1/8-AG	10.01.01.13238
SPF 15 ED-65 G1/8-IG	10.01.01.13239
SPF 20 ED-65 G1/8-AG	10.01.01.13240
SPF 20 ED-65 G1/8-IG	10.01.01.13241
SPF 25 ED-65 G1/8-AG	10.01.01.13242
SPF 25 ED-65 G1/8-IG	10.01.01.13243
SPF 30 ED-65 G1/8-AG	10.01.01.13244
SPF 30 ED-65 G1/8-IG	10.01.01.13245
SPF 40 ED-65 G1/4-AG	10.01.01.13246
SPF 40 ED-65 G1/4-IG	10.01.01.13247
SPF 50 ED-65 G1/4-AG	10.01.01.13248
SPF 50 ED-65 G1/4-IG	10.01.01.13249
SPF 60 ED-65 G1/4-AG	10.01.01.13250
SPF 60 ED-65 G1/4-IG	10.01.01.13251

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 1: Flat Suction Cups SPF

Type*	Part Number
SPF 10 ED-65 SC030	10.01.01.12894
SPF 15 ED-65 SC040	10.01.01.12895
SPF 20 ED-65 SC040	10.01.01.12370
SPF 25 ED-65 SC040	10.01.01.12371
SPF 30 ED-65 SC040	10.01.01.12372
SPF 40 ED-65 SC050	10.01.01.12373
SPF 50 ED-65 SC050	10.01.01.12374
SPF 60 ED-65 SC050	10.01.01.12896

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Flat Suction Cups SPF

Suction area (Ø) from 10 to 60 mm

Step 2: Connection Elements Flat Suction Cups SPF

Type	SPF 10	SPF 15	SPF 20	SPF 25	SPF 30	SPF 40	SPF 50	SPF 60
SC 030 M5-AG	10.01.06.02802	-	-	-	-	-	-	-
SC 040 G1/8-AG	-	10.01.06.02490	10.01.06.02490	10.01.06.02490	10.01.06.02490	-	-	-
SC 040 G1/8-IG	-	10.01.06.02482	10.01.06.02482	10.01.06.02482	10.01.06.02482	-	-	-
SC 050 G1/4-AG	-	-	-	-	-	10.01.06.02487	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	-	-	-	-	10.01.06.02488	10.01.06.02488	10.01.06.02488

Accessories Flat Suction Cups SPF

Type	Filter screen
SPF 10 ED-65 SC030	-
SPF 15 ED-65 SC040	-
SPF 20 ED-65 SC040	10.07.01.00309
SPF 25 ED-65 SC040	10.07.01.00309
SPF 30 ED-65 SC040	10.07.01.00309
SPF 40 ED-65 SC050	10.07.01.00308
SPF 50 ED-65 SC050	10.07.01.00308
SPF 60 ED-65 SC050	10.07.01.00308

Technical Data Flat Suction Cups SPF

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element
SPF 10 ED-65 SC030	4.4	5.2	3.5	0.3	8	4	SC 030
SPF 15 ED-65 SC040	9.8	11.0	7.9	0.8	13	4	SC 040
SPF 20 ED-65 SC040	16.0	19.2	10.5	1.1	25	4	SC 040
SPF 25 ED-65 SC040	22.7	27.1	17.0	1.7	40	4	SC 040
SPF 30 ED-65 SC040	29.5	35.3	22.5	2.5	45	6	SC 040
SPF 40 ED-65 SC050	49.5	62.5	25.0	5.1	75	6	SC 050
SPF 50 ED-65 SC050	74.2	87.4	44.0	8.0	100	6	SC 050
SPF 60 ED-65 SC050	107.0	135.0	65.0	12.7	75	6	SC 050

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

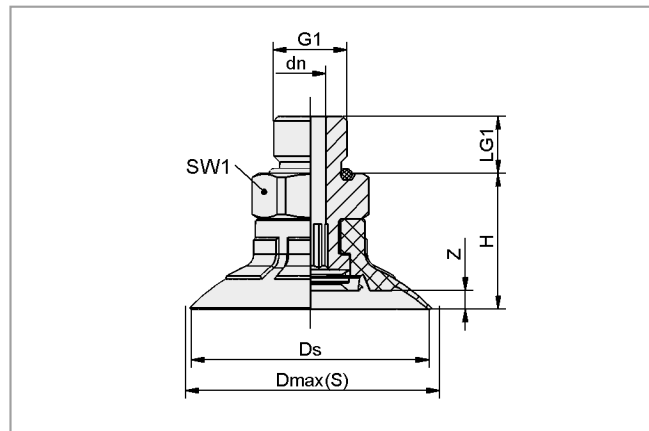
Suction Cups for Packaging



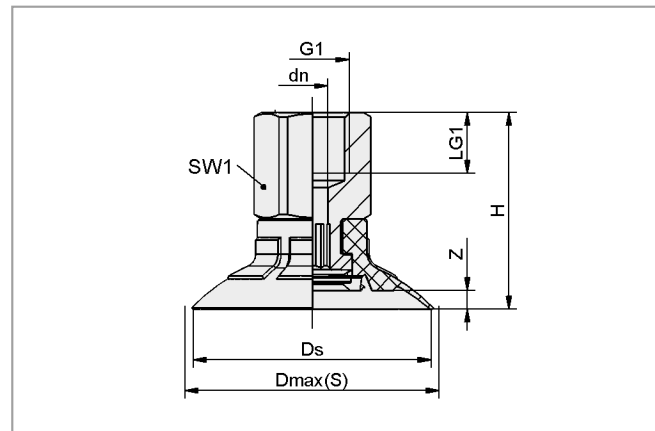
Flat Suction Cups SPF

Suction area (\emptyset) from 10 to 60 mm

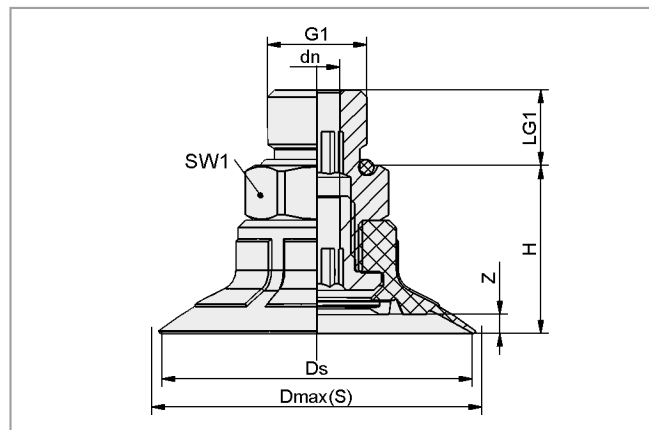
Design Data Flat Suction Cups SPF



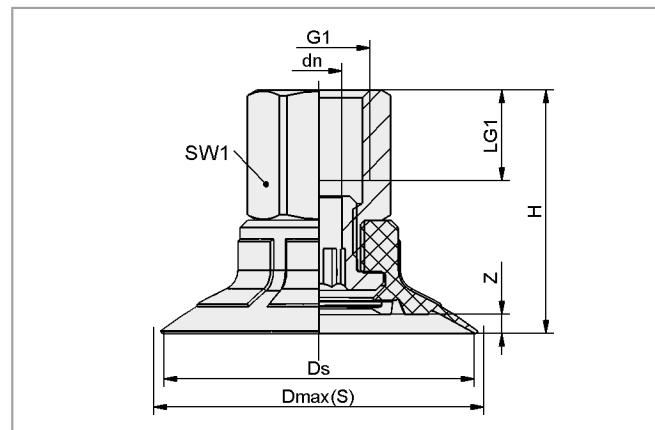
SPF 10...30 AG



SPF 10...30 IG



SPF 40...60 AG



SPF 40...60 IG

Type	Dimensions in mm*								
	dn	Ds	Dmax(S)**	G1	H	LG1	SW1	Z (Stroke)	
SPF 10 ED-65 M5-IG	3.1	10.5	12.0	M5-F	19	5.5	8	1.0	
SPF 15 ED-65 G1/8-AG	4.1	16.4	18.5	G1/8"-M	16	7.5	14	1.5	
SPF 15 ED-65 G1/8-IG	4.1	16.4	18.5	G1/8"-F	24	8.0	14	1.5	
SPF 20 ED-65 G1/8-AG	4.1	21.4	23.3	G1/8"-M	17	7.5	14	2.0	
SPF 20 ED-65 G1/8-IG	4.1	21.4	23.3	G1/8"-F	25	8.0	14	2.0	
SPF 25 ED-65 G1/8-AG	4.1	26.4	28.0	G1/8"-M	17	7.5	14	2.0	
SPF 25 ED-65 G1/8-IG	4.1	26.4	28.0	G1/8"-F	25	8.0	14	2.0	
SPF 30 ED-65 G1/8-AG	4.1	31.4	33.6	G1/8"-M	18	7.5	14	2.5	
SPF 30 ED-65 G1/8-IG	4.1	31.4	33.6	G1/8"-F	26	8.0	14	2.5	
SPF 40 ED-65 G1/4-AG	6.1	41.4	43.7	G1/4"-M	22	10.0	17	2.5	
SPF 40 ED-65 G1/4-IG	6.1	41.4	43.7	G1/4"-F	32	12.0	17	2.5	
SPF 50 ED-65 G1/4-AG	6.1	51.4	53.9	G1/4"-M	23	10.0	17	3.5	
SPF 50 ED-65 G1/4-IG	6.1	51.4	53.9	G1/4"-F	33	12.0	17	3.5	
SPF 60 ED-65 G1/4-AG	6.1	61.2	65.0	G1/4"-M	25	10.0	17	5.1	
SPF 60 ED-65 G1/4-IG	6.1	61.2	65.0	G1/4"-F	35	12.0	17	5.1	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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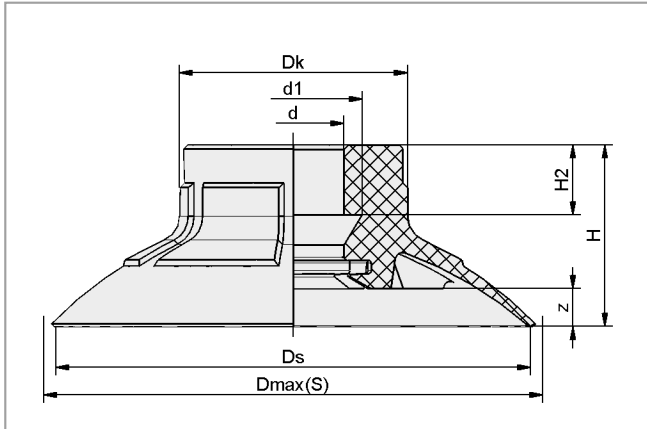


Flat Suction Cups SPF

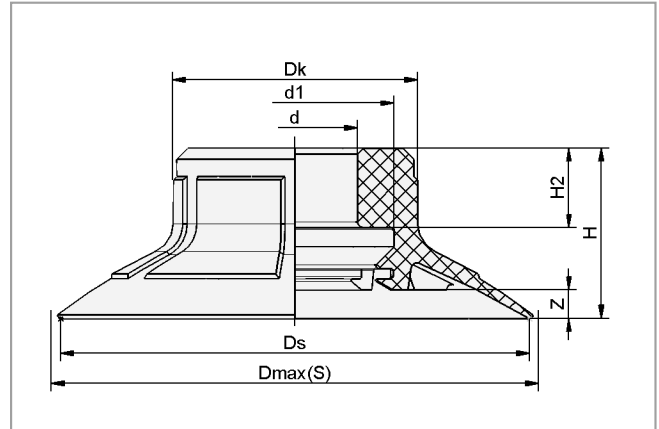
Suction area (\emptyset) from 10 to 60 mm



Design Data Flat Suction Cups SPF



SPF 10...30



SPF 40...60

Type	Dimensions in mm*								
	d	d1	Dk	Ds	Dmax(S)**	H	H2	Z (Stroke)	
SPF 10 ED-65 SC030	5.5	7.2	9.6	10.5	12.0	9	4.2	1.0	
SPF 15 ED-65 SC040	7.5	10.4	13.0	16.4	18.5	10	4.6	1.5	
SPF 20 ED-65 SC040	7.5	10.5	15.1	21.4	23.3	11	4.6	2.0	
SPF 25 ED-65 SC040	7.5	10.5	15.1	26.4	28.0	11	4.6	2.0	
SPF 30 ED-65 SC040	7.5	10.5	15.1	31.4	33.6	12	4.6	2.5	
SPF 40 ED-65 SC050	11.0	17.5	21.6	41.4	43.7	15	7.0	2.5	
SPF 50 ED-65 SC050	11.0	17.5	21.6	51.4	53.9	16	7.0	3.5	
SPF 60 ED-65 SC050	10.5	17.5	22.1	61.2	65.0	18	7.5	5.1	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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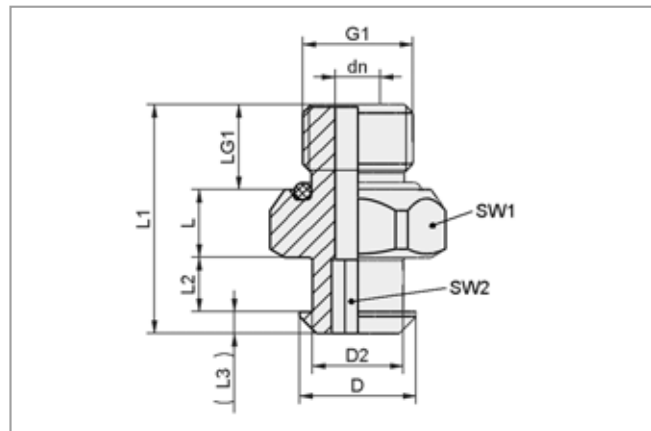
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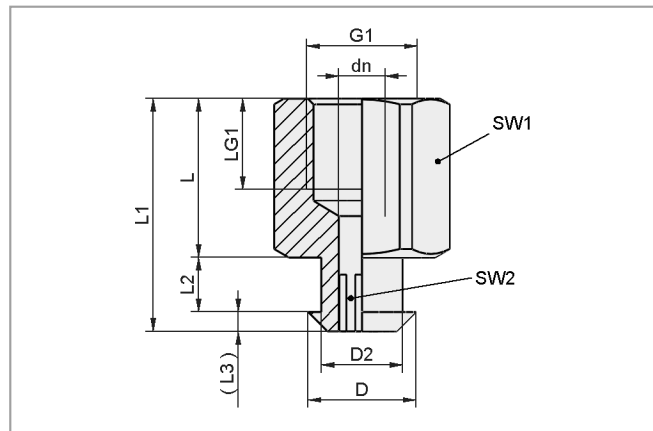
Flat Suction Cups SPF

Suction area (\emptyset) from 10 to 60 mm

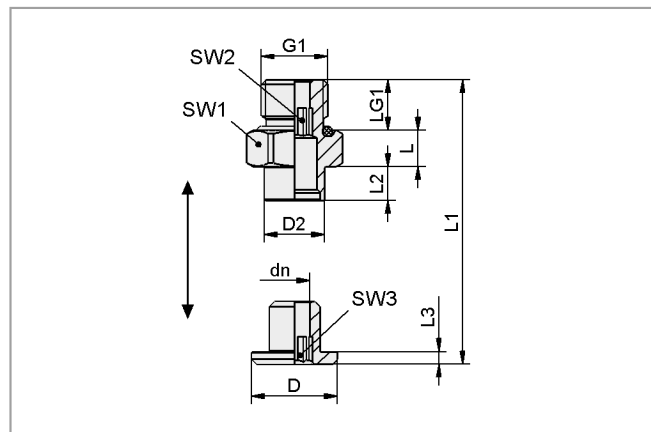
Design Data Connection Elements Flat Suction Cups SPF



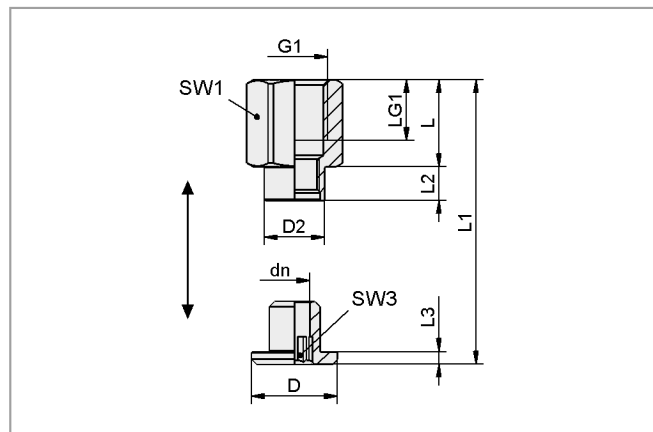
SC 030/040 G1/8-AG



SC 040 G1/8-IG



SC 050 G1/4-AG



SC 050 G1/4-IG

Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 030 M5-AG	7.2	6	2	M5-M	5.0	15.5	4.3	1.5	4.7	8	3	-
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	20.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6

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Bellows Suction Cups SPB1 (1.5 Folds)

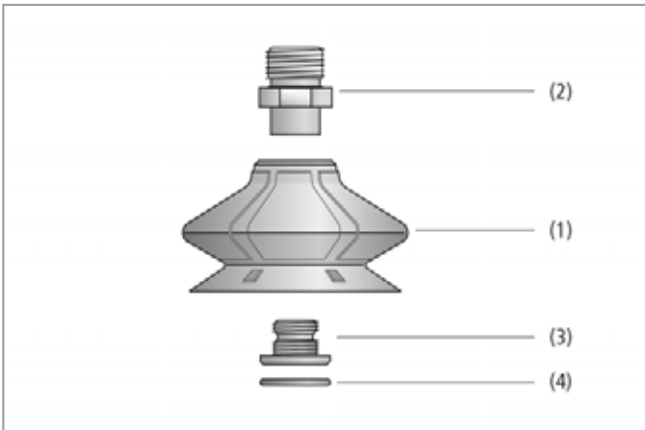
Suction area (Ø) from 10 mm to 80 mm



Suitable for Industry Specific Applications



Bellows suction cups SPB1 (1.5 folds)



System design bellows suction cups SPB1 (1.5 folds)

Applications

- Round, bellows suction cup with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction cups with excellent sealing and low wear

Design

- Round, bellows suction cup SPB1 (1) with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element
- Starting at 40 mm diameter with a two-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter
- All connection elements with male thread are equipped with integrated sealing

Our Highlights...

- Flexible, adaptable sealing lip
- Robust, reinforced main body
- Interlocking of sealing-lip and fold due to locking elements
- Large effective suction surface
- Wear-proof and abrasion-proof material Elastodur ED-65

Your Benefits...

- > Excellent sealing performance on cardboard and rigid packaging
- > High intrinsic stability in dynamic processes
- > Form-locking connection to avoid sliding of the suction cup
- > High suction force but small dimensions of the suction cup
- > Very low wear; approx. 3x the service life of NBR



Bellows suction cups SPB1 being used for handling of cardboard

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Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Designation Code Bellows Suction Cups SPB1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB1-30 ED-65 G1/8-AG:			
SPB1	30	ED-65	G1/8-AG
SPB1	10 to 80	ED-65	M5-AG (AG = (male (M))) M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Bellows Suction Cups SPB1 (1.5 Folds)

Suction cup SPB1 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, suction cup insert

Bellows Suction Cups SPB1 (1.5 Folds) (Mounted)

Type*	Part Number
SPB1 10 ED-65 M5-AG	10.01.06.03489
SPB1 10 ED-65 M5-IG	10.01.06.03568
SPB1 15 ED-65 G1/8-AG	10.01.06.03490
SPB1 15 ED-65 G1/8-IG	10.01.06.03491
SPB1 20 ED-65 G1/8-AG	10.01.06.03492
SPB1 20 ED-65 G1/8-IG	10.01.06.03493
SPB1 25 ED-65 G1/8-AG	10.01.06.03494
SPB1 25 ED-65 G1/8-IG	10.01.06.03495
SPB1 30 ED-65 G1/8-AG	10.01.06.03496
SPB1 30 ED-65 G1/8-IG	10.01.06.03497
SPB1 40 ED-65 G1/4-AG	10.01.06.03498
SPB1 40 ED-65 G1/4-IG	10.01.06.03499
SPB1 50 ED-65 G1/4-AG	10.01.06.03500
SPB1 50 ED-65 G1/4-IG	10.01.06.03501
SPB1 60 ED-65 G1/4-AG	10.01.06.03502
SPB1 60 ED-65 G1/4-IG	10.01.06.03503
SPB1 80 ED-65 G1/4-AG	10.01.06.03504
SPB1 80 ED-65 G1/4-IG	10.01.06.03505

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 80 mm

Step 1: Bellows Suction Cups SPB1 (1.5 Folds) (Single Component)

Type*	Part Number
SPB1 10 ED-65 SC030	10.01.06.02782
SPB1 15 ED-65 SC040	10.01.06.02783
SPB1 20 ED-65 SC040	10.01.06.02452
SPB1 25 ED-65 SC040	10.01.06.02453
SPB1 30 ED-65 SC040	10.01.06.02454
SPB1 40 ED-65 SC050	10.01.06.02455
SPB1 50 ED-65 SC050	10.01.06.02456
SPB1 60 ED-65 SC050	10.01.06.02457
SPB1 80 ED-65 SC065	10.01.06.03071

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Connection elements Bellows Suction Cups SPB1 (1.5 Folds) (Single Component)

Type	SPB1 10	SPB1 15	SPB1 20	SPB1 25	SPB1 30
SC 030 M5-AG	10.01.06.02802	-	-	-	-
SC 040 G1/8-AG	-	10.01.06.02490	10.01.06.02490	10.01.06.02490	-
SC 040 G1/8-IG	-	10.01.06.02482	10.01.06.02482	10.01.06.02482	-

Type	SPB1 40	SPB1 50	SPB1 60	SPB1 80
SC 050 G1/4-AG	10.01.06.02487	10.01.06.02487	10.01.06.02487	-
SC 050 G1/4-IG	10.01.06.02488	10.01.06.02488	10.01.06.02488	-
SC 065 G1/4-AG L	-	-	-	10.01.06.03193
SC 065 G1/4-IG L	-	-	-	10.01.06.03194

Ordering Data Accessories Bellows Suction Cups SPB1 (1.5 Folds)

Type	Filter screen	Suction cup insert
SPB1 10 ED-65 SC030	-	10.01.06.02802
SPB1 15 ED-65 SC040	-	10.01.06.02490
SPB1 20 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 25 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 30 ED-65 SC040	10.07.01.00309	10.01.06.02490
SPB1 40 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 50 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 60 ED-65 SC050	10.07.01.00308	10.01.06.02487
SPB1 80 ED-65 SC065	10.07.01.00364	10.01.06.03194

Technical Data Bellows Suction Cups SPB1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter [mm]**	Type Connection element
SPB1 10 ED-65 SC030	1.5	4.0	2.0	0.5	5	4	SC 030
SPB1 15 ED-65 SC040	4.3	9.0	5.0	1.5	8	4	SC 040
SPB1 20 ED-65 SC040	9.9	16.2	9.8	3.1	20	4	SC 040
SPB1 25 ED-65 SC040	14.9	23.4	13.0	5.3	20	4	SC 040
SPB1 30 ED-65 SC040	20.7	30.6	15.5	8.0	35	6	SC 040
SPB1 40 ED-65 SC050	35.9	46.8	24.8	18.3	70	6	SC 050
SPB1 50 ED-65 SC050	54.7	72.7	31.2	30.2	100	6	SC 050
SPB1 60 ED-65 SC050	78.0	100.9	49.4	49.2	200	6	SC 050
SPB1 80 ED-65 SC065	166.0	200.0	59.0	98.4	100	6	SC 065

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

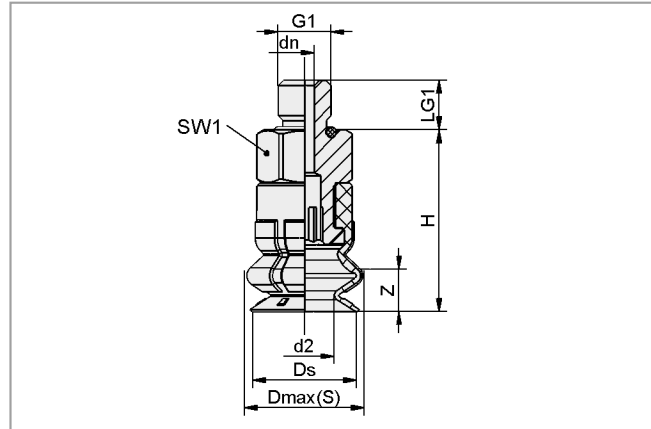
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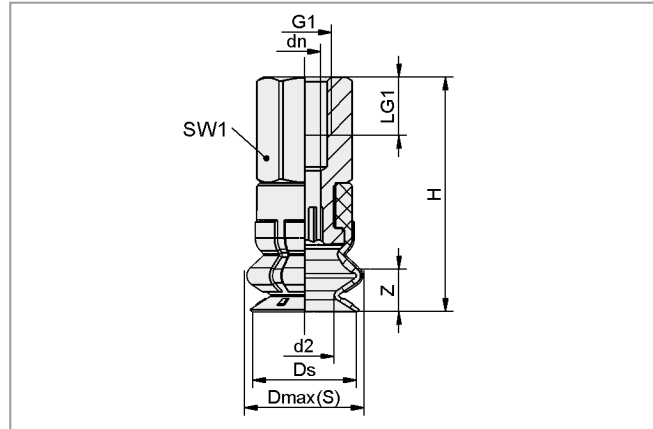
Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (\emptyset) from 10 mm to 80 mm

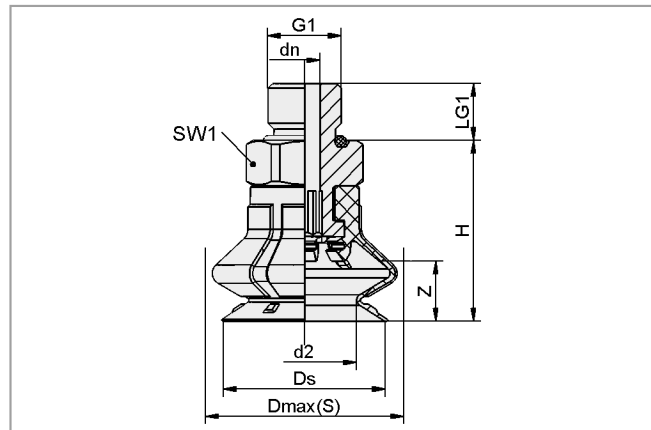
Design Data Bellows Suction Cups SPB1 (1.5 Folds)



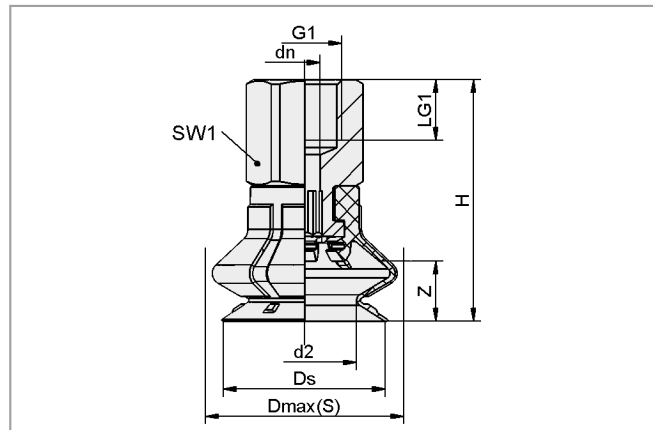
SPB1 10...15 AG



SPB1 10...15 IG



SPB1 20...80 AG



SPB1 20...80 IG

Type	Dimensions in mm*								Z (Stroke)
	dn	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	
SPB1 10 ED-65 M5-AG	1.8	5.6	11.3	9.8	M5-M	17	4.7	8	4
SPB1 10 ED-65 M5-IG	3.1	5.6	11.3	9.8	M5-F	22	5.5	8	4
SPB1 15 ED-65 G1/8-AG	4.1	9.5	19.7	15.4	G1/8"-M	21	7.5	14	6
SPB1 15 ED-65 G1/8-IG	4.1	9.5	19.7	15.4	G1/8"-F	29	8.0	14	6
SPB1 20 ED-65 G1/8-AG	4.1	13.8	26.3	21.4	G1/8"-M	24	7.5	14	8
SPB1 20 ED-65 G1/8-IG	4.1	13.8	26.3	21.4	G1/8"-F	32	8.0	14	8
SPB1 25 ED-65 G1/8-AG	4.1	16.9	31.3	26.4	G1/8"-M	27	7.5	14	11
SPB1 25 ED-65 G1/8-IG	4.1	16.9	31.3	26.4	G1/8"-F	35	8.0	14	11
SPB1 30 ED-65 G1/8-AG	4.1	20.0	36.7	31.4	G1/8"-M	29	7.5	14	13
SPB1 30 ED-65 G1/8-IG	4.1	20.0	36.7	31.4	G1/8"-F	37	8.0	14	13
SPB1 40 ED-65 G1/4-AG	6.1	26.1	48.0	41.4	G1/4"-M	37	10.0	17	16
SPB1 40 ED-65 G1/4-IG	6.1	26.1	48.0	41.4	G1/4"-F	47	12.0	17	16
SPB1 50 ED-65 G1/4-AG	6.1	32.3	58.4	51.4	G1/4"-M	39	10.0	17	18
SPB1 50 ED-65 G1/4-IG	6.1	32.3	58.4	51.4	G1/4"-F	49	12.0	17	18
SPB1 60 ED-65 G1/4-AG	6.1	38.6	69.6	61.4	G1/4"-M	43	10.0	17	22
SPB1 60 ED-65 G1/4-IG	6.1	38.6	69.6	61.4	G1/4"-F	53	12.0	17	22
SPB1 80 ED-65 G1/4-AG	6.1	56.0	88.0	81.4	G1/4"-M	54	10.0	22	27
SPB1 80 ED-65 G1/4-IG	6.1	56.0	88.0	81.4	G1/4"-F	54	12.0	22	27

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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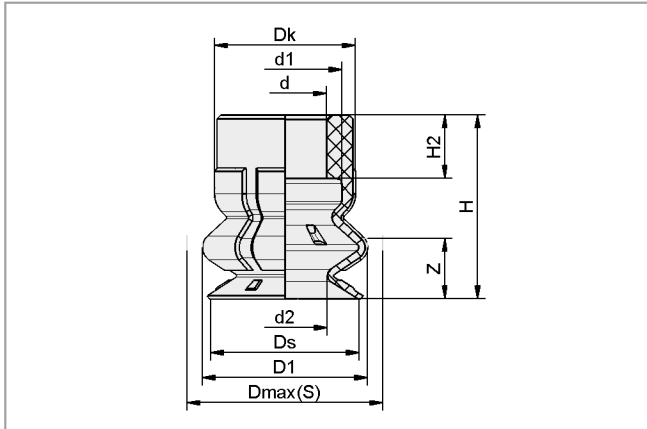


Bellows Suction Cups SPB1 (1.5 Folds)

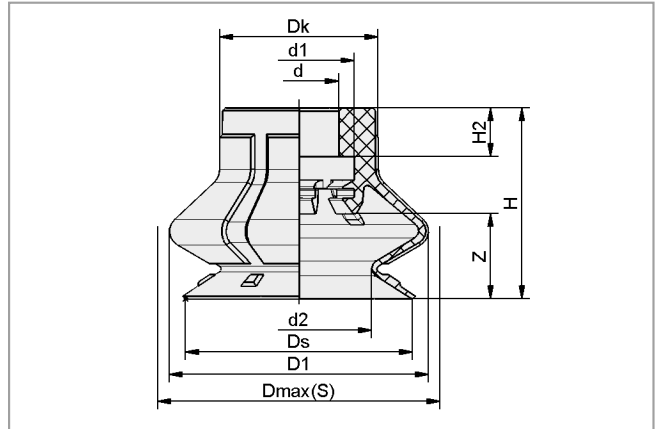
Suction area (\emptyset) from 10 mm to 80 mm



Design Data Bellows Suction Cups SPB1 (1.5 Folds)



SPB1-10...15



SPB1 20...80

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)	
SPB1 10 ED-65 SC030	5.5	7.5	5.6	11.0	9.4	11.3	9.8	12	4.2	4	
SPB1 15 ED-65 SC040	7.5	10.5	9.5	18.4	15.1	19.7	15.4	15	4.6	6	
SPB1 20 ED-65 SC040	7.5	10.5	13.8	24.6	15.1	26.3	21.4	18	4.6	8	
SPB1 25 ED-65 SC040	7.5	10.5	16.9	29.0	15.1	31.3	26.4	21	4.6	11	
SPB1 30 ED-65 SC040	7.5	10.5	20.0	34.2	15.1	36.7	31.4	23	4.6	13	
SPB1 40 ED-65 SC050	11.0	17.5	26.1	44.6	21.6	48.0	41.4	30	7.0	16	
SPB1 50 ED-65 SC050	11.0	17.5	32.3	55.2	21.6	58.4	51.4	32	7.0	18	
SPB1 60 ED-65 SC050	11.0	17.5	38.6	65.7	21.6	69.6	61.4	36	7.0	22	
SPB1 80 ED-65 SC065	14.0	29.3	56.0	82.7	27.1	88.0	81.4	46	15.3	24	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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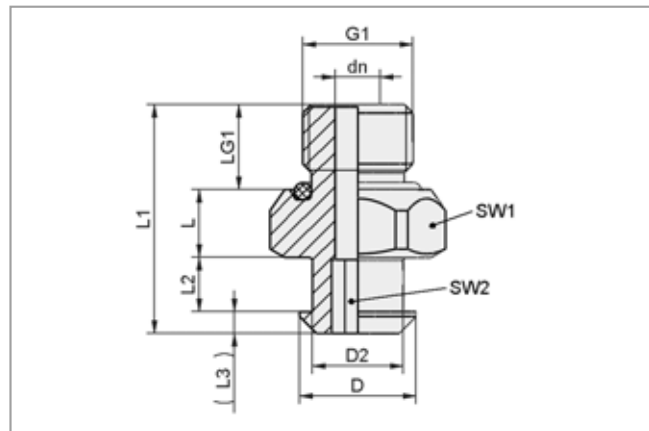
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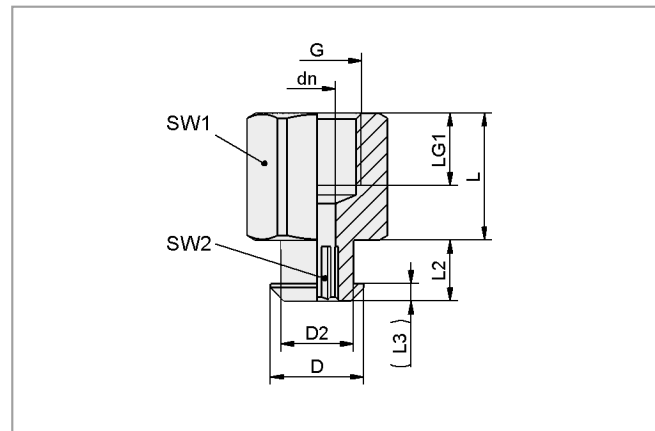
Bellows Suction Cups SPB1 (1.5 Folds)

Suction area (\emptyset) from 10 mm to 80 mm

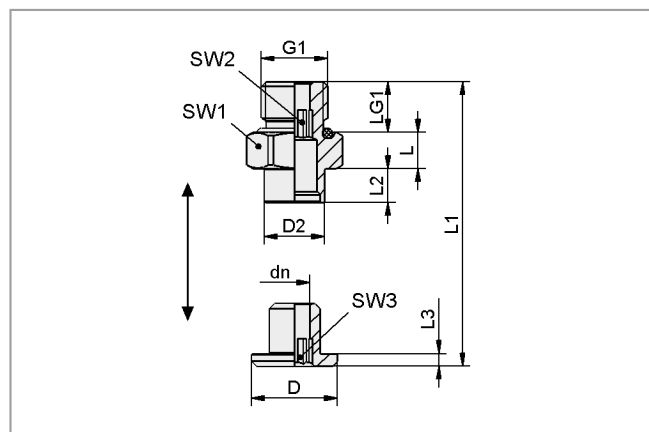
Design Data Connection Elements Bellows Suction Cups SPB1 (1.5 Folds)



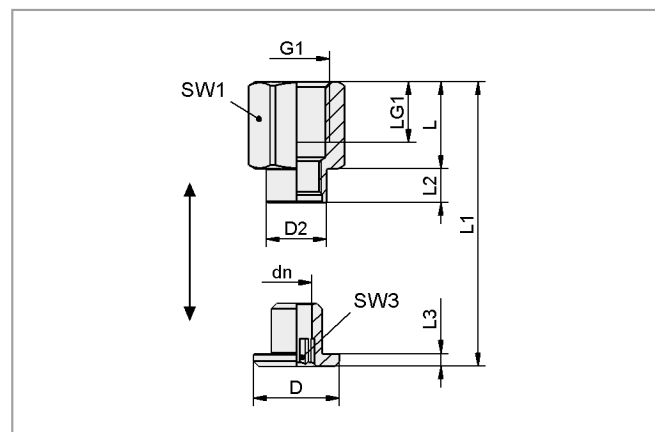
SC 030/040-AG



SC 040 G1/8-IG



SC 050/065 G1/4-AG



SC 050/065 G1/4-IG

Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 030 M5-AG	7.2	6	2	M5-M	5.0	15.5	4.3	1.5	4.7	8	3	-
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	20.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6
SC 065 G1/4-AG L	29.0	15	6	G1/4"-M	8.0	36.1	15.1	3.0	10.0	22	6	6
SC 065 G1/4-IG L	29.0	15	6	G1/4"-F	18.0	36.1	15.1	3.0	12.0	22	-	6

Suction Cups for Packaging



Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

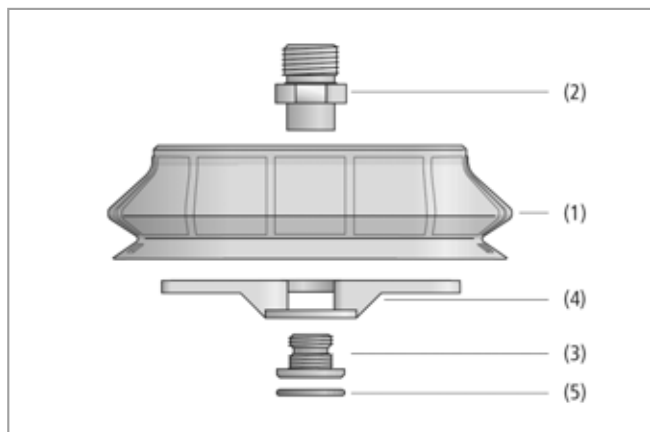
Suction area (LxW) from 60x20 mm to 100x40 mm



Suitable for Industry Specific Applications



Bellows suction cups SPOB1 (oval, 1.5 folds)



System design bellows suction cups SPOB1 (oval, 1.5 folds)

Applications

- Oval, bellows suction cup with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid or flexible packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction cups with excellent sealing and low wear

Design

- Oval, bellows suction cup SPOB1 with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65 with a long service life
- All sizes come with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Size 100 mm x 40 mm with additional suction cup insert (4); included in scope of delivery reusable connection elements
- Clip-in filter screen (5) as pre-filter (filter pore size 250 µm)



Bellows suction cups SPOB1 being used for handling of cardboard

Our Highlights...

- Oval shape
- Suction cup features robust, reinforced main body
- "Interlocking" of sealing-lip and fold due to locking elements
- Made from wear-proof and abrasion-proof material Elastodur ED-65

Your Benefits...

- > Ideal for all oblong workpieces
- > High intrinsic stability of the suction cup in dynamic processes
- > Form-locking connection to avoid sliding of the suction cup
- > Very low wear; approx. 3x the service life of NBR

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Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Designation Code Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPOB1 60x20 ED-65 G1/8-AG:			
SPOB1	60x20	ED-65	G1/8-AG
SPOB1	60x20	ED-65	G1/4-AG (AG = male (M))
	100x40		G1/4-IG (IG = female (F))
			G1/8-AG
			G1/8-IG

Ordering Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction cup SPOB1 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPOB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads, includes stabilization plate for model size 100 x 400 mm

Available accessories: filter screen

Bellows Suction Cups SPOB1 (Oval, 1.5 Folds) (Mounted)

Type*	Part Number
SPOB1 60x20 ED-65 G1/8-AG	10.01.06.03510
SPOB1 60x20 ED-65 G1/8-IG	10.01.06.03511
SPOB1 100x40 ED-65 G1/4-AG	10.01.06.03512
SPOB1 100x40 ED-65 G1/4-IG	10.01.06.03513

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 1: Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type*	Part Number
SPOB1 60x20 ED-65 SC040	10.01.06.02462
SPOB1 100x40 ED-65 SC050	10.01.06.02461

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Ordering data Connection elements Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type	SPOB1 60x20	SPOB1 100x40
SC 04-AR G1/8-AG	10.01.06.02495	-
SC 040-AR G1/8-IG	10.01.06.02496	-
SC 050-AR G1/4-AG	-	10.01.06.02491
SC 050-AR G1/4-IG	-	10.01.06.02493

Ordering Data Accessories Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type	Filter screen
SPOB1 60x20 ED-65 SC040	10.07.01.00309
SPOB1 100x40 ED-65 SC050	10.07.01.00308

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Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

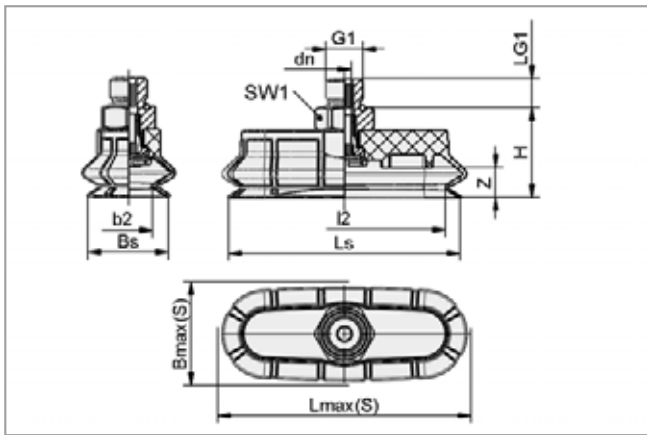
Technical Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Type Connection element
SPOB1 60x20 ED-65 SC040	32.5	39.8	32.2	11.0	25	6	SC 040
SPOB1 100x40 ED-65 SC050	111.2	131.4	76.9	60.1	50	6	SC 050

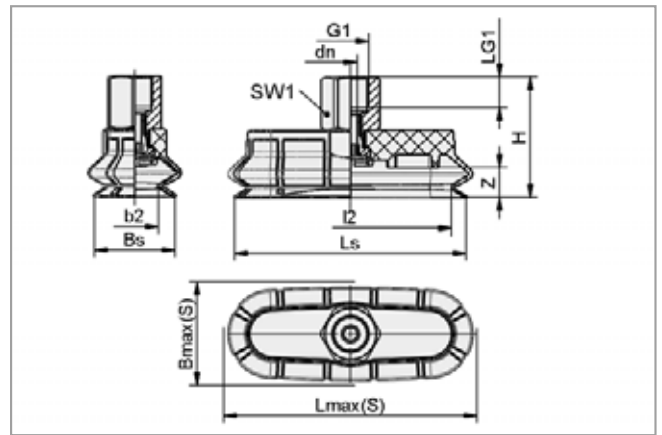
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)



SPOB1 AG



SPOB1 IG

Type	Dimensions in mm*												
	b2	Bmax(S)**	Bs	dn	G1	H	LG1	Lmax(S)**	Ls	L2	SW1	Z (Stroke)	
SPOB1 60x20 ED-65 G1/8-AG	12.8	27.5	21.4	3.6	G1/8"-M	18	7.5	67.0	61.4	53.5	14	8	
SPOB1 60x20 ED-65 G1/8-IG	12.8	27.5	21.4	3.6	G1/8"-F	18	8.0	67.0	61.4	53.5	14	8	
SPOB1 100x40 ED-65 G1/4-AG	25.9	52.0	41.4	6.1	G1/4"-M	30	10.0	113.0	104.4	88.9	17	16	
SPOB1 100x40 ED-65 G1/4-IG	25.9	52.0	41.4	6.1	G1/4"-F	30	12.0	113.0	104.4	88.9	17	16	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

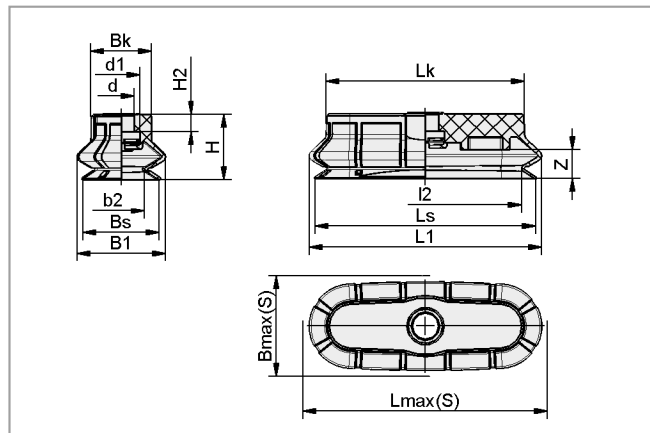
Suction Cups for Packaging



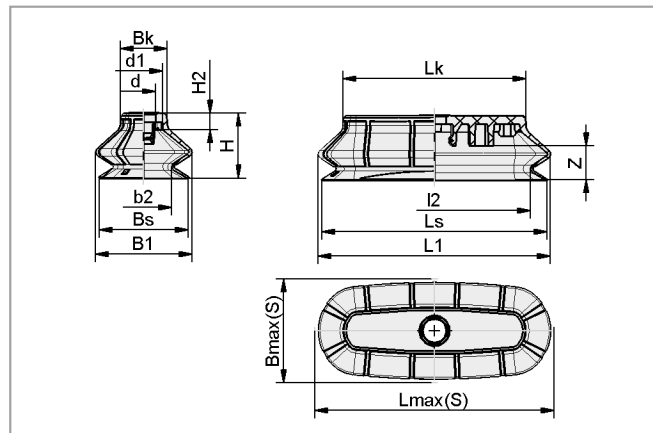
Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Design Data Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)



SPOB1 60x20



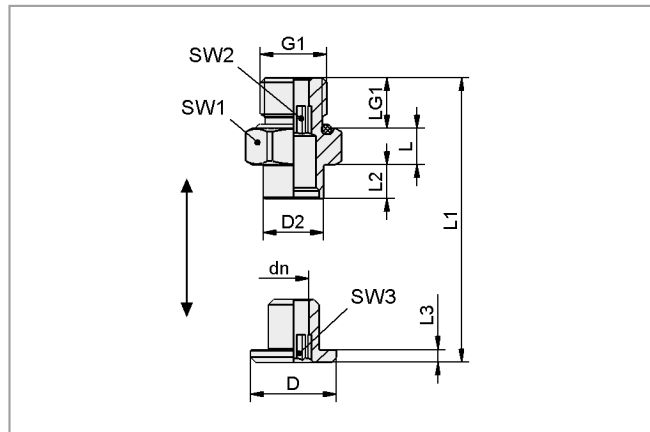
SPOB1 100x40

Type	Dimensions in mm*														Z (Stroke)
	b2	B1	Bk	Bmax(S)**	Bs	d	d1	H	H2	L2	L1	Lk	Lmax(S)**	Ls	
SPOB1 60x20 ED-65 SC040	12.8	24.6	16.8	27.5	21.4	7.3	10.5	18	4.8	53.4	64.6	55.1	67.0	61.4	8
SPOB1 100x40 ED-65 SC050	25.9	44.6	21.6	52.0	41.4	11.0	17.5	30	7.0	88.9	107.6	84.6	113.0	104.4	16

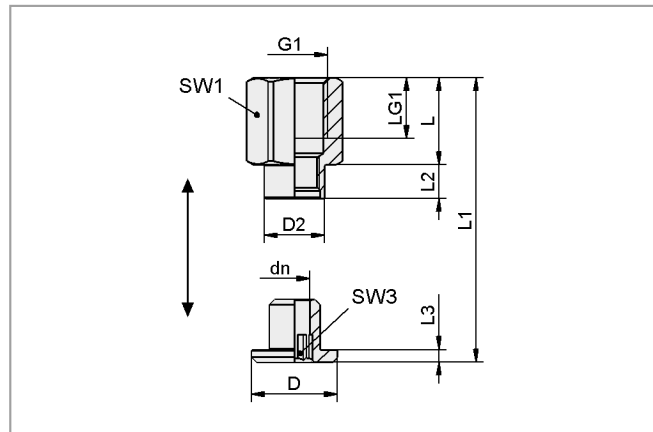
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Connection Elements Bellows Suction Cups SPOB1 (Oval, 1.5 Folds)



SC040/050-AG



SC040/050-IG

Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 040-AR G1/8-AG	10.3	8	4	G1/8"-M	6.0	20.3	4.8	2.0	7.5	14	4	4
SC 040-AR G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.8	4.8	2.0	8.0	14	-	4
SC 050-AR G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050-AR G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6

Suction Cups for Packaging



Bellows Suction Cups SPB2 (2.5 Folds)

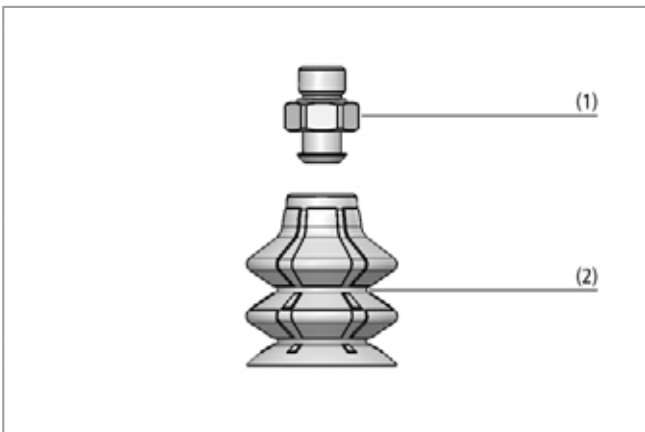
Suction area (Ø) from 20 mm to 50 mm



Suitable for Industry Specific Applications



Bellow suction cups SPB2 (2.5 folds)



System design bellows suction cups SPB2 (2.5 Folds)

Applications

- Round bellows suction cups with 2.5 folds for use in carton and tray erectors with high demands on suction cup stroke, dynamics and wear resistance
- Handling of non-rigid workpieces such as filled cardboard boxes for palletizing and depalletizing processes
- Applications which require high adaptability and high height compensation, such as taking cartons from a magazine in rotary erectors
- Handling of cardboard, inherently stable and flexible packaging in top-loading and side-loading machines

Design

- Round bellows suction cup SPB2 with 2.5 folds (2) and flexible sealing lip
- Diameter up to 30 mm with a one-piece plug-in connection element (1)
- From diameter 40 mm with two-piece connection element: consisting of machine-side component and suction cup-side component
- Available as mounted suction cup consisting of connection element and suction cup or as individual parts



Bellows Suction Cups SPB2 being used in side-loading machines

Our Highlights...

- High suction cup stroke
- Large inner fold diameters
- Flexible, adaptable sealing lip
- Locking elements between sealing lip and fold
- Wear and abrasion resistant material Elastodur ED-65

Your Benefits...

- > Good adaptability and height adjustment on curved surfaces
- > High volume flow rates and short cycle times
- > Good sealing on cardboard and rigid packaging
- > Gearing prevents shifting of the suction cup
- > Low wear, lifetime of ED-65 about 3 times longer than NBR

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Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Designation Code Bellows Suction Cups SPB2 (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB2 30 ED-65 G1/8-AG:			
SPB2	30	ED-65	G1/8-AG
SPB2	20 to 50	ED-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/8-AG G1/8-IG

Ordering Data Bellows Suction Cups SPB2 (2.5 Folds)

Suction cup SPB2 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB2 (step 1) - elastomer part, available in various diameters
- Connection element of type SC (step 2) - available with various threads

Bellows Suction Cups SPB2 (2.5 Folds) (Mounted)

Type	Connection G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F
SPB2 20 ED-65	-	-	10.01.06.03453	10.01.06.03454
SPB2 25 ED-65	-	-	10.01.06.03455	10.01.06.03456
SPB2 30 ED-65	-	-	10.01.06.03457	10.01.06.03458
SPB2 40 ED-65	10.01.06.03459	10.01.06.03460	-	-
SPB2 50 ED-65	10.01.06.03461	10.01.06.03462	-	-

Step 1: Bellows Suction Cups SPB2 (2.5 Folds) (Single Component)

Type	Part Number
SPB2 20 ED-65 SC040	10.01.06.03409
SPB2 25 ED-65 SC040	10.01.06.03410
SPB2 30 ED-65 SC040	10.01.06.03411
SPB2 40 ED-65 SC050	10.01.06.03412
SPB2 50 ED-65 SC050	10.01.06.03413

Step 2: Connection Elements Bellows Suction Cups SPB2 (2.5 Folds)

Type	SPB2 20	SPB2 25	SPB2 30	SPB2 40	SPB2 50
SC 040 G1/8-AG	10.01.06.02490	10.01.06.02490	10.01.06.02490	-	-
SC 040 G1/8-IG	10.01.06.02482	10.01.06.02482	10.01.06.02482	-	-
SC 050 G1/4-AG	-	-	-	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	-	-	10.01.06.02488	10.01.06.02488

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Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (\emptyset) from 20 mm to 50 mm

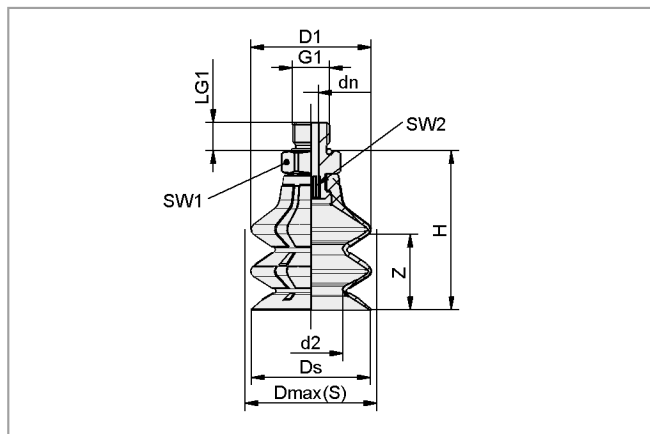
Technical Data Bellows Suction Cups SPB2 (2.5 Folds) (Single Component)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**	Type Connection element
SPB2 20 ED-65 SC040	6.8	15.7	8.4	4.2	20	4	SC 040
SPB2 25 ED-65 SC040	9.9	20.1	9.1	7.6	20	4	SC 040
SPB2 30 ED-65 SC040	14.4	28.4	12.8	12.4	30	6	SC 040
SPB2 40 ED-65 SC050	24.8	40.5	20.3	27.9	60	6	SC 050
SPB2 50 ED-65 SC050	34.6	61.8	28.5	51.8	75	6	SC 050

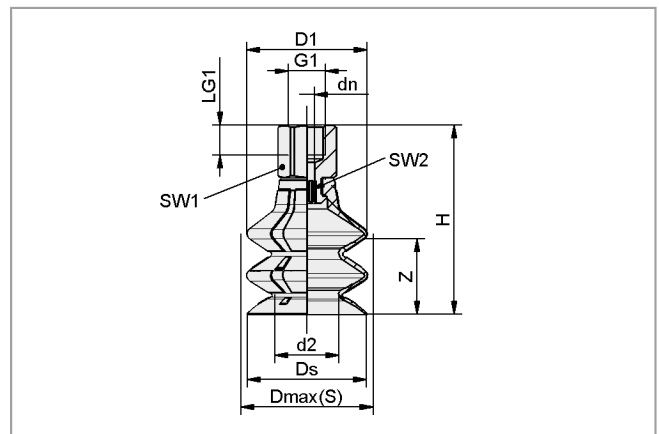
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Bellows Suction Cups SPB2 (2.5 Folds) (assembled)



SPB2...AG



SPB2...IG

Type	Dimensions in mm*										
	dn	d2	D1	Dmax(S)**	Ds	G1	H	LG1	SW1	SW2	Z (Stroke)
SPB2 20 ED-65 G1/8-AG	4.0	12.0	22.1	23.5	21.4	G1/8"-M	31	7.5	14	4	13
SPB2 20 ED-65 G1/8-IG	4.0	12.0	22.1	23.5	21.4	G1/8"-F	39	8.0	14	4	13
SPB2 25 ED-65 G1/8-AG	4.0	14.5	27.2	28.0	26.4	G1/8"-M	37	7.5	14	4	17
SPB2 25 ED-65 G1/8-IG	4.0	14.5	27.2	28.0	26.4	G1/8"-F	45	8.0	14	4	17
SPB2 30 ED-65 G1/8-AG	4.0	16.9	32.2	34.0	31.4	G1/8"-M	42	7.5	14	4	20
SPB2 30 ED-65 G1/8-IG	4.0	16.9	32.2	34.0	31.4	G1/8"-F	50	8.0	14	4	20
SPB2 40 ED-65 G1/4-AG	6.1	22.9	42.2	44.5	41.3	G1/4"-M	52	10.0	17	6	25
SPB2 40 ED-65 G1/4-IG	6.1	22.9	42.2	44.5	41.3	G1/4"-F	62	12.0	17	6	25
SPB2 50 ED-65 G1/4-AG	6.1	27.1	52.2	55.5	51.3	G1/4"-M	63	10.0	17	6	32
SPB2 50 ED-65 G1/4-IG	6.1	27.1	52.2	55.5	51.3	G1/4"-F	73	12.0	17	6	32

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging

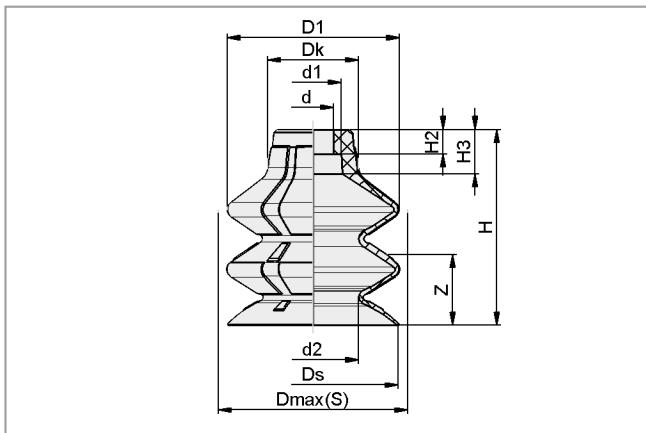


Bellows Suction Cups SPB2 (2.5 Folds)

Suction area (\emptyset) from 20 mm to 50 mm



Design Data Bellows Suction Cups SPB2 (2.5 Folds) (Single Component)



SPB2 ... ED-65

Type	Dimensions in mm*										
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)
SPB2 20 ED-65 SC040	7.5	10.5	12.0	22.2	15.0	23.5	21.4	25	4.6	7.0	13
SPB2 25 ED-65 SC040	7.5	10.5	14.5	27.2	15.5	28.0	26.4	31	4.6	7.8	17
SPB2 30 ED-65 SC040	7.5	10.5	16.9	32.2	16.8	34.0	31.4	36	4.6	7.9	20
SPB2 40 ED-65 SC050	11.0	17.3	22.9	42.2	22.5	44.5	41.3	45	7.0	9.9	25
SPB2 50 ED-65 SC050	11.0	17.3	27.1	52.2	23.5	55.5	51.3	56	7.0	11.6	32

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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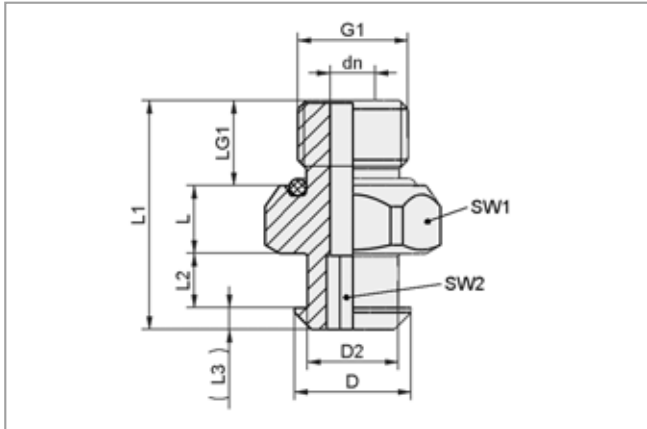


Bellows Suction Cups SPB2 (2.5 Folds)

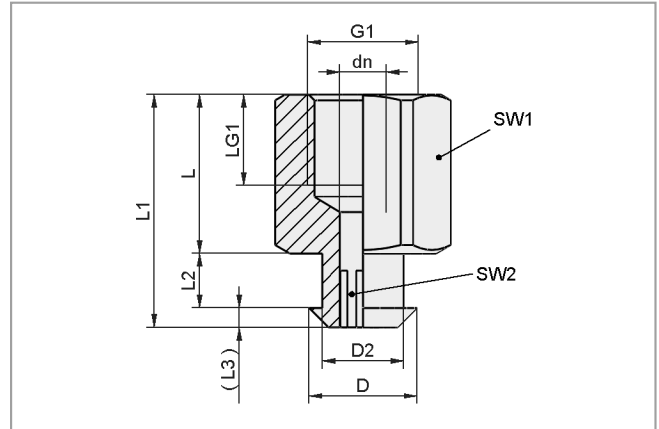
Suction area (\emptyset) from 20 mm to 50 mm



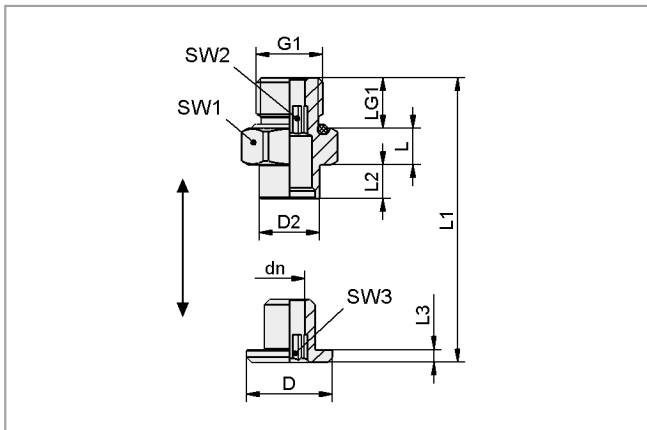
Design Data Connection Elements Bellows Suction Cups SPB2



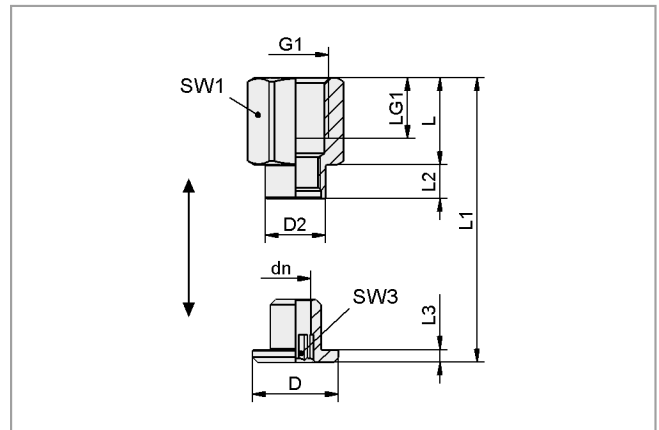
SC 030/040 G1/8-AG



SC 040 G1/8-IG



SC 050 G1/4-AG



SC 050 G1/4-IG

Type	Dimensions in mm											
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	20.2	4.8	1.9	7.5	14	4	-
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4	-
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6

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Bellows Suction Cups SPB2 P (2.5 Folds)

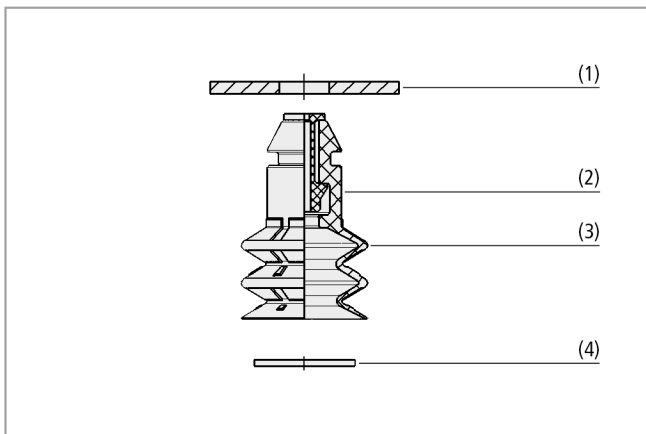
Suction area (Ø) 20 and 40 mm



Suitable for Industry Specific Applications



Bellows suction cups SPB2 P (2.5 folds)



System design bellows suction cups SPB2 P (2.5 folds)



Bellows suction cups SPB2 P being used for handling of cardboard boxes

Applications

- Round bellows suction cup with 2.5 folds used for palletizing and depalletizing processes in the packaging industry
- Handling of packaging materials such as cardboard boxes, rigid and flexible packaging
- Handling of blister packaging, shrink-wrapped products, plastic bags or trays
- Used in area gripping systems and "suction cup carpets"; optionally integrated flow resistances to reduce leakage occurring at partial occupancy

Design

- Round bellows suction cup SPB2 P with 2.5 folds (3) and soft, flexible sealing lip
- Integrated flow restrictor (2) with diameters from 0.8 to 1.5 mm
- Tool free assembly directly in an existing drill hole (1) due to push-in function (2)
- Optional integration of filter screen (4) as a pre-filter (120 µm filter pore size)

Our Highlights...

- Tool-free installation due to push-in function
- Flexible, adaptable sealing lip
- Soft bellows with a large stroke and low restoring force
- Interlocking of sealing lip and fold due to locking elements
- Food grade material (FDA conform) Silicone SI

Your Benefits...

- > Quick installation and removal of the suction cups
- > Optimal sealing on cardboard boxes and packaging material as well as on arching, non-rigid surfaces
- > Used in area gripping systems and "suction cup carpets"; damping effect and compensation for height differences
- > Form-locking connection to avoid sliding of the suction cup
- > Direct use in the food industry possible

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Suction Cups for Packaging



Bellows Suction Cups SPB2 P (2.5 Folds)

Suction area (Ø) 20 and 40 mm

Designation Code Bellows Suction Cups SPB2 P (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Flow restrictor	Product addition
Example SPB2 20 SI-40 SW80 P:				
SPB2	20	SI-40	SW80	P
SPB2	20	SI-40	SW80 = 0.8 mm	P push-in function
	40	SI-55	SW100 = 1.0 mm	
			SW130 = 1.3 mm	
			SW150 = 1.5 mm	

Ordering Data Bellows Suction Cups SPB2 P (2.5 Folds)

Bellows suction cup SPB2 P is delivered as a ready-to-connect component. Available in different diameters as single component or with integrated flow restrictor.

Available spare parts: Flow restrictor

Available accessories: Filter screen

Bellows Suction Cups SPB2 P (2.5 Folds)

Type	Part Number
SPB2 20 SI-40 P	10.01.06.03125
SPB2 40 SI-55 P	10.01.06.03126

Bellows Suction Cups SPB2 P (2.5 Folds) (with Flow Restrictor)

Type	Flow restrictor SW...			
	0.80 mm	1.00 mm	1.30 mm	1.50 mm
SPB2 20 SI-40 SW... P	10.01.06.03220	10.01.06.03221	10.01.06.03222	10.01.06.03223
SPB2 40 SI-55 SW... P	10.01.06.03224	10.01.06.03225	10.01.06.03226	10.01.06.03227

Ordering Data Accessories Bellows Suction Cups SPB2 P (2.5 Folds)

Type	Filter screen
SPB2 20 SI-40 P	10.01.06.02565
SPB2 40 SI-55 P	10.01.06.02572

Ordering Data Spare Parts Bellows Suction Cups SPB2 (2.5 Folds)

Type	Flow restrictor
SW 80 P	10.05.04.00090
SW 100 P	10.05.04.00091
SW 130 P	10.05.04.00092
SW 150 P	10.05.04.00093

Technical Data Bellows Suction Cups SPB2 P (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Min. curve radius [mm] (convex)	Volume [cm³]
SPB2 20 SI-40 P	4.9	8	25	2.5
SPB2 40 SI-55 P	14.9	40	75	22.0

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include safety factors

Suction Cups for Packaging

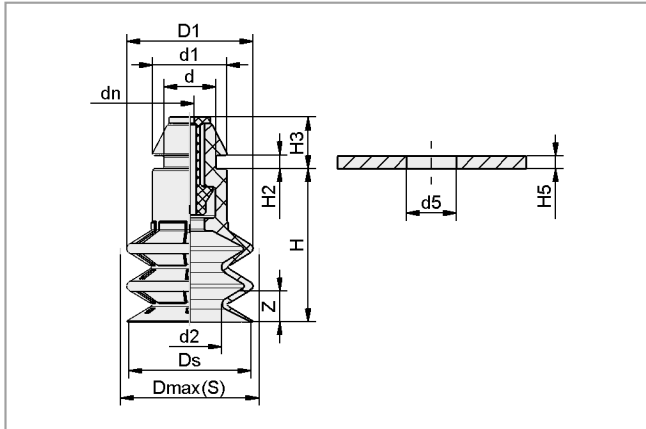


Bellows Suction Cups SPB2 P (2.5 Folds)

Suction area (Ø) 20 and 40 mm



Design Data Bellows Suction Cups SPB2 P (2.5 Folds)



SPB2 20 and 40 P

Type	Dimensions in mm*												
	d	d1	d2	d5	D1	Dmax(S)**	dn	Ds	H	H2	H3	H5	Z (Stroke)
SPB2 20 SI-40 P	8.5	11.8	10.2	7.9	20.0	20.5	4.6	19.6	24.3	2.2	7.2	2	9
SPB2 40 SI-55 P	12.5	15.7	17.8	11.5	43.5	44.6	4.6	42.7	47.0	2.2	7.2	2	20

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for Packaging



Bellows Suction Cups SPB4 (4.5 Folds)

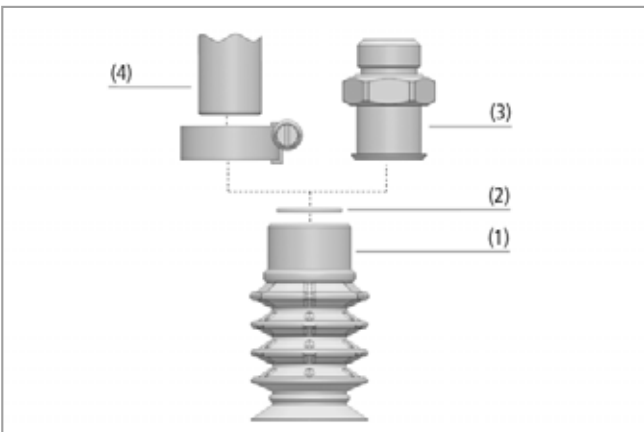
Suction area (Ø) from 20 mm to 50 mm



Suitable for Industry Specific Applications



Bellows suction cups SPB4 (4.5 folds)



System design bellows suction cups SPB4 (4.5 folds)

Applications

- Round, bellows suction cup with 4.5 folds for handling of flexible products such as pouches and other plastic film packaging
- Process reliable gripping and handling of solid, powdery and liquid filled pouches
- High-speed packaging processes, particularly in conjunction with parallel kinematic robots

Design

- Bellows suction cup SPB4 (1) with 4.5 folds and soft, flexible sealing lip
- Special reinforced bellows for additional stability
- Mounting via Schmalz Connector SC (3). Alternatively direct attachment on 3/8" - or 1/2" - pipe via hose clamp (4)
- All mounting elements with male thread include an integrated sealing ring
- Optional pre-filter (2) (250 µm filter pore size)
- Optional insert disc SPI for the lower suction fold avoids taping the foil

Our Highlights...

- Thin, steep sealing lip with flow fins
- Functional separation of folds and sealing lip
- Reinforced basic body and folds
- Extra large nominal diameter for high volume flow rates
- Food grade material (FDA conform) Silicone SI and SI-HD

Your Benefits...

- > Extraordinary sealing on pouches and other flexible materials
- > Compressed bellows have no negative effect on flexibility of sealing lip
- > No collapsing when suction cup is stretched under vacuum
- > Sized for operation with pumps, blowers and multistage ejectors
- > Suitable for applications in the food industry



Bellows suction cups SPB4 being used for handling foil-wrapped products

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Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Designation Code Bellows Suction Cups SPB4 (4.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB4 30 SI-55 G1/4-AG:			
SPB4	30	SI-55	G1/4-AG
SPB4	20	SI-55	G1/8-AG (AG = male (M))
	30	SI-55	G1/8-IG (IG = female (F))
	40	SI-55	G1/4-AG
	50	SI-55	G1/4-IG
		SI-HD	G3/8-AG
			G3/8-IG
			G1/2-AG
			G1/2-IG

Ordering Data Bellows Suction Cups SPB4 (4.5 Folds)

Suction cup SPB4 (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB4 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, hose clamp, insert disc

Bellows Suction Cups SPB4 (4.5 Folds) (Mounted)

Type	G1/2"-M	G1/2"-F	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F	G3/8"-M	G3/8"-F
SPB4-20 SI-55	-	-	10.01.06.03515	10.01.06.03518	10.01.06.03514	10.01.06.03517	10.01.06.03516	10.01.06.03519
SPB4-30 SI-55	-	-	10.01.06.03521	10.01.06.03524	10.01.06.03520	10.01.06.03523	10.01.06.03522	10.01.06.03525
SPB4-40 SI-55	10.01.06.03528	10.01.06.03531	10.01.06.03526	10.01.06.03529	-	-	10.01.06.03527	10.01.06.03530
SPB4-50 SI-55	10.01.06.03534	10.01.06.03537	10.01.06.03532	10.01.06.03535	-	-	10.01.06.03533	10.01.06.03536

Step 1: Bellows Suction Cups SPB4 (4.5 Folds) (Single Component)

Type*	Part Number
SPB4 20 SI-55 SC080	10.01.06.02588
SPB4 20 SI-HD SC080	10.01.06.03378
SPB4 30 SI-55 SC080	10.01.06.02589
SPB4 30 SI-HD SC080	10.01.06.03180
SPB4 40 SI-55 SC090	10.01.06.02590
SPB4 40 SI-HD SC090	10.01.06.03379
SPB4 50 SI-55 SC090	10.01.06.02613
SPB4 50 SI-HD SC090	10.01.06.03380

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

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Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Step 2: Ordering data Connection elements Bellows Suction Cups SPB4 (4.5 Folds) (Single Component)

Type	SPB4 20...30	SPB4 40...50
SC 080 G1/8-AG	10.01.06.03142	-
SC 080 G1/8-IG	10.01.06.03270	-
SC 080 G1/4-AG	10.01.06.03268	-
SC 080 G1/4-IG	10.01.06.03271	-
SC 080 G3/8-AG	10.01.06.02593	-
SC 080 G3/8-IG	10.01.06.02594	-
SC 080 NPT1/4-AG	10.01.06.03662	-
SC 080 NPT1/4-IG	10.01.06.03663	-
SC 080 NPT3/8-AG	10.01.06.03664	-
SC 080 NPT3/8-IG	10.01.06.03665	-
SC 090 G1/8-AG	-	10.01.06.03269
SC 090 G1/8-IG	-	10.01.06.03272
SC 090 G1/4-AG	-	10.01.06.02793
SC 090 G1/4-IG	-	10.01.06.03273
SC 090 G3/8-AG	-	10.01.06.02791
SC 090 G3/8-IG	-	10.01.06.03274
SC 090 G1/2-AG	-	10.01.06.02595
SC 090 G1/2-IG	-	10.01.06.02596
SC 090 NPT1/4-AG	-	10.01.06.03666
SC 090 NPT1/4-IG	-	10.01.06.03667
SC 090 NPT3/8-AG	-	10.01.06.03668
SC 090 NPT3/8-IG	-	10.01.06.03669

Ordering Data Accessories Bellows Suction Cups SPB4 (4.5 Folds)

Type	Filter screen	Hose clamp	Insert disc SPI
SPB4 20 SI-55 SC080	10.07.01.00320	10.07.10.00002	10.01.06.02915
SPB4 20 SI-HD SC080	10.07.01.00320	10.07.10.00002	10.01.06.02915
SPB4 30 SI-55 SC080	10.07.01.00320	10.07.10.00002	10.01.06.02855
SPB4 30 SI-HD SC080	10.07.01.00320	10.07.10.00002	10.01.06.02855
SPB4 40 SI-55 SC090	10.07.01.00321	10.07.10.00003	10.01.06.02856
SPB4 40 SI-HD SC090	10.07.01.00321	10.07.10.00003	10.01.06.02856
SPB4 50 SI-55 SC090	10.07.01.00321	10.07.10.00003	10.01.06.02916
SPB4 50 SI-HD SC090	10.07.01.00321	10.07.10.00003	10.01.06.02916

Technical Data Bellows Suction Cups SPB4 (4.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Pull-off force [N] at -200 mbar	Pull-off force [N] at -400 mbar	Volume [cm³]	Type Connection element
SPB4 20 SI-55 SC080	2.6	5.3	8	4.9	7	7.9	SC 080
SPB4 20 SI-HD SC080	2.6	5.3	8	4.9	7	7.9	SC 080
SPB4 30 SI-55 SC080	5.3	10.6	16	9.9	13	15.6	SC 080
SPB4 30 SI-HD SC080	5.3	10.6	16	9.9	13	15.6	SC 080
SPB4 40 SI-55 SC090	8.3	16.6	25	14.1	23	35.7	SC 090
SPB4 40 SI-HD SC090	8.3	16.6	25	14.1	23	35.7	SC 090
SPB4 50 SI-55 SC090	16.5	33.0	50	22.0	37	64.5	SC 090
SPB4 50 SI-HD SC090	16.5	33.0	50	22.0	37	64.5	SC 090

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include a safety factor

Suction Cups for Packaging

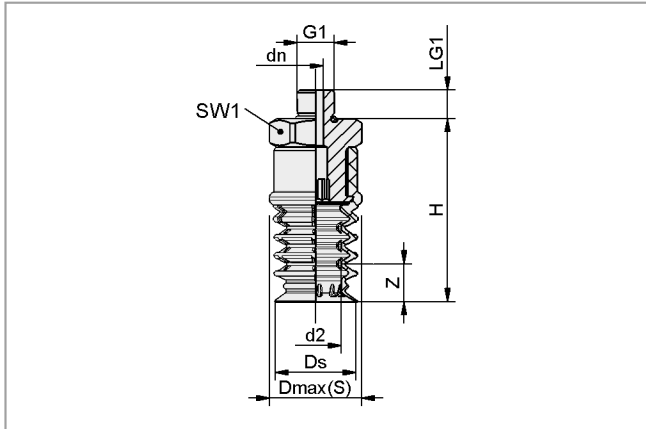


Bellows Suction Cups SPB4 (4.5 Folds)

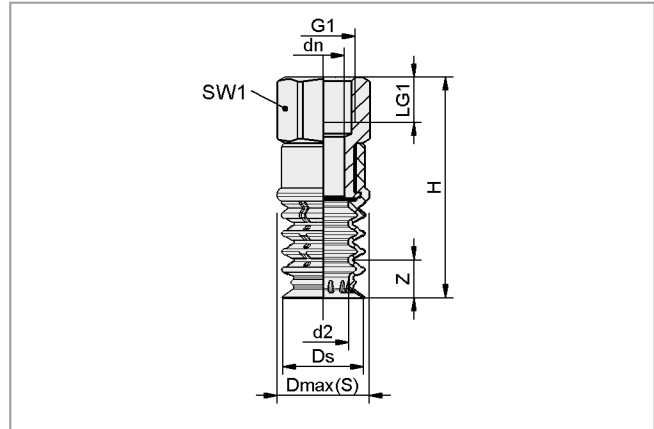
Suction area (\emptyset) from 20 mm to 50 mm



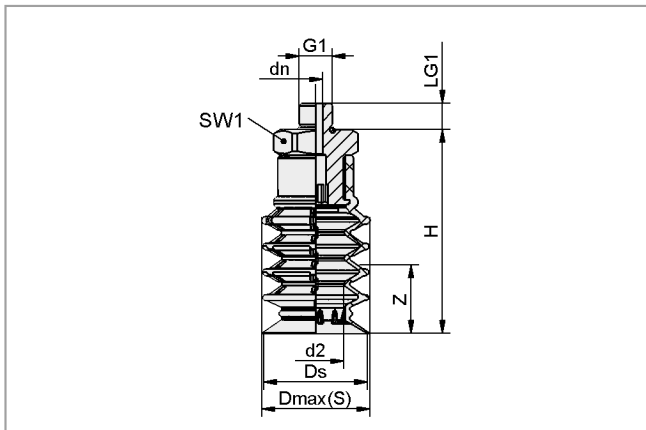
Design Data Bellows Suction Cups SPB4 (4.5 Folds) (Mounted)



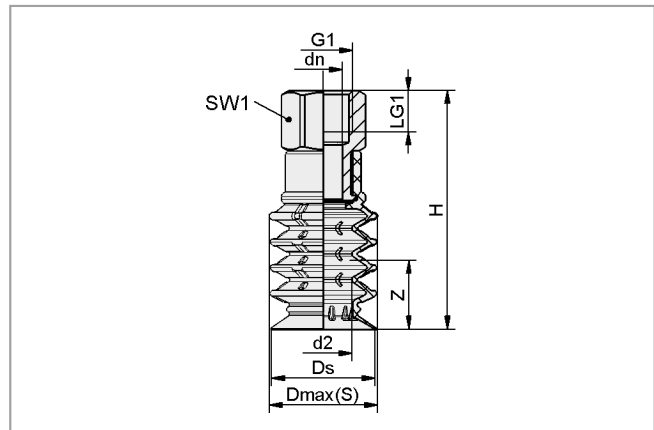
SPB4 20 AG



SPB4 20 IG



SPB4 30...50 AG



SPB4 30...50 IG

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Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm



Design Data Bellows Suction Cups SPB4 (4.5 Folds) (Mounted)

Type	Dimensions in mm*		Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)
	dn	d2							
SPB4 20 SI-55 G1/8-AG	4.0	13.5	24.4	21.4	G1/8"-M	48	7.5	22	10
SPB4 20 SI-55 G1/4-AG	8.0	13.5	24.4	21.4	G1/4"-M	48	10.0	22	10
SPB4 20 SI-55 G3/8-AG	10.3	13.5	24.4	21.4	G3/8"-M	48	10.0	22	10
SPB4 20 SI-55 G1/8-IG	8.6	13.5	24.4	21.4	G1/8"-F	58	12.0	22	10
SPB4 20 SI-55 G1/4-IG	11.0	13.5	24.4	21.4	G1/4"-F	58	12.0	22	10
SPB4 20 SI-55 G3/8-IG	11.0	13.5	24.4	21.4	G3/8"-F	58	12.0	22	10
SPB4 30 SI-55 G1/8-AG	4.0	17.0	31.5	30.2	G1/8"-M	60	7.5	22	20
SPB4 30 SI-55 G1/4-AG	8.0	17.0	31.5	30.2	G1/4"-M	60	10.0	22	20
SPB4 30 SI-55 G3/8-AG	10.3	17.0	31.5	30.2	G3/8"-M	60	10.0	22	20
SPB4 30 SI-55 G1/8-IG	8.6	17.0	31.5	30.2	G1/8"-F	70	12.0	22	20
SPB4 30 SI-55 G1/4-IG	11.0	17.0	31.5	30.2	G1/4"-F	70	12.0	22	20
SPB4 30 SI-55 G3/8-IG	11.0	17.0	31.5	30.2	G3/8"-F	70	12.0	22	20
SPB4 40 SI-55 G1/4-AG	8.0	23.0	41.5	40.5	G1/4"-M	73	10.0	27	27
SPB4 40 SI-55 G3/8-AG	10.3	23.0	41.5	40.5	G3/8"-M	73	10.0	27	27
SPB4 40 SI-55 G1/2-AG	15.0	23.0	41.5	40.5	G1/2"-M	73	14.0	27	27
SPB4 40 SI-55 G1/4-IG	11.4	23.0	41.5	40.5	G1/4"-F	87	12.0	27	27
SPB4 40 SI-55 G3/8-IG	15.0	23.0	41.5	40.5	G3/8"-F	87	12.0	27	27
SPB4 40 SI-55 G1/2-IG	15.0	23.0	41.5	40.5	G1/2"-F	87	16.0	27	27
SPB4 50 SI-55 G1/4-AG	8.0	30.0	51.5	50.3	G1/4"-M	84	10.0	27	37
SPB4 50 SI-55 G3/8-AG	10.3	30.0	51.5	50.3	G3/8"-M	84	10.0	27	37
SPB4 50 SI-55 G1/2-AG	15.0	30.0	51.5	50.3	G1/2"-M	84	14.0	27	37
SPB4 50 SI-55 G1/4-IG	11.4	30.0	51.5	50.3	G1/4"-F	98	12.0	27	37
SPB4 50 SI-55 G3/8-IG	15.0	30.0	51.5	50.3	G3/8"-F	98	12.0	27	37
SPB4 50 SI-55 G1/2-IG	15.0	30.0	51.5	50.3	G1/2"-F	98	16.0	27	37

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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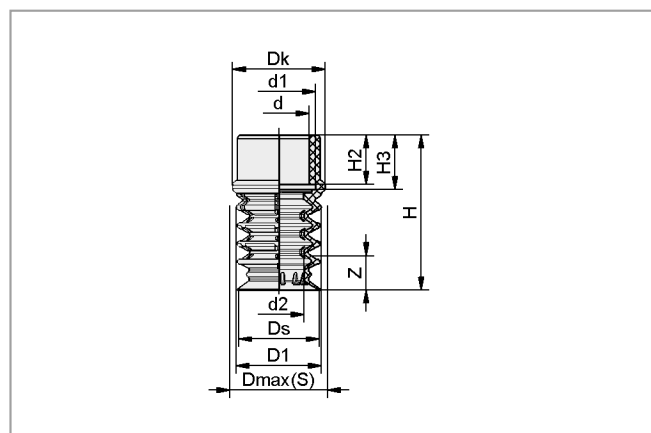
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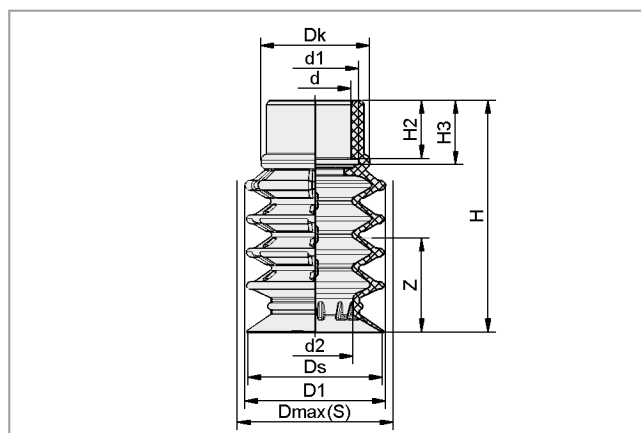
Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (\emptyset) from 20 mm to 50 mm

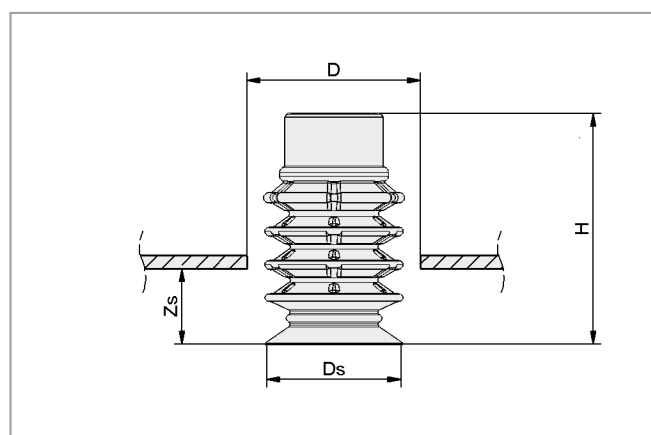
Design Data Bellows Suction Cups SPB4 (4.5 Folds)



SPB4 20



SPB4 30...50



Installation instructions when using a support plate

Type	Dimensions in mm*												
	d	d1	d2	D**	D1	Dk	Dmax(S)***	Ds	H	H2	H3	Z (Stroke)	Zs
SPB4 20 SI-55 SC080	16	19.6	13.5	30	22.0	24	24.4	21.4	41	13	14.4	10	8
SPB4 20 SI-HD SC080	16	19.6	13.5	30	22.0	24	24.4	21.4	41	13	14.4	10	8
SPB4 30 SI-55 SC080	16	19.6	17.0	39	31.0	24	31.5	30.2	52	13	14.4	20	17
SPB4 30 SI-HD SC080	16	19.6	17.0	39	31.0	24	31.5	30.2	52	13	14.4	20	17
SPB4 40 SI-55 SC090	20	24.8	23.0	51	41.0	31	41.5	40.5	66	14	16.0	27	25
SPB4 40 SI-HD SC090	20	24.8	23.0	51	41.0	31	41.5	40.5	66	14	16.0	27	25
SPB4 50 SI-55 SC090	20	24.8	30.0	61	51.0	31	51.5	50.3	76	14	16.0	37	35
SPB4 50 SI-HD SC090	20	24.8	30.0	61	51.0	31	51.5	50.3	76	14	16.0	37	35

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**These parameters ensure that the suction cup seal on the packaging is correct and that the shear force is maximized when using a support plate

***External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging

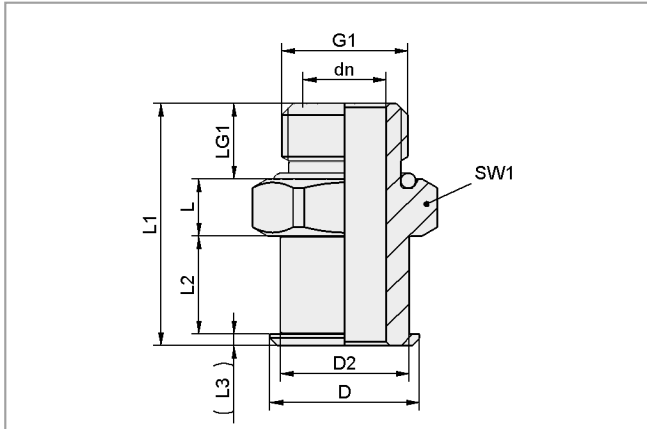


Bellows Suction Cups SPB4 (4.5 Folds)

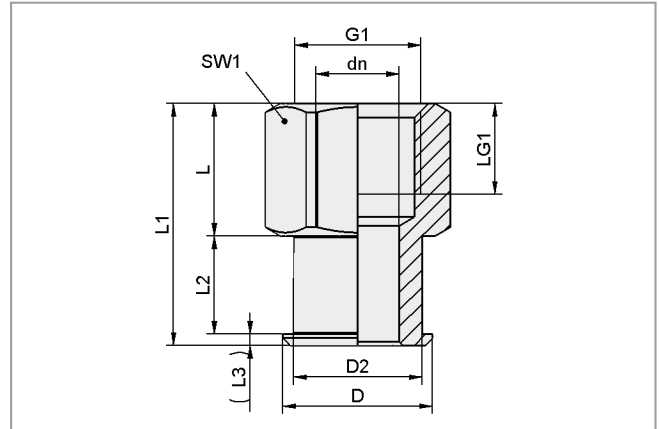
Suction area (\emptyset) from 20 mm to 50 mm



Design Data Connection Elements Bellows Suction Cups SPB4 (4.5 Folds)



SC...AG



SC...IG

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28	13	1.5	8	22	
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32	13	1.5	12	22	
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32	13	1.5	10	22	
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32	13	1.5	12	22	
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32	13	1.5	10	22	
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32	13	1.5	12	22	
SC 080 NPT1/4-AG	19.8	17	8	NPT1/4-M	7.5	32	13	1.5	10	22	
SC 080 NPT1/4-IG	19.8	17	10	NPT1/4-F	17.5	32	13	1.5	13	22	
SC 080 NPT3/8-AG	19.8	17	10	NPT3/8-M	7.5	32	13	1.5	10	22	
SC 080 NPT3/8-IG	19.8	17	10	NPT3/8-F	17.5	32	13	1.5	13	22	
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31	14	2.0	8	27	
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	38	14	2.0	12	27	
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	34	14	2.0	10	27	
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	38	14	2.0	12	27	
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	34	14	2.0	10	27	
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	38	14	2.0	12	27	
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	38	14	2.0	14	27	
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	38	14	2.0	16	27	
SC 090 NPT1/4-AG	25.0	21	8	NPT1/4-M	10.0	36	14	2.0	10	27	
SC 090 NPT1/4-IG	25.0	21	10	NPT1/4-F	21.5	38	14	2.0	14	27	
SC 090 NPT3/8-AG	25.0	21	10	NPT3/8-M	10.0	36	14	2.0	10	27	
SC 090 NPT3/8-IG	25.0	21	10	NPT3/8-F	21.5	38	14	2.0	13	27	

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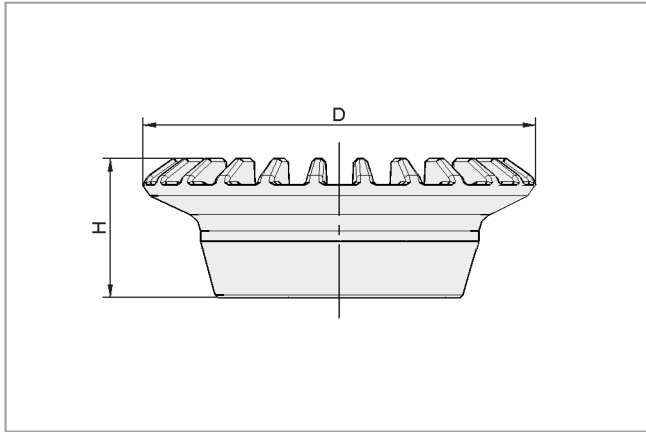


Bellows Suction Cups SPB4 (4.5 Folds)

Suction area (\emptyset) from 20 mm to 50 mm



Design Data Suction Cup Inserts SPI (for SPB4)



SPI

Type	Dimensions in mm For suction cup type	D	H
SPI 16 PE	SPB4 20	16	7.5
SPI 24 PE	SPB4 30	24	9.5
SPI 32 PE	SPB4 40	32	11.5
SPI 42 PE	SPB4 50	42	15.0

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Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

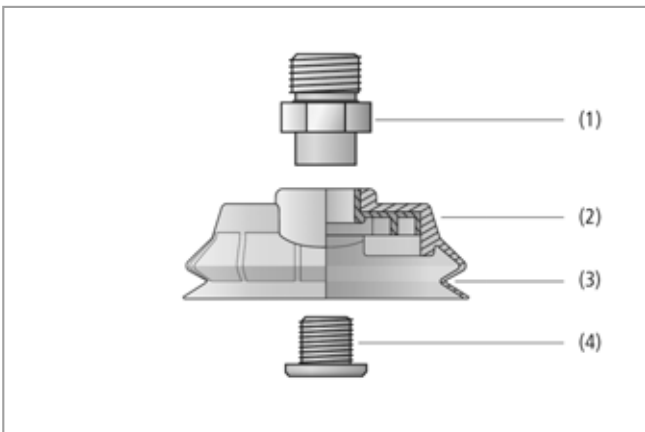
Suction area (LxW) from 35x15 mm to 80x35 mm



Suitable for Industry Specific Applications



Bellows suction cups SPOB1f (oval, 1.5 folds)



System design bellows suction cups SPOB1f (oval, 1.5 folds)



SPOB1f bellows suction cups for handling small flow-wrap packaging

Applications

- Oval bellows suction cup with 1.5 folds for reliable handling of small, film packaging products such as candy bars, popsicles or bulk materials
- Used in packaging lines for processing bulk material packaging in the case-packing process step
- Handling of small flow-wrap packaging with different fill levels
- Stability and high suction force in rapid packaging processes thanks to its oval shape

Design

- Oval bellows suction cup with 1.5 folds (3) with a very soft and flexible sealing lip
- Integrated anti-rotation guard and easy-to-use function for positioning the suction cup on the workpiece (2)
- Large shaft diameter for high flow rates
- Mounting using one-piece Schmalz SC 040 connection element (1) respectively two-piece Schmalz SC 050 connection element (1) and (4)
- All SC connection elements with male threads come equipped with an integrated sealing ring

Our Highlights...

- Oval shape with 1.5 folds
- Very flexible and easy-to-adapt sealing lip and suction bellows
- Integrated anti-rotation guard
- Large nominal diameter
- FDA-compliant silicone material

Your Benefits...

- > High holding force and secure gripping even on small workpieces such as tubular bag packaging
- > Optimum sealing for bag packaging even when the bags have an extremely large number of folds and are not very full
- > Simple and reliable positioning of the suction cup on the workpiece (no additional component parts required)
- > High flow rates for short cycle times
- > Capable of direct use in the food product sector

Suction Cups for Packaging



Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35 x 15 mm to 80 x 35 mm

Designation Code Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Type connection element
Example SPOB1f 60x25 SI-55 SC050:			
SPOB1f	60x25	SI-55	SC050
SPOB1f	35x15	SI-55	SC040
	60x25		SC050
	80x35		

Ordering Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

The SPOB1f suction cup (elastomer part + connection element) with integrated bag stabilizer is delivered assembled. As an alternative, the suction cup can be ordered as individual parts. To do this, the following ordering steps are required:

- SPOB1f-type suction cup (step 1) - elastomer part, available in a range of different diameters
- SC-type connection element (step 2) - available with a range of different threads

Step 1: Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Type	Part Number
SPOB1f 35x15 SI-55 SC040-AR	10.01.06.03625
SPOB1f 60x25 SI-55 SC050-AR	10.01.06.03626
SPOB1f 80x35 SI-55 SC050-AR	10.01.06.03627

Step 2: Connection Elements Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Type	SPOB1f 35x15	SPOB1f 60x25	SPOB1f 80x35
SC 040-AR G1/8-AG	10.01.06.02495	-	-
SC 040-AR G1/8-IG	10.01.06.02496	-	-
SC 050-AR G1/4-AG	-	10.01.06.03741	10.01.06.03741
SC 050-AR G1/4-IG	-	10.01.06.03742	10.01.06.03742

Technical Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm ³]	Min. work-piece width [mm]	Recom. internal hose diameter d [mm]**	Type Connection element
SPOB1f 35x15 SI-55 SC040	4.2	8.4	12.6	2.1	10.0	6	SC 040
SPOB1f 60x25 SI-55 SC050	12.2	24.4	36.6	11.5	20.0	8	SC 050
SPOB1f 80x35 SI-55 SC050	24.9	49.8	74.7	26.1	30.0	8	SC 050

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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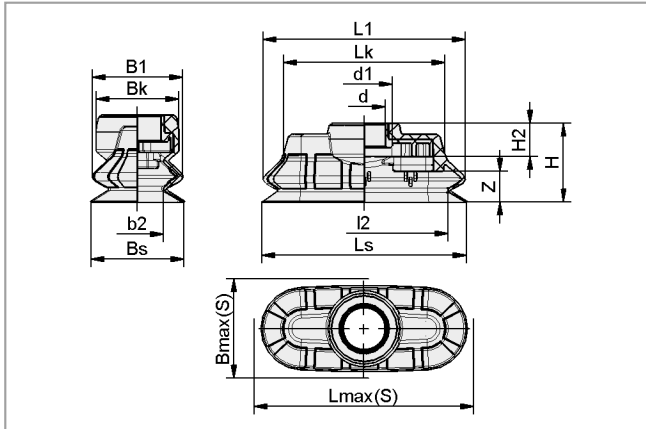


Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

Suction area (LxW) from 35 x 15 mm to 80 x 35 mm



Design Data Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)



SPOB1f

Type	Dimensions in mm*															
	b2	B1	Bk	Bmax(S)**	Bs	d	d1	H	H2	I2	L1	Lk	Lmax(S)**	Ls	Z (Stroke)	
SPOB1f 35x15 SI-55 SC040	8.0	15	14	17	14.6	8.3	11.0	13	5.0	28.0	35	28.5	37	34.6	4	
SPOB1f 60x25 SI-55 SC050	13.8	25	22	27	24.5	12.4	17.3	23	6.9	48.8	60	46.9	62	59.5	9	
SPOB1f 80x35 SI-55 SC050	21.0	35	24	38	34.5	12.4	17.3	27	6.9	66.0	80	61.1	83	79.5	11	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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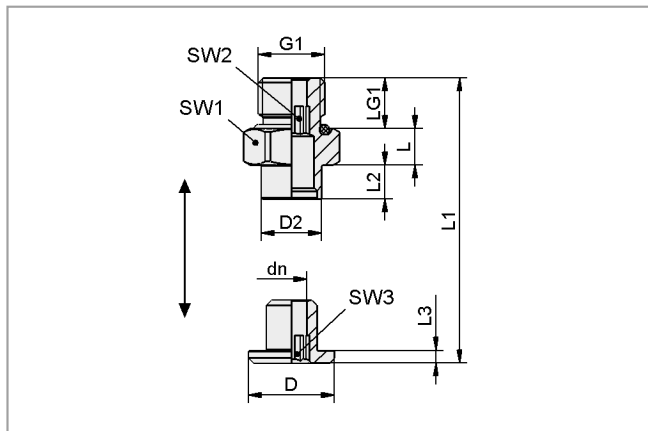


Bellows Suction Cups SPOB1f (Oval, 1.5 Folds)

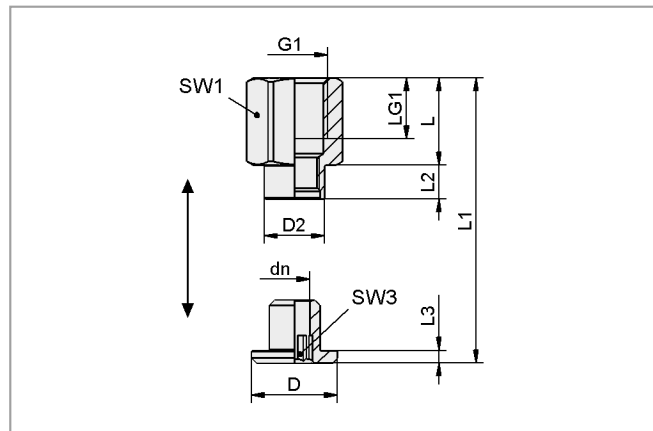
Suction area (LxW) from 35 x 15 mm to 80 x 35 mm



Design Data Connection Elements Bellows Suction Cups SPOB1f



SC 040 G1/8-AG / SC 050 G1/4-AG



SC 040 G1/8-IG / SC 050 G1/4-IG

Type	Dimensions in mm												
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2	SW3	
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	20.2	4.8	1.9	7.5	14	4	-	
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4	-	
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6	6	
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	-	6	

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Bellows Suction Cups SPB2f (2.5 Folds)

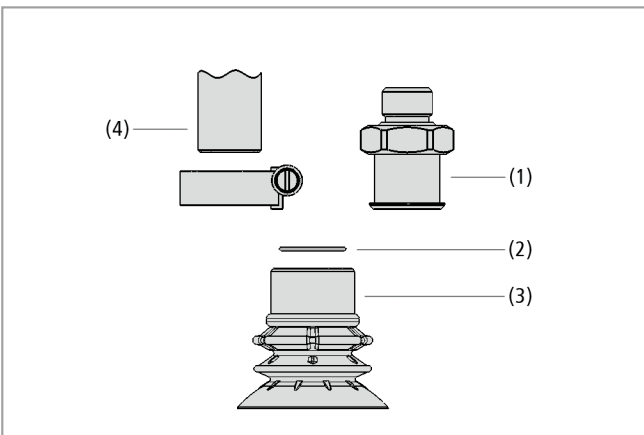
Suction area (Ø) from 30 mm to 50 mm



Suitable for Industry Specific Applications



Bellows Suction Cups SPB2f (2.5 Folds)



System design bellows suction cups SPB2f (2.5 folds)

Applications

- Round bellows suction cup with 2.5 folds for dynamical handling of bags and other types of very flexible packaging
- Reliably gripping and handling of bags containing fluids, solids or powder and packaging that is not very full
- Stable in extremely quick packaging processes, particularly in conjunction with Delta robots (case packer and pick-and-place applications)

Design

- SPB2f bellows suction cup with 2.5 folds (3) and a gentle and flexible sealing lip with segmented flow vanes and integrated bag stabilizer
- Very large shaft diameter for high volume flow rates
- Specially reinforced suction bellows for additional stability
- Installation using the Schmalz SC connection element (1); alternatively by placing directly onto the 3/8" or 1/2" pipe (4) on the machine side and attaching with a hose clamp
- All SC connection elements with male thread are equipped with an integrated sealing ring
- Optional insert filter for pre-filter (2) (250 µm filter pore size)



Bellows suction cup SPB2f for handling bags

Our Highlights...

- Extremely flexible and adaptable sealing lip with flow vanes
- Integrated bag stabilizer
- Compact, reinforced main body with 2.5 folds
- Large nominal diameter
- FDA-compliant SI silicone material

Your Benefits...

- > Optimum sealing on bags, even when there are many folds, the bags are not very full or when the bags are swinging about
- > Bag stabilization; even thin and soft plastic films (LDPE) are not sucked in
- > Secure grip and stability, even at high speeds; no swinging workpieces
- > High flow rate for short cycle times
- > Can be used directly in the food industry

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Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Designation Code Bellows Suction Cups SPB2f (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB2f 30 SI-55 G1/8-AG:			
SPB2f	30	SI-55	G1/8-AG
SPB2f	30 to 50	SI-55	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG G3/8-AG G3/8-IG

Ordering Data Bellows Suction Cups SPB2f (2.5 Folds)

Suction cup SPB2f (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB2f (step 1) - elastomer part, available in various diameters
- Connection element of type SC (step 2) - available with various threads

Bellows Suction Cups SPB2f (2.5 Folds) (Mounted)

Type	Part Number
SPB2f 30 SI-55 G1/8-AG	10.01.06.03698
SPB2f 30 SI-55 G1/8-IG	10.01.06.03699
SPB2f 30 SI-55 G1/4-AG	10.01.06.03700
SPB2f 30 SI-55 G1/4-IG	10.01.06.03701
SPB2f 30 SI-55 G3/8-AG	10.01.06.03702
SPB2f 30 SI-55 G3/8-IG	10.01.06.03703
SPB2f 40 SI-55 G1/8-AG	10.01.06.03646
SPB2f 40 SI-55 G1/8-IG	10.01.06.03647
SPB2f 40 SI-55 G1/4-AG	10.01.06.03648
SPB2f 40 SI-55 G1/4-IG	10.01.06.03649
SPB2f 40 SI-55 G3/8-AG	10.01.06.03650
SPB2f 40 SI-55 G3/8-IG	10.01.06.03651
SPB2f 50 SI-55 G1/8-AG	10.01.06.03652
SPB2f 50 SI-55 G1/8-IG	10.01.06.03653
SPB2f 50 SI-55 G1/4-AG	10.01.06.03654
SPB2f 50 SI-55 G1/4-IG	10.01.06.03655
SPB2f 50 SI-55 G3/8-AG	10.01.06.03656
SPB2f 50 SI-55 G3/8-IG	10.01.06.03657
SPB2f 50 SI-55 G1/2-AG	10.01.06.03658
SPB2f 50 SI-55 G1/2-IG	10.01.06.03659

Step 1: Bellows Suction Cups SPB2f (2.5 Folds) (Single Component)

Type	Part Number
SPB2f 30 SI-55 SC080	10.01.06.03643
SPB2f 40 SI-55 SC080	10.01.06.03559
SPB2f 50 SI-55 SC090	10.01.06.03560

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Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Step 2: Connection Elements Bellows Suction Cups SPB2f (2.5 Folds)

Type	SPB2f 30...40	SPB2f 50
SC 080 G1/8-AG	10.01.06.03142	-
SC 080 G1/8-IG	10.01.06.03270	-
SC 080 G1/4-AG	10.01.06.03268	-
SC 080 G1/4-IG	10.01.06.03271	-
SC 080 G3/8-AG	10.01.06.02593	-
SC 080 G3/8-IG	10.01.06.02594	-
SC 080 NPT1/4-AG	10.01.06.03662	-
SC 080 NPT1/4-IG	10.01.06.03663	-
SC 080 NPT3/8-AG	10.01.06.03664	-
SC 080 NPT3/8-IG	10.01.06.03665	-
SC 090 G1/8-AG	-	10.01.06.03269
SC 090 G1/8-IG	-	10.01.06.03272
SC 090 G1/4-AG	-	10.01.06.02793
SC 090 G1/4-IG	-	10.01.06.03273
SC 090 G3/8-AG	-	10.01.06.02791
SC 090 G3/8-IG	-	10.01.06.03274
SC 090 G1/2-AG	-	10.01.06.02595
SC 090 G1/2-IG	-	10.01.06.02596
SC 090 NPT1/4-AG	-	10.01.06.03666
SC 090 NPT1/4-IG	-	10.01.06.03667
SC 090 NPT3/8-AG	-	10.01.06.03668
SC 090 NPT3/8-IG	-	10.01.06.03669

Technical Data Bellows Suction Cups SPB2f (2.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm ³]	Type Connection element
SPB2f 30 SI-55 SC080	4.3	8.5	12.8	7.2	SC 080
SPB2f 40 SI-55 SC080	6.8	13.6	20.4	12.9	SC 080
SPB2f 50 SI-55 SC090	13.7	27.3	41.0	26.5	SC 090

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

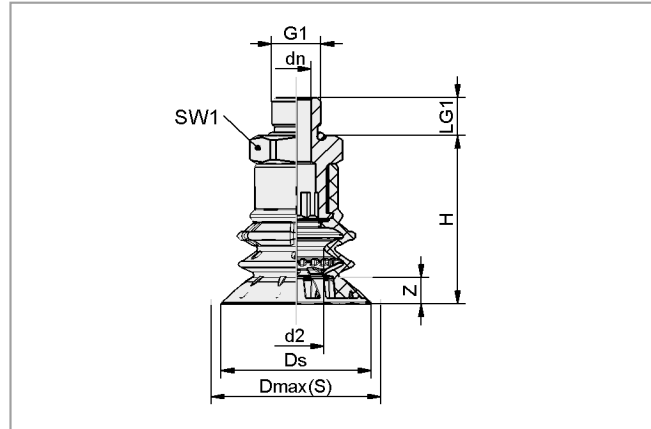
Suction Cups for Packaging



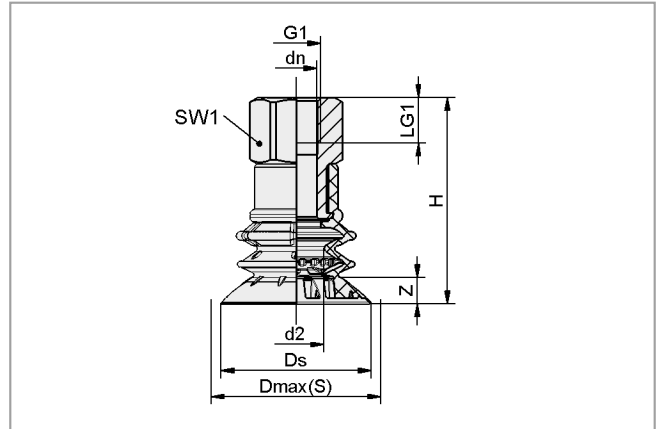
Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB2f (2.5 Folds)



SPB2f...AG



SPB2f...IG

Type	Dimensions in mm*								
	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)	
SPB2f 30 SI-55 G1/8-AG	7.2	32.0	30.0	G1/8"-M	40	7.5	22.0	5	
SPB2f 30 SI-55 G1/8-IG	7.2	32.0	30.0	G1/8"-F	50	12.0	22.0	5	
SPB2f 30 SI-55 G1/4-AG	7.2	32.0	30.0	G1/4"-M	40	10.0	22.0	5	
SPB2f 30 SI-55 G1/4-IG	7.2	32.0	30.0	G1/4"-F	50	12.0	22.0	5	
SPB2f 30 SI-55 G3/8-AG	7.2	32.0	30.0	G3/8"-M	40	10.0	22.0	5	
SPB2f 30 SI-55 G3/8-IG	7.2	32.0	30.0	G3/8"-F	50	12.0	22.0	5	
SPB2f 40 SI-55 G1/8-AG	15.3	42.0	39.7	G1/8"-M	45	7.5	22.0	7	
SPB2f 40 SI-55 G1/8-IG	15.3	42.0	39.7	G1/8"-F	55	12.0	22.0	7	
SPB2f 40 SI-55 G1/4-AG	15.3	42.0	39.7	G1/4"-M	45	10.0	22.0	7	
SPB2f 40 SI-55 G1/4-IG	15.3	42.0	39.7	G1/4"-F	55	12.0	22.0	7	
SPB2f 40 SI-55 G3/8-AG	15.3	42.0	39.7	G3/8"-M	45	10.0	22.0	7	
SPB2f 40 SI-55 G3/8-IG	15.3	42.0	39.7	G3/8"-F	55	12.0	22.0	7	
SPB2f 50 SI-55 G1/8-AG	21.0	52.0	49.7	G1/8"-M	53	7.5	27.0	9	
SPB2f 50 SI-55 G1/8-IG	21.0	52.0	49.7	G1/8"-F	67	12.0	27.0	9	
SPB2f 50 SI-55 G1/4-AG	21.0	52.0	49.7	G1/4"-M	53	10.0	27.0	9	
SPB2f 50 SI-55 G1/4-IG	21.0	52.0	49.7	G1/4"-F	67	12.0	27.0	9	
SPB2f 50 SI-55 G3/8-AG	21.0	52.0	49.7	G3/8"-M	53	10.0	27.0	9	
SPB2f 50 SI-55 G3/8-IG	21.0	52.0	49.7	G3/8"-F	67	12.0	27.0	9	
SPB2f 50 SI-55 G1/2-AG	21.0	52.0	49.7	G1/2"-M	53	14.0	27.0	9	
SPB2f 50 SI-55 G1/2-IG	21.0	52.0	49.7	G1/2"-F	67	16.0	27.0	9	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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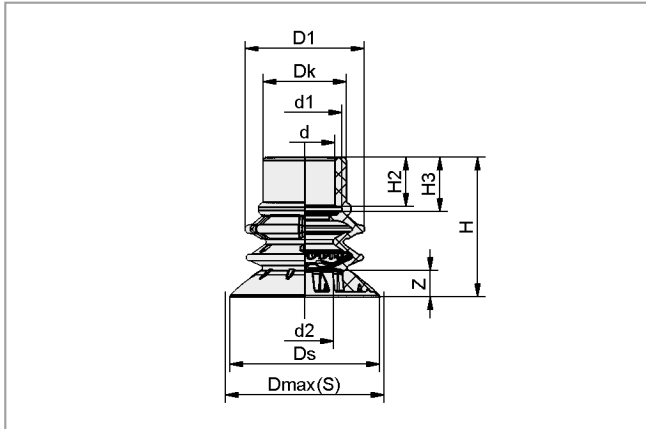


Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm



Design Data Bellows Suction Cups SPB2f (2.5 Folds)



SPB2f 30...50

Type	Dimensions in mm*											
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)	
SPB2f 30 SI-55 SC080	16.0	19.6	7.2	24.4	22.0	32.0	30.0	32	13.0	14.4	5	
SPB2f 40 SI-55 SC080	16.0	19.6	15.3	31.6	24.4	42.0	39.7	37	13.0	14.4	7	
SPB2f 50 SI-55 SC090	20.0	24.8	21.0	41.6	31.0	52.0	49.7	46	14.0	16.0	9	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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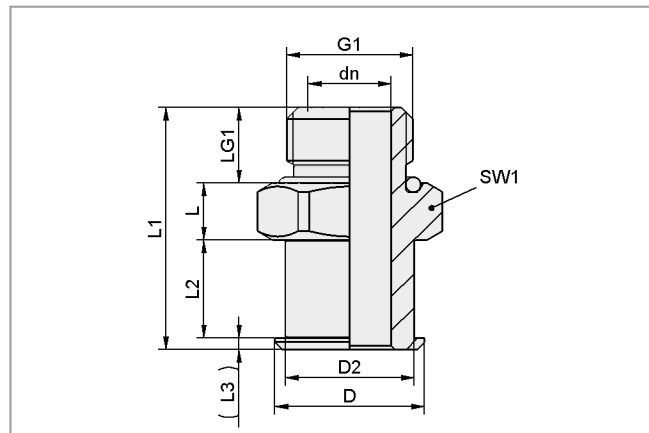
Suction Cups for Packaging



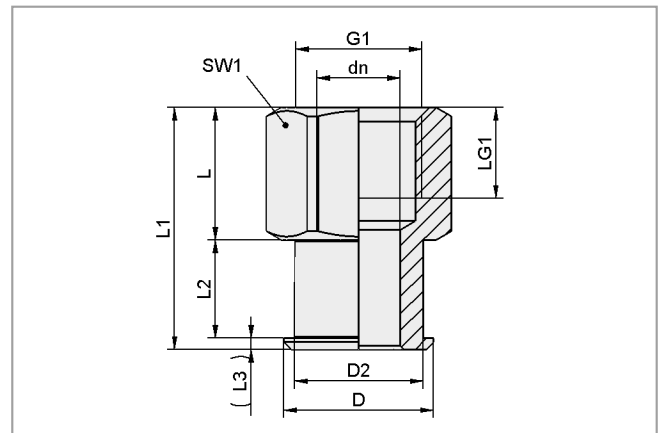
Bellows Suction Cups SPB2f (2.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm

Design Data Connection Elements Bellows Suction Cups SPB2f



SC...AG



SC...IG

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28.0	13.0	1.5	7.5	22	
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32.0	13.0	1.5	12.0	22	
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32.0	13.0	1.5	10.0	22	
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32.0	13.0	1.5	12.0	22	
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32.0	13.0	1.5	10.0	22	
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32.0	13.0	1.5	12.0	22	
SC 080 NPT1/4-AG	19.8	17	8	NPT1/4-M	7.5	32.2	13.0	1.5	10.2	22	
SC 080 NPT1/4-IG	19.8	17	10	NPT1/4-F	17.5	32.0	13.0	1.5	12.8	22	
SC 080 NPT3/8-AG	19.8	17	10	NPT3/8-M	7.5	32.4	13.0	1.5	10.4	22	
SC 080 NPT3/8-IG	19.8	17	10	NPT3/8-F	17.5	32.0	13.0	1.5	12.8	22	
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31.0	14.0	2.0	7.5	27	
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	37.5	14.0	2.0	12.0	27	
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	33.5	14.0	2.0	10.0	27	
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	37.5	14.0	2.0	12.0	27	
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	33.5	14.0	2.0	10.0	27	
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	37.5	14.0	2.0	12.0	27	
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	37.5	14.0	2.0	14.0	27	
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	37.5	14.0	2.0	16.0	27	
SC 090 NPT1/4-AG	25.0	21	8	NPT1/4-M	10.0	36.2	14.0	2.0	10.2	27	
SC 090 NPT1/4-IG	25.0	21	10	NPT1/4-F	21.5	37.5	14.0	2.0	13.8	27	
SC 090 NPT3/8-AG	25.0	21	10	NPT3/8-M	10.0	36.4	14.0	2.0	10.4	27	
SC 090 NPT3/8-IG	25.0	21	10	NPT3/8-F	21.5	37.5	14.0	2.0	12.8	27	

Suction Cups for Packaging



Bellows Suction Cups SPB4f (4.5 Folds)

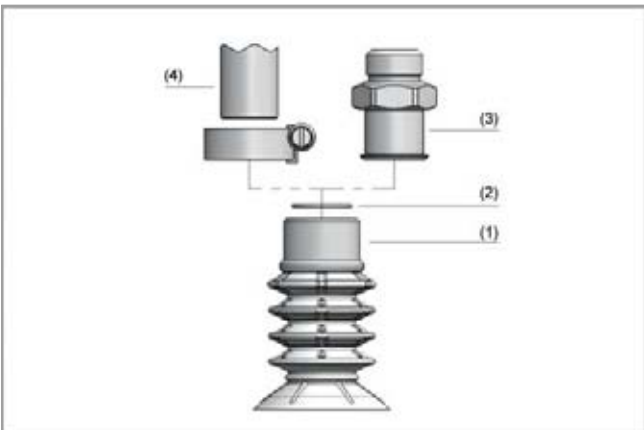
Suction area (Ø) from 30 mm to 50 mm



Suitable for Industry Specific Applications



Bellows suction cups SPB4f (4.5 folds)



System design bellows suction cups SPB4f (4.5 folds)



Bellows suction cup SPB4f for handling bags

Applications

- Round, bellows suction cup with 4.5 folds for handling bags and other very flexible packaging
- Reliable gripping and handling especially of bags and packaging with low filling degree as well as liquid, solid or powder filled pouches
- For use in fast packaging processes, particularly together with delta robots (case packers and pick-and-place applications)

Design

- Bellows suction cup SPB4f with 4.5 folds (1) as well as soft, flexible sealing lip with segmented flow fins and integrated bag stabilizer
- Very large shaft diameter for high volume flow rates
- Special reinforced bellows for additional stability
- Installation using the Schmalz connection element SC (3); alternatively by attaching directly onto a 3/8" or 1/2" pipe (4) on the machine side and fixing with a hose clamp
- All connection elements SC with male thread are equipped with an integrated sealing ring
- Optional filter as pre-filter (2) (250 µm filter pore size)

Our Highlights...

- Extremely flexible and adaptable sealing lip with flow fins
- Integrated bag stabilizer
- Reinforced basic body and folds
- Very large nominal diameter
- Suction cup made from FDA compliant silicone SI and SI-HD

Your Benefits...

- > Optimal sealing on bags, even with strong wrinkles, low filling degree or during swivel motion
- > Bag stabilization; even thin and soft plastic films (LDPE) are not drawn in
- > Secure gripping with high lateral loads and swinging workpieces
- > High volume flow rates and short cycle times
- > Can be used directly in the food industry

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Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Designation Code Bellows Suction Cups SPB4f (4.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPB4f 40 SI-55 G1/8-IG:			
SPB4f	40	SI-55	G1/8-IG
SPB4f	30	SI-55	G1/8-AG (AG = male (M))
	40	SI-55	G1/8-IG (IG = female (F))
	50	SI-55	G1/4-AG
		SI-55	G1/4-IG
		SI-55	G3/8-AG
		SI-55	G3/8-IG
		SI-55	G1/2-AG
		SI-55	G1/2-IG

Ordering Data Bellows Suction Cups SPB4f (4.5 Folds)

Suction cup SPB4f (elastomer part + connection element) with integrated bag stabilizer is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Suction cup of type SPB4f (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, hose clamp

Bellows Suction Cups SPB4f (4.5 Folds) (Mounted)

Type	Part Number
SPB4f 30 SI-55 G1/8-AG	10.01.06.03538
SPB4f 30 SI-55 G1/4-AG	10.01.06.03539
SPB4f 30 SI-55 G3/8-AG	10.01.06.03540
SPB4f 30 SI-55 G1/8-IG	10.01.06.03541
SPB4f 30 SI-55 G1/4-IG	10.01.06.03542
SPB4f 30 SI-55 G3/8-IG	10.01.06.03543
SPB4f 40 SI-55 G1/8-AG	10.01.06.03544
SPB4f 40 SI-55 G1/4-AG	10.01.06.03545
SPB4f 40 SI-55 G3/8-AG	10.01.06.03546
SPB4f 40 SI-55 G1/8-IG	10.01.06.03547
SPB4f 40 SI-55 G1/4-IG	10.01.06.03548
SPB4f 40 SI-55 G3/8-IG	10.01.06.03549
SPB4f 50 SI-55 G1/8-AG	10.01.06.03550
SPB4f 50 SI-55 G1/4-AG	10.01.06.03551
SPB4f 50 SI-55 G3/8-AG	10.01.06.03552
SPB4f 50 SI-55 G1/2-AG	10.01.06.03553
SPB4f 50 SI-55 G1/8-IG	10.01.06.03554
SPB4f 50 SI-55 G1/4-IG	10.01.06.03555
SPB4f 50 SI-55 G3/8-IG	10.01.06.03556
SPB4f 50 SI-55 G1/2-IG	10.01.06.03557

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Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (Ø) from 30 mm to 50 mm

Step 1: Bellows Suction Cups SPB4f (4.5 Folds)

Type	Part Number
SPB4f 30 SI-55 SC080	10.01.06.03264
SPB4f 30 SI-HD SC080	10.01.06.03563
SPB4f 40 SI-55 SC080	10.01.06.03265
SPB4f 40 SI-HD SC080	10.01.06.03448
SPB4f 50 SI-55 SC090	10.01.06.03266
SPB4f 50 SI-HD SC090	10.01.06.03564

Step 2: Connection Elements Bellows Suction Cups SPB4f (4.5 Folds)

Type	SPB4f 30	SPB4f 40	SPB4f 50
SC 080 G1/8-AG	10.01.06.03142	10.01.06.03142	-
SC 080 G1/8-IG	10.01.06.03270	10.01.06.03270	-
SC 080 G1/4-AG	10.01.06.03268	10.01.06.03268	-
SC 080 G1/4-IG	10.01.06.03271	10.01.06.03271	-
SC 080 G3/8-AG	10.01.06.02593	10.01.06.02593	-
SC 080 G3/8-IG	10.01.06.02594	10.01.06.02594	-
SC 090 G1/8-AG	-	-	10.01.06.03269
SC 090 G1/8-IG	-	-	10.01.06.03272
SC 090 G1/4-AG	-	-	10.01.06.02793
SC 090 G1/4-IG	-	-	10.01.06.03273
SC 090 G3/8-AG	-	-	10.01.06.02791
SC 090 G3/8-IG	-	-	10.01.06.03274
SC 090 G1/2-AG	-	-	10.01.06.02595
SC 090 G1/2-IG	-	-	10.01.06.02596

Ordering Data Accessories Bellows Suction Cups SPB4f (4.5 Folds)

Type	Filter screen	Hose clamp
SPB4f 30 SI-55 SC080	10.07.01.00320	10.07.10.00002
SPB4f 30 SI-HD SC080	10.07.01.00320	10.07.10.00002
SPB4f 40 SI-55 SC080	10.07.01.00320	10.07.10.00002
SPB4f 40 SI-HD SC080	10.07.01.00320	10.07.10.00002
SPB4f 50 SI-55 SC090	10.07.01.00321	10.07.10.00003
SPB4f 50 SI-HD SC090	10.07.01.00321	10.07.10.00003

Technical Data Bellows Suction Cups SPB4f (4.5 Folds)

Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Volume [cm ³]	Type Connection element
SPB4f 30 SI-55 SC080	4.3	8.5	12.8	6.0	SC 080
SPB4f 30 SI-HD SC080	4.3	8.5	12.8	6.0	SC 080
SPB4f 40 SI-55 SC080	6.8	13.6	20.4	15.1	SC 080
SPB4f 40 SI-HD SC080	6.8	13.6	20.4	15.1	SC 080
SPB4f 50 SI-55 SC090	13.7	27.3	41.0	33.1	SC 090
SPB4f 50 SI-HD SC090	13.7	27.3	41.0	33.1	SC 090

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include a safety factor

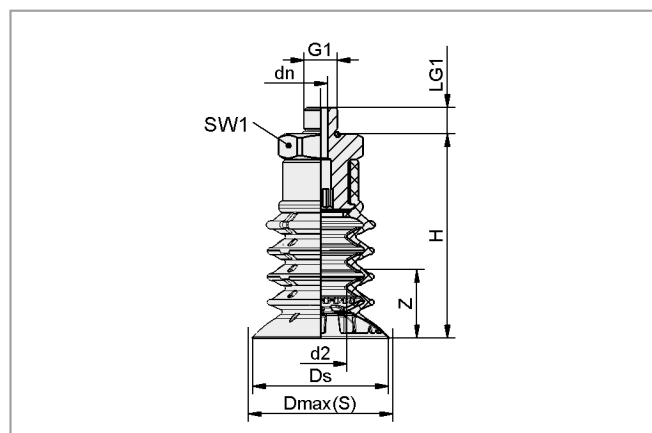
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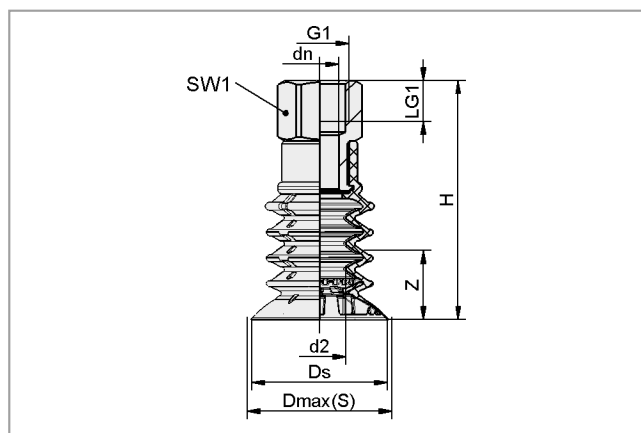
Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm

Design Data Bellows Suction Cups SPB4f (4.5 Folds)



SPB4f AG



SPB4f IG

Type	Dimensions in mm*									
	dn	d2	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)	
SPB4f 30 SI-55 G1/8-AG	3.0	12.3	32.0	30.7	G1/8"-M	48	7.5	22	10	
SPB4f 30 SI-55 G1/4-AG	8.0	12.3	32.0	30.7	G1/4"-M	48	10.0	22	10	
SPB4f 30 SI-55 G3/8-AG	10.3	12.3	32.0	30.7	G3/8"-M	48	10.0	22	10	
SPB4f 30 SI-55 G1/8-IG	8.6	12.3	32.0	30.7	G1/8"-F	58	12.0	22	10	
SPB4f 30 SI-55 G1/4-IG	11.0	12.3	32.0	30.7	G1/4"-F	58	12.0	22	10	
SPB4f 30 SI-55 G3/8-IG	11.0	12.3	32.0	30.7	G3/8"-F	58	12.0	22	10	
SPB4f 40 SI-55 G1/8-AG	3.0	15.3	42.0	39.7	G1/8"-M	60	7.5	22	20	
SPB4f 40 SI-55 G1/4-AG	8.0	15.3	42.0	39.7	G1/4"-M	60	10.0	22	20	
SPB4f 40 SI-55 G3/8-AG	8.0	15.3	42.0	39.7	G3/8"-M	60	10.0	22	20	
SPB4f 40 SI-55 G1/8-IG	8.6	15.3	42.0	39.7	G1/8"-F	70	12.0	22	20	
SPB4f 40 SI-55 G1/4-IG	11.0	15.3	42.0	39.7	G1/4"-F	70	12.0	22	20	
SPB4f 40 SI-55 G3/8-IG	11.0	15.3	42.0	39.7	G3/8"-F	70	12.0	22	20	
SPB4f 50 SI-55 G1/8-AG	4.0	21.0	52.0	49.7	G1/8"-M	73	7.5	27	26	
SPB4f 50 SI-55 G1/4-AG	8.0	21.0	52.0	49.7	G1/4"-M	73	10.0	27	26	
SPB4f 50 SI-55 G3/8-AG	10.3	21.0	52.0	49.7	G3/8"-M	73	10.0	27	26	
SPB4f 50 SI-55 G1/2-AG	15.0	21.0	52.0	49.7	G1/2"-M	73	14.0	27	26	
SPB4f 50 SI-55 G1/8-IG	8.6	21.0	52.0	49.7	G1/8"-F	87	12.0	27	26	
SPB4f 50 SI-55 G1/4-IG	11.4	21.0	52.0	49.7	G1/4"-F	87	12.0	27	26	
SPB4f 50 SI-55 G3/8-IG	15.0	21.0	52.0	49.7	G3/8"-F	87	12.0	27	26	
SPB4f 50 SI-55 G1/2-IG	15.0	21.0	52.0	49.7	G1/2"-F	87	16.0	27	26	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging

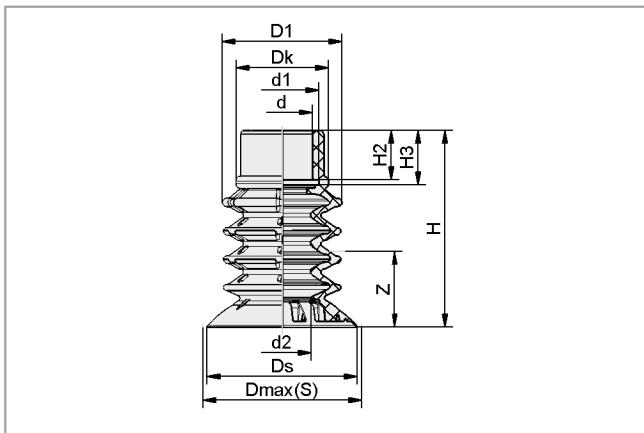


Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm



Design Data Bellows Suction Cups SPB4f (4.5 Folds)



SPB4f 30...50

Type	Dimensions in mm*											
	d	d1	d2	D1	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)	
SPB4f 30 SI-55 SC080	16	19.6	12.3	22.4	24.4	32	31	40	13	14.4	10	
SPB4f 30 SI-HD SC080	16	19.6	12.3	22.4	24.4	32	31	40	13	14.4	10	
SPB4f 40 SI-55 SC080	16	19.6	15.3	31.6	24.4	42	40	52	13	14.4	20	
SPB4f 40 SI-HD SC080	16	19.6	15.3	31.6	24.4	42	40	52	13	14.4	20	
SPB4f 50 SI-55 SC090	20	24.8	21.0	41.6	31.0	52	50	65	14	16.0	26	
SPB4f 50 SI-HD SC090	20	24.8	21.0	41.6	31.0	52	50	65	14	16.0	26	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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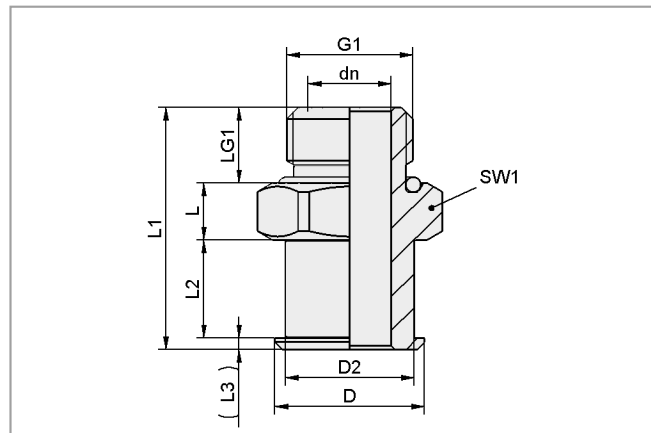
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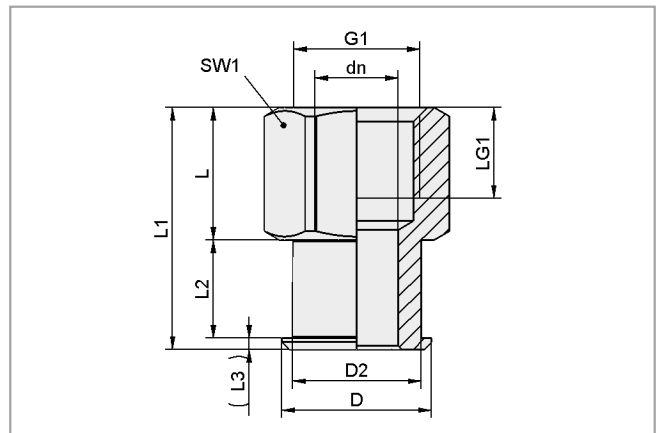
Bellows Suction Cups SPB4f (4.5 Folds)

Suction area (\emptyset) from 30 mm to 50 mm

Design Data Connection Elements Bellows Suction Cups SPB4f



SC...AG



SC...IG

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	
SC 080 G1/8-AG	19.8	17	4	G1/8"-M	7.5	28.0	13	1.5	8	22	
SC 080 G1/8-IG	19.8	17	9	G1/8"-F	17.5	32.0	13	1.5	12	22	
SC 080 G1/4-AG	19.8	17	8	G1/4"-M	7.5	32.0	13	1.5	10	22	
SC 080 G1/4-IG	19.8	17	11	G1/4"-F	17.5	32.0	13	1.5	12	22	
SC 080 G3/8-AG	19.8	17	10	G3/8"-M	7.5	32.0	13	1.5	10	22	
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32.0	13	1.5	12	22	
SC 090 G1/8-AG	25.0	21	4	G1/8"-M	7.5	31.0	14	2.0	8	27	
SC 090 G1/8-IG	25.0	21	9	G1/8"-F	21.5	37.5	14	2.0	12	27	
SC 090 G1/4-AG	25.0	21	8	G1/4"-M	7.5	33.5	14	2.0	10	27	
SC 090 G1/4-IG	25.0	21	11	G1/4"-F	21.5	37.5	14	2.0	12	27	
SC 090 G3/8-AG	25.0	21	10	G3/8"-M	7.5	33.5	14	2.0	10	27	
SC 090 G3/8-IG	25.0	21	15	G3/8"-F	21.5	37.5	14	2.0	12	27	
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.5	37.5	14	2.0	14	27	
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.5	37.5	14	2.0	16	27	

Suction Cups for Packaging



Bellows Suction Cups FGA PVC (1.5 Folds)

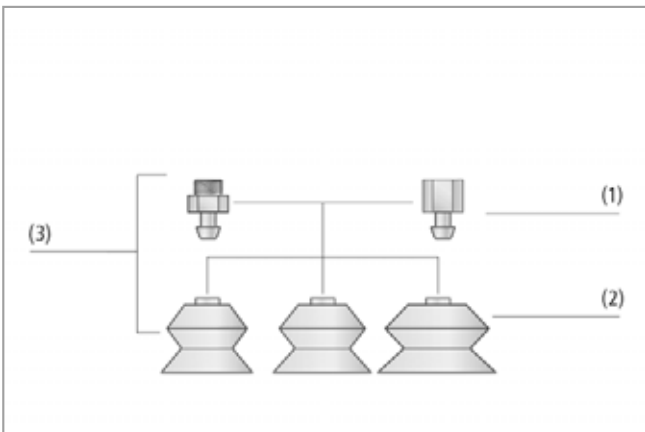
Suction area (Ø) from 13 mm to 22 mm



Suitable for Industry Specific Applications



Bellows suction cups FGA PVC (1.5 folds)



System design bellows suction cups FGA PVC (1.5 folds)



Bellows suction cups FGA PVC being used for handling non-rigid workpieces

Applications

- Round, bellows suction cup with 1.5 folds for handling of fragile workpieces thanks to damping effect of corrugations and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags

Design

- Robust and wear-resistant suction cup FGA (2) with 1.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter
- With each nipple family, the replacement cups and nipples (1) can be combined as desired (3)

Our Highlights...

- 1.5 folds
- Large effective internal diameter
- Soft and adaptable sealing lip and bottom corrugation
- Stiffer upper corrugation
- Flexible and adaptable material
- Wear-resistant material PVC

Your Benefits...

- > Good damping when positioning on workpiece
- > High suction force
- > Good adaptation to curved or uneven surfaces
- > High stability against horizontal acceleration
- > Optimum sealing, even on non-rigid workpieces
- > Long operating lifetime, use for FDA and BfR-compliance requirements

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Bellows Suction Cups FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Designation Code Bellows Suction Cups FGA PVC (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Type connection element
Example FGA 13 PVC-50 N016:			
FGA	13	PVC-50	N016
FGA	13	PVC-50	N016
	19		N056
	22		N056

Ordering Data Bellows Suction Cups FGA PVC (1.5 Folds)

Suction cup FGA PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection nipple), the following ordering steps are required:

- Suction cup of type FGA PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Cups FGA PVC (1.5 Folds) (Single Component)

Type	Part Number
FGA 13 PVC-50 N016	10.01.06.01549
FGA 19 PVC-50 N056	10.01.06.01975
FGA 22 PVC-50 N016	10.01.06.01947

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Connection Nipples Bellows Suction Cups FGA PVC (1.5 Folds)

Type	M5-AG	G1/8-AG	G1/8-IG
FGA 13 PVC	10.01.06.00123	10.01.06.05735	10.01.06.05731
FGA 19 PVC	10.01.06.03080	10.01.06.03571	10.01.06.03572
FGA 22 PVC	10.01.06.00123	10.01.06.05735	10.01.06.05731

Technical Data Bellows Suction Cups FGA PVC (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]**
FGA 13 PVC-50 N016	1.7	6	0.6	10	4
FGA 19 PVC-50 N056	5.9	10	2.0	20	4
FGA 22 PVC-50 N016	5.3	16	2.3	20	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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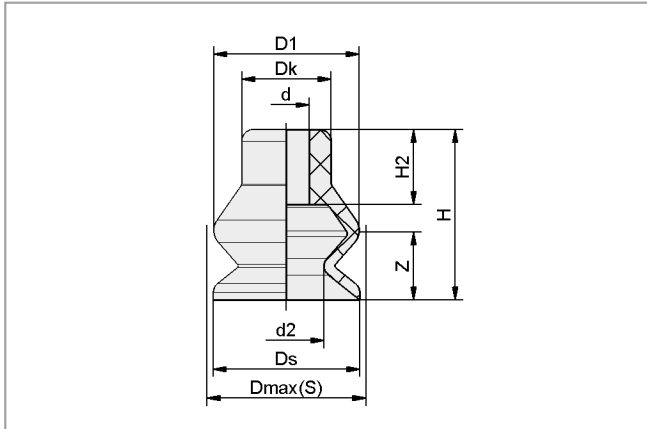


Bellows Suction Cups FGA PVC (1.5 Folds)

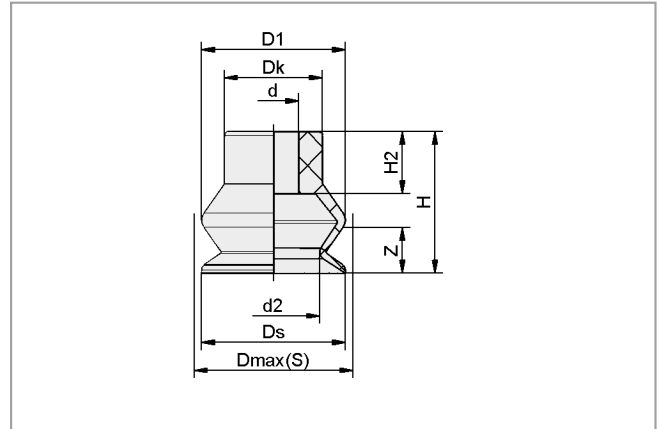
Suction area (\emptyset) from 13 mm to 22 mm



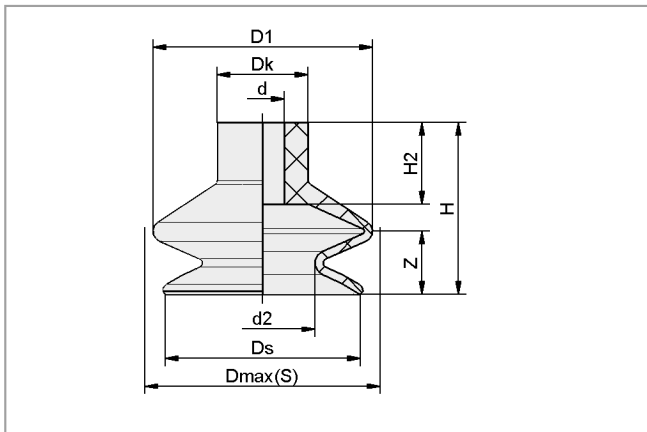
Design Data Bellows Suction Cups FGA PVC (1.5 Folds) (Single Component)



FGA 13 PVC-50



FGA 19 PVC-50



FGA 22 PVC-50

Type	Dimensions in mm*									
	D1	d	d2	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)	
FGA 13 PVC-50 N016	12.8	4.0	6.6	7.9	15	12.9	15.0	6.6	6	
FGA 19 PVC-50 N056	19.0	6.6	12.2	13.0	22	19.0	18.7	8.2	6	
FGA 22 PVC-50 N016	24.2	4.8	11.5	10.0	25	21.5	19.0	9.0	7	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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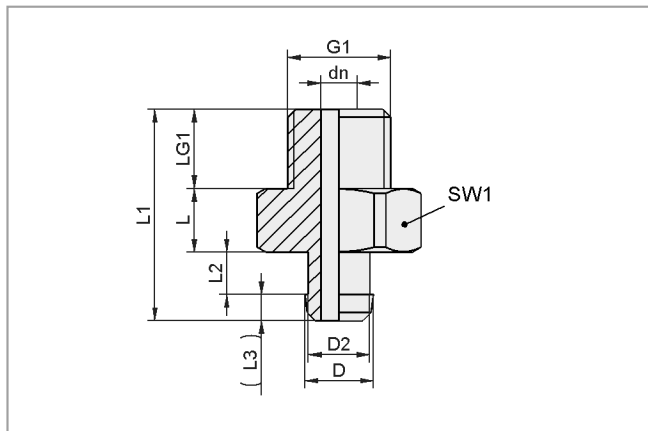


Bellows Suction Cups FGA PVC (1.5 Folds)

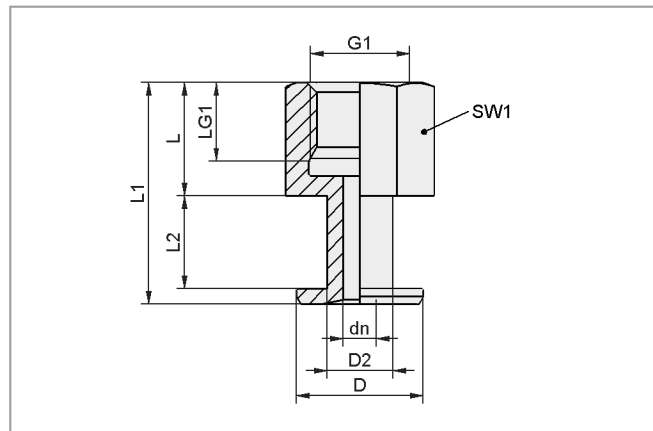
Suction area (\emptyset) from 13 mm to 22 mm



Design Data Connection Nipples Bellows Suction Cups FGA PVC (1.5 Folds)



SA-NIP M5-M, G1/8-M



SA-NIP G1/8-F

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	
SA-NIP N016 M5-AG DN250	6.5	6	3	M5-M	5.0	16.0	3.5	2.5	5.0	7	
SA-NIP N056 M5-AG DN250	8.2	8	3	M5-M	5.0	17.0	4.0	3.0	5.0	14	
SA-NIP N016 G1/8-AG DN350	6.5	6	4	G1/8"-M	6.0	20.0	4.0	2.5	7.5	14	
SA-NIP N056 G1/8-AG DN400	8.2	8	4	G1/8"-M	5.0	20.0	4.0	3.0	8.0	14	
SA-NIP N016 G1/8-IG DN350	6.5	6	4	G1/8"-F	12.0	18.5	4.0	2.5	8.0	14	
SA-NIP N056 G1/8-IG DN400	8.2	8	4	G1/8"-F	10.0	17.0	4.0	3.0	8.0	14	

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Bellows Suction Cups FG PVC (2.5 Folds)

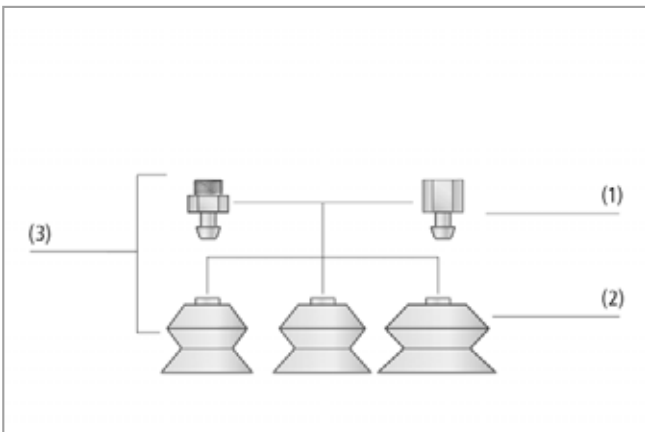
Suction area (Ø) from 18 mm to 50 mm



Suitable for Industry Specific Applications



Bellows suction cups FG PVC (2.5 folds)



System design bellows suction cups FG PVC (2.5 folds)



Bellows suction cups FG PVC being used for handling small cardboard boxes

Applications

- Round, bellows suction cup with 2.5 folds for handling of extremely fragile workpieces thanks to damping effect of folds and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags

Design

- Robust and wear-resistant suction cup FG (2) with 2.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter
- With each nipple family, the replacement cups and nipples (1) can be combined as desired (3)

Our Highlights...

- 2.5 folds
- Large effective internal diameter
- Soft and flexible sealing lip
- Flexible, adaptable material and soft folds
- Wear-resistant material PVC

Your Benefits...

- > Good damping when positioning on workpiece
- > High suction force
- > Good adaptation to curved or uneven surfaces
- > Optimum sealing, particularly on non-rigid workpieces
- > Long operating lifetime, use for FDA and BfR-compliance requirements

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Bellows Suction Cups FG PVC (2.5 Folds)

Suction area (\emptyset) from 18 mm to 50 mm

Designation Code Bellows Suction Cups FG PVC (2.5 Folds)

Abbreviated designation	Suction area \emptyset in mm	Material and Shore hardness	Type connection element
Example FG 32 PVC-50:			
FG	32	PVC-50	
FG	18	PVC-50	N016
	23		N033
	32		N057
	40		
	50		

Ordering Data Bellows Suction Cups FG PVC (2.5 Folds)

Suction cup FG PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection nipple), the following ordering steps are required:

- Suction cup of type FG PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Cups FG PVC (2.5 Folds) (Single Component)

Type*	Part Number
FG 18 PVC-50 N016	10.01.06.01941
FG 23 PVC-50 N057	10.01.06.01942
FG 32 PVC-50	10.01.06.01943
FG 40 PVC-50 N033	10.01.06.02468
FG 50 PVC-50 N033	10.01.06.02469

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Connection Nipples Bellows Suction Cups FG PVC (2.5 Folds)

Type	M5-AG	G1/8"-AG	G1/8"-IG	G1/4"-AG	G1/4"-IG
FG 18 PVC	10.01.06.00123	10.01.06.05735	10.01.06.05731	-	-
FG 23 PVC	-	10.01.06.03573	10.01.06.03574	-	-
FG 32 PVC	-	10.01.06.02249	-	-	-
FG 40 PVC	-	-	-	10.01.01.00818	10.01.01.00817
FG 50 PVC	-	-	-	10.01.01.00818	10.01.01.00817

Technical Data Bellows Suction Cups FG PVC (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FG 18 PVC-50 N016	3.2	8	2.0	15	4
FG 23 PVC-50 N057	6.6	15	3.9	20	4
FG 32 PVC-50	13.9	24	9.0	30	6
FG 40 PVC-50 N033	21.7	56	15.2	60	6
FG 50 PVC-50 N033	36.6	68	28.4	75	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

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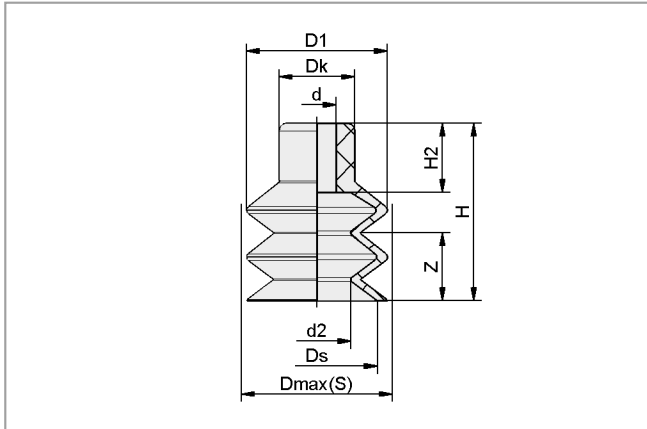


Bellows Suction Cups FG PVC (2.5 Folds)

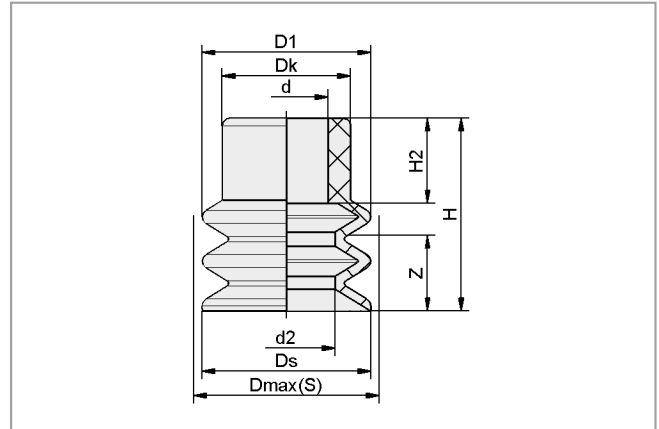
Suction area (\emptyset) from 18 mm to 50 mm



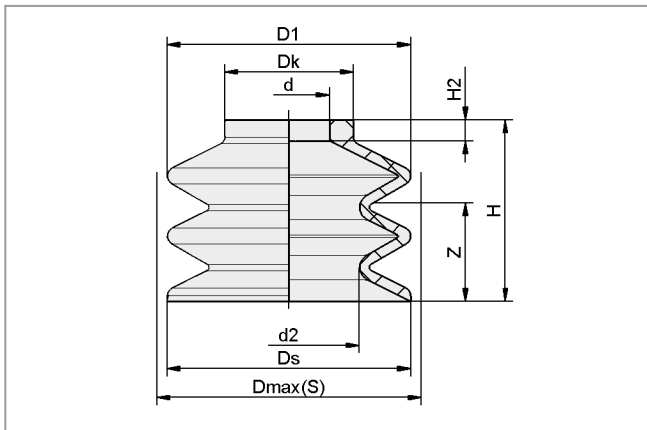
Design Data Bellows Suction Cups FG PVC (2.5 Folds)



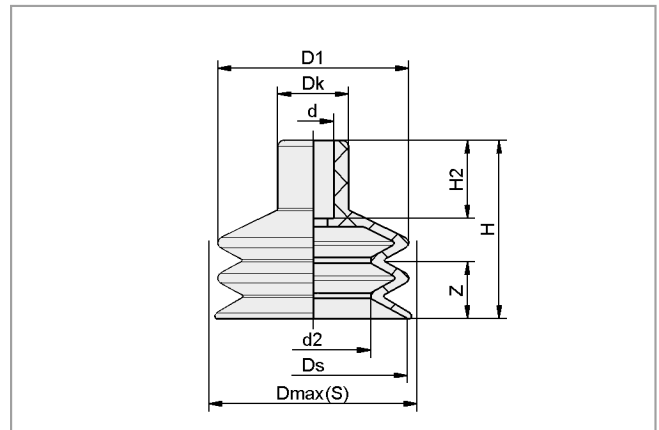
FG 18 PVC-50



FG 23 PVC-50



FG 32 PVC-50



FG 40 and 50 PVC-50

Type	Dimensions in mm*									
	D1	d	d2	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)	
FG 18 PVC-50 N016	18.6	5.0	8.9	10	20.0	16.0	23.5	9.2	9	
FG 23 PVC-50 N057	22.3	11.0	12.9	17	25.0	22.3	25.5	11.3	10	
FG 32 PVC-50	32.2	10.7	18.6	17	33.5	32.2	24.0	2.8	15	
FG 40 PVC-50 N033	40.4	10.8	23.4	19	44.0	40.0	41.7	20.7	11	
FG 50 PVC-50 N033	50.5	10.8	30.4	19	54.0	50.0	47.2	20.7	15	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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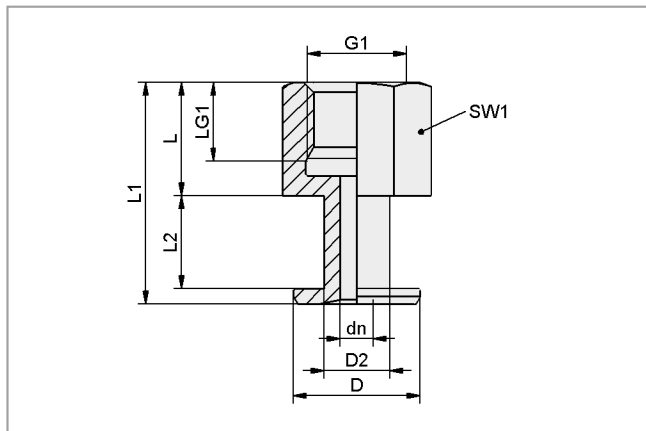


Bellows Suction Cups FG PVC (2.5 Folds)

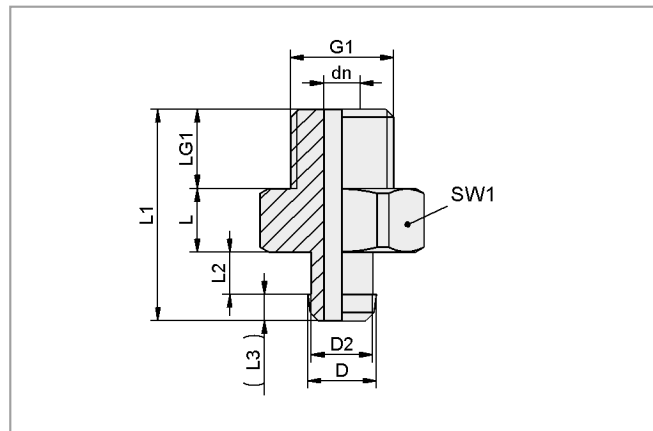
Suction area (\emptyset) from 18 mm to 50 mm



Design Data Connection Nipples Bellows Suction Cups FG PVC (2.5 Folds)



SA-NIP G1/8''-IG, G1/4''-IG



SA-NIP M5-AG, G1/8''-AG, G1/4''-AG

Type	Dimensions in mm									
	D	dn	D2	G1	L	L1	LG1	L2	SW1	
SA-NIP N016 M5-AG DN250	6.5	2.5	5.8	M5-M	5	16.0	5.0	3.5	7	
SA-NIP N016 G1/8-AG DN350	6.5	3.5	5.8	G1/8''-M	6	20.0	7.5	4.0	14	
SA-NIP N057 G1/8-AG DN510	14.0	5.1	11.8	G1/8''-M	7	27.8	8.0	11.3	17	
SA-NIP G1/8-AG DN500	16.0	5.0	12.0	G1/8''-M	5	17.6	8.0	2.3	17	
SA-NIP N016 G1/8-IG DN350	6.5	3.5	5.8	G1/8''-F	12	18.5	8.0	4.0	14	
SA-NIP N057 G1/8-IG DN510	14.0	5.1	11.8	G1/8''-F	12	24.0	8.0	11.3	17	
SA-NIP N033 G1/4-AG DN550	13.0	5.5	11.0	G1/4''-M	5	28.0	10.0	13.0	17	
SA-NIP N033 G1/4-IG DN550	13.0	5.5	11.0	G1/4''-F	15	28.0	12.0	13.0	17	

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Suction Cups for Packaging



Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52 x 25 mm to 80 x 50 mm



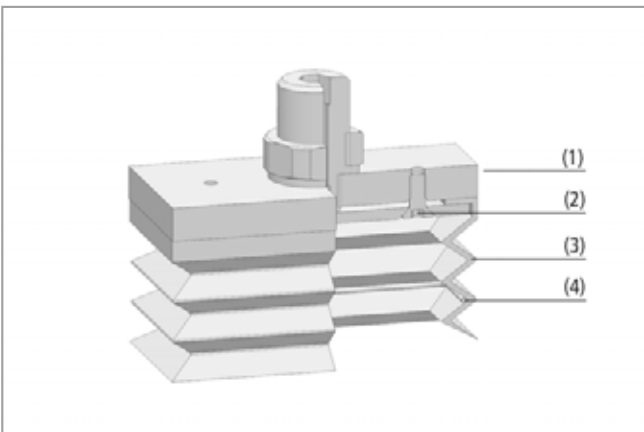
Suitable for Industry Specific Applications



Bellows suction cups FSGB-R (rectangular)

Applications

- Rectangular bellows suction cups with 2.5 or 3.5 folds for handling of rectangular packing materials with non-uniform surfaces
- Handling of film-packed products, filled plastic bags; workpieces with folds
- Handling of non-rigid workpieces and flexible outer packing materials which can be deformed during handling
- Use of supporting frame in variable numbers depending on application



System design bellows suction cups FSGB-R

Design

- Rectangular bellows suction cup FSGB-R with single sealing lip, consisting of suction cup FGB-R (3) and connection plates (1)
- FSGB-R 52x25 and FSGB-R 60x29 with 2.5 folds; FSGB-R 80x30, FSGB-R80x40 and FSGB-R 80x50 with 3.5 folds
- Very adaptable geometry and soft, flexible sealing lip
- Suction cup is securely clamped between connection plates; screw connection (2) of the cup side permits simple, in-situ replacement of cup
- Supporting frames (4) (available as accessories) can optionally be mounted in one or more of the corrugations



Bellows suction cups FSGB-R being used for handling of packing materials

Our Highlights...

- Large, rectangular suction surface
- Soft and flexible folds
- Soft and adaptable sealing lip
- Supporting frames for mounting in folds (optional)

Your Benefits...

- > Good gripping of rectangular workpieces
- > Good adaptation to non-uniform surfaces and non-rigid workpieces
- > Sealing on structured surfaces and workpieces with folds
- > Improved stability of the suction cup's folds

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Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52 x 25 mm to 80 x 50 mm

Designation Code Bellows Suction Cups FSGB-R (Rectangular)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example FSGB-R 60x29 NBR-50 G1/8-IG:			
FSGB-R	60x29	NBR-50	G1/8-IG
FSGB-R	52x25	NBR-50	G1/8-IG (IG = female (F))
	60x29	SI-50	G1/4-AG (AG = male (M))
	80x30		
	80x40		
	80x50		

Ordering Data Bellows Suction Cups FSGB-R (Rectangular)

Suction cup FSGB-R (elastomer part + connection plate) is delivered assembled. The assembly consists of:

- Suction cup of type FGB-R – elastomer part, available in various dimensions (LxW) and materials
- Aluminium support plate – available with various threads

Available spare parts: suction cup FGB-R

Available accessories: supporting frames

Bellows Suction Cups FSGB-R (Rectangular)

Type	Suction cup material * / hardness in Shore A	
	NBR-50	SI-50
FSGB-R 52x25 G1/4-AG**	10.01.06.02281	10.01.06.02282
FSGB-R 52x25 G1/8-IG**	10.01.06.02287	10.01.06.02288
FSGB-R 60x29 G1/4-AG**	10.01.06.02283	-
FSGB-R 60x29 G1/8-IG**	10.01.06.02289	-
FSGB-R 80x30 G1/4-AG***	-	10.01.06.02284
FSGB-R 80x30 G1/8-IG***	-	10.01.06.02290
FSGB-R 80x40 G1/4-AG***	-	10.01.06.02285
FSGB-R 80x40 G1/8-IG***	-	10.01.06.02291
FSGB-R 80x50 G1/4-AG***	-	10.01.06.02286
FSGB-R 80x50 G1/8-IG***	-	10.01.06.02292

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

**2.5 folds

***3.5 folds

Ordering Data Spare Parts Bellows Suction Cups FSGB-R

Type	Suction cup material * / hardness in Shore A	
	NBR-50	SI-50
FGB-R 52x25**	10.01.06.01115	10.01.06.01116
FGB-R 60x29**	10.01.06.01117	-
FGB-R 80x30***	-	10.01.06.01112
FGB-R 80x40***	-	10.01.06.01113
FGB-R 80x50***	-	10.01.06.01114

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

**2.5 folds

***3.5 folds

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Suction Cups for Packaging



Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52 x 25 mm to 80 x 50 mm

Ordering Data Accessories Bellows Suction Cups FSGB-R (Rectangular)

Type	Supporting frame
FSGB-R 52x25	10.01.06.02276
FSGB-R 60x29	10.01.06.02277
FSGB-R 80x30	10.01.06.02278
FSGB-R 80x40	10.01.06.02279
FSGB-R 80x50	10.01.06.02280

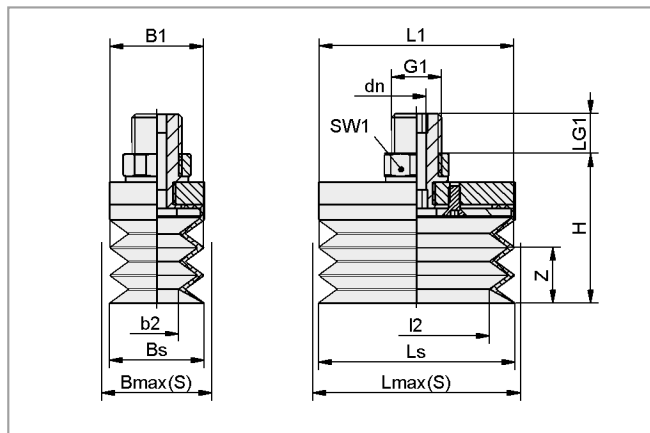
Technical Data Bellows Suction Cups FSGB-R (Rectangular)

Type	Suction force [N]*	Volume [cm ³]	Number of folds	Recom. internal hose diameter d [mm]**
FSGB-R 52x25	20	16	2.5	6
FSGB-R 60x29	36	22	2.5	6
FSGB-R 80x30	29	41	3.5	6
FSGB-R 80x40	61	61	3.5	9
FSGB-R 80x50	92	80	3.5	9

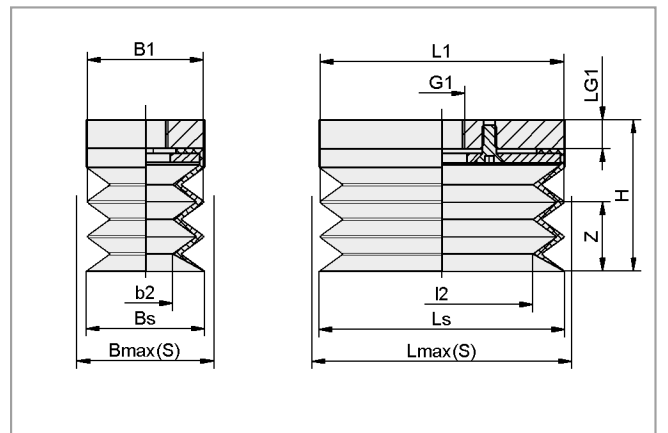
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

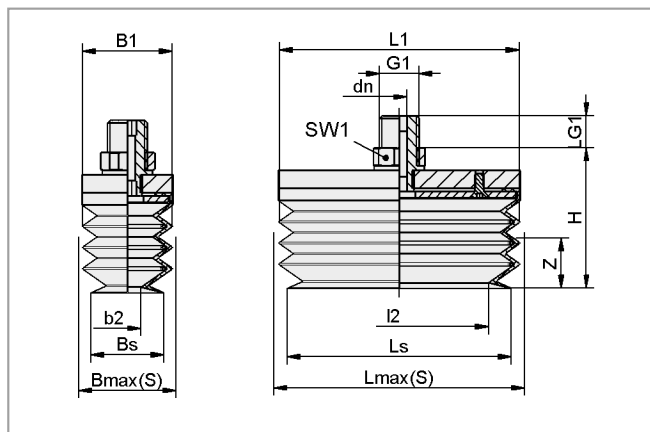
Design Data Bellows Suction Cups FSGB-R (Rectangular)



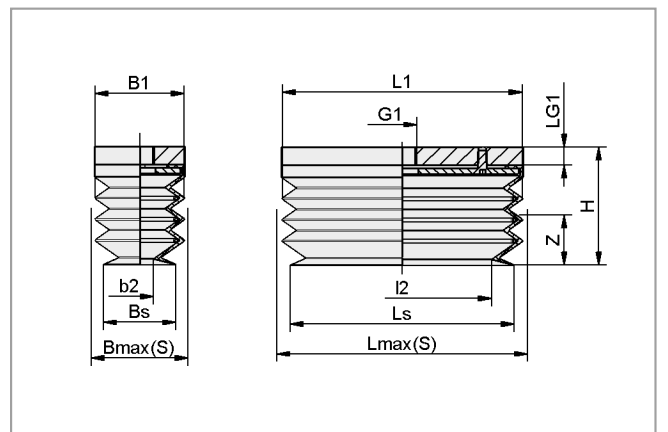
FSGB-R 52x25 and 60x29 AG



FSGB-R 52x25 and 60x29 IG



FSGB-R 80x30 to 80x50 AG



FSGB-R 80x30 to 50x50 IG

Suction Cups for Packaging



Bellows Suction Cups FSGB-R (Rectangular)

Suction area (LxW) from 52 x 25 mm to 80 x 50 mm

Design Data Bellows Suction Cups FSGB-R (Rectangular)

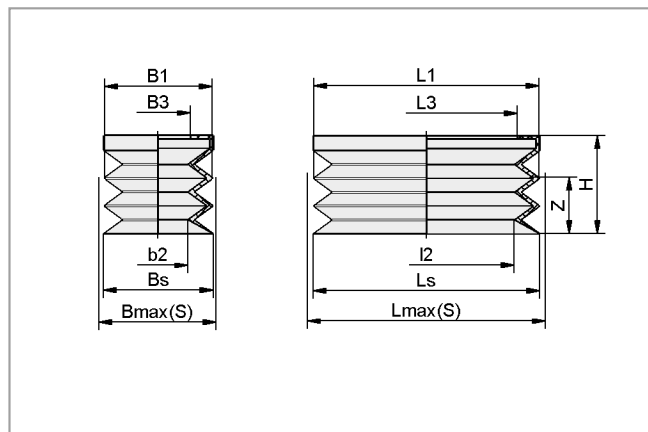
Type	Dimensions in mm*													
	b2	B1	Bmax(S)**	Bs	dn	G1	H	I2	L1	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)**
FSGB-R 52x25 G1/4-AG	10.0	25	27.5	25.0	5	G1/4"-M	50.0	37.0	52	10.5	54.5	52.0	17	15
FSGB-R 52x25 G1/8-IG	10.0	25	27.5	25.0	5	-	32.0	37.0	52	-	54.5	52.0	-	15
FSGB-R 60x29 G1/4-AG	15.0	29	32.0	29.0	5	G1/4"-M	50.0	45.0	60	10.5	63.0	60.0	17	14
FSGB-R 60x29 G1/8-IG	15.0	29	32.0	29.0	-	G1/8"-F	32.0	45.0	60	6.0	63.0	60.0	-	14
FSGB-R 80x30 G1/4-AG	9.0	24	33.0	24.0	5	G1/4"-M	57.0	59.0	74	10.5	83.0	74.0	17	16
FSGB-R 80x30 G1/8-IG	9.0	24	33.0	24.0	-	G1/8"-F	39.0	59.0	74	6.0	83.0	74.0	-	16
FSGB-R 80x40 G1/4-AG	19.0	34	44.0	34.0	5	G1/4"-M	57.0	59.0	74	10.5	84.0	74.0	17	13
FSGB-R 80x40 G1/8-IG	19.0	34	44.0	34.0	-	G1/8"-F	39.0	59.0	74	6.0	84.0	74.0	-	13
FSGB-R 80x50 G1/4-AG	29.0	44	54.0	44.0	5	G1/4"-M	57.0	59.0	74	10.5	84.0	74.0	17	13
FSGB-R 80x50 G1/8-IG	29.0	44	54.0	44.0	-	G1/8"-F	39.0	59.0	74	6.0	84.0	74.0	-	13

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

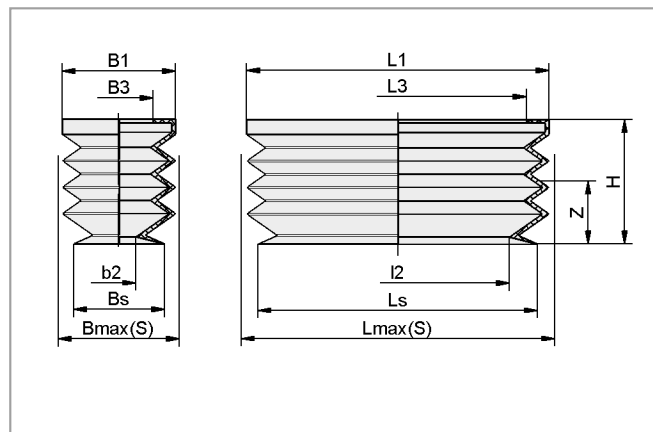
**The specified stroke is for use with a supporting frame in each fold.

***External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Bellows Suction Cups FGB-R - Spare Parts for FSGB-R



FGB-R 52x25 and 60x29



FGB-R 80x30 to 80x50

Type	Dimensions in mm*											Ls	Z (Stroke)**
	b2	Bmax(S)**	Bs	B1	B3	H	I2	L1	L3	Lmax(S)**			
FGB-R 52x25	10.0	27.5	25.0	25	13	26	37.0	52	40	54.5	52.0	15	
FGB-R 60x29	15.0	32.0	29.0	29	17	26	45.0	60	48	63.0	60.0	14	
FGB-R 80x30	9.0	33.0	24.0	30	18	33	59.0	80	68	83.0	74.0	16	
FGB-R 80x40	19.0	44.0	34.0	40	28	33	59.0	80	68	84.0	74.0	13	
FGB-R 80x50	29.0	54.0	44.0	50	38	33	59.0	80	68	84.0	74.0	13	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**The specified stroke is for use with a supporting frame in each fold.

***External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Packaging



Chocolate Suction Cups SPG

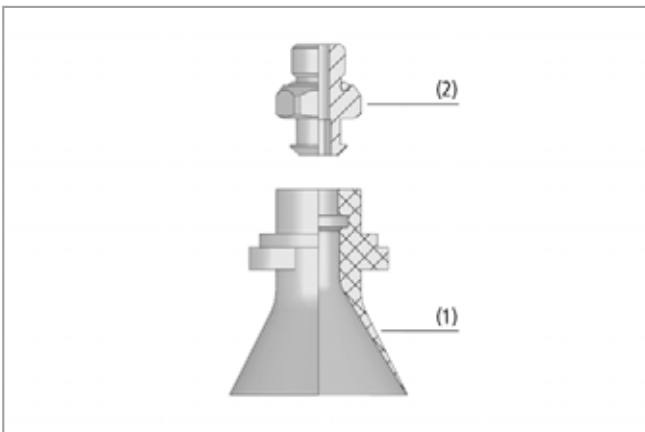
Suction area (Ø) 33 mm



Suitable for Industry Specific Applications



Chocolate suction cups SPG



System design chocolate suction cups SPG

Applications

- Bell-shaped suction cup for dynamic handling and packing of chocolates in combination with picker robots
- Direct handling of round, oval or square chocolates
- Handling of confectionery with structured surfaces or toppings
- Suitable for direct contact with food due to FDA-compliant material silicone
- Handling of round chocolates with maximum diameter of 35 mm and oval/square chocolates with maximum diagonal measurement of 30 mm

Design

- Suction cup (1) with extremely thin, soft sealing lip and tapered suction cup geometry
- Optimal sealing lip shape for handling workpieces with structured surfaces
- Use of one-piece insertable connection element (2), with G1/8" male or female thread, for changing the suction cup quickly
- Connection element with male thread has integrated seal



Chocolate suction cups SPG being used for handling chocolates

Our Highlights...

- Extremely thin sealing lip
- Tapered sealing lip shape
- Large nominal flow
- FDA-compliant material silicone

Your Benefits...

- > Good sealing on decorated chocolates
- > Even square chocolates are enclosed by suction cup; dynamic handling possible
- > Leakage compensation on highly-structured chocolates
- > Suitable for direct contact with food

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Suction Cups for Packaging



Chocolate Suction Cups SPG

Suction area (Ø) 33 mm

Designation Code Chocolate Suction Cups SPG

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Type connection element
Example SPG 33 SI-45 SC040:			
SPG	33	SI-45	SC040
SPG	33	SI-45 SI-HD	SC040

Ordering Data Chocolate Suction Cups SPG

Chocolate suction cup SPG (elastomer part) is supplied as an individual part. In order to receive a complete suction cup (elastomer part + connection element), the following ordering steps are required:

- Suction cup of type SPG (step 1) – elastomer part
- Connection element of type SC (step 2) – available with various threads

Step 1: Chocolate Suction Cups SPG (Single Component)

Type*	Part Number
SPG 33 SI-45 SC040	10.01.19.00002
SPG 33 SI-HD SC040	10.01.19.00165

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Step 2: Connection Elements Chocolate Suction Cup SPG

Type	Part Number
SC 040 G1/8-AG	10.01.06.02490
SC 040 G1/8-IG	10.01.06.02482

Technical Data Chocolate Suction Cups SPG

Type	Volume [cm ³]	Recommended internal hose [mm]	Max. diameter of the chocolates [mm]*	Weight of workpiece [g]**
SPG 33 SI-45	7,6	4	35	20
SPG 33 SI-HD	8,0	4	35	20

*The suction force and operating vacuum are dependent on the geometry and surface characteristics of the chocolate. We recommend a maximum operating vacuum of -150 mbar.

**For handling with high accelerations (up to 10g)

Suction Cups for Packaging

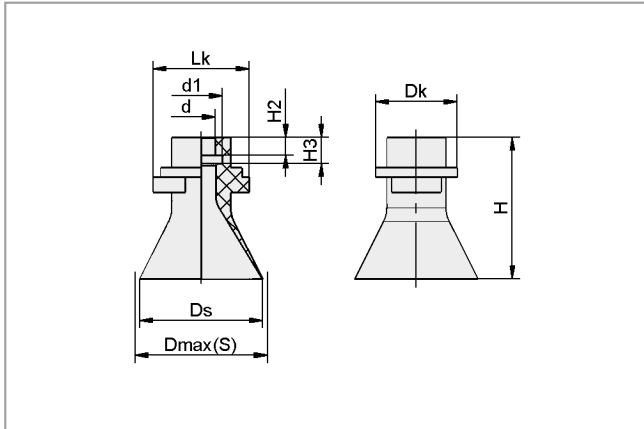


Chocolate Suction Cups SPG

Suction area (\emptyset) 33 mm



Design Data Chocolate Suction Cups SPG



SPG 33

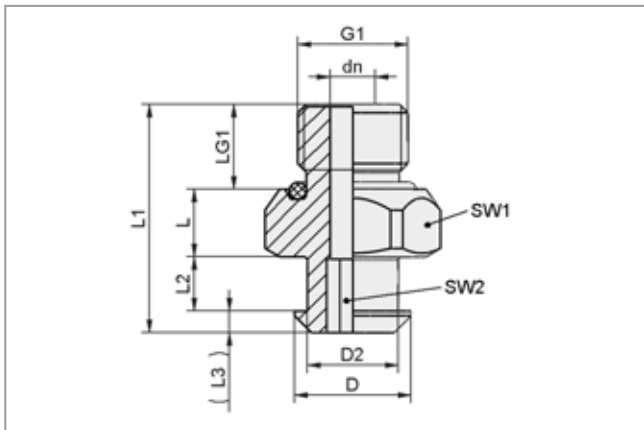
Type	Dimensions in mm*									
	d	d1	Dk	Dmax(S)**	Ds	H	H2	H3	Lk	
SPG 33 SI-45 SC040	7.3	11	21.5	35.0	32.1	38	4.8	7	25.5	
SPG 33 SI-HD SC040	7.3	11	21.5	35.0	32.1	38	4.8	7	25.5	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

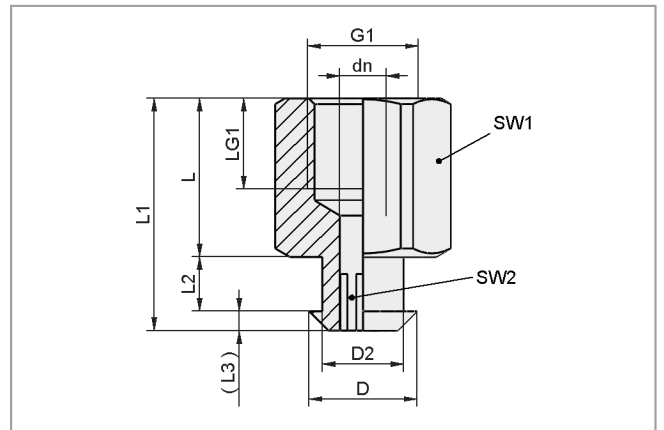
**External dimension of the suction cup when it is pressed against the workpiece by the vacuum



Design Data Connection Elements Chocolate Suction Cup SPG



SC 040 G1/8-AG



SC 040 G1/8-IG

Type	Dimensions in mm										
	dn	D	D2	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 040 G1/8-AG	4	10.3	8	G1/8"-M	6.0	20.2	4.8	1.9	7.5	14	4
SC 040 G1/8-IG	4	10.3	8	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4

Suction Cups for Plastic Films and Paper



Flat Suction Cups SGPN

Suction area (\emptyset) from 15 mm to 40 mm



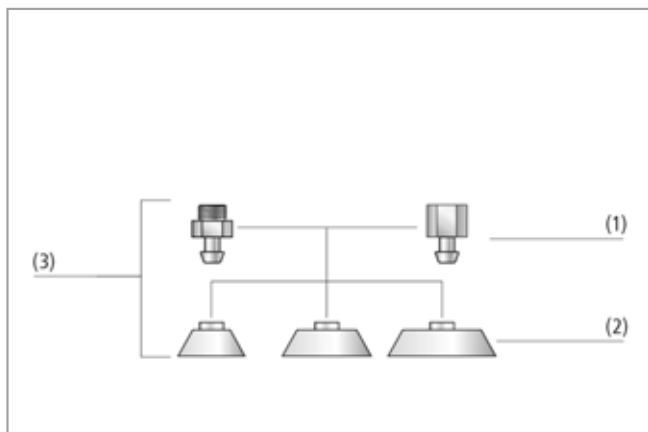
Suitable for Industry Specific Applications



Flat suction cups SGPN

Applications

- Round, flat suction cup for handling of wooden veneers, wafers and solar cells
- Handling of various packing material, e.g. plastic films, paper, blister packs
- Gentle handling of plastic films and paper due to flat, long-tapered sealing lip and inner support



System design flat suction cups SGPN

Design

- Robust, wear-resistant suction cup SGPN (3) with single sealing lip, consisting of suction cup SGP (2) and connection nipple (1)
- Nipple plugged into cup
- With each nipple family, the replacement cups and nipples can be combined as desired



Flat suction cups SGPN being used for handling blister packagings

Our Highlights...

- Flat, long-tapered sealing lip and inner support
- Material: natural rubber NK 40 Shore A
- Material: Silicone SI 50 Shore A
- Material: HT1

Your Benefits...

- > No "pulling-in" into the suction cup, i.e. very suitable for plastic film, paper and solar cells
- > No crinkling when gripping paper and plastic film
- > Resistant to ozone, UV radiation and heat; very suitable for handling tasks in the paper and printing industry
- > No marks on the workpiece; even at high temperatures

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Suction Cups for Plastic Films and Paper



Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Designation Code Flat Suction Cups SGPN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGPN 20 SI-50 M5-AG:			
SGPN	20	SI-50	M5-AG
SGPN	15 to 40	HT1-60 NK-40 SI-50 FMP-65	M5-AG (AG = male (M)) G1/8-AG G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering Data Flat Suction Cups SGPN

Flat suction cup SGPN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:

- Suction cup of type SGP – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction cup SGP, connection nipple SA-NIP

Flat Suction Cups SGPN

Type*	Suction cup material * / hardness in Shore A			
	FPM-65	HT1-60	NK-40	SI-50
SGPN 15 M5-AG	-	10.01.01.12396	10.01.01.11977	10.01.01.11980
SGPN 15 G1/8-AG	10.01.01.12921	10.01.01.12397	10.01.01.10315	10.01.01.11981
SGPN 15 G1/8-IG	10.01.01.13047	10.01.01.12398	10.01.01.10181	10.01.01.11982
SGPN 20 M5-AG	-	-	10.01.01.11978	10.01.01.11983
SGPN 20 G1/8-AG	10.01.01.12922	-	10.01.01.10316	10.01.01.11984
SGPN 20 G1/8-IG	10.01.01.13048	-	10.01.01.10180	10.01.01.11985
SGPN 24 M5-AG	-	10.01.01.12403	10.01.01.11979	10.01.01.11986
SGPN 24 G1/8-AG	-	10.01.01.12404	10.01.01.10317	10.01.01.11987
SGPN 24 G1/8-IG	-	10.01.01.12405	10.01.01.10182	10.01.01.11988
SGPN 30 G1/4-AG	-	10.01.01.12399	10.01.01.00791	10.01.01.11989
SGPN 30 G1/4-IG	-	10.01.01.12400	10.01.01.00790	10.01.01.11990
SGPN 34 G1/4-AG	10.01.01.12920	-	10.01.01.10831	-
SGPN 34 G1/4-IG	10.01.01.13046	-	10.01.01.10830	-
SGPN 35 G1/4-AG	-	10.01.01.12848	10.01.01.00793	10.01.01.12785
SGPN 35 G1/4-IG	-	10.01.01.12849	10.01.01.00792	10.01.01.12787
SGPN 40 G1/8-AG	-	10.01.01.12847	10.01.01.11739	10.01.01.12773
SGPN 40 G1/4-AG	-	10.01.01.12845	10.01.01.00795	10.01.01.12775
SGPN 40 G1/4-IG	-	10.01.01.12846	10.01.01.00794	10.01.01.12774

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Suction Cups for Plastic Films and Paper



Flat Suction Cups SGPN

Suction area (Ø) from 15 mm to 40 mm

Ordering Data Spare Parts Flat Suction Cups and Connection Nipples

Type*	Suction cup material * / hardness in Shore A			
	FPM-65	HT1-60	NK-40	SI-50
SGP 15	10.01.01.12908	10.01.01.12394	10.01.01.10318	10.01.01.10574
SGP 20	10.01.01.12909	-	10.01.01.10319	10.01.01.11571
SGP 24	-	10.01.01.12402	10.01.01.10320	10.01.01.10577
SGP 30	-	10.01.01.12395	10.01.01.00787	10.01.01.01064
SGP 34	10.01.01.12919	-	10.01.01.10829	-
SGP 35	-	10.01.01.12811	10.01.01.00788	10.01.01.12784
SGP 40	-	10.01.01.12812	10.01.01.00789	10.01.01.12772

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Type	Connection nipple	
SGPN 15 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 15 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 15 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 20 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 20 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 20 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 24 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 24 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 24 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 30 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 30 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 34 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 34 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 35 G1/4-AG	SA-NIP N034 G1/4-AG DN550	10.01.01.00820
SGPN 35 G1/4-IG	SA-NIP N034 G1/4-IG DN550	10.01.01.00819
SGPN 40 G1/8-AG	SA-NIP N035 G1/8-AG DN500	10.01.01.11738
SGPN 40 G1/4-AG	SA-NIP N035 G1/4-AG DN550	10.01.01.00822
SGPN 40 G1/4-IG	SA-NIP N035 G1/4-IG DN550	10.01.01.00821

Technical Data Flat Suction Cups SGPN

Type	Suction force [N]*	Volume [cm³]	Recommended internal hose diameter d [mm]**	Nipple family
SGPN 15	5.5	0.12	2	N 016
SGPN 20	8.5	0.31	2	N 016
SGPN 24	11.0	0.70	4	N 016
SGPN 30	19.0	1.50	4	N 033
SGPN 34	25.0	2.10	4	N 033
SGPN 35	31.0	2.20	4	N 034
SGPN 40	33.0	2.90	4	N 035

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Plastic Films and Paper

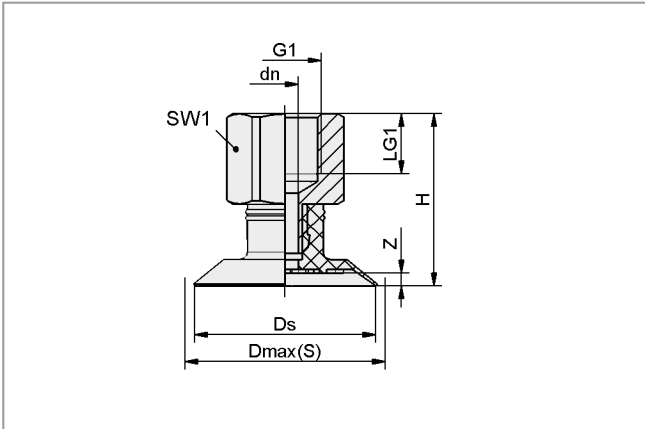


Flat Suction Cups SGPN

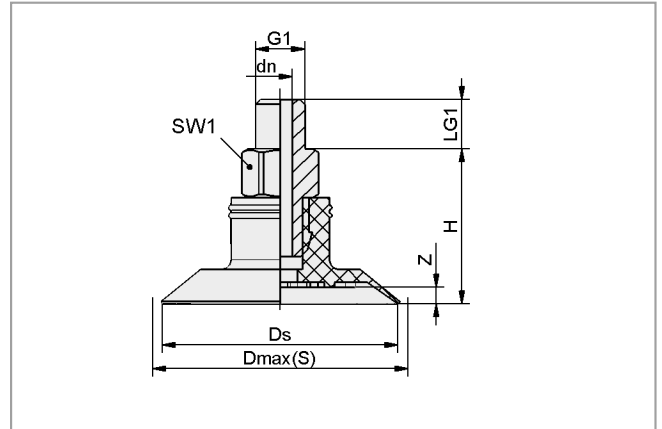
Suction area (\emptyset) from 15 mm to 40 mm



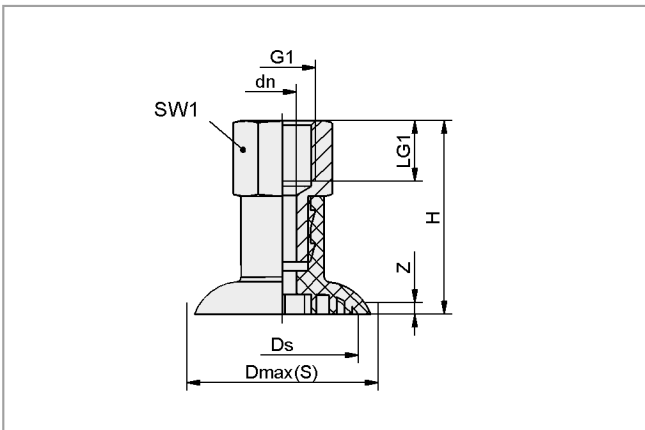
Design Data Flat Suction Cups SGPN



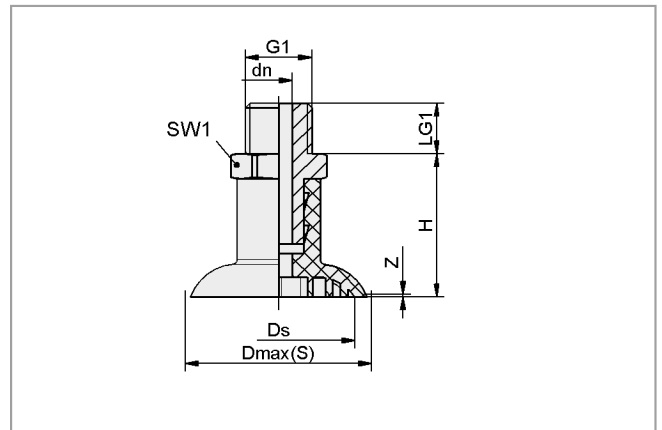
SGPN 15 to 40 IG



SGPN 15 to 40 AG



SGPN 35 IG



SGPN 35 AG

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Flat Suction Cups SGPN

Suction area (\emptyset) from 15 mm to 40 mm

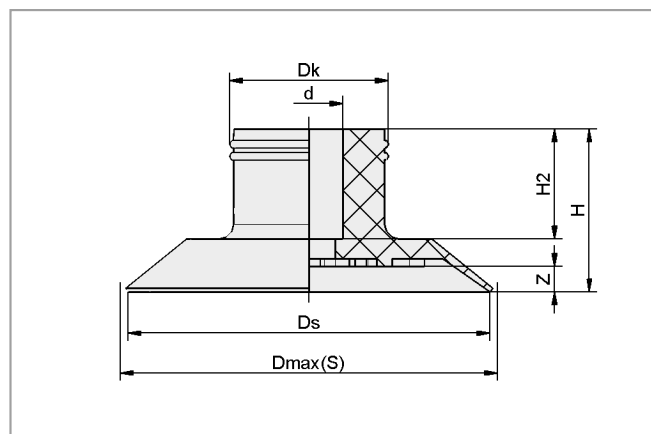
Design Data Flat Suction Cups SGPN

Type	Dimensions in mm*								
	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)	
SGPN 15 M5-AG	2.5	15.5	14.5	M5-M	15.0	5.0	7	0.9	
SGPN 15 G1/8-AG	3.5	15.5	14.5	G1/8"-M	16.0	7.5	14	0.9	
SGPN 15 G1/8-IG	3.5	15.5	14.5	G1/8"-F	22.0	8.0	14	0.9	
SGPN 20 M5-AG	2.5	22.0	20.0	M5-M	15.4	5.0	7	1.5	
SGPN 20 G1/8-AG	3.5	22.0	20.0	G1/8"-M	16.4	7.5	14	1.5	
SGPN 20 G1/8-IG	3.5	22.0	20.0	G1/8"-F	22.4	8.0	14	1.5	
SGPN 24 M5-AG	2.5	25.5	24.0	M5-M	15.8	5.0	7	1.7	
SGPN 24 G1/8-AG	3.5	25.5	24.0	G1/8"-M	16.8	7.5	14	1.7	
SGPN 24 G1/8-IG	3.5	25.5	24.0	G1/8"-F	22.8	8.0	14	1.7	
SGPN 30 G1/4-AG	5.5	32.0	30.0	G1/4"-M	27.2	10.0	17	2.0	
SGPN 30 G1/4-IG	5.5	32.0	30.0	G1/4"-F	37.2	12.0	17	2.0	
SGPN 34 G1/4-AG	5.5	37.5	34.0	G1/4"-M	28.0	10.0	17	1.4	
SGPN 34 G1/4-IG	5.5	37.5	34.0	G1/4"-F	38.0	12.0	17	1.4	
SGPN 35 G1/4-AG	5.5	35.0	34.0	G1/4"-M	28.5	10.0	17	0.5	
SGPN 35 G1/4-IG	5.5	35.0	34.0	G1/4"-F	38.5	12.0	17	0.5	
SGPN 40 G1/8-AG	5.0	42.0	40.0	G1/8"-M	25.6	10.0	17	2.3	
SGPN 40 G1/4-AG	5.0	42.0	40.0	G1/4"-M	25.6	10.0	17	2.3	
SGPN 40 G1/4-IG	5.0	42.0	40.0	G1/4"-F	35.6	12.0	17	2.3	

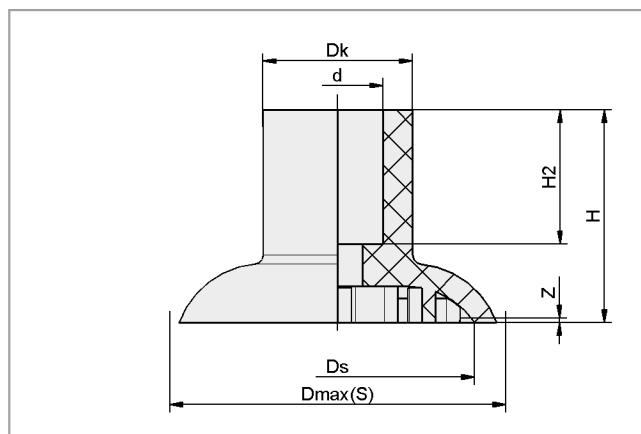
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Design Data Flat Suction Cups SGP - Spare Parts for SGPN



SGP 15 to 40



SGP 35

Type	Dimensions in mm*							
	d	Dk	Dmax(S)**	Ds	H	H2	Z (Stroke)	
SGP 15	4.5	9.5	15.5	14.5	10.0	7.2	0.9	
SGP 20	4.5	11.0	22.0	20.0	10.4	7.1	1.5	
SGP 24	4.5	10.5	25.5	24.0	10.8	7.3	1.7	
SGP 30	11.2	15.6	32.0	30.0	22.2	15.7	2.0	
SGP 34	11.2	15.2	37.5	34.0	23.0	16.8	1.4	
SGP 35	10.0	16.5	35.0	30.2	23.5	14.8	0.5	
SGP 40	8.0	16.0	42.0	40.0	20.6	14.5	2.3	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Glass



Suction Plates SGF

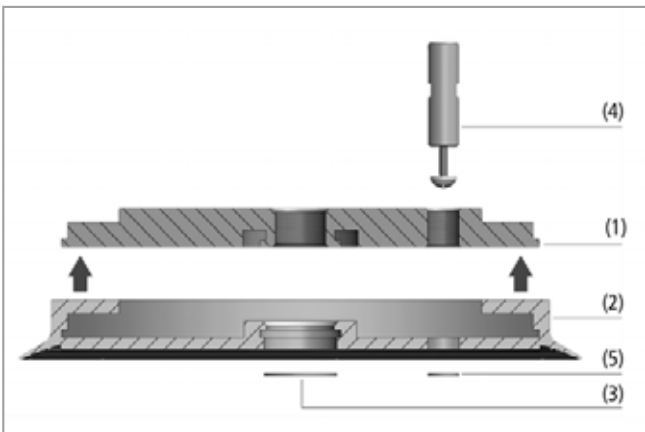
Suction area (Ø) from 125 mm to 400 mm



Suitable for Industry Specific Applications



Suction plates SGF



System design suction plates SGF



Suction plates SGF being used for handling sensitive glass sheets

Applications

- Suction plates for handling of flat and smooth workpieces such as glass and plastic sheets where high lateral forces are important e.g. through high accelerations or vertical handling
- Handling of very thin workpieces, such as flat glass (float glass) or coated glass
- Used in glass manufacturing processes where interleavnt powder is used
- Handling of solar modules, e.g. in module manufacturing processes

Design

- Aluminum support plate (1) and sealing ring (2)
- Diameters 125 mm to 200 mm: replaceable sealing ring and thin, flat sealing lip
- Diameters 250 mm to 400 mm: vulcanized sealing ring and steep sealing lip
- Central vacuum connection, optionally with clip-in filter screen (3) as pre-filter
- Eccentric connection for touch valve (4) or filter screen (5), as a standard closed with a plug (secured with adhesive)
- Special designed internal structure for handling glass sheets when interleavnt powder is used in the process

Our Highlights...

- Thin and flat sealing lip (Ø 125 mm to 200 mm)
- Steep sealing lip (Ø 250 mm to 400 mm)
- Low total weight of the suction plate
- Large effective suction area
- Special material EPDM
- Special material HT1 which leaves no marks

Your Benefits...

- > Little relative movement during pick-up; this prevents the surface of the workpiece from being damaged
- > Optimum pick-up characteristics and damping effect when positioning the suction plate
- > High accelerations in automated processes
- > High suction and lateral forces in dynamic processes
- > Usage in areas with high UV and ozone levels
- > No visible marks left on the workpiece, even at high temperatures

Suction Cups for Handling Glass



Suction Plates SGF

Suction area (Ø) from 125 mm to 400 mm

Designation Code Suction Plates SGF

Abbreviated designation	Suction area Ø in mm	Product addition	Material and Shore hardness	Connection thread
Example SGF 125 EPDM-55 G1/4-IG:				
SGF	125		EPDM-55	G1/4-IG
SGF	125 to 400	HS High stroke	EPDM-55 HT1-60	G1/4-IG (IG = female (F)) G1/2-IG

Ordering Data Suction Plates SGF

Suction plate SGF (sealing ring + support plate) is delivered assembled. The assembly consists of:

- Sealing ring of type DR-SGF – elastomer part, available in various diameters
- Aluminium support plate – available with various threads

Available spare parts: sealing ring of type DR-SGF

Available accessories: touch valve, filter screen

Suction Plates SGF

Type*	Part Number
SGF 125 EPDM-55 G1/4-IG	10.01.01.12475
SGF 125 HT1-60 G1/4-IG	10.01.01.12892
SGF 150 EPDM-55 G1/2-IG	10.01.01.13019
SGF 150 HT1-60 G1/2-IG	10.01.01.13021
SGF 150 HS HT1-60 G1/2-IG	10.01.01.13178
SGF 200 EPDM-55 G1/2-IG	10.01.01.12476
SGF 200 HT1-60 G1/2-IG	10.01.01.12893
SGF 250 HS HT1-60 G1/2-IG	10.01.01.13153
SGF 250 HS EPDM-55 G1/2-IG	10.01.01.13038
SGF 300 EPDM-55 G1/2-IG	10.01.01.12477
SGF 300 HT1-60 G1/2-IG	10.01.01.13002
SGF 350 HS EPDM-55 G1/2-IG	10.01.01.13039
SGF 350 HS HT1-60 G1/2-IG	10.01.01.13154
SGF 400 EPDM-55 G1/2-IG	10.01.01.12478

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts And Accessories Suction Plates SGF

Type	Sealing ring DR-SGF	Sensing valve	Filter screen*
SGF 125 EPDM-55 G1/4-IG	10.01.01.12473	10.05.10.00061	10.07.01.00215
SGF 125 HT1-60 G1/4-IG	10.01.01.12890	10.05.10.00061	10.07.01.00215
SGF 150 EPDM-55 G1/2-IG	10.01.01.13018	10.05.10.00061	10.07.01.00110
SGF 150 HT1-60 G1/2-IG	10.01.01.13020	10.05.10.00061	10.07.01.00110
SGF 150 HS HT1-60 G1/2-IG	10.01.01.13176	10.05.10.00061	10.07.01.00110
SGF 200 EPDM-55 G1/2-IG	10.01.01.12474	10.05.10.00061	10.07.01.00110
SGF 200 HT1-60 G1/2-IG	10.01.01.12891	10.05.10.00061	10.07.01.00110
SGF 250 HS HT1-60 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 250 HS EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 300 EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 300 HT1-60 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 350 HS EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 350 HS HT1-60 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 400 EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110

*Filter screen for centered vacuum connection; for eccentric connection use filter screen 10.07.01.00215.

Suction Cups for Handling Glass



Suction Plates SGF

Suction area (\emptyset) from 125 mm to 400 mm

Technical Data Suction Plates SGF

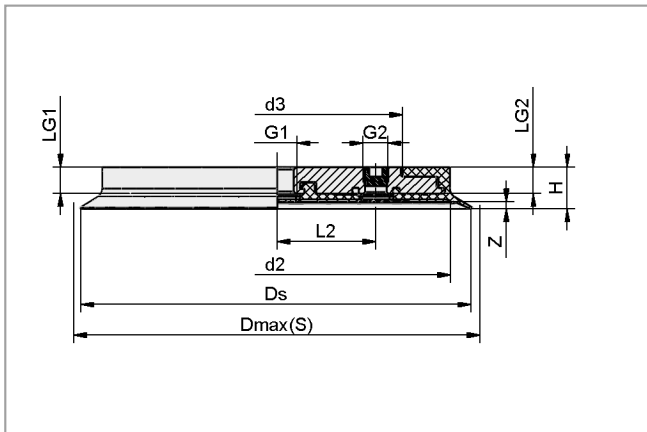
Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm ³]	Recommended internal hose diameter d [mm]***
SGF 125	730	470	44	9
SGF 150	1060	730	65	9
SGF 150 HS	1060	730	119	9
SGF 200	1880	1610	144	12
SGF 250 HS	2900	2220	372	12
SGF 300	4240	3480	308	12
SGF 350 HS	5700	4730	779	12
SGF 400	7530	6520	560	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

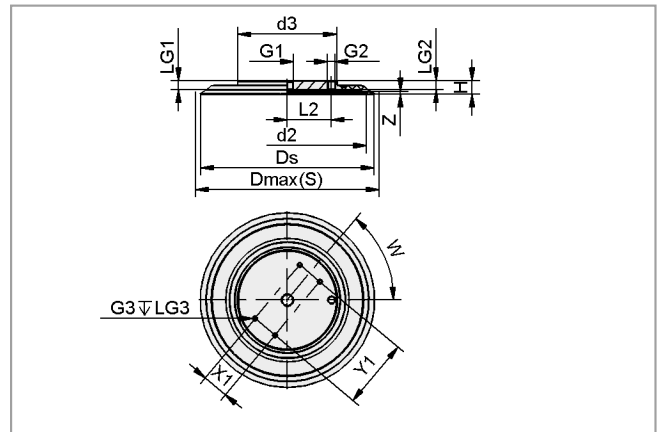
**Suction force referred to the sealing-edge diameter d2

***The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Suction Plates SGF



SGF 125 to 200



SGF 250 to 400

Type	Dimensions in mm*														Z (Stroke)	
	d2	d3	Dmax(S)**	Ds	G1	G2	G3	H	LG1	LG2	LG3	L2	W	X1		Y1
SGF 125	100.0	70	130	123	G1/4"-F	G1/4"-F	-	21.4	14.0	14.0	-	26.5	-	-	-	3.0
SGF 150	125.0	93	156	148	G1/2"-F	G1/4"-F	-	21.7	14.0	14.0	-	36.5	-	-	-	3.3
SGF 150 HS	126.0	70	165	149	G1/2"-F	G1/4"-F	-	25.9	14.0	14.0	-	26.5	-	-	-	7.5
SGF 200	185.0	134	213	206	G1/2"-F	G1/4"-F	-	22.0	14.0	14.0	-	52.8	-	-	-	3.6
SGF 250 HS	217.0	140	260	248	G1/2"-F	G1/4"-F	M8-F	26.8	14.5	14.5	12	52.5	70	45	100	9.0
SGF 300	272.3	170	305	298	G1/2"-F	G1/4"-F	M8-F	22.3	14.5	14.5	12	76.0	50	45	120	4.5
SGF 350 HS	317.0	170	360	348	G1/2"-F	G1/4"-F	M8-F	26.8	14.5	14.5	12	76.0	50	45	120	9.0
SGF 400	372.3	170	405	398	G1/2"-F	G1/4"-F	M8-F	22.3	14.5	14.5	12	76.0	50	45	120	4.5

*Acceptable dimensional tolerances for rubber sealings concerning to DIN 3302 - M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Glass



Bellows Suction Cups SAB HT1 (1.5 Folds)

Suction area (\emptyset) from 22 mm to 125 mm



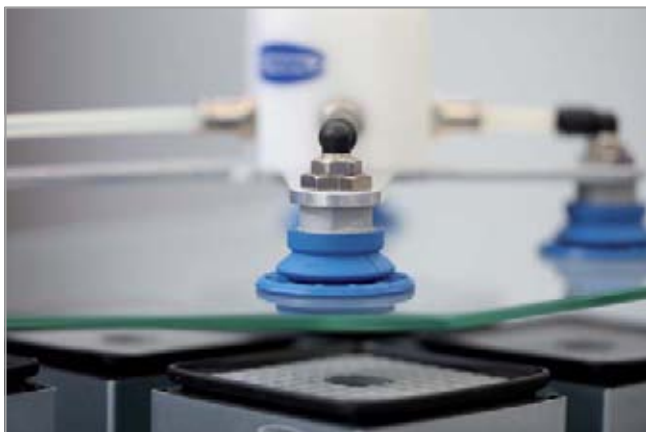
Suitable for Industry Specific Applications



Bellows suction cups SAB HT1 (1,5 folds)



System design bellows suction cup SAB HT1 (1.5 folds)



Bellows suction cups SAB HT1 being used for handling glass

Applications

- Round bellows suction cup with 1.5 folds for dynamic handling of glass workpieces
- Handling of flat glass and formed glass pieces
- Use in automated production lines for automotive windscreens or side windows, even after the bending process at temperatures up to 170° C
- Exact positioning in production processes without displacement
- High lateral forces in use with separation powder on flat glass or on damp surfaces

Design

- Robust and hard-wearing bellows suction cup made of HT1 with 1.5 folds, with special slot and inner support
- Suction cup is vulcanized to the connection nipple (for very high strength)
- Special structure of the suction surface with high performance profile

Our Highlights...

- Non-marking material HT1
- High temperature resistance
- Large, structured inner support
- 1.5 folds
- Very stiff top fold

Your Benefits...

- > Minimal chemical influence on the workpiece surface
- > Handling of hot workpieces without modification of the material properties
- > Capable of handling high lateral forces, especially in use with separating powder and wet workpieces
- > Optimum adaptation and sealing to curved workpieces, very good damping
- > Very good resistance to lateral forces and lateral acceleration

Suction Cups for Handling Glass



Bellows Suction Cups SAB HT1 (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

Designation Code Bellows Suction Cups SAB HT1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAB 30 HT1-60 G1/4-AG:			
SAB	30	HT1-60	G1/4-AG
SAB	22 to 125	HT1-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-AG G3/8-IG RA rectangular adapter

Ordering Data Bellows Suction Cups SAB HT1 (1.5 Folds)

Suction cup SAB HT1, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Cups SAB HT1 (1.5 Folds)

Type	Connection				Rectangular adapter
	G1/4"-M	G1/4"-F	G3/8"-M	G3/8"-F	
SAB 22 HT1-60	10.01.06.02753	10.01.06.02722	10.01.06.03015	10.01.06.03006	-
SAB 30 HT1-60	10.01.06.03048	10.01.06.02723	10.01.06.03049	10.01.06.03050	10.01.06.02755
SAB 40 HT1-60	10.01.06.03051	10.01.06.02724	10.01.06.03052	10.01.06.03053	10.01.06.02757
SAB 50 HT1-60	10.01.06.03057	10.01.06.02760	10.01.06.03058	10.01.06.02725	10.01.06.02759
SAB 60 HT1-60	10.01.06.03059	10.01.06.02779	10.01.06.03060	10.01.06.02726	10.01.06.02762
SAB 80 HT1-60	10.01.06.03061	10.01.06.02778	10.01.06.03062	10.01.06.02727	10.01.06.02764
SAB 100 HT1-60	10.01.06.02927	10.01.06.02961	10.01.06.03063	10.01.06.02728	10.01.06.02766
SAB 125 HT1-60	10.01.06.03065	10.01.06.03064	10.01.06.03066	10.01.06.02729	-

Technical Data Bellows Suction Cups SAB HT1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAB 22 HT1-60	16	24	18	1.5	20	4
SAB 30 HT1-60	22	33	30	5.9	40	4
SAB 40 HT1-60	38	59	36	7.0	40	4
SAB 50 HT1-60	53	87	55	11.5	50	4
SAB 60 HT1-60	82	130	82	24.0	65	6
SAB 80 HT1-60	135	221	145	56.5	75	6
SAB 100 HT1-60	190	357	220	92.5	90	6
SAB 125 HT1-60	250	558	352	191.0	140	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for Handling Glass

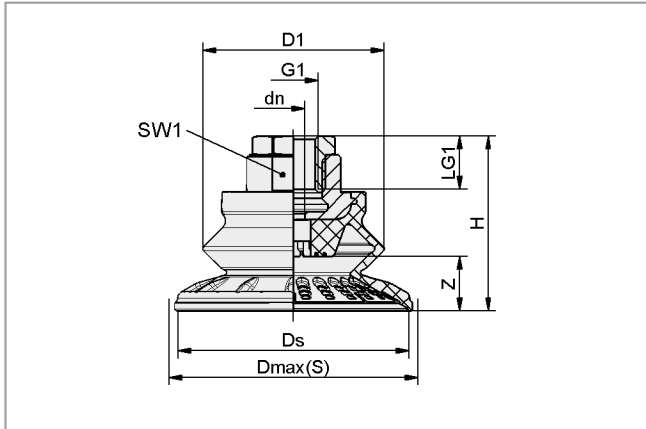


Bellows Suction Cups SAB HT1 (1.5 Folds)

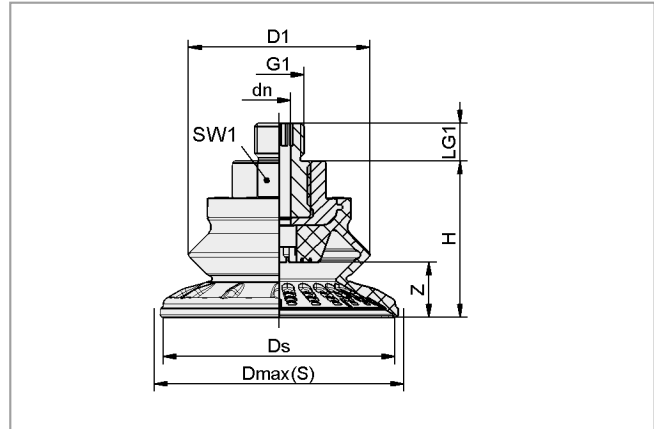
Suction area (\emptyset) from 22 mm to 125 mm



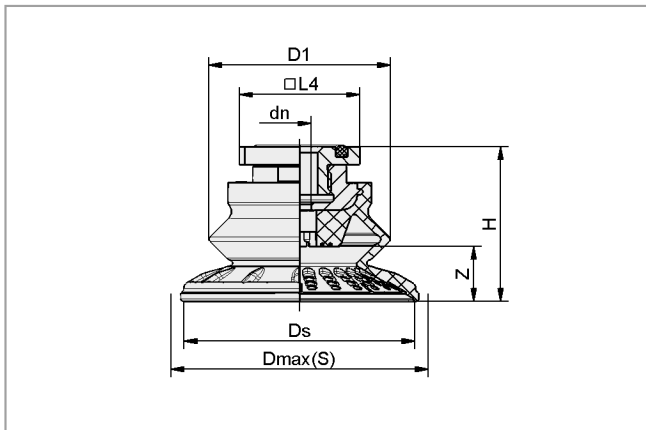
Design Data Bellows Suction Cups SAB HT1 (1.5 Folds)



SAB HT1 22 to 125 IG (female)



SAB HT1 22 to 125 AG (male)



SAB HT1 22 to 125 RA

- Schmalz - The Company
- Vacuum Knowledge
- Vacuum Suction Cups**
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
- Valve Technology
- Switches and Monitoring
- Filters and Connections
- Services
- Contact
- Index of Products

Suction Cups for Handling Glass



Bellows Suction Cups SAB HT1 (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm



Design Data Bellows Suction Cups SAB HT1 (1.5 Folds)

Type	Dimensions in mm*									
	D1	dn	Ds	Dmax(S)**	G1	H	LG1	L4	SW1	Z (Stroke)
SAB 22 HT1-60 G1/4-AG	22	3.5	21	24	G1/4"-M	25.0	10.0	-	16	5.8
SAB 22 HT1-60 G1/4-IG	22	3.5	21	24	G1/4"-F	25.0	12.0	-	16	5.8
SAB 22 HT1-60 G3/8-AG	22	3.5	21	24	G3/8"-M	25.0	10.0	-	16	5.8
SAB 22 HT1-60 G3/8-IG	22	3.5	21	24	G3/8"-F	41.0	9.5	-	22	5.8
SAB 30 HT1-60 G1/4-AG	32	4.0	31	34	G1/4"-M	28.0	10.0	-	17	9.0
SAB 30 HT1-60 G1/4-IG	32	4.0	31	34	G1/4"-F	28.0	12.0	-	17	9.0
SAB 30 HT1-60 G3/8-AG	32	4.0	31	34	G3/8"-M	28.0	10.0	-	17	9.0
SAB 30 HT1-60 G3/8-IG	32	4.0	31	34	G3/8"-F	44.0	9.5	-	22	9.0
SAB 30 HT1-60 RA	32	4.0	31	34	-	31.2	-	31.8	-	9.0
SAB 40 HT1-60 G1/4-AG	32	4.0	40	45	G1/4"-M	28.8	10.0	-	17	10.0
SAB 40 HT1-60 G1/4-IG	32	4.0	40	45	G1/4"-F	28.8	12.0	-	17	10.0
SAB 40 HT1-60 G3/8-AG	32	4.0	40	45	G3/8"-M	28.8	10.0	-	17	10.0
SAB 40 HT1-60 G3/8-IG	32	4.0	40	45	G3/8"-F	44.8	9.5	-	22	10.0
SAB 40 HT1-60 RA	32	4.0	40	45	-	31.2	-	31.8	-	10.0
SAB 50 HT1-60 G1/4-AG	40	6.0	50	56	G1/4"-M	36.9	10.0	-	22	11.5
SAB 50 HT1-60 G1/4-IG	40	6.0	50	56	G1/4"-F	42.0	20.0	-	22	11.5
SAB 50 HT1-60 G3/8-AG	40	6.0	50	56	G3/8"-M	36.9	10.0	-	22	11.5
SAB 50 HT1-60 G3/8-IG	40	6.0	50	56	G3/8"-F	36.9	15.0	-	22	11.5
SAB 50 HT1-60 RA	40	6.0	50	56	-	36.6	-	31.8	-	11.5
SAB 60 HT1-60 G1/4-AG	48	6.0	61	67	G1/4"-M	41.3	10.0	-	22	14.5
SAB 60 HT1-60 G1/4-IG	48	6.0	61	67	G1/4"-F	46.3	20.0	-	22	14.5
SAB 60 HT1-60 G3/8-AG	48	6.0	61	67	G3/8"-M	41.3	10.0	-	22	14.5
SAB 60 HT1-60 G3/8-IG	48	6.0	61	67	G3/8"-F	41.3	15.0	-	22	14.5
SAB 60 HT1-60 RA	48	6.0	61	67	-	41.0	-	31.8	-	14.5
SAB 80 HT1-60 G1/4-AG	64	6.0	81	89	G1/4"-M	49.9	10.0	-	22	22.1
SAB 80 HT1-60 G1/4-IG	64	6.0	81	89	G1/4"-F	54.9	20.0	-	22	22.1
SAB 80 HT1-60 G3/8-AG	64	6.0	81	89	G3/8"-M	49.9	10.0	-	22	22.1
SAB 80 HT1-60 G3/8-IG	64	6.0	81	89	G3/8"-F	49.9	15.0	-	22	22.1
SAB 80 HT1-60 RA	64	6.0	81	89	-	49.6	-	31.8	-	22.1
SAB 100 HT1-60 G1/4-AG	77	6.0	101	110	G1/4"-M	56.6	10.0	-	22	25.8
SAB 100 HT1-60 G1/4-IG	77	6.0	101	110	G1/4"-F	61.8	20.0	-	22	25.8
SAB 100 HT1-60 G3/8-AG	77	6.0	101	110	G3/8"-M	56.6	10.0	-	22	25.8
SAB 100 HT1-60 G3/8-IG	77	6.0	101	110	G3/8"-F	56.6	15.0	-	22	25.8
SAB 100 HT1-60 RA	77	6.0	101	110	-	56.3	-	31.8	-	25.8
SAB 125 HT1-60 G1/4-AG	94	6.0	126	135	G1/4"-M	67.8	10.0	-	22	32.0
SAB 125 HT1-60 G1/4-IG	94	6.0	126	135	G1/4"-F	72.8	20.0	-	22	32.0
SAB 125 HT1-60 G3/8-AG	94	6.0	126	135	G3/8"-M	67.8	10.0	-	22	32.0
SAB 125 HT1-60 G3/8-IG	94	9.0	126	135	G3/8"-F	67.8	15.0	-	22	32.0

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Vacuum Suction Cups
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Filters and Connections
Services
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Index of Products

Suction Cups for Handling Glass



Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

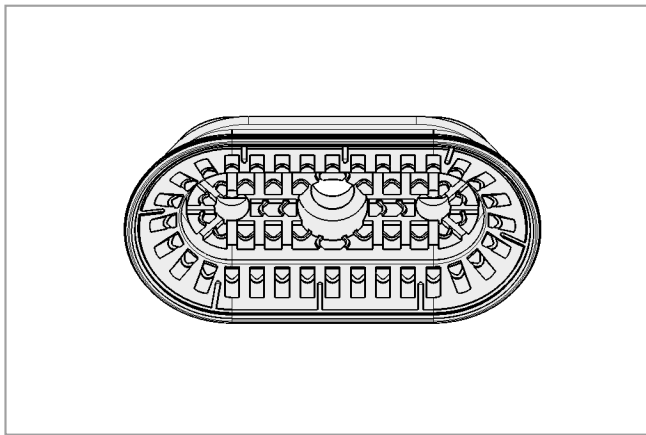
Suction area (LxW) from 60 x 30 mm to 140 x 70 mm



Suitable for Industry Specific Applications



Bellows Suction cup SAOB HT1 (oval, 1.5 folds)



System design bellows suction cups SAOB HT1 (oval, 1.5 folds)



Bellows Suction cups SAOB HT1 being used for handling hollow glass

Applications

- Oval bellows suction cup with 1.5 folds for dynamic handling of elongated glass workpieces
- Handling of flat glass and also formed glass pieces
- Use in automated production lines for automotive glass such as windscreens and side windows, even after the bending process at temperatures up to 170° C
- Exact positioning in production processes without displacement
- High lateral forces in use with separation powder on flat glass or on wet glass surfaces

Design

- Robust, wear-resistant oval bellows suction cup SAOB with 1.5 folds made of HT1, with single sealing lip, special slot and inner support
- Connection element glued to the reinforcing element of the suction cup (very high strength)
- Special structure of the suction surface for high resistance to lateral forces

Our Highlights...

- Non-marking material HT1
- High temperature resistance
- Large, structured inner support
- 1.5 folds
- Very stiff top fold

Your Benefits...

- > Minimal chemical influence on the workpiece surface
- > Handling of hot workpieces without modification of the material properties
- > Capable of handling high lateral forces, especially in use with separating powder and wet workpieces
- > Optimum adaptation and sealing to curved workpieces, very good damping
- > Very good resistance to lateral forces and lateral acceleration

Suction Cups for Handling Glass



Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Designation Code Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAOB 110x55 HT1-60 G1/4-AG:			
SAOB	110x55	HT1-60	G1/4-AG
SAOB	60x30	HT1-60	G1/4-AG (AG = male (M))
	80x40		G1/4-IG (IG = female (F))
	110x55		G3/8-AG
	140x70		G3/8-IG

Ordering Data Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Suction cup SAOB HT1, available in various diameters, is delivered with connection nipple glued to elastomer part.

Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Type	Connection			
	G1/4"-M	G1/4"-F	G3/8"-M	G3/8"-F
SAOB 60x30 HT1-60	10.01.06.03156	10.01.06.03175	10.01.06.03201	10.01.06.03202
SAOB 80x40 HT1-60	10.01.06.03203	10.01.06.03176	10.01.06.03204	10.01.06.03205
SAOB 110x55 HT1-60	10.01.06.03206	10.01.06.03178	10.01.06.03207	10.01.06.03208
SAOB 140x70 HT1-60	10.01.06.03209	10.01.06.03177	10.01.06.03210	10.01.06.03211

Technical Data Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOB 60x30 HT1-60	38	70	80	10.5	18	4
SAOB 80x40 HT1-60	65	132	153	21.8	25	6
SAOB 110x55 HT1-60	110	234	299	53.1	50	6
SAOB 140x70 HT1-60	165	352	459	106.0	70	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

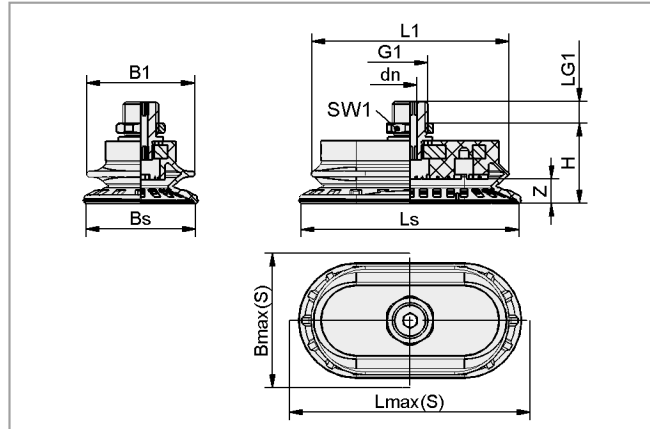
Suction Cups for Handling Glass



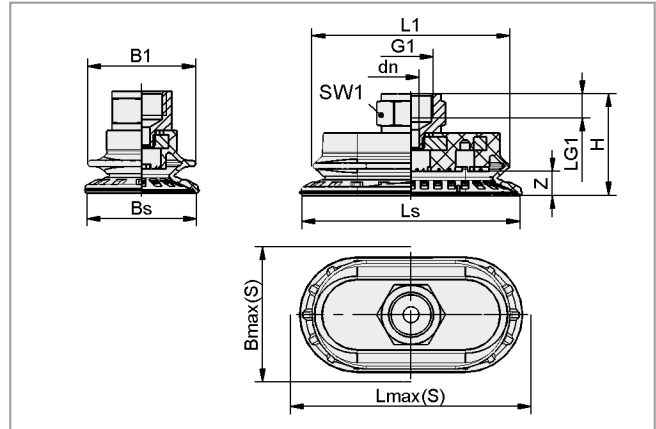
Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Design Data Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)



SAOB HT1 60x30 to 140x70 AG (male)



SAOB HT1 60x30 to 140x70 IG (female)

Design Data Bellows Suction Cups SAOB HT1 (Oval, 1.5 Folds)

Type	Dimensions in mm*											
	B1	Bmax(S)**	Bs	dn	G1	H	L1	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)
SAOB 60x30 HT1-60 G1/4-AG	31	33	30.6	5.0	G1/4"-M	27.0	55.7	8.0	63.0	60.6	17	7.0
SAOB 60x30 HT1-60 G1/4-IG	31	33	30.6	5.5	G1/4"-F	34.4	55.7	8.0	63.0	60.6	17	7.0
SAOB 60x30 HT1-60 G3/8-AG	31	33	30.6	5.2	G3/8"-M	27.5	55.7	7.4	63.0	60.6	22	7.0
SAOB 60x30 HT1-60 G3/8-IG	31	33	30.6	6.0	G3/8"-F	35.0	55.7	9.0	63.0	60.6	22	7.0
SAOB 80x40 HT1-60 G1/4-AG	40	43	40.6	5.0	G1/4"-M	29.7	73.3	8.0	83.0	80.6	17	9.0
SAOB 80x40 HT1-60 G1/4-IG	40	43	40.6	6.0	G1/4"-F	37.2	73.3	8.0	83.0	80.6	17	9.0
SAOB 80x40 HT1-60 G3/8-AG	40	43	40.6	5.2	G3/8"-M	27.7	73.3	8.0	83.0	80.6	22	9.0
SAOB 80x40 HT1-60 G3/8-IG	40	43	40.6	6.0	G3/8"-F	37.7	73.3	9.0	83.0	80.6	22	9.0
SAOB 110x55 HT1-60 G1/4-AG	53	59	55.1	6.0	G1/4"-M	35.5	98.8	8.0	114.0	110.1	17	12.0
SAOB 110x55 HT1-60 G1/4-IG	53	59	55.1	8.0	G1/4"-F	43.0	98.8	8.0	114.0	110.1	17	12.0
SAOB 110x55 HT1-60 G3/8-AG	53	59	55.1	6.1	G3/8"-M	33.5	98.8	8.0	114.0	110.1	22	12.0
SAOB 110x55 HT1-60 G3/8-IG	53	59	55.1	8.0	G3/8"-F	43.5	98.8	9.0	114.0	110.1	22	12.0
SAOB 140x70 HT1-60 G1/4-AG	67	75	70.1	6.0	G1/4"-M	39.5	126.0	8.0	146.0	141.1	17	16.5
SAOB 140x70 HT1-60 G1/4-IG	67	75	70.1	8.0	G1/4"-F	47.0	126.0	8.0	146.0	141.1	17	16.5
SAOB 140x70 HT1-60 G3/8-AG	67	75	70.1	6.0	G3/8"-M	37.5	126.0	10.0	146.0	141.1	19	16.5
SAOB 140x70 HT1-60 G3/8-IG	67	75	70.1	8.0	G3/8"-F	47.5	126.0	9.0	146.0	141.1	22	16.5

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for High-Temperature Applications



Flat Suction Cups SAF HT2

Suction area (\varnothing) from 30 mm to 60 mm



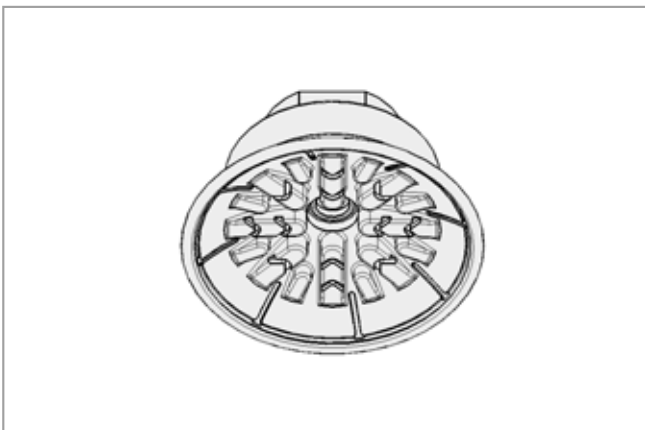
Suitable for Industry Specific Applications



Flat suction cups SAF HT2

Applications

- Round, flat suction cups for dynamic handling of hot metal sheets up to 250 °C (short cycle times)
- Unloading of parts after forming
- Handling of thin aluminum sheets without deformation or deep drawing
- For use e.g. in feeder systems for press lines in the automobile industry



System design flat suction cup SAF HT2

Design

- Robust and wear-resistant suction cup SAF made of HT2 with special inner support
- Suction cup SAF vulcanized to the connection nipple (very high strength)



Flat suction cup SAF HT2 for handling formed sheet metal parts

Our Highlights...

- Silicone-free special material HT2
- Large structured inner support
- Soft and flexible sealing lip

Your Benefits...

- > Absence of PWIS (paint wetting impairment substances), temperature resistance up to 250 °C long term
- > No deep drawing of the workpiece; capable of handling high lateral forces
- > Good sealing, even on slightly curved surfaces

Schmalz - The Company

Vacuum Knowledge

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Special Grippers

Vacuum Gripping Systems

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Suction Cups for High-Temperature Applications

Flat Suction Cups SAF HT2

Suction area (Ø) from 30 mm to 60 mm

Designation Code Flat Suction Cups SAF HT2

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAF 60 HT2-65 G3/8-IG:			
SAF	60	HT2-65	G3/8-IG
SAF	30 to 60	HT2-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG

Ordering Data Flat Suction Cups SAF HT2

Suction cup SAF HT2, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Cups SAF HT2

Type	Connection		
	G1/4"-M	G1/4"-F	G3/8"-F
SAF 30 HT2-65	10.01.01.12349	10.01.01.12348	10.01.01.12350
SAF 40 HT2-65	10.01.01.12353	10.01.01.12352	10.01.01.12354
SAF 50 HT2-65	10.01.01.12357	10.01.01.12356	10.01.01.12358
SAF 60 HT2-65	10.01.01.12361	10.01.01.12360	10.01.01.12362

Technical Data Flat Suction Cups SAF HT2

Type	Suction force [N]*	Lateral force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAF 30 HT2-65	38	29	1.7	40	4
SAF 40 HT2-65	69	51	3.8	50	4
SAF 50 HT2-65	100	78	7.0	65	4
SAF 60 HT2-65	150	102	13.0	75	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for High-Temperature Applications

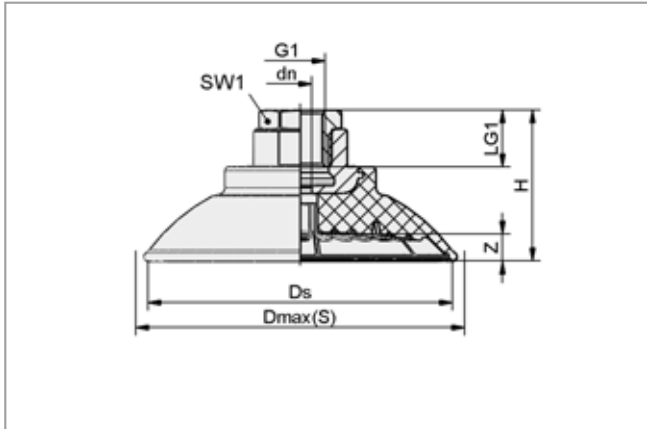


Flat Suction Cups SAF HT2

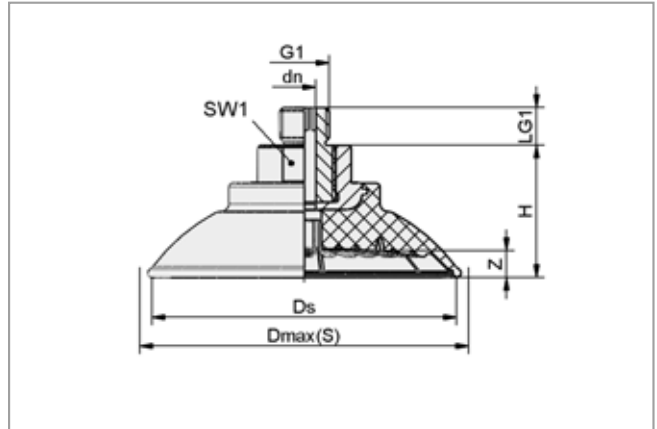
Suction area (\emptyset) from 30 mm to 60 mm



Design Data Flat Suction Cups SAF HT2



SAF HT2 30 to 60 IG (female)



SAF HT2 30 to 60 AG (male)

Type	Dimensions in mm*								
	Dmax(S)**	dn	Ds	G1	H	LG1	SW1	Z (Stroke)	
SAF 30 HT2-65 G1/4-AG	34	4	31	G1/4"-M	20	10	17	3	
SAF 30 HT2-65 G1/4-IG	34	4	31	G1/4"-F	20	12	17	3	
SAF 30 HT2-65 G3/8-IG	34	4	31	G3/8"-F	36	9	22	3	
SAF 40 HT2-65 G1/4-AG	46	4	41	G1/4"-M	22	10	17	4	
SAF 40 HT2-65 G1/4-IG	46	4	41	G1/4"-F	22	12	17	4	
SAF 40 HT2-65 G3/8-IG	46	4	41	G3/8"-F	38	9	22	4	
SAF 50 HT2-65 G1/4-AG	56	6	50	G1/4"-M	28	10	22	5	
SAF 50 HT2-65 G1/4-IG	56	6	50	G1/4"-F	33	15	22	5	
SAF 50 HT2-65 G3/8-IG	56	6	50	G3/8"-F	28	15	22	5	
SAF 60 HT2-65 G1/4-AG	67	6	61	G1/4"-M	31	10	22	6	
SAF 60 HT2-65 G1/4-IG	67	6	61	G1/4"-F	36	15	22	6	
SAF 60 HT2-65 G3/8-IG	67	6	61	G3/8"-F	31	15	22	6	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

Switches and Monitoring

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Suction Cups for High-Temperature Applications



Bellows Suction Cups SAB HT2 (1.5 Folds)

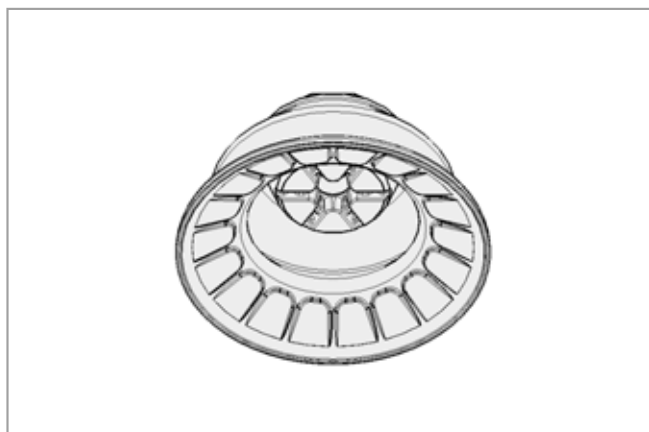
Suction area (Ø) from 22 mm to 80 mm



Suitable for Industry Specific Applications



Bellows suction cups SAB HT2 (1.5 folds)



System design bellows suction cups SAB HT2 (1.5 folds)



Bellows suction cups SAB HT2 for handling formed sheet metal parts

Applications

- Round bellows suction cup with 1.5 folds for dynamic handling of hot metal sheets up to 250 °C
- Handling of pre-shaped metal sheet parts, bellows shape permits optimum adaptation
- Unloading of parts after forming
- Handling of thin aluminum sheets without deformation or deep drawing
- For use e.g. in feeder systems for press lines in the automobile industry

Design

- Robust and wear resistant bellows suction cup SAB made of HT2 with 1.5 folds and special inner support
- Suction cup SAB vulcanized to the connection nipple (very high strength)

Our Highlights...

- Silicone-free special material HT2
- Large structured inner support
- Soft and flexible sealing lip
- 1.5 folds
- Stiff top fold

Your Benefits...

- > Absence of PWIS (paint wetting impairment substances), temperature resistance up to 250° C long term
- > No deep-drawing of the workpiece; capable of handling high lateral forces
- > Good sealing, even on slightly curved surfaces
- > Optimum adaptation and sealing to curved workpieces, very good damping
- > Good resistance to horizontal forces and lateral acceleration

- Schmalz - The Company
- Vacuum Knowledge
- Vacuum Suction Cups**
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
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Suction Cups for High-Temperature Applications



Bellows Suction Cups SAB HT2 (1.5 Folds)

Suction area (Ø) from 22 mm to 80 mm

Designation Code Bellows Suction Cups SAB HT2 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAB 30 HT2-65 G1/4-AG:			
SAB	30	HT2-65	G1/4-AG
SAB	22 to 80	HT2-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG

Ordering Data Bellows Suction Cups SAB HT2 (1.5 Folds)

Suction cup SAB HT2, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Cups SAB HT2 (1.5 Folds)

Type	Connection		
	G1/4"-M	G1/4"-F	G3/8"-F
SAB 22 HT2-65	10.01.06.02420	10.01.06.02419	10.01.06.02421
SAB 30 HT2-65	10.01.06.02424	10.01.06.02423	10.01.06.02425
SAB 40 HT2-65	10.01.06.02428	10.01.06.02427	10.01.06.02429
SAB 50 HT2-65	10.01.06.03452	10.01.06.03451	10.01.06.03401
SAB 60 HT2-65	10.01.06.03450	10.01.06.03449	10.01.06.03354
SAB 80 HT2-65	10.01.06.03357	10.01.06.03356	10.01.06.03318

Technical Data Bellows Suction Cups SAB HT2 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recommended internal hose diameter d [mm]***
SAB 22 HT2-65	16	24	17	1.5	20	4
SAB 30 HT2-65	22	33	29	5.6	40	4
SAB 40 HT2-65	38	59	34	7.0	40	4
SAB 50 HT2-65	53	91	102	18.9	25	6
SAB 60 HT2-65	82	136	126	32.0	30	6
SAB 80 HT2-65	135	238	217	75.4	40	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

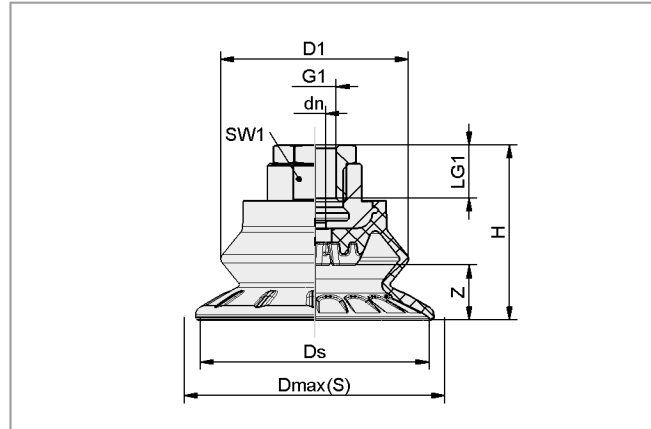
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for High-Temperature Applications

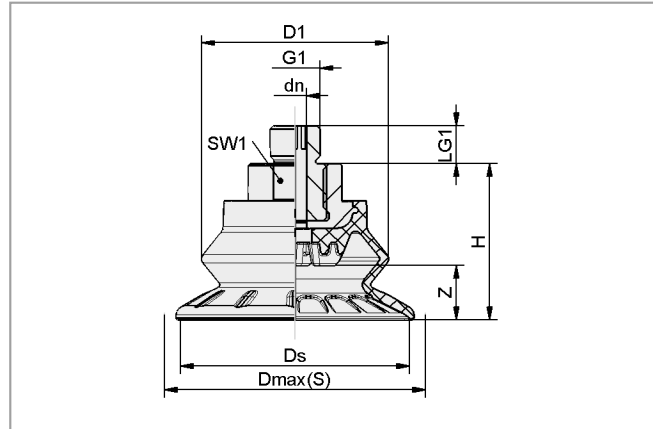
Bellows Suction Cups SAB HT2 (1.5 Folds)

Suction area (\emptyset) from 22 mm to 80 mm

Design Data Bellows Suction Cups SAB HT2 (1.5 Folds)



SAB HT2 22 to 80 IG (female)



SAB HT2 22 to 80 AG (male)

Type	Dimensions in mm*									
	dn	D1	Dmax(S)**	Ds	G1	H	LG1	SW1	Z (Stroke)	
SAB 22 HT2-65 G1/4-AG	3.5	22	24	21	G1/4"-M	25.0	10.0	16	5.8	
SAB 22 HT2-65 G1/4-IG	3.5	22	24	21	G1/4"-F	25.0	12.0	16	5.8	
SAB 22 HT2-65 G3/8-IG	3.5	22	24	21	G3/8"-F	41.0	9.5	22	5.8	
SAB 30 HT2-65 G1/4-AG	4.0	32	34	31	G1/4"-M	28.0	10.0	17	9.0	
SAB 30 HT2-65 G1/4-IG	4.0	32	34	31	G1/4"-F	28.0	12.0	17	9.0	
SAB 30 HT2-65 G3/8-IG	4.0	32	34	31	G3/8"-F	44.0	9.5	22	9.0	
SAB 40 HT2-65 G1/4-AG	4.0	32	45	40	G1/4"-M	29.0	10.0	17	10.0	
SAB 40 HT2-65 G1/4-IG	4.0	32	45	40	G1/4"-F	29.0	12.0	17	10.0	
SAB 40 HT2-65 G3/8-IG	4.0	32	45	40	G3/8"-F	44.0	9.5	22	10.0	
SAB 50 HT2-65 G1/4-AG	6.0	42	56	50	G1/4"-M	36.9	10.0	22	11.5	
SAB 50 HT2-65 G1/4-IG	6.0	42	56	50	G1/4"-F	41.9	20.0	22	11.5	
SAB 50 HT2-65 G3/8-IG	6.0	42	56	50	G3/8"-F	36.9	15.0	22	11.5	
SAB 60 HT2-65 G1/4-AG	6.0	50	67	61	G1/4"-M	41.3	10.0	22	14.5	
SAB 60 HT2-65 G1/4-IG	6.0	50	67	61	G1/4"-F	46.3	20.0	22	14.5	
SAB 60 HT2-65 G3/8-IG	6.0	50	67	61	G3/8"-F	41.3	15.0	22	14.5	
SAB 80 HT2-65 G1/4-AG	6.0	65	88	81	G1/4"-M	49.8	15.0	22	22.0	
SAB 80 HT2-65 G1/4-IG	6.0	65	88	81	G1/4"-F	54.8	15.0	22	22.0	
SAB 80 HT2-65 G3/8-IG	6.0	65	88	81	G3/8"-F	49.8	15.0	22	22.0	

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when pressed against the workpiece by the vacuum

Suction Cups for High-Temperature Applications



Flat Suction Cups SAOF HT2 (Oval)

Suction area (LxW) from 60 x 23 mm to 100 x 50 mm



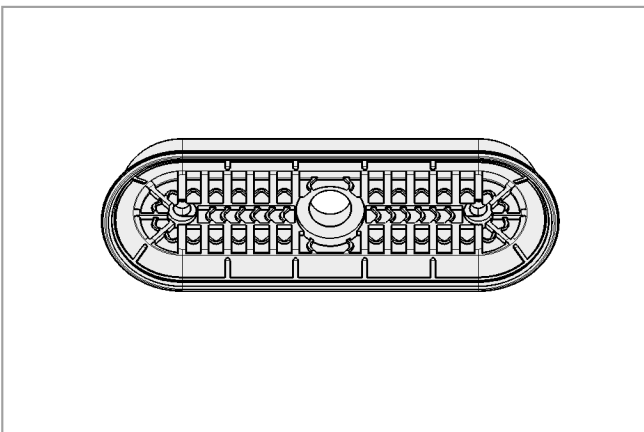
Suitable for Industry Specific Applications



Flat suction cups SAOF HT2 (oval)

Applications

- Oval flat suction cup for dynamic handling of hot metal sheets up to 250° C
- Unloading e.g. of elongated workpieces after forming
- Handling of thin aluminum sheets without deformation or deep drawing
- For use e.g. in feeder systems for press lines in the automobile industry



System design flat suction cups SAOF HT2 (oval)

Design

- Robust, wear-resistant oval flat suction cup SAOF made of HT2 with single sealing lip and inner support
- Connection nipple glued to the reinforcing element of the suction cup (very high strength and temperature resistance)



Flat suction cups SAOF HT2 for handling formed sheet metal parts

Our Highlights...

- Silicone-free special material HT2
- Large, structured inner support
- Soft and flexible sealing lip

Your Benefits...

- > Absence of PWIS (paint wetting impairment substances), temperature resistance up to 250° C long term
- > No deep-drawing of the workpiece; capable of handling high lateral forces
- > Good sealing, even on slightly curved surfaces

Schmalz - The Company

Vacuum Knowledge

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Suction Cups for High-Temperature Applications

Flat Suction Cups SAOF HT2 (Oval)

Suction area (LxW) from 60 x 23 mm to 100 x 50 mm

Designation Code Flat Suction Cups SAOF HT2 (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOF 80x40 HT2-65 G1/4-IG:			
SAOF	80x40	HT2-65	G1/4-IG
SAOF	60x23 to 100x50	HT2-65	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG

Ordering Data Flat Suction Cups SAOF HT2 (Oval)

Suction cup SAOF HT2, available in various dimensions, is delivered with connection nipple glued to elastomer part.

Flat Suction Cups SAOF HT2 (Oval)

Type	Connection		
	G1/4"-M	G1/4"-F	G3/8"-F
SAOF 60x23 HT2-65	10.01.05.00743	10.01.05.00742	10.01.05.00741
SAOF 80x40 HT2-65	10.01.05.00751	10.01.05.00750	10.01.05.00749
SAOF 90x30 HT2-65	10.01.05.00747	10.01.05.00746	10.01.05.00745
SAOF 100x50 HT2-65	10.01.05.00755	10.01.05.00754	10.01.05.00753

Technical Data Flat Suction Cups SAOF HT2 (Oval)

Type	Suction force [N]*	Lateral force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOF 60x23 HT2-65	57	36	3.0	20	4
SAOF 80x40 HT2-65	140	108	10.7	50	4
SAOF 90x30 HT2-65	122	94	7.0	40	4
SAOF 100x50 HT2-65	217	177	20.0	75	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for High-Temperature Applications

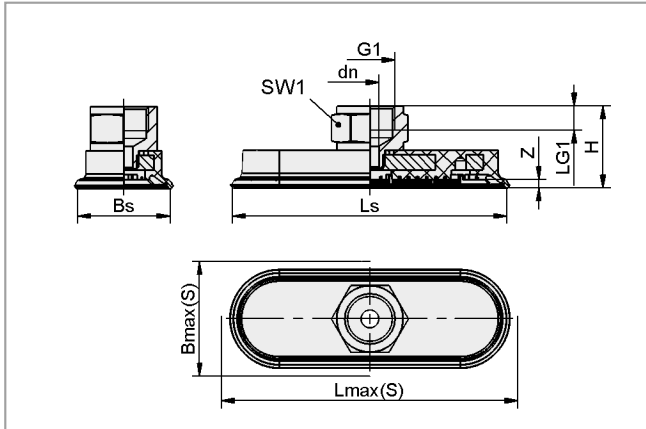


Flat Suction Cups SAOF HT2 (Oval)

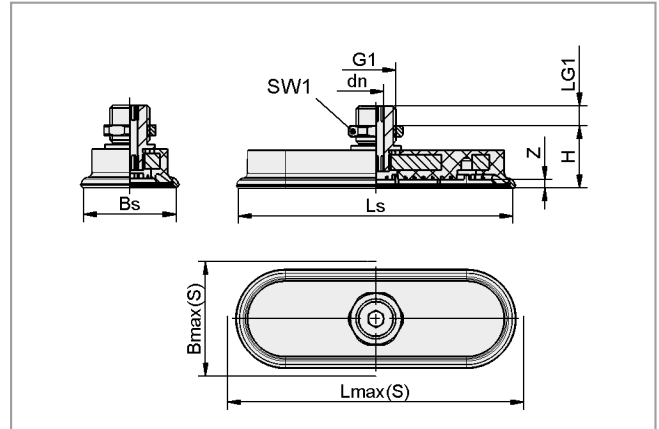
Suction area (LxW) from 60 x 23 mm to 100 x 50 mm



Design Data Flat Suction Cups SAOF HT2 (Oval)



SAOF HT2 60x23 to 100x50 IG (female)



SAOF HT2 60x23 to 100x50 AG (male)

Type	Dimensions in mm*										Z (Stroke)
	Bmax(S)**	Bs	dn	G1	H	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)	
SAOF 60x23 HT2-65 G1/4-AG	25	21.6	5	G1/4"-M	18	8	64	60.6	17	3	
SAOF 60x23 HT2-65 G1/4-IG	25	21.6	6	G1/4"-F	26	8	64	60.6	17	3	
SAOF 60x23 HT2-65 G3/8-IG	25	21.6	6	G3/8"-F	26	8	64	60.6	22	3	
SAOF 80x40 HT2-65 G1/4-AG	43	38.6	5	G1/4"-M	20	8	85	80.6	17	4	
SAOF 80x40 HT2-65 G1/4-IG	43	38.6	6	G1/4"-F	28	8	85	80.6	17	4	
SAOF 80x40 HT2-65 G3/8-IG	43	38.6	6	G3/8"-F	28	9	85	80.6	22	4	
SAOF 90x30 HT2-65 G1/4-AG	34	30.6	5	G1/4"-M	19	8	94	90.6	17	3	
SAOF 90x30 HT2-65 G1/4-IG	34	30.6	6	G1/4"-F	26	8	94	90.6	17	3	
SAOF 90x30 HT2-65 G3/8-IG	34	30.6	6	G3/8"-F	27	9	94	90.6	22	3	
SAOF 100x50 HT2-65 G1/4-AG	54	48.1	6	G1/4"-M	22	8	106	101.1	17	5	
SAOF 100x50 HT2-65 G1/4-IG	54	48.1	8	G1/4"-F	30	8	106	101.1	17	5	
SAOF 100x50 HT2-65 G3/8-IG	54	48.1	8	G3/8"-F	31	9	106	101.1	22	5	

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for High-Temperature Applications



Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

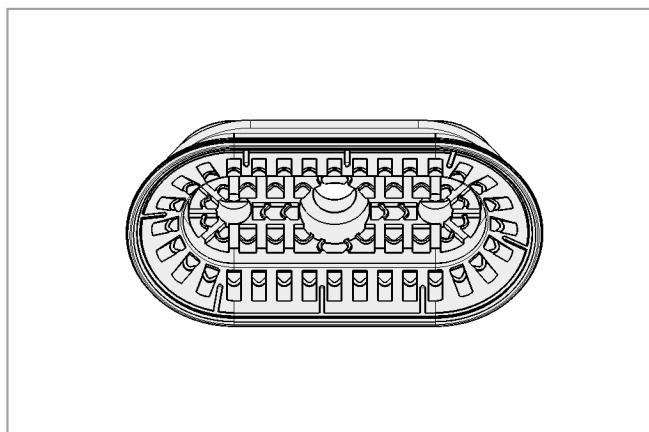
Suction area (LxW) 60 x 30 mm and 80 x 40 mm



Suitable for Industry Specific Applications



Bellows suction cups SAOB HT2 (oval, 1.5 folds)



System design bellows suction cup SAOB HT2 (oval, 1.5 folds)



Bellows suction cups SAOB HT2 for handling formed sheet metal parts

Applications

- Oval bellows suction cup with 1.5 folds for most dynamic handling of hot metal sheets up to 250° C
- Unloading e.g. of elongated workpieces after forming, e.g. reinforced ribs and plates
- Handling of formed sheet metal parts; fold structure allows optimal adjustment
- Handling of thin aluminum sheets without deformation or deep drawing
- For use e.g. in feeder systems for press lines in the automobile industry

Design

- Robust, wear-resistant oval bellows suction cup SAOB with 1.5 folds made of HT2, single sealing lip and inner support
- Connection nipple glued to the reinforcing element of the suction cup (very high strength and temperature resistance)

Our Highlights...

- Silicone-free special material HT2
- Large, structured inner support
- Soft and flexible sealing lip
- 1.5 folds
- Stiff top fold

Your Benefits...

- > Absence of PWIS (paint wetting impairment substances), up to 250° C temperature resistance long term
- > No deep-drawing of the workpiece; capable of handling high lateral forces
- > Good sealing of even slightly curved surfaces
- > Optimum adaptation to curved workpieces, very good damping
- > Resistance to lateral forces and high horizontal accelerations

Suction Cups for High-Temperature Applications



Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Suction area (LxW) 60 x 30 mm and 80 x 40 mm

Designation Code Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOB 60x30 HT2-65 G3/8-IG:			
SAOB	60x30	HT2-65	G3/8-IG
SAOB	60x30	HT2-65	G1/4-AG (AG = male (M))
	80x40		G1/4-IG (IG = female (F))
			G3/8-IG

Ordering Data Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Suction cup SAOB HT2, available in various dimensions, is delivered with connection nipple glued to elastomer part.

Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Type	Connection		
	G1/4"-M	G1/4"-F	G3/8"-F
SAOB 60x30 HT2-65	10.01.06.02443	10.01.06.02442	10.01.06.02441
SAOB 80x40 HT2-65	10.01.06.02447	10.01.06.02446	10.01.06.02445

Technical Data Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Volume [cm ³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOB 60x30 HT2-65	38	55	56	9.6	30	4
SAOB 80x40 HT2-65	65	100	98	20.6	40	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

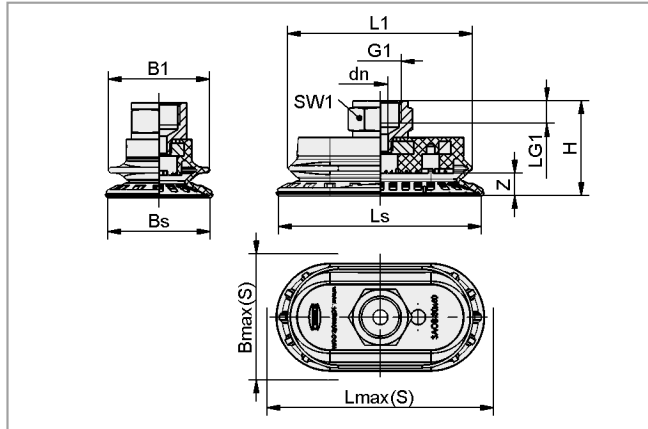
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Cups for High-Temperature Applications

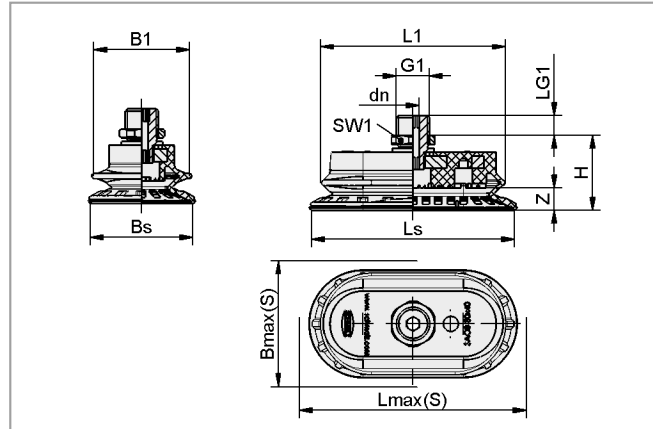
Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)

Suction area (LxW) 60 x 30 mm and 80 x 40 mm

Design Data Bellows Suction Cups SAOB HT2 (Oval, 1.5 Folds)



SAOB HT2 60x30 and 80x40 IG



SAOB HT2 60x30 and 80x40 AG

Type	Dimensions in mm*												
	B1	Bmax(S)**	Bs	dn	G1	H	L1	LG1	Lmax(S)**	Ls	SW1	Z (Stroke)	
SAOB 60x30 HT2-65 G1/4-AG	31	33	30.6	5	G1/4"-M	27.0	56	8	63	60.6	17	7	
SAOB 60x30 HT2-65 G1/4-IG	31	33	30.6	6	G1/4"-F	34.4	56	8	63	60.6	17	7	
SAOB 60x30 HT2-65 G3/8-IG	31	33	30.6	6	G3/8"-F	35.0	56	9	63	60.6	22	7	
SAOB 80x40 HT2-65 G1/4-AG	40	43	40.6	5	G1/4"-M	29.7	73	8	83	80.6	17	9	
SAOB 80x40 HT2-65 G1/4-IG	40	43	40.6	6	G1/4"-F	37.2	73	8	83	80.6	17	9	
SAOB 80x40 HT2-65 G3/8-IG	40	43	40.6	6	G3/8"-F	37.7	73	9	83	80.6	22	9	

*Acceptable dimensional tolerances for rubber parts according to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for High-Temperature Applications



Suction Plates for High-Temperature SPL-HT FPM-F

Suction area (Ø) 90 mm to 190 mm



Suitable for Industry Specific Applications



High-temperature suction plates SPL-HT FPM-F

Applications

- Round suction plate for handling of very hot workpieces
- Removing of hot cathode ray tubes from molds
- Handling of hot glass

Design

- Robust and wear-resistant suction plate SPL-HT FPM-F with single sealing lip, consisting of suction plate SPL and large-area metal mounting
- Suction plate screwed to mounting

Our Highlights...

- Special materials fluorocau-
tchouc FPM-F with felt coat-
ing
- Suction plate screwed to
mounting
- Large-area metal mounting
for the suction plate

Your Benefits...

- > Resistance to very high
temperatures (up to 400 °C
for short periods) and little
marking of the workpieces
- > Suction plate can be replaced
separately when worn
- > Good heat dissipation, short
cooling times



Designation Code Suction Plates for High-Temperature SPL-HT FPM-F

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPL-HT 90 FPM-F-65 G1/4-AG:			
SPL-HT	90	FPM-F-65	G1/4-AG
SPL-HT	90	FPM-F-65	G1/4-AG (AG = male (M))
	120		G1/2-AG
	190		



Ordering Data Suction Plates for High-Temperature SPL-HT FPM-F

Suction plate SPL-HT FPM-F (elastomer part + mounting) is delivered unassembled. The delivery consists of:

- Suction plate of type SPL-HT FPM-F – elastomer part, available in various diameters
- Mounting – available with various threads

Available spare parts: suction plate SPL-HT FPM-F

Suction Cups for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT FPM-F

Suction area (\emptyset) 90 mm to 190 mm

Suction Plates for High-Temperature SPL-HT FPM-F

Type*	Part Number
SPL-HT 90 FPM-F-65 G1/4-AG	10.01.01.00551
SPL-HT 120 FPM-F-65 G1/4-AG	10.01.01.13438
SPL-HT 190 FPM-F-65 G1/2-AG	10.01.01.00832

*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Ordering Data Spare Parts Suction Plates for High-Temperature SPL-HT FPM-F

Type*	Part Number
SPL-HT 90 FPM-F-65	10.01.01.00553
SPL-HT 120 FPM-F-65	10.01.01.13435
SPL-HT 190 FPM-F-65	10.01.01.00834

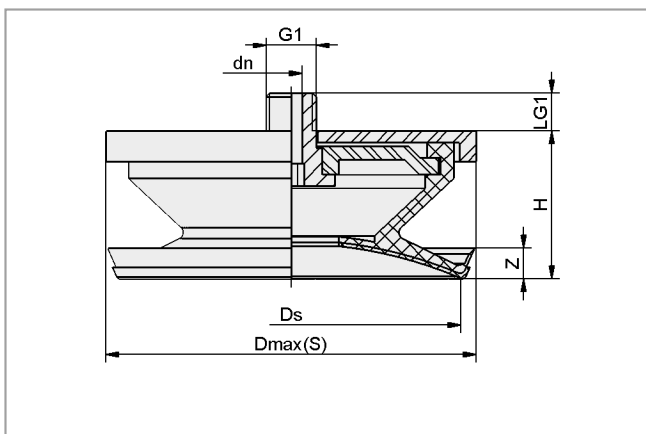
*Additional material specifications at beginning of the section "Vacuum Suction Cups"

Technical Data Suction Plates for High-Temperature SPL-HT FPM-F

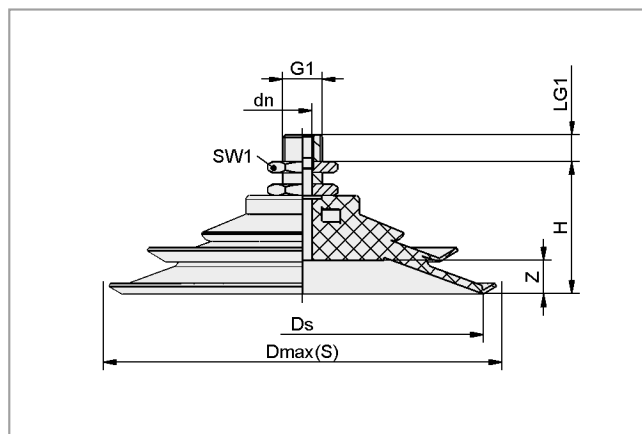
Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)	Weight [g]
SPL-HT 90 FPM-F-65 G1/4-AG	230	66.5	250	225
SPL-HT 120 FPM-F-65 G1/4-AG	675	250.0	300	295
SPL-HT 190 FPM-F-65 G1/2-AG	1050	165.0	350	1420

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

Design Data Suction Plates for High-Temperature SPL-HT FPM-F



SPL-HT 90 and 120 FPM-F



SPL-HT 190 FPM-F

Type	Dimensions in mm*								
	Dmax(S)**	dn	Ds	G1	H	LG1	SW1	Z (Stroke)	
SPL-HT 90 FPM-F-65 G1/4-AG	98	6	90	G1/4"-M	39	11	-	16.5	
SPL-HT 120 FPM-F-65 G1/4-AG	130	6	120	G1/4"-M	46	11	8	25.0	
SPL-HT 190 FPM-F-65 G1/2-AG	209	10	190	G1/2"-M	66	18	32	8.0	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for High-Temperature Applications

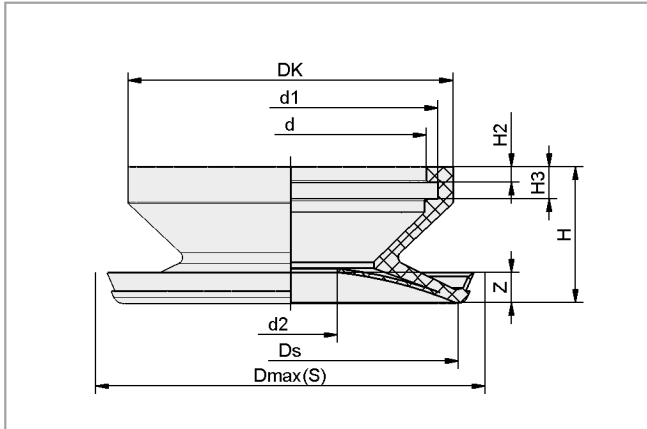


Suction Plates for High-Temperature SPL-HT FPM-F

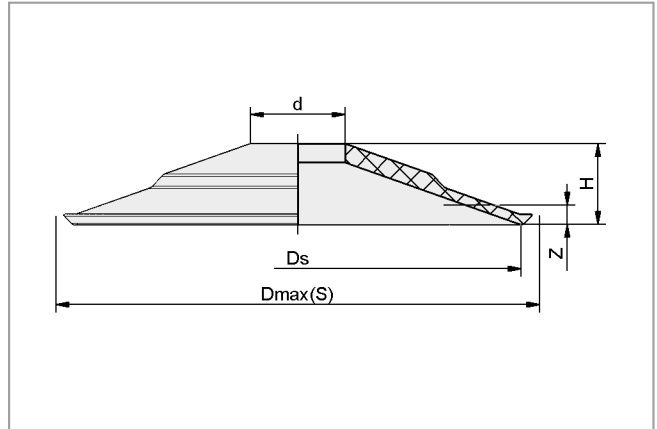
Suction area (Ø) 90 mm to 190 mm



Design Data Suction Plates for High-Temperature SPL-HT FPM-F - Spare Parts



SPL-HT 90 and 120 FPM-F



SPL-HT 190 FPM-F

Type	Dimensions in mm*										
	d	d1	d2	Dk	Dmax(S)**	Ds	H	H2	H3	Z (Stroke)	
SPL-HT 90 FPM-F-65	72	78	15	86	98	90	36	4	9.5	16.5	
SPL-HT 120 FPM-F-65	88	96	-	105	130	120	43	5	10.0	25.0	
SPL-HT 190 FPM-F-65	40	-	-	-	209	190	17	-	-	8.0	

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

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Suction Cups for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT

Suction area (Ø) from 35 mm to 140 mm



Suitable for Industry Specific Applications



High-temperature suction plates SPL-HT

Applications

- Round suction plate for handling of workpieces with smooth surfaces
- Usage in manufacturing of float glass or in tempering processes in the glass industry
- Hot forming in the metal industry

Design

- Robust stainless-steel body
- Seal clamped into the body and quickly replaceable
- Seal made of special textile material for handling hot workpieces

Our Highlights...

- Stainless-steel body; seal made of special textile materials
- Withstanding temperatures of up to 600 °C
- Seal quickly and easily replaceable

Your Benefits...

- > Very high temperature resistance (even for long periods)
- > Safe and gentle gripping of hot workpieces with vacuum
- > Seal can be replaced separately when worn or damaged

Designation Code Suction Plates for High-Temperature SPL-HT

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPL-HT 90 ST G1/4-IG:			
SPL-HT	90	ST	G1/4-IG
SPL-HT	35	ST woven silicate material	G1/8-IG (IG = female (F))
	60		G1/4-IG
	90		G3/8-IG
	140		

Ordering Data Suction Plates for High-Temperature SPL-HT

Suction plate SPL-HT (sealing ring + mounting) is delivered assembled. The assembly consists of:

- Sealing ring of type DR-SPL-HT – available in various diameters
- Stainless-steel mounting – available with various threads

Available spare parts: sealing ring DR-SPL-HT

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Suction Cups for High-Temperature Applications



Suction Plates for High-Temperature SPL-HT

Suction area (\emptyset) from 35 mm to 140 mm

Suction Plates for High-Temperature SPL-HT

Type	Part Number
SPL-HT 35 ST G1/8-IG	10.01.23.00023
SPL-HT 60 ST G1/4-IG	10.01.23.00006
SPL-HT 90 ST G1/4-IG	10.01.23.00007
SPL-HT 140 ST G3/8-IG	10.01.23.00008

Ordering Data Spare Parts Suction Plates for High-Temperature SPL-HT

Type	Sealing ring DR-SPL-HT
SPL-HT 35 ST G1/8-IG	10.01.23.00022
SPL-HT 60 ST G1/4-IG	10.01.23.00001
SPL-HT 90 ST G1/4-IG	10.01.23.00016
SPL-HT 140 ST G3/8-IG	10.01.23.00018

Technical Data Suction Plates for High-Temperature SPL-HT

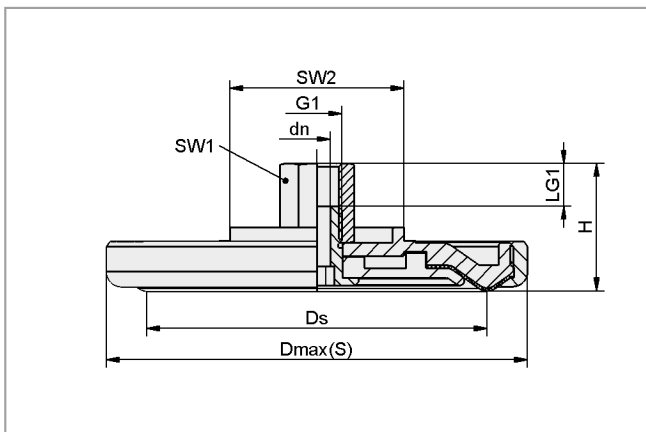
Type	Suction force [N]*	Volume [cm ³]	Min. curve radius [mm] (convex)	Required evacuation rate for pu = -0,7 bar [l/min]**	Weight [g]	Recom. internal hose diameter d [mm]***
SPL-HT 35 ST G1/8-IG	47	6	90	55	225	4
SPL-HT 60 ST G1/4-IG	130	28	440	78	375	6
SPL-HT 90 ST G1/4-IG	320	36	1060	100	675	6
SPL-HT 140 ST G3/8-IG	740	36	1700	120	1390	9

*The suction-force figures are theoretical values at a vacuum of -0.6 bar and with a smooth, flat workpiece surface. They are specified without any safety factor. For the system design the safety factors should be increased at least by the factor 3.

**The recommended suction capacity is based on an average workpiece temperature of about 300°C. We recommend testing with original workpieces.

***The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Suction Plates for High-Temperature SPL-HT - Spare Parts



SPL-HT 35 to 140 ST

Type	Dimensions in mm*							
	dn	Dmax(S)**	Ds	G1	H	LG1	SW1	SW2
SPL-HT 35 ST G1/8-IG	5	53.0	35	G1/8"-F	29	12	14	27
SPL-HT 60 ST G1/4-IG	7	79.5	58	G1/4"-F	39	12	17	27
SPL-HT 90 ST G1/4-IG	7	111.5	90	G1/4"-F	39	12	17	46
SPL-HT 140 ST G3/8-IG	8	159.5	138	G3/8"-F	39	12	22	95

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Suction Cups for Handling Composites



Suction Plates SPL POM-NBR

Suction area (Ø) from 40 mm to 115 mm



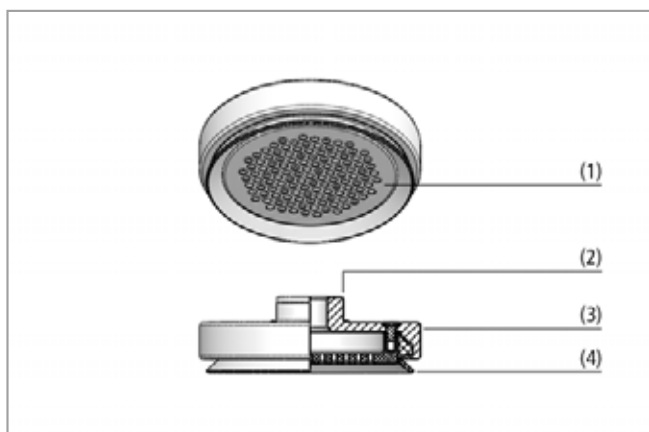
Suitable for Industry Specific Applications



Suction plates SPL POM-NBR

Applications

- Suction plates for handling flexible materials e.g. prepregs or semi-finished products made of fiber composite material such as CFRP, GFRP
- Handling of sensitive workpieces that must not be deformed such as foils
- Prevention of fiber displacement by "sucking in" (no influence on the fiber orientation)
- Handling free of permanent mechanical marks



System design suction plates SPL POM-NBR

Design

- Robust body made of aluminium (3); low construction height with spanner flat (2) for assembly
- Sealing ring (4) made of NBR
- Internal support made of POM with suction openings for evenly vacuum distribution (1)



Suction plate SPL POM-NBR being used for handling composite textiles

Our Highlights...

- Round suction plate with inner support for flat handling of flexible materials
- Evenly vacuum distribution due to air extraction holes
- Large air extraction holes for high flow rates
- Sealing ring for good sealing and increased friction

Your Benefits...

- > No „sucking in“ of workpieces into the suction plate (no permanent deformation)
- > Reduced energy consumption and higher resistance to lateral forces
- > Evenly flow and low surface pressure; no damage of sensitive workpieces
- > Use with electric or pneumatic vacuum generators

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Suction Cups for Handling Composites



Suction Plates SPL POM-NBR

Suction area (Ø) from 40 mm to 115 mm

Designation Code Suction Plates SPL POM-NBR

Abbreviated designation	Suction area Ø in mm	Material	Connection thread
Example SPL 40 POM-NBR G1/8-IG:			
SPL	40	POM-NBR	G1/8-IG
SPL	40	POM-NBR	G1/8-IG (IG = female (F))
	70		G1/4-IG
	115		

Ordering Data Suction Plates SPL POM-NBR

Suction plate SPL POM-NBR (sealing ring + support plate) is available with different diameters and is delivered as a ready to connect product.

Suction Plates SPL POM-NBR

Type	Part Number
SPL 40 POM-NBR G1/8-IG	10.01.01.13104
SPL 70 POM-NBR G1/4-IG	10.01.01.13107
SPL 115 POM-NBR G1/4-IG	10.01.01.13110

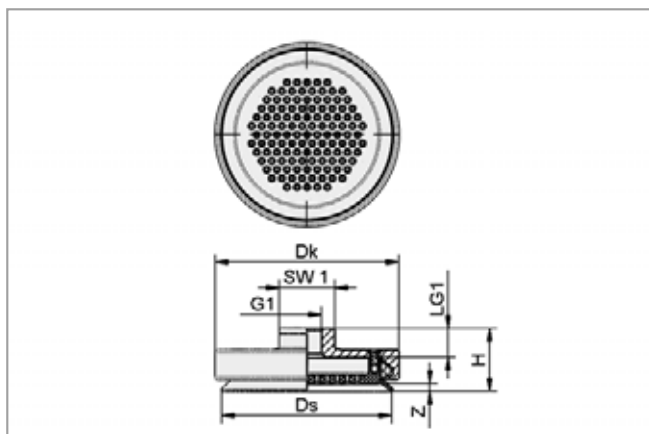
Technical Data Suction Plates SPL POM-NBR

Type	Suction force [N]*	Volume [cm³]	Recom. internal hose diameter d [mm]**
SPL 40 POM-NBR G1/8-IG	70	5	4
SPL 70 POM-NBR G1/4-IG	217	24	6
SPL 115 POM-NBR G1/4-IG	600	91	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include safety factors

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Suction Plates SPL POM-NBR



Type	Dimensions in mm*						
	Dk	Ds	G1	H	LG1	SW1	Z (Stroke)
SPL 40 POM-NBR G1/8-IG	42	39	G1/8"-F	20.5	9.5	17	2
SPL 70 POM-NBR G1/4-IG	73	68	G1/4"-F	24.5	11.5	22	3
SPL 115 POM-NBR G1/4-IG	118	113	G1/4"-F	30.5	12.0	22	4

*Acceptable dimensional tolerances for rubber sealings according to DIN 3302-1 M3

Suction Cups for Handling CDs/DVDs



Suction Cups SGR and SGH

Suction area (Ø) from 17 mm to 36 mm



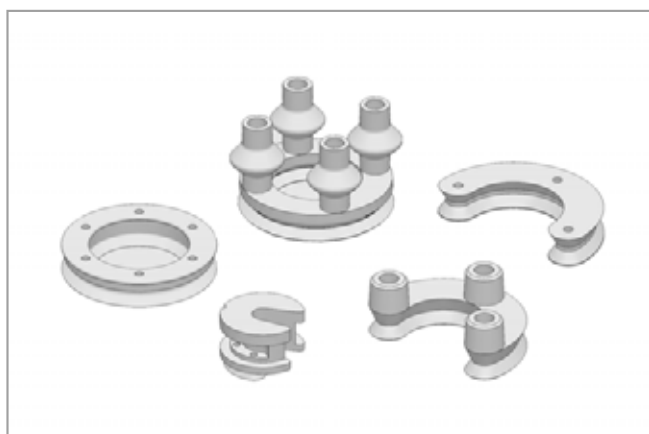
Suitable for Industry Specific Applications



Suction cups SGR and SGH

Applications

- Suction cups for handling of CDs or DVDs in fast-running, fully automatic systems
- Handling of CDs and DVDs in all processing steps of the production and further processing



System design suction cups SGR and SGH

Design

- Circular suction cup with closed version (SGR) or semi-circular version (SGH)
- Suction cup shaped for direct insertion into various mountings



Overview of Technical Data

Diameter in mm	Material	Versions	Additional Functions	Dimensions in mm	Weight in g
17 to 36	Silicone SI	Annular Semi-annular	Spring-mounted version	Ø: 17 to 36 Height max. 20	1.1 to 4.2

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Sealing Profiles



Sealing Cords DI-SCHN

Diameter from 6 mm to 12 mm



Suitable for Industry Specific Applications



Sealing cords DI-SCHN

Applications

- Sealing cord for production of special, self-made suction plates
- Adaptation of suction plates to the dimensions of special workpieces
- Handling of chipboard and MDF panels with cut-outs

Design

- Wear-resistant sealing cords made of silicon-free foam rubber in various diameters and cross-sections

Our Highlights...

- Profiled sealing cord in any desired length
- Wide range of diameters

Your Benefits...

- > Self-construction of "vacuum grippers" in any desired shape and size to match special workpieces
- > Suitable for a wide range of workpiece sizes and shapes



Designation Code Sealing Cords DI-SCHN

Abbreviated designation	Dimensions in mm	Material and Shore hardness*	Product addition
Example DI-SCHN 8 MOS EPDM-20 SL:			
DI-SCHN	8	MOS EPDM-20	SL
DI-SCHN	6 to 12	MOS EPDM-20	SL slot

*Average Shore hardness



Ordering Data Sealing Cords DI-SCHN

Sealing cord DI-SCHN is delivered in the desired length.
Accounting unit 1 m.

Sealing Cords DI-SCHN

Type	Part Number
DI-SCHN 6 MOS EPDM-20	10.07.04.00001
DI-SCHN 8 MOS EPDM-20	10.07.04.00002
DI-SCHN 8 MOS EPDM-20 SL	10.07.04.00005
DI-SCHN 10 MOS EPDM-20	10.07.04.00003
DI-SCHN 12 MOS EPDM-20	10.07.04.00004

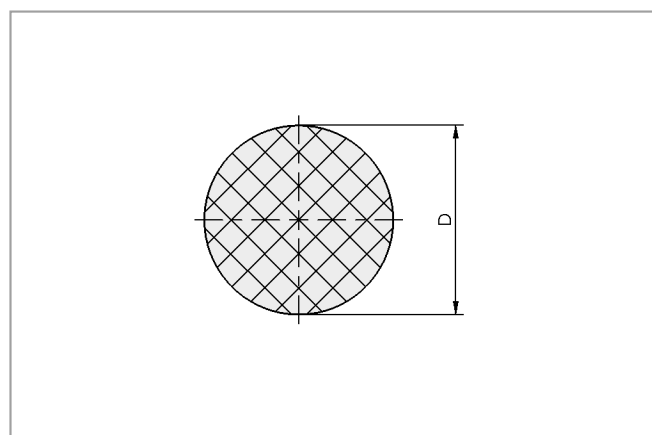
Sealing Cords DI-SCHN

Diameter from 6 mm to 12 mm

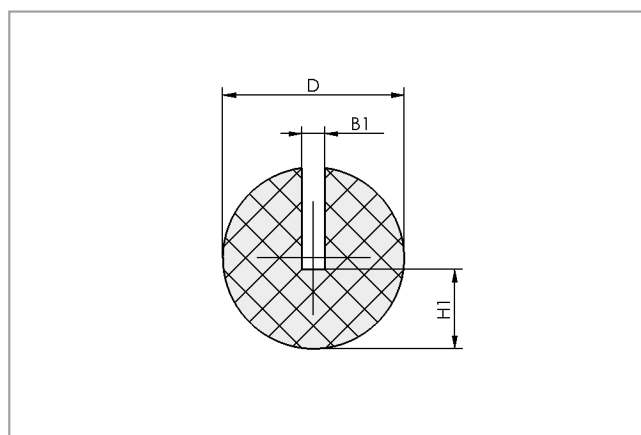
Technical Data Sealing Cords DI-SCHN

Type	Min. installation radius [mm]	Operating temperature [°C]	Recommended slot width x slot depth [mm]	Length (max) [m]
DI-SCHN 6 MOS EPDM-20	10	-25 ... 70	6 x 4.2	200
DI-SCHN 8 MOS EPDM-20	10	-25 ... 70	8 x 5.6	200
DI-SCHN 8 MOS EPDM-20 SL	10	-25 ... 70	8 x 5.6	50
DI-SCHN 10 MOS EPDM-20	10	-25 ... 70	10 x 7	100
DI-SCHN 12 MOS EPDM-20	10	-25 ... 70	12 x 8.4	100

Design Data Sealing Cords DI-SCHN



DI-SCHN 6 to 12



DI-SCHN 8 SL

Type	Dimensions in mm*		
	B1	D	H1
DI-SCHN 6 MOS EPDM-20	-	6	-
DI-SCHN 8 MOS EPDM-20	-	8	-
DI-SCHN 8 MOS EPDM-20 SL	1	8	3.5
DI-SCHN 10 MOS EPDM-20	-	10	-
DI-SCHN 12 MOS EPDM-20	-	12	-

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Sealing Profiles



Sealing Profiles DI-PROF

Dimensions from 5.5x8 mm to 30x25 mm



Suitable for Industry Specific Applications



Sealing profiles DI-PROF

Applications

- Sealing profile made of two component section for production of self-made, individual suction plates
- Sealing profile for rough or structured surfaces
- Handling of barrels, sacks and similar objects with irregular surfaces

Design

- Robust and wear-resistant sealing profiles in various cross-sections
- Profile 2K-MOS-20: sealing strip made of foam rubber, vulcanized to support strip (supporting and sealing section made of Chloroprene CR)
- Profile 2K-SWG-20: sealing strip made of foam rubber, glued to support strip (supporting section NBR, sealing section natural rubber NK)
- High-strength supporting-section material with profile on the sides for plugging into a corresponding mounting plate

Our Highlights...

- Sealing strip in any desired length
- Sealing profile made of two-component section

Your Benefits...

- > Self-construction of "vacuum grippers" in any desired shape and size to match specific workpieces
- > High-strength support strip with foam rubber vulcanized or glued to it, for sealing to very rough or structured surfaces (such as ornamental glass, rough natural stone, concrete blocks, etc.)

Designation Code Sealing Profiles DI-PROF

Abbreviated designation	Dimensions in mm	Material and Shore hardness*	Product addition
Example DI-PROF 5.5x8 2K-MOS CR-20/60:			
DI-PROF	5.5x8	2K-MOS CR-20/60	
DI-PROF	5.5x8 to 30x25	2K-MOS CR-20/60 2K-SWG NK-20/55 MOS NK-20 MOS EPDM-20 MOS CR-20	DL sealing lip HR half-round

*Average Shore hardness

Ordering Data Sealing Profiles DI-PROF

Sealing profile DI-PROF is delivered in the desired length. Accounting unit 1 m.

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Sealing Profiles DI-PROF

Dimensions from 5.5x8 mm to 30x25 mm

Sealing Profiles DI-PROF

Type	Part Number
DI-PROF 5.5x8 2K-MOS CR-20/60	10.01.01.10554
DI-PROF 9x9.7 2K-MOS CR-20/60	10.01.01.10527
DI-PROF 20x15 2K-SWG NK-20/55	10.07.04.00040
DI-PROF 30x25 2K-SWG NK-20/55	10.07.04.00041
DI-PROF 6x8 MOS NK-20 HR	10.07.04.00014
DI-PROF 8x14 MOS NK-20 DL	10.07.04.00012
DI-PROF 10x6 MOS EPDM-20	10.07.04.00006
DI-PROF 10x20 MOS EPDM-20 HR	10.07.04.00010
DI-PROF 11x23 MOS CR-20 DL	10.07.04.00015
DI-PROF 12x17 MOS EPDM-20 HR	10.07.04.00011
DI-PROF 25x20 MOS EPDM-20	10.07.04.00007

Technical Data Sealing Profiles DI-PROF

Type	Min. installation radius [mm]	Operating temperature [°C]	Recommended slot width x slot depth [mm]	Length (max) [m]
DI-PROF 5.5x8 2K-MOS CR-20/60	65	-30.0 ... 90.0	-	15
DI-PROF 9x9.7 2K-MOS CR-20/60	85	-30.0 ... 90.0	-	15
DI-PROF 20x15 2K-SWG NK-20/55	120	-35.0 ... 70.0	-	30
DI-PROF 30x25 2K-SWG NK-20/55	200	-35.0 ... 70.0	-	30
DI-PROF 6x8 MOS NK-20 HR	10	-25.0 ... 60.0	7 x 4	50
DI-PROF 8x14 MOS NK-20 DL	20	-25.0 ... 60.0	9 x 6.5	100
DI-PROF 10x6 MOS EPDM-20	10	-25.0 ... 70.0	11 x 3	50
DI-PROF 10x20 MOS EPDM-20 HR	10	-25.0 ... 70.0	11 x 10	50
DI-PROF 11x23 MOS CR-20 DL	20	-25.0 ... 70.0	12 x 11.5	50
DI-PROF 12x17 MOS EPDM-20 HR	10	-25.0 ... 70.0	13 x 10	50
DI-PROF 25x20 MOS EPDM-20	30	-25.0 ... 70.0	26 x 10	25

Sealing Profiles

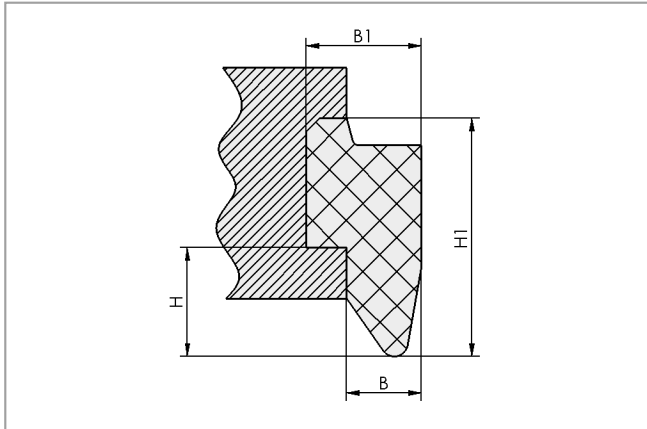


Sealing Profiles DI-PROF

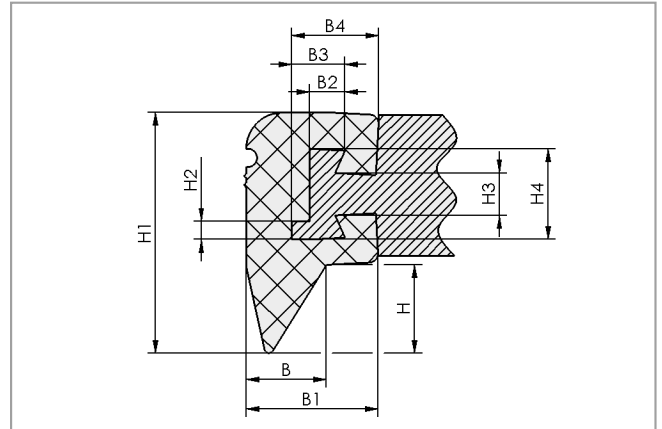
Dimensions from 5.5x8 mm to 30x25 mm



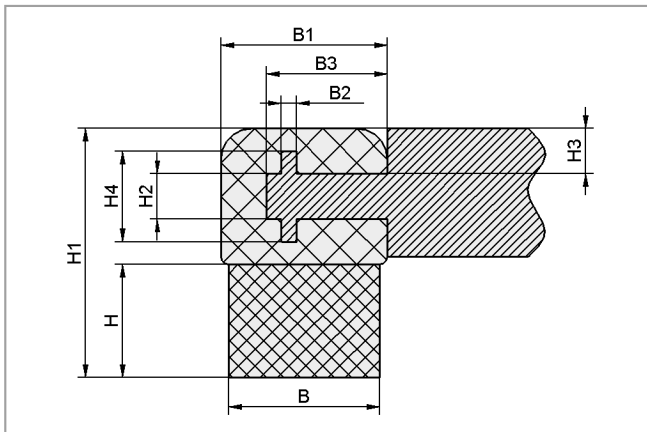
Design Data Sealing Profiles DI-PROF



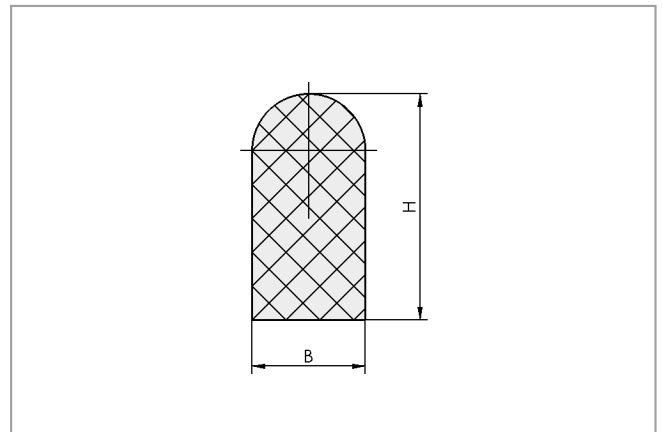
DI-PROF 5.5x8



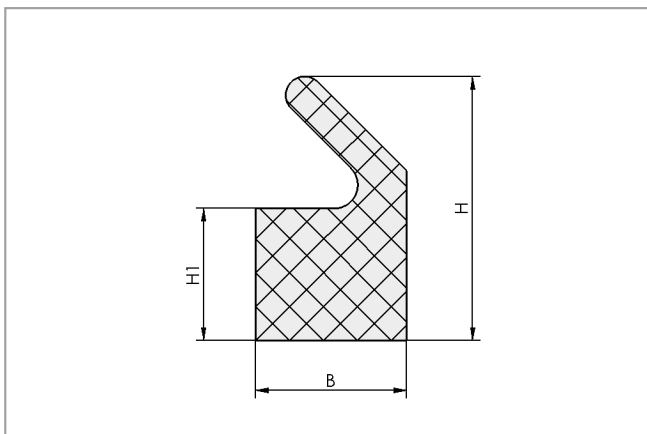
DI-PROF 9x9.7



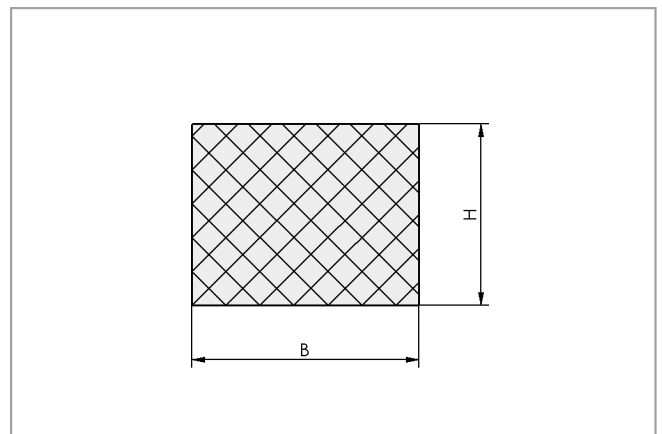
DI-PROF 20x15 and DI-PROF 30x25



DI-PROF 6x8 HR to DI-PROF 12x17 HR



DI-PROF 8x14 DL



DI-PROF 10x6 and DI-PROF 25x20

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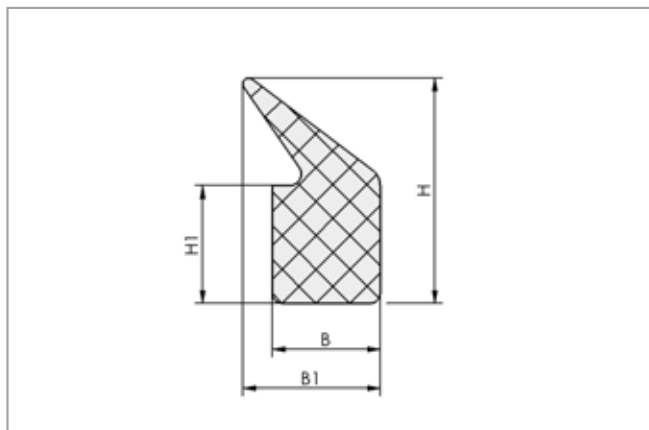
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Sealing Profiles



Sealing Profiles DI-PROF

Dimensions from 5.5x8 mm to 30x25 mm



DI-PROF 11x23 DL

Type	Dimensions in mm*									
	B	B1	B2	B3	B4	H	H1	H2	H3	H4
DI-PROF 5.5x8 2K-MOS CR-20/60	5.5	8.5	-	-	-	8.0	17.5	-	-	-
DI-PROF 9x9.7 2K-MOS CR-20/60	9.0	14.5	3.9	5.9	9.6	9.7	26.5	2	4.7	10
DI-PROF 20x15 2K-SWG NK-20/55	20.0	22.0	2.0	16.0	-	15.0	33.0	6	6.0	12
DI-PROF 30x25 2K-SWG NK-20/55	30.0	32.0	2.0	24.0	-	25.0	53.0	8	10.0	17
DI-PROF 6x8 MOS NK-20 HR	6.0	-	-	-	-	8.0	-	-	-	-
DI-PROF 8x14 MOS NK-20 DL	8.0	-	-	-	-	14.0	7.0	-	-	-
DI-PROF 10x6 MOS EPDM-20	10.0	-	-	-	-	6.0	-	-	-	-
DI-PROF 10x20 MOS EPDM-20 HR	10.0	-	-	-	-	20.0	-	-	-	-
DI-PROF 11x23 MOS CR-20 DL	11.0	14.0	-	-	-	23.0	12.0	-	-	-
DI-PROF 12x17 MOS EPDM-20 HR	12.0	-	-	-	-	17.0	-	-	-	-
DI-PROF 25x20 MOS EPDM-20	25.0	-	-	-	-	20.0	-	-	-	-

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

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Accessories Vacuum Suction Cups



Filter Discs FD

Diameter (Ø) from 16 mm to 55 mm



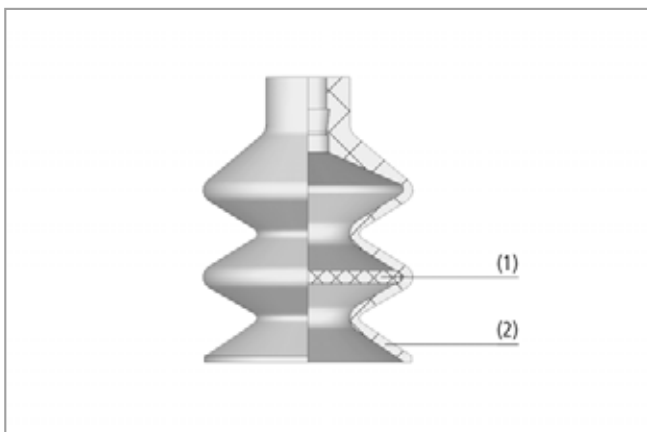
Suitable for Industry Specific Applications



Filter discs FD

Applications

- Filter disc to protect the vacuum system from dust and dirt, without changing the flow resistance
- Filter disc prevents the workpiece from being pilled into the suction cup



System design filter discs FD

Design

- Filter disc (1) made of porous polyethylene (sinter PE)
- Filtration grade 120 µm
- Can be placed directly into the suction cup (2)



Bellows suction cups with filter discs FD being used for handling wooden boards

Our Highlights...

- Placed directly in a fold of the suction cup
- Wide variety of diameters
- Stable filter disc

Your Benefits...

- > Dirt and dust is filtered out directly at the workpiece
- > Wide range of application possibilities for suction cup series FGA and FG
- > High intrinsic stability of the suction cup; stops the workpiece from being sucked in

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Filter Discs FD

Diameter (Ø) from 16 mm to 55 mm

Designation Code Filter Discs FD

Abbreviated designation	Diameter in mm	Porosity in µm
Example FD 16 120:		
FD	16	120
FD	16 to 55	120

Ordering Data Filter Discs FD

Filter discs FD is delivered in the desired diameter.

Filter Discs FD

Type	Part Number
FD 16 120	10.01.06.02565
FD 18 120	10.01.06.02567
FD 22 120	10.01.06.02566
FD 27 120	10.01.06.02571
FD 30 120	10.01.06.02568
FD 34 120	10.01.06.02572
FD 38 120	10.01.06.02569
FD 44 120	10.01.06.02573
FD 55 120	10.01.06.02570

Technical Data Filter Discs FD

Type	Porosity [µm]	For suction cup type
FD 16 120	120	FG20/FGA20
FD 18 120	120	FG25/FGA25
FD 22 120	120	FGA22
FD 27 120	120	FG32
FD 30 120	120	FGA33
FD 34 120	120	FG42
FD 38 120	120	FGA43
FD 44 120	120	FG52
FD 55 120	120	FGA53

Accessories Vacuum Suction Cups

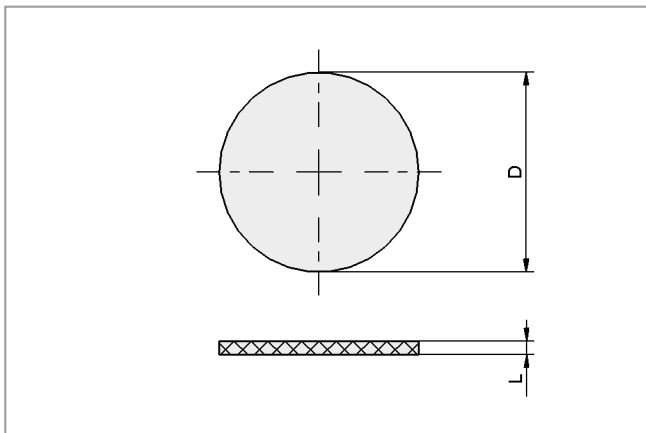


Filter Discs FD

Diameter (\varnothing) from 16 mm to 55 mm



Design Data Filter Discs FD



Filter disc FD

Type	Dimensions in mm	
	D	L
FD 16 120	16	1.5
FD 18 120	18	1.5
FD 22 120	22	1.5
FD 27 120	27	1.5
FD 30 120	30	1.5
FD 34 120	34	1.5
FD 38 120	38	1.5
FD 44 120	44	1.5
FD 55 120	55	1.5

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Suction Cup Inserts SPI PEEK

Suction area (Ø) from 6 mm to 32 mm



Suitable for Industry Specific Applications



Suction cup inserts SPI PEEK for bellows suction cups

Applications

- Suction cup inserts for gentle and mark-free gripping and depositing of smooth workpieces
- Application with crystalline solar cells, thin-film modules and wafers / substrates in the semiconductor area
- Handling of glass such as display glass, thin glass with thickness < 0.1 mm or coated glass without leaving a chemical fingerprint by elastomers
- Use in combination with bellows suction cups FGA (1.5 folds) and FG (2.5 folds)

Design

- Suction cup inserts made of PEEK with support structure and vacuum channels
- Inserts are tool-free clipped into the lower suction cup fold of bellows suction cups

Our Highlights...

- Suction cup inserts made of PEEK
- Structure with defined contact area, flow grooves and vacuum channels
- Smart vacuum distribution on the suction surface
- Clip-in assembly in suction cups without tools
- Even sealing surface

Your Benefits...

- > Non-marking and gentle handling of thin, flat workpieces without leaving chemical fingerprints
- > Defined and low surface pressure on the workpiece surface
- > High leakage compensation for high effective suction forces
- > Quick and easy installation and replacement
- > Low stress in the workpiece

Designation Code Suction Cup Inserts SPI PEEK

Abbreviated designation	Diameter in mm	Material
Example SPI 9 PEEK:		
SPI	9	PEEK
SPI	6 to 32	PEEK Polyetheretherketon

Ordering Data Suction Cup Inserts SPI PEEK

Suction cup insert SPI PEEK is delivered with the desired diameter.

Suction Cup Inserts SPI PEEK

Suction area (Ø) from 6 mm to 32 mm

Suction Cup Inserts SPI PEEK

Type	Part Number
SPI 6 PEEK	10.01.06.03279
SPI 9 PEEK	10.01.06.03280
SPI 11 PEEK	10.01.06.03281
SPI 14 PEEK	10.01.06.03282
SPI 17 PEEK	10.01.06.03283
SPI 18 PEEK	10.01.06.03284
SPI 21 PEEK	10.01.06.03285
SPI 25 PEEK	10.01.06.03286
SPI 32 PEEK	10.01.06.03287

Technical Data Suction Cup Inserts SPI PEEK

Type*	For suction cup type**
SPI 6 PEEK	FG5/FGA6
SPI 9 PEEK	FG9
SPI 11 PEEK	FGA11
SPI 14 PEEK	FG12/FG14/FGA14
SPI 17 PEEK	FG18/FGA16
SPI 18 PEEK	FGA20
SPI 21 PEEK	FG20/FGA22
SPI 25 PEEK	FG25/FGA25
SPI 32 PEEK	FG32/FGA33

*Suction capacity of min. 2 l/min is recommended. An experiment has to be carried out with the original workpiece and suction cups to define the required suction power for the application. Frictional force is reduced during vertical applications.

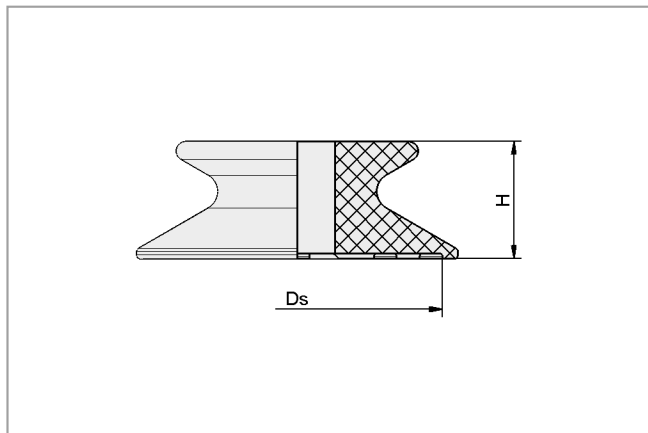
**Suitable suction cups are to find in chapter 3.

Suction Cup Inserts SPI PEEK

Suction area (\emptyset) from 6 mm to 32 mm



Design Data Suction Cup Inserts SPI PEEK



SPI PEEK

Type	Dimensions in mm	
	D_s	H
SPI 6 PEEK	5.2	3.3
SPI 9 PEEK	7.4	3.5
SPI 11 PEEK	8.8	5.1
SPI 14 PEEK	11.8	6.3
SPI 17 PEEK	14.8	6.7
SPI 18 PEEK	16.0	5.3
SPI 21 PEEK	19.0	6.3
SPI 25 PEEK	22.6	10.1
SPI 32 PEEK	29.0	10.3

Accessories Vacuum Suction Cups



Suction Cup Covers SU

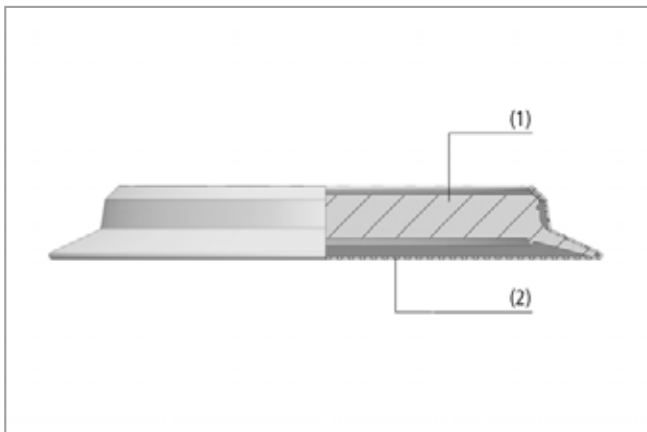
Diameter (Ø) from 30 mm to 360 mm



Suitable for Industry Specific Applications



Suction cup covers SU



System design suction cup covers SU



Suction cup covers SU being used for handling sensitive glass sheets

Applications

- Suction cup cover for handling sensitive, flat and smooth workpieces (coated, processed or painted) to prevent marks and damage
- For use in manufacturing, processing and transportation, for example in the glass and solar industry
- Used in combination with suction cups and suction plates

Design

- Suction cup cover SU is made of a robust fleece material that is highly tear-resistant as well as extremely resistant to chemicals
- The material is abrasion-free and enables gentle handling of workpieces
- The cover (2) can be easily slid over the suction cup or the suction plate (1) and fastened with the integrated rubber band
- With diameters from 30 to 360 mm, the covers are designed to match the corresponding diameter ranges of the suction plates and suction cups

Our Highlights...

- Suction cup cover made of special fleece material (PP/PE)
- Integrated rubber band
- Large range of diameters

Your Benefits...

- > No marks on sensitive workpieces (e.g. glass), highly tear-resistant
- > Quick and easy installation on suction plates and suction cups
- > Installation on flat suction cups, bellows suction cups and suction plates

Suction Cup Covers SU

Diameter (Ø) from 30 mm to 360 mm

Designation Code Suction Cup Covers SU

Abbreviated designation	Diameter in mm
Example SU 120:	
SU	120
SU	30
	to
	360

Ordering Data Suction Cup Covers SU

Suction cup cover SU is delivered in the desired diameter.

Suction Cup Covers SU

Type	Part Number
SU 30	10.01.01.12889
SU 40	10.01.01.12856
SU 50	10.01.01.12837
SU 70	10.01.01.12838
SU 80	10.01.01.12839
SU 100	10.01.01.12840
SU 120	10.01.01.12437
SU 160	10.01.01.12438
SU 210	10.01.01.12439
SU 230	10.01.01.12440
SU 280	10.01.01.12485
SU 300	10.01.01.12843
SU 360	10.01.01.12842

Technical Data Suction Cup Covers SU

Type*	Weight [g]	Clamping range
SU 30	0.9	27 - 35 mm
SU 40	1.2	35 - 45 mm
SU 50	1.3	45 - 60 mm
SU 70	1.7	65 - 80 mm
SU 80	2.0	80 - 100 mm
SU 100	2.0	100 - 115 mm
SU 120	2.0	115 - 130 mm
SU 160	4.0	150 - 180 mm
SU 210	4.0	210 - 220 mm
SU 230	5.0	230 - 250 mm
SU 280	9.0	270 - 300 mm
SU 300	17.0	300 - 330 mm
SU 360	23.0	360 - 400 mm

*In vertical applications with a suction plate or cup, the lateral force sinks by up to 70%. The vacuum generator must be able to provide 10% more suction power.

Accessories Vacuum Suction Cups

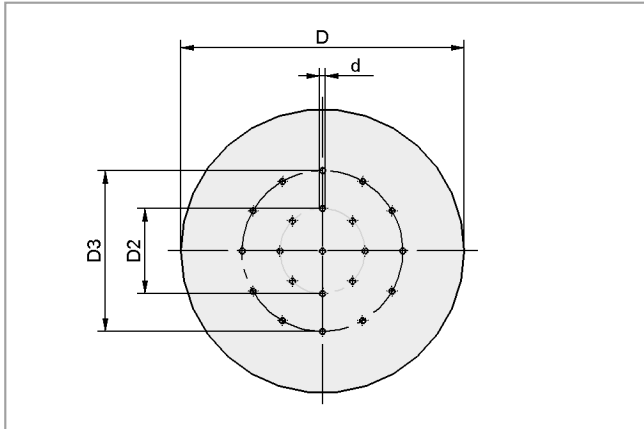


Suction Cup Covers SU

Diameter (Ø) from 30 mm to 360 mm



Design Data Suction Cup Covers SU



SU 30 to 360

Type	Dimensions in mm			
	d	D	D2	D3
SU 30	3	30	-	-
SU 40	3	40	-	-
SU 50	5	50	30	-
SU 70	5	70	30	-
SU 80	5	80	30	-
SU 100	6	100	50	-
SU 120	6	120	50	-
SU 160	6	160	50	-
SU 210	6	210	50	-
SU 230	6	230	50	-
SU 280	6	280	50	-
SU 300	6	300	90	170
SU 360	6	360	90	170

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Protection Covers PC

Diameters (Ø) 125 mm to 400 mm



Suitable for Industry Specific Applications



Suction cup protection covers PC

Applications

- High quality protection cover for suction plates during storage or when not in use
- Protection against pollution (dust or moisture) and aging (by ozone or UV impact) in outdoor areas
- Use with suction plates and suction cups such as SPU and SGF
- Use with manual glass lifting devices indoors and outdoors during storage and transport

Design

- Robust and tear-resistant material, resistant to external environmental influences
- Mounted tool-free to suction cups/suction plates and fastened with the integrated elastic band
- Diameters of the covers are designed to match the corresponding diameter ranges of the suction plates and suction cups

Our Highlights...

- High quality protection cover for suction plates
- Integrated elastic band
- Large range of diameters

Your Benefits...

- > Reduced risk of contamination and damage of the sealing lip during storage
- > Fast and easy installation on suction plates and suction cups
- > Installation on flat suction cups, bellows suction cups and suction plates

Designation Code Protection Covers PC

Abbreviated designation	Diameter in mm
Example PC 125:	
PC	125
PC	125 to 400

Ordering Data Protection Covers PC

Protection cover PC is delivered with the desired diameter.

Accessories Vacuum Suction Cups



Protection Covers PC

Diameters (Ø) 125 mm to 400 mm

Protection Covers PC

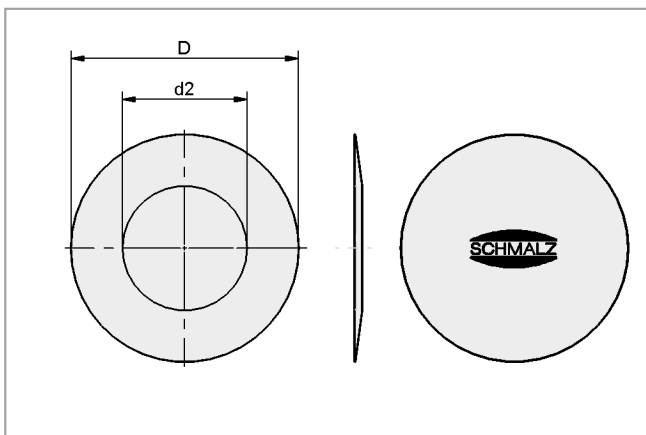
Type	Part Number
PC 125	10.01.01.13086
PC 150	10.01.01.13087
PC 175	10.01.01.13088
PC 200	10.01.01.13089
PC 250	10.01.01.13090
PC 300	10.01.01.13091
PC 350	10.01.01.13092
PC 400	10.01.01.13093

Technical Data Protection Covers PC

Type*	Clamping range
PC 125	110 - 135 mm
PC 150	135 - 165 mm
PC 175	165 - 190 mm
PC 200	190 - 220 mm
PC 250	220 - 275 mm
PC 300	275 - 325 mm
PC 350	325 - 375 mm
PC 400	375 - 425 mm

*Suction cup protection covers PC are designed for the use with suction cups and suction plates that are out of use. They cannot be used during handling.

Design Data Protection Covers PC



PC 125 to 300

Type	Dimensions in mm	
	D	d2
PC 125	125	65
PC 150	150	75
PC 175	175	90
PC 200	200	100
PC 250	250	125
PC 300	300	150
PC 350	350	175
PC 400	400	200

Sealing Rings DR-MOS SI

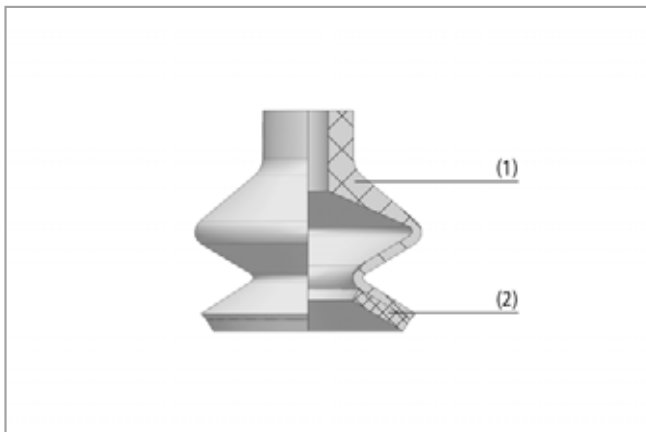
Diameter (Ø) from 20 mm to 88 mm



Suitable for Industry Specific Applications



Sealing rings DR-MOS SI



System design sealing rings DR-MOS SI



Standard suction cup with sealing ring DR-MOS SI being used for handling structured plastic parts

Applications

- Sealing ring made from special foam for an optimum sealing on structured surfaces
- Used on structured surfaces (studded, rippled or rough) where suction cups hardly seal or cannot seal at all
- Handling of packaging materials and flat or uneven workpieces with structured surfaces such as foil packed products or plastic components
- Can be used as an accessory for suction cup series FG and FGA made from silicone

Design

- Sealing ring of high-quality silicone foam (2) for gluing onto the silicone suction cup (1)
- Available in a variety of diameters and thicknesses, suitable for standard suction cup series FGA (1.5 folds) and FG (2.5 folds)
- Material connection with silicone adhesive

Our Highlights...

- Foam rings for gluing onto bellows suction cup
- Available in a variety of diameters and thicknesses
- Silicone adhesive available as accessory

Your Benefits...

- > Optimal sealing on structured surfaces
- > Wide range of application possibilities for standard suction cup series FGA (1.5 folds) and FG (2.5 folds)
- > Secure mounting and connection to the suction cup

Accessories Vacuum Suction Cups



Sealing Rings DR-MOS SI

Diameter (Ø) from 20 mm to 88 mm

Designation Code Sealing Rings DR-MOS SI

Abbreviated designation	Dimensions in mm	Height in mm	Material and Shore hardness
Example DR 20/10x2 MOS SI-15:			
DR	20/10	x2	MOS SI-15
DR	20/10 to 88/64 outside/inside	x2 x5	MOS SI-15 silicone

Ordering Data Sealing Rings DR-MOS SI

Sealing profile DR-MOS SI is delivered with the desired characteristics.

Available accessories: silicone adhesive

Sealing Rings DR-MOS SI

Type	Part Number
DR 20/10x2 MOS SI-15	10.01.06.02618
DR 22.5/13x2 MOS SI-15	10.01.06.02614
DR 32/19x2 MOS SI-15	10.01.06.02615
DR 42/20x5 MOS SI-15	10.01.06.02616
DR 52/33x5 MOS SI-15	10.01.06.02548
DR 62/42x5 MOS SI-15	10.01.06.02617
DR 78/54x5 MOS SI-15	10.01.06.02619
DR 88/64x5 MOS SI-15	10.01.06.02620

Ordering Data Accessories Sealing Rings DR-MOS SI

Type	Part Number
Silicone adhesive (90 ml tube)	27.03.04.00003

Technical Data Sealing Rings DR-MOS SI

Type	For suction cup type*	Material-Type	Temperature resistance [°C]	Colour
DR 20/10x2 MOS SI-15	FGA 20	Foam rubber	180	beige
DR 22.5/13x2 MOS SI-15	FGA-22, FGA-25, FG-25	Foam rubber	180	beige
DR 32/19x2 MOS SI-15	FGA-33, FG-32	Foam rubber	180	beige
DR 42/20x5 MOS SI-15	FGA-43, FG-42	Foam rubber	180	beige
DR 52/33x5 MOS SI-15	FGA-53, FG-52	Foam rubber	180	beige
DR 62/42x5 MOS SI-15	FGA-63, FG-62	Foam rubber	180	beige
DR 78/54x5 MOS SI-15	FGA-78	Foam rubber	180	beige
DR 88/64x5 MOS SI-15	FG-88	Foam rubber	180	beige

*Suitable for the silicone suction cup types listed

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Accessories Vacuum Suction Cups

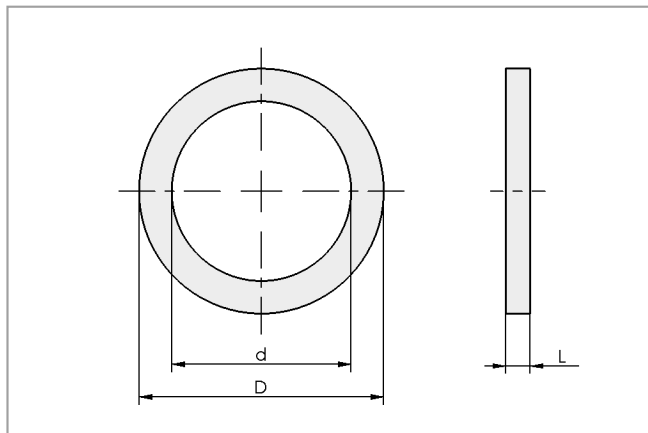


Sealing Rings DR-MOS SI

Diameter (\emptyset) from 20 mm to 88 mm



Design Data Sealing Rings DR-MOS SI



DR-MOS SI

Type	Dimensions in mm		
	d	D	L
DR 20/10x2 MOS SI-15	10	20.0	2
DR 22.5/13x2 MOS SI-15	13	22.5	2
DR 32/19x2 MOS SI-15	19	32.0	2
DR 42/20x5 MOS SI-15	20	42.0	5
DR 52/33x5 MOS SI-15	33	52.0	5
DR 62/42x5 MOS SI-15	42	62.0	5
DR 78/54x5 MOS SI-15	54	78.0	5
DR 88/64x5 MOS SI-15	64	88.0	5

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Special Grippers

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Overview of Section 4



Special Grippers

At a Glance

Selection Aid		Page
	Selection by Workpiece	316
Floating Suction Cups		
	Floating Suction Cups SBS <ul style="list-style-type: none"> • Diameter: 20 to 120 mm • Holding force: 2.0 to 104.0 N • Rubber buffer on the bottom side of the suction cup 	317 Floating suction cup for low-contact handling of fragile workpieces such as paper, film, printed circuit boards or wafers and solar cells.
Magnetic Grippers		
	Magnetic Grippers SGM <ul style="list-style-type: none"> • Diameter: 30 to 70 mm • Holding force: 35 to 290 N 	321 Special gripper with permanent magnet for safe handling of magnetic workpieces such as perforated metal sheets.
Needle Grippers		
	Needle Grippers SNGi-AE <ul style="list-style-type: none"> • Needle diameter: 0.8 mm or 1.2 mm • No. of needles: 10 • Needle stroke: 3 mm to 20 mm (variable) 	326 Electrical needle gripper in compact, maintenance friendly design with automatic, continuously adjustable stroke and IO-Link interface for handling materials that are difficult to grip using vacuum such as composite textiles, etc.
	Needle Grippers SNG-AP <ul style="list-style-type: none"> • Needle diameter: 0.8 mm or 1.2 mm • No. of needles: 10 • Needle stroke: 3 mm to 20 mm (variable) 	330 Pneumatic needle gripper in compact, maintenance-friendly design with manual, continuously adjustable stroke for handling materials that are difficult to grip using vacuum such as composite textiles, etc.
	Needle Grippers SNG-V <ul style="list-style-type: none"> • Needle diameter: 1.2 mm • Number of needles: 10 • Needle stroke: 0 mm to 7 mm (variable) 	334 Needle gripper with intersecting needles and manual, continuously adjustable stroke for materials that are difficult to grip like composite textiles and much more.

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Special Grippers

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Needle Grippers SNG-M



337

- Needle diameter: 0.8 mm
- Number of needles: 4
- Needle stroke: 3.0 mm

Needle gripper with a compact design for materials which are difficult to handle with vacuum.

Wafer Grippers



Wafer Grippers SWGm



340

- Dimensions: 125 x 125 mm and 156 x 156 mm
- Selectable base model with axial exhaust air or sideways exhaust air
- Material suction plate: PEEK

Wafer gripper for extremely quick and gentle handling of wafers and solar cells with maximum process reliability.

Composite Grippers



Composite Grippers SCG



348

- Suction rate: 270 l/min to 650 l/min
- Diameter suction plate: 40 mm and 60 mm
- Material suction plate: POM

Special gripper with integrated vacuum generation and high flow rate for handling fragile workpieces with unstable shapes.



Flow Grippers SCG



354

- Flow gripper with axial or sideways mounting
- Suction cup with 1.5 folds made of fda compliant material silicone
- Diameter suction cup: 50 mm

Modular flow gripper with suction cup made of fda-compliant material for handling dry food products such as cookies, cakes and waffles.

Thin glass grippers



Thin Glass Grippers STGG



359

- Suction area: 100 x 55 mm and 170 x 105 mm
- Integrated vacuum generator or connection to external vacuum generator
- Material suction area: PEEK
- Suction rate: 31 to 235 l/min

Area gripper for gentle, contamination-free and extremely dynamic handling of sensitive workpieces such as thinnest display glass in fully-automated or semi-automated processes.

Feed Ejectors



Feed Ejectors SEC



367

- Suction capacity up to 8,640 l/min
- Diameter 6 to 75 mm

Ejector with high evacuation volume for applying suction to very porous parts and for transportation of bulk materials.

Overview of Section 4



Special Grippers

At a Glance

Vacuum Lifting Cylinders HS



Vacuum Lifting Cylinders HS



370

- Body of aluminium with integrated lifting cylinder
- Connection thread M5 and G1/8" for suction cups

Vacuum-actuated automatic lifting cylinder for fast separation of films and paper.

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Selection by Workpiece

For workpieces that are difficult or impossible to handle with suction cups, the “Special Grippers” section offers alternatives. There follow some examples of applications to assist selection of the appropriate special grippers:

Applications	Workpiece	Schmalz Special Grippers	
		Type	Product Properties
	Ferromagnetic sheet metal, perforated plate	Magnetic grippers SGM	<ul style="list-style-type: none"> • Handling using a permanent magnet • Absorption of lateral forces by friction ring
	Thin, delicate glass such as display glass	Thin glass gripper STGG	<ul style="list-style-type: none"> • Large contact surface for delicate handling • With integrated vacuum generation as an option • High flow rate for a secure grip
	Delicate components such as blank circuit boards	Floating suction cup SBS	<ul style="list-style-type: none"> • Low-contact handling • Integrated vacuum generation • Effective leakage compensation
	Solar components such as wafers and solar cells	Wafer gripper SWGm	<ul style="list-style-type: none"> • Extremely fast and precise handling • Integrated vacuum generation with high suction rate • Product dimensions especially for wafer sizes 125 x 125 mm and 156 x 156 mm
		Floating suction cup SBS	<ul style="list-style-type: none"> • Low-contact handling • Integrated vacuum generation
	Thin workpieces such as plastic film and paper	Floating suction cup SBS	<ul style="list-style-type: none"> • Low-contact handling • Integrated vacuum generation • Effective leakage compensation • Absorption of lateral forces by elastomer cushions on the underside
		Composite grippers SCG	<ul style="list-style-type: none"> • Integrated vacuum generation • High flow rate for a secure grip on even porous workpieces • Large contact surface for delicate handling
		Wafer gripper SWGm	<ul style="list-style-type: none"> • Extremely fast and precise handling • Integrated vacuum generation with high suction rate
		Thin glass gripper STGG	<ul style="list-style-type: none"> • Large contact surface for delicate handling • With integrated vacuum generation as an option • High flow rate for a secure grip
	Porous, flexible workpieces such as technical fiber composites, textiles, foam, construction materials and non-wovens	Needle grippers SNG/SNGi	<ul style="list-style-type: none"> • Needle grippers with variable needle stroke and different needle diameters that can be adjusted for individual workpiece geometries • Electrical version with infinitely adjustable stroke
		Floating suction cup SBS	<ul style="list-style-type: none"> • Low-contact handling • Integrated vacuum generation • Effective leakage compensation
		Composite grippers SCG	<ul style="list-style-type: none"> • Integrated vacuum generation • High flow rate for a secure grip on even porous workpieces • Large contact surface for delicate handling

Floating Suction Cups



Floating Suction Cups SBS

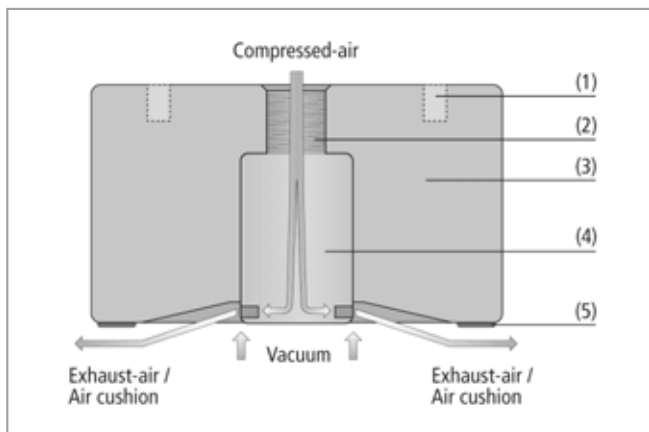
Diameter (Ø) from 20 mm to 120 mm



Suitable for Industry Specific Applications



Floating suction cups SBS



System design floating suction cups SBS



Floating suction cups SBS being used for handling thin wood veneer

Applications

- Floating suction cup for handling and separation of extremely thin workpieces without permanent deformation (e.g. film, paper, wood veneer)
- Handling of very porous workpieces (e.g. printed circuit board)
- Handling of highly sensitive workpieces (e.g. wafer, solar cells)

Design

- Connection directly via four mounting threads on the top side of the gripper (1)
- Vertical (2) and horizontal compressed-air connections (closed with a plug)
- Anodized aluminum body with integrated Bernoulli nozzle (3)
- Streaming element (4) in two versions: Standard Flow SF for air-tight workpieces and High Flow HF with higher leakage compensation for porous workpieces
- Mark-free rubber buffer of special material HT1 on the bottom side of the suction cup (5)
- Optional available with central support

Our Highlights...

- Integrated vacuum generation on the Bernoulli principle
- Suction cup "floats" on an air cushion
- High volume flow rate at a low vacuum
- No air is drawn through the workpiece
- Elastomer buffer made of HT1 on the bottom side
- Optional with central support (additional HT1 buffer)

Your Benefits...

- > Operating without ejector
- > Low-contact handling
- > Very good compensation of leakages
- > Reliable separation of thin, porous workpieces
- > Absorption of lateral forces
- > Safe handling of wafer and solar cells

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Floating Suction Cups



Floating Suction Cups SBS

Diameter (Ø) from 20 mm to 120 mm

Designation Code Floating Suction Cups SBS

Abbreviated designation	Diameter in mm	Streaming element	Connection thread mechanical	Product addition
Example SBS 20 SF M5-IG:				
SBS	20	SF	M5-IG	
SBS	20 to 120	HF high flow SF standard flow	M5-IG (IG = female (F)) G1/8-IG	CS central support

Ordering Data Floating Suction Cups SBS

Floating suction cup SBS is delivered assembled. The assembly consists of:

- Floating suction cup of type SBS – available in various diameters
- Elastomer buffer made of the material HT1
- Optional product addition: central support

Available spare parts: rubber buffer

Floating Suction Cups SBS

Type	Part Number
SBS 20 SF M5-IG	10.01.01.12633
SBS 20 HF M5-IG	10.01.01.12650
SBS 30 SF M5-IG	10.01.01.12636
SBS 30 HF M5-IG	10.01.01.12651
SBS 40 SF G1/8-IG	10.01.01.12638
SBS 40 SF G1/8-IG CS	10.01.01.12776
SBS 40 HF G1/8-IG	10.01.01.12653
SBS 60 SF G1/8-IG	10.01.01.12641
SBS 60 SF G1/8-IG CS	10.01.01.12777
SBS 60 HF G1/8-IG	10.01.01.12655
SBS 100 SF G1/8-IG	10.01.01.12688
SBS 100 HF G1/8-IG	10.01.01.12689
SBS 120 SF G1/8-IG	10.01.01.13136
SBS 120 HF G1/8-IG	10.01.01.13139

Ordering Data Spare Parts Floating Suction Cups SBS

Type	Rubber buffer	Central support
SBS 20 SF M5-IG	10.01.01.12585	-
SBS 20 HF M5-IG	10.01.01.12585	-
SBS 30 SF M5-IG	10.01.01.12585	-
SBS 30 HF M5-IG	10.01.01.12585	-
SBS 40 SF G1/8-IG	10.01.01.12593	-
SBS 40 HF G1/8-IG	10.01.01.12593	-
SBS 40 SF G1/8-IG CS	10.01.01.12593	10.01.01.12780
SBS 60 SF G1/8-IG	10.01.01.12593	-
SBS 60 HF G1/8-IG	10.01.01.12593	-
SBS 40 SF G1/8-IG CS	10.01.01.12593	10.01.01.12780
SBS 100 SF G1/8-IG	10.01.01.12593	-
SBS 100 HF G1/8-IG	10.01.01.12593	-
SBS 120 SF G1/8-IG	10.01.01.12593	-
SBS 120 HF G1/8-IG	10.01.01.12593	-

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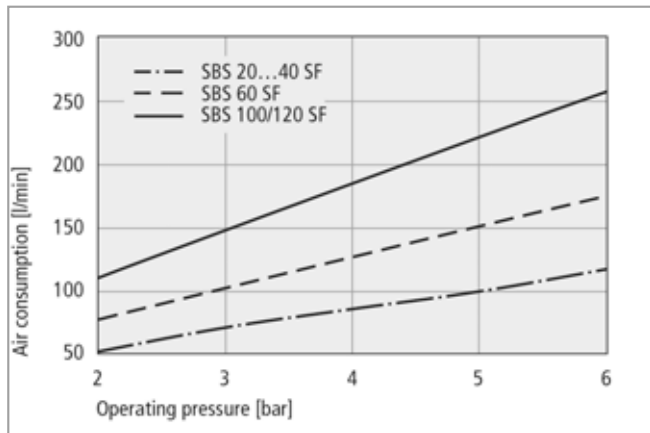
Floating Suction Cups



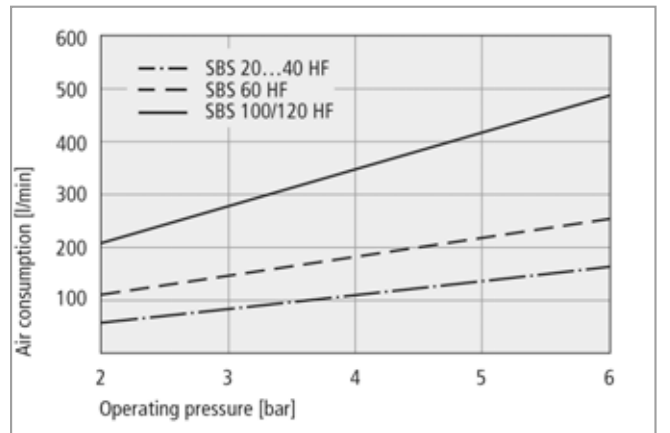
Floating Suction Cups SBS

Diameter (\varnothing) from 20 mm to 120 mm

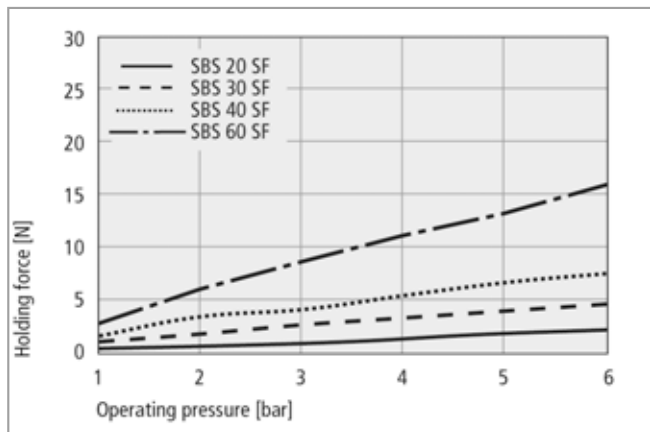
Performance Data Floating Suction Cups SBS



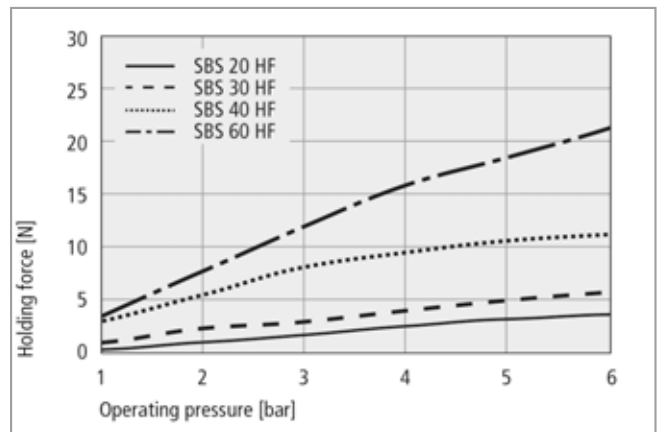
Air consumption SBS 20 to 120 SF



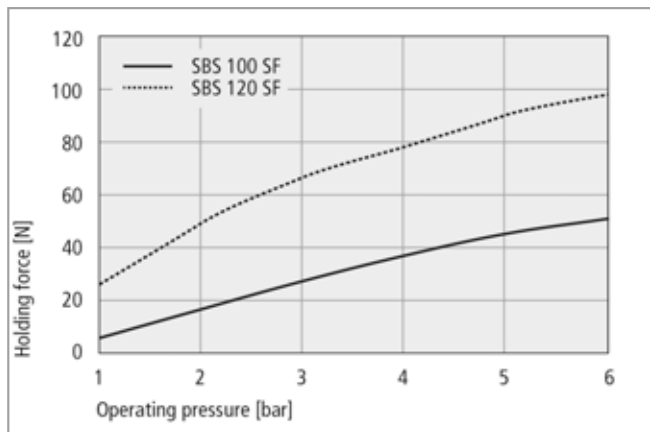
Air consumption SBS 20 to 120 HF



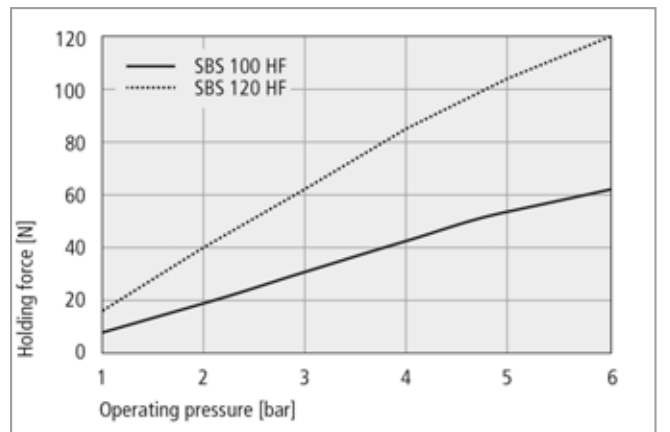
Holding force SBS 20 to 60 SF



Holding force SBS 20 to 60 HF



Holding force SBS 100 and 120 SF



Holding force SBS 100 and 120 HF

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Floating Suction Cups



Floating Suction Cups SBS

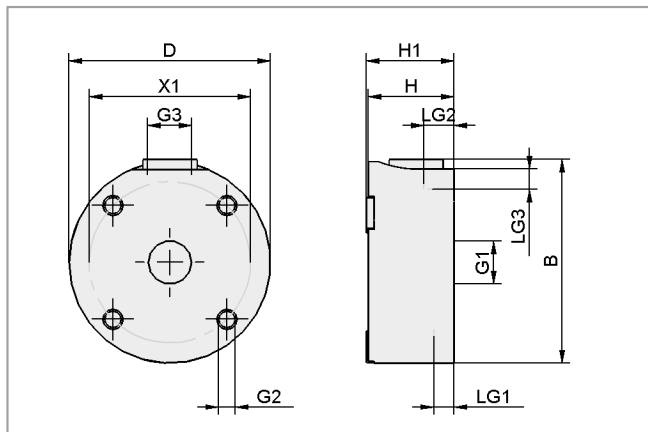
Diameter (Ø) from 20 mm to 120 mm

Technical Data Floating Suction Cups SBS

Type	Holding force [N]*	Air consumption [l/min]*	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Weight [g]
SBS 20 SF M5-IG	2.0	100	1.0 ... 6.0	0 ... 80	12
SBS 20 HF M5-IG	3.0	140	1.0 ... 6.0	0 ... 80	12
SBS 30 SF M5-IG	4.0	100	1.0 ... 6.0	0 ... 80	31
SBS 30 HF M5-IG	5.0	140	1.0 ... 6.0	0 ... 80	31
SBS 40 SF G1/8-IG	6.5	100	1.0 ... 6.0	0 ... 80	51
SBS 40 SF G1/8-IG CS	6.5	100	1.0 ... 6.0	0 ... 80	53
SBS 40 HF G1/8-IG	10.5	190	1.0 ... 6.0	0 ... 80	51
SBS 60 SF G1/8-IG	13.0	150	1.0 ... 6.0	0 ... 80	118
SBS 60 SF G1/8-IG CS	13.0	150	1.0 ... 6.0	0 ... 80	120
SBS 60 HF G1/8-IG	18.5	225	1.0 ... 6.0	0 ... 80	118
SBS 100 SF G1/8-IG	46.0	225	1.0 ... 6.0	0 ... 80	295
SBS 100 HF G1/8-IG	55.5	420	1.0 ... 6.0	0 ... 80	295
SBS 120 SF G1/8-IG	89.0	225	1.0 ... 6.0	0 ... 80	390
SBS 120 HF G1/8-IG	104.0	420	1.0 ... 6.0	0 ... 80	390

*The values provided are based on an operating pressure of 5 bar, measured on a suction-tight workpiece. The actual values may differ depending on the properties of the workpiece.

Design Data Floating Suction Cups SBS



SBS 20 to 120

Type	Dimensions in mm										
	B	D	G1	G2	G3	H	H1	LG1	LG2	LG3	X1
SBS 20 SF M5-IG	22.2	20	M5-F	M3-F	M5-F	17	17.5	5	6	6	15
SBS 20 HF M5-IG	22.2	20	M5-F	M3-F	M5-F	17	17.5	5	6	6	15
SBS 30 SF M5-IG	32.0	30	M5-F	M4-F	M5-F	17	17.5	5	6	6	22
SBS 30 HF M5-IG	32.0	30	M5-F	M4-F	M5-F	17	17.5	5	6	6	22
SBS 40 SF G1/8-IG	41.0	40	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	32
SBS 40 SF G1/8-IG CS	41.0	40	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	32
SBS 40 HF G1/8-IG	41.0	40	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	32
SBS 60 SF G1/8-IG	61.6	60	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	45
SBS 60 SF G1/8-IG CS	61.6	60	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	45
SBS 60 HF G1/8-IG	61.6	60	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	45
SBS 100 SF G1/8-IG	101.0	100	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	75
SBS 100 HF G1/8-IG	101.0	100	G1/8"-F	M4-F	G1/8"-F	17	17.5	5	6	6	75
SBS 120 SF G1/8-IG	121.5	120	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	10	6	105
SBS 120 HF G1/8-IG	121.5	120	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	10	6	105

Magnetic Grippers



Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm



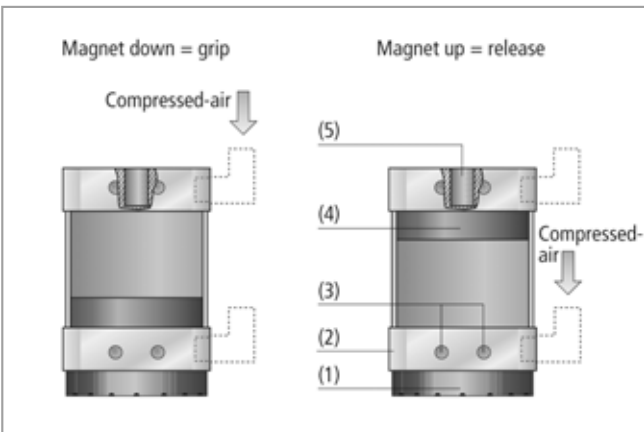
Suitable for Industry Specific Applications



Magnetic grippers SGM

Applications

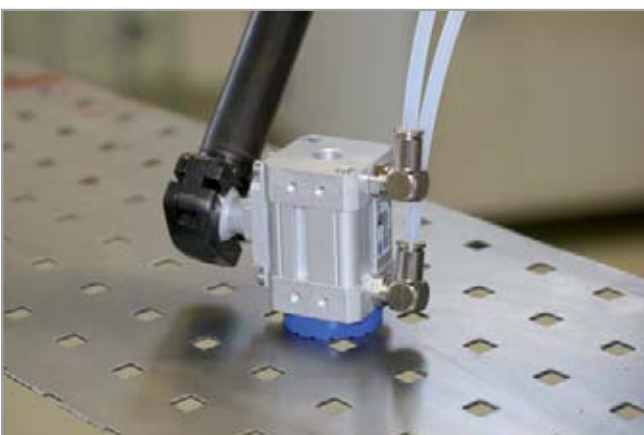
- Magnetic gripper for handling of perforated metal sheets, complex laser-cut workpieces and metal sheets with holes and apertures
- Handling of ferromagnetic workpieces



System design magnetic grippers SGM

Design

- Robust aluminum housing (2) with permanent magnet (4)
- Clip-on, easy to replace friction ring (1)
- Bistable design: the magnet settings "grip" and "release" are maintained in case of power loss
- Standard connection threads (5) in top cover
- Mounting threads (3) for holder systems HTS on three sides
- The holder system HTS offers several options for mounting a gripper onto the gripping apparatus; HTS...D version for interlocking and mounting two grippers
- SGM-S with piston control for sensor recognition of piston position of the magnetic gripper



Magnetic grippers SGM being used for handling perforated metal sheets

Our Highlights...

- Safe gripping by a permanent magnet
- Compact and lightweight design
- Easily replaceable friction ring
- Optional side connection for tooling
- Option to interlock two magnetic grippers (HTS...D)
- Piston control (only in series SGM-S in PNP or NPN version with IO-Link)

Your Benefits...

- > No electric power required
- > Minimal space requirements, low total weight
- > High shear forces can be achieved
- > Flexible mounting options
- > Optimal for oblong workpieces
- > Recognition of piston position via Hall effect sensor

Magnetic Grippers



Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm

Designation Code Magnetic Grippers SGM

Abbreviated designation	Product addition	Diameter in mm	Connection mechanical	Switching function sensor
Example SGM-S 30 G1/8-IG PNP:				
SGM-S	S	30	G1/8-IG	PNP
SGM	S with piston control HD Heavy Duty	30 40 50 70	G1/8-IG (IG = female (F)) G1/4-IG	NPN switches to minus PNP switches to plus

Ordering Data Magnetic Grippers SGM

Magnet gripper SGM is delivered assembled. The assembly consists of:

- Gripper of type SGM – available in various diameters
- Gripper of type SGM-HD – stainless-steel grip surface for robust applications – available in various diameters
- Friction ring made of the material PU
- Optional product addition: piston control (type SGM-S)

Available spare parts: friction ring

Available accessories: holder system

Magnetic Grippers SGM

Type*	Part Number
SGM 30 G1/8-IG	10.01.17.00162
SGM 40 G1/4-IG	10.01.17.00163
SGM 50 G1/4-IG	10.01.17.00164
SGM 70 G1/4-IG	10.01.17.00165
SGM-S 30 G1/8-IG PNP	10.01.17.00200
SGM-S 40 G1/4-IG PNP	10.01.17.00201
SGM-S 50 G1/4-IG PNP	10.01.17.00202
SGM-S 70 G1/4-IG PNP	10.01.17.00203
SGM-S 30 G1/8-IG NPN	10.01.17.00216
SGM-S 40 G1/4-IG NPN	10.01.17.00217
SGM-S 50 G1/4-IG NPN	10.01.17.00218
SGM-S 70 G1/4-IG NPN	10.01.17.00219
SGM-HD 30 G1/8-IG	10.01.17.00184
SGM-HD 40 G1/4-IG	10.01.17.00185
SGM-HD 50 G1/4-IG	10.01.17.00273
SGM-HD 70 G1/4-IG	10.01.17.00272

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts Magnetic Grippers SGM

Type	Friction ring	Proximity switch PNP	Proximity switch NPN
SGM 30 / SGM-HD 30	10.01.17.00136	-	-
SGM 40 / SGM-HD 40	10.01.17.00137	-	-
SGM 50 / SGM-HD 50	10.01.17.00138	-	-
SGM 70 / SGM-HD 70	10.01.17.00139	-	-
SGM-S 30	10.01.17.00136	10.01.17.00199	10.01.17.00215
SGM-S 40	10.01.17.00137	10.01.17.00199	10.01.17.00215
SGM-S 50	10.01.17.00138	10.01.17.00199	10.01.17.00215
SGM-S 70	10.01.17.00139	10.01.17.00199	10.01.17.00215

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Magnetic Grippers



Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm

Ordering Data Accessories Holder System (single) Magnetic Grippers SGM

Type	Holder System HTS-A2*	Holder System HTS-A3*
SGM 30 / SGM-S 30 / SGM-HD 30	10.01.17.00169	10.01.17.00170
SGM 40 / SGM-S 40 / SGM-HD 40	10.01.17.00169	10.01.17.00170
SGM 50 / SGM-S 50 / SGM-HD 50	10.01.17.00172	10.01.17.00173
SGM 70 / SGM-S 70 / SGM-HD 70	10.01.17.00172	10.01.17.00173

*Mounting screws included

Ordering Data Accessories Holder System (double) Magnetic Grippers SGM

Type	Holder System HTS-A2 D*	Holder System HTS-A3 D*
SGM 30 / SGM-S 30 / SGM-HD 30	10.01.17.00175	10.01.17.00176
SGM 40 / SGM-S 40 / SGM-HD 40	10.01.17.00175	10.01.17.00176
SGM 50 / SGM-S 50 / SGM-HD 50	10.01.17.00178	10.01.17.00179
SGM 70 / SGM-S 70 / SGM-HD 70	10.01.17.00178	10.01.17.00179

*Mounting screws included

Technical Data Magnetic Grippers SGM

Type	Holding force [N]*	Remaining force [N]	Pressure range (operating pressure) [bar]	Installation position	Principle of operation	Operating temperature [°C]	Weight [g]
SGM 30	35	0.3	3.5 ... 6.0	Any	Bistable	5 ... 50	130
SGM 40	100	0.3	3.5 ... 6.0	Any	Bistable	5 ... 50	240
SGM 50	180	0.3	3.5 ... 6.0	Any	Bistable	5 ... 50	440
SGM 70	290	0.3	3.5 ... 6.0	Any	Bistable	5 ... 50	715
SGM-S 30	35	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	145
SGM-S 40	100	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	255
SGM-S 50	180	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	445
SGM-S 70	290	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	730
SGM-HD 30	35	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	191
SGM-HD 40	100	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	342
SGM-HD 50	180	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	594
SGM-HD 70	290	0.3	3.5 ... 6.0	Any	Bistable	5 ... 70	975

*Note: The value given is a static value with no safety factor; based on a plate with a thickness of 2 mm. For system configurations with magnetic grippers SGM, a safety factor of S = 3 must be applied.

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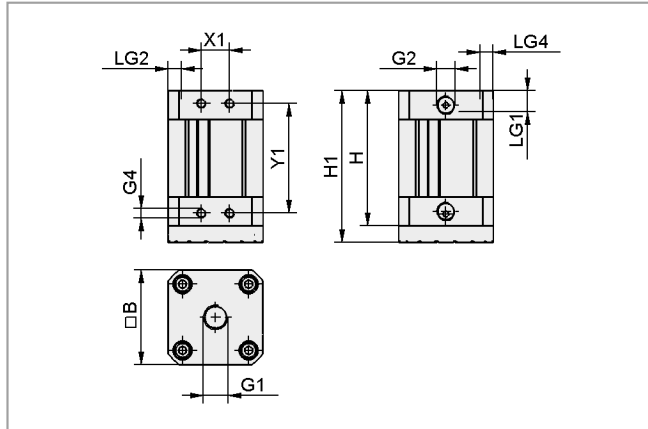
Magnetic Grippers



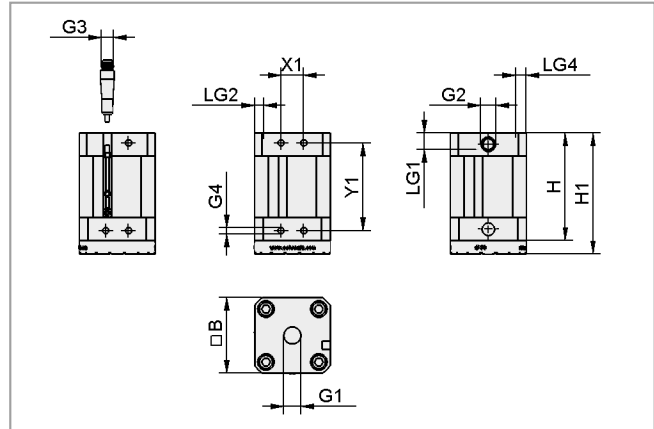
Magnetic Grippers SGM

Suction area (\emptyset) from 30 mm to 70 mm

Design Data Magnetic Grippers SGM



SGM 30 to 70 / SGM-HD 30 to 70



SGM-S 30 to 70

Type	Dimensions in mm											
	B*	G1	G2	G3	G4	H	H1	LG1	LG2	LG4	X1	Y1
SGM 30 G1/8-IG	30.0	G1/8"-F	G1/8"-F	-	M4-F	61.4	70.2	7	6	5	12	46
SGM 40 G1/4-IG	40.6	G1/4"-F	G1/8"-F	-	M4-F	61.4	70.2	11	6	7	12	46
SGM 50 G1/4-IG	50.6	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	7	15	58
SGM 70 G1/4-IG	68.7	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	8	15	58
SGM-S 30 G1/8-IG PNP	30.0	G1/8"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	7	6	5	12	46
SGM-S 40 G1/4-IG PNP	40.6	G1/4"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	11	6	7	12	46
SGM-S 50 G1/4-IG PNP	50.6	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	7	15	58
SGM-S 70 G1/4-IG PNP	68.7	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	8	15	58
SGM-S 30 G1/8-IG NPN	30.0	G1/8"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	7	6	5	12	46
SGM-S 40 G1/4-IG NPN	40.6	G1/4"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	11	6	7	12	46
SGM-S 50 G1/4-IG NPN	50.6	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	7	15	58
SGM-S 70 G1/4-IG NPN	68.7	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	8	15	58
SGM-HD 30 G1/8-IG	30.0	G1/8"-F	G1/8"-F	-	M4-F	61.4	70.2	7	6	5	12	46
SGM-HD 40 G1/4-IG	40.6	G1/4"-F	G1/8"-F	-	M4-F	61.4	70.2	11	6	7	12	46
SGM-HD 50 G1/4-IG	50.6	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	7	15	58
SGM-HD 70 G1/4-IG	68.7	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	8	15	58

*Contact surface of the grippers (round) corresponds to dimension B

Magnetic Grippers

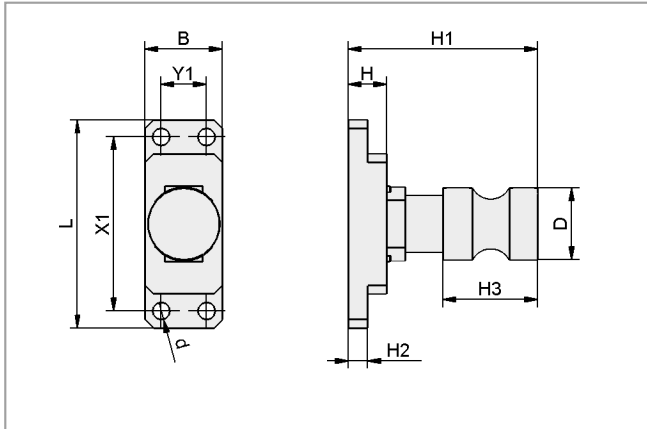


Magnetic Grippers SGM

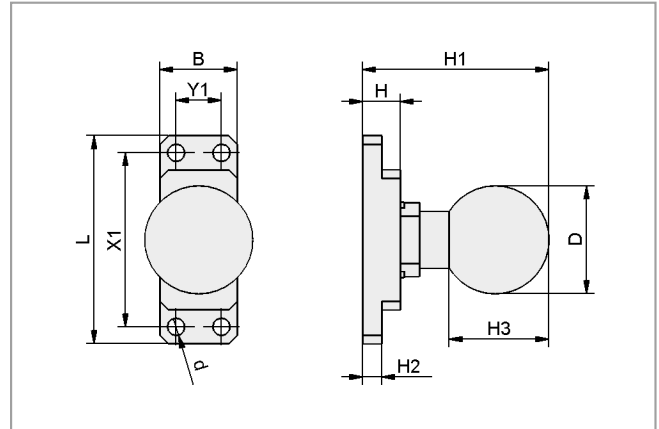
Suction area (\emptyset) from 30 mm to 70 mm



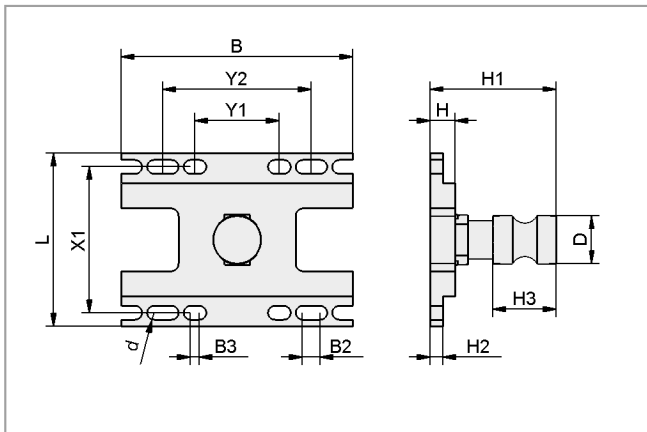
Design Data Accessories Magnetic Grippers SGM



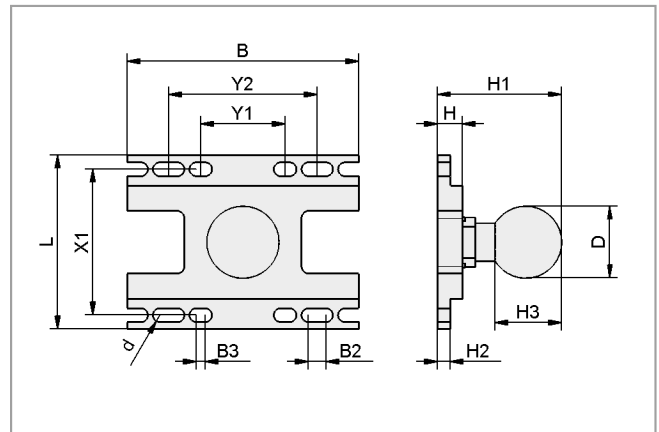
HTS-A2



HTS-A3



HTS-A2 D



HTS-A3 D

Type	Dimensions in mm													
	B	B2	B3	d	D	H	H1	H2	H3	L	X1	Y1	Y2	
HTS-A2 SGM 30/40*	20.5	-	-	4.6	19.0	10	49.9	5.2	25.0	55.0	46.0	12.0	-	
HTS-A3 SGM 30/40*	20.5	-	-	4.6	28.5	10	49.4	5.2	26.4	55.0	46.0	12.0	-	
HTS-A2 SGM 50/70**	26.0	-	-	5.6	19.0	10	49.9	5.2	25.0	69.0	58.0	15.0	-	
HTS-A3 SGM 50/70**	26.0	-	-	5.6	28.5	10	49.2	5.2	26.4	69.0	58.0	15.0	-	
HTS-A2 D SGM 30/40***	59.0	7.5	-	4.5	19.0	10	50.0	5.2	25.0	59.0	46.0	21.5	-	
HTS-A3 D SGM 30/40***	59.0	7.5	-	4.5	28.5	10	49.3	5.2	26.4	59.0	46.0	21.5	-	
HTS-A2 D SGM 50/70****	92.0	7.0	3.5	5.5	19.0	10	50.0	5.2	25.0	69.0	58.0	33.5	59.0	
HTS-A3 D SGM 50/70****	92.0	7.0	3.5	5.5	28.5	10	49.3	5.2	26.4	69.0	58.0	33.5	59.0	

*suitable for 1 SGM 30 or 1 SGM 40

**suitable for 1 SGM 50 or 1 SGM 70

***suitable for 2 SGM 30 or 2 SGM 40; not suitable for SGM-S 30

****suitable for 2 SGM 50 or 2 SGM 70

Needle Grippers



Needle Grippers SNGi-AE

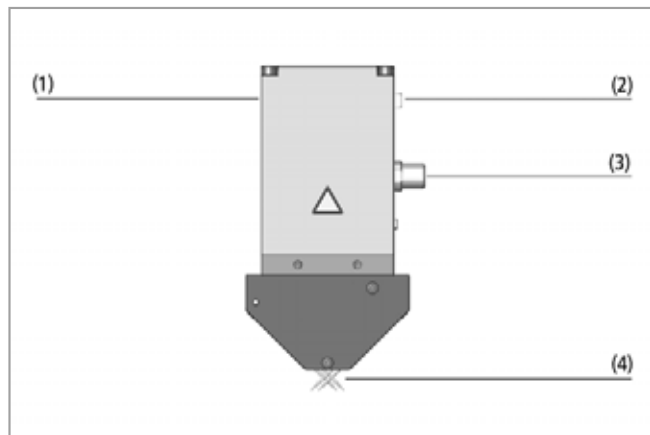
Needle stroke max. 3 mm to max. 20 mm (variable)



Suitable for Industry Specific Applications



Needle grippers SNGi-AE



System design needle grippers SNGi-AE



Needle grippers SNGi-AE being used for handling composite textiles

Applications

- Needle gripper for handling non-rigid and highly porous materials (primary textiles)
- Handling materials that are difficult to grip using vacuum such as textiles, fleece, filter materials, insulation and foam materials, and much more
- Flexible handling of materials with changing stacking height due to free selectable stroke adjustment

Design

- Electrically driven gripper
- High-strength housing with lightweight design (1)
- Three sizes with needle strokes of max. 3 mm, 10 mm or 20 mm
- Ten needles (4) with diameters of 0.8 mm or 1.2 mm (depending on the model)
- Insertion angle of 30° or 45° (depending on the model)
- LED status display (2)
- IO-Link interface with M12 plug connection, 5-pin (3)
- Can also be mounted with the Schmalz holder system HTS

Our Highlights...

- Intersecting needles and small gripping area
- Needle stroke adjustable using definable process profiles
- Stroke can be adapted for each cycle; unlimited number of stroke sequences possible
- Blow-off function for fast and exact release of the workpiece
- Continuous stroke monitoring
- IO-Link interface
- Quick and toolfree cleaning of the needles and replacing the needle modules
- Low power consumption

Your Benefits...

- > Safe handling, even of small and very unstable workpieces
- > Individual adaptation to different workpiece geometries
- > Allows handling of single layers and complete stacks with just one gripper
- > High level of process reliability; short cycle times
- > Comprehensive process control available
- > Optimized start of operations and set-up times
- > Low maintenance
- > Easy connection to bus systems

Needle Grippers



Needle Grippers SNGi-AE

Needle stroke max. 3 mm to max. 20 mm (variable)

Designation Code Needle Grippers SNGi-AE

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition	Needle stroke in mm	Product addition
Example SNGi-AE 10 0.8 V 3 IOL:					
SNGi-AE	10	0.8	V	3	IOL
SNGi-AE	10	0.8	V	3	IOL IO-Link compatible
		1.2	variable needle stroke	10 20	

Ordering Data Needle Grippers SNGi-AE

Needle gripper SNGi-AE is delivered assembled. The product consists of:

- Gripper of type SNGi-AE – available with various needle diameters and strokes

Available spare parts: needle modules, maintenance cover

Available accessories: mounting plate, holder system, connection cable, distributor

Needle Grippers SNGi-AE

Type	Part Number
SNGi-AE 10 0.8 V 3 IOL	10.01.29.00390
SNGi-AE 10 1.2 V 3 IOL	10.01.29.00394
SNGi-AE 10 0.8 V 10 IOL	10.01.29.00392
SNGi-AE 10 1.2 V 10 IOL	10.01.29.00396
SNGi-AE 10 1.2 V 20 IOL	10.01.29.00393

Ordering Data Accessories Needle Grippers SNGi-AE

Type	Type	Part Number
HTS-A2 AP SNG	Holder system	10.01.29.00402
HTS-A3 AP SNG	Holder system	10.01.29.00322
BEF-PL 38x15x11.5 G1/4-IG SNG*	Mounting plate	10.01.29.00403
ASK B-M12-5 5000 PUR GE**	Connection cable	21.04.05.00080
ASK-S B-M12-5 1000 M12-5 PUR***	Connection cable	21.04.05.00158
ASK-S B-M12-5 2000 M12-5 PUR****	Connection cable	21.04.05.00211
ASV IO-L-A 2xM12-4*****	Distributor	10.02.02.04336

*Incl. mounting screws

**Confectionable, 5 m

***Class B, 1 m

****Class B, 2 m

*****Class A, 1 m + 0,3 m

Ordering Data Spare Parts Needle Grippers SNGi-AE

Type	Needle modules*	Maintenance over**
SNGi-AE 10 0.8 V 3 IOL	10.01.29.00405	10.01.29.00419
SNGi-AE 10 1.2 V 3 IOL	10.01.29.00406	10.01.29.00419
SNGi-AE 10 0.8 V 10 IOL	10.01.29.00407	10.01.29.00420
SNGi-AE 10 1.2 V 10 IOL	10.01.29.00408	10.01.29.00420
SNGi-AE 10 1.2 V 20 IOL	10.01.29.00409	10.01.29.00421

*Set of two needle housings with needles

**Set of 2 coverages

Needle Grippers



Needle Grippers SNGi-AE

Needle stroke max. 3 mm to max. 20 mm (variable)

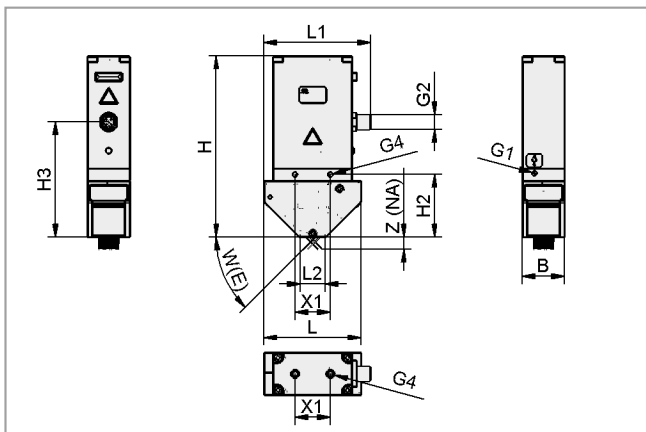
Technical Data Needle Grippers SNGi-AE

Type	Number of needles	Needle diameter [mm]	Stroke [mm]*	Operating temperature [°C]	Weight [g]	Electrical connection	Protection IP	Voltage	Current consumption [mA]**
SNGi-AE 10 0.8 V 3 IOL	10	0.8	3 mm	5 ... 50	500	Male connect M12, 5 pol	IP 53	24V - DC	900
SNGi-AE 10 1.2 V 3 IOL	10	1.2	3 mm	5 ... 50	500	Male connect M12, 5 pol	IP 53	24V - DC	900
SNGi-AE 10 0.8 V 10 IOL	10	0.8	10 mm	5 ... 50	515	Male connect M12, 5 pol	IP 53	24V - DC	900
SNGi-AE 10 1.2 V 10 IOL	10	1.2	10 mm	5 ... 50	515	Male connect M12, 5 pol	IP 53	24V - DC	900
SNGi-AE 10 1.2 V 20 IOL	10	1.2	20 mm	5 ... 50	600	Male connect M12, 5 pol	IP 53	24V - DC	900

*Needle speed approx. 8 mm/s per stroke

**Max. power consumption during normal operation 600 mA

Design Data Needle Grippers SNGi-AE



SNGi-AE

Type	Dimensions in mm												
	B	G1	G2	G4	H	H2	H3	L	L1	L2	W (E)	X1	Z (NA)
SNGi-AE 10 0.8 V 3 IOL	35	M5-F	M12-M	M5-F	140.0	40.2	83.2	65	80.0	28	30	29	3
SNGi-AE 10 1.2 V 3 IOL	35	M5-F	M12-M	M5-F	140.0	40.2	83.2	65	80.0	28	30	29	3
SNGi-AE 10 0.8 V 10 IOL	35	M5-F	M12-M	M5-F	151.5	51.5	94.5	80	87.5	22	45	29	10
SNGi-AE 10 1.2 V 10 IOL	35	M5-F	M12-M	M5-F	151.5	51.5	94.5	80	87.5	22	45	29	10
SNGi-AE 10 1.2 V 20 IOL	35	M5-F	M12-M	M5-F	178.0	78.2	121.0	120	107.5	22	45	29	20

Needle Grippers

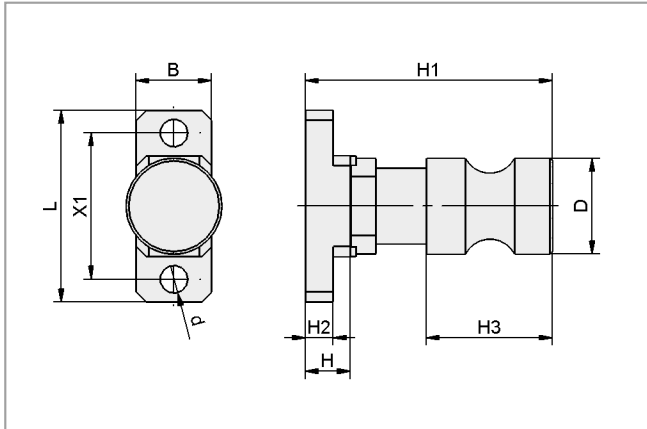


Needle Grippers SNGi-AE

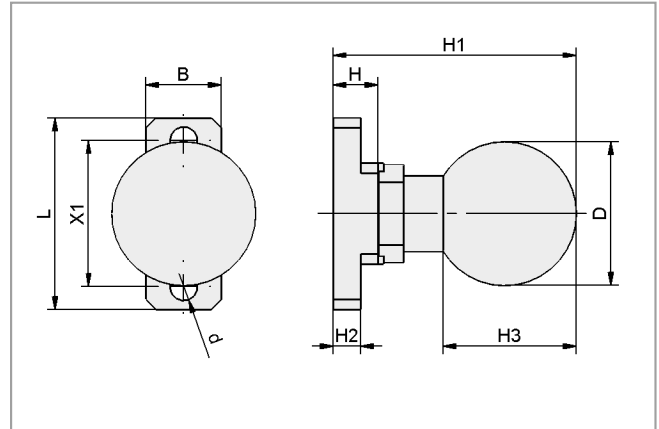
Needle stroke max. 3 mm to max. 20 mm (variable)



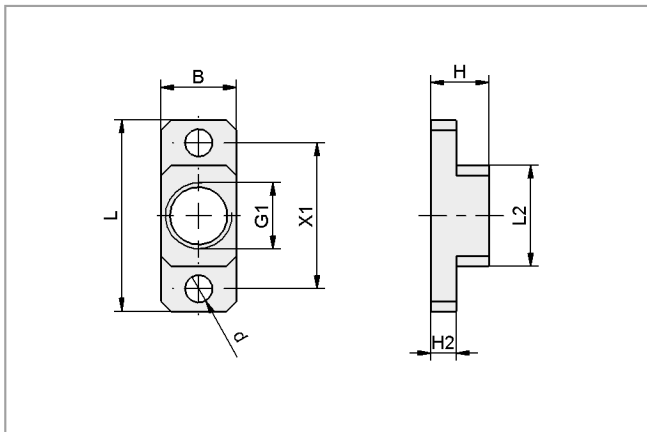
Design Data Accessories Needle Grippers SNGi-AE



HTS-A2 AP SNG



HTS-A3 AP SNG



BEF-PL

Type	Dimensions in mm											
	B	d	D	G1	H	H1	H2	H3	L	L2	X1	
HTS-A2 AP SNG	15	5.5	19.0	-	9	49	5.5	25.0	38.0	-	29	
HTS-A3 AP SNG	15	5.5	28.5	-	9	48	5.5	26.4	38.0	-	29	
BEF-PL 38x15x11.5 G1/4-IG SNG	15	5.5	-	G1/4"-F	12	-	5.0	-	38.0	20.0	29	

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Needle Grippers SNG-AP

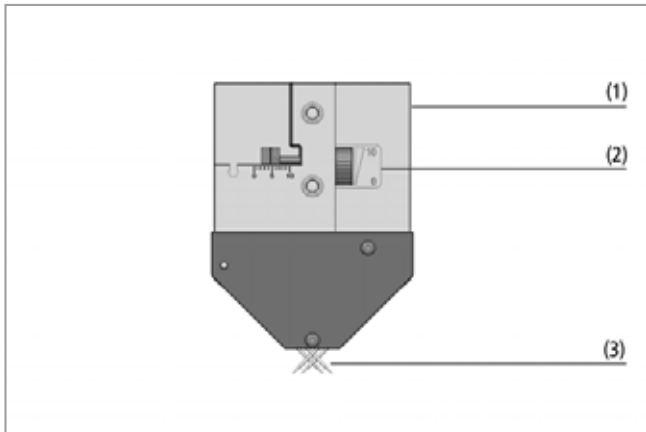
Needle stroke max. 3 mm to max. 20 mm (variable)



Suitable for Industry Specific Applications



Needle grippers SNG-AP



System design needle grippers SNG-AP



Needle grippers SNG-AP being used for handling composite textiles

Applications

- Needle gripper for handling non-rigid and highly porous materials (primarily textiles)
- Handling materials that are difficult to grip using vacuum such as composite textiles, fleece, filter materials, insulation and foam materials etc.
- Flexible handling of materials with changing stacking height due to free selectable stroke adjustment

Design

- Driven by double-acting pneumatic cylinders
- High-strength housing with lightweight design (1)
- Three sizes with needle strokes of max. 3 mm, 10 mm or 20 mm
- Adjustment wheel (2) with scale for continuous, simultaneous stroke adjustment
- Ten needles (3) with diameters of 0.8 mm or 1.2 mm (depending on the model)
- Insertion angle of 30° or 45° (depending on the model)
- Optional sensors for monitoring the needle end positions
- Can also be mounted with the Schmalz holder system HTS

Our Highlights...

- Intersecting needles and small gripping area
- Low weight and double-acting pneumatic cylinders
- Tool-free simultaneous needle stroke adjustment up to a maximum of 20 mm
- One central pneumatic drive
- Blow off function for fast and reliable load release
- Quick and tool-free cleaning of the needles and replacing the needle modules

Your Benefits...

- > Safe handling, even of small and very unstable workpieces
- > High acceleration for minimized cycle times
- > Individual adaptation to different workpiece geometries; fast start of operations and set-up time
- > Synchronous extension and retraction of the needles; reduces the need for couplings and hoses
- > High level of process reliability and exact positioning; short cycle times
- > Low maintenance

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Needle Grippers



Needle Grippers SNG-AP

Needle stroke max. 3 mm to max. 20 mm (variable)

Designation Code Needle Grippers SNG-AP

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition	Needle stroke in mm
Example SNG-AP 10 0.8 V 3:				
SNG-AP	10	0.8	V	3
SNG-AP	10	0.8	V variable needle stroke	3
		1.2		10
				20

Ordering Data Needle Grippers SNG-AP

Needle gripper SNG-AP is delivered assembled. The product consists of:

- Gripper of type SNG-AP – available with various needle diameters and strokes

Available spare parts: needle modules, maintenance cover

Available accessories: mounting plate, holder system, add-on kit sensor

Needle Grippers SNG-AP

Type	Part Number
SNG-AP 10 0.8 V 3	10.01.29.00340
SNG-AP 10 1.2 V 3	10.01.29.00377
SNG-AP 10 0.8 V 10	10.01.29.00361
SNG-AP 10 1.2 V 10	10.01.29.00381
SNG-AP 10 1.2 V 20	10.01.29.00362

Ordering Data Accessories Needle Grippers SNG-AP

Type	Mounting plate*	Holder system A2*	Holder system A3*	Add-on kit sensor**	STV-W***
SNG-AP 10 0.8 V 3	10.01.29.00403	10.01.29.00402	10.01.29.00322	10.01.29.00400	10.08.02.00296
SNG-AP 10 1.2 V 3	10.01.29.00403	10.01.29.00402	10.01.29.00322	10.01.29.00400	10.08.02.00296
SNG-AP 10 0.8 V 10	10.01.29.00403	10.01.29.00402	10.01.29.00322	10.01.29.00400	10.08.02.00296
SNG-AP 10 1.2 V 10	10.01.29.00403	10.01.29.00402	10.01.29.00322	10.01.29.00400	10.08.02.00296
SNG-AP 10 1.2 V 20	10.01.29.00403	10.01.29.00402	10.01.29.00322	10.01.29.00400	10.08.02.00296

*complete with mounting screws

**Set of sensor and mounting element

***Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts Needle Grippers SNG-AP

Type	Needle modules*	Maintenance coverage**
SNG-AP 10 0.8 V 3	10.01.29.00405	10.01.29.00419
SNG-AP 10 1.2 V 3	10.01.29.00406	10.01.29.00419
SNG-AP 10 0.8 V 10	10.01.29.00407	10.01.29.00420
SNG-AP 10 1.2 V 10	10.01.29.00408	10.01.29.00420
SNG-AP 10 1.2 V 20	10.01.29.00409	10.01.29.00421

*Set of two needle housings with needles

**Set of two coverages

Needle Grippers



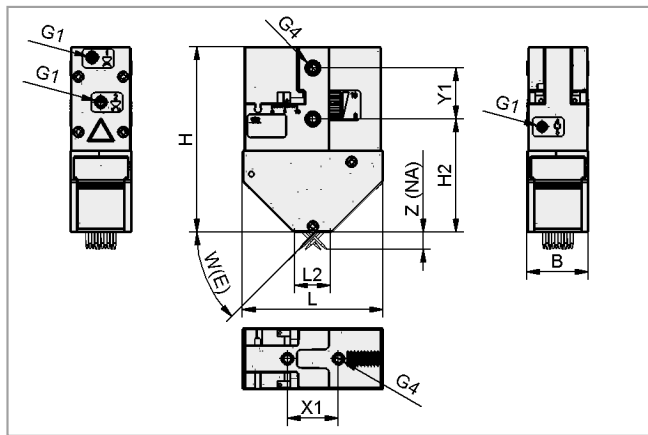
Needle Grippers SNG-AP

Needle stroke max. 3 mm to max. 20 mm (variable)

Technical Data Needle Grippers SNG-AP

Type	Number of needles	Needle diameter [mm]	Additional function	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-AP 10 0.8 V 3	10	0.8	Variable stroke	3.0 ... 6.0	5 ... 75	Any	190
SNG-AP 10 1.2 V 3	10	1.2	Variable stroke	3.0 ... 6.0	5 ... 75	Any	190
SNG-AP 10 0.8 V 10	10	0.8	Variable stroke	3.0 ... 6.0	5 ... 75	Any	225
SNG-AP 10 1.2 V 10	10	1.2	Variable stroke	3.0 ... 6.0	5 ... 75	Any	225
SNG-AP 10 1.2 V 20	10	1.2	Variable stroke	3.0 ... 6.0	5 ... 75	Any	400

Design Data Needle Grippers SNG-AP



SNG-AP

Type	Dimensions in mm										
	B	G1	G4	H	H2	L	L2	W (E)	X1	Y1	Z (NA)
SNG-AP 10 0.8 V 3	35	M5-F	M5-F	80.2	46.1	65	28	30	29	29	3
SNG-AP 10 1.2 V 3	35	M5-F	M5-F	80.2	46.1	65	28	30	29	29	3
SNG-AP 10 0.8 V 10	35	M5-F	M5-F	105.5	64.4	80	22	45	29	29	10
SNG-AP 10 1.2 V 10	35	M5-F	M5-F	105.5	64.4	80	22	45	29	29	10
SNG-AP 10 1.2 V 20	35	M5-F	M5-F	160.0	104.9	120	22	45	29	29	20

Needle Grippers

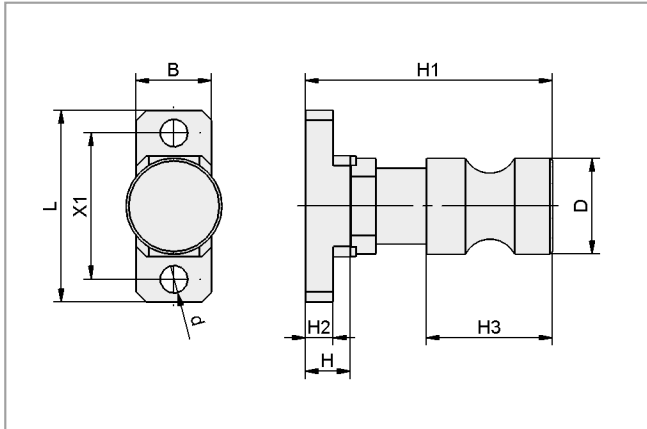


Needle Grippers SNG-AP

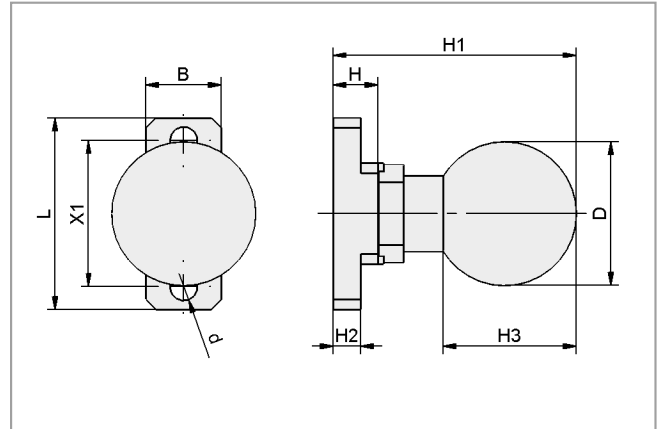
Needle stroke max. 3 mm to max. 20 mm (variable)



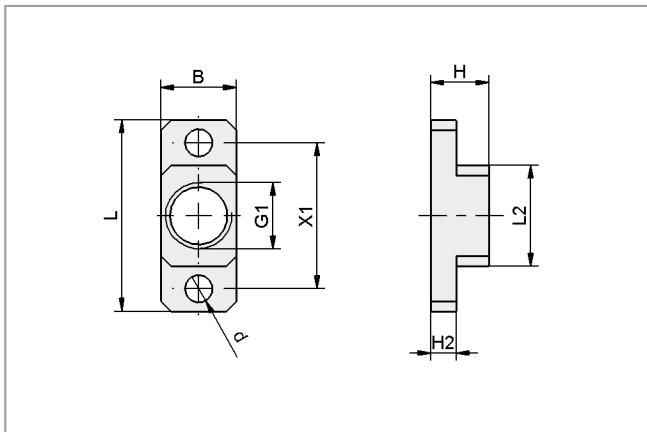
Design Data Accessories Needle Grippers SNG-AP



HTS-A2 AP SNG



HTS-A3 AP SNG



BEF-PL

Type	Dimensions in mm											
	B	d	D	G1	H	H1	H2	H3	L	L2	X1	
HTS-A2 AP SNG	15	5.5	19.0	-	9	49	5.5	25.0	38.0	-	29	
HTS-A3 AP SNG	15	5.5	28.5	-	9	48	5.5	26.4	38.0	-	29	
BEF-PL 38x15x11.5 G1/4-IG SNG	15	5.5	-	G1/4"-F	12	-	5.0	-	38.0	20.0	29	

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Needle Grippers



Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)



Suitable for Industry Specific Applications



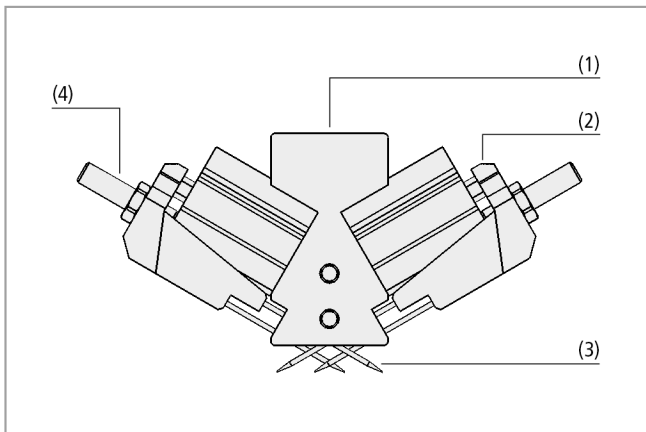
Needle grippers SNG-V

Applications

- Needle gripper for handling non-rigid and highly porous materials (primarily textiles)
- Handling materials that are difficult to grip using vacuum such as composite textiles, fleece, filter materials, insulation and foam materials etc.

Design

- Robust aluminum housing (1)
- Drive via double-acting pneumatic cylinders (2)
- 10 needles with diameter 1.2 mm (3)
- Insertion angle 30°
- Continuously variable stroke adjustment (4)
- Optional mounting with holder system HTS



System design needle gripper SNG-V

Our Highlights...

- Intersecting needles
- Minimized active contact surface
- Double-acting pneumatic cylinders
- Variable needle stroke
- One pneumatic connection point for both pneumatic cylinders

Your Benefits...

- > High holding force, even for flexible, non-rigid workpieces
- > Handling of small workpieces possible
- > Very short cycle times
- > Individual adjustment for different workpiece thicknesses, sizes and shapes
- > Saves pneumatic tubes and connectors; ensures synchronous movement of needles



Needle grippers SNG-V being used for handling composite textiles

Needle Grippers



Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)

Designation Code Needle Grippers SNG-V

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition	Needle stroke in mm
Example SNG-V 10 1.2 V 7:				
SNG-V	10	1.2	V	7
SNG-V	10	1.2	V variable needle stroke V-HT variable needle stroke and high-temperature	7

Ordering Data Needle Grippers SNG-V

Needle gripper SNG-V is delivered assembled.

Available spare parts: needle module

Available accessories: mounting plate

Needle Grippers SNG-V

Type	Part Number
SNG-V 10 1.2 V 7	10.01.29.00176
SNG-V 10 1.2 V-HT 7*	10.01.29.00428

*For operating temperatures from 5 to 150 °C and a maximum workpiece temperature of 260 °C

Ordering Data Accessories Needle Grippers SNG-V

Type*	Mounting plate**
SNG-V 10 1.2 V 7	10.01.29.00093
SNG-V 10 1.2 V-HT 7	10.01.29.00093

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

**Including mounting screws

Ordering Data Spare Parts Needle Grippers SNG-V

Type	Needle module*
SNG-V 10 1.2 V 7	10.01.29.00238
SNG-V 10 1.2 V-HT 7	10.01.29.00464

*Set of 2 needle modules with needles

Technical Data Needle Grippers SNG-V

Type	Number of needles	Needle diameter [mm]	Additional function	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-V 10 1.2 V 7	10	1.2	Variable stroke	3.0 ... 7.0	5 ... 60	Any	265
SNG-V 10 1.2 V-HT 7	10	1.2	Variable stroke, high temperature	3.0 ... 7.0	5 ... 150	Any	255

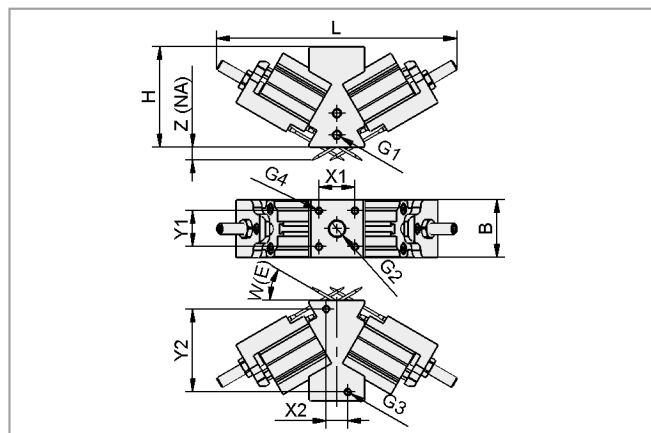
Needle Grippers



Needle Grippers SNG-V

Needle stroke 0 mm to 7 mm (variable)

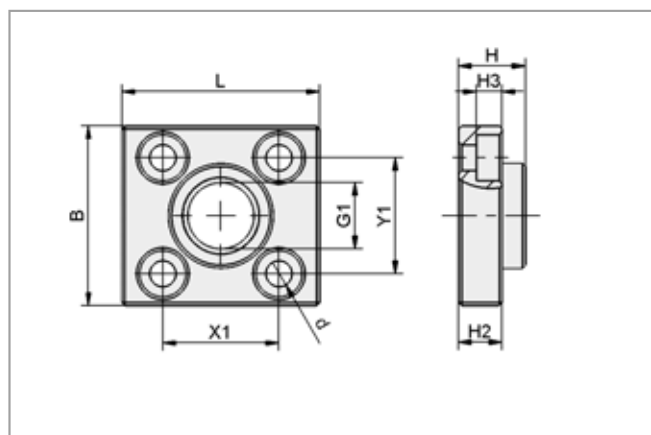
Design Data Needle Grippers SNG-V



SNG-V 10 1.2 V

Type	Dimensions in mm												
	B	G1	G2	G3	G4	H	L	W (E)	X1	X2	Y1	Y2	Z (NA)
SNG-V 10 1.2 V 7	32	M5-F	G1/8"-F	M4-F	M4-F	56	149	30	20	12	20	46	7
SNG-V 10 1.2 V-HT 7	32	M5-F	G1/8"-F	M5-F	M4-F	56	149	30	20	12	20	29	7

Design Data Accessories Needle Grippers SNG-V



BEF-PL SNG

Type	Dimensions in mm									
	B	d	G1	H	H2	H3	L	X1	Y1	
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20	

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Needle Grippers



Needle Grippers SNG-M

Needle Stroke 3 mm



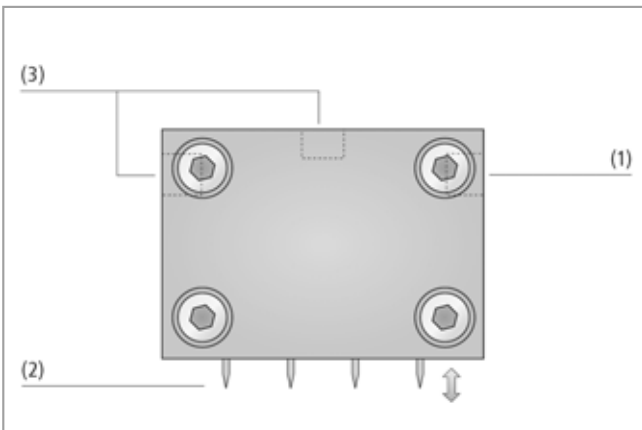
Suitable for Industry Specific Applications



Needle grippers SNG-M

Applications

- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, filters, woven fibreglass or carbon-fibre, woven aramide, foam materials, etc.



System design needle grippers SNG-M

Design

- Robust aluminum housing
- Four needles (2)
- Activated by compressed air, needles retracted by springs on the right (1) or optional above (3)
- Insertion angle 30°
- The needle gripper can be optionally connected using a mounting plate



Needle grippers SNG-M being used for handling structured foam materials

Our Highlights...

- Very small size
- Needles retracted by springs
- Synchronised extension of the needles
- Optionally available with adapter flange plate

Your Benefits...

- > Optimal for installation in restricted spaces
- > Only one control signal
- > Safe handling of the workpieces
- > Perfect adaptation to other mounting components

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Needle Grippers



Needle Grippers SNG-M

Needle Stroke 3 mm

Designation Code Needle Grippers SNG-M

Abbreviated designation	Number of needles	Needle diameter in mm
Example SNG-M 4 0.8:		
SNG-M	4	0.8
SNG-M	4	0.8

Ordering Data Needle Grippers SNG-M

Needle gripper SNG-M is delivered assembled. The assembly consists of:

- Gripper of type SNG-M

Available spare parts: needle piston

Available accessories: mounting plate

Needle Grippers SNG-M

Type*	Part Number
SNG-M 4 0.8	10.01.29.00001

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts And Accessories Needle Grippers SNG-M

Type	Needle piston*	Type	Mounting plate*	STV-W**
SNG-M 4 0.8	10.01.29.00094	SNG-M 4 0.8	10.01.29.00093	10.08.02.00296

*Set of 4 needles with guide pistons and springs

*Complete with mounting screws

**Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Technical Data Needle Grippers SNG-M

Type	Number of needles	Needle diameter [mm]	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-M 4 0.8	4	0.8	4.0 ... 6.0	5 ... 60	Any	80

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Needle Grippers

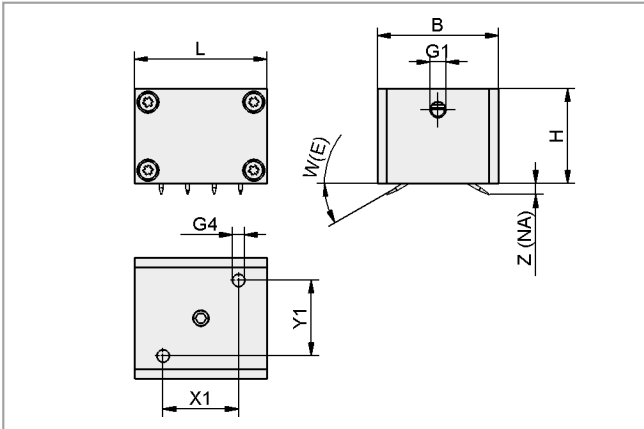


Needle Grippers SNG-M

Needle Stroke 3 mm



Design Data Needle Grippers SNG-M

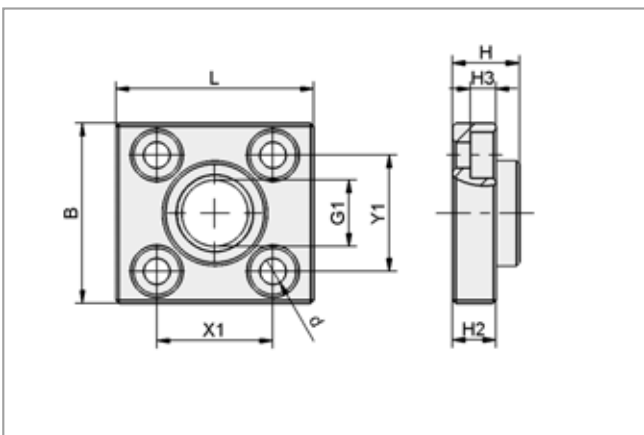


SNG-M 4 0.8

Type	Dimensions in mm									
	B	G1	G4	H	L	W (E)	X1	Y1	Z (NA)	
SNG-M 4 0.8	32	M5-F	M4-F	25	35	30	20	20	3	



Design Data Accessories Needle Grippers SNG-M



BEF-PL SNG

Type	Dimensions in mm									
	B	d	G1	H	H2	H3	L	X1	Y1	
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20	

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Wafer Grippers



Wafer Grippers SWGm

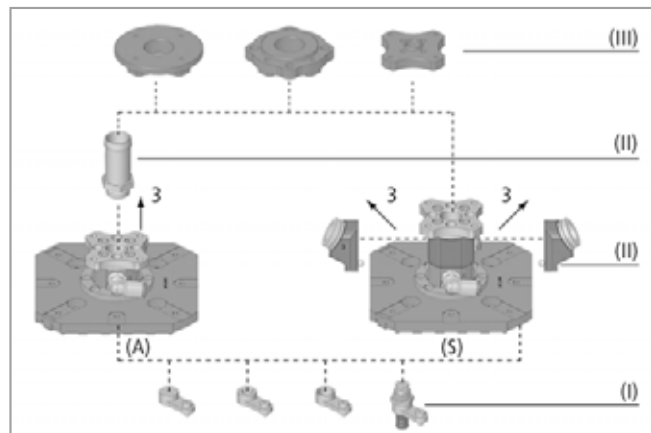
Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm



Suitable for Industry Specific Applications



Wafer grippers SWGm



System design wafer grippers SWGm



Wafer grippers SWGm being used for handling solar cells

Applications

- Wafer gripper for extremely fast and gentle handling of wafers and solar cells in the production processes
- Loading and unloading from stacks and conveyor belts
- Exact positioning during the visual inspection and position measurement allow for on-the-fly breakage detection during the handling process
- Fully or partially automated production of PV cells with maximum process stability, production line uptime, cell efficiency and line output

Design

- Base model version with discharging exhaust air (3) in axial (A) or lateral (S) direction
- Suction area geometries available in common cell sizes 125 mm and 156 mm (5" and 6")
- Optional component (II) for controlled discharging of exhaust air
- Modular design with accessories for the mounting of sensors and modules for suction and damping (I) and a selection of flange modules (III)
- Minimal overall height through reduced-weight plastic design
- Replaceable contact surfaces

Our Highlights...

- Low overall height and operating weight
- Optimum allocation and dimension of the suction points
- High suction rate even for partial coverage or leakages
- Exhaust air channels for controlled air discharge
- Quick object release
- Gripper surface made of PEEK (Polyetheretherketone)

Your Benefits...

- > High speed, high accuracy handling for cycle times below one second
- > Less operating cost
- > Reliable gripping and handling, even for deformed, broken or perforated wafers
- > No contamination of process area
- > Precise positioning and very short cycle times
- > Minimal surface contamination of the wafer and reduction of blind spots

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Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Designation Code Wafer Grippers SWGm

Abbreviated designation	Wafer/cell size in inch	Design	Dimensions in mm	Performance class of ejector	Blow off function	Material suction area
Example SWGm-5A 115x115x40 1xE100 A PEEK:						
SWGm	5	A	115x115x40	1xE100	A	PEEK
SWGm	5	A axial	115x115x40	1xE100	A blow off function	PEEK Poly-ether-ether- keton
	6	A exhaust air	115x115x65			
		S lateral	146x146x40			
		S exhaust air	146x146x65			

Ordering Data Wafer Grippers SWGm

Wafer gripper SWGm is delivered assembled. The assembly consists of:

- Wafer gripper of type SWGm – available in various dimensions, with axial or side exhaust

Available spare parts: suction surface

Available accessories: component for discharging exhaust air, holder, suction-/absorption module, floating suction cup module, exhaust duct, solenoid valves, flange plate

Wafer Grippers SWGm

Type	Part Number
SWGm-5A 115x115x40 1xE100 A PEEK	10.01.30.00135
SWGm-6A 146x146x40 1xE100 A PEEK	10.01.30.00136
SWGm-5S 115x115x65 1xE100 A PEEK	10.01.30.00137
SWGm-6S 146x146x65 1xE100 A PEEK	10.01.30.00138

Ordering Data Accessories Wafer Grippers SWGm

Type	SWGm-5A	SWGm-6A	SWGm-5S	SWGm-6S
Exhaust set ABL-SET 14 SWG/SCG	-	-	10.01.30.00059	10.01.30.00059
Holder HTR-UNI SWGm	10.01.30.00117	10.01.30.00117	10.01.30.00117	10.01.30.00117
Holder HTR M8x1-IG SWGm	10.01.30.00118	10.01.30.00118	10.01.30.00118	10.01.30.00118
Holder HTR M12x1-IG SWGm	10.01.30.00119	10.01.30.00119	10.01.30.00119	10.01.30.00119
Suction/damping module SD-MOD 4 32x15x35 FG 9 SWGm	10.01.30.00121	10.01.30.00121	10.01.30.00121	10.01.30.00121
Floating suction cup module SBSm 14 90-3 S1	10.01.01.12912	10.01.01.12912	10.01.01.12912	10.01.01.12912
Exhasut duct ABL-FUEHR 19.5x46 SWGm/SCG	10.01.30.00087	10.01.30.00087	-	-
Solenoid valve EMV 1.5 24V-DC 3/2 NC K-2P*	10.05.01.00288	10.05.01.00288	10.05.01.00288	10.05.01.00288
Solenoid valve EMV 2.5 24V-DC 3/2 NC K-2P**	10.05.01.00289	10.05.01.00289	10.05.01.00289	10.05.01.00289
Flange plate FLAN-PL 55x7.5-AB1	-	-	10.01.30.00015	10.01.30.00015
Flange plate FLAN-PL 63x10.5-AD1	10.01.30.00016	10.01.30.00016	10.01.30.00016	10.01.30.00016
Flange plate FLAN-PL 63x11.5-UNI	10.01.30.00017	10.01.30.00017	10.01.30.00017	10.01.30.00017
Flange plate FLAN-PL 80x9-ST1	10.01.30.00167	10.01.30.00167	10.01.30.00167	10.01.30.00167
Flange plate FLAN-PL 55x9.5-JP1	10.01.30.00194	10.01.30.00194	10.01.30.00194	10.01.30.00194
Flange plate FLAN-PL 55x7.5-EL1	-	-	10.01.30.00208	10.01.30.00208

*Suitable for compressed-air connection "Blow off"

**Suitable for compressed-air connection "Suction"

Ordering Data Spare Parts Wafer Grippers SWGm

Type Wafer Grippers	Type Spare Part	Suction plate
SWGm-5A 115x115x40 1xE100 A PEEK	SAUG-FL SWGm-5 110x110 PEEK	10.01.30.00125
SWGm-6A 146x146x40 1xE100 A PEEK	SAUG-FL SWGm-6 141x141 PEEK	10.01.30.00126
SWGm-5S 115x115x65 1xE100 A PEEK	SAUG-FL SWGm-5 110x110 PEEK	10.01.30.00125
SWGm-6S 146x146x65 1xE100 A PEEK	SAUG-FL SWGm-6 141x141 PEEK	10.01.30.00126

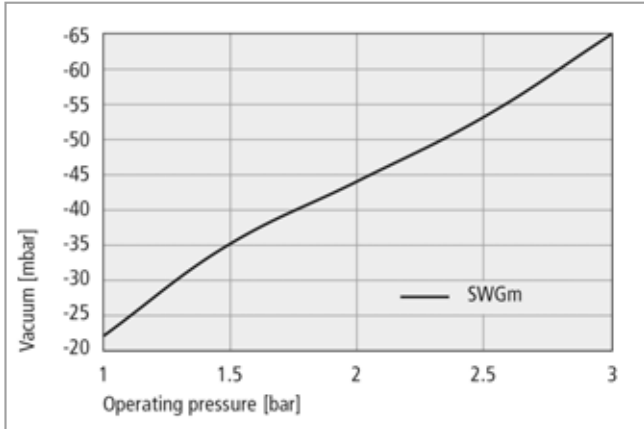
Wafer Grippers



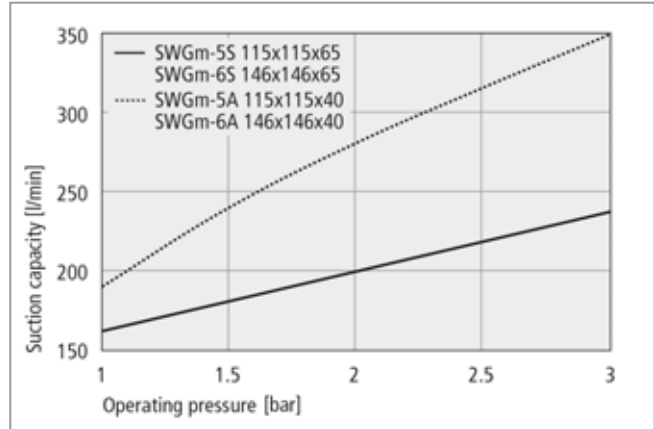
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

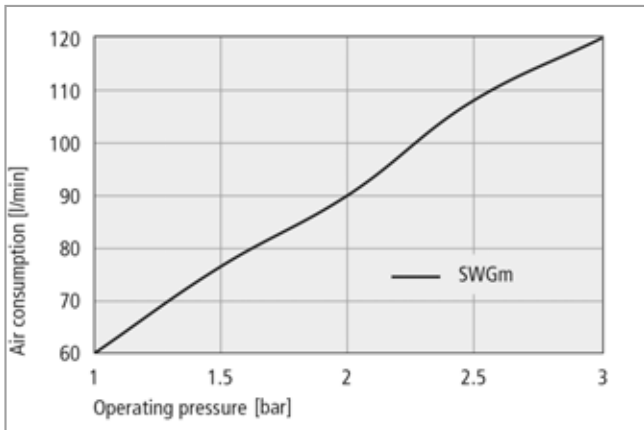
Performance Data Wafer Grippers SWGm



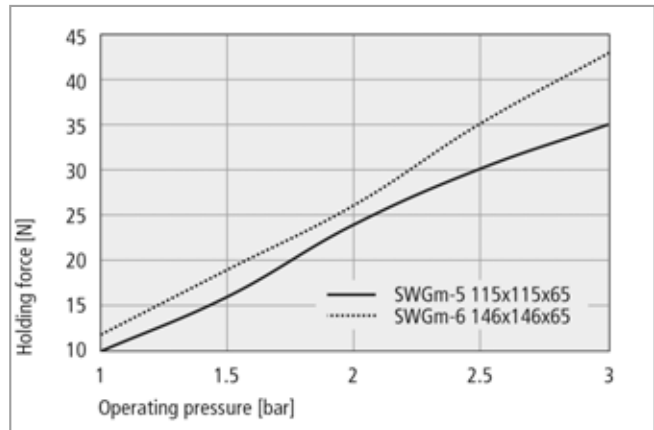
Achievable vacuum at various operating pressures



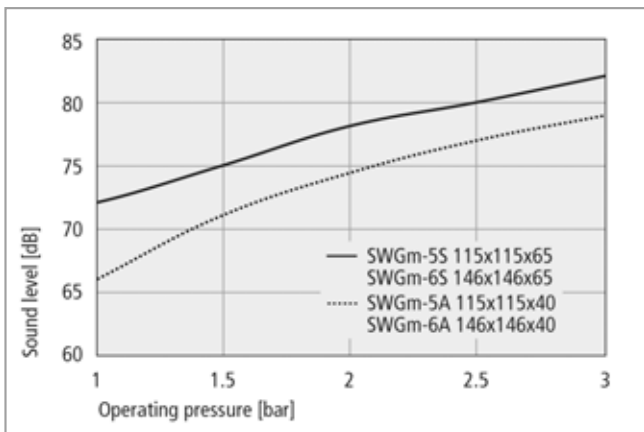
Suction capacity at various operating pressures



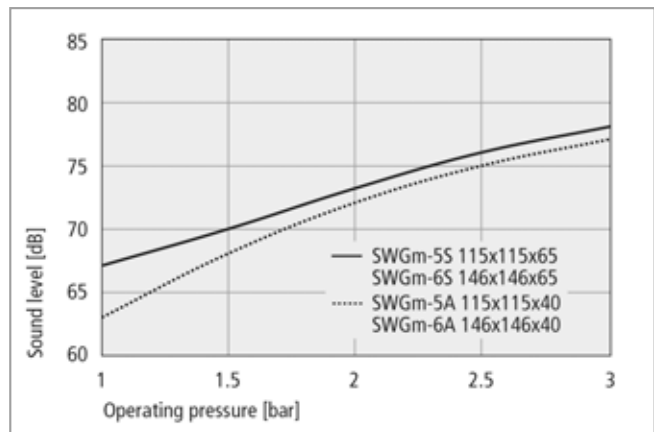
Air consumption at various operating pressures



Holding force at various operating pressures



Noise level free at various operating pressures



Noise level workp. gripped at various operating pressures

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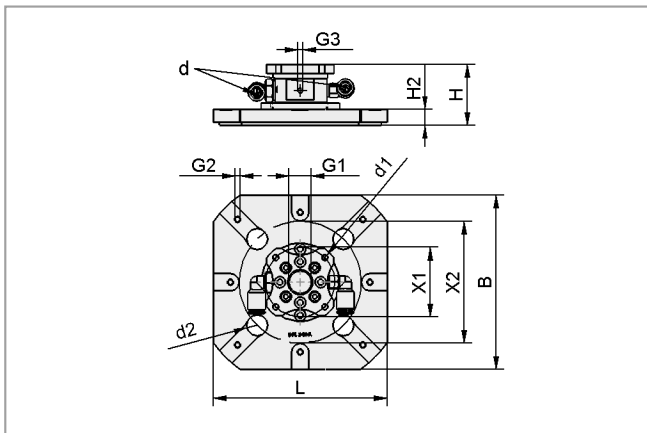
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Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

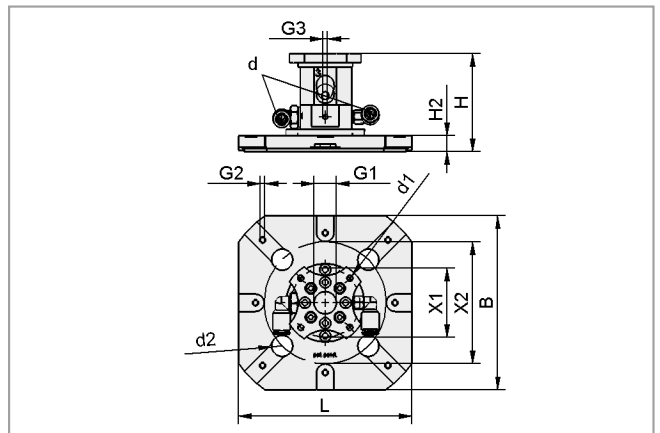
Technical Data Wafer Grippers SWGm

Type	Holding force [N]	Suction rate [l/min]	Air consumption [l/min]	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Weight [g]
SWGm-5A 115x115x40 1xE100 A PEEK	10 ... 35	190 ... 350	60 ... 120	1.0 ... 3.0	5 ... 75	210
SWGm-6A 146x146x40 1xE100 A PEEK	12 ... 43	190 ... 350	60 ... 120	1.0 ... 3.0	5 ... 75	275
SWGm-5S 115x115x65 1xE100 A PEEK	10 ... 35	160 ... 350	60 ... 120	1.0 ... 3.0	5 ... 75	235
SWGm-6S 146x146x65 1xE100 A PEEK	12 ... 43	160 ... 350	60 ... 120	1.0 ... 3.0	5 ... 75	300

Design Data Wafer Grippers SWGm



SWGm-5A... and SWGm-6A...



SWGm-5S... and SWGm-6S...

Type	Dimensions in mm											
	B	d	d1	d2	G1	G2	G3	H	H2	L	X1	X2
SWGm-5A 115x115x40 1xE100 A PEEK	115	6	4.0	14	G3/8"-F	M4-F	M4-F	40	10.5	115	46	80.6
SWGm-6A 146x146x40 1xE100 A PEEK	146	6	4.0	14	G3/8"-F	M4-F	M4-F	40	10.5	146	46	110.6
SWGm-5S 115x115x65 1xE100 A PEEK	115	6	4.0	14	G3/8"-F	M4-F	M4-F	65	10.5	115	46	80.6
SWGm-6S 146x146x65 1xE100 A PEEK	146	6	4.0	14	G3/8"-F	M4-F	M4-F	65	10.5	146	46	110.6

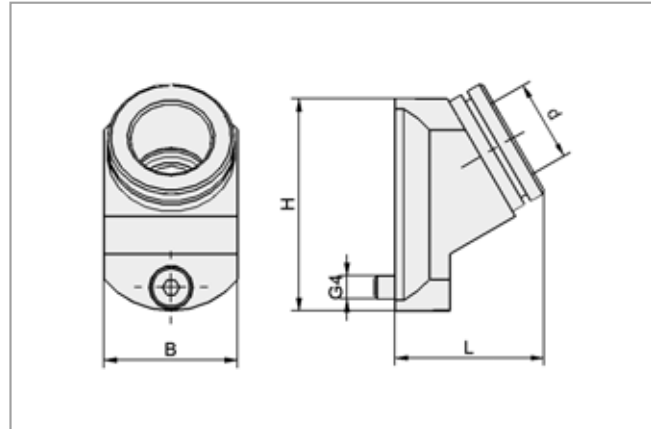
Wafer Grippers



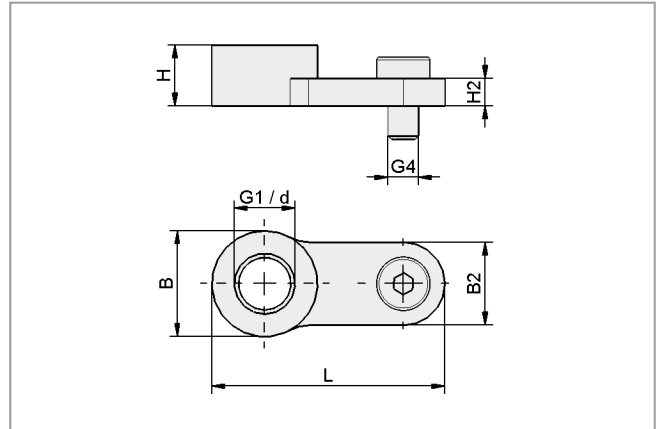
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

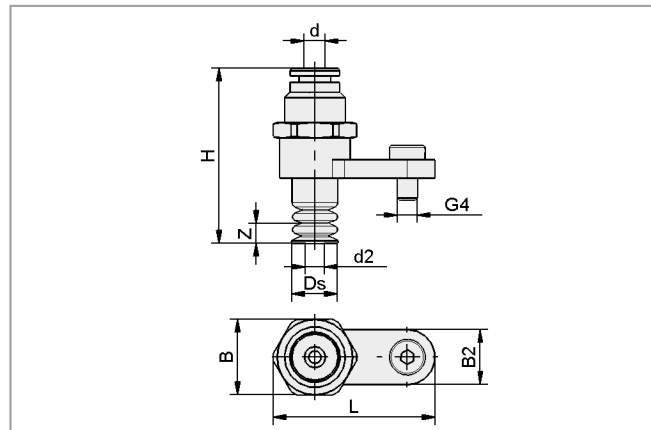
Design Data Accessories Wafer Gripper SWGm



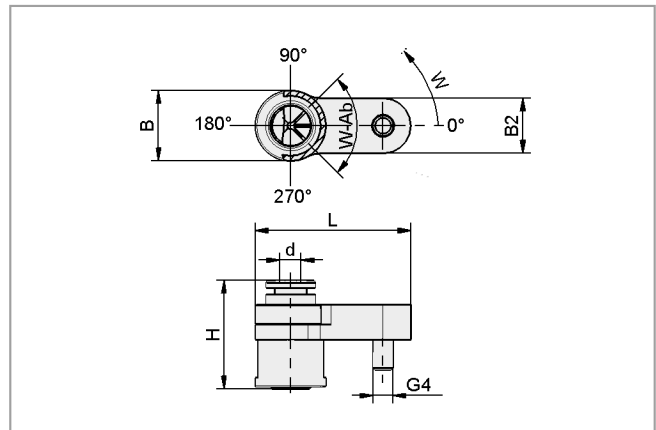
ABL-SET 14 SWGm



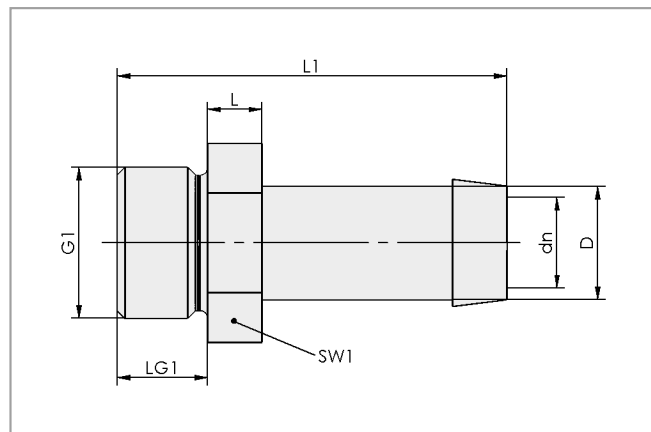
HTR-UNI SWGm, HTR M8x1-IG SWGm, HTR M12x1-IG SWGm



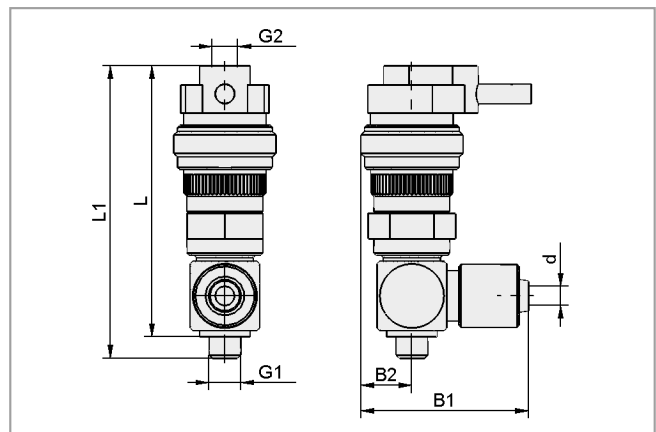
SD-MOD 4 32x15x35 FG 9 SWGm



SBSm 14 90-3 4/2...



ABL-FUEHR 19.5x46 SWGm/SCG



EMV

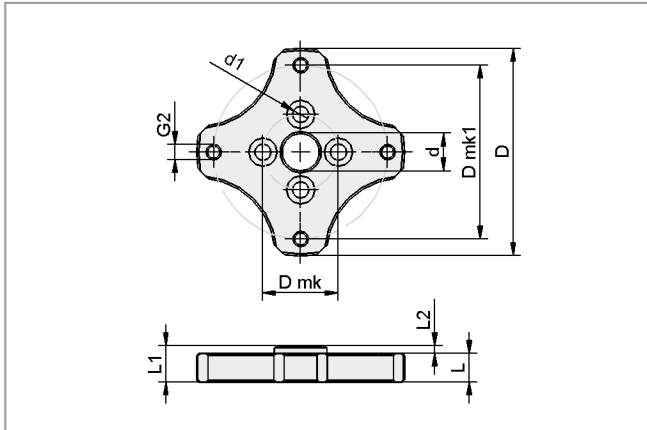
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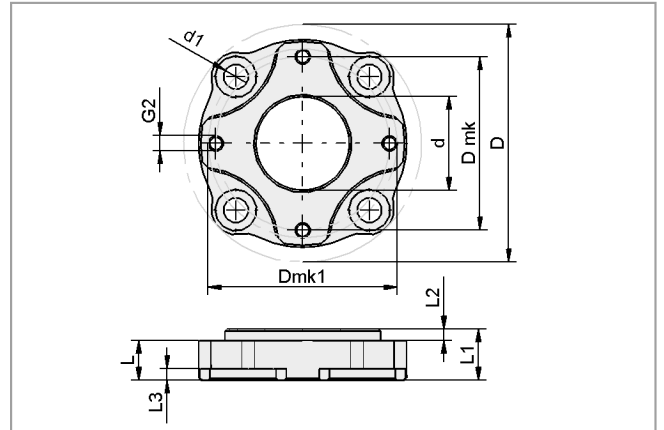


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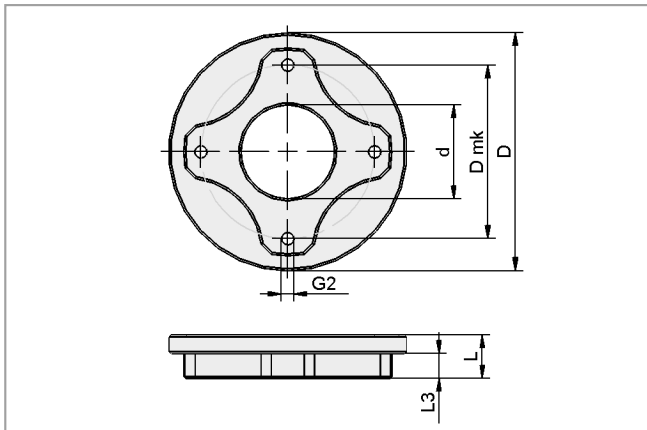
Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm



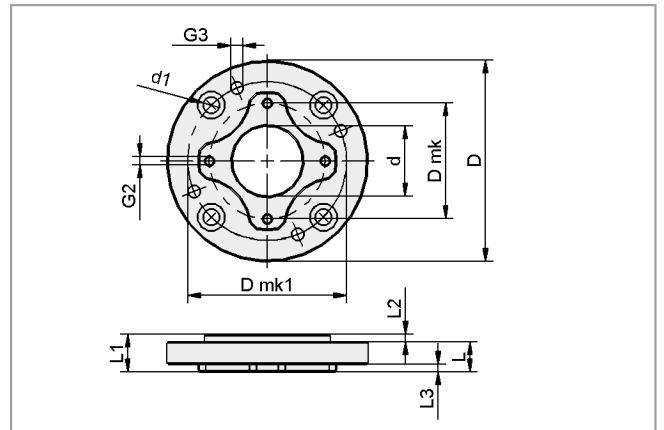
FLAN-PL 55x7.5-AB1



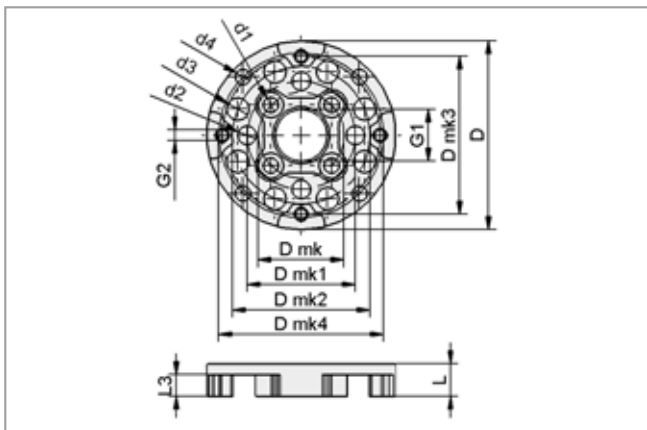
FLAN-PL 63x10.5-AD1



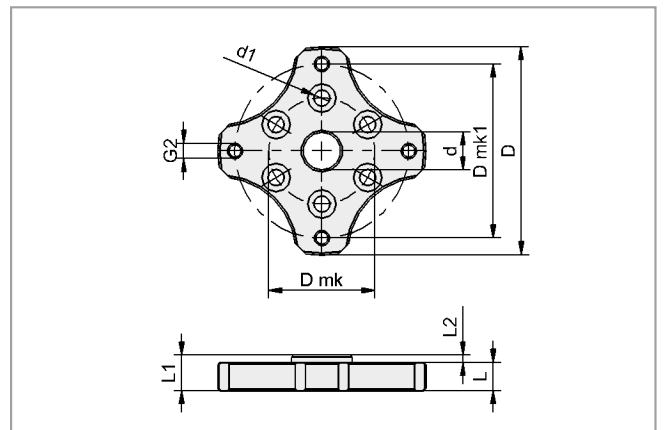
FLAN-PL 63x11.5 SWG-UNI



FLAN-PL 80x9-ST1



FLAN-PL 55x9.5-JP1



FLAN-PL 55x7.5-EL1

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Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Design Data Accessories Wafer Gripper SWGm

Type	Dimensions in mm															
	B	B1	B2	d	d1	d2	d3	d4	dn	D	D mk	D mk1	D mk2	D mk3	D mk4	Ds
ABL-SET 14 SWG/SCG	23	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-
HTR-UNI SWGm	14	-	11	2	-	-	-	-	-	-	-	-	-	-	-	-
HTR SWGm	14	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-
HTR SWGm	14	-	11	-	-	-	-	-	-	-	-	-	-	-	-	-
SD-MOD 4 32x15x35 FG 9 SWGm	15	-	11	4	-	4.1	-	-	-	-	-	-	-	-	-	9
SBSm 14 90-3 4/2 0	14	-	11	4	-	-	-	-	-	-	-	-	-	-	-	-
ABL-FUEHR 19.5x46 SWGm/SCG	-	-	-	-	-	-	-	-	12.5	19.5	-	-	-	-	-	-
EMV 1.5 24V-DC 3/2 NC K-2P	-	26.6	8	4	-	-	-	-	-	-	-	-	-	-	-	-
EMV 2.5 24V-DC 3/2 NC K-2P	-	31.7	11	4	-	-	-	-	-	-	-	-	-	-	-	-
FLAN-PL 55x7.5-AB1	-	-	-	10	4.3	-	-	-	-	55.0	20	46	-	-	-	-
FLAN-PL 63x10.5-AD1	-	-	-	21	6.6	-	-	-	-	63.0	46	50	-	-	-	-
FLAN-PL 63x11.5-UNI	-	-	-	25	-	-	-	-	-	63.0	46	-	-	-	-	-
FLAN-PL 80x9-ST1	-	-	-	28	7.0	-	-	-	-	80.0	46	63	-	-	-	-
FLAN-PL 55x9.5-JP1	-	-	-	-	4.5	5.5	6.6	4.5	-	55.0	25	32	40	46	48	-
FLAN-PL 55x7.5-EL1	-	-	-	10	4.3	-	-	-	-	55.0	28	46	-	-	-	-

Type	Dimensions in mm															
	G1	G2	G3	G4	H	H2	L	L1	L2	L3	LG1	SW1	W	W-Ab	Z	
ABL-SET 14 SWG/SCG	-	-	-	M4-M	36.5	-	25.5	-	-	-	-	-	-	-	-	
HTR-UNI SWGm	-	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-	-	-	
HTR SWGm	M8x1-F	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-	-	-	
HTR SWGm	M12x1-F	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-	-	-	
SD-MOD 4 32x15x35 FG 9 SWGm	-	-	-	M4-M	35.0	-	32.0	-	-	-	-	-	-	-	3	
SBSm 14 90-3 4/2 0	-	-	-	M4-M	21.6	-	30.9	-	-	-	-	-	0	90	-	
ABL-FUEHR 19.5x46 SWGm/SCG	G3/8"-M	-	-	-	-	-	5.0	46.0	-	-	7.5	19	-	-	-	
EMV 1.5 24V-DC 3/2 NC K-2P	M5-M	M5-F	-	-	-	-	43.1	46.5	-	-	-	-	-	-	-	
EMV 2.5 24V-DC 3/2 NC K-2P	G1/8"-M	M5-F	-	-	-	-	51.7	56.5	-	-	-	-	-	-	-	
FLAN-PL 55x7.5-AB1	-	M4-F	-	-	-	-	7.5	9.5	2.0	-	-	-	-	-	-	
FLAN-PL 63x10.5-AD1	-	M4-F	-	-	-	-	10.5	13.5	3.0	3.0	-	-	-	-	-	
FLAN-PL 63x11.5-UNI	-	M4-F	-	-	-	-	11.5	-	-	6.5	-	-	-	-	-	
FLAN-PL 80x9-ST1	-	M4-F	M6-F	-	-	-	9.0	12.0	3.0	3.0	-	-	-	-	-	
FLAN-PL 55x9.5-JP1	G3/8"-F	M4-F	-	-	-	-	9.5	-	-	6.3	-	-	-	-	-	
FLAN-PL 55x7.5-EL1	-	M4-F	-	-	-	-	7.5	9.5	2.0	-	-	-	-	-	-	

Wafer Grippers

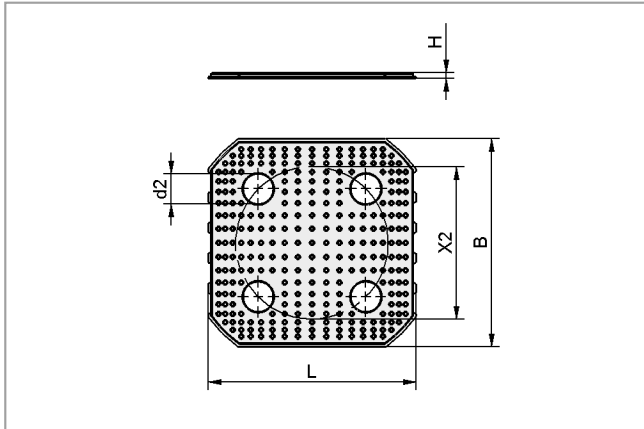


Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm



Design Data Spare Parts Wafer Gripper SWGm



SAUG-FL SWGm-...

Type	Dimensions in mm					
	B	d2	H	L	X2	
SAUG-FL SWGm-5 110x110 PEEK	110	16	3	110	80.6	
SAUG-FL SWGm-6 141x141 PEEK	141	16	3	141	110.6	

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Composite Grippers



Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min



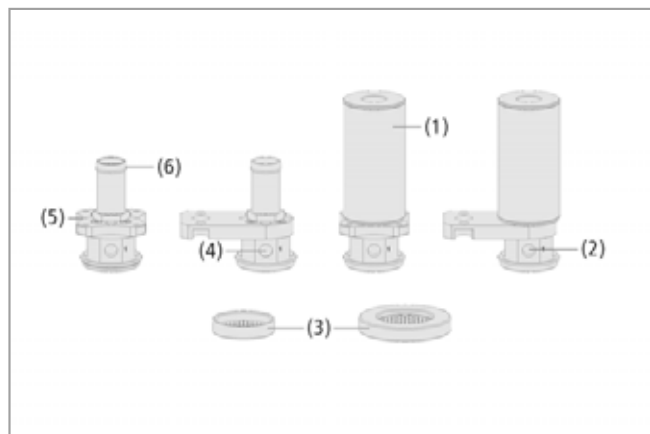
Suitable for Industry Specific Applications



Composite grippers SCG

Applications

- Gripper for handling of composites
- Handling of non-rigid and flexible workpieces
- Handling of extremely thin, sensitive foils
- Handling of blank circuit boards



System design composite grippers SCG

Design

- Quick-change contact surfaces (3) with various diameters
- Anodised aluminum main body with integrated vacuum generation (2)
- Base model with capability for axial mounting (MA) or sideways mounting (MS) (5)
- Controlled exhaust air (6)
- Two compressed air connections for suction and blow off (2/4)
- Silencer (1)



Composite grippers SCG being used for handling composites

Our Highlights...

- Suction surface with suction openings placed close to each other
- Integrated vacuum generation
- Very high suction rate
- High suction rate with minimum air consumption
- Controlled air discharge
- Axial or sideways mounting of gripper

Your Benefits...

- > Prevents the workpiece from being sucked in or damaged
- > Compact, ready-to-connect gripper unit
- > Safe gripping, even with porous materials
- > Low operating costs
- > No contamination of process area
- > Flexible mounting possibilities

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Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Designation Code Composite Grippers SCG

Abbreviated designation	Performance class of ejector	Blow off function	Possibility for mounting	Product addition
Example SCG 1xE100 A MA:				
SCG	1xE100	A	MA	
SCG	1xE100	A blow off function	MA mounting axial MS mounting sideways	SDA silencer axial

Ordering Data Composite Grippers SCG

Composite-Gripper SCG is supplied as an individual part (without suction surface). In order to receive a complete gripper the following ordering steps are required:

- Composite-Gripper SCG (step 1) – available for axial or sideways mounting
- Suction surface of type SAUG-FL (step 2) – available in various dimensions

Available accessories: silencer, screw in push fitting (right-angle)

Step 1: Composite Grippers SCG

Type	Part Number
SCG 1xE100 A MA	10.01.30.00092
SCG 1xE100 A MA SDA	10.01.30.00359
SCG 1xE100 A MS	10.01.30.00170
SCG 1xE100 A MS SDA	10.01.30.00360

Step 2: Suction area Composite Grippers SCG

Type	Part Number
SAUG-FL SCG 40 POM	10.01.30.00030
SAUG-FL SCG 60 POM	10.01.30.00031

Ordering Data Accessories Composite Grippers SCG

Type	Part Number
SD G3/8-AG 40x80 SCG	10.01.30.00352
STV-W G1/8-AG 6*	10.08.02.00288
STV-W M5-AG 6**	10.08.02.00296

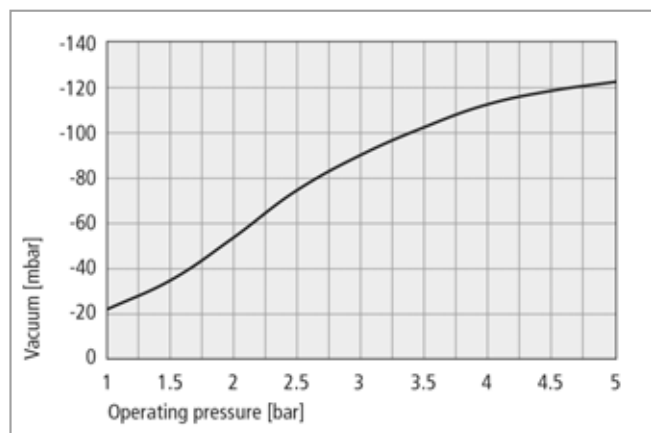
*Suitable for compressed-air connection "Suction"

**Suitable for compressed-air connection "Blow off"

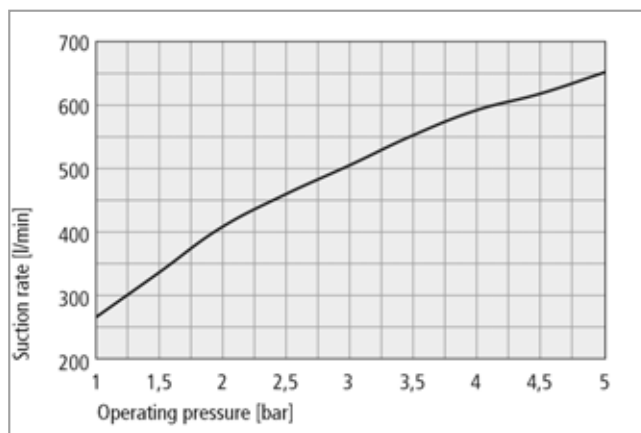
Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min

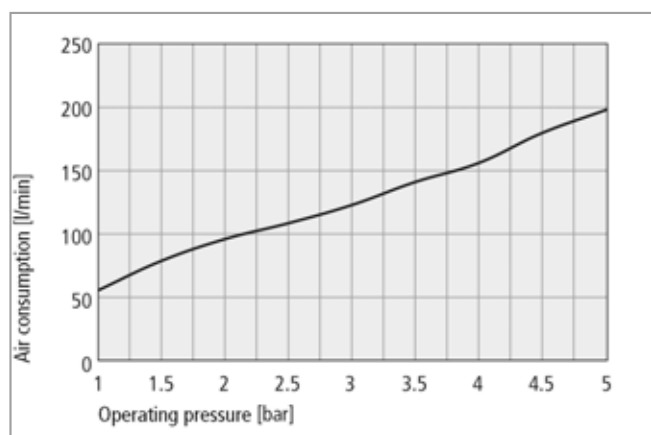
Performance Data Composite Grippers SCG



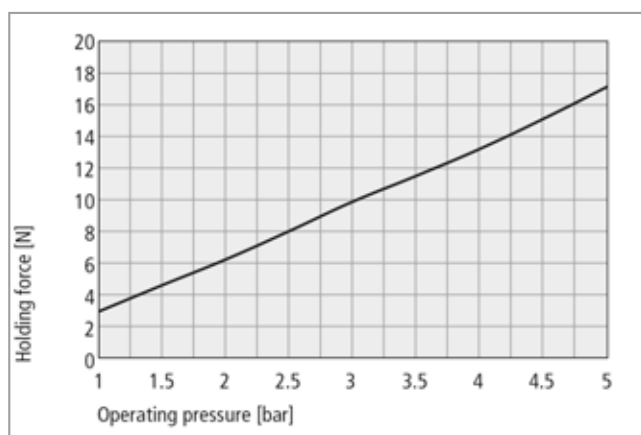
Achievable vacuum at various operating pressures



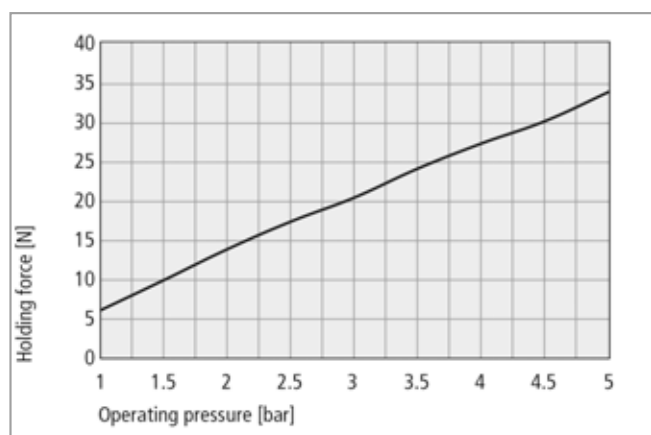
Suction rate at various operating pressures



Air consumption at various operating pressures



Holding force with suction area 40 at various operating pressures (measured on a suction-tight workpiece)



Holding force with suction area 60 at various operating pressures (measured on a suction-tight workpiece)

Composite Grippers



Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min



Technical Data Composite Grippers SCG

Type	Suction rate [l/min]	Air consumption [l/min]	Pressure range (operating pressure) [bar]**	Operating temperature [°C]	Recom. internal hose diameter, suction [mm]	Recom. internal hose diameter, blow off [mm]	Weight [g]
SCG 1xE100 A MA	270 ... 650	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	85
SCG 1xE100 A MA SDA*	270 ... 590	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	164
SCG 1xE100 A MS	270 ... 650	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	109
SCG 1xE100 A MS SDA*	270 ... 590	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	188

*Using the silencer reduces the suction flow specified above by approx. 9% and noise emissions by up to 12 dBA.

**The specified value can be equal for suction and blow-off. Operating pressures below 1 bar are possible but have to be tested individually.

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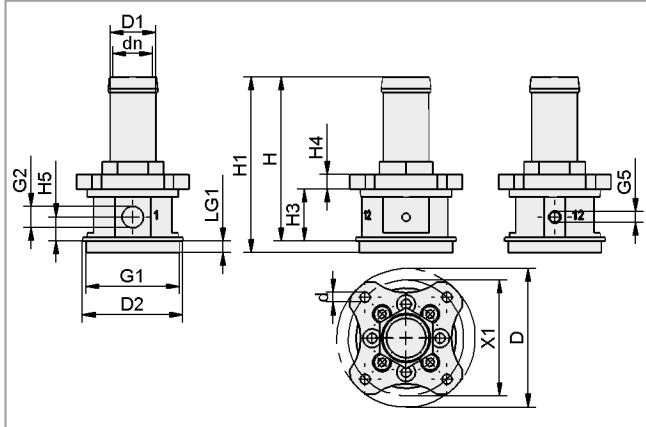


Composite Grippers SCG

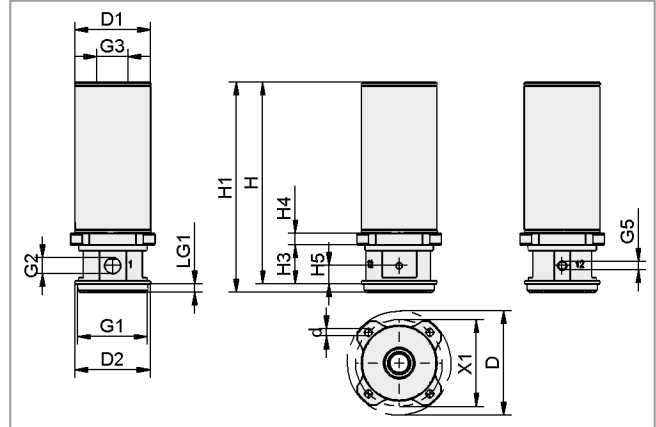
Suction capacity from 270 l/min to 650 l/min



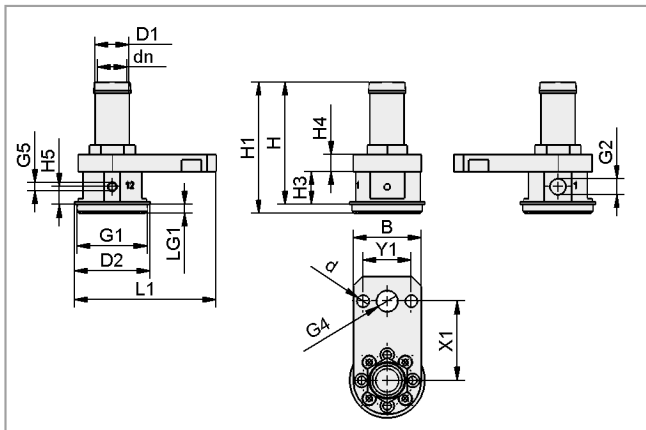
Design Data Composite Grippers SCG



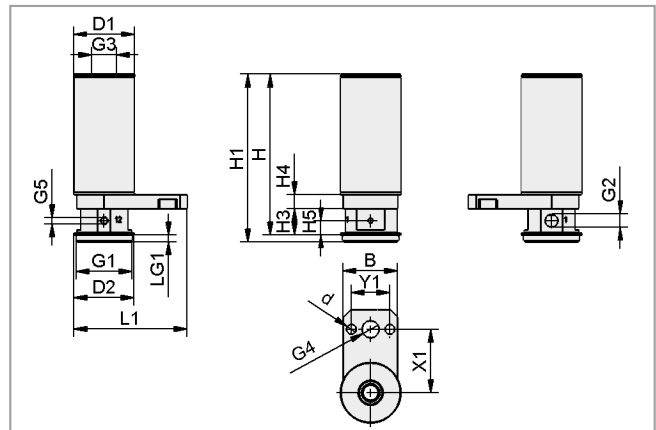
SCG 1xE100 A MA



SCG 1xE100 A MA SDA



SCG 1xE100 A MS



SCG 1xE100 A MS SDA

Type	Dimensions in mm										
	B	d	dn	D	D1	D2	G1	G2	G3	G4	
SCG 1xE100 A MA	-	4.0	12.5	55	18	39.8	M37x1-M	G1/8"-F	-	-	
SCG 1xE100 A MA SDA	-	4.0	-	55	40	39.8	M37x1-M	G1/8"-F	G3/8"-F	-	
SCG 1xE100 A MS	36	6.6	12.5	-	18	39.8	M37x1-M	G1/8"-F	-	G1/4"-F	
SCG 1xE100 A MS SDA	36	6.6	-	-	40	39.8	M37x1-M	G1/8"-F	G3/8"-F	G1/4"-F	

Type	Dimensions in mm										
	G5	H	H1	H3	H4	H5	L1	LG1	Y1	X1	
SCG 1xE100 A MA	M5-F	65	69.6	20.6	6	9.5	-	4.5	-	46	
SCG 1xE100 A MA SDA	M5-F	107	111.1	20.6	6	9.6	-	4.5	-	46	
SCG 1xE100 A MS	M5-F	65	69.6	17.6	9	9.5	74.9	4.5	25.5	42	
SCG 1xE100 A MS SDA	M5-F	107	111.1	17.6	9	9.6	74.9	4.5	25.5	42	

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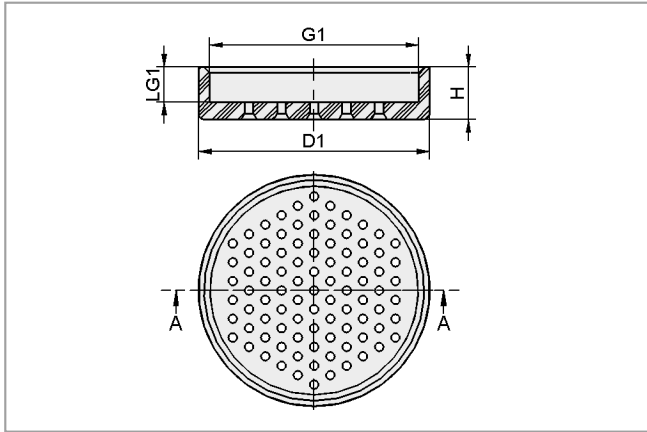


Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min



Design Data Suction Area for Composite Gripper SCG

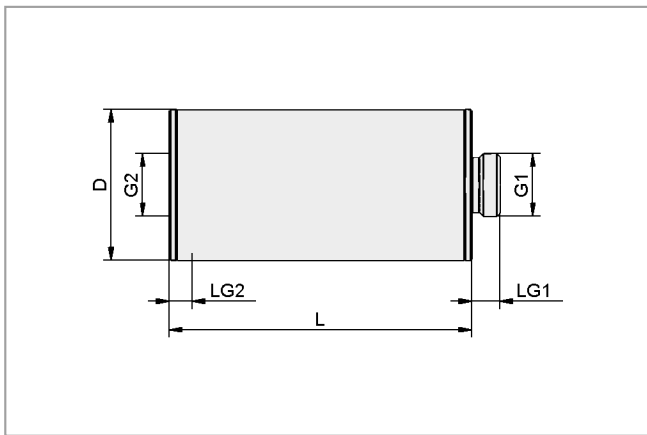


SAUG-FL

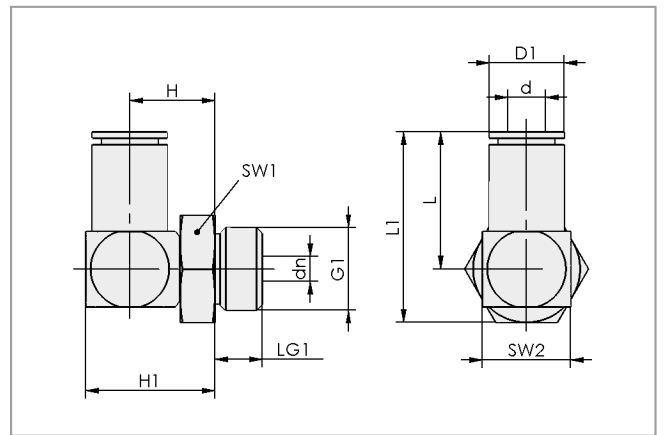
Type	Dimensions in mm						Weight [g]
	D1	G1	H	LG1			
SAUG-FL SCG 40 POM	40	M37x1-F	9.5	6.5		6.5	
SAUG-FL SCG 60 POM	60	M37x1-F	9.5	6.8		16.0	



Design Data Accessories Composite Gripper SCG



SD



Screw in push fitting STV-W

Type	Dimensions in mm													
	d	D	dn	D1	G1	G2	H	H1	L	L1	LG1	LG2	SW1	SW2
SD G3/8-AG 40x80 SCG	-	40	-	-	G3/8"-M	G3/8"-F	-	-	80.0	-	8	6	-	-
STV-W G1/8-AG 6	6	-	4	11.5	G1/8"-M	-	12.5	16.5	20.8	27.5	6	-	13	8
STV-W M5-AG 6	6	-	4	11.5	M5-M	-	13.0	16.5	20.8	25.5	4	-	8	8

Composite Grippers



Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min



Suitable for Industry Specific Applications



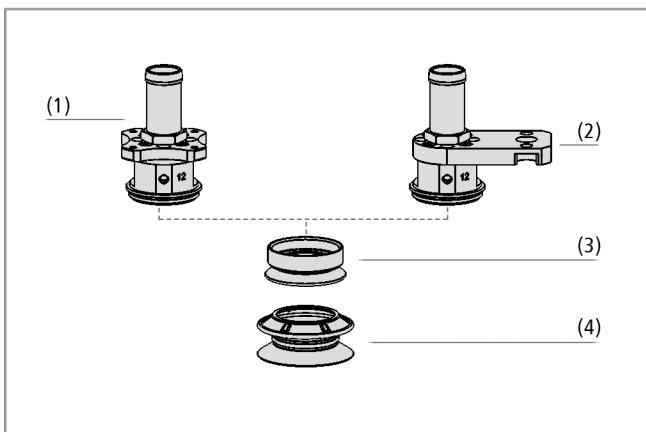
Flow gripper SCG

Applications

- Gripper solution for handling dry food products such as cookies, cakes and waffles
- Handling of products that require a high suction flow rate due to their surface or geometry
- The contact element made from FDA-compliant material allows for direct, repeated contact with food products

Design

- Main body made from anodized aluminum with integrated compressed air-operated vacuum generation
- Base model available for axial (1) or side mounting (2)
- Suction cup connection nipple made from POM (material: FDA-compliant) (3)
- Suction cup (4) with 1.5 folds (suction area Ø 50 mm) made from silicone (material: FDA-compliant); large shaft diameter for high flow rates
- Customer-specific suction areas on request



System Design Flow gripper SCG



Flow gripper SCG for handling bakery products

Our Highlights...

- Contact element made from FDA-compliant silicone material
- Very high suction flow rate
- Compact suction bellows with 1.5 folds
- Suction area with soft and flexible sealing lip
- Dirt-resistant vacuum generator
- Suction cup can be disassembled without tools

Your Benefits...

- > Suitable for direct use in the food product industry
- > Secure gripping even of porous, highly textured workpieces
- > High lateral stability even with rapid acceleration
- > Excellent sealing and damping on textured surfaces such as cookies with frosting
- > Long service intervals
- > Easy to clean

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Composite Grippers



Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Designation Code Flow Grippers SCG

Abbreviated designation	Performance class of ejector	Blow off function	Possibility for mounting
Example SCG 1xE100 A MA:			
SCG	1xE100	A	MA
SCG	1xE100	A blow off function	MA mounting axial MS mounting sideways

Ordering Data Flow Grippers SCG

The flow gripper SCG für dry food is supplied as an individual part (without suction cup). In order to receive a complete gripper the following ordering steps are required:

- Flow gripper (step1) – available for axial or sideways mounting
- Suction cup (step 2)

Available accessories: screw in push fitting (right-angle)

Step 1: Flow Grippers SCG

Type	Part Number
SCG 1xE100 A MA	10.01.30.00092
SCG 1xE100 A MS	10.01.30.00170

Step 2: Suction Cups

Type	Type	Part Number
SAUG-SCG 50 SI-HD	Suction cup (round)	10.01.30.00593

Ordering Data Accessories Flow Grippers SCG

Type	Part Number
STV-W G1/8-AG 6*	10.08.02.00288
STV-W M5-AG 6**	10.08.02.00296

*Suitable for compressed-air connection "Suction"

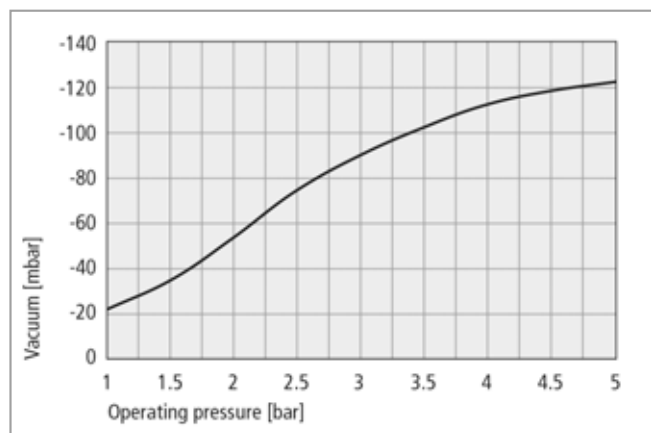
**Suitable for compressed-air connection "Blow off"

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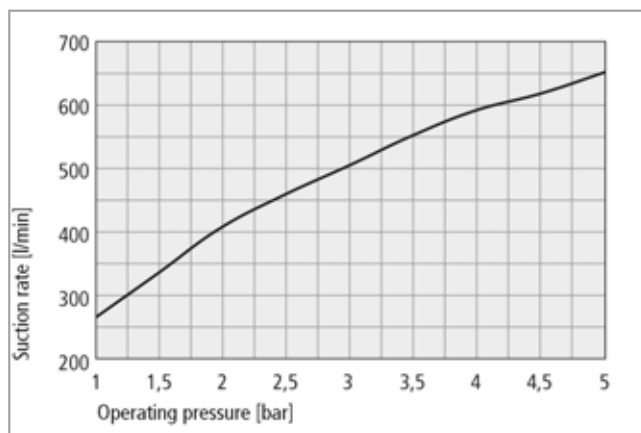
Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min

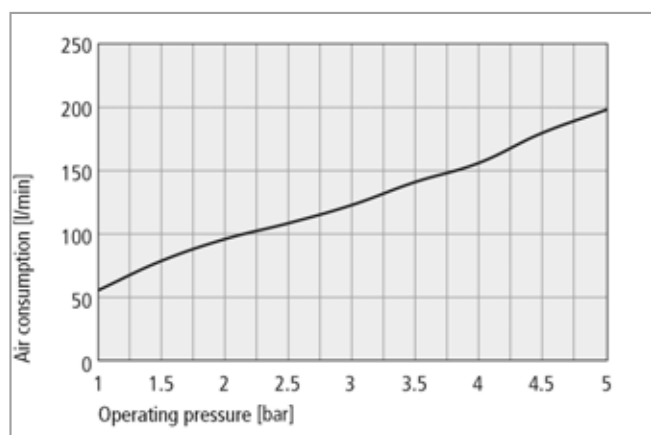
Performance Data Flow Grippers SCG



Achievable vacuum at various operating pressures



Suction rate at various operating pressures



Air consumption at various operating pressures

Technical Data Flow Grippers SCG

Type	Suction rate [l/min]	Air consumption [l/min]	Pressure range (operating pressure) [bar]**	Operating temperature [°C]	Recom. internal hose diameter, suction [mm]	Recom. internal hose diameter, blow off [mm]	Weight [g]
SCG 1xE100 A MA	270 ... 650	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	85
SCG 1xE100 A MS*	270 ... 650	60 ... 200	1.0 ... 5.0	5 ... 75	4	4	109

*Using the silencer reduces the suction flow specified above by approx. 9% and noise emissions by up to 12 dBA.

**The specified value can be equal for suction and blow-off. Operating pressures below 1 bar are possible but have to be tested individually.

Composite Grippers

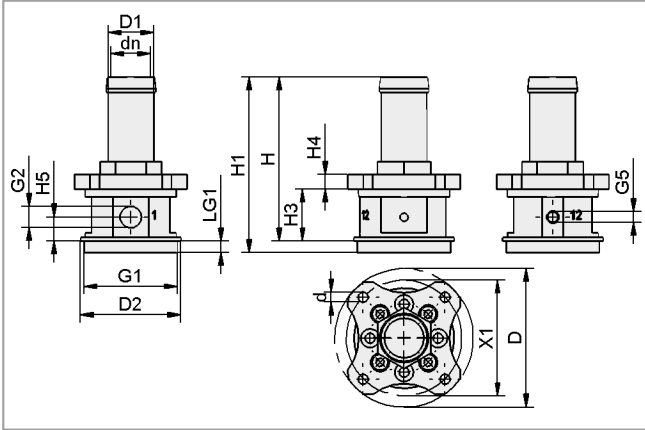


Flow Grippers SCG

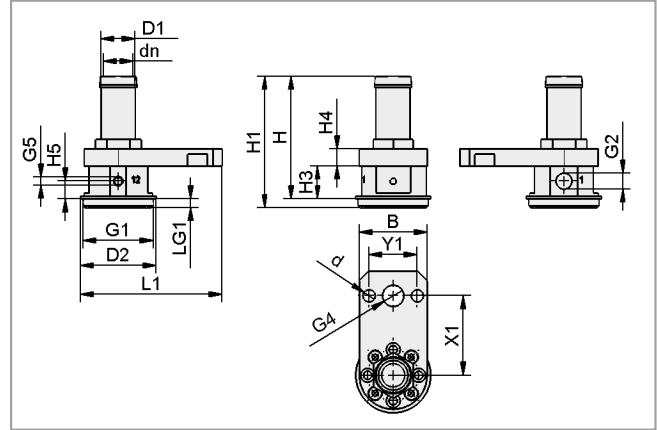
Suction capacity from 270 l/min to 650 l/min



Design Data Flow Grippers SCG



SCG 1xE100 A MA



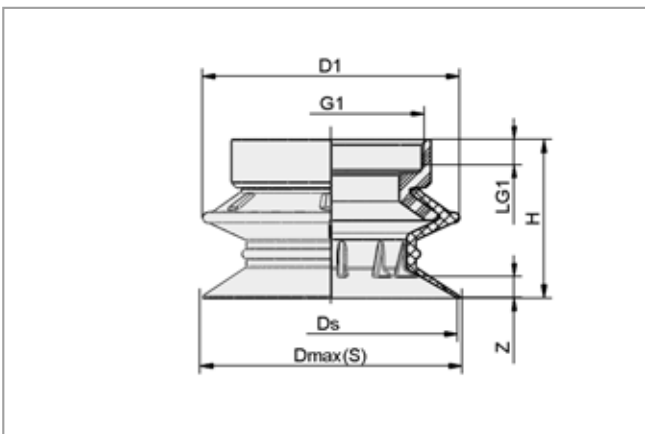
SCG 1xE100 A MS

Type	Dimensions in mm										
	B	d	dn	D	D1	D2	G1	G2	G4	G5	
SCG 1xE100 A MA	-	4.0	12.5	55	18	39.8	M37x1-M	G1/8"-F	-	M5-F	
SCG 1xE100 A MS	36	6.6	12.5	-	18	39.8	M37x1-M	G1/8"-F	G1/4"-F	M5-F	

Type	Dimensions in mm										
	H	H1	H3	H4	H5	L1	LG1	Y1	X1		
SCG 1xE100 A MA	65	69.6	20.6	6	9.5	-	4.5	-	46		
SCG 1xE100 A MS	65	69.6	17.6	9	9.5	74.9	4.5	25.5	42		



Design Data Suction Cups



SAUG-SCG 50 SI-HD

Type	Dimensions in mm						
	D1	Dmax(S)*	Ds	G1	H	LG1	Z
SAUG-SCG 50 SI-HD	51.0	51.5	50.3	M37x1-F	31.5	5.0	4.2

*External dimension of the suction cup when it is pressed against the workpiece by the vacuum

Composite Grippers

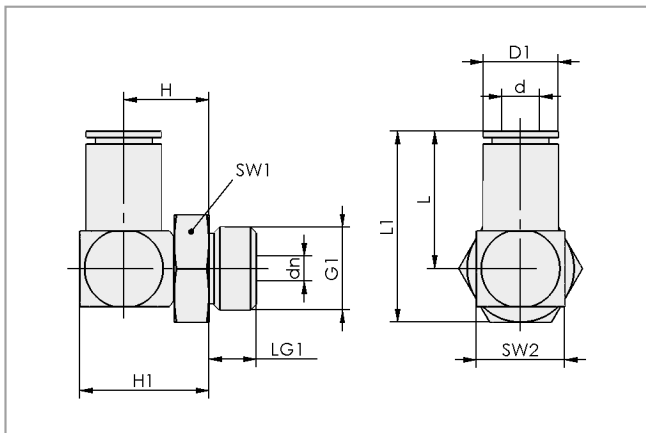


Flow Grippers SCG

Suction capacity from 270 l/min to 650 l/min



Design Data Accessories Composite Gripper SCG



STV-W

Type	Dimensions in mm										
	d	dn	D1	G1	H	H1	L	L1	LG1	SW1	SW2
STV-W G1/8-AG 6	6	4	11.5	G1/8"-M	12.5	16.5	20.8	27.5	6	13	8
STV-W M5-AG 6	6	4	11.5	M5-M	13.0	16.5	20.8	25.5	4	8	8

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Thin glass grippers



Thin Glass Grippers STGG

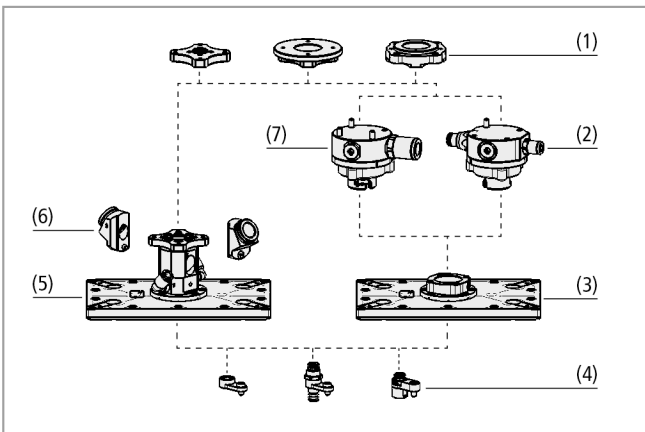
Two suction areas 100 x 55 mm and 170 x 105 mm



Suitable for Industry Specific Applications



Thin glass grippers STGG (left QCFA with QCMV, right E100)



System design thin glass grippers STGG

Applications

- Special gripper for gentle handling of thinnest glass
- Use in the manufacturing of 0.1 mm thin display glass
- Extremely fast and gentle handling of sensitive workpieces in fully or semi-automated production of displays, e.g. TFT screens, smartphones or tablets
- Handling without contamination and thus no negative effect on subsequent processes such as coating

Design

- Basic body (5) made of lightweight plastic and aluminium with integrated vacuum generation and blowoff function (type E100)
- Basic body (3) made of lightweight plastic and aluminium with integrated vacuum generator (type QCMV) (2); alternatively for connection to an external vacuum generator (type QCM) (7)
- PEEK suction area in standard sizes 100 x 55 mm and 170 x 105 mm, custom made sizes available on request
- Modular design: optional mounting of sensors and modules for suction and damping (4); different robot flange modules (1) available
- Optional exhaust unit (6) for controlled discharge of exhaust air for clean room applications (only type E100)



Thin glass gripper STGG being used for handling display glass

Our Highlights...

- Suction area made of the mark-free material PEEK
- High suction capacity and large effective suction area
- Active blow off function
- Full-surface gripping with a low vacuum level
- Low compressed air consumption
- Optional use of Bernoulli modules and suction cups

Your Benefits...

- > No contamination of the glass surface
- > Safe and precise handling in high dynamic processes
- > Fast and exact depositing
- > Minimum surface pressure for a very gentle handling process
- > Minimum operating costs
- > High engagement distance

Thin glass grippers



Thin Glass Grippers STGG

Two suction areas 100 x 55 mm and 170 x 105 mm

Designation Code Thin Glass Grippers STGG

Abbreviated designation	Design	Dimensions in mm	Vacuum generation	Blow off function
Example STGG S 100x55 1xE100 A:				
STGG	S	100x55	1xE100	A
STGG	S lateral exhaust air	100x55 170x105	1xE100 integrated QCMV HV 2 13 integrated QCM 51 external	A blow off function

Ordering Data Thin Glass Grippers STGG

Thin glass gripper STGG is delivered assembled.

- Gripper available in various dimensions with integrated vacuum generation (1xE100 or QCMV) or with connection for external vacuum generation (QCM)

Available accessories: exhaust set, holder, suction / damping module, floating suction cup module, flange plate

Thin Glass Grippers STGG

Type	Part Number
STGG S 100x55 1xE100 A	10.01.30.00469
STGG S 170x105 1xE100 A	10.01.30.00473
STGG 100x55 QCMV HV 2 13	10.01.30.00517
STGG 170x105 QCMV HV 2 13	10.01.30.00518
STGG 100x55 QCM 51	10.01.30.00519
STGG 170x105 QCM 51	10.01.30.00520

Ordering Data Accessories Thin Glass Grippers STGG

Type	STGG S 100x55 1xE100 A	STGG S 170x105 1xE100 A	STGG 100x55 QCMV HV 2 13	STGG 170x105 QCMV HV 2 13	STGG 100x55 QCM 51	STGG 170x105 QCM 51
Exhaust set ABL-SET	10.01.30.00059	10.01.30.00059	-	-	-	-
Holder HTR-UNI	10.01.30.00117	10.01.30.00117	10.01.30.00117	10.01.30.00117	10.01.30.00117	10.01.30.00117
Holder HTR M8x1-IG	10.01.30.00118	10.01.30.00118	10.01.30.00118	10.01.30.00118	10.01.30.00118	10.01.30.00118
Holder HTR M12x1-IG	10.01.30.00119	10.01.30.00119	10.01.30.00119	10.01.30.00119	10.01.30.00119	10.01.30.00119
Suction/damping module SD-MOD	10.01.30.00121	10.01.30.00121	10.01.30.00121	10.01.30.00121	10.01.30.00121	10.01.30.00121
Floating suction cup module SBSm*	-	10.01.01.12912	-	10.01.01.12912	-	10.01.01.12912
Floating suction cup module SBSm**	10.01.01.13171	-	10.01.01.13171	-	10.01.01.13171	-
Flange plate FLAN-PL 55x7.5-AB1	10.01.30.00015	10.01.30.00015	10.01.30.00015	10.01.30.00015	10.01.30.00015	10.01.30.00015
Flange plate FLAN-PL 63x10.5-AD1	10.01.30.00016	10.01.30.00016	10.01.30.00016	10.01.30.00016	10.01.30.00016	10.01.30.00016
Flange plate FLAN-PL 63x11.5-UNI	10.01.30.00017	10.01.30.00017	10.01.30.00017	10.01.30.00017	10.01.30.00017	10.01.30.00017
Flange plate FLAN-PL 80x9-ST1	10.01.30.00167	10.01.30.00167	10.01.30.00167	10.01.30.00167	10.01.30.00167	10.01.30.00167
Flange plate FLAN-PL 55x9.5-JP1	10.01.30.00194	10.01.30.00194	10.01.30.00194	10.01.30.00194	10.01.30.00194	10.01.30.00194
Flange plate FLAN-PL 55x9.5-EL1	10.01.30.00208	10.01.30.00208	10.01.30.00208	10.01.30.00208	10.01.30.00208	10.01.30.00208

*Order max. 4x per STGG

**Order 2x per STGG

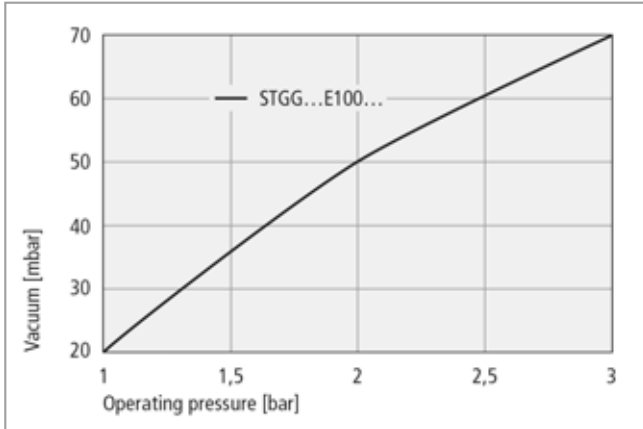
Thin glass grippers



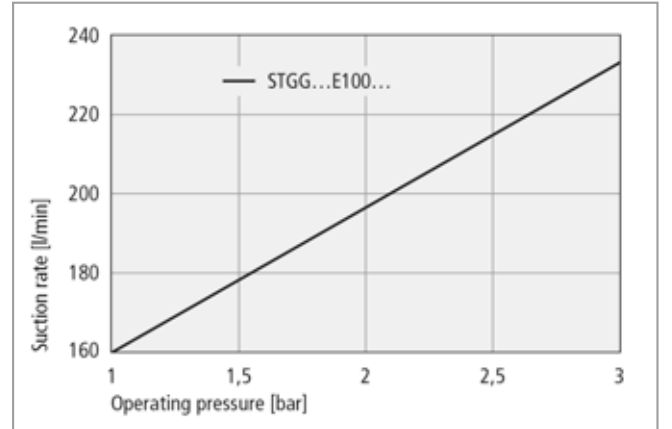
Thin Glass Grippers STGG

Two suction areas 100 x 55 mm and 170 x 105 mm

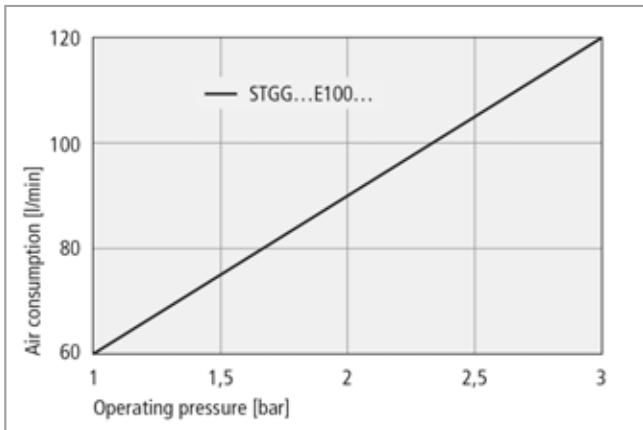
Performance Data Thin Glass Grippers STGG



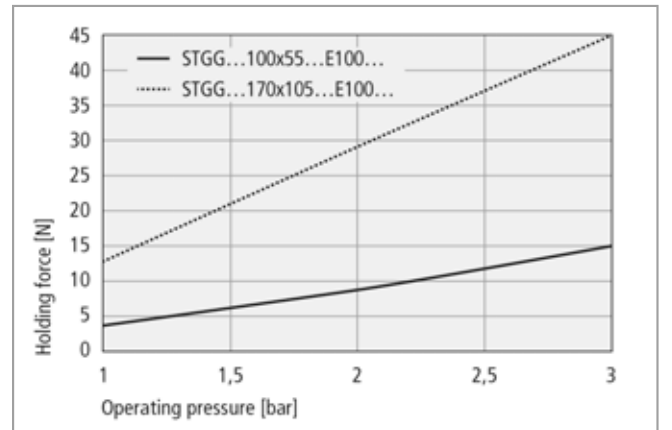
Vacuum STGG...E100...



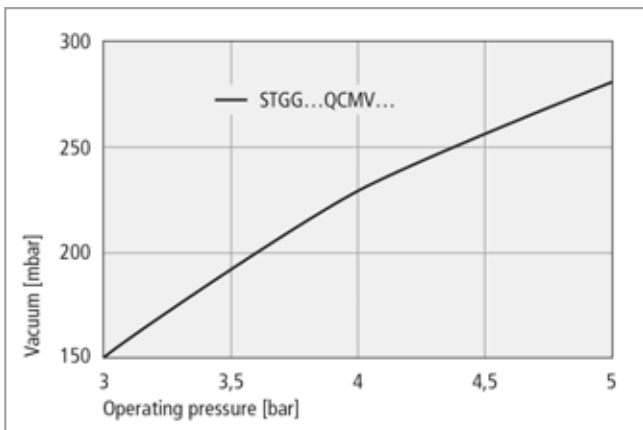
Suction rate STGG...E100...



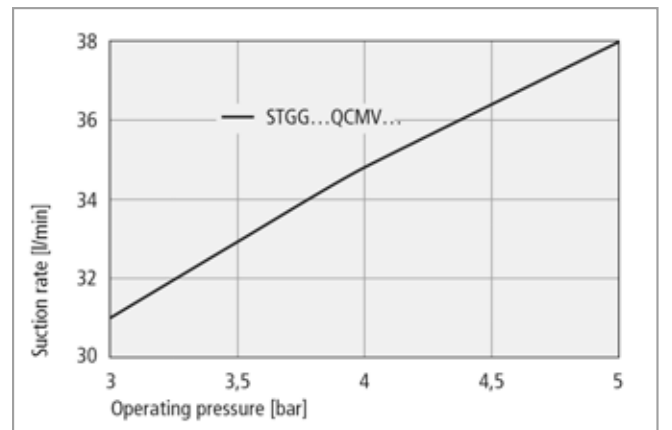
Air consumption STGG...E100...



Holding force STGG...100x55...E100/STGG...170x105...E100



Vacuum STGG...QCMV...



Suction rate STGG...QCMV...

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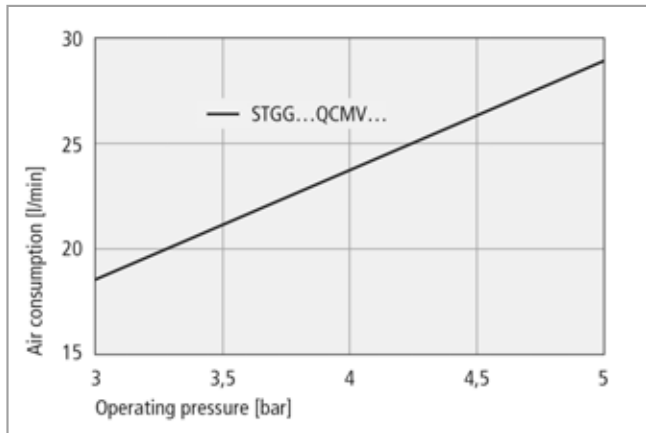
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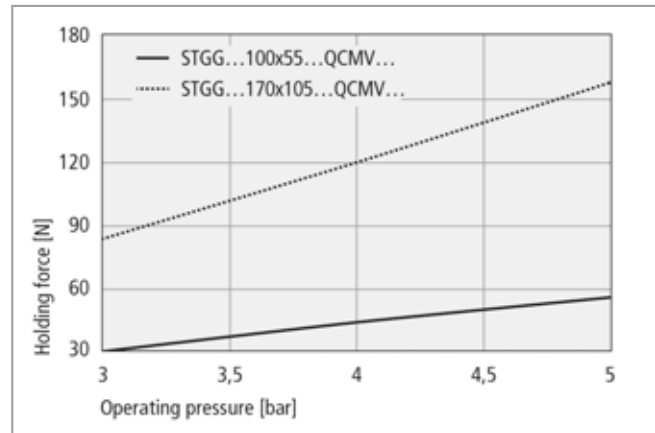


Thin Glass Grippers STGG

Two suction areas 100 x 55 mm and 170 x 105 mm



Air consumption STGG...QCMV...



Holding force STGG...100x55...QCMV/STGG...170x105...QCMV

Technical Data STGG...1xE100/QCMV (with integrated vacuum generation)

Type	Holding force [N]	Suction rate [l/min]	Air consumption [l/min]	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Weight [g]
STGG S 100x55 1xE100 A	4 ... 15	160 ... 235	60 ... 120	1.0 ... 3.0	5 ... 60	215
STGG S 170x105 1xE100 A	13 ... 45	160 ... 235	60 ... 120	1.0 ... 3.0	5 ... 60	360
STGG 100x55 QCMV HV 2 13	30 ... 56	31 ... 38	18 ... 28	3.0 ... 5.0	5 ... 60	300
STGG 170x105 QCMV HV 2 13	85 ... 160	31 ... 38	18 ... 28	3.0 ... 5.0	5 ... 60	450

Technical Data STGG...QCM (with connection to external vacuum generation)

Type	Max. flow rate [m³/h]	Operating temperature [°C]	Weight [g]
STGG 100x55 QCM 51	20	5 ... 60	325
STGG 170x105 QCM 51	20	5 ... 60	475

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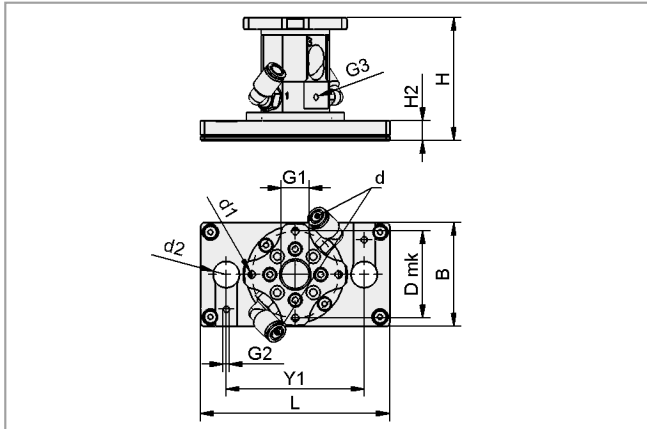


Thin Glass Grippers STGG

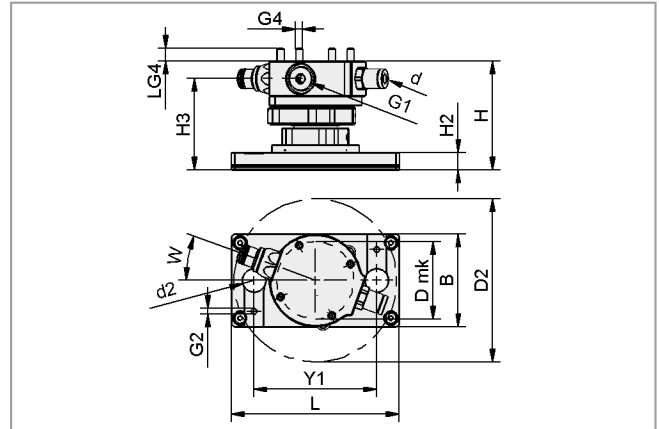
Two suction areas 100 x 55 mm and 170 x 105 mm



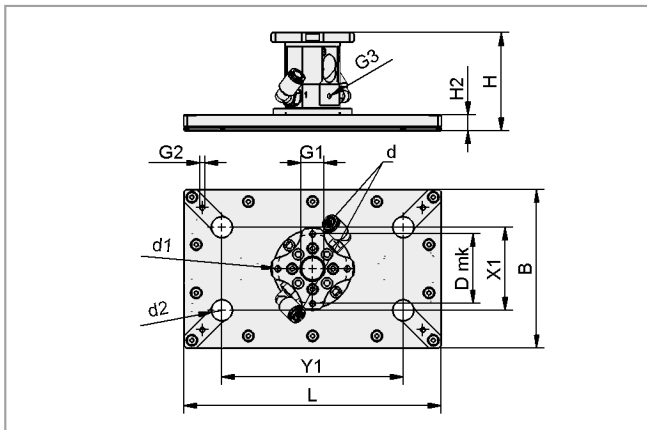
Design Data Thin Glass Grippers STGG



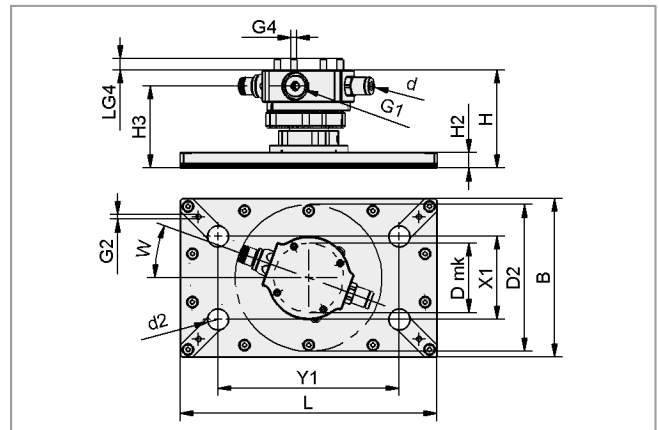
STGG S 100x55 1xE100 A



STGG 100x55 QCM...



STGG S 170x105 1xE100 A



STGG 170x105 QCM...

Type	Dimensions in mm																	
	B	d	d1	d2	D2	D mk	G1	G2	G3	G4	H	H2	H3	L	LG4	W	X1	Y1
STGG S 100x55 1xE100 A	55	6	4.0	14	-	46	G3/8"-F	M4-F	M4-F	-	65	11	-	100	-	-	-	73
STGG S 170x105 1xE100 A	105	6	4.0	14	-	46	G3/8"-F	M4-F	M4-F	-	65	11	-	170	-	-	55	120
STGG 100x55 QCMV HV 2 13	55	6	-	14	97	46	G1/8"-F	M4-F	-	M4-M	67	11	54	100	7.6	20	-	73
STGG 170x105 QCMV HV 2 13	105	6	-	14	97	46	G1/8"-F	M4-F	-	M4-M	67	11	54	170	7.6	20	55	120
STGG 100x55 QCM 51	55	12	-	14	112	46	G1/8"-F	M4-F	-	M4-M	67	11	54	100	7.6	20	-	73
STGG 170x105 QCM 51	105	12	-	14	112	46	G1/8"-F	M4-F	-	M4-M	67	11	54	170	7.6	20	55	120

Thin glass grippers

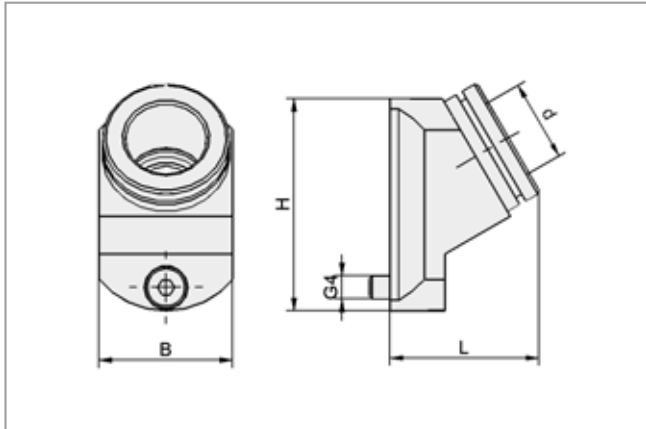


Thin Glass Grippers STGG

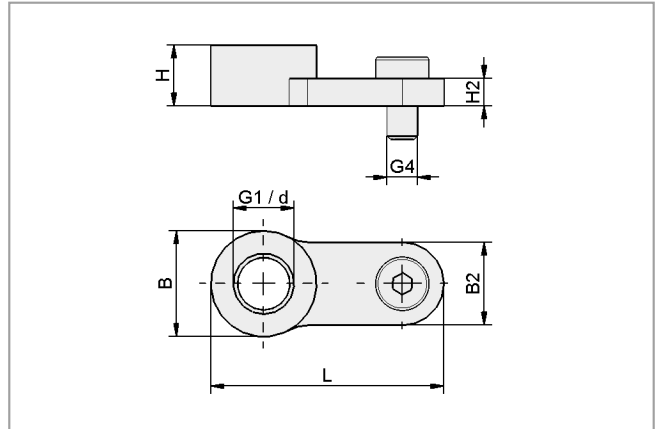
Two suction areas 100 x 55 mm and 170 x 105 mm



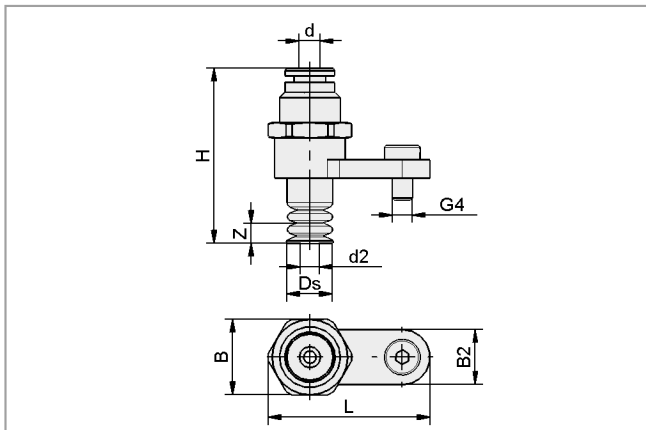
Design Data Accessories Thin Glass Grippers STGG



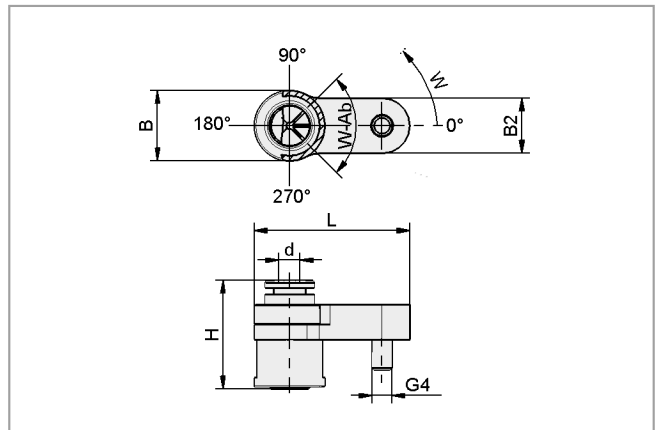
ABL-SET 14 SWG



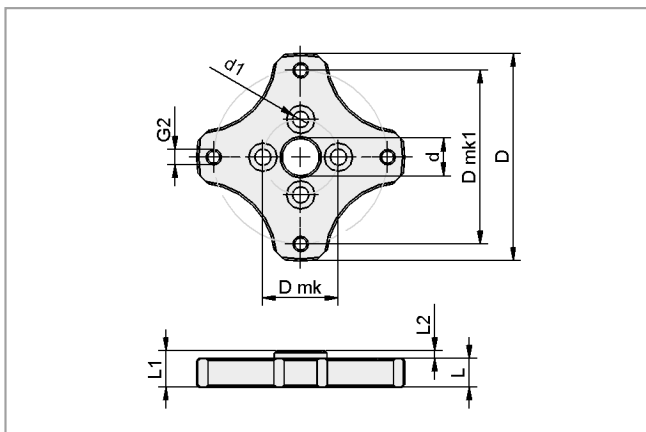
HTR-UNI SWGm, HTR M8x1-IG SWGm, HTR M12x1-IG SWGm



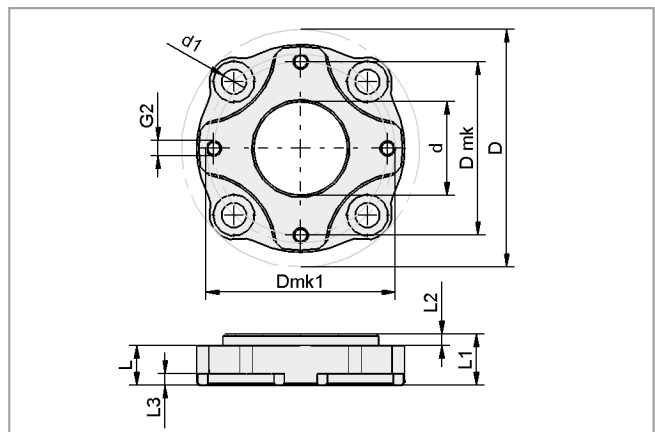
SD-MOD 4 32x15x35 FG 9 SWGm



SBSm 14 90-3 4/2...



FLAN-PL 55x7.5-AB1



FLAN-PL 63x10.5-AD1

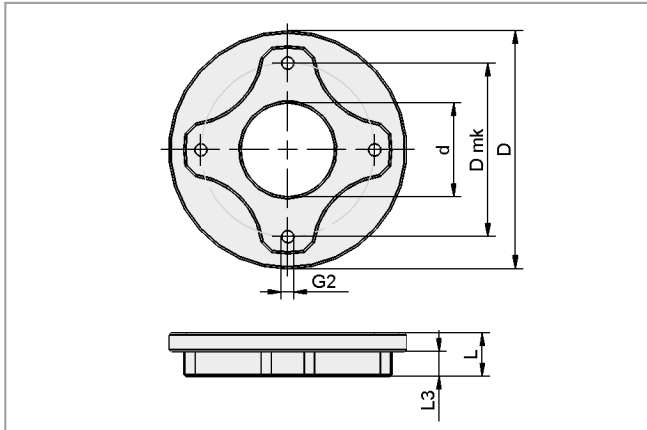
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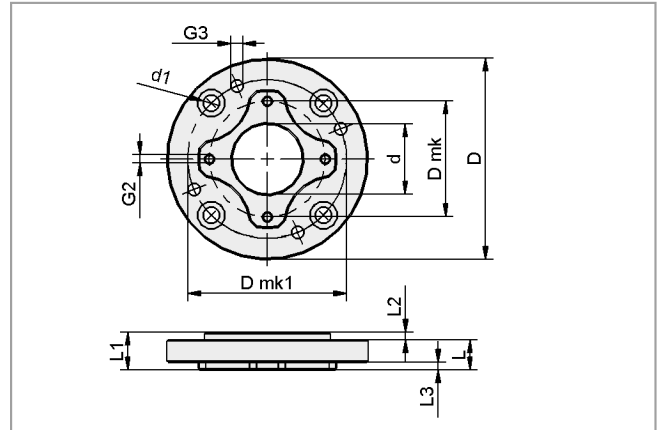


Thin Glass Grippers STGG

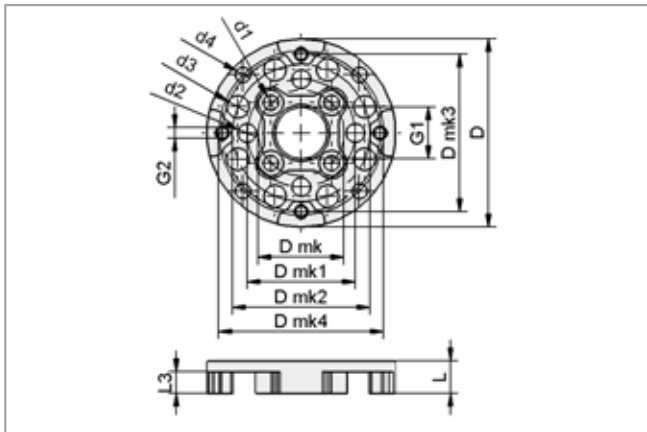
Two suction areas 100 x 55 mm and 170 x 105 mm



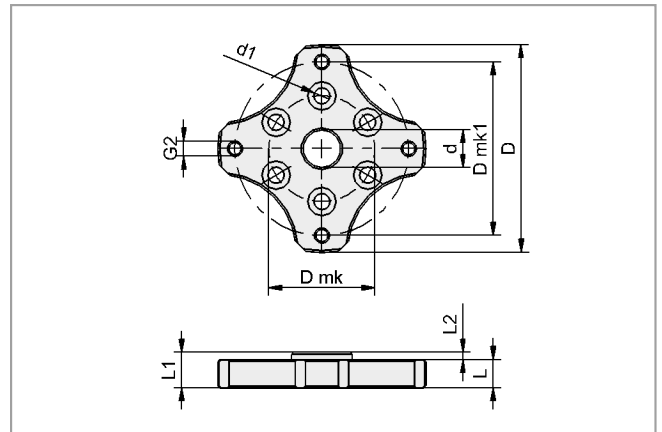
FLAN-PL 63x11.5 SWG-UNI



FLAN-PL 80x9-ST1



FLAN-PL 55x9.5-JP1



FLAN-PL 55x7.5-EL1

Type	Dimensions in mm													
	B	B2	d	d1	d2	d3	d4	D	D mk	D mk1	D mk2	D mk3	D mk4	Ds
ABL-SET 14 SWG/SCG	23	-	14	-	-	-	-	-	-	-	-	-	-	-
HTR-UNI SWGm	14	11	2	-	-	-	-	-	-	-	-	-	-	-
HTR SWGm	14	11	-	-	-	-	-	-	-	-	-	-	-	-
HTR SWGm	14	11	-	-	-	-	-	-	-	-	-	-	-	-
SD-MOD 4 32x15x35 FG 9 SWGm	15	11	4	-	4.1	-	-	-	-	-	-	-	-	9
SBSm 14 90-3 4/2 0	14	11	4	-	-	-	-	-	-	-	-	-	-	-
SBSm 14 90-3 4/2 90	14	11	4	-	-	-	-	-	-	-	-	-	-	-
FLAN-PL 55x7.5-AB1	-	-	10	4.3	-	-	-	55	20	46	-	-	-	-
FLAN-PL 63x10.5-AD1	-	-	21	6.6	-	-	-	63	46	50	-	-	-	-
FLAN-PL 63x11.5-UNI	-	-	25	-	-	-	-	63	46	-	-	-	-	-
FLAN-PL 80x9-ST1	-	-	28	7.0	-	-	-	80	46	63	-	-	-	-
FLAN-PL 55x9.5-JP1	-	-	-	4.5	5.5	6.6	4.5	55	25	32	40	46	48	-
FLAN-PL 55x7.5-EL1	-	-	10	4.3	-	-	-	55	28	46	-	-	-	-

Thin glass grippers



Thin Glass Grippers STGG

Two suction areas 100 x 55 mm and 170 x 105 mm

Type	Dimensions in mm												
	G1	G2	G3	G4	H	H2	L	L1	L2	L3	W	W-Ab	Z (Stroke)
ABL-SET 14 SWG/SCG	-	-	-	M4-M	36.5	-	25.5	-	-	-	-	-	-
HTR-UNI SWGm	-	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-
HTR SWGm	M8x1-F	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-
HTR SWGm	M12x1-F	-	-	M4-M	8.0	3.6	30.9	-	-	-	-	-	-
SD-MOD 4 32x15x35 FG 9 SWGm	-	-	-	M4-M	35.0	-	32.0	-	-	-	-	-	3
SBSm 14 90-3 4/2 0	-	-	-	M4-M	21.6	-	30.9	-	-	-	0	90	-
SBSm 14 90-3 4/2 90	-	-	-	M4-M	21.6	-	30.9	-	-	-	90	90	-
FLAN-PL 55x7.5-AB1	-	M4-F	-	-	-	-	7.5	9.5	2.0	-	-	-	-
FLAN-PL 63x10.5-AD1	-	M4-F	-	-	-	-	10.5	13.5	3.0	3.0	-	-	-
FLAN-PL 63x11.5-UNI	-	M4-F	-	-	-	-	11.5	-	-	6.5	-	-	-
FLAN-PL 80x9-ST1	-	M4-F	M6-F	-	-	-	9.0	12.0	3.0	3.0	-	-	-
FLAN-PL 55x9.5-JP1	G3/8"-F	M4-F	-	-	-	-	9.5	-	-	6.3	-	-	-
FLAN-PL 55x7.5-EL1	-	M4-F	-	-	-	-	7.5	9.5	2.0	-	-	-	-

Feed ejectors



Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min



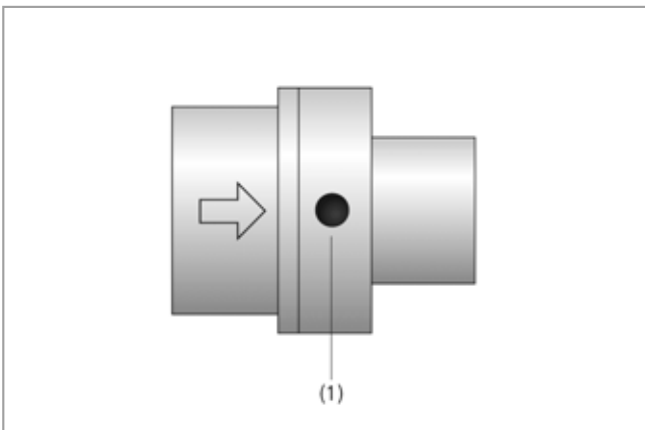
Suitable for Industry Specific Applications



Feed ejectors SEC

Applications

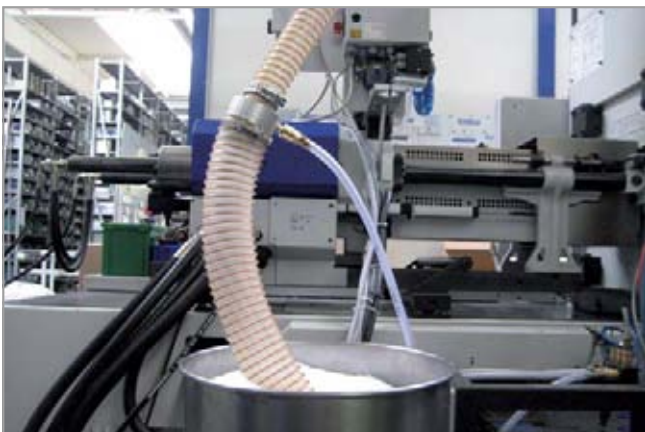
- Gripping of very porous materials such as foams, textiles, paper and various recycling materials
- Conveyance of light solids, such as polystyrene, plastic granulates, rice or other filling materials
- Exhaust of non-aggressive vapors and gases



System design feed ejectors SEC

Design

- Body made of anodized aluminum or stainless steel
- Straight vacuum passage
- Compressed air enters at the side (1), through an annular gap



Vacuum generation with feed ejector SEC for transporting granulates

Our Highlights...

- Special ejector with straight vacuum passage for very high volume flow rates at low vacuum values
- Various models with different performance figures

Your Benefits...

- > Handling of very porous materials and low-loss transport of bulk goods; high efficiency
- > Optimum range of sizes for all applications

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Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min

Designation Code Feed Ejectors SEC

Abbreviated designation	Nozzle size
Example SEC-100:	
SEC	100
SEC	60 = 6.0 mm
	100 = 10.0 mm
	200 = 20.0 mm
	400 = 40.0 mm
	750 = 75.0 mm

Ordering Data Feed Ejectors SEC

Ejector SEC is delivered as a ready to connect product.

Feed Ejectors SEC

Type	Part Number
SEC-60	10.02.01.01079
SEC-60 A2	10.02.01.01155
SEC-100	10.02.01.00078
SEC-100 A2	10.02.01.01691
SEC-200	10.02.01.00079
SEC-200 A2	10.02.01.01326
SEC-400	10.02.01.00080
SEC-400 A2	10.02.01.01620
SEC-750	10.02.01.00081

Technical Data Feed Ejectors SEC

Type	Nozzle-Ø [mm]	Max. vacuum [mbar]	Max. suction rate [l/min]*	Max. suction rate [m³/h]*	Airconsumpt. during evac. [l/min]*	Airconsumpt. during evac. [m³/h]*	Pressure range (operating pressure) [bar]	Weight [kg]	Operating temperature [°C]
SEC-60	6	-245	215	12.9	110	6.6	2.0 ... 5.0	0.040	-20 ... 80
SEC-60 A2	6	-245	215	12.9	110	6.6	2.0 ... 5.0	0.091	-20 ... 80
SEC-100	10	-185	610	36.6	135	8.1	2.0 ... 6.0	0.070	-20 ... 80
SEC-100 A2	10	-185	610	36.6	135	8.1	2.0 ... 6.0	0.206	-20 ... 80
SEC-200	20	-85	1375	82.5	290	17.4	2.0 ... 6.0	0.180	-20 ... 80
SEC-200 A2	20	-85	1375	82.5	290	17.4	2.0 ... 6.0	0.511	-20 ... 80
SEC-400	40	-35	2250	135.0	445	26.7	2.0 ... 6.0	0.525	-20 ... 80
SEC-400 A2	40	-35	2250	135.0	445	26.7	1.9 ... 5.9	1,475	-20 ... 80
SEC-750	75	-5	8640	518.4	770	46.2	2.0 ... 6.0	2.350	-20 ... 80

*At optimal operating pressure of approx. 4.5 bar

Feed ejectors

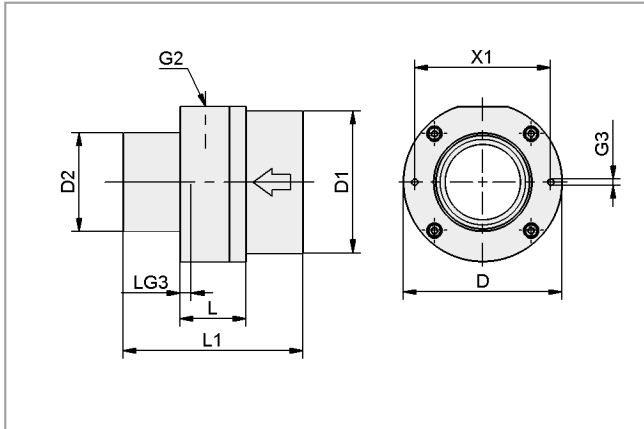


Feed Ejectors SEC

Suction rate from 215 l/min to 8,640 l/min



Design Data Feed Ejectors SEC



SEC 60 to 750

Type	Dimensions in mm									
	D	D1	D2	G2	G3	L	L1	LG3	X1	
SEC-60	32	12.5	12.5	M5-F	M3-F	14	44.0	5	25	
SEC-60 A2	32	12.5	12.5	M5-F	M3-F	14	44.0	5	25	
SEC-100	37	19.0	19.0	G1/8"-F	M4-F	21	70.0	8	29	
SEC-100 A2	37	19.0	19.0	G1/8"-F	M4-F	21	70.0	8	29	
SEC-200	50	38.0	32.0	G1/4"-F	M4-F	30	90.0	12	42	
SEC-200 A2	50	38.0	32.0	G1/4"-F	M4-F	30	90.0	12	42	
SEC-400	84	75.0	52.0	G3/8"-F	M4-F	35	95.0	14	72	
SEC-400 A2	84	75.0	52.0	G3/8"-F	M4-F	35	95.0	14	72	
SEC-750	140	125.0	100.0	G1/2"-F	M6-F	65	180.0	6	126	

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Special Grippers

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Vacuum Lifting Cylinders



Vacuum Lifting Cylinders HS

Stroke 15 mm and 30 mm



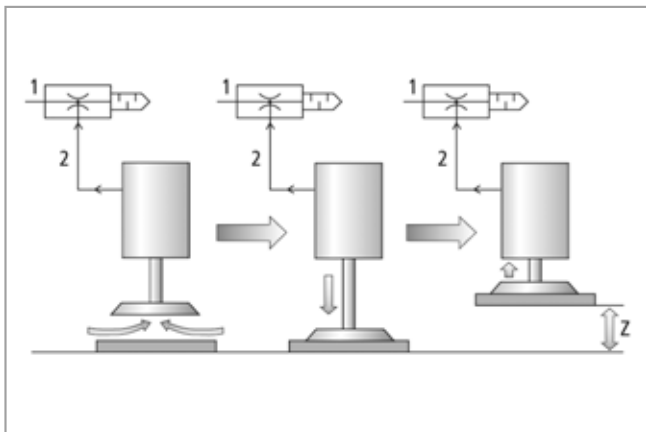
Suitable for Industry Specific Applications



Vacuum lifting cylinders HS

Applications

- Vacuum lifting cylinder for handling and separation of paper, veneer and similar thin, porous workpieces when mounted vertically



System design vacuum lifting cylinders HS

Design

- Lifting suction cup consisting of a piston rod and anodized aluminum housing
- In idle position, the piston rod is retracted
- Piston rod is extended, when vacuum is applied
- As soon as the suction cup touches the workpiece, the piston rod is retracted, lifting the workpiece before the "suck-through" effect is generated
- Delivery without suction cup



Vacuum lifting cylinders HS being used for handling adhesive paper

Our Highlights...

- Vacuum-actuated, automatic lifting

Your Benefits...

- > Reliable separation of thin, porous workpieces

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Vacuum Lifting Cylinders



Vacuum Lifting Cylinders HS

Stroke 15 mm and 30 mm

Designation Code Vacuum Lifting Cylinders HS

Abbreviated designation	Stroke in mm	Spring plunger length in mm	Connection thread
Example HS 15-22 M5-IG:			
HS	15	22	M5-IG
HS	15	22	M5-IG (IG = female (F))
	30	32	G1/8-IG

Ordering Data Vacuum Lifting Cylinders HS

Vacuum lifting cylinder HS is delivered as a ready to connect product with the desired properties. The delivery does not include a suction cup.

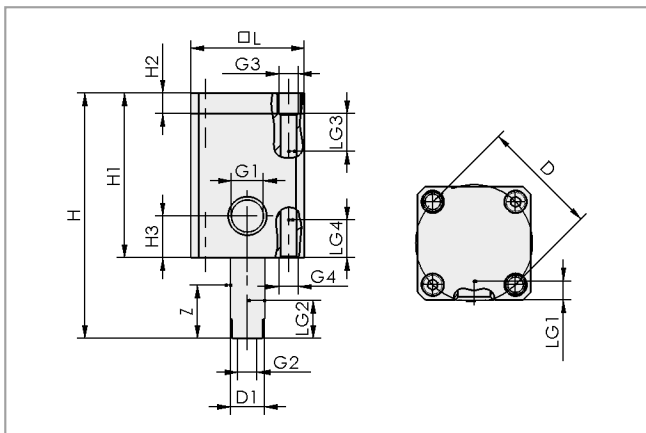
Vacuum Lifting Cylinders HS

Type	Part Number
HS 15-22 M5-IG	10.01.07.00014
HS 30-32 G1/8-IG	10.01.07.00001

Technical Data Vacuum Lifting Cylinders HS

Type	Lifting force ($p_u = 0.8 \text{ bar}$) [N]	Air consumption [l/min]	Air consumption [m ³ /h]	Cycle time [s]	Weight [kg]
HS 15-22 M5-IG	3.5	33.3	2	0.8	0.130
HS 30-32 G1/8-IG	9.0	66.7	4	0.8	0.360

Design Data Vacuum Lifting Cylinders HS



HS 15-22 to 30-32

Type	Dimensions in mm															
	D	D1	G1	G2	G3	G4	H	H1	H2	H3	L	LG1	LG2	LG3	LG4	Z (Stroke)
HS 15-22 M5-IG	31	9	G1/8"-F	M5-F	M5-F	M5-F	65.5	43.5	5.5	11	30	5	10	10	10	14
HS 30-32 G1/8-IG	50	14	G1/8"-F	G1/8"-F	M8-F	M8-F	97.0	67.0	10.0	10	50	8	10	12	12	28

Vacuum Area Gripping Systems and Vacuum End Effectors

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Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

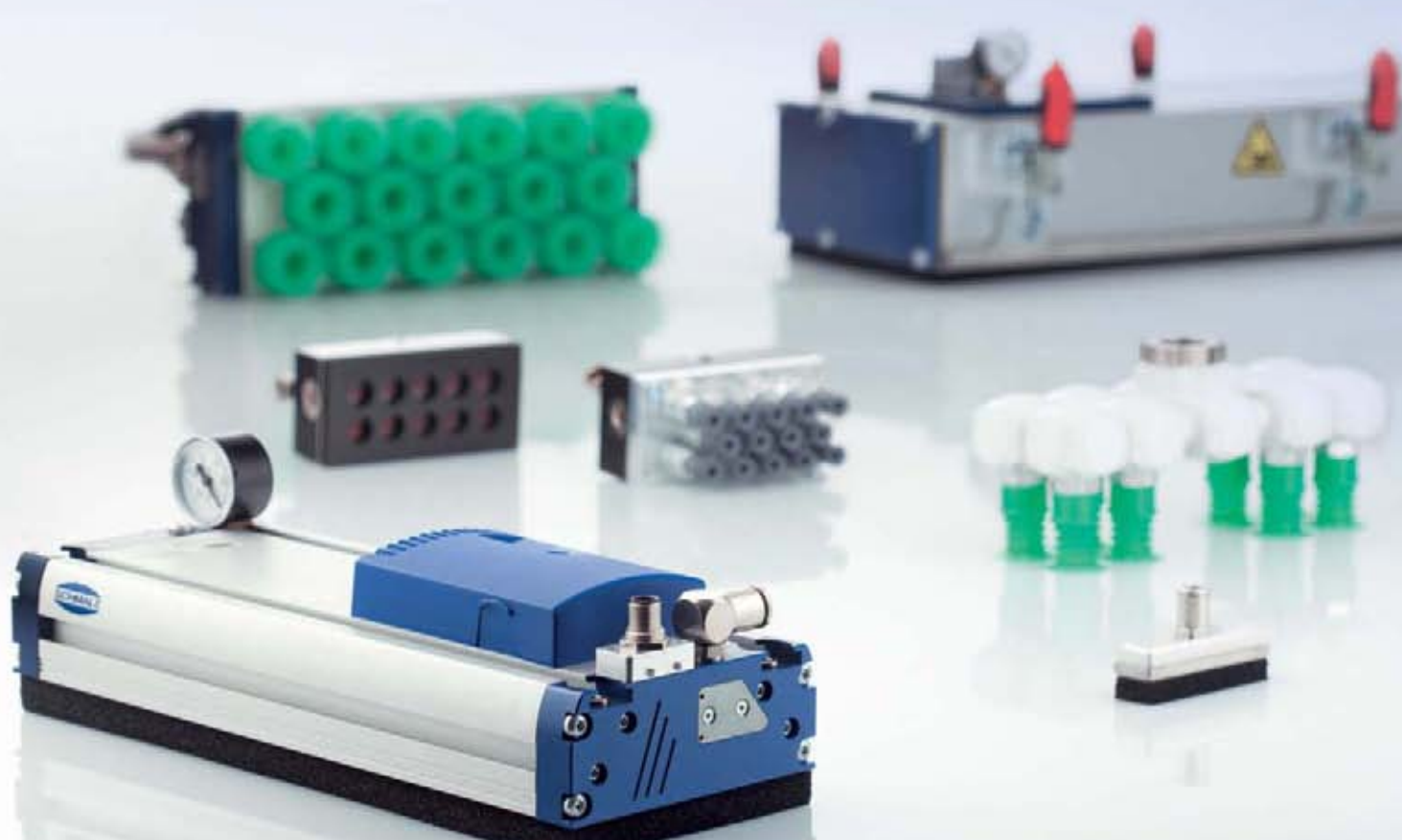
Switches and Monitoring

Filters and Connections

Services

Contact



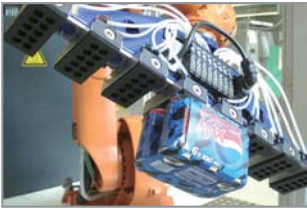





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Overview of Section 5



Vacuum Area Gripping Systems and Vacuum End Effectors

Area Gripping Systems			Page
	Vacuum Area Gripping Systems FXP / FMP <ul style="list-style-type: none"> • Dimensions: 442 x 130 to 1,432 x 130 mm* • Sealing element: sealing foam, suction cups 		374
	Vacuum Area Gripping Systems FX / FM <ul style="list-style-type: none"> • Dimensions: 76 x 22 to 120 x 60 mm* • Sealing element: sealing foam, suction cups 		388
	Vacuum Area Gripping Systems SBX <ul style="list-style-type: none"> • Dimensions: 1.040 x 200 to 1,250 x 400 mm* • Sealing element: sealing foam 		390
Vacuum End Effectors			
	Vacuum End Effectors VEE <ul style="list-style-type: none"> • Dimensions: 38 x 38 to 300 x 200 mm • Sealing element: suction cups 		394

*Customer-specific gripper dimensions on request

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Powerful handling of heavy wooden beams

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 unplanned), 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

Design

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. With comparatively low maximum vacuum, the ejector generates a high volume flow and thus provides high holding forces, especially for applications with porous workpieces.

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

- Reduces the sound level to 74 dB(A)

Vacuum booster

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

Valve film

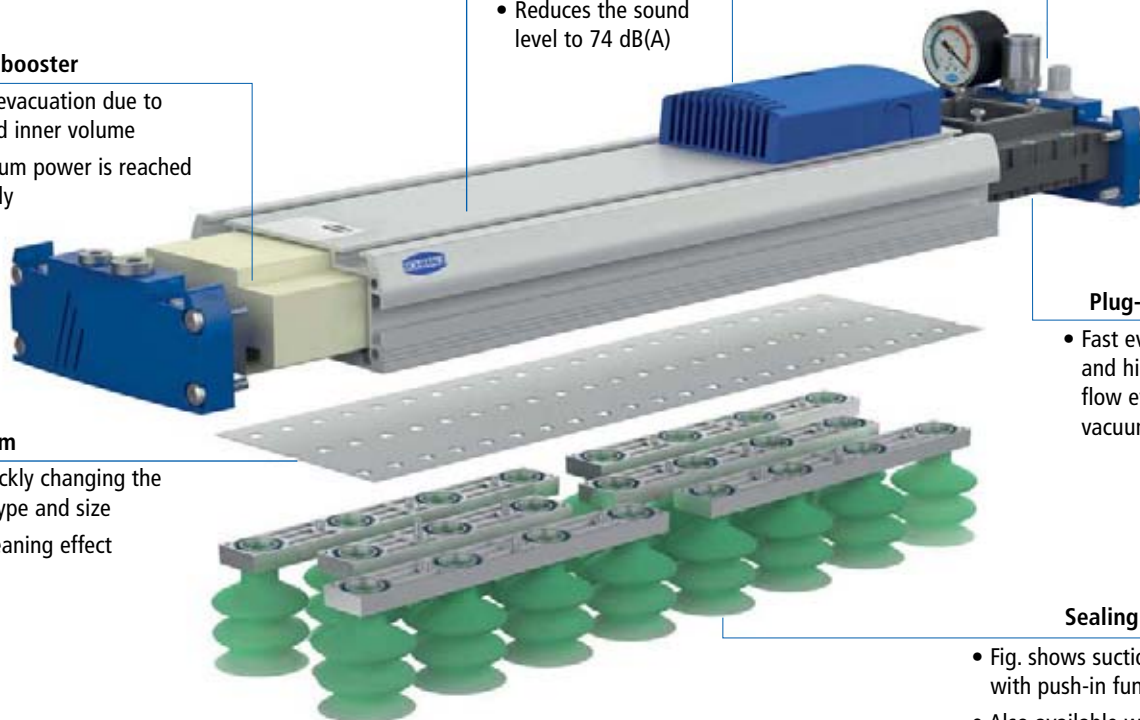
- For quickly changing the valve type and size
- Self-cleaning effect

Plug-in ejector

- Fast evacuation and high suction flow even at low vacuum values

Sealing elements

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



Vacuum Area Gripping Systems FXP / FMP



Flexibility and Power

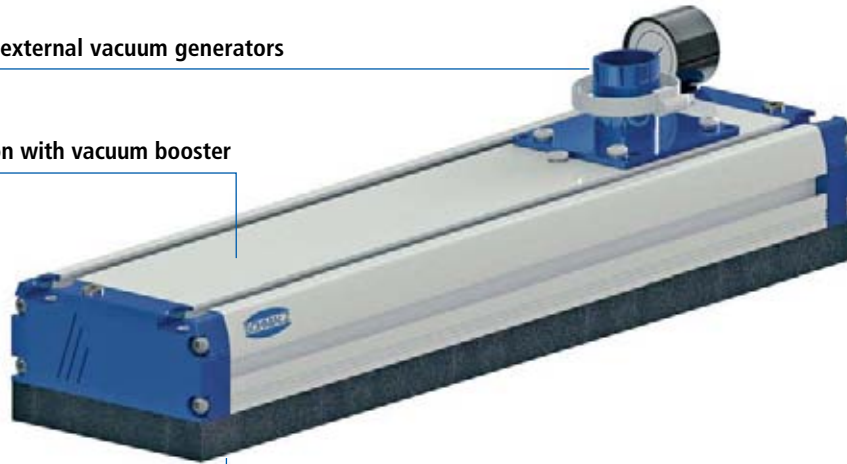
FMP: External Vacuum Generation

The area gripping system FMP is equipped with a connection piece for external vacuum generators and is therefore suitable for use in combination with powerful pumps and blowers.

Connection piece for external vacuum generators

Aluminum base section with vacuum booster

End cover



Valve film and sealing element

- Fig. shows sealing foam



Your Benefits



86 % More Power

In a benchmark test, the FXP / FMP generates an 86 % higher suction force on average than comparable grippers on the market



Minimal Maintenance

Easy retooling of flow technology and fast replacement of sealing elements



Unique Flexibility

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



High Energy Efficiency

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



Low Weight

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



Low Sound Level

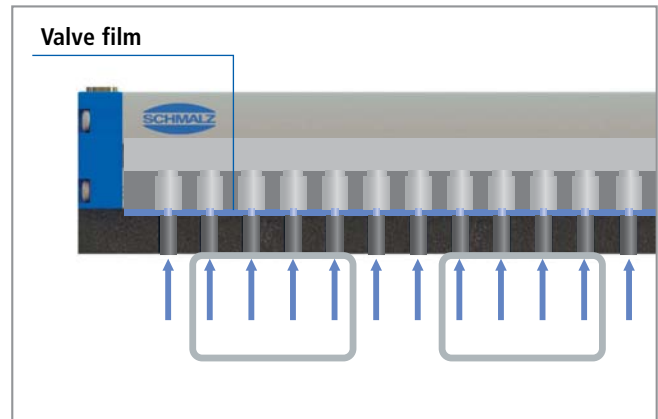
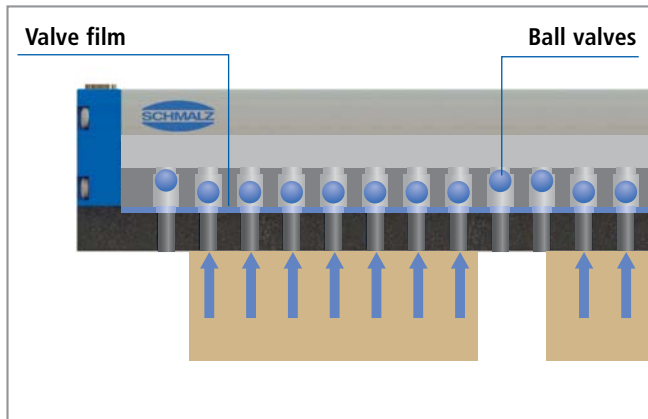
Low-noise operation with a sound level of only 74 dB(A)

Selection Aid

Application features	FXP	FMP
Minimization of interfering edges caused by hoses and attached vacuum generator (integration of functions)	✓	
Easy mounting and quick connection of the gripper	✓	
Minimal system costs (investment costs including vacuum generation, hoses and controller)	✓	
Minimal operating costs (because of the option of electrical vacuum generation), especially for applications with multiple grippers		✓
Handling of highly porous workpieces		✓



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



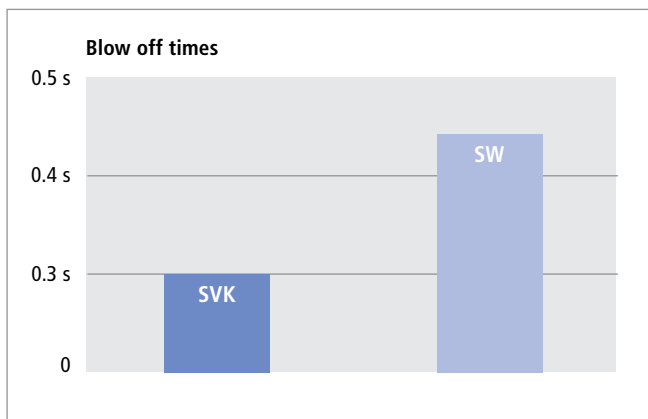
Check Valves SVK

- Ball valves integrated in the base section for closing off uncovered suction cells
- Integrated leak-free, 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

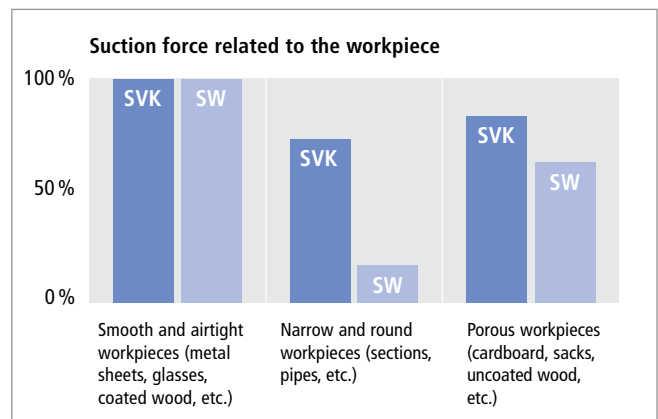
Flow Restrictors SW

- 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)

Selection Aid



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)



The valve type SVK achieves a higher suction force than the SW in case of porous workpieces and low degree of gripper coverage

Application features

- Smooth and airtight workpieces (e.g. metal sheets, glass, coated wood)
- Porous workpieces (e.g. boxes, sacks, uncoated wood)
- Structured surfaces
- Workpieces with low gripper coverage (e.g. pipes, sections)
- Minimum cycle times (active blow off)
- Optimization of energy efficiency
- Swiveling movements > 45°

	SVK	SW
Smooth and airtight workpieces (e.g. metal sheets, glass, coated wood)	✓	✓
Porous workpieces (e.g. boxes, sacks, uncoated wood)	✓	
Structured surfaces	✓	
Workpieces with low gripper coverage (e.g. pipes, sections)	✓	
Minimum cycle times (active blow off)	✓	
Optimization of energy efficiency	✓	
Swiveling movements > 45°		✓

Vacuum Area Gripping Systems FXP / FMP



Flexible, Quick-Change Sealing Elements



Sealing foam and suction cups 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 Cups 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

Application features	Sealing foam	Suction cups
Rigid workpieces such as sheets, metal sheets, boards, sections and pallets	✓	
Flexible workpieces such as cardboard boxes, sacks, bags and trays		✓
Elongated workpieces such as strips, sections, boards	✓	
Workpieces with rough and structured surface	✓	
Handling of smaller product layers such as jars (open or closed) and cans with a continuous edge	✓	

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



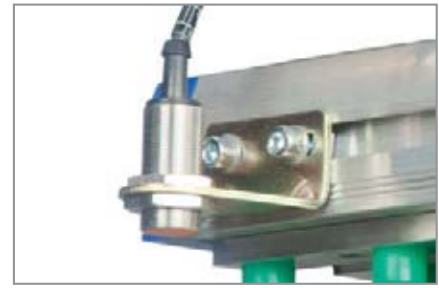
Vacuum Switch

- 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

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

FXP	S*	SVK	442	5R	36	SPB2-20P
Type	Version	Valve technology	Length [mm]	Number of suction rows	Suction cell grid distance [mm]	Sealing element [mm]
FXP (Integrated vacuum generation)	S Control valves	SVK Check valves	442	5R 5 suction rows	36	SPB2-20P
FXP (Integrated vacuum generation)	S Control valves	SVK Check valves	442 640 838 1,234	3R 3 suction rows	18	 Sealing foam (Height = 20)
FMP (External vacuum generation)		SW Flow restrictors	1,432	5R 5 suction rows	18	 Sealing foam (Height = 20)
				5R 5 suction rows	36	 SPB2-20P Suction cup (Ø 20)
				3R 3 suction rows	54	 SPB2-40P Suction cup (Ø 40)

*Integrated control valves at FXP-S and integrated vacuum valve at FMP-S (optional)

- Control of vacuum on/off (24V DC, normally open) and blow off on/off (24V DC, normally closed) on version FXP-S
- Control of vacuum on/off (24V DC, normally open) and blow off on/off (24V DC, normally closed) as well as hose storage pretensioning and blower ventilation function on version FMP-S
- Integrated in the end cover
- 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 cups 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 cup 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 (3 Suction Rows)

Ordering Data for Area Gripping Systems FXP / FMP

Type*	Part number		Type*	Part number	
	Without filter	With filter		Without filter	With filter
FXP-SVK 442 3R18	10.01.38.00675	10.01.38.00680	FMP-SVK 442 3R18	10.01.38.00303	10.01.38.00415
FXP-SVK 640 3R18	10.01.38.00676	10.01.38.00681	FMP-SVK 640 3R18	10.01.38.00411	10.01.38.00416
FXP-SVK 838 3R18	10.01.38.00677	10.01.38.00682	FMP-SVK 838 3R18	10.01.38.00412	10.01.38.00417
FXP-SVK 1234 3R18	10.01.38.00678	10.01.38.00683	FMP-SVK 1234 3R18	10.01.38.00413	10.01.38.00418
FXP-SVK 1432 3R18	10.01.38.00679	10.01.38.00684	FMP-SVK 1432 3R18	10.01.38.00414	10.01.38.00419
FXP-SW 442 3R18	10.01.38.00685	10.01.38.00690	FMP-SW 442 3R18	10.01.38.00433	10.01.38.00428
FXP-SW 640 3R18	10.01.38.00686	10.01.38.00691	FMP-SW 640 3R18	10.01.38.00434	10.01.38.00429
FXP-SW 838 3R18	10.01.38.00687	10.01.38.00692	FMP-SW 838 3R18	10.01.38.00435	10.01.38.00430
FXP-SW 1234 3R18	10.01.38.00688	10.01.38.00693	FMP-SW 1234 3R18	10.01.38.00436	10.01.38.00431
FXP-SW 1432 3R18	10.01.38.00689	10.01.38.00694	FMP-SW 1432 3R18	10.01.38.00437	10.01.38.00432

*Customer-specific gripper dimensions on request

Ordering Data for Sealing Foam (Spare Part)

Type	Part number	
	Without filter	With filter
DI-PL 442x128 3R18	10.01.38.00113	10.01.38.00192
DI-PL 640x128 3R18	10.01.38.00405	10.01.38.00408
DI-PL 838x128 3R18	10.01.38.00140	10.01.38.00409
DI-PL 1234x128 3R18	10.01.38.00193	10.01.38.00196
DI-PL 1432x128 3R18	10.01.38.00406	10.01.38.00410

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

Technical Data FXP / FMP

Type	Number of suction cells	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FXP-SVK 442 3R18	66	250	1,050	55	550	2.2
FXP-SVK 640 3R18	99	375	1,350	55	820	3.0
FXP-SVK 838 3R18	132	500	1,600	55	1,090	3.8
FXP-SVK 1234 3R18	198	875	2,940	55	1,650	5.3
FXP-SVK 1432 3R18	231	1,000	3,180	55	1,910	5.9
FXP-SW 442 3R18	66	250	1,050	55	440	2.1
FXP-SW 640 3R18	99	375	1,350	55	660	2.9
FXP-SW 838 3R18	132	500	1,600	55	870	3.7
FXP-SW 1234 3R18	198	875	2,940	55	1,310	5.2
FXP-SW 1432 3R18	231	1,000	3,180	55	1,530	5.8

Sound level: 74 dB(A)

Type	Number of suction cells	Required suction flow*** [l/min]	Suction force** [N]	Weight [kg]
FMP-SVK 442 3R18	66	300	550	2.1
FMP-SVK 640 3R18	99	450	820	2.9
FMP-SVK 838 3R18	132	600	1,090	3.7
FMP-SVK 1234 3R18	198	900	1,650	5.1
FMP-SVK 1432 3R18	231	1,050	1,910	5.7
FMP-SW 442 3R18	66	300	440	2.0
FMP-SW 640 3R18	99	450	660	2.8
FMP-SW 838 3R18	132	600	870	3.6
FMP-SW 1234 3R18	198	900	1,310	5.0
FMP-SW 1432 3R18	231	1,050	1,530	5.6

*For compressed air with 5.5 bar input pressure

**At -0.25 bar and with the gripper fully covered by a workpiece typical for the application (wooden board with structured surface)

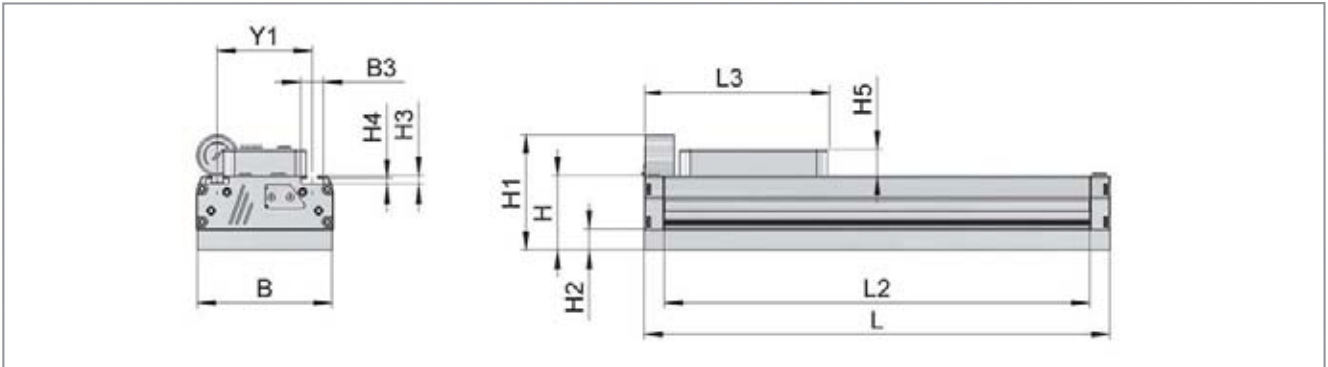
***The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

Vacuum Area Gripping Systems FXP / FMP



Design with Sealing Foam (3 Suction Rows)

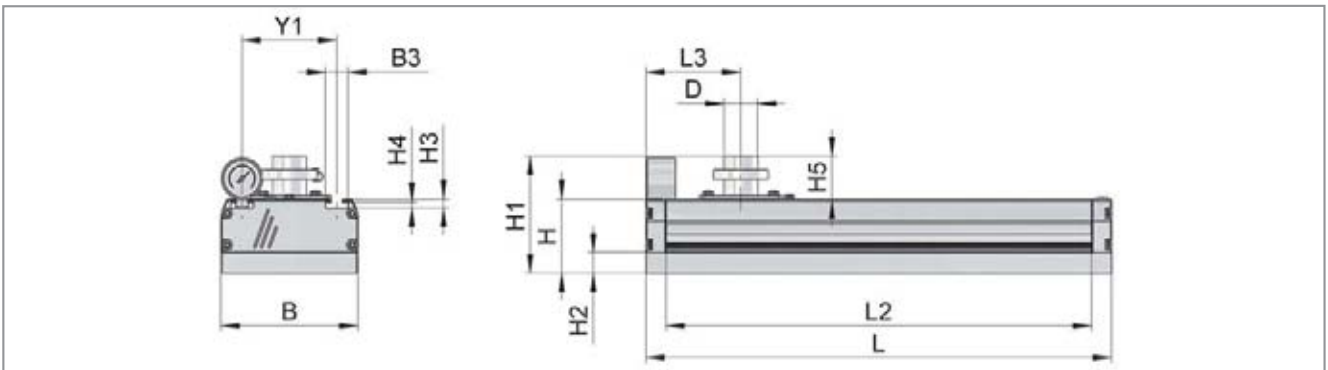
Design Data FXP



Type	Dimensions [mm]											
	B	B3	H	H1	H2	H3	H4	H5	L	L2	L3	Y1
FXP-SVK 442 3R18	130	21.6	70	111	20	7.7	5.5	28	442	404	154	90
FXP-SVK 640 3R18	130	21.6	70	111	20	7.7	5.5	28	640	602	154	90
FXP-SVK 838 3R18	130	21.6	70	116	20	7.7	5.5	28	838	800	154	90
FXP-SVK 1234 3R18	130	21.6	70	116	20	7.7	5.5	28	1,234	1,196	154	90
FXP-SVK 1432 3R18	130	21.6	70	116	20	7.7	5.5	28	1,432	1,394	154	90
FXP-SW 442 3R18	130	21.6	70	111	20	7.7	5.5	28	442	404	154	90
FXP-SW 640 3R18	130	21.6	70	111	20	7.7	5.5	28	640	602	154	90
FXP-SW 838 3R18	130	21.6	70	116	20	7.7	5.5	28	838	800	154	90
FXP-SW 1234 3R18	130	21.6	70	116	20	7.7	5.5	28	1,234	1,196	154	90
FXP-SW 1432 3R18	130	21.6	70	116	20	7.7	5.5	28	1,432	1,394	154	90

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



Type	Dimensions [mm]												
	B	B3	D	H	H1	H2	H3	H4	H5	L	L2	L3	Y1
FMP-SVK 442 3R18	130	21.6	32	70	111	20	7.7	5.5	41	442	404	90	90
FMP-SVK 640 3R18	130	21.6	32	70	111	20	7.7	5.5	41	640	602	90	90
FMP-SVK 838 3R18	130	21.6	60	70	116	20	7.7	5.5	46	838	800	90	90
FMP-SVK 1234 3R18	130	21.6	60	70	116	20	7.7	5.5	46	1,234	1,196	90	90
FMP-SVK 1432 3R18	130	21.6	60	70	116	20	7.7	5.5	46	1,432	1,394	90	90
FMP-SW 442 3R18	130	21.6	32	70	111	20	7.7	5.5	41	442	404	90	90
FMP-SW 640 3R18	130	21.6	32	70	111	20	7.7	5.5	41	640	602	90	90
FMP-SW 838 3R18	130	21.6	60	70	116	20	7.7	5.5	46	838	800	90	90
FMP-SW 1234 3R18	130	21.6	60	70	116	20	7.7	5.5	46	1,234	1,196	90	90
FMP-SW 1432 3R18	130	21.6	60	70	116	20	7.7	5.5	46	1,432	1,394	90	90

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

Vacuum Area Gripping Systems FXP / FMP



Design with Sealing Foam (5 Suction Rows)

Ordering Data for Area Gripping Systems FXP / FMP

Type*	Part number		Type*	Part number	
	Without filter	With filter		Without filter	With filter
FXP-SVK 442 5R18	10.01.38.00695	10.01.38.00700	FMP-SVK 442 5R18	10.01.38.00324	10.01.38.00651
FXP-SVK 640 5R18	10.01.38.00696	10.01.38.00701	FMP-SVK 640 5R18	10.01.38.00643	10.01.38.00652
FXP-SVK 838 5R18	10.01.38.00697	10.01.38.00702	FMP-SVK 838 5R18	10.01.38.00644	10.01.38.00653
FXP-SVK 1234 5R18	10.01.38.00698	10.01.38.00703	FMP-SVK 1234 5R18	10.01.38.00645	10.01.38.00654
FXP-SVK 1432 5R18	10.01.38.00699	10.01.38.00704	FMP-SVK 1432 5R18	10.01.38.00646	10.01.38.00655
FXP-SW 442 5R18	10.01.38.00705	10.01.38.00710	FMP-SW 442 5R18	10.01.38.00642	10.01.38.00656
FXP-SW 640 5R18	10.01.38.00706	10.01.38.00711	FMP-SW 640 5R18	10.01.38.00647	10.01.38.00657
FXP-SW 838 5R18	10.01.38.00707	10.01.38.00712	FMP-SW 838 5R18	10.01.38.00648	10.01.38.00658
FXP-SW 1234 5R18	10.01.38.00708	10.01.38.00713	FMP-SW 1234 5R18	10.01.38.00649	10.01.38.00659
FXP-SW 1432 5R18	10.01.38.00709	10.01.38.00714	FMP-SW 1432 5R18	10.01.38.00650	10.01.38.00660

*Customer-specific gripper dimensions on request

Ordering Data for Sealing Foam (Spare Part)

Type	Part number	
	Without filter	With filter
DI-PL 442x128 5R18	10.01.38.00864	10.01.38.00622
DI-PL 640x128 5R18	10.01.38.00865	10.01.38.00627
DI-PL 838x128 5R18	10.01.38.00866	10.01.38.00628
DI-PL 1234x128 5R18	10.01.38.00867	10.01.38.00629
DI-PL 1432x128 5R18	10.01.38.00868	10.01.38.00630

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

Technical Data FXP / FMP

Type	Number of suction cells	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FXP-SVK 442 5R18	110	250	1,050	55	430	2.2
FXP-SVK 640 5R18	165	375	1,350	55	630	3.0
FXP-SVK 838 5R18	220	500	1,600	55	840	3.8
FXP-SVK 1234 5R18	330	875	2,940	55	1,270	5.3
FXP-SVK 1432 5R18	385	1,000	3,180	55	1,470	5.9
FXP-SW 442 5R18	110	250	1,050	55	340	2.1
FXP-SW 640 5R18	165	375	1,350	55	510	2.9
FXP-SW 838 5R18	220	500	1,600	55	670	3.7
FXP-SW 1234 5R18	330	875	2,940	55	1,010	5.2
FXP-SW 1432 5R18	385	1,000	3,180	55	1,180	5.8

Sound level: 74 dB(A)

Type	Number of suction cells	Required suction flow*** [l/min]	Suction force** [N]	Weight [kg]
FMP-SVK 442 5R18	110	300	430	2.1
FMP-SVK 640 5R18	165	450	630	2.9
FMP-SVK 838 5R18	220	600	840	3.7
FMP-SVK 1234 5R18	330	900	1,270	5.1
FMP-SVK 1432 5R18	385	1,050	1,470	5.7
FMP-SW 442 5R18	110	300	340	2.0
FMP-SW 640 5R18	165	450	510	2.8
FMP-SW 838 5R18	220	600	670	3.6
FMP-SW 1234 5R18	330	900	1,010	5.0
FMP-SW 1432 5R18	385	1,050	1,180	5.6

*For compressed air with 5.5 bar input pressure

**At -0.25 bar and with the gripper fully covered by a workpiece typical for the application (wooden board with structured surface)

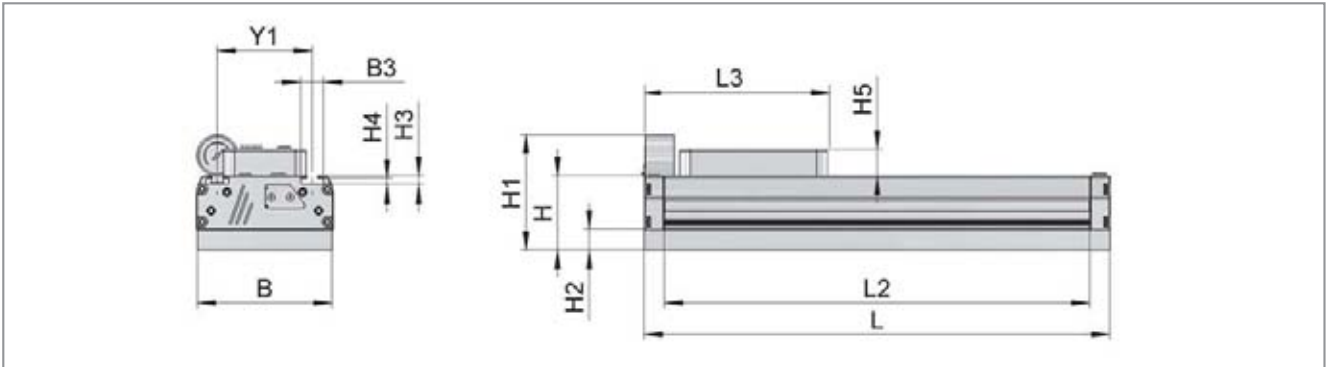
***The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

Vacuum Area Gripping Systems FXP / FMP



Design with Sealing Foam (5 Suction Rows)

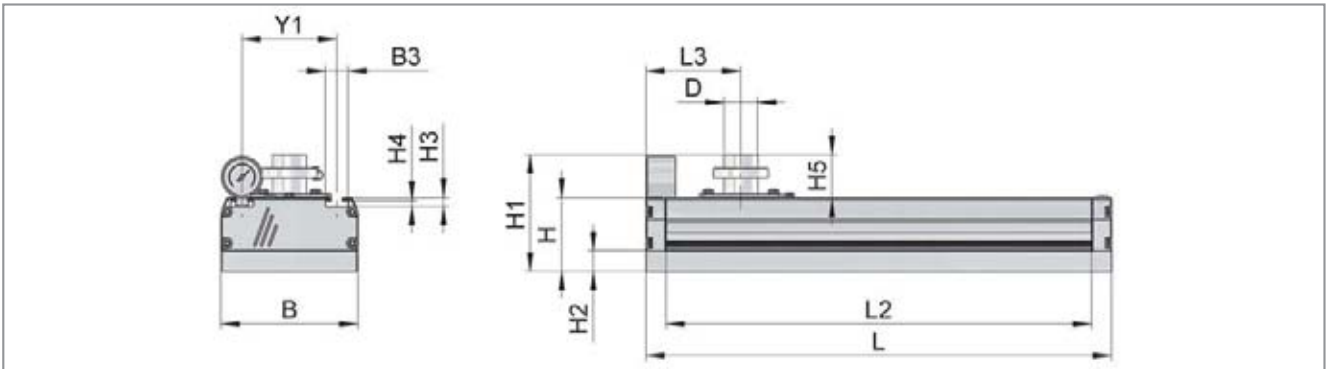
Design Data FXP



Type	Dimensions [mm]											
	B	B3	H	H1	H2	H3	H4	H5	L	L2	L3	Y1
FXP-SVK 442 5R18	130	21.6	70	111	20	7.7	5.5	28	442	404	154	90
FXP-SVK 640 5R18	130	21.6	70	111	20	7.7	5.5	28	640	602	154	90
FXP-SVK 838 5R18	130	21.6	70	116	20	7.7	5.5	28	838	800	154	90
FXP-SVK 1234 5R18	130	21.6	70	116	20	7.7	5.5	28	1,234	1,196	154	90
FXP-SVK 1432 5R18	130	21.6	70	116	20	7.7	5.5	28	1,432	1,394	154	90
FXP-SW 442 5R18	130	21.6	70	111	20	7.7	5.5	28	442	404	154	90
FXP-SW 640 5R18	130	21.6	70	111	20	7.7	5.5	28	640	602	154	90
FXP-SW 838 5R18	130	21.6	70	116	20	7.7	5.5	28	838	800	154	90
FXP-SW 1234 5R18	130	21.6	70	116	20	7.7	5.5	28	1,234	1,196	154	90
FXP-SW 1432 5R18	130	21.6	70	116	20	7.7	5.5	28	1,432	1,394	154	90

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



Type	Dimensions [mm]												
	B	B3	D	H	H1	H2	H3	H4	H5	L	L2	L3	Y1
FMP-SVK 442 5R18	130	21.6	32	70	111	20	7.7	5.5	41	442	404	90	90
FMP-SVK 640 5R18	130	21.6	32	70	111	20	7.7	5.5	41	640	602	90	90
FMP-SVK 838 5R18	130	21.6	60	70	116	20	7.7	5.5	46	838	800	90	90
FMP-SVK 1234 5R18	130	21.6	60	70	116	20	7.7	5.5	46	1,234	1,196	90	90
FMP-SVK 1432 5R18	130	21.6	60	70	116	20	7.7	5.5	46	1,432	1,394	90	90
FMP-SW 442 5R18	130	21.6	32	70	111	20	7.7	5.5	41	442	404	90	90
FMP-SW 640 5R18	130	21.6	32	70	111	20	7.7	5.5	41	640	602	90	90
FMP-SW 838 5R18	130	21.6	60	70	116	20	7.7	5.5	46	838	800	90	90
FMP-SW 1234 5R18	130	21.6	60	70	116	20	7.7	5.5	46	1,234	1,196	90	90
FMP-SW 1432 5R18	130	21.6	60	70	116	20	7.7	5.5	46	1,432	1,394	90	90

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

Vacuum Area Gripping Systems FXP / FMP



Design with Suction Cups ($\varnothing = 20 \text{ mm}$)

Ordering Data for Area Gripping Systems FXP / FMP

Type*	Part number		Type*	Part number	
	Without filter	With filter		Without filter	With filter
FXP-SVK 442 5R36 SPB2-20P	10.01.38.00735	10.01.38.00740	FMP-SVK 442 5R36 SPB2-20P	10.01.38.00323	10.01.38.00479
FXP-SVK 640 5R36 SPB2-20P	10.01.38.00736	10.01.38.00741	FMP-SVK 640 5R36 SPB2-20P	10.01.38.00475	10.01.38.00480
FXP-SVK 838 5R36 SPB2-20P	10.01.38.00737	10.01.38.00742	FMP-SVK 838 5R36 SPB2-20P	10.01.38.00476	10.01.38.00481
FXP-SVK 1234 5R36 SPB2-20P	10.01.38.00738	10.01.38.00743	FMP-SVK 1234 5R36 SPB2-20P	10.01.38.00477	10.01.38.00482
FXP-SVK 1432 5R36 SPB2-20P	10.01.38.00739	10.01.38.00744	FMP-SVK 1432 5R36 SPB2-20P	10.01.38.00478	10.01.38.00483
FXP-SW 442 5R36 SPB2-20P	10.01.38.00745	10.01.38.00750	FMP-SW 442 5R36 SPB2-20P	10.01.38.00484	10.01.38.00489
FXP-SW 640 5R36 SPB2-20P	10.01.38.00746	10.01.38.00751	FMP-SW 640 5R36 SPB2-20P	10.01.38.00485	10.01.38.00490
FXP-SW 838 5R36 SPB2-20P	10.01.38.00747	10.01.38.00752	FMP-SW 838 5R36 SPB2-20P	10.01.38.00486	10.01.38.00491
FXP-SW 1234 5R36 SPB2-20P	10.01.38.00748	10.01.38.00753	FMP-SW 1234 5R36 SPB2-20P	10.01.38.00487	10.01.38.00492
FXP-SW 1432 5R36 SPB2-20P	10.01.38.00749	10.01.38.00754	FMP-SW 1432 5R36 SPB2-20P	10.01.38.00488	10.01.38.00493

*Customer-specific gripper dimensions on request

Ordering Data for Suction Cups (Spare Parts)

Type	Part number	Without filter	With filter
SPB2 20 SI-40 P		10.01.06.03125	10.01.38.00465

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

Technical Data FXP / FMP

Type	Number of suction cups	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FXP-SVK 442 5R36 SPB2-20P	55	250	1,050	55	180	2.7
FXP-SVK 640 5R36 SPB2-20P	82	375	1,350	55	270	3.7
FXP-SVK 838 5R36 SPB2-20P	110	500	1,600	55	360	4.5
FXP-SVK 1234 5R36 SPB2-20P	165	875	2,940	55	540	6.3
FXP-SVK 1432 5R36 SPB2-20P	193	1,000	3,180	55	630	7.1
FXP-SW 442 5R36 SPB2-20P	55	250	1,050	55	140	2.6
FXP-SW 640 5R36 SPB2-20P	82	375	1,350	55	210	3.6
FXP-SW 838 5R36 SPB2-20P	110	500	1,600	55	280	4.4
FXP-SW 1234 5R36 SPB2-20P	165	875	2,940	55	420	6.2
FXP-SW 1432 5R36 SPB2-20P	193	1,000	3,180	55	490	7.0

Sound level: 74 dB(A)

Type	Number of suction cups	Required suction flow*** [l/min]	Suction force** [N]	Weight [kg]
FMP-SVK 442 5R36 SPB2-20P	55	300	180	2.6
FMP-SVK 640 5R36 SPB2-20P	82	450	270	3.6
FMP-SVK 838 5R36 SPB2-20P	110	600	360	4.4
FMP-SVK 1234 5R36 SPB2-20P	165	900	540	6.1
FMP-SVK 1432 5R36 SPB2-20P	193	1,050	630	6.9
FMP-SW 442 5R36 SPB2-20P	55	300	140	2.5
FMP-SW 640 5R36 SPB2-20P	82	450	210	3.5
FMP-SW 838 5R36 SPB2-20P	110	600	280	4.3
FMP-SW 1234 5R36 SPB2-20P	165	900	420	6.0
FMP-SW 1432 5R36 SPB2-20P	193	1,050	490	6.8

*For compressed air with 5.5 bar input pressure

**At a vacuum of -0.25 bar and with the gripper fully covered by a workpiece typical for the application (cardboard box, corrugated with structured surface)

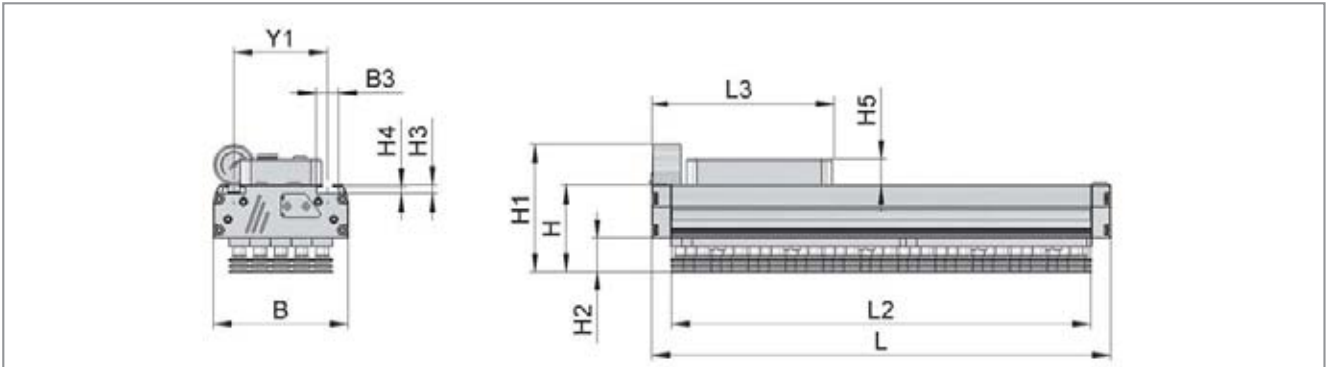
***The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

Vacuum Area Gripping Systems FXP / FMP



Design with Suction Cups ($\varnothing = 20$ mm)

Design Data FXP

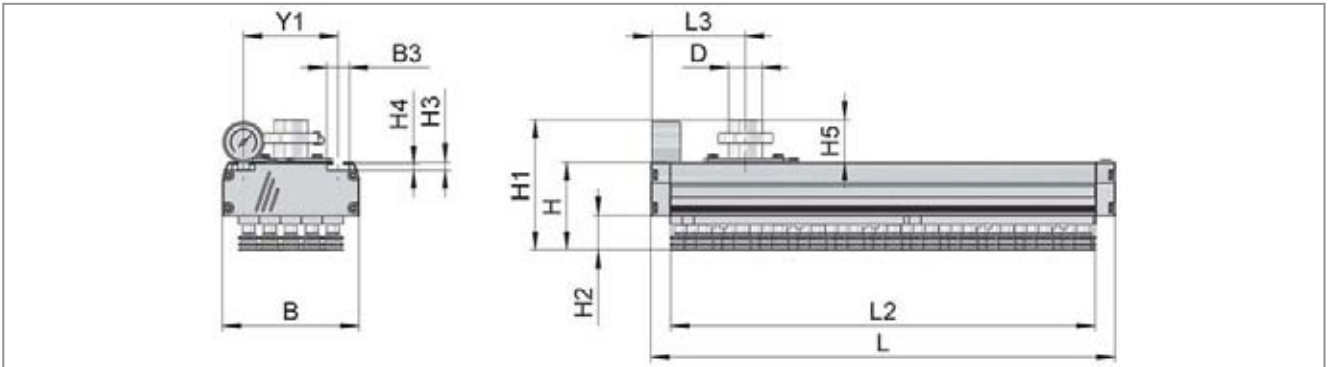


Type	Dimensions [mm]											
	B	B3	H	H1	H2*	H3	H4	H5	L	L2	L3	Y1
FXP-SVK 442 5R36 SPB2-20P	130	21.6	83	124	33	7.7	5.5	28	442	404	154	90
FXP-SVK 640 5R36 SPB2-20P	130	21.6	83	124	33	7.7	5.5	28	640	602	154	90
FXP-SVK 838 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	838	800	154	90
FXP-SVK 1234 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	1,234	1,196	154	90
FXP-SVK 1432 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	1,432	1,394	154	90
FXP-SW 442 5R36 SPB2-20P	130	21.6	83	124	33	7.7	5.5	28	442	404	154	90
FXP-SW 640 5R36 SPB2-20P	130	21.6	83	124	33	7.7	5.5	28	640	602	154	90
FXP-SW 838 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	838	800	154	90
FXP-SW 1234 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	1,234	1,196	154	90
FXP-SW 1432 5R36 SPB2-20P	130	21.6	83	129	33	7.7	5.5	28	1,432	1,394	154	90

*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



Type	Dimensions [mm]												
	B	B3	D	H	H1	H2*	H3	H4	H5	L	L2	L3	Y1
FMP-SVK 442 5R36 SPB2-20P	130	21.6	32	83	124	33	7.7	5.5	41	442	404	90	90
FMP-SVK 640 5R36 SPB2-20P	130	21.6	32	83	124	33	7.7	5.5	41	640	602	90	90
FMP-SVK 838 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	838	800	90	90
FMP-SVK 1234 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	1,234	1,196	90	90
FMP-SVK 1432 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	1,432	1,394	90	90
FMP-SW 442 5R36 SPB2-20P	130	21.6	32	83	124	33	7.7	5.5	41	442	404	90	90
FMP-SW 640 5R36 SPB2-20P	130	21.6	32	83	124	33	7.7	5.5	41	640	602	90	90
FMP-SW 838 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	838	800	90	90
FMP-SW 1234 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	1,234	1,196	90	90
FMP-SW 1432 5R36 SPB2-20P	130	21.6	60	83	129	33	7.7	5.5	46	1,432	1,394	90	90

*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



Design with Suction Cups ($\varnothing = 40 \text{ mm}$)

Ordering Data for Area Gripping Systems FXP / FMP

Type*	Part number		Type*	Part number	
	Without filter	With filter		Without filter	With filter
FXP-SVK 442 3R54 SPB2-40P	10.01.38.00715	10.01.38.00720	FMP-SVK 442 3R54 SPB2-40P	10.01.38.00311	10.01.38.00446
FXP-SVK 640 3R54 SPB2-40P	10.01.38.00716	10.01.38.00721	FMP-SVK 640 3R54 SPB2-40P	10.01.38.00439	10.01.38.00447
FXP-SVK 838 3R54 SPB2-40P	10.01.38.00717	10.01.38.00722	FMP-SVK 838 3R54 SPB2-40P	10.01.38.00443	10.01.38.00448
FXP-SVK 1234 3R54 SPB2-40P	10.01.38.00718	10.01.38.00723	FMP-SVK 1234 3R54 SPB2-40P	10.01.38.00444	10.01.38.00449
FXP-SVK 1432 3R54 SPB2-40P	10.01.38.00719	10.01.38.00724	FMP-SVK 1432 3R54 SPB2-40P	10.01.38.00445	10.01.38.00450
FXP-SW 442 3R54 SPB2-40P	10.01.38.00725	10.01.38.00730	FMP-SW 442 3R54 SPB2-40P	10.01.38.00451	10.01.38.00458
FXP-SW 640 3R54 SPB2-40P	10.01.38.00726	10.01.38.00731	FMP-SW 640 3R54 SPB2-40P	10.01.38.00453	10.01.38.00459
FXP-SW 838 3R54 SPB2-40P	10.01.38.00727	10.01.38.00732	FMP-SW 838 3R54 SPB2-40P	10.01.38.00455	10.01.38.00460
FXP-SW 1234 3R54 SPB2-40P	10.01.38.00728	10.01.38.00733	FMP-SW 1234 3R54 SPB2-40P	10.01.38.00456	10.01.38.00461
FXP-SW 1432 3R54 SPB2-40P	10.01.38.00729	10.01.38.00734	FMP-SW 1432 3R54 SPB2-40P	10.01.38.00457	10.01.38.00462

*Customer-specific gripper dimensions on request

Ordering Data for Suction Cups (Spare Parts)

Type	Part number	Without filter	With filter
SPB2 40 SI-55 P		10.01.06.03126	10.01.38.00452

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

Technical Data FXP / FMP

Type	Number of suction cups	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FXP-SVK 442 3R54 SPB2-40P	23	250	1,050	55	250	2.8
FXP-SVK 640 3R54 SPB2-40P	33	375	1,350	55	360	3.8
FXP-SVK 838 3R54 SPB2-40P	44	500	1,600	55	480	4.7
FXP-SVK 1234 3R54 SPB2-40P	66	875	2,940	55	720	6.5
FXP-SVK 1432 3R54 SPB2-40P	77	1,000	3,180	55	840	7.3
FXP-SW 442 3R54 SPB2-40P	23	250	1,050	55	200	2.7
FXP-SW 640 3R54 SPB2-40P	33	375	1,350	55	290	3.7
FXP-SW 838 3R54 SPB2-40P	44	500	1,600	55	390	4.6
FXP-SW 1234 3R54 SPB2-40P	66	875	2,940	55	580	6.4
FXP-SW 1432 3R54 SPB2-40P	77	1,000	3,180	55	680	7.2

Sound level: 74 dB(A)

Type	Number of suction cups	Required suction flow*** [l/min]	Suction force** [N]	Weight [kg]
FMP-SVK 442 3R54 SPB2-40P	23	300	250	2.7
FMP-SVK 640 3R54 SPB2-40P	33	450	360	3.7
FMP-SVK 838 3R54 SPB2-40P	44	600	480	4.6
FMP-SVK 1234 3R54 SPB2-40P	66	900	720	6.3
FMP-SVK 1432 3R54 SPB2-40P	77	1,050	840	7.1
FMP-SW 442 3R54 SPB2-40P	23	300	200	2.6
FMP-SW 640 3R54 SPB2-40P	33	450	290	3.6
FMP-SW 838 3R54 SPB2-40P	44	600	390	4.5
FMP-SW 1234 3R54 SPB2-40P	66	900	580	6.2
FMP-SW 1432 3R54 SPB2-40P	77	1,050	680	7.0

*For compressed air with 5.5 bar input pressure

**At a vacuum of -0.25 bar and with the gripper fully covered by a workpiece typical for the application (cardboard box, corrugated with structured surface)

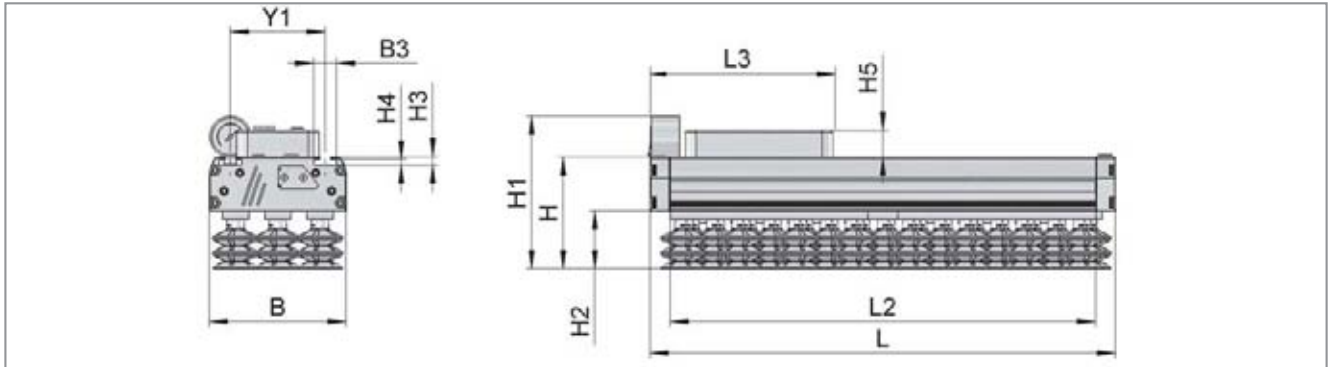
***The external vacuum generator used must supply at least the specified suction flow (at the vacuum connection piece of the FMP) at -0.25 bar but max. 135 % of the specified suction flow

Vacuum Area Gripping Systems FXP / FMP



Design with Suction Cups ($\varnothing = 40$ mm)

Design Data FXP

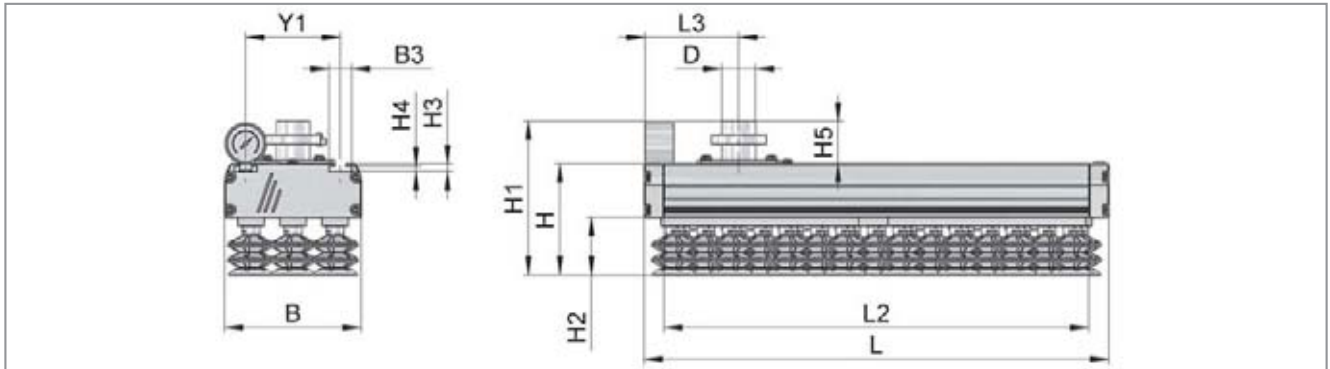


Type	Dimensions [mm]											
	B	B3	H	H1	H2*	H3	H4	H5	L	L2	L3	Y1
FXP-SVK 442 3R54 SPB2-40P	130	21.6	105	146	55	7.7	5.5	28	442	404	154	90
FXP-SVK 640 3R54 SPB2-40P	130	21.6	105	146	55	7.7	5.5	28	640	602	154	90
FXP-SVK 838 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	838	800	154	90
FXP-SVK 1234 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	1,234	1,196	154	90
FXP-SVK 1432 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	1,432	1,394	154	90
FXP-SW 442 3R54 SPB2-40P	130	21.6	105	146	55	7.7	5.5	28	442	404	154	90
FXP-SW 640 3R54 SPB2-40P	130	21.6	105	146	55	7.7	5.5	28	640	602	154	90
FXP-SW 838 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	838	800	154	90
FXP-SW 1234 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	1,234	1,196	154	90
FXP-SW 1432 3R54 SPB2-40P	130	21.6	105	151	55	7.7	5.5	28	1,432	1,394	154	90

*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



Type	Dimensions [mm]												
	B	B3	D	H	H1	H2*	H3	H4	H5	L	L2	L3	Y1
FMP-SVK 442 3R54 SPB2-40P	130	21.6	32	105	146	55	7.7	5.5	41	442	404	90	90
FMP-SVK 640 3R54 SPB2-40P	130	21.6	32	105	146	55	7.7	5.5	41	640	602	90	90
FMP-SVK 838 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	838	800	90	90
FMP-SVK 1234 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	1,234	1,196	90	90
FMP-SVK 1432 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	1,432	1,394	90	90
FMP-SW 442 3R54 SPB2-40P	130	21.6	32	105	146	55	7.7	5.5	41	442	404	90	90
FMP-SW 640 3R54 SPB2-40P	130	21.6	32	105	146	55	7.7	5.5	41	640	602	90	90
FMP-SW 838 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	838	800	90	90
FMP-SW 1234 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	1,234	1,196	90	90
FMP-SW 1432 3R54 SPB2-40P	130	21.6	60	105	151	55	7.7	5.5	46	1,432	1,394	90	90

*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 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 FX / FM

Type	Part number	Sealing foam (spare part)**
FX-SW 120x60	10.01.11.01802	10.01.10.00874
FX-SW 120x60 SEA*	10.01.11.01800	10.01.10.00874

Type	Part number	Sealing foam (spare part)**
FM-SW 76x22	10.01.11.00851	10.01.11.01388
FM-SW 120x60	10.01.11.01823	10.01.10.00874

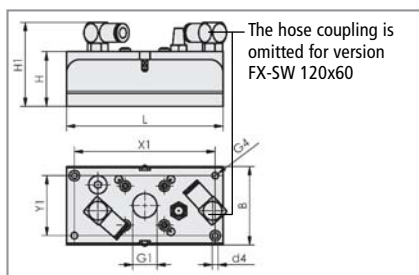
*Gripping system with blow off function for fast depositing of workpieces
 **Other foam heights and types on request
 Note: Noise reduction possible by using an additional silencer (FX 120x60)

Technical Data FX / FM

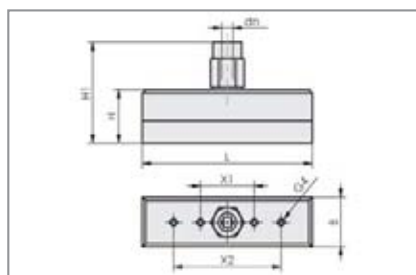
Type	Number of suction cells	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FX-SW 120x60	10	117	69	80	98	0.70
FX-SW 120x60 SEA	10	117	69	80	98	0.80
FM-SW 76x22	26	***	***	***	40	0.06
FM-SW 120x60	10	***	***	***	98	0.50

*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

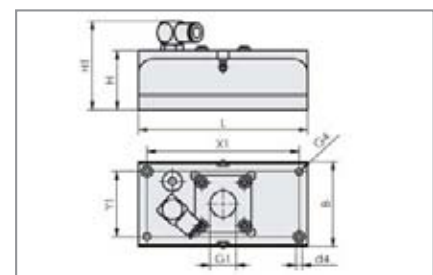
Design Data



FX-SW 120x60 SEA



FM-SW 76x22



FM-SW 120x60

Type	Dimensions [mm]										
	B	d4	dn	G1	G4	H	H1	L	X1	X2	Y1
FX-SW 120x60	60	4.5	-	G ¹ / ₂ "-F	M6-F	42	63	120	108	-	46
FX-SW 120x60 SEA	60	4.5	-	G ¹ / ₂ "-F	M6-F	42	63	120	108	-	46
FM-SW 76x22	22	-	8	-	M3-F	24	35	76	24	48	-
FM-SW 120x60	60	4.5	-	G ¹ / ₂ "-F	M6-F	42	63	120	108	-	46

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 Cups ($\varnothing = 12$ mm)

Ordering Data FX / FM

Type	Part number		Type	Part number	
	Gripping system	Suction cup (spare part)**		Gripping system	Suction cup (spare part)**
FX-SW 120x60 20 FSG12	10.01.11.02009	10.01.06.00558	FM-SW 120x60 20 FSG12	10.01.11.02010	10.01.06.00558
FX-SW 120x60 20 FSG12 SEA*	10.01.11.02008	10.01.06.00558			

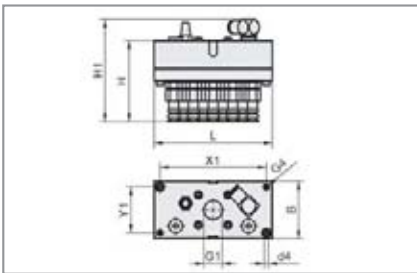
*Gripping system with blow off function for fast depositing of workpieces
 **Other suction cup types (construction, material) available on request
 Note: Noise reduction possible by using an additional silencer (FX 120x60)

Technical Data FX / FM

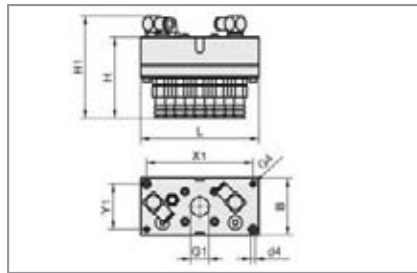
Type	Number of suction cups	Air consumption* [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force** [N]	Weight [kg]
FX-SW 120x60 20 FSG12	14	117	69	80	12.6	1.0
FX-SW 120x60 20 FSG12 SEA	14	117	69	80	12.6	1.1
FM-SW 120x60 20 FSG12	14	***	***	***	12.6	0.8

*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

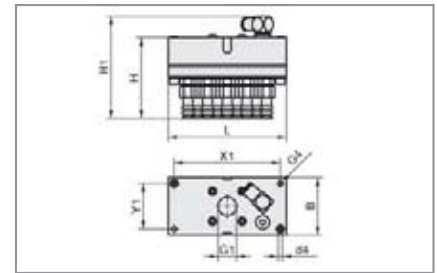
Design Data



FX-SW 120x60 20 FSG12



FX-SW 120x60 20 FSG12 SEA



FM-SW 120x60 20 FSG12

Type	Dimensions [mm]								
	B	d4	G1	G4	H	H1	L	X1	Y1
FX-SW 120x60 20 FSG12	60	4.5	G ^{1/2} "-F	M6-F	82	103	120	108	46
FX-SW 120x60 20 FSG12 SEA	60	4.5	G ^{1/2} "-F	M6-F	82	103	120	108	46
FM-SW 120x60 20 FSG12	60	4.5	G ^{1/2} "-F	M6-F	82	103	120	108	46

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

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Vacuum Area Gripping Systems SBX



Very Robust Grippers for the Timber and Woodworking Industry



Vacuum area gripping system SBX

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

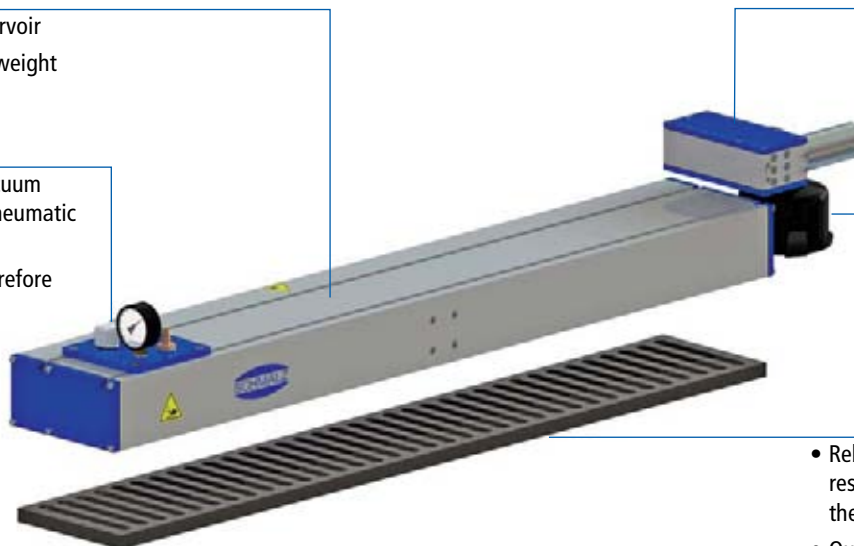
Vacuum generation

- 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



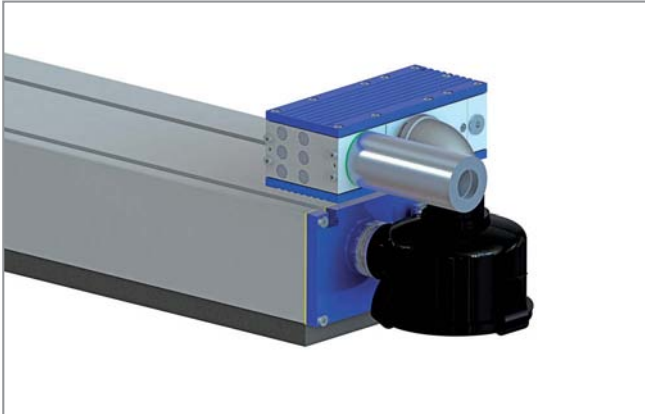
Vacuum area gripping systems SBX on an industrial gantry for handling unplanned wooden boards

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

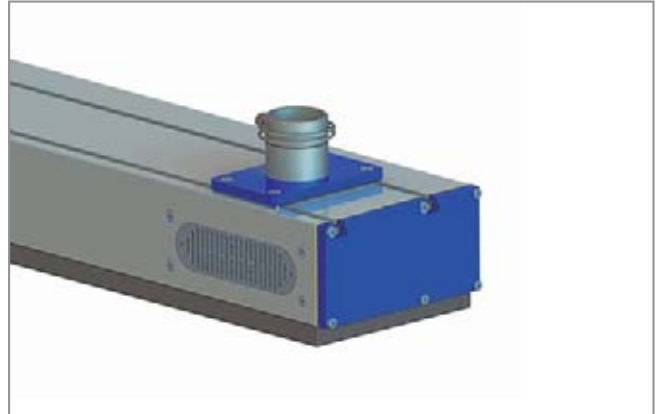
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Types



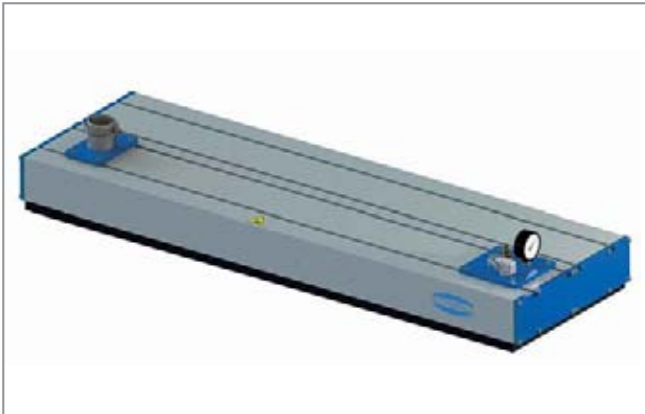
SBX 200 with Vacuum Generation

- 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 vacuum 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

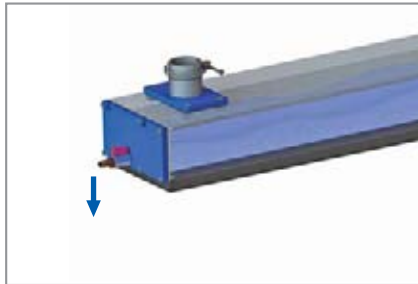


Product Specifications



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



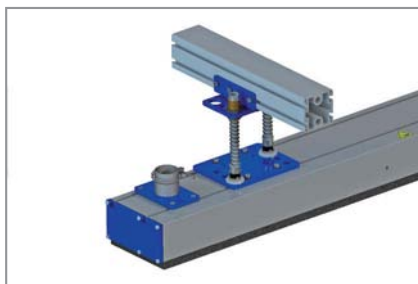
Heating System

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



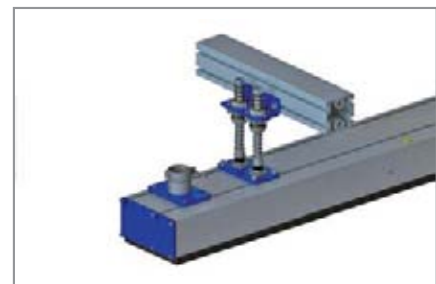
Gripper Segmentation

- 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

SBX	C	1040x200	35	25	SEM-150
Type	Version	Length x width [mm]	Suction cell grid distance [mm]	Foam height [mm]	Vacuum generation
SBX	C With compact valve unit	1,040 x 200	35	25	SEM-150 Multi-stage ejector
SBX	C With compact valve unit	1,040 x 200 1,250 x 200 1,040 x 400 1,250 x 400	35 Moderate (standard) 28 Fine (on request)	25	SEM-150 Multi-stage ejector - External vacuum generation (pump or blower)

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Vacuum Area Gripping Systems SBX



Product Specifications

Ordering Data SBX

Type*	Part number	Gripping system	Sealing plate** (spare part)
SBX-C 1040x200 35 25 SEM-150		10.01.20.01000	10.01.20.01006
SBX-C 1250x200 35 25 SEM-150		10.01.20.01001	10.01.20.00438
SBX-C 1040x200 35 25		10.01.20.01002	10.01.20.01006
SBX-C 1250x200 35 25		10.01.20.01003	10.01.20.00438
SBX-C 1040x400 35 25		10.01.20.01004	10.01.20.01007
SBX-C 1250x400 35 25		10.01.20.01005	10.01.20.00440

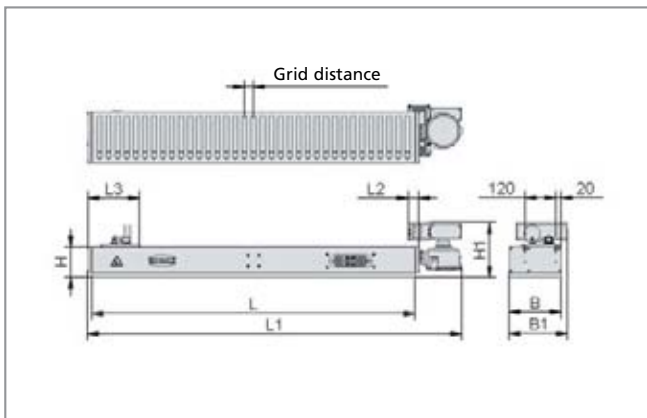
*Customer-specific gripper dimensions on request
 **Other foam heights and foam types on request

Technical Data SBX

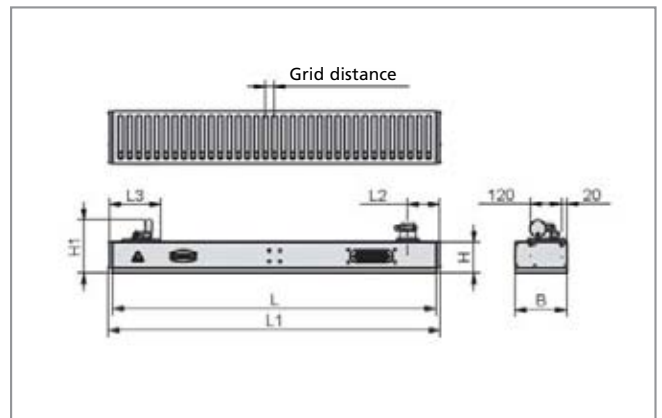
Type	Vacuum generation	Number of suction cells	Air consumption [l/min]	Max. suction flow [l/min]	Max. degree of evacuation [%]	Suction force**[N]	Weight [kg]
SBX-C 1040x200 35 25 SEM-150*	Ejector	29	640	1,400	80	2,400	25
SBX-C 1250x200 35 25 SEM-150*	Ejector	35	640	1,400	80	3,000	28
SBX-C 1040x200 35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

*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

Type	Dimensions [mm]							
	H	H1	B	B1	L	L1	L2	L3
SBX-C 1040x200 35 25 SEM-150	125	217.0	200	225.5	1040	1234	41	185
SBX-C 1250x200 35 25 SEM-150	125	217.0	200	225.5	1250	1444	41	185
SBX-C 1040x200 35 25	125	207.5	200	-	1040	1075	123	185
SBX-C 1250x200 35 25	125	207.5	200	-	1250	1285	123	185
SBX-C 1040x400 35 25	125	207.5	400	-	1040	1075	123	185
SBX-C 1250x400 35 25	125	207.5	400	-	1250	1285	123	185

Note: Type SBX requires compressed air hose 15/9 mm

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Vacuum End Effectors VEE

Configuring Rather than Designing



Suitability for industry-specific applications

Application

- Fast and cost-effective design of vacuum end effectors for high-speed packaging processes
- Pick-and-place applications with Delta, SCARA and articulated robots
- Fully automated filling of cardboard boxes and case packers
- Mainly used in primary and secondary packaging processes
- Transporting products into top-loading machines, and cardboard box and tray erectors
- Use in flexible packaging machines with frequent format changes



The vacuum end effector with vacuum module and bellows suction cups SPB4f handling flexible packages



Vacuum end effector with flat suction cups SPF handling boxes of tea



The vacuum end effector with bellows suction cups SPB4f handling pouches with strong wrinkling and low filling degree

Our highlights ...

- Perfectly coordinated individual components
- Online configurator with generation of CAD data and parts list
- Light weight (ready-to-connect end effectors starting at 150 g)
- FDA and BfR-compliant (German Federal Institute for Risk Assessment) high performance thermoplastic
- With optional integrated vacuum generation using the Schmalz eco nozzle technology
- Assembly service

Your benefits ...

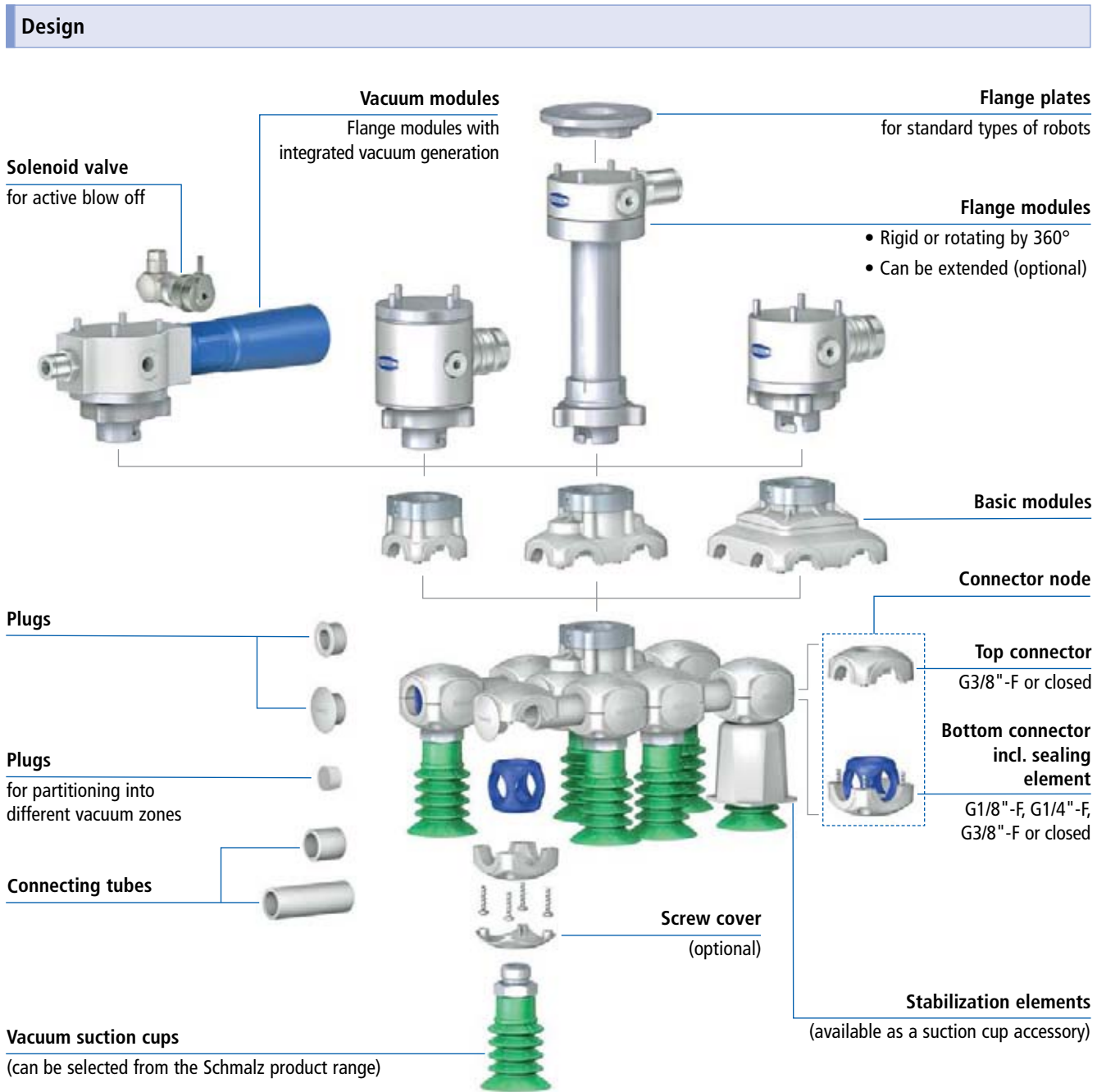
- > Flexible gripper configurations with variable suction cup number and positioning
- > Minimizes configuration and setup times by more than 80 %
- > Designed for high-speed applications with accelerations of up to 10 g (100 m/s²)
- > Excellent resistance to alkaline cleaning agents
- > Fast, energy-efficient vacuum generation right at the gripper
- > Delivery of entire assembled, ready-to-connect vacuum end effectors

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Vacuum End Effectors VEE



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VEE online configurator

- Live 3D preview of the configuration
- Creation of a 3D PDF data sheet including a parts list and CAD data
- Simple importing in your existing construction
- Quick request for proposal (RFP)



Online Configurator for Vacuum End Effectors VEE

Vacuum End Effectors VEE

Configuring Rather than Designing



Flange plates FLAN-PL

Quick and easy connection of the flange module to the robot; available for connectional robot types and as an universal flange.

www.schmalz.com/flan-pl



Flange modules VEE-QCM

Quick-change adapters and vacuum connection; either horizontal or vertical (max. flow rate 60 m³/h). Rotary unit VEE-RU for continuous rotation of the end effector without decreasing the flow or winding up the hose available as an alternative.

www.schmalz.com/vee-qcm.../vee-ru



Vacuum modules VEE-QCMV

Quick-change adapters with space-saving integrated, energy-efficient vacuum generation using the Schmalz ecoPump (max. suction rate: 10.5 m³/h); with silencer or holder cap.

www.schmalz.com/vee-qcmv



Solenoid valve EMV for active blow off

Minimal cycle times with active blow off through a controlled compressed air pulse; available as an accessory for vacuum module VEE-QCMV.

www.schmalz.com/emv



Flange extensions VEE-FE

Option for flange modules for dipping into cardboard boxes or trays; available in three lengths. Can be swapped quickly thanks to the bayonet mount.

www.schmalz.com/vee-fe



Basic modules VEE-QCF

Tool-free connection of the end effector to the flange module and central vacuum feed; available as a 1-, 2-, or 4-connection module.

www.schmalz.com/vee-qcf



Top connector VEE-CO-U

Top half-shell for assembly of connection nodes; available in closed design or with connection for additional vacuum feed (G3/8"-F).

www.schmalz.com/vee-co-u



Bottom connector VEE-CO-L

Bottom half-shell including sealing element and screws for assembly of connecting nodes; either closed or with connection for suction cup (G1/8"-F, G1/4"-F, G3/8"-F); optional screw cover available.

www.schmalz.com/vee-co-l



Connection tubes VEE-TU

Vacuum guide and variable connection of nodes; available in 18 mm and 200 mm lengths. Pipe scissors for quick and safe cutting available as accessory.

www.schmalz.com/vee-tu



Plugs VEE-PL

For sealing unused connections on connector nodes, vacuum feed on the side and partitioning into different vacuum zones.

www.schmalz.com/vee-pl



Stabilization elements SPSE

Increases process speed by supporting the workpiece; available as an accessory for bellows suction cups.

www.schmalz.com/spse



Tool center point VEE-TCP

For determining the robot tool position with a center point that can be flange mounted directly; suitable for the quick-change interfaces of the flange modules or vacuum modules.

www.schmalz.com/vee-tcp

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VEE-Starterset

Whether for use directly in a robotic system or as handy design tool – with the VEE Starter Set you have all of the most important components for quickly assembling your effector right at your fingertips.

Content

120-piece starter set with all of the components necessary for installing up to two VEE vacuum end effectors, including:

- 8 vacuum suction cups SPB4f-30 for bags and flexible packaging
 - Lockable quick-change adapter with bayonet mount
- Supplied in a sturdy plastic case with detailed assembly instructions
Part no.: 10.01.36.00030



VEE-Starterset



Technical Data

Specification	Vacuum end effectors from the VEE system
Max. rated flow	60 m ³ /h
Max. vacuum value	-980 mbar
Overpressure resistance	up to 3 bar
Temperature range	-25 °C to +80 °C (QCMV from 0 °C to +60 °C)
Material	High performance thermoplastic (compliant with FDA guidelines)
Max. load capacity	2,000 g



Design Data

Vacuum end effectors VEE can be freely configured within the framework values. When used in connection with our wide selection of suction cups, the possibilities are practically endless.

Specifications	Vacuum end effectors from the VEE system	
	Minimum configuration	Maximum configuration
Basic module	1-connection	4-connection
Suction cups connection thread	G1/8"-F, G1/4"-F, G3/8"-F	G1/8"-F, G1/4"-F, G3/8"-F
Gripper size (L/W)	38 x 38 mm	300 x 200 mm
Weight*	65 g	500 g
Qty. of suction cups	1	12
Workpiece sizes (L/W)	15 x 15 mm	400 x 300 mm

*without flange module and suction cup

Mounting Elements

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Overview of Section 6



Mounting Elements

At a Glance

Selection Aid		Page
		Overview Connection Possibilities 402
Jointed Mountings		
	Flexolink FLK <ul style="list-style-type: none"> • Connection: M10x1,5 to G1/2" • Deflection: max. 12° • Rubber buffer (vulcanised into position) as a joint 	 404 Polydirectional joint mounting made from high-quality steel with vulcanize-bonded rubber buffer for adjusting the suction cup to uneven surfaces; automatic resetting.
	Ball Joints KGL <ul style="list-style-type: none"> • Connection: G1/8" to G1/2" • Deflection: max. 15° • Sealed ball-and-socket joint with vacuum-tight seal 	 407 Polydirectional ball joint made from galvanized steel or stainless steel, sealed using O-ring, for adjustment of the suction cup to uneven surfaces.
Spring plungers		
	Spring Plungers FSTIm <ul style="list-style-type: none"> • Modular suction cup connection • Stroke: 5 to 20 mm • Internal damping spring 	 409 Spring plunger with internal damping spring and small design for handling sensitive workpieces, particularly in the electronics industry.
	Spring Plungers FSTE <ul style="list-style-type: none"> • Connection: M3, M5, G1/8" to G1/2" • Stroke: 5 to 90 mm • Integrated vacuum feed 	 413 Spring plunger with damping spring for height compensation and careful handling of fragile workpieces.
	Spring Plungers FSTE-HD <ul style="list-style-type: none"> • Connection: G1/8" to G1/2" • Stroke: 15 to 90 mm • Version Heavy Duty • Integrated vacuum feed 	 417 Spring plunger with special slide bearings and damping spring for height compensation for highly dynamic applications with short cycles.

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Overview of Section 6



Mounting Elements

At a Glance


Schmalz - The Company		Spring Plungers FSTA		421
Vacuum Knowledge		<ul style="list-style-type: none"> • Connection: G1/4" and G1/2" • Stroke: 25 to 90 mm • Integrated vacuum feed 	<p>Spring plunger with two damping springs for protection of the connection and protection of the workpiece (by means of the lower damping spring), as well as for even load distribution.</p>	
Vacuum Suction Cups		Spring Plungers FSTA-HD		424
Vacuum Grippers		<ul style="list-style-type: none"> • Connection: G1/4" to G1/2" • Stroke: 25 to 90 mm • Version Heavy Duty • Integrated vacuum feed 	<p>Spring plunger with special slide bearings and two damping springs for height compensation for highly dynamic applications with fragile workpieces and short cycles, as well as for even load distribution.</p>	
Vacuum Gripping Systems		Spring Plungers FSTI		427
Vacuum Generators		<ul style="list-style-type: none"> • Connection: G1/4" and G3/8" • Stroke: 10 to 50 mm • Internal damping spring • Integrated vacuum feed 	<p>Spring plunger with internal damping spring and high-quality sliding bearings for handling fragile workpieces, particularly in the automotive industry.</p>	
Mounting Elements		Spring Plungers FSTF		431
Vacuum Technology		<ul style="list-style-type: none"> • Connection: G1/2" • Stroke: 50 mm • Variable mounting facility • Integrated vacuum feed 	<p>Spring plunger with variable mounting system and damping spring for handling wood plates and furniture pieces.</p>	
Valve Technology		Suspension rigid/flexible		434
Switches and Monitoring		<ul style="list-style-type: none"> • Combination of FST-FLEX and FST-STARR 	<p>Connection of FST-FLEX and FST-STARR as a system with fixed and floating bearings. Specially suited for handling workpieces with height differences.</p>	
Filters and Connections		Suspension flexible FST-FLEX		435
Services		<ul style="list-style-type: none"> • Connection: G1/2" • Stroke: 25-75 mm • Jamming safe by spherical mounting 	<p>Spring plunger with spherical mounting. Particularly suitable for handling of workpieces with height differences</p>	
Contact		Suspension rigid FST-STARR		439
Index of Products		<ul style="list-style-type: none"> • Connection: G1/2" • Stroke: 25-75 mm • Version Heavy Duty 	<p>Spring plunger particularly suitable for handling of workpieces with height differences</p>	

Overview of Section 6



Mounting Elements

At a Glance

Holder for Suction Cups and Spring Plungers			
	Adapters for Elbow Connector ANW		443
	<ul style="list-style-type: none"> • Connection: M5 to G1/2" 		Adapter for elbow connection with side vacuum connection for direct and space-saving installation of suction cups.
	Bulkhead Connectors SVS-GE		446
	<ul style="list-style-type: none"> • Connection: G1/8" and G1/4" 		Bulkhead connector for direct and height-adjustable installation of suction cups.
	Holders for Light-Metal Sections HTR-STA		448
	<ul style="list-style-type: none"> • Mountings for spring plungers FSTE/FSTA from M5 to G1/4" 		Steel sheet holder for direct installation on light-alloy sections.
	Holders for Square Tubes HTR-ST5		450
	<ul style="list-style-type: none"> • Mountings for spring plungers FSTE/FSTA/FSTI from M5 to G1/2" • Square sections 30 x 30 mm to 60 x 60 mm 		Steel sheet holder for direct installation on square tubes.
	Universal Holders HTR-UNI		453
	<ul style="list-style-type: none"> • Mounting thread: M5 • Connection: G1/4" 		Holder for adjustable installation of suction cups; height and incline of the suction cup can be adjusted.
Sections and Connectors			
	Mounting Sections MO-PROF		457
	<ul style="list-style-type: none"> • Cross-sections: 40 x 40 mm and 80 x 40 mm • With 1 or 3 chambers 		High-strength aluminum section with accessories for constructing your own load beam with integrated vacuum line.

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Overview Connection Possibilities

The following overview shows the various connection possibilities offered by the mounting elements from Schmalz and should help you to select the appropriate components for your application. All components of the various product families are grouped together in the overview. The design data and technical data of the mounting elements can be found on the related products pages in this section of the catalogue.

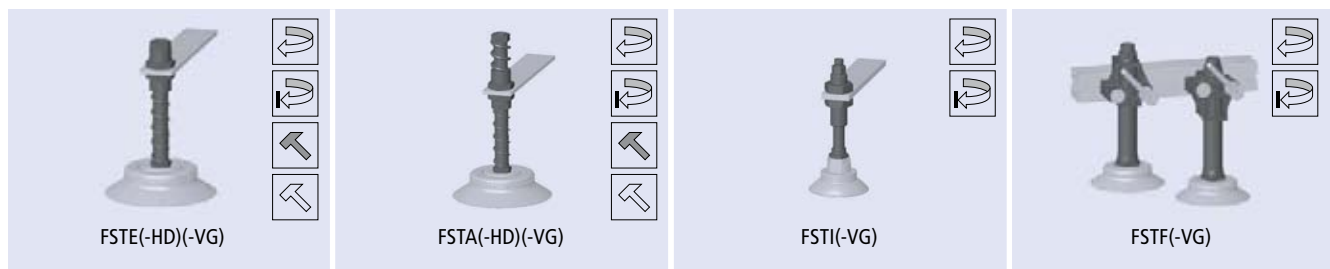
Mounting section (also suitable for mounting of suction cups)



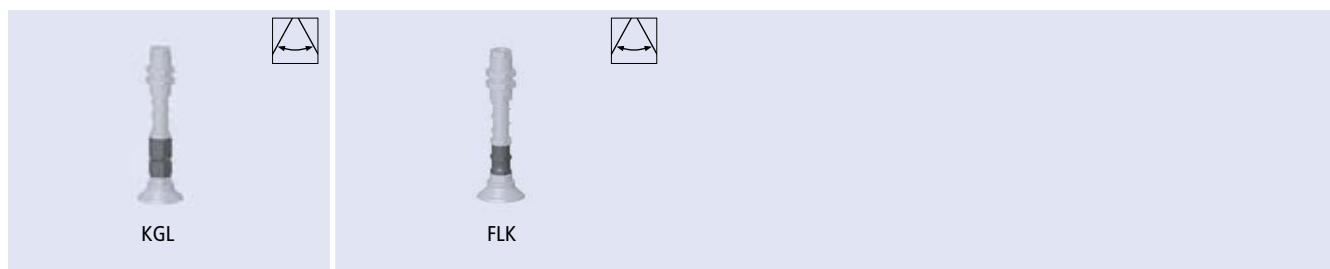
Holders and cross-beam connectors (for spring-mounting of suction cups)



Spring plungers



Flexible mountings for use with spring plungers



- Fully rotatable
- Available with anti-rotation guard
- Heavy-duty (HD) version for short cycle times and rough operating conditions
- For standard applications without swivelling of the loads
- Flexible in all directions

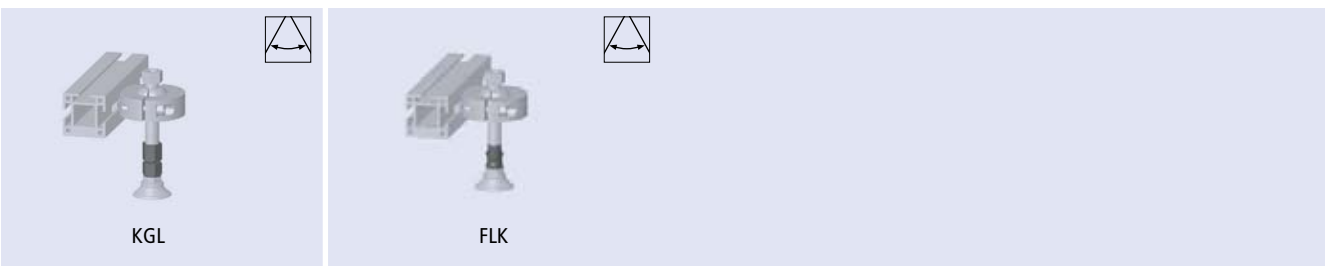
Mounting section (also suitable for mounting of suction cups)



Holders and cross-beam connectors (for rigid mounting of suction cups)



Flexible mountings for use with rigid suction cup mountings



Jointed Mountings



Flexolink FLK

Connection thread G1/4" and G1/2"



Suitable for Industry Specific Applications



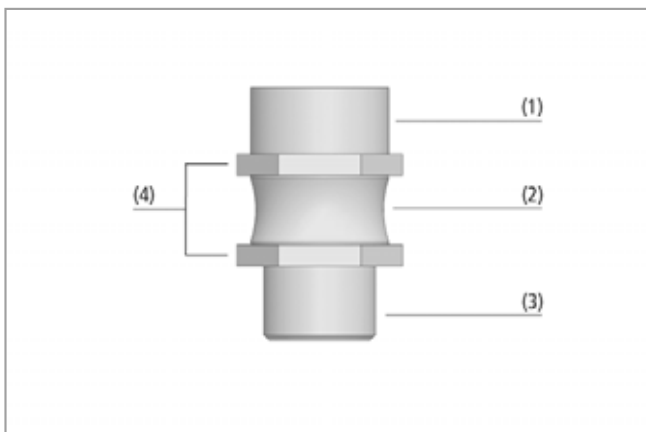
Flexolink FLK

Applications

- Flexolink for handling of workpieces with sloping surfaces with the aid of large-size suction cups or suction plates
- Handling of large sheets of materials (such as wood or sheet metal) which may sag when lifted (Flexolink prevents the sheet from being pulled off due to one-sided forces)
- Can be used together with spring plungers to compensate for differing workpiece heights and uneven surfaces
- Automatic resetting

Design

- Flexible mounting made of high-quality steel with a rubber buffer (vulcanized into position) as a joint (2)
- Maximum deflection angle limited by a screw-in stop
- Force is transferred via a shaped metal connection within the joint
- Flats on upper and lower halves for damage-free installation (4)
- Connection thread for top connection (1) and (3) in various sizes
- Deflection (max.) 12°



System design Flexolink FLK

Our Highlights...

- Fully flexible mounting of suction cups and suction plates
- Joint made of rubber and metal
- Low center of flexure
- High-strength connection between rubber and metal parts

Your Benefits...

- > Very good adaptation to sloping workpiece surfaces
- > Automatic reset function to neutral position
- > Reduced wear on suction cups when they are placed on sloping surfaces
- > Vacuum-tight design with integrated protection against damage



Flexolink FLK for adaptation to sloping metal sheets

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Jointed Mountings



Flexolink FLK

Connection thread G1/4" and G1/2"

Designation Code Flexolink FLK

Abbreviated designation	Connection thread 1	Connection thread 2	Product addition
Example FLK G1/4-IG M10x1.25-AG:			
FLK	G1/4-IG	M10x1.25-AG	
FLK	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/2-AG G1/2-IG	M10x1.25-AG (AG = male (M)) G1/4-AG G1/2-AG	V special reinforced Flexolink

Ordering Data Flexolink FLK

Jointed mounting Flexolink FLK is delivered as a ready to connect product.

Flexolink FLK

Type*	Part Number
FLK G1/4-IG M10x1.25-AG	10.01.03.00206
FLK G1/4-IG G1/4-AG	10.01.03.00178
FLK G1/4-AG G1/4-AG	10.01.03.00152
FLK G1/2-IG G1/2-AG	10.01.03.00175
FLK G1/2-AG G1/2-AG	10.01.03.00153
FLK G1/2-IG G1/2-AG V	10.01.03.00207

*V = Special reinforced Flexolink for use with suction plates SPU 300 and SPU 400

Technical Data Flexolink FLK

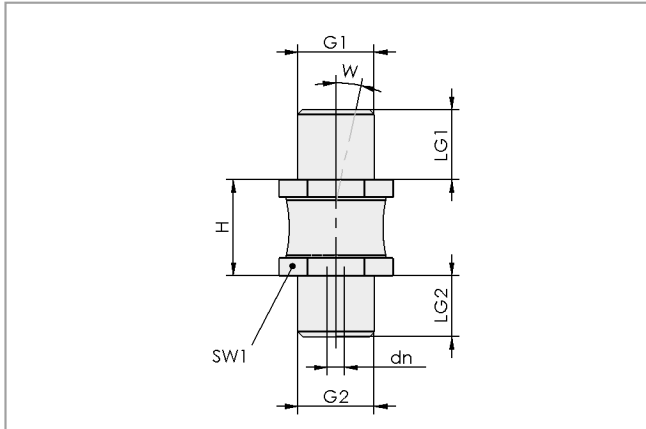
Type	Vertical load [N]	Bending moment [Nm]	Weight [g]
FLK G1/4-IG M10x1.25-AG	500	8	26
FLK G1/4-IG G1/4-AG	750	10	30
FLK G1/4-AG G1/4-AG	750	10	30
FLK G1/2-IG G1/2-AG	3000	50	100
FLK G1/2-AG G1/2-AG	3000	65	100
FLK G1/2-IG G1/2-AG V	4500	65	190

Flexolink FLK

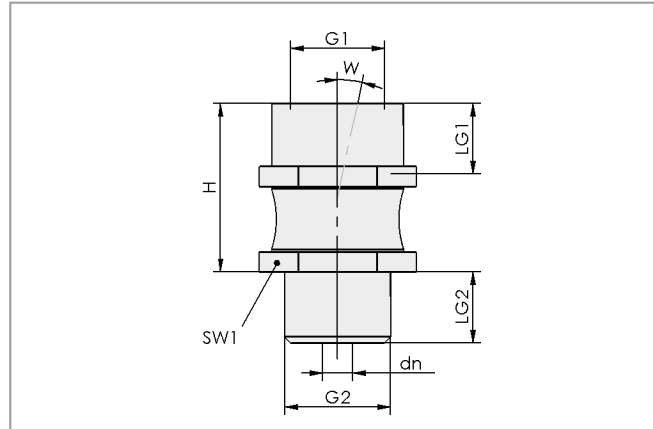
Connection thread G1/4" and G1/2"



Design Data Flexolink FLK



FLK AG-AG



FLK IG-AG

Type	Dimensions in mm								
	dn	G1	G2	H	LG1	LG2	SW1	W	
FLK G1/4-IG M10x1.25-AG	2.8	G1/4"-F	M10x1.25-M	27.0	10.5	8	17	12	
FLK G1/4-IG G1/4-AG	3.0	G1/4"-F	G1/4"-M	27.0	12.0	12	17	12	
FLK G1/4-AG G1/4-AG	3.0	G1/4"-M	G1/4"-M	16.5	10.5	12	17	12	
FLK G1/2-IG G1/2-AG	6.0	G1/2"-F	G1/2"-M	33.5	14.0	14	27	12	
FLK G1/2-AG G1/2-AG	5.5	G1/2"-M	G1/2"-M	21.0	14.0	14	27	12	
FLK G1/2-IG G1/2-AG V	6.0	G1/2"-F	G1/2"-M	53.0	14.0	14	36	8	

Jointed Mountings



Ball Joints KGL

Connection thread from G1/8" to G1/2"



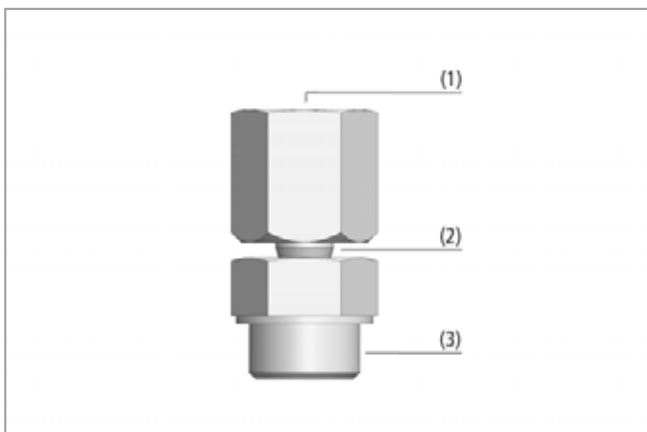
Suitable for Industry Specific Applications



Ball joints KGL

Applications

- Ball joint for handling of workpieces with sloping surfaces with the aid of large-size suction cups or suction plates
- Handling of large sheets of materials (such as wood or sheet metal) which may sag when lifted (flexible mounting with KGL prevents premature pulling-off of the sheet due to one-sided forces)
- Can be used together with spring plungers to compensate for differing workpiece heights and uneven surfaces



System design ball joints KGL

Design

- Ball and socket made of galvanized steel (KGL...) or stainless steel (KGL...A2)
- Ball and socket (2) with O-ring seal to prevent vacuum leaks
- Connection thread above (1) and below (3) in various sizes
- Deflection (max.) 15°



Mounting example ball joints KGL

Our Highlights...

- Fully flexible mounting of suction cups and suction plates
- Sealed ball-and-socket joint with vacuum-tight seal
- Low center of flexure

Your Benefits...

- > Very good adaptation to workpieces with sloping surfaces
- > Safe handling
- > Minimum wear on the suction cup when it is placed on a sloping surface

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Ball Joints KGL

Connection thread from G1/8" to G1/2"

Designation Code Ball Joints KGL

Abbreviated designation	Connection thread 1	Connection thread 2	Material
Example KGL G1/2-IG G1/2 AG:			
KGL	G1/2-IG	G1/2-AG	
KGL	G1/8-IG (IG = female (F))	G1/8-AG (AG = male (M))	- galvanised steel
	G1/4-IG	G1/4-AG	A2 stainless steel
	G1/2-IG	G1/2-AG	
		M10x1.25-AG	

Ordering Data Ball Joints KGL

Ball joint KGL is delivered as a ready to connect product.

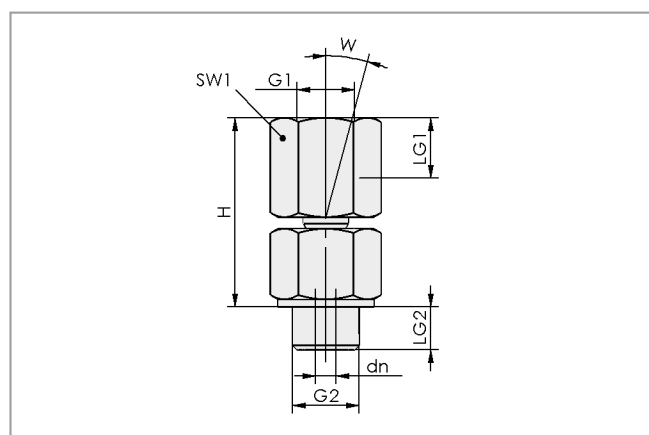
Ball Joints KGL

Type	Part Number
KGL G1/8-IG G1/8-AG A2	10.01.03.00109
KGL G1/4-IG G1/4-AG	10.01.03.00110
KGL G1/4-IG M10x1.25-AG	10.01.03.00137
KGL G1/2-IG G1/2-AG	10.01.03.00111

Technical Data Ball Joints KGL

Type	Vertical load [N]	Weight [g]
KGL G1/8-IG G1/8-AG A2	300	26
KGL G1/4-IG G1/4-AG	1500	67
KGL G1/4-IG M10x1.25-AG	1500	67
KGL G1/2-IG G1/2-AG	2500	116

Design Data Ball Joints KGL



KGL G1/8 to G1/2

Type	Dimensions in mm							
	dn	G1	G2	H	LG1	LG2	SW1	W
KGL G1/8-IG G1/8-AG A2	2.0	G1/8"-F	G1/8"-M	26.5	8.5	7	14	15
KGL G1/4-IG G1/4-AG	3.5	G1/4"-F	G1/4"-M	37.5	12.0	10	19	15
KGL G1/4-IG M10x1.25-AG	3.5	G1/4"-F	M10x1.25-M	37.5	12.0	10	19	15
KGL G1/2-IG G1/2-AG	4.0	G1/2"-F	G1/2"-M	40.0	14.0	12	24	15

Spring plungers



Spring Plungers FSTIm

Stroke from 5 mm to 20 mm



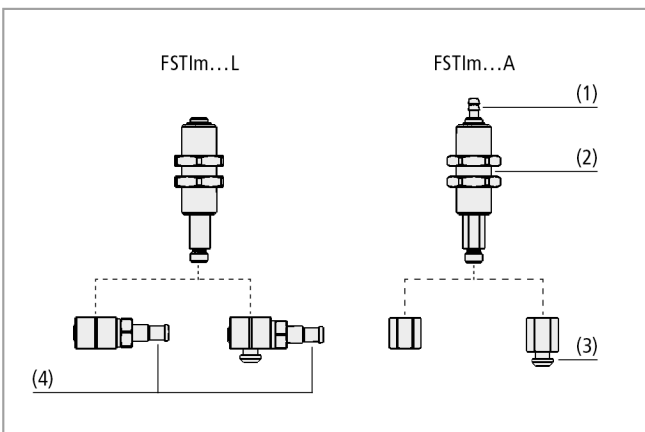
Suitable for Industry Specific Applications



Spring plungers FSTIm

Applications

- Spring plunger in small design with internal damping spring for handling of workpieces with differing heights and curvatures
- Handling of very sensitive workpieces (e.g. printed circuit boards) without additional control expenses; ensures gentle placement
- Handling tasks in the electronics industry



System design spring plungers FSTIm

Design

- Modular spring plunger with axial (1) or lateral (4) vacuum connection
- Two lock nuts (2) for mounting
- Connection for suction cups of the nipple families N004 and N016 (3) or alternatively via internal thread



Spring plungers being used for handling conductor boards

Our Highlights...

- Low spring forces
- Minimum size; weight-optimized
- Internal damping spring
- Ability to connect a second lateral vacuum feed

Your Benefits...

- > Gentle handling process with very sensitive workpieces
- > Suitable for confined spaces and high dynamic
- > Spring protected against dirt and mechanical damage
- > Series connection of several spring plungers feasible

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Spring plungers



Spring Plungers FSTIm

Stroke from 5 mm to 20 mm

Designation Code Spring Plungers FSTIm

Abbreviated designation	Suction cup connection	Vacuum connection	Plunger stroke in mm
Example FSTIm N004 L 10:			
FSTIm	N004	L	10
FSTIm	M3-IG (IG = female (F))	A axial	5
	M5-IG	L lateral	10
	N004		20
	N016		

Ordering Data Spring Plungers FSTIm

Spring plunger FSTIm is delivered assembled.

Spring Plungers FSTIm

Type	Plunger stroke in mm*		
	5	10	20
FSTIm M3-IG A	10.01.02.01333	-	-
FSTIm M3-IG L	10.01.02.01334	-	-
FSTIm N004 A	10.01.02.01335	10.01.02.01339	-
FSTIm N004 L	10.01.02.01336	10.01.02.01340	-
FSTIm M5-IG A	-	10.01.02.01337	10.01.02.01344
FSTIm M5-IG L	-	10.01.02.01338	10.01.02.01343
FSTIm N016 A	-	-	10.01.02.01342
FSTIm N016 L	-	-	10.01.02.01341

*Recommendation: To raise the lifetime in continuous operation, prevent the maximal slide stroke

Ordering Data Accessories Spring Plungers FSTIm

Type	Hose*	Hose sleeve**
FSTIm M3-IG A 5	10.07.09.00142	-
FSTIm M3-IG L 5	10.07.09.00142	10.08.03.00312
FSTIm N004 A 5	10.07.09.00142	-
FSTIm N004 L 5	10.07.09.00142	10.08.03.00312
FSTIm M5-IG A 10	10.07.09.00141	-
FSTIm M5-IG L 10	10.07.09.00141	10.08.03.00311
FSTIm N004 A 10	10.07.09.00141	-
FSTIm N004 L 10	10.07.09.00141	10.08.03.00311
FSTIm M5-IG A 20	10.07.09.00141	-
FSTIm M5-IG L 20	10.07.09.00141	10.08.03.00311
FSTIm N016 A 20	10.07.09.00141	-
FSTIm N016 L 20	10.07.09.00141	10.08.03.00311

*Especially soft hoses for gentle handling

**To retrofit daisy chaining of FSTIm...L

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Spring plungers



Spring Plungers FSTIm

Stroke from 5 mm to 20 mm

Technical Data Spring Plungers FSTIm

Type	Spring rate [N/mm]	Spring pre-tension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTIm M3-IG A 5	0.055	0.5	0.64	15	1.5	17	0 ... 80
FSTIm M3-IG L 5	0.055	0.5	0.64	15	1.5	20	0 ... 80
FSTIm N004 A 5	0.055	0.5	0.64	15	1.5	16	0 ... 80
FSTIm N004 L 5	0.055	0.5	0.64	15	1.5	20	0 ... 80
FSTIm M5-IG A 10	0.050	0.5	0.75	15	1.5	20	0 ... 80
FSTIm M5-IG L 10	0.050	0.5	0.75	15	1.5	22	0 ... 80
FSTIm N004 A 10	0.050	0.5	0.75	15	1.5	18	0 ... 80
FSTIm N004 L 10	0.050	0.5	0.75	15	1.5	22	0 ... 80
FSTIm M5-IG A 20	0.052	0.5	1.02	15	1.5	26	0 ... 80
FSTIm M5-IG L 20	0.052	0.5	1.02	15	1.5	28	0 ... 80
FSTIm N016 A 20	0.052	0.5	1.02	15	1.5	24	0 ... 80
FSTIm N016 L 20	0.052	0.5	1.02	15	1.5	28	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal load refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

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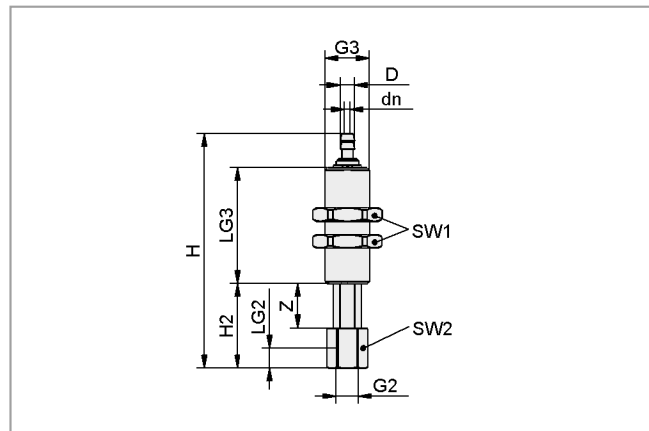
Spring plungers



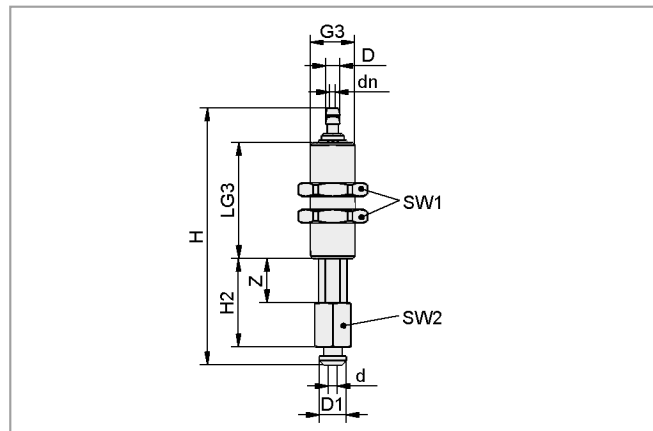
Spring Plungers FSTIm

Stroke from 5 mm to 20 mm

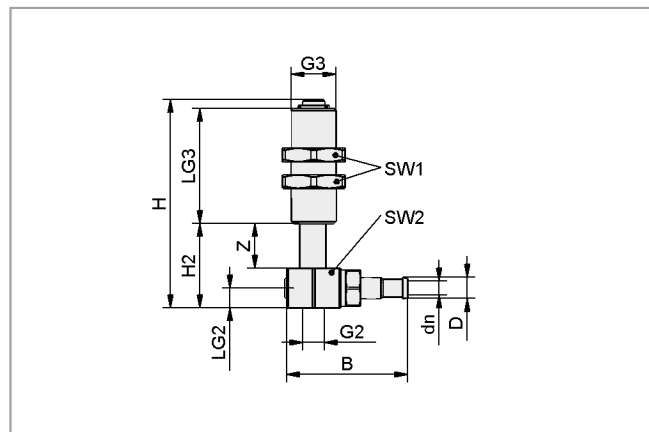
Design Data Spring Plungers FSTIm



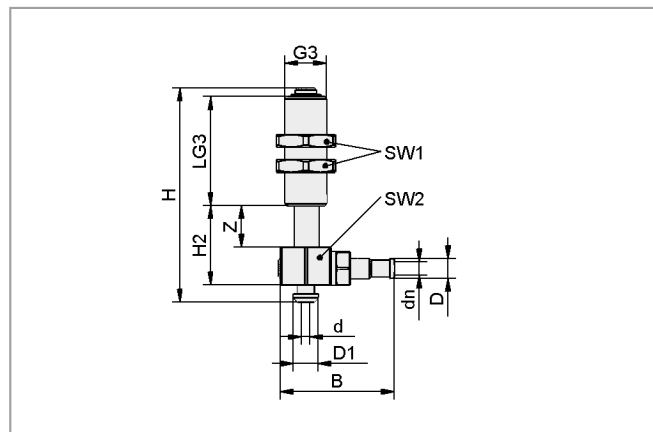
FSTIm M3/M5-IG A ...



FSTIm N004/N016 A ...



FSTIm M3/M5-IG L ...



FSTIm N004/N016 L ...

Type	Dimensions in mm														Z (Stroke)
	B	d	dn	D	D1	G2	G3	H	H2	LG2	LG3	SW1	SW2		
FSTIm M3-IG A 5	-	-	1.3	2.5	-	M3-F	M10x1-M	40.7	14	5	19	14	8	5	
FSTIm M3-IG L 5	21.5	-	1.8	2.5	-	M3-F	M10x1-M	35.0	14	5	19	14	13	5	
FSTIm N004 A 5	-	2.0	1.3	2.5	6.0	-	M10x1-M	45.7	15	-	19	14	8	5	
FSTIm N004 L 5	21.5	2.0	1.8	2.5	6.0	-	M10x1-M	39.0	14	-	19	14	13	5	
FSTIm M5-IG A 10	-	-	2.0	4.0	-	M5-F	M10x1-M	54.7	19	5	26	14	8	10	
FSTIm M5-IG L 10	23.2	-	2.5	4.0	-	M5-F	M10x1-M	47.0	19	5	26	14	13	10	
FSTIm N004 A 10	-	2.0	2.0	4.0	6.0	-	M10x1-M	59.7	20	-	26	14	8	10	
FSTIm N004 L 10	23.2	2.0	2.5	4.0	6.0	-	M10x1-M	51.0	19	-	26	14	13	10	
FSTIm M5-IG A 20	-	-	2.0	4.0	-	M5-F	M10x1-M	79.7	29	5	41	14	8	20	
FSTIm M5-IG L 20	23.2	-	2.5	4.0	-	M5-F	M10x1-M	72.0	29	5	41	14	13	20	
FSTIm N016 A 20	-	2.5	2.0	4.0	6.5	-	M10x1-M	86.7	30	-	41	14	8	20	
FSTIm N016 L 20	23.2	2.5	2.5	4.0	6.5	-	M10x1-M	78.0	29	-	41	14	13	20	

Spring plungers



Spring Plungers FSTE

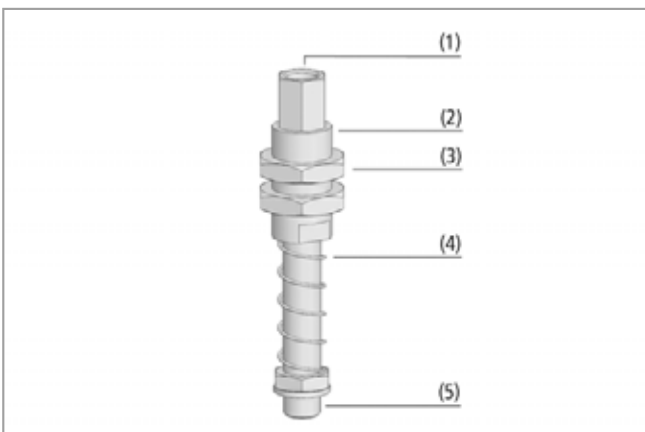
Stroke from 5 mm to 90 mm



Suitable for Industry Specific Applications



Spring plungers FSTE



System design spring plungers FSTE

Applications

- Spring plunger for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement

Design

- Spring plunger consisting of a high-strength rod made of galvanized steel, guide sleeve (2) and lower damping springs (4)
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Always female connection thread for suction cups (5) up to size M5, otherwise male thread
- Two lock nuts (3) for attachment



Mounting example spring plungers FSTE

Our Highlights...

- Spring plunger with lower damping spring
- Wide range of connection threads and stroke lengths
- Available with anti-rotation guard

Your Benefits...

- > Soft placement of the suction cup on easily damaged workpieces; good compensation for varying workpiece heights
- > For a wide range of applications; available for all suction cups of the standard range
- > Suitable for use with oval suction cups

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Spring plungers



Spring Plungers FSTE

Stroke from 5 mm to 90 mm

Designation Code Spring Plungers FSTE

Abbreviated designation	Suction cup connection	Plunger stroke in mm	Product addition
Example FSTE M3-IG 5 VG:			
FSTE	M3-IG	5	VG
FSTE	M3-IG (IG = female (F))	5	VG with anti-rotation guard
	M5-IG	to	
	G1/8-AG (AG = male (M))	90	
	G1/4-AG		
	G1/2-AG		

Ordering Data Spring Plungers FSTE

Spring plunger FSTE is delivered as a ready to connect product.

Spring Plungers FSTE

Type*	Plunger stroke in mm**							
	5	10	15	20	25	50	75	90
FSTE M3	10.01.02.00613	-	-	-	-	-	-	-
FSTE M3 VG	10.01.02.00614	-	-	-	-	-	-	-
FSTE M5	10.01.02.00607	10.01.02.00608	-	10.01.02.00609	-	-	-	-
FSTE M5 VG	10.01.02.00610	10.01.02.00611	-	10.01.02.00612	-	-	-	-
FSTE G1/8	-	-	10.01.02.00602	-	10.01.02.00603	10.01.02.00604	-	-
FSTE G1/8 VG	-	-	10.01.02.00605	-	-	10.01.02.00606	-	-
FSTE G1/4	-	-	-	-	10.01.02.00567	10.01.02.00568	10.01.02.00569	-
FSTE G1/4 VG	-	-	-	-	10.01.02.00570	-	10.01.02.00571	-
FSTE G1/2	-	-	-	-	10.01.02.00574	-	10.01.02.00575	10.01.02.00576

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction cups

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Spring plungers



Spring Plungers FSTE

Stroke from 5 mm to 90 mm

Technical Data Spring Plungers FSTE

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTE M3-IG 5	0.596	1.49	2.98	550	47	9	0 ... 80
FSTE M3-IG 5 VG	0.596	1.49	2.98	550	47	9	0 ... 80
FSTE M5-IG 5	0.508	3.30	4.57	1500	132	16	0 ... 80
FSTE M5-IG 5 VG	0.508	3.30	4.57	1500	132	16	0 ... 80
FSTE M5-IG 10	0.323	2.75	4.36	1500	97	19	0 ... 80
FSTE M5-IG 10 VG	0.323	2.75	4.36	1500	97	19	0 ... 80
FSTE M5-IG 20	0.209	1.78	3.87	1500	63	25	0 ... 80
FSTE M5-IG 20 VG	0.209	1.78	3.87	1500	63	25	0 ... 80
FSTE G1/8-AG 15	0.221	3.53	5.19	3700	385	80	0 ... 80
FSTE G1/8-AG 15 VG	0.221	3.53	5.19	3700	385	80	0 ... 80
FSTE G1/8-AG 25	0.143	3.57	5.36	3700	283	90	0 ... 80
FSTE G1/8-AG 50	0.097	2.92	5.34	3700	173	110	0 ... 80
FSTE G1/8-AG 50 VG	0.097	2.92	5.34	3700	173	110	0 ... 80
FSTE G1/4-AG 25	0.711	6.47	15.36	2400	747	145	0 ... 80
FSTE G1/4-AG 25 VG	0.711	6.47	15.36	2400	747	144	0 ... 80
FSTE G1/4-AG 50	0.452	1.40	12.70	2400	466	175	0 ... 80
FSTE G1/4-AG 75	0.262	5.38	15.20	2400	340	190	0 ... 80
FSTE G1/4-AG 75 VG	0.262	5.38	15.20	2400	340	202	0 ... 80
FSTE G1/2-AG 25	3.829	25.64	73.50	4900	1870	400	0 ... 80
FSTE G1/2-AG 75	1.072	37.20	77.40	4900	800	530	0 ... 80
FSTE G1/2-AG 90	1.072	24.38	75.30	4900	730	544	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

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Spring plungers

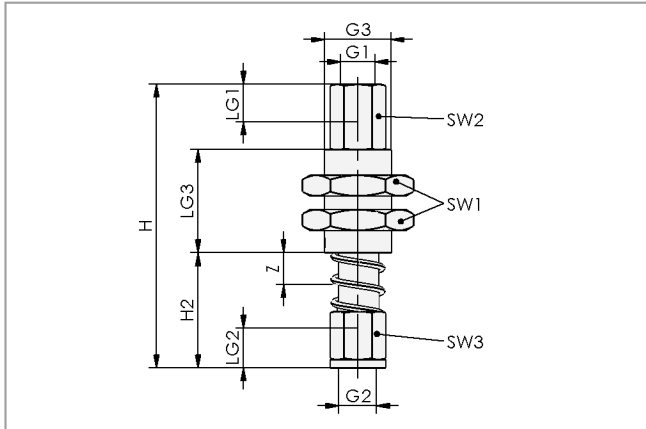


Spring Plungers FSTE

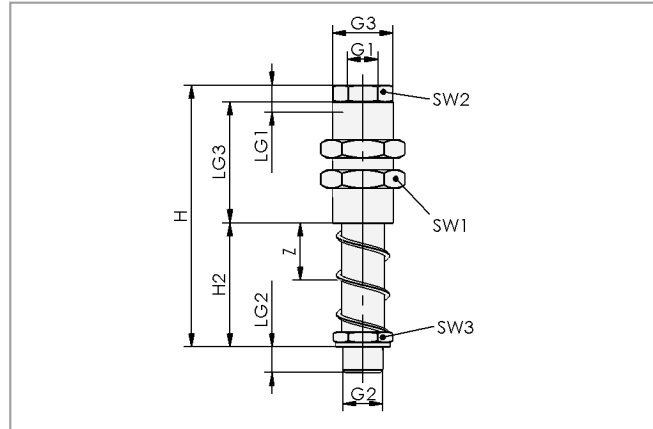
Stroke from 5 mm to 90 mm



Design Data Spring Plungers FSTE



FSTE M3 to M5 (VG)



FSTE G1/8 to G1/2 (VG)

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTE M3-IG 5	M3-F	M3-F	M6x0.75-M	33.5	15.0	3.8	6.0	10	10	5	7	5
FSTE M3-IG 5 VG	M3-F	M3-F	M6x0.75-M	33.5	15.0	3.8	6.0	10	10	5	7	5
FSTE M5-IG 5	M5-F	M5-F	G1/8"-M	41.2	17.0	5.5	6.2	15	14	7	7	5
FSTE M5-IG 5 VG	M5-F	M5-F	G1/8"-M	41.2	17.0	5.5	6.2	15	14	7	7	5
FSTE M5-IG 10	M5-F	M5-F	G1/8"-M	47.2	23.0	5.5	6.2	15	14	7	7	10
FSTE M5-IG 10 VG	M5-F	M5-F	G1/8"-M	47.2	23.0	5.5	6.2	15	14	7	7	10
FSTE M5-IG 20	M5-F	M5-F	G1/8"-M	59.2	35.0	5.5	6.2	15	14	7	7	20
FSTE M5-IG 20 VG	M5-F	M5-F	G1/8"-M	59.2	35.0	5.5	6.2	15	14	7	7	20
FSTE G1/8-AG 15	G1/8"-F	G1/8"-M	M16x1-M	73.5	29.5	8.0	6.5	30	22	12	14	15
FSTE G1/8-AG 15 VG	G1/8"-F	G1/8"-M	M16x1-M	73.5	28.5	8.0	6.5	30	22	12	14	15
FSTE G1/8-AG 25	G1/8"-F	G1/8"-M	M16x1-M	86.5	42.5	8.0	6.5	30	22	12	14	25
FSTE G1/8-AG 50	G1/8"-F	G1/8"-M	M16x1-M	117.5	73.5	8.0	6.5	30	22	12	14	50
FSTE G1/8-AG 50 VG	G1/8"-F	G1/8"-M	M16x1-M	117.5	72.5	8.0	6.5	30	22	12	14	50
FSTE G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13.0	8.5	40	24	17	17	25
FSTE G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13.0	8.5	40	24	17	17	25
FSTE G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	13.0	8.5	40	24	17	17	50
FSTE G1/4-AG 75	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13.0	8.5	40	24	17	17	75
FSTE G1/4-AG 75 VG	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13.0	8.5	40	24	17	17	75
FSTE G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	42.5	13.0	10.5	55	36	24	24	25
FSTE G1/2-AG 75	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	113.5	13.0	10.5	55	36	24	24	75
FSTE G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	125.5	13.0	10.5	55	36	24	24	90

Spring plungers



Spring Plungers FSTE-HD

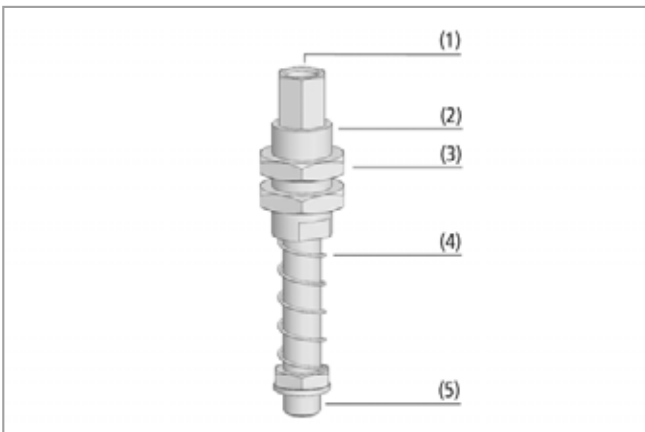
Stroke from 15 mm to 90 mm



Suitable for Industry Specific Applications



Spring plungers FSTE-HD



System design spring plungers FSTE-HD

Applications

- Spring plunger with special sliding bearings and one damping spring for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- For use under rough operating conditions
- For handling tasks with very dynamic motion and short cycle times

Design

- Spring plunger consisting of high-strength stainless steel rod, brass sleeve with integrated bearing (2) and damping spring (4)
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve
- Always male connection thread for suction cup (5)
- Two lock nuts (3) for attachment



Mounting example spring plungers FSTE-HD

Our Highlights...

- Spring plunger with high-quality sliding bearings
- Spring plunger with one or two damping springs
- Wide range of connection threads and stroke lengths
- Available with anti-rotation guard

Your Benefits...

- > Maintenance-free, with extremely long operating lifetime; suitable for short cycle times
- > Guarantees soft placement on easily damaged workpieces. Absorbs shocks and vibration
- > Available for a wide range of applications and for all standard suction cups
- > Suitable for use with oval suction cups

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Spring plungers



Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

Designation Code Spring Plungers FSTE-HD

Abbreviated designation	Version	Suction cup connection	Plunger stroke in mm	Product addition
Example FSTE-HD G1/8-AG 15 VG:				
FSTE	HD	G1/8-AG	15	VG
FSTE	HD Heavy Duty (hard use)	G1/8-AG (AG = male (M)) G1/4-AG G3/8-AG G1/2-AG	15 25 50 75 90	VG with anti-rotation guard

Ordering Data Spring Plungers FSTE-HD

Spring plunger FSTE-HD is delivered as a ready to connect product.

Spring Plungers FSTE-HD

Type*	Plunger stroke in mm**				
	15	25	50	75	90
FSTE-HD G1/8	10.01.02.00756	10.01.02.00757	10.01.02.00758	-	-
FSTE-HD G1/8 VG	10.01.02.00872	10.01.02.00873	10.01.02.00874	-	-
FSTE-HD G1/4	-	10.01.02.00763	10.01.02.00764	10.01.02.00765	-
FSTE-HD G1/4 VG	-	10.01.02.00875	10.01.02.00876	10.01.02.00877	10.01.02.01056
FSTE-HD G3/8	-	10.01.02.00811	-	10.01.02.00812	10.01.02.00813
FSTE-HD G3/8 VG	-	10.01.02.00878	-	10.01.02.00879	10.01.02.00880
FSTE-HD G1/2	-	10.01.02.00770	-	10.01.02.00771	10.01.02.00772
FSTE-HD G1/2 VG	-	10.01.02.00881	-	10.01.02.00882	10.01.02.00883

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction cups

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Spring plungers



Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

Technical Data Spring Plungers FSTE-HD

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTE-HD G1/8-AG 15	0.221	3.53	5.19	3700	385	80	0 ... 80
FSTE-HD G1/8-AG 15 VG	0.221	3.53	5.19	3700	385	80	0 ... 80
FSTE-HD G1/8-AG 25	0.143	3.57	5.36	3700	283	90	0 ... 80
FSTE-HD G1/8-AG 25 VG	0.143	3.57	5.36	3700	283	90	0 ... 80
FSTE-HD G1/8-AG 50	0.097	2.92	5.34	3700	173	110	0 ... 80
FSTE-HD G1/8-AG 50 VG	0.097	2.92	5.34	3700	173	110	0 ... 80
FSTE-HD G1/4-AG 25	0.711	6.47	15.36	2400	747	145	0 ... 80
FSTE-HD G1/4-AG 25 VG	0.711	6.47	15.36	2400	747	145	0 ... 80
FSTE-HD G1/4-AG 50	0.452	1.40	12.70	2400	466	175	0 ... 80
FSTE-HD G1/4-AG 50 VG	0.452	1.40	12.70	2400	466	175	0 ... 80
FSTE-HD G1/4-AG 75	0.262	5.38	15.20	2400	340	190	0 ... 80
FSTE-HD G1/4-AG 75 VG	0.262	5.38	15.20	2400	340	190	0 ... 80
FSTE-HD G1/4-AG 90 VG	0.262	1.49	13.28	1500	300	210	0 ... 80
FSTE-HD G3/8-AG 25	3.829	25.64	73.50	4800	1870	400	0 ... 80
FSTE-HD G3/8-AG 25 VG	3.829	25.64	73.50	4800	1870	400	0 ... 80
FSTE-HD G3/8-AG 75	1.072	37.20	77.40	4800	800	530	0 ... 80
FSTE-HD G3/8-AG 75 VG	1.072	37.20	77.40	4800	800	530	0 ... 80
FSTE-HD G3/8-AG 90	1.072	24.38	75.30	4800	730	545	0 ... 80
FSTE-HD G3/8-AG 90 VG	1.072	24.38	75.30	4800	730	545	0 ... 80
FSTE-HD G1/2-AG 25	3.829	25.64	73.50	4900	1870	400	0 ... 80
FSTE-HD G1/2-AG 25 VG	3.829	25.64	73.50	4900	1870	400	0 ... 80
FSTE-HD G1/2-AG 75	1.072	37.20	77.40	4900	800	530	0 ... 80
FSTE-HD G1/2-AG 75 VG	1.072	37.20	77.40	4900	800	530	0 ... 80
FSTE-HD G1/2-AG 90	1.072	24.38	75.30	4900	730	544	0 ... 80
FSTE-HD G1/2-AG 90 VG	1.072	24.38	75.30	4900	730	545	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

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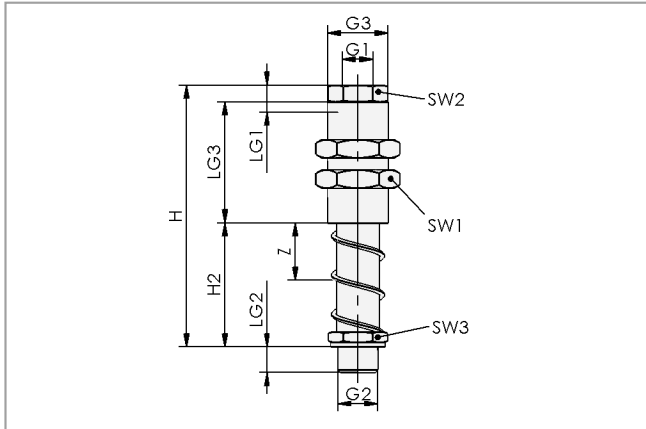


Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm



Design Data Spring Plungers FSTE-HD



FSTE-HD 1/8 to 1/2 (VG)

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTE-HD G1/8-AG 15	G1/8"-F	G1/8"-M	M16x1-M	72.5	28.5	8	7.5	30	22	12	14	15
FSTE-HD G1/8-AG 15 VG	G1/8"-F	G1/8"-M	M16x1-M	72.5	28.5	8	7.5	30	22	12	14	15
FSTE-HD G1/8-AG 25	G1/8"-F	G1/8"-M	M16x1-M	85.5	41.5	8	7.5	30	22	12	14	25
FSTE-HD G1/8-AG 25 VG	G1/8"-F	G1/8"-M	M16x1-M	85.5	41.5	8	7.5	30	22	12	14	25
FSTE-HD G1/8-AG 50	G1/8"-F	G1/8"-M	M16x1-M	116.5	72.5	8	7.5	30	22	12	14	50
FSTE-HD G1/8-AG 50 VG	G1/8"-F	G1/8"-M	M16x1-M	116.5	72.5	8	7.5	30	22	12	14	50
FSTE-HD G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13	8.5	40	24	17	17	25
FSTE-HD G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13	8.5	40	24	17	17	25
FSTE-HD G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	13	8.5	40	24	17	17	50
FSTE-HD G1/4-AG 50 VG	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	13	8.5	40	24	17	17	50
FSTE-HD G1/4-AG 75	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13	8.5	40	24	17	17	75
FSTE-HD G1/4-AG 75 VG	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13	8.5	40	24	17	17	75
FSTE-HD G1/4-AG 90 VG	G1/8"-F	G1/4"-M	M20x1.5-M	160.0	114.3	12	8.5	40	24	17	17	90
FSTE-HD G3/8-AG 25	G3/8"-F	G3/8"-M	M30x1.5-M	106.0	41.0	12	10.0	53	36	24	24	25
FSTE-HD G3/8-AG 25 VG	G3/8"-F	G3/8"-M	M30x1.5-M	106.0	41.0	13	10.0	53	36	24	24	25
FSTE-HD G3/8-AG 75	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	112.0	12	10.0	53	36	24	24	75
FSTE-HD G3/8-AG 75 VG	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	112.0	13	10.0	53	36	24	24	75
FSTE-HD G3/8-AG 90	G3/8"-F	G3/8"-M	M30x1.5-M	189.0	124.0	12	10.0	53	36	24	24	90
FSTE-HD G3/8-AG 90 VG	G3/8"-F	G3/8"-M	M30x1.5-M	189.0	124.0	13	10.0	53	36	24	24	90
FSTE-HD G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	40.5	12	10.5	53	36	24	24	25
FSTE-HD G1/2-AG 25 VG	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	40.5	13	10.5	53	36	24	24	25
FSTE-HD G1/2-AG 75	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	111.5	12	10.5	53	36	24	24	75
FSTE-HD G1/2-AG 75 VG	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	111.5	13	10.5	53	36	24	24	75
FSTE-HD G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	123.5	12	10.5	53	36	24	24	90
FSTE-HD G1/2-AG 90 VG	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	123.5	13	10.5	53	36	24	24	90

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Spring plungers



Spring Plungers FSTA

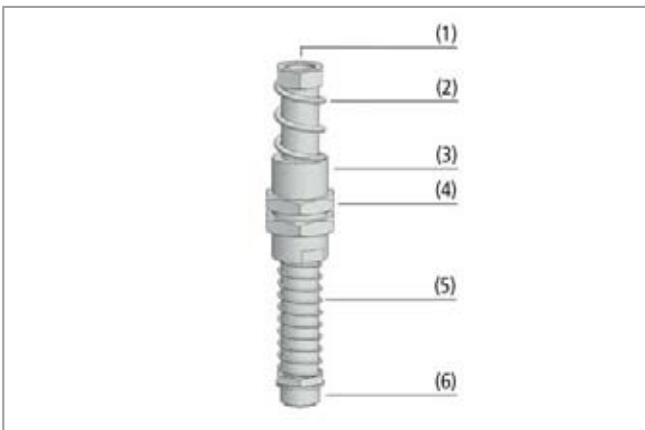
Stroke from 25 mm to 90 mm



Suitable for Industry Specific Applications



Spring plungers FSTA



System design spring plungers FSTA

Applications

- Spring plunger with two damping springs for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement

Design

- Spring plunger consisting of a high-strength rod made of galvanized steel, guide sleeve (3) and upper (2) and lower (5) damping springs
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Thread for suction cup is always a male thread (6)
- Two lock nuts for attachment (4)



Mounting example spring plungers FSTA

Our Highlights...

- Spring plunger with two damping springs
- Upper damping spring with high spring rate

Your Benefits...

- > Soft placement of the suction cup on easily damaged workpieces; good compensation for varying workpiece heights
- > Prevention of excessive stroke lengths; uniform load distribution

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Spring plungers



Spring Plungers FSTA

Stroke from 25 mm to 90 mm

Designation Code Spring Plungers FSTA

Abbreviated designation	Suction cup connection	Plunger stroke in mm
Example FSTA G1/2-AG 25:		
FSTA	G1/2-AG	25
FSTA	G1/4-AG (AG = male (M))	25
	G1/2-AG	50
		90

Ordering Data Spring Plungers FSTA

Spring plunger FSTA is delivered as a ready to connect product.

Spring Plungers FSTA

Type	Plunger stroke in mm*		
	25	50	90
FSTA G1/4	10.01.02.00572	10.01.02.00573	-
FSTA G1/2	10.01.02.00577	10.01.02.00578	10.01.02.00579

*Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Technical Data Spring Plungers FSTA

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTA G1/4-AG 25	0.711	8.95	17.8	2400	800	185	0 ... 80
FSTA G1/4-AG 50	0.262	14.10	20.6	2400	490	210	0 ... 80
FSTA G1/2-AG 25	3.828	25.65	73.5	4900	1870	493	0 ... 80
FSTA G1/2-AG 50	1.810	3.95	49.2	4900	1200	539	0 ... 80
FSTA G1/2-AG 90	1.072	24.38	75.3	4900	730	645	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

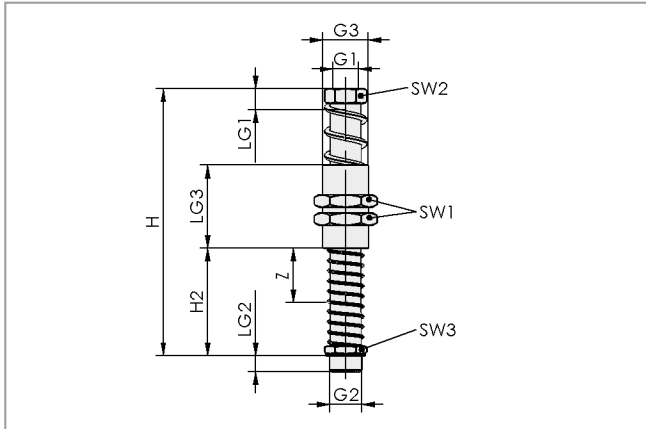


Spring Plungers FSTA

Stroke from 25 mm to 90 mm



Design Data Spring Plungers FSTA



FSTA G1/4 and G1/2

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTA G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.0	12	8.5	40	24	17	17	25
FSTA G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	66.5	12	8.5	40	24	17	17	50
FSTA G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	42.5	12	10.5	55	36	24	24	25
FSTA G1/2-AG 50	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	72.5	12	10.5	55	36	24	24	50
FSTA G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	125.5	12	10.5	55	36	24	24	90

Schmalz - The Company

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Spring Plungers FSTA-HD

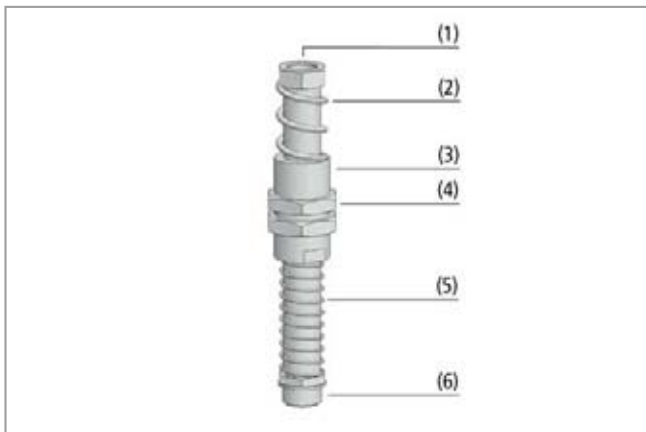
Stroke from 25 mm to 90 mm



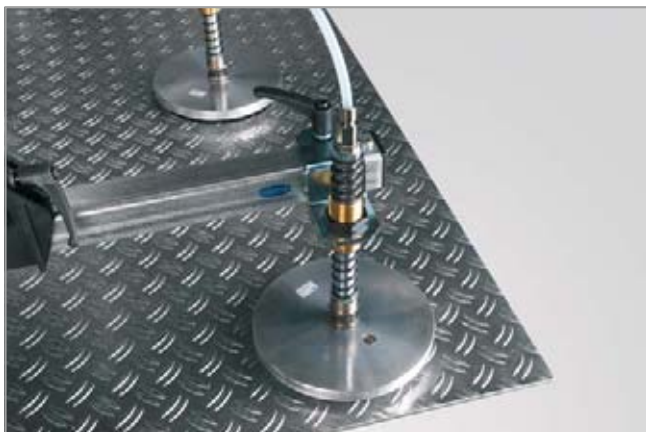
Suitable for Industry Specific Applications



Spring plungers FSTA-HD



System design spring plungers FSTA-HD



Mounting example spring plungers FSTA-HD

Applications

- Spring plunger with two damping springs and special sliding bearings for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- For use under rough operating conditions
- For handling tasks with very dynamic motion and short cycle times

Design

- Spring plunger consisting of high-strength steel rod, guide sleeve (3) with integrated bearing and lower (5) and upper (2) damping spring
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve
- Thread for suction cup is always a male thread (6)
- Two lock nuts (4) for attachment

Our Highlights...

- Spring plunger with high-quality sliding bearings and specially machined plunger rod
- Spring plunger with two damping springs
- Wide range of different connection threads and stroke lengths
- Optionally available with anti-rotation guard

Your Benefits...

- > Maintenance-free, with extremely long operating lifetime; suitable for short cycle times
- > Guarantees soft placement on easily damaged workpieces. Absorbs shocks and vibration. Prevents excessively long strokes
- > Available for a wide range of applications and for all suction cups of the standard range
- > Suitable for use with oval suction cups

Spring plungers



Spring Plungers FSTA-HD

Stroke from 25 mm to 90 mm

Designation Code Spring Plungers FSTA-HD

Abbreviated designation	Version	Suction cup connection	Plunger stroke in mm	Product addition
Example FSTA-HD G1/4-AG 50 VG:				
FSTA	HD	G1/4-AG	50	VG
FSTA	HD Heavy Duty (hard use)	G1/4-AG (AG = male (M)) G3/8-AG G1/2-AG	25 50 90	VG with anti-rotation guard

Ordering Data Spring Plungers FSTA-HD

Spring plunger FSTA-HD is delivered as a ready to connect product.

Spring Plungers FSTA-HD

Type*	Plunger stroke in mm		
	25	50	90
FSTA-HD G1/4	10.01.02.00777	10.01.02.00778	-
FSTA-HD G1/4 VG	10.01.02.00884	10.01.02.00885	-
FSTA-HD G3/8	10.01.02.00814	10.01.02.00815	10.01.02.00816
FSTA-HD G3/8 VG	10.01.02.00886	10.01.02.00887	10.01.02.00888
FSTA-HD G1/2	10.01.02.00779	10.01.02.00780	10.01.02.00781
FSTA-HD G1/2 VG	10.01.02.00889	10.01.02.00890	10.01.02.00891

*Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Technical Data Spring Plungers FSTA-HD

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTA-HD G1/4-AG 25	0.711	8.95	17.8	2400	800	185	0 ... 80
FSTA-HD G1/4-AG 25 VG	0.711	8.95	17.8	2400	800	185	0 ... 80
FSTA-HD G1/4-AG 50	0.262	14.10	20.6	2400	490	210	0 ... 80
FSTA-HD G1/4-AG 50 VG	0.262	14.10	20.6	2400	490	210	0 ... 80
FSTA-HD G3/8-AG 25	3.828	25.65	73.5	4800	1870	495	0 ... 80
FSTA-HD G3/8-AG 25 VG	3.828	25.65	73.5	4800	1870	495	0 ... 80
FSTA-HD G3/8-AG 50	1.810	3.95	49.2	4800	1200	540	0 ... 80
FSTA-HD G3/8-AG 50 VG	1.810	3.95	49.2	4800	1200	540	0 ... 80
FSTA-HD G3/8-AG 90	1.072	24.38	75.3	4800	730	645	0 ... 80
FSTA-HD G3/8-AG 90 VG	1.072	24.38	75.3	4800	730	645	0 ... 80
FSTA-HD G1/2-AG 25	3.828	25.65	73.5	4900	1870	493	0 ... 80
FSTA-HD G1/2-AG 25 VG	3.828	25.65	73.5	4900	1870	495	0 ... 80
FSTA-HD G1/2-AG 50	1.810	3.95	49.2	4900	1200	539	0 ... 80
FSTA-HD G1/2-AG 50 VG	1.810	3.95	49.2	4900	1200	540	0 ... 80
FSTA-HD G1/2-AG 90	1.072	24.38	75.3	4900	730	645	0 ... 80
FSTA-HD G1/2-AG 90 VG	1.072	24.38	75.3	4900	730	645	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

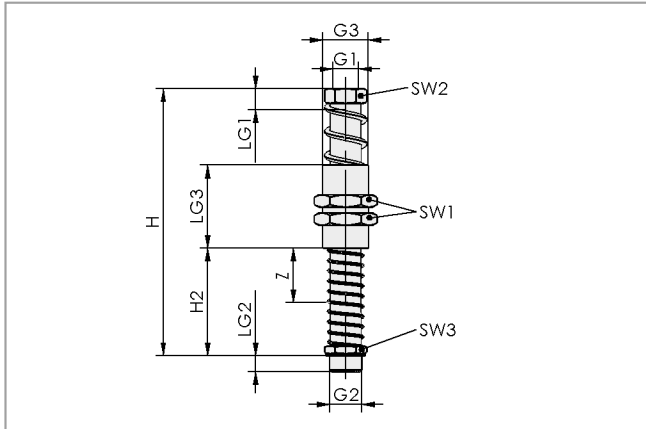


Spring Plungers FSTA-HD

Stroke from 25 mm to 90 mm



Design Data Spring Plungers FSTA-HD



FSTA-HD G1/4 to G1/2

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTA-HD G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.5	12	8.5	40	24	17	17	25
FSTA-HD G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.0	12	8.5	40	24	17	17	25
FSTA-HD G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	67.0	12	8.5	40	24	17	17	50
FSTA-HD G1/4-AG 50 VG	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	66.5	12	8.5	40	24	17	17	50
FSTA-HD G3/8-AG 25	G3/8"-F	G3/8"-M	M30x1.5-M	146.5	40.8	12	10.5	53	36	24	24	25
FSTA-HD G3/8-AG 25 VG	G3/8"-F	G3/8"-M	M30x1.5-M	147.0	40.8	12	10.5	53	36	24	24	25
FSTA-HD G3/8-AG 50	G3/8"-F	G3/8"-M	M30x1.5-M	176.5	70.8	12	10.5	53	36	24	24	50
FSTA-HD G3/8-AG 50 VG	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	70.8	12	10.5	53	36	24	24	50
FSTA-HD G3/8-AG 90	G3/8"-F	G3/8"-M	M30x1.5-M	229.5	123.8	12	10.5	53	36	24	24	90
FSTA-HD G3/8-AG 90 VG	G3/8"-F	G3/8"-M	M30x1.5-M	230.0	123.8	12	10.5	53	36	24	24	90
FSTA-HD G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	40.3	12	10.5	53	36	24	24	25
FSTA-HD G1/2-AG 25 VG	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	40.3	12	10.5	53	36	24	24	25
FSTA-HD G1/2-AG 50	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	70.3	12	10.5	53	36	24	24	50
FSTA-HD G1/2-AG 50 VG	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	70.3	12	10.5	53	36	24	24	50
FSTA-HD G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	123.3	12	10.5	53	36	24	24	90
FSTA-HD G1/2-AG 90 VG	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	123.3	12	10.5	53	36	24	24	90

Spring plungers



Spring Plungers FSTI

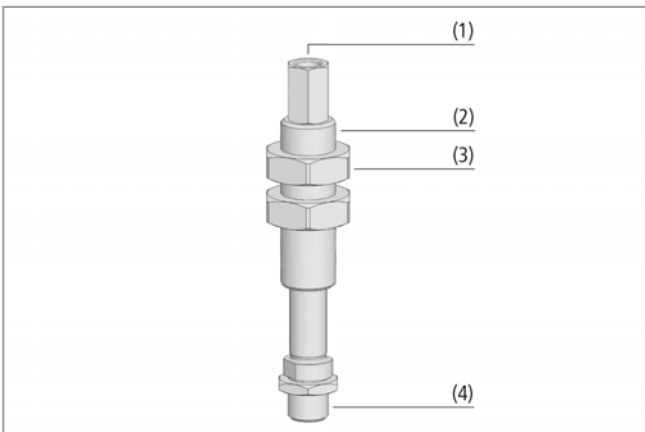
Stroke from 10 mm to 50 mm



Suitable for Industry Specific Applications



Spring plungers FSTI



System design spring plungers FSTI

Applications

- Spring plunger with internal damping spring for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- Particularly suitable for handling tasks in the automobile sector

Design

- Spring plunger consisting of high-strength steel rod, guide sleeve with integrated sliding bearing (2) and internal damping spring
- Connection thread for suction cup is male (4); connection thread for vacuum supply (1) has either a female or male thread
- Two lock nuts (3) for attachment
- Burnished surface; on the version with anti-turning function, the plunger rod is specially coated for optimum sliding behaviour
- Plunger rod with integrated vacuum feed
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve



Mounting example spring plungers FSTI

Our Highlights...

- Spring plunger with high-quality sliding bearings and excellent guidance
- Internal damping spring
- Minimum overall height; weight optimized
- Available with anti-rotation guard

Your Benefits...

- > Very economical operation, since no maintenance needed
- > Soft placement on easily damaged workpieces; spring protected against dirt and external mechanical forces
- > Suitable for use in very small spaces and with highly dynamic motion
- > Suitable for use with oval suction cups

Schmalz - The Company

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Spring plungers



Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Designation Code Spring Plungers FSTI

Abbreviated designation	Suction cup connection	Vacuum connection	Plunger stroke in mm	Product addition
Example FSTI G1/4-AG G1/8-AG 10 VG:				
FSTI	G1/4-AG	G1/8-AG	10	VG
FSTI	G1/4-AG (AG = male (M))	G1/8-AG (AG = male (M))	10	VG with anti-rotation guard
	G3/8-AG	G1/8-IG (IG = female (F))	25	
			50	

Ordering Data Spring Plungers FSTI

The spring plunger FSTI is delivered as a ready to connect product.

Spring Plungers FSTI

Type*	Plunger stroke in mm**		
	10	25	50
FSTI G1/4-AG G1/8-AG	10.01.02.00864	10.01.02.00868	10.01.02.00992
FSTI G1/4-AG G1/8-AG VG	10.01.02.00865	10.01.02.00869	10.01.02.00993
FSTI G1/4-AG G1/8-IG	10.01.02.00866	10.01.02.00870	10.01.02.00994
FSTI G1/4-AG G1/8-IG VG	10.01.02.00867	10.01.02.00871	10.01.02.00995
FSTI G3/8-AG G1/8-AG	10.01.02.00755	10.01.02.00843	10.01.02.00996
FSTI G3/8-AG G1/8-AG VG	10.01.02.00860	10.01.02.00862	10.01.02.00997
FSTI G3/8-AG G1/8-IG	10.01.02.00851	10.01.02.00850	10.01.02.00998
FSTI G3/8-AG G1/8-IG VG	10.01.02.00861	10.01.02.00863	10.01.02.00999

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction cups

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

- Schmalz - The Company
- Vacuum Knowledge
- Vacuum Suction Cups
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements**
- Vacuum Generators
- Valve Technology
- Switches and Monitoring
- Filters and Connections
- Services
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Spring plungers



Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Technical Data Spring Plungers FSTI

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTI G1/4-AG G1/8-AG 10	0.097	7.08	7.57	1000	700	150	0 ... 80
FSTI G1/4-AG G1/8-AG 10 VG	0.097	7.08	7.57	1000	500	150	0 ... 80
FSTI G1/4-AG G1/8-IG 10	0.097	7.08	7.57	1000	700	150	0 ... 80
FSTI G1/4-AG G1/8-IG 10 VG	0.097	7.08	7.57	1000	500	150	0 ... 80
FSTI G1/4-AG G1/8-AG 25	0.097	5.63	6.84	1000	700	180	0 ... 80
FSTI G1/4-AG G1/8-AG 25 VG	0.097	5.63	6.84	1000	500	180	0 ... 80
FSTI G1/4-AG G1/8-IG 25	0.097	5.63	6.84	1000	700	180	0 ... 80
FSTI G1/4-AG G1/8-IG 25 VG	0.097	5.63	6.84	1000	500	180	0 ... 80
FSTI G1/4-AG G1/8-AG 50	0.097	2.30	4.70	1000	700	230	0 ... 80
FSTI G1/4-AG G1/8-AG 50 VG	0.097	2.30	4.70	1000	500	230	0 ... 80
FSTI G1/4-AG G1/8-IG 50	0.097	2.30	4.70	1000	700	230	0 ... 80
FSTI G1/4-AG G1/8-IG 50 VG	0.097	2.30	4.70	1000	500	230	0 ... 80
FSTI G3/8-AG G1/8-AG 10	0.097	7.08	7.57	1000	700	150	0 ... 80
FSTI G3/8-AG G1/8-AG 10 VG	0.097	7.08	7.57	1000	500	150	0 ... 80
FSTI G3/8-AG G1/8-IG 10	0.097	7.08	7.57	1000	700	150	0 ... 80
FSTI G3/8-AG G1/8-IG 10 VG	0.097	7.08	7.57	1000	500	150	0 ... 80
FSTI G3/8-AG G1/8-AG 25	0.097	5.63	6.84	1000	700	180	0 ... 80
FSTI G3/8-AG G1/8-AG 25 VG	0.097	5.63	6.84	1000	500	180	0 ... 80
FSTI G3/8-AG G1/8-IG 25	0.097	5.63	6.84	1000	700	180	0 ... 80
FSTI G3/8-AG G1/8-IG 25 VG	0.097	5.63	6.84	1000	500	180	0 ... 80
FSTI G3/8-AG G1/8-AG 50	0.097	2.30	4.70	1000	700	230	0 ... 80
FSTI G3/8-AG G1/8-AG 50 VG	0.097	2.30	4.70	1000	500	230	0 ... 80
FSTI G3/8-AG G1/8-IG 50	0.097	2.30	4.70	1000	700	230	0 ... 80
FSTI G3/8-AG G1/8-IG 50 VG	0.097	2.30	4.70	1000	500	230	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

- Schmalz - The Company
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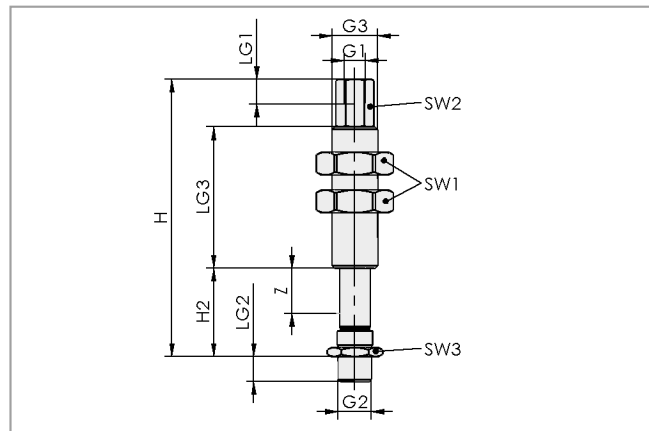
Spring plungers



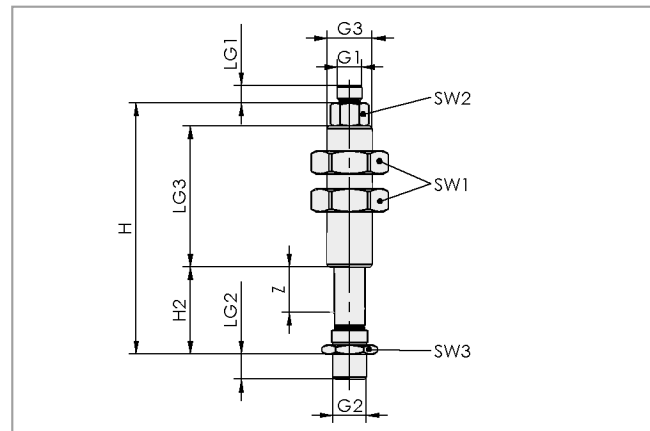
Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Design Data Spring Plungers FSTI



FSTI...AG...IG (VG)



FSTI...AG...AG (VG)

Type	Dimensions in mm												Z (Stroke)
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3		
FSTI G1/4-AG G1/8-AG 10	G1/8"-M	G1/4"-M	M18x1.5-M	71.0	21.0	6.5	10	41	27	13	17	10	
FSTI G1/4-AG G1/8-AG 10 VG	G1/8"-M	G1/4"-M	M18x1.5-M	71.0	21.0	6.5	10	41	27	13	17	10	
FSTI G1/4-AG G1/8-IG 10	G1/8"-F	G1/4"-M	M18x1.5-M	79.5	19.5	12.0	10	41	27	13	17	10	
FSTI G1/4-AG G1/8-IG 10 VG	G1/8"-F	G1/4"-M	M18x1.5-M	79.5	19.5	12.0	10	41	27	13	17	10	
FSTI G1/4-AG G1/8-AG 25	G1/8"-M	G1/4"-M	M18x1.5-M	101.0	36.0	6.5	10	56	27	13	17	25	
FSTI G1/4-AG G1/8-AG 25 VG	G1/8"-M	G1/4"-M	M18x1.5-M	101.0	36.0	6.5	10	56	27	13	17	25	
FSTI G1/4-AG G1/8-IG 25	G1/8"-F	G1/4"-M	M18x1.5-M	109.5	34.5	12.0	10	56	27	13	17	25	
FSTI G1/4-AG G1/8-IG 25 VG	G1/8"-F	G1/4"-M	M18x1.5-M	109.5	34.5	12.0	10	56	27	13	17	25	
FSTI G1/4-AG G1/8-AG 50	G1/8"-M	G1/4"-M	M18x1.5-M	176.5	59.0	6.5	8	91	27	13	17	50	
FSTI G1/4-AG G1/8-AG 50 VG	G1/8"-M	G1/4"-M	M18x1.5-M	176.5	59.0	6.5	8	91	27	13	17	50	
FSTI G1/4-AG G1/8-IG 50	G1/8"-F	G1/4"-M	M18x1.5-M	180.0	59.0	12.0	8	91	27	13	17	50	
FSTI G1/4-AG G1/8-IG 50 VG	G1/8"-F	G1/4"-M	M18x1.5-M	180.0	59.0	12.0	8	91	27	13	17	50	
FSTI G3/8-AG G1/8-AG 10	G1/8"-M	G3/8"-M	M18x1.5-M	72.0	22.0	6.5	9	41	27	13	19	10	
FSTI G3/8-AG G1/8-AG 10 VG	G1/8"-M	G3/8"-M	M18x1.5-M	72.0	22.0	6.5	9	41	27	13	19	10	
FSTI G3/8-AG G1/8-IG 10	G1/8"-F	G3/8"-M	M18x1.5-M	82.5	22.5	12.0	9	41	27	13	19	10	
FSTI G3/8-AG G1/8-IG 10 VG	G1/8"-F	G3/8"-M	M18x1.5-M	82.5	22.5	12.0	9	41	27	13	19	10	
FSTI G3/8-AG G1/8-AG 25	G1/8"-M	G3/8"-M	M18x1.5-M	102.0	37.0	6.5	9	56	27	13	19	25	
FSTI G3/8-AG G1/8-AG 25 VG	G1/8"-M	G3/8"-M	M18x1.5-M	102.0	37.0	6.5	9	56	27	13	19	25	
FSTI G3/8-AG G1/8-IG 25	G1/8"-F	G3/8"-M	M18x1.5-M	112.5	37.5	12.0	9	56	27	13	19	25	
FSTI G3/8-AG G1/8-IG 25 VG	G1/8"-F	G3/8"-M	M18x1.5-M	112.5	37.5	12.0	9	56	27	13	19	25	
FSTI G3/8-AG G1/8-AG 50	G1/8"-M	G3/8"-M	M18x1.5-M	176.5	54.0	6.5	8	91	27	13	19	50	
FSTI G3/8-AG G1/8-AG 50 VG	G1/8"-M	G3/8"-M	M18x1.5-M	176.5	54.0	6.5	8	91	27	13	19	50	
FSTI G3/8-AG G1/8-IG 50	G1/8"-F	G3/8"-M	M18x1.5-M	180.0	54.0	12.0	8	91	27	13	19	50	
FSTI G3/8-AG G1/8-IG 50 VG	G1/8"-F	G3/8"-M	M18x1.5-M	180.0	54.0	12.0	8	91	27	13	19	50	

Spring plungers



Spring Plungers FSTF

Stroke 50 mm



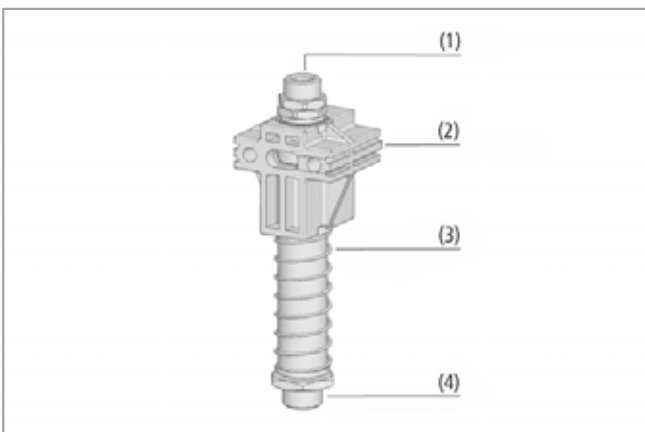
Suitable for Industry Specific Applications



Spring plungers FSTF

Applications

- Spring plunger with integrated mounting facilities for handling of workpieces with differing heights
- Handling of sheets and planks of wood in the furniture, chipboard, door and flooring industries
- Handling tasks in dusty surroundings



System design spring plungers FSTF

Design

- Plastic mounting block (2) with integrated guide for plunger rod (no additional sliding bearing)
- Connection thread for suction cup (4)
- Connection thread for vacuum supply (1)
- Lower damping spring (3)
- Plunger rod made of high-strength aluminum alloy, with integrated anti-blocking device to protect against spring breakage
- Can be mounted with the mounting kit on sectional beams out of alu.
- Versions with and without anti-rotation guard available



Mounting example spring plungers FSTF

Our Highlights...

- Variable mounting facility
- Integrated mounting facilities
- Guide and mounting block made of high-quality injection-molded plastic

Your Benefits...

- > Individual, flexible and quick adaptation to the intended application
- > Can be adapted for use with all common aluminum sectional beam systems
- > Price and weight optimized; extremely robust and unaffected by dust

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Spring plungers



Spring Plungers FSTF

Stroke 50 mm

Designation Code Spring Plungers FSTF

Abbreviated designation	Suction cup connection	Plunger stroke in mm	Product addition
Example FSTF G1/2-AG 50 VG:			
FSTF	G1/2-AG	50	VG
FSTF	G1/2-AG (AG = male (M))	50	VG with anti-rotation guard

Ordering Data Spring Plungers FSTF

Spring plunger FSTF is delivered as a ready to connect product.

Available accessories: mounting set

Spring Plungers FSTF

Type*	Part Number
FSTF G1/2-AG 50	10.01.02.01012
FSTF G1/2-AG 50 VG	10.01.02.01013

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction cups

Ordering Data Accessories Spring Plungers FSTF

Type	Mounting set SET FSTF	Mounting set SET FSTF COM
FSTF G1/2-AG 50	10.01.02.01030	10.01.02.01031
FSTF G1/2-AG 50 VG	10.01.02.01030	10.01.02.01031

!Standard: consisting of two screws ISKT M8x60, 1x guide block with 2x M8, 2x U-washers

!!Komfort: consisting of one release handle, one screw ISKT M8x60, 1x guide block with 2x M8, 2x U-washers

Technical Data Spring Plungers FSTF

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTF G1/2-AG 50	0.567	17.6	31.75	2500	800	246	0 ... 50
FSTF G1/2-AG 50 VG	0.567	17.6	31.75	2500	800	250	0 ... 50

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

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Spring plungers

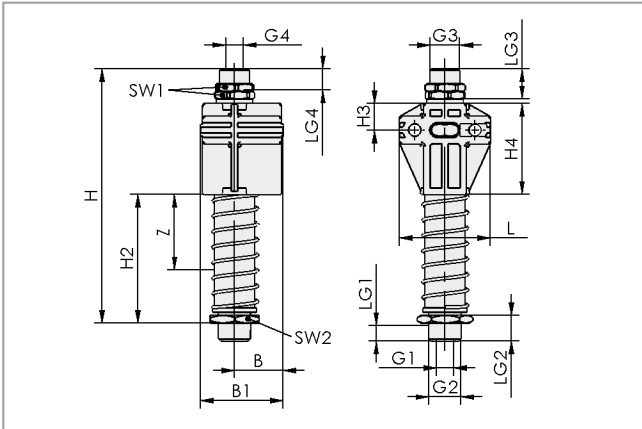


Spring Plungers FSTF

Stroke 50 mm



Design Data Spring Plungers FSTF



FSTF (VG)

Type	Dimensions in mm								
	B	B1	G1	G2	G3	G4	H	H2	H3
FSTF G1/2-AG 50	32.3	54.6	G1/4"-F	G1/2"-M	M20-M	G1/4"-F	168	85	17.5
FSTF G1/2-AG 50 VG	32.3	54.6	G1/4"-F	G1/2"-M	M20-M	G1/4"-F	168	85	17.5

Type	Dimensions in mm								
	H4	L	LG1	LG2	LG3	LG4	SW1	SW2	Z (Stroke)
FSTF G1/2-AG 50	60	60	10	17	20	10	24	32	50
FSTF G1/2-AG 50 VG	60	60	10	17	20	10	24	32	50

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Suspension rigid/flexible



Suitable for Industry Specific Applications



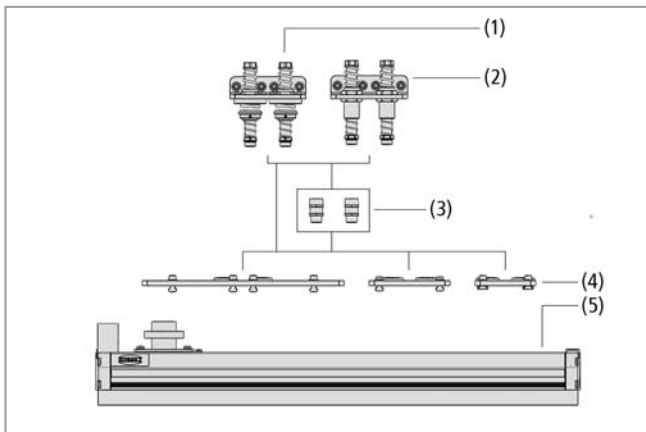
Mounting example spring plungers FST-STARR/FLEX

Applications

- FST-STARR next to the hose connector, mounted as a fixed bearing
- FST-FLEX on the opposite side, mounted as a floating bearing
- No jamming between the suspensions even at short distances, through the spherical bearing of the FST-FLEX

Design

- Area gripper (5) is mounted to handling portal by flange (4) and optional angle compensating element (3) via height compensation elements type FST-FLEX (1) with spherical bearing and FST-STARR (2). The FST-FLEX serves as a floating bearing, the FST STARR as fixed bearing. Through this system, jamming of the spring plungers is reliably avoided even when very uneven workpiece surfaces are gripped.



System design spring plungers FST-STARR/FLEX

Spring plungers



Suspension flexible FST-FLEX

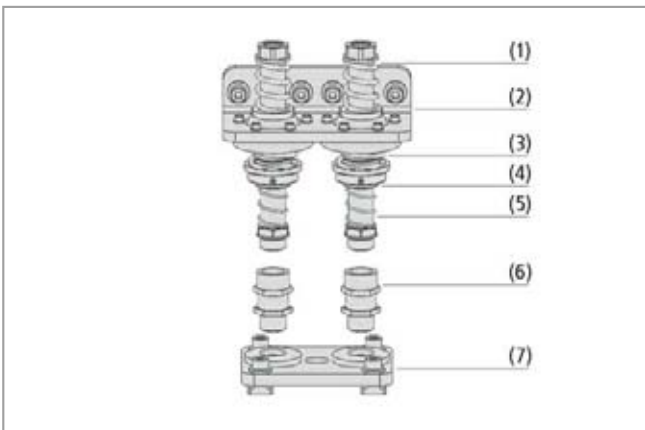
Stroke from 25 mm to 75 mm



Suitable for Industry Specific Applications



Suspension flexible FST-FLEX



System design spring plungers FST-FLEX



Mounting example spring plungers FST-FLEX

Applications

- Spherically mounted spring plunger with two damping springs, centering spring and special universal ball joint for handling workpieces with height differences
- Handling very sensitive components without additional control requirements (e.g. glass sheets), it ensures that workpieces are set down gently
- Handling very warped and naturally growing materials (e.g. dried wood) without additional technical control requirements
- Use under harsh conditions
- Highly dynamic handling tasks with short cycle times

Design

- Spring plunger with stainless-steel plunger rod, brass guide sleeve with integrated sliding sleeve both lower (5) and upper (1) damping spring
- Powder-coated retaining plate (2) as attachment to an aluminum section to hold the automatic centering unit consisting of the centering spring (3) and the spring seat nut (4). The centering spring pretensioning (3) can be set using locking screws in the spring seat nut (4).
- Jointed mounting (6) made of high-quality steel with a vulcanize-bonded rubber buffer as a joint available as an option
- Powder-coated, adaptable connection plate (7) for connection to a large-area gripper

Our Highlights...

- Spring plunger with high-quality slide bearings and machined plunger rod
- Spring plunger with two damping springs
- Plunger with centering spring and universal ball joint
- Connection plate for connection to a large-area gripper
- Optional Flexolink

Your Benefits...

- > Maintenance-free with a particularly long service life, suitable for minimal cycle times
- > Gentle placement on sensitive workpieces; absorbs impacts and vibration; prevents over-stroke
- > Maximum flexibility for extremely uneven workpiece layers
- > Simple connection to F-series and SBX area grippers
- > Very good adaptation to uneven workpiece surfaces

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Spring plungers



Suspension flexible FST-FLEX

Stroke from 25 mm to 75 mm

Designation Code Suspension flexible FST-FLEX

Abbreviated designation	Plunger stroke in mm	Version	Number of spring plungers
Example FST-FLEX-50-HD2			
FST-FLEX	50	HD	2
FST-FLEX	25	HD (Heavy Duty)	1
	50		2
	75		

Ordering Data Suspension flexible FST-FLEX

The flexible suspension FST-FLEX (retaining plate + spring plunger) is supplied as an individual part. To receive a complete flexible suspension (retaining plate + spring plunger + connection plate + accessories), please order the following:

- Flexible suspension FST-FLEX (step 1) – retaining plate + spring plunger, available with different strokes and number of spring plungers
- Connection plate FLAN-PL (step 2) – available for different large-area grippers

Available accessories: Flexolink (FLK)

Step 1: Suspension flexible FST-FLEX

Type	Part Number
FST-FLEX 25 HD1 G1/2-AG G3/8-IG*	10.01.10.05697
FST-FLEX 50 HD1 G1/2-AG G3/8-IG*	10.01.10.05687
FST-FLEX 75 HD1 G1/2-AG G3/8-IG*	10.01.10.05698
FST-FLEX 25 HD2 G1/2-AG G3/8-IG*	10.01.10.05695
FST-FLEX 50 HD2 G1/2-AG G3/8-IG*	10.01.10.05168
FST-FLEX 75 HD2 G1/2-AG G3/8-IG*	10.01.10.05696
FST-FLEX 25 HD1 G1/2-AG G3/8-IG**	10.01.10.07015
FST-FLEX 50 HD1 G1/2-AG G3/8-IG**	10.01.10.07016
FST-FLEX 75 HD1 G1/2-AG G3/8-IG**	10.01.10.07017
FST-FLEX 25 HD2 G1/2-AG G3/8-IG**	10.01.10.07018
FST-FLEX 50 HD2 G1/2-AG G3/8-IG**	10.01.10.07019
FST-FLEX 75 HD2 G1/2-AG G3/8-IG**	10.01.10.07020

*MO-PROF 90x90, 120x120

**MO-PROF 40x40, 80x40

Step 2: Flange Plates FLAN-PL

Type	Part Number
FLAN-PL 120x85x10 ST FLGR*	10.01.10.05701
FLAN-PL 160x120x10 ST SBX**	10.01.10.05706
FLAN-PL 400x90x10 ST SBX***	10.01.10.05702

*F-Series

**SBX 200

***SBX 400

Ordering Data Flexolink FLK

Type	Part Number
FLK G1/2-IG G1/2-AG	10.01.03.00175
FLK G1/2-IG G1/2-AG V	10.01.03.00207

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Spring plungers



Suspension flexible FST-FLEX

Stroke from 25 mm to 75 mm

Technical Data Suspension flexible FST-FLEX

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Weight [g]	Operating temperature [°C]
FST-FLEX 25 HD1 G1/2-AG G3/8-IG	3.828	25.60	73.50	3000	1450	0 ... 80
FST-FLEX 50 HD1 G1/2-AG G3/8-IG	1.810	5.40	50.70	3000	1500	0 ... 80
FST-FLEX 75 HD1 G1/2-AG G3/8-IG	1.072	36.90	77.10	3000	1550	0 ... 80
FST-FLEX 25 HD2 G1/2-AG G3/8-IG	3.828	51.30	147.00	6000	2700	0 ... 80
FST-FLEX 50 HD2 G1/2-AG G3/8-IG	1.810	10.90	101.40	6000	2800	0 ... 80
FST-FLEX 75 HD2 G1/2-AG G3/8-IG	1.072	73.90	154.30	6000	2900	0 ... 80
FST-FLEX 25 HD1 G1/2-AG G3/8-IG	3.828	25.60	73.50	2100	1450	0 ... 80
FST-FLEX 50 HD1 G1/2-AG G3/8-IG	1.810	5.40	50.70	2100	1500	0 ... 80
FST-FLEX 75 HD1 G1/2-AG G3/8-IG	1.072	36.90	77.10	2100	1550	0 ... 80
FST-FLEX 25 HD2 G1/2-AG G3/8-IG	3.828	51.30	147.00	4200	2700	0 ... 80
FST-FLEX 50 HD2 G1/2-AG G3/8-IG	1.810	10.90	101.40	4200	2800	0 ... 80
FST-FLEX 75 HD2 G1/2-AG G3/8-IG	1.072	73.90	154.30	4200	2900	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

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Spring plungers

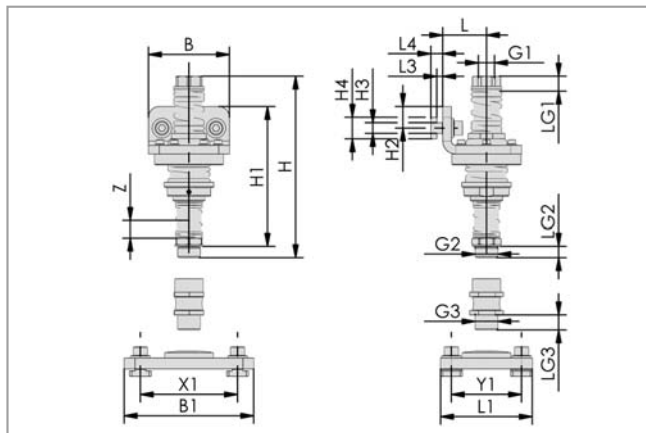


Suspension flexible FST-FLEX

Stroke from 25 mm to 75 mm



Design Data Suspension flexible FST-FLEX



FST-FLEX 25 to 75

Type	Dimensions in mm													Z	
	B	G1	G2	G3	H*	H1	H2	H3	H4	L	L3	L4	LG2		LG3
FST-FLEX 25 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	6	11	11	14	25
FST-FLEX 50 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	6	11	11	14	50
FST-FLEX 75 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	6	11	11	14	75
FST-FLEX 25 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	6	11	11	14	25
FST-FLEX 50 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	6	11	11	14	50
FST-FLEX 75 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	6	11	11	14	75
FST-FLEX 25 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	2	6	11	14	25
FST-FLEX 50 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	1	6	11	14	50
FST-FLEX 75 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	2	6	11	14	75
FST-FLEX 25 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	2	6	11	14	25
FST-FLEX 50 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	2	6	11	14	50
FST-FLEX 75 HD2 G1/2-AG G3/8-IG	150	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	2	6	11	14	75

*when installed, 33.5 mm higher with Flexolink; 53.0 mm higher with Flexolink in reinforced design

Type	Dimensions in mm			
	L1	B1	X1	Y1
FLAN-PL 120x85x10 ST FLGR	85	120	90	65
FLAN-PL 160x120x10 ST SBX	120	160	120	90
FLAN-PL 400x90x10 ST SBX	90	400	280	65

Spring plungers



Suspension rigid FST-STARR

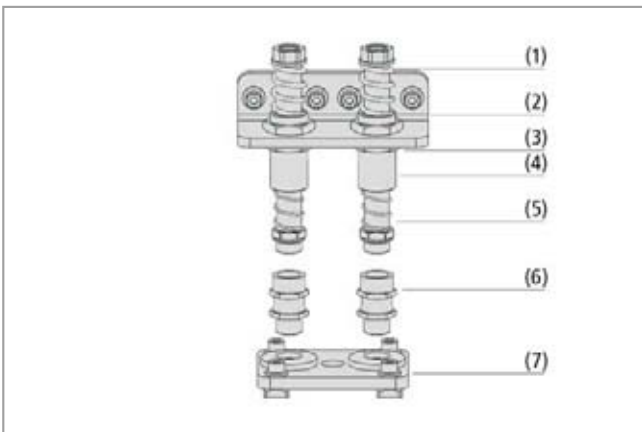
Stroke from 25 mm to 75 mm



Suitable for Industry Specific Applications



Suspension rigid FST-STARR



System design spring plungers FST-STARR



Mounting example spring plungers FST-STARR

Applications

- Spring plunger with two damping springs and special slide bearings for handling workpieces with differences in height (e.g. curved sheet metal or wooden parts)
- Handling very sensitive components without additional control requirements (e.g. glass sheets), it ensures the workpieces are set down gently
- Handling very warped and naturally growing materials (e.g. dried wood) without additional technical control requirements
- Use under harsh conditions
- Highly dynamic handling tasks with short cycle times

Design

- Spring plunger with stainless-steel plunger rod, brass guide sleeve with integrated sliding sleeve both lower (5) and upper (1) damping spring.
- Powder-coated retaining plate (2) as attachment to an aluminum section to hold the brass guide sleeve (4) and integrated sliding sleeve.
- The guide sleeve is attached by two lock nuts (3)
- Jointed mounting (6) made of high-quality steel with a vulcanize-bonded rubber buffer as a joint for a maximum swivel angle available as an option
- Powder-coated connection plate (7) for connection to a large-area gripper

Our Highlights...

- Spring plunger with high-quality slide bearings and machined plunger rod
- Spring plunger with two damping springs
- Different lifting heights
- Connection plate for connection to a large-area gripper
- Optional Flexolink

Your Benefits...

- > Maintenance-free with a particularly long service life, suitable for minimal cycle times
- > Gentle placement on sensitive workpieces; absorbs impacts and vibration; prevents over-stroke
- > For a wide range of applications and uneven workpieces
- > Simple connection to F-series and SBX area grippers
- > Very good adaptation to uneven workpiece surfaces

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Spring plungers



Suspension rigid FST-STARR

Stroke from 25 mm to 75 mm

Designation Code Suspension rigid FST-STARR

Abbreviated designation	Plunger stroke in mm	Version	Number of spring plungers
Example FST-STARR-50-HD2			
FST-STARR	50	HD	2
FST-STARR	25	HD (Heavy Duty)	1
	50		2
	75		

Ordering Data Suspension, rigid FST-STARR

The rigid suspension FST-STARR (retaining plate + spring plunger) is supplied as an individual part.

To receive a rigid suspension (retaining plate + spring plunger + connection plate + accessories), please order the following:

- Rigid suspension FST-STARR (step 1) – retaining plate + spring plunger, available with different strokes and number of spring plungers
- Connection plate FLAN-PL (step 2) – available for different large-area grippers

Available accessories: Flexolink (FLK)

Step 1: Suspension rigid FST-STARR

Type	Part Number
FST-STARR 75 HD2 G1/2-AG G3/8-IG*	10.01.10.05803
FST-STARR 50 HD2 G1/2-AG G3/8-IG*	10.01.10.05805
FST-STARR 25 HD2 G1/2-AG G3/8-IG*	10.01.10.05806
FST-STARR 75 HD1 G1/2-AG G3/8-IG*	10.01.10.05808
FST-STARR 50 HD1 G1/2-AG G3/8-IG*	10.01.10.05809
FST-STARR 25 HD1 G1/2-AG G3/8-IG*	10.01.10.05810
FST-STARR 25 HD1 G1/2-AG G3/8-IG**	10.01.10.07009
FST-STARR 50 HD1 G1/2-AG G3/8-IG**	10.01.10.07010
FST-STARR 75 HD1 G1/2-AG G3/8-IG**	10.01.10.07011
FST-STARR 25 HD2 G1/2-AG G3/8-IG**	10.01.10.07012
FST-STARR 50 HD2 G1/2-AG G3/8-IG**	10.01.10.07013
FST-STARR 75 HD2 G1/2-AG G3/8-IG**	10.01.10.07014

*MO-PROF 90x90, 120x120

**MO-PROF 40x40, 80x40

Step 2: Flange Plates FLAN-PL

Type	Part Number
FLAN-PL 120x85x10 ST FLGR*	10.01.10.05701
FLAN-PL 160x120x10 ST SBX**	10.01.10.05706
FLAN-PL 400x90x10 ST SBX***	10.01.10.05702

*F-Series

**SBX 200

***SBX 400

Ordering Data Flexolink FLK

Type	Part Number
FLK G1/2-IG G1/2-AG	10.01.03.00175
FLK G1/2-IG G1/2-AG V	10.01.03.00207

Spring plungers



Suspension rigid FST-STARR

Stroke from 25 mm to 75 mm

Technical Data Suspension rigid FST-STARR

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FST-STARR 75 HD2 G1/2-AG G3/8-IG	1.072	73.90	154.30	6000	800	2500	0 ... 80
FST-STARR 50 HD2 G1/2-AG G3/8-IG	1.810	10.90	101.40	6000	960	2400	0 ... 80
FST-STARR 25 HD2 G1/2-AG G3/8-IG	3.828	51.30	147.00	6000	1240	2300	0 ... 80
FST-STARR 75 HD1 G1/2-AG G3/8-IG	1.072	36.90	77.10	3000	400	1300	0 ... 80
FST-STARR 50 HD1 G1/2-AG G3/8-IG	1.810	5.40	50.70	3000	480	1250	0 ... 80
FST-STARR 25 HD1 G1/2-AG G3/8-IG	3.828	25.60	73.50	3000	620	1200	0 ... 80
FST-STARR 25 HD1 G1/2-AG G3/8-IG	3.828	25.60	73.50	2100	620	1200	0 ... 80
FST-STARR 50 HD1 G1/2-AG G3/8-IG	1.810	5.40	50.70	2100	480	1250	0 ... 80
FST-STARR 75 HD1 G1/2-AG G3/8-IG	1.072	36.90	77.10	2100	400	1300	0 ... 80
FST-STARR 25 HD2 G1/2-AG G3/8-IG	3.828	51.30	147.00	4200	1240	2300	0 ... 80
FST-STARR 50 HD2 G1/2-AG G3/8-IG	1.810	10.90	101.40	4200	960	2400	0 ... 80
FST-STARR 75 HD2 G1/2-AG G3/8-IG	1.072	73.90	154.30	4200	800	2500	0 ... 80

*Referred to 50% of operating stroke

**Maximum static loading

***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

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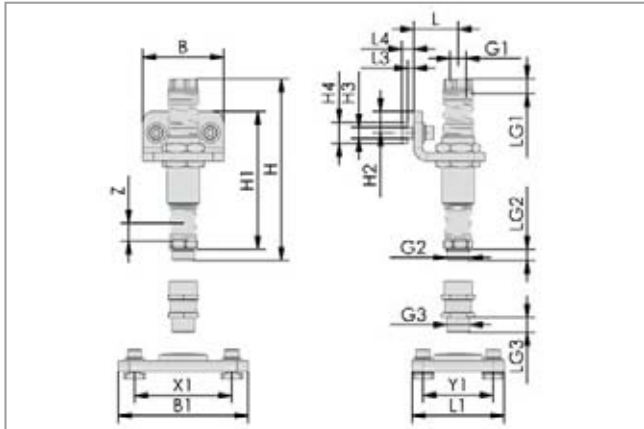


Suspension rigid FST-STARR

Stroke from 25 mm to 75 mm



Design Data Suspension rigid FST-STARR



FST-STARR 25 to 75

Type	Dimensions in mm														Z
	B	G1	G2	G3	H*	H1	H2	H3	H4	L	L3	L4	LG2	LG3	
FST-STARR 75 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	6	11	11	14	75
FST-STARR 50 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	6	11	11	14	50
FST-STARR 25 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	6	11	11	14	25
FST-STARR 75 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	6	11	11	14	75
FST-STARR 50 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	6	11	11	14	50
FST-STARR 25 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	6	11	11	14	25
FST-STARR 25 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	2	6	11	14	25
FST-STARR 50 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	2	6	11	14	50
FST-STARR 75 HD1 G1/2-AG G3/8-IG	75	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	2	6	11	14	75
FST-STARR 25 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	167.6	129	20	10	20	41	2	6	11	14	25
FST-STARR 50 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	199.8	161	20	10	20	41	2	6	11	14	50
FST-STARR 75 HD2 G1/2-AG G3/8-IG	152	G3/8"-F	G1/2"-M	G1/2"-M	238.6	200	20	10	20	41	2	6	11	14	75

*when installed, 33.5 mm higher with Flexolink; 53.0 mm higher with Flexolink in reinforced design

Type	Dimensions in mm			
	L1	B1	X1	Y1
FLAN-PL 120x85x10 ST FLGR	85	120	90	65
FLAN-PL 160x120x10 ST SBX	120	160	120	90
FLAN-PL 400x90x10 ST SBX	90	400	280	65

Holder for Suction Cups and Spring Plungers



Adapters for Elbow Connector ANW

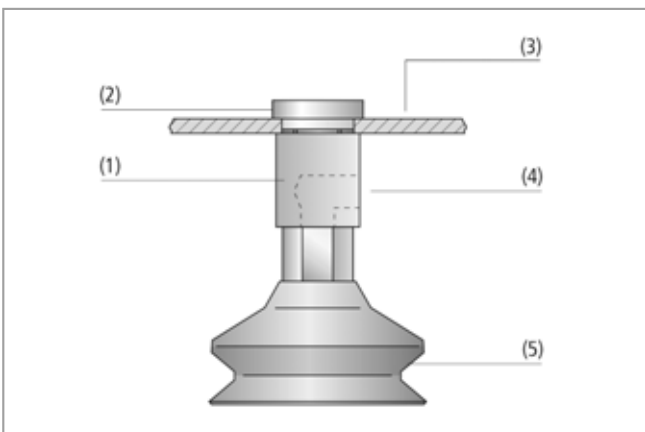
Suction cup connection from M5 to G1/2"



Suitable for Industry Specific Applications



Adapters for elbow connectors ANW



System design adapters for elbow connector ANW



Mounting example adapters for elbow connector ANW

Applications

- Adapter for elbow connector for use in restricted spaces
- Adapter for side connection ANW permits mounting on other accessories such as spring plungers or, together with mounting adapter VRS-AN, on standard holders or mounting brackets

Design

- Adapter for elbow connector ANW (1) made of galvanized steel with underside connection thread for suction cups (5) and side vacuum connection (4)
- Mounting thread without vacuum connector at the top
- Mounting adapter VRS-AN (2) made of galvanized steel for screwing into further accessories or mounting to adapter to elbow connector ANW
- Connection to metal sheet (3) with a thickness of at least 3.5 mm

Our Highlights...

- Minimal overall height
- Vacuum connector on the side
- Connection threads from M5 to G1/2"
- For use together with spring plungers or for mounting with a mounting adapter directly on holders or mounting brackets

Your Benefits...

- > Smallest possible space requirements, since suction cups can be mounted directly on cross-beams
- > No additional vertical space needed
- > Wide range of applications for all suction cups of the standard program
- > Flexible use to meet all requirements

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Adapters for Elbow Connector ANW

Suction cup connection from M5 to G1/2"

Designation Code Adapters for Elbow Connector ANW

Abbreviated designation	Vacuum connection	Suction cup connection
Example ANW M5-IG M5-IG:		
ANW	M5-IG	M5-IG
ANW	M5-IG (IG = female (F))	M5-IG (IG = female (F))
	G1/8-IG	G1/8-AG (AG = male (M))
	G3/8-IG	G1/4-AG
		G3/8-AG
		G1/2-AG

Ordering Data Adapters for Elbow Connector ANW

Adapter for elbow connector ANW is delivered as a ready to connect product.

Accessories: mounting adapter VRS-AN

Adapters for Elbow Connector ANW

Type	Part Number
ANW M5-IG M5-IG	10.01.01.10149
ANW G1/8-IG G1/8-AG	10.01.01.10113
ANW G1/8-IG G1/4-AG	10.01.01.10112
ANW G3/8-IG G3/8-AG	10.01.01.11618
ANW G3/8-IG G1/2-AG	10.01.01.10111

Ordering data Accessories Adapters for Elbow Connector ANW

Type	VRS-AN
ANW M5-IG M5-IG	10.01.01.10150
ANW G1/8-IG G1/8-AG	10.01.01.10119
ANW G1/8-IG G1/4-AG	10.01.01.10118
ANW G3/8-IG G3/8-AG	10.01.01.10117
ANW G3/8-IG G1/2-AG	10.01.01.10117

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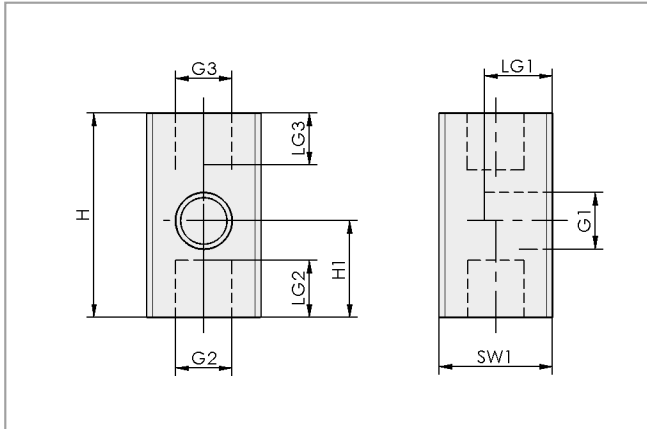


Adapters for Elbow Connector ANW

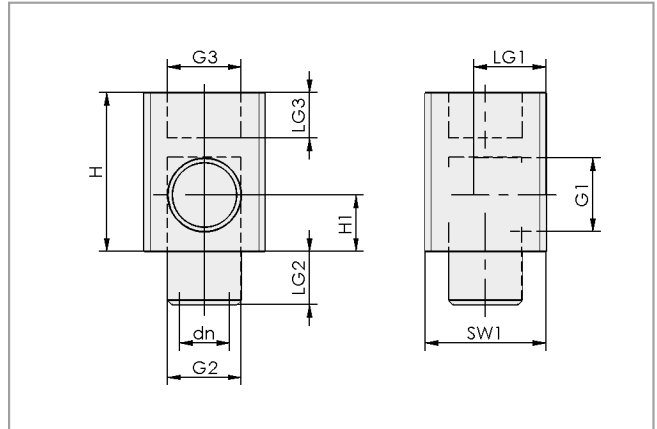
Suction cup connection from M5 to G1/2"



Design Data Adapters for Elbow Connector ANW



ANW M5-IG M5-IG

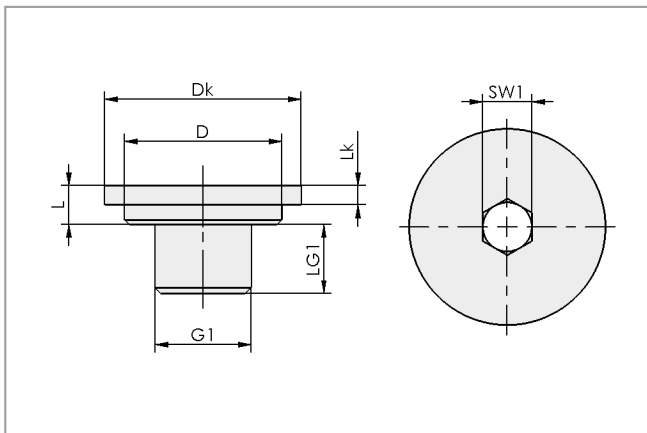


ANW G1/8-IG G1/8-AG to G3/8-IG G1/2-AG

Type	Dimensions in mm									
	dn	G1	G2	G3	H	H1	LG1	LG2	LG3	SW1
ANW M5-IG M5-IG	-	M5-F	M5-F	M5-F	18	8.5	6.0	5	5	10
ANW G1/8-IG G1/8-AG	6.6	G1/8"-F	G1/8"-M	G1/8"-F	21	7.5	9.5	7	6	16
ANW G1/8-IG G1/4-AG	8.0	G1/8"-F	G1/4"-M	G1/4"-F	26	8.0	11.0	10	10	18
ANW G3/8-IG G3/8-AG	10.0	G3/8"-F	G3/8"-M	G1/2"-F	35	10.5	13.0	10	12	24
ANW G3/8-IG G1/2-AG	10.0	G3/8"-F	G1/2"-M	G1/2"-F	35	10.5	13.0	10	12	24



Design Data VRS-AN



VRS-AN

Type	Dimensions in mm						
	D	Dk	G1	L	LG1	Lk	SW1
VRS-AN M5-AG	10	14	M5-M	4	5.5	2	3
VRS-AN G1/8-AG	16	20	G1/8"-M	4	7.0	2	5
VRS-AN G1/4-AG	20	25	G1/4"-M	6	10.0	3	6
VRS-AN G1/2-AG	28	32	G1/2"-M	7	11.0	3	10

Holder for Suction Cups and Spring Plungers



Bulkhead Connectors SVS-GE

Suction cup connection G1/8" and G1/4"



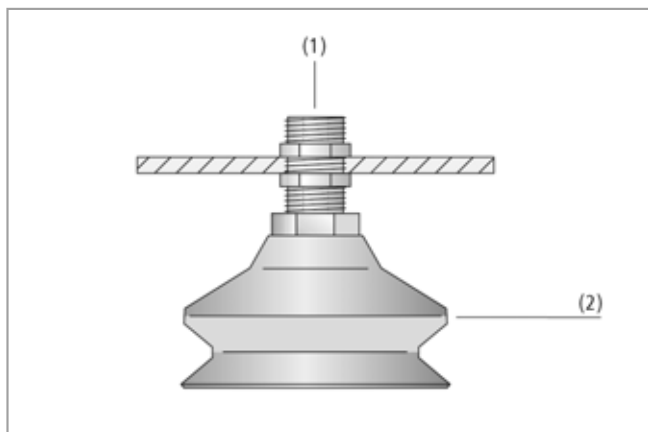
Suitable for Industry Specific Applications



Bulkhead connectors SVS-GE

Applications

- Bulkhead connector for mounting of suction cups
- Adaptation of hose connections



System design bulkhead connectors SVS-GE

Design

- Stainless-steel sleeve with male and female threads
- Two locking (galvanized) nuts included
- Flats for spanner on male thread
- Vacuum connection (1) by plug-in union (not included in delivery), see chapter "Filters and Connections"
- Suitable suction cups (2) can be found in section "Vacuum Suction Cups"



Mounting example bulkhead connectors SVS-GE

Our Highlights...

- Bulkhead fitting with G1/8" -IG and G1/4" -IG threads
- Male thread over the entire length
- Locking nuts included
- Stainless steel
- Hose connection can be combined with Schmalz plug-in unions

Your Benefits...

- > All suction cups and nipples with G1/8" -AG and G1/4" -AG threads can be screwed in
- > Permits precise adjustment of the suction-cup position
- > No further mounting elements needed
- > No corrosion, high stability
- > Easy adaptation to various hose diameters

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Bulkhead Connectors SVS-GE

Suction cup connection G1/8" and G1/4"

Designation Code Bulkhead Connectors SVS-GE

Abbreviated designation	Male thread	Connection thread	Fitting length in mm
Example SVS-GE M16x1-AG G1/8-IG 30:			
SVS-GE	M16x1-AG	G1/8-IG	30
SVS-GE	M16x1-AG (AG = male (M))	G1/8-IG (IG = female (F))	30
	M20x1.5-AG	G1/4-IG	

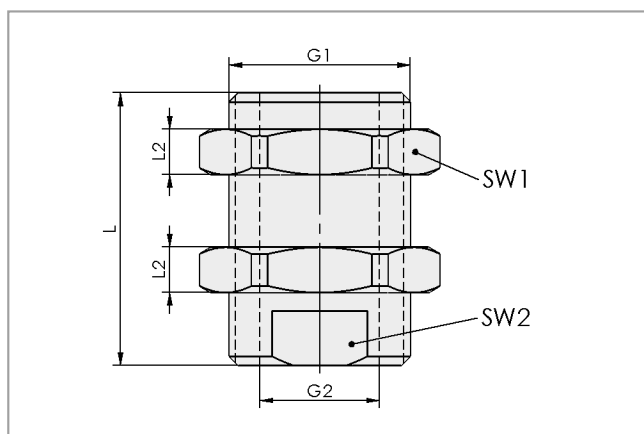
Ordering Data Bulkhead Connectors SVS-GE

Bulkhead connector SVS-GE is delivered as a ready to connect product, including two locking nuts.

Bulkhead Connectors SVS-GE

Type	Part Number
SVS-GE M16x1-AG G1/8-IG 30	10.08.03.00181
SVS-GE M20x1.5-AG G1/4-IG 30	10.08.03.00180

Design Data Bulkhead Connectors SVS-GE



SVS-GE

Type	Dimensions in mm						
	G1	G2	L	L2	SW1	SW2	
SVS-GE M16x1-AG G1/8-IG 30	M16x1-M	G1/8"-F	30	5	22	13	
SVS-GE M20x1.5-AG G1/4-IG 30	M20x1.5-M	G1/4"-F	30	5	24	17	

Holder for Suction Cups and Spring Plungers



Holders for Light-Metal Sections HTR-STA

Mountings for spring plungers from M5 to G1/4"



Suitable for Industry Specific Applications



Holders for light-metal sections HTR-STA

Applications

- Holder for mounting of suction cups and spring plungers on light-alloy sections

Design

- Size 47: sheet-steel holder with mounting holes
- Size 55 and 62: angled aluminum bracket with mounting holes
- Delivered complete with M8 mounting screw and position locking pin



Mounting example holders HTR-STA FL

Our Highlights...

- Sliding mounting of light-alloy sections with slots
- Direct mounting of suction cups and spring plungers
- Fits spring plungers of the sizes M5 to G1/4"

Your Benefits...

- > Flexible use, quick conversion, short set-up times
- > For universal use
- > Very versatile



Mounting example holders HTR-STA WI

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Holder for Suction Cups and Spring Plungers



Holder for Light-Metal Sections HTR-STA

Mountings for spring plungers from M5 to G1/4"

Designation Code Holders for Light-Metal Sections HTR-STA

Abbreviated designation	Dimensions length in mm	Cross-beam connection	Diameter spring plunger connection in mm	Shape
Example HTR-STA 55 1N D20 WI:				
HTR-STA	55	1N	D20	WI
HTR-STA	47	1N 1 sliding block	D10/D16	FL flat
	55		D20	WI angle
	62		D30	

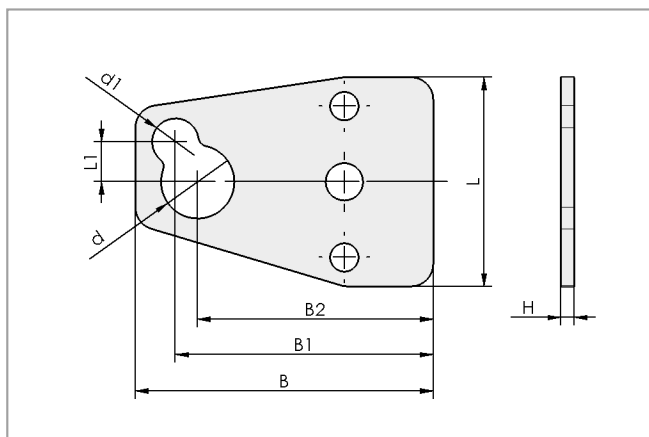
Ordering Data Holders for Light-Metal Sections HTR-STA

Holder for light-metal sections HTR-STA is delivered as a ready to connect product including mounting screws and position locking pin.

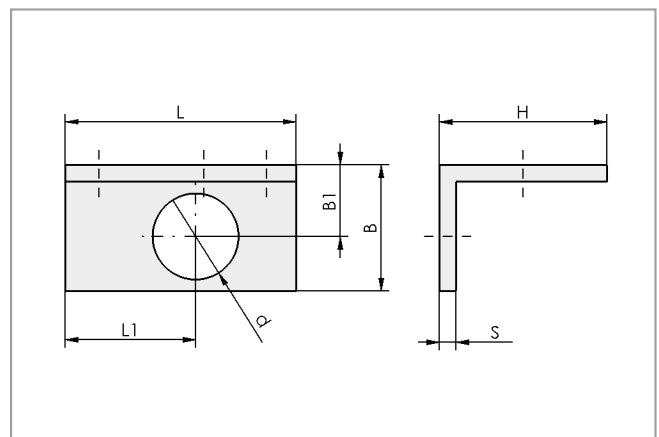
Holder for Light-Metal Sections HTR-STA

Type	Part Number
HTR-STA 47 1N D10/16 FL	10.08.03.00085
HTR-STA 55 1N D20 WI	10.08.03.00086
HTR-STA 62 1N D30 WI	10.08.03.00148

Design Data Holders for Light-Metal Sections HTR-STA



HTR-STA FL



HTR-STA WI

Type	Dimensions in mm									
	B	B1	B2	d	d1	H	L	L1	s	
HTR-STA 47 1N D10/16 FL	67	58	53	17	11	3	47	9	-	
HTR-STA 55 1N D20 WI	30	17	-	21	-	40	55	31	4	
HTR-STA 62 1N D30 WI	50	27	-	31	-	40	62	40	5	

Holder for Suction Cups and Spring Plungers



Holders for Square Tubes HTR-ST5



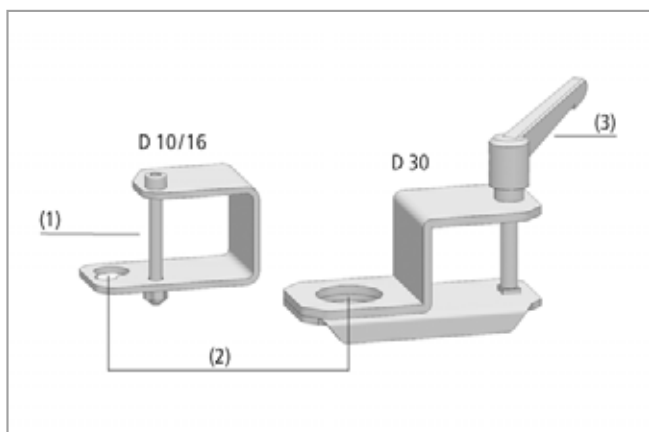
Suitable for Industry Specific Applications



Holders for square tubes HTR-ST5

Applications

- Holder for mounting of suction cups and spring plungers on square tubes



System design holders for square tubes HTR-ST5

Design

- Folded holder made from sheet steel with drilled mounting holes (2)
- Size D10/16: secured to square tube with machine screw (1)
- Size D30: secured to square tube with clamping lever and machine screw (3)



Mounting example holders HTR-ST5

Our Highlights...

- Sliding mounting on square tubes
- Direct mounting of suction cups and spring plungers
- Secured with clamping lever (type ST5-...-D30)
- Fits spring plungers of the sizes M5 to G1/2"

Your Benefits...

- > Flexible use, quick conversion, short set-up times
- > For universal use
- > Can be secured and adjusted without tools
- > Very versatile

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Holder for Suction Cups and Spring Plungers



Holders for Square Tubes HTR-STs

Designation Code Holders for Square Tubes HTR-STs

Abbreviated designation	For square section dimensions in mm	Diameter spring plunger connection in mm	Shape
Example HTR-STs 30x30 D10/16 WI:			
HTR-STs	30x30	D10/16	WI
HTR-STs	30x30 40x40 50x50 60x60	D10/D16 D30	WI angle

Ordering Data Holders for Square Tubes HTR-STs

Holder for square tubes HTR-STs is delivered as a ready to connect product.

Available accessories: spacer washer and flat washer

Holder for Square Tubes HTR-STs

Type	Part Number
HTR-STs 30x30 D10/16 WI	10.08.03.00088
HTR-STs 40x40 D10/16 WI	10.08.03.00089
HTR-STs 40x40 D30 WI	10.08.03.00090
HTR-STs 50x50 D30 WI	10.08.03.00091
HTR-STs 60x60 D30 WI	10.08.03.00092

Ordering Data Accessories Holders for Square Tubes HTR-STs

Type*	Spacer washer - M16 for spring plunger FSTE G1/8	Spacer washer - M18 for spring plunger FSTI G1/4; G3/8	Spacer washer - M20 for spring plunger FST(E/A) G1/4	Flat washer - M30 for spring plunger FST(E/A) G1/2
HTR-STs 30x30 D10/16 WI	-	-	-	-
HTR-STs 40x40 D10/16 WI	-	10.01.03.06140	-	-
HTR-STs 40x40 D30 WI	10.01.01.10025	10.01.03.06140	10.01.01.10015	20.06.01.00044
HTR-STs 50x50 D30 WI	10.01.01.10025	10.01.03.06140	10.01.01.10015	20.06.01.00044
HTR-STs 60x60 D30 WI	10.01.01.10025	10.01.03.06140	10.01.01.10015	20.06.01.00044

*Attention: For mounting of each spring plunger use two washers always

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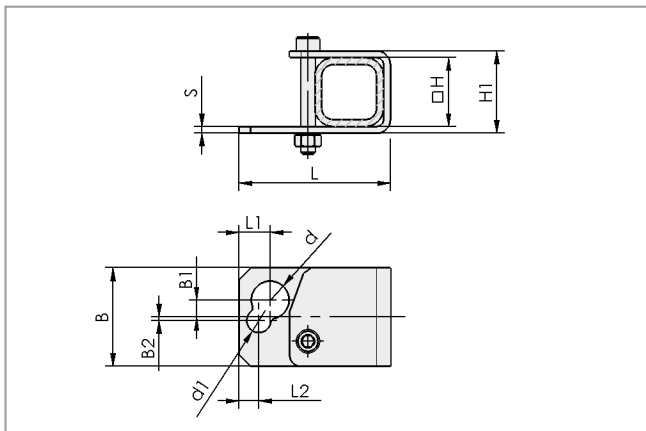
Holder for Suction Cups and Spring Plungers



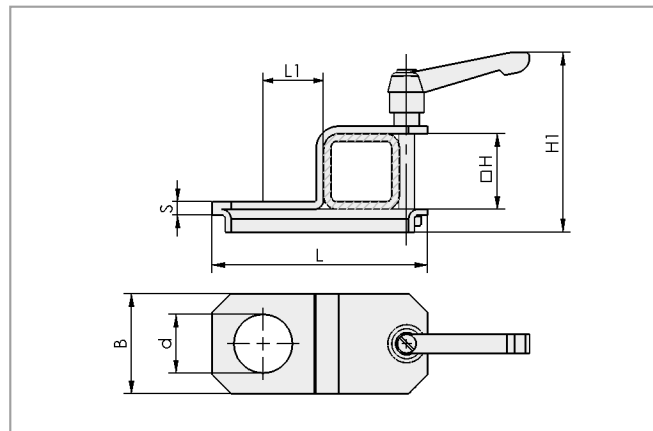
Holders for Square Tubes HTR-ST5



Design Data Holders for Square Tubes HTR-ST5



HTR-ST5 D10/16



HTR-ST5 D30

Type	Dimensions in mm											
	B	B1	B2	d	d1	H	H1	L	L1	L2	s	
HTR-ST5 30x30 D10/16 WI	43	7.5	1.5	16.5	10.5	30	36	66	11	8.5	3	
HTR-ST5 40x40 D10/16 WI	43	7.5	1.5	16.5	10.5	40	46	76	11	8.5	3	
HTR-ST5 40x40 D30 WI	53	-	-	31.0	-	40	95	114	32	-	7	
HTR-ST5 50x50 D30 WI	53	-	-	31.0	-	50	105	124	32	-	7	
HTR-ST5 60x60 D30 WI	53	-	-	31.0	-	60	115	134	32	-	7	

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Holder for Suction Cups and Spring Plungers



Universal Holders HTR-UNI

Connection G1/4"



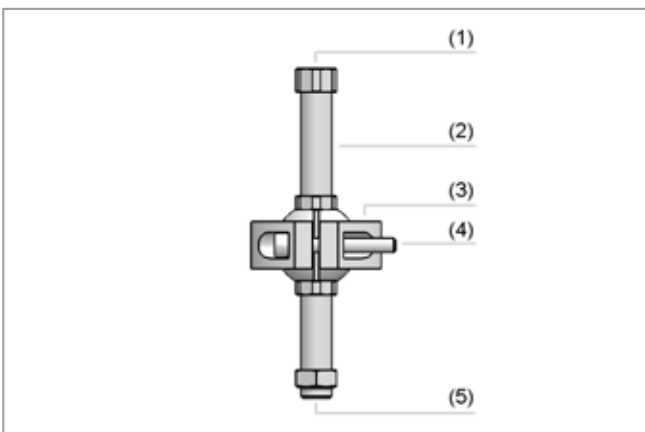
Suitable for Industry Specific Applications



Universal holders HTR-UNI

Applications

- Universal holder for mounting of vacuum components on existing cross-beams made of square or round tubes with the aid of various adapters
- Adjustable height and inclination for flexible adaptation to workpieces



System design universal holders HTR-UNI

Design

- Holder made of high-strength, anodized aluminum, consisting of holder tube (2), ball clamp (3) and various adapters for mounting of square and round tubes
- Threaded tube (5) has a G1/4" thread at the bottom for a suction cup and a G1/4" thread at the top (1) for connection of a vacuum line or an inline ejector
- Incl. securing screws (4)



Suction cups with universal holders HTR-UNI being used for handling sheet metal

Our Highlights...

- Adjustment and fixing with ball clamp
- Adjustable height and inclination
- Suitable for mounting on square and round tubes
- Suction cups can be screwed directly into the G1/4" thread

Your Benefits...

- > Flexible use, rapid changing, short set-up times
- > Flexible adaptation to workpieces with, e.g. curved sheet metal
- > For universal use
- > Quick and efficient construction of a load cross-beam

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Holder for Suction Cups and Spring Plungers



Universal Holders HTR-UNI

Connection G1/4"

Designation Code Universal Holders HTR-UNI

Abbreviated designation	Cross-beam connection	Connection thread	Dimensions in mm
Example HTR-UNI 1N G2 80:			
HTR-UNI	1N	G2	80
HTR-UNI	1N 1 sliding block	G2 connection thread	80
	2N 2 sliding blocks	G1/4-AG	110
			140
			200

Ordering Data Universal Holders HTR-UNI

Holder HTR-UNI is delivered unassembled. The delivery consists of:

- Holder tube – available in various lengths
- Ball clamp – available in various versions

Available accessories: section adapter, tube adapter, tube adapter reducing piece, suction cup connection

Universal Holders HTR-UNI

Type	Part Number
HTR-UNI 1N G2 80	10.01.03.00107
HTR-UNI 2N G2 80	10.01.03.00223
HTR-UNI 2N G2 80*	10.01.03.00298
HTR-UNI 2N G2 110*	10.01.03.00328
HTR-UNI 2N G2 140*	10.01.03.00299
HTR-UNI 2N G2 200	10.01.03.00309

*Incl. two lock nuts

Ordering Data Universal Holders HTR-UNI

Type	Part Number
HTR-STB 30x30 UNI*	10.01.03.00135
HTR-STC D32 UNI**	10.01.03.00108
BUCHSE 32-25x21 PA***	10.01.03.00097
SAUG-ANB G1/4-AG 80	10.01.03.00292
SAUG-ANB G1/4-AG 110	10.01.03.00327
SAUG-ANB G1/4-AG 140	10.01.03.00291
SAUG-ANB G1/4-AG 200	10.01.03.00308

*Square adapter for mount. on square sections 30x30 mm (HTR-UNI 1N G2)

**Tube adapter for mounting on round tubes with diameter 32 mm (HTR-UNI 1N G2)

***Tube adapter reducing piece for tubes with diameter 25 mm (HTR-UNI 1N G2)

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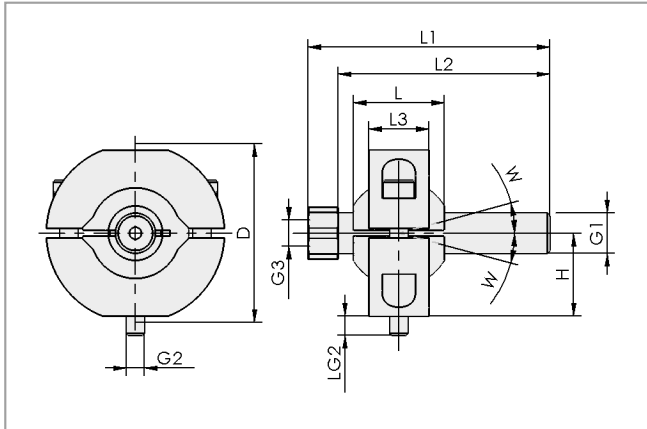


Universal Holders HTR-UNI

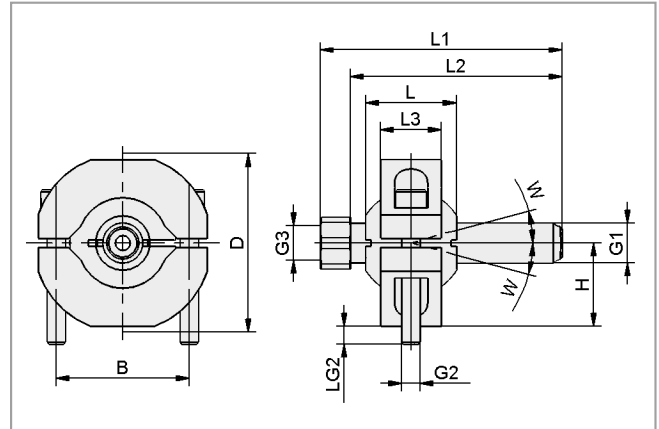
Connection G1/4"



Design Data Universal Holders HTR-UNI



HTR-UNI 1N G2



HTR-UNI 2N G2

Type	Dimensions in mm											
	B	D	G1	G2	G3	H	L	L1	L2	L3	LG2	W
HTR-UNI 1N G2 80	-	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 80	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 80*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 110*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	110	100	20	6	15
HTR-UNI 2N G2 140*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	140	130	20	6	15
HTR-UNI 2N G2 200	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	200	190	20	6	15

*Incl. two lock nuts

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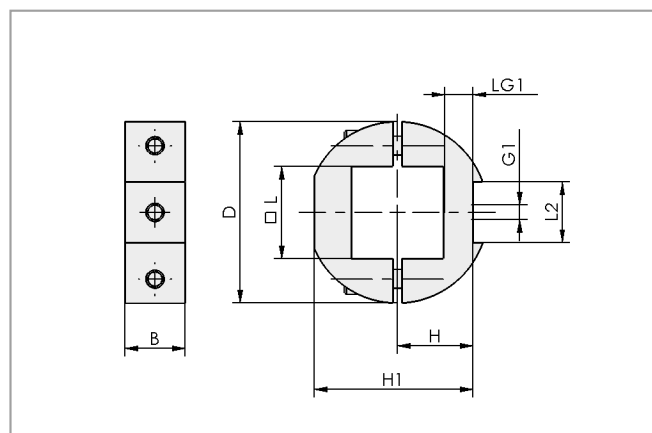
Holder for Suction Cups and Spring Plungers



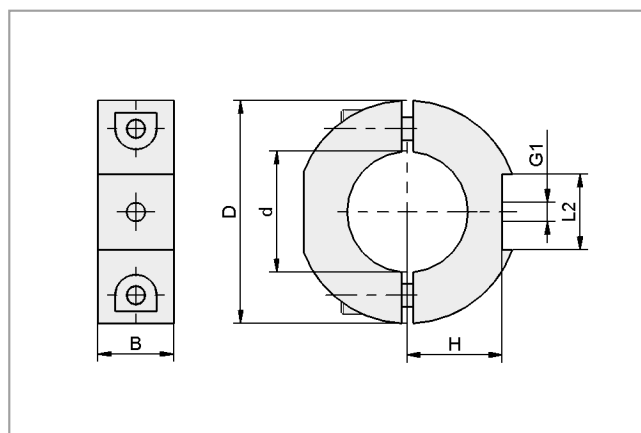
Universal Holders HTR-UNI

Connection G1/4"

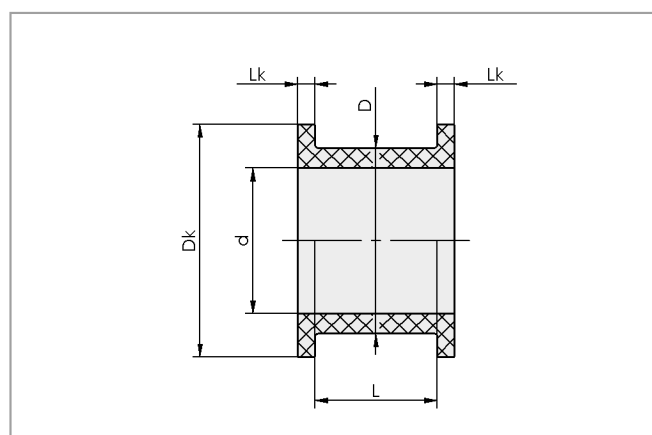
Design Data Universal Holders HTR-UNI



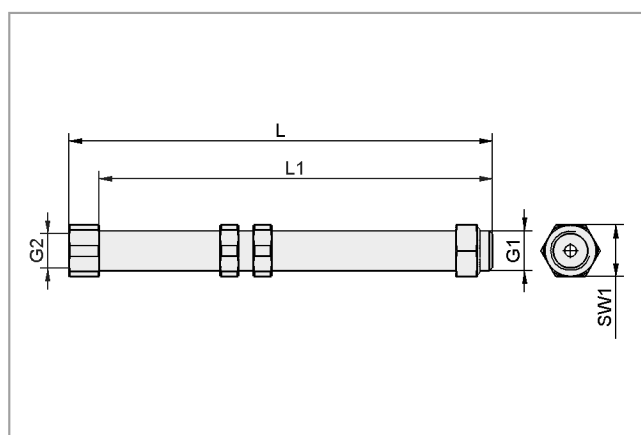
HTR-STB 30x30 UNI



HTR-STC D32 UNI



BUCHSE 32-25x21 PA



SAUG-ANB...

Type	Dimensions in mm														
	B	d	D	Dk	G1	G2	H	H1	L	L1	L2	LG1	Lk	SW1	
HTR-STB 30x30 UNI	20	-	58.9	-	M6-F	-	25	52.5	30.5	-	20.1	10	-	-	
HTR-STC D32 UNI	20	32	58.9	-	M6-F	-	25	-	-	-	20.1	12	-	-	
BUCHSE 32-25x21 PA	-	25	32.0	40	-	-	-	-	21.0	-	-	-	3	-	
SAUG-ANB G1/4-AG 80	-	-	-	-	G1/4"-M	G1/4"-F	-	-	80.0	70	-	-	-	17	
SAUG-ANB G1/4-AG 110	-	-	-	-	G1/4"-M	G1/4"-F	-	-	110.0	100	-	-	-	17	
SAUG-ANB G1/4-AG 140	-	-	-	-	G1/4"-M	G1/4"-F	-	-	140.0	130	-	-	-	17	
SAUG-ANB G1/4-AG 200	-	-	-	-	G1/4"-M	G1/4"-F	-	-	200.0	190	-	-	-	17	

Sections and Connectors



Mounting Sections MO-PROF

Cross-section: 40 x 40 mm und 80 x 40 mm



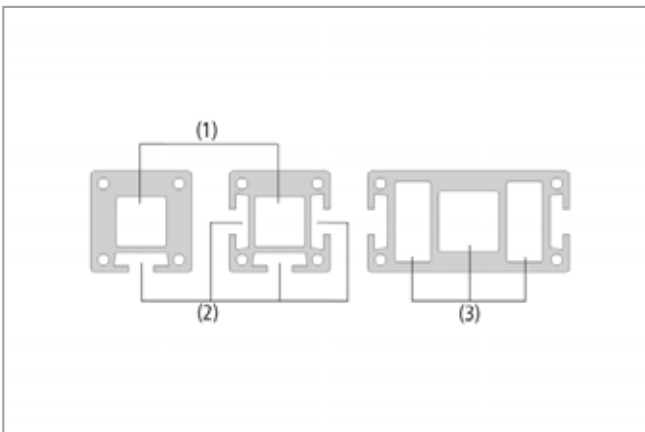
Suitable for Industry Specific Applications



Mounting sections MO-PROF

Applications

- Mounting section for flexible construction of tailor-made load cross-beams
- Used as load cross-beam and vacuum distributor
- Three-chamber section permits distribution of different vacuum and compressed-air pressures



System design mounting sections MO-PROF

Design

- Hollow extruded aluminium sections
- 40 x 40 mm section with one chamber (1) and optionally with one or three grooves on the sides (2)
- 80 x 40 mm section with three chambers (3) and two grooves on the sides
- Holes and slots at the ends for assembly with the aid of elbow and corner connectors, sealing plates and other accessories



Mounting example mounting sections MO-PROF

Our Highlights...

- Vacuum-tight hollow section with internal chambers
- Suction cups can be screwed directly into the sections
- Sections with grooved sides
- High-strength extruded aluminium sections
- Wide range of accessories such as corner connectors, sealing plates, etc.

Your Benefits...

- > Vacuum/compressed air can be carried directly in the sections
- > Hose-free, integrated vacuum distribution from a central connection to the individual suction cups
- > Simple attachment of mounting elements such as holders and plungers
- > Low weight combined with high load capacity and maximum precision
- > Complete modular system for the flexible construction of load cross-beams

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Mounting Sections MO-PROF

Cross-section: 40 x 40 mm und 80 x 40 mm

Designation Code Mounting Sections MO-PROF

Abbreviated designation	Dimensions in mm	Shape
Example MO-PROF 40x40 3 TN:		
MO-PROF	40x40	3 TN
MO-PROF	40x40	1 TN 1 slot
	80x40	2 TN 2 slots
		3 TN 3 slots

Ordering Data Mounting Sections MO-PROF

Mounting sections MO-PROF is delivered in the desired length.

Available accessories: sealing plate, sealing frame, section connector, mounting bracket, sliding block, drilling jig, self-cutting lens head screws

Mounting Sections MO-PROF

Type	Part Number
MO-PROF 40 1TN AL-1	26.07.01.00023
MO-PROF 40 3TN AL-1	26.07.01.00022
MO-PROF 80x40 2TN AL-1	26.07.01.00021

Ordering Data Accessories Mounting Sections MO-PROF

Type	Type	Part Number
VRS-PL-40 MO-PROF	Sealing plate	25.09.06.00008
VRS-PL-40 G1/2-IG MO-PROF	Sealing plate	25.09.06.00009
VRS-PL-40x40 MO-PROF	Sealing plate	25.09.06.00026
VRS-PL-80x40 MO-PROF	Sealing plate	25.09.06.00001
VRS-PL-80x40 G1/2-IG MO-PROF	Sealing plate	25.09.06.00010
DI-RA 40 PPTA	Sealing frame	10.07.08.00131
DI-RA 80x40 PPTA	Sealing frame	10.07.08.00132
SCHR WN1552 5x20 ST VZ T25	Self-cutting lens head screw	20.10.03.00008
VBR-PR 185x185x3 K-FL	Section connector	25.09.06.00005
VBR-PR 150x3 E-FL	Section connector	25.09.06.00006
VBR-PR 40x55x55 E-V	Section connector	10.08.03.00099
BEF-WIN 40x40x40 5	Mounting bracket	25.09.06.00007
NUT-STEI 20x10 M6-IG 10	Sliding block	25.09.06.00002
NUT-STEI 20x10 M8-IG 10	Sliding block	25.09.06.00003
NUT-STEI 20x20 M8-IG 10	Sliding block	25.09.06.00012
BOHR-SCHAB MO-PROF 40x40-1N	Drilling template	10.08.03.00100

Technical Data Mounting Sections MO-PROF

Type	Area [cm ²]	Resistance moment Wx [cm ³]	Resistance moment Wy [cm ³]	Area moment Ix [cm ⁴]	Area moment Iy [cm ⁴]	Mass [kg/m]	Warping (max) [mm/m]	Length (max) [mm]	Sealing material
MO-PROF 40 1TN AL-1	9.1	6.9	9.6	13.7	17.0	2.5	0.8	6100	Al Mg Si 0,5 F22
MO-PROF 40 3TN AL-1	6.5	5.5	5.2	12.7	10.4	1.8	0.8	6100	Al Mg Si 0,5 F22
MO-PROF 80x40 2TN AL-1	12.1	14.0	19.3	28.1	77.2	3.3	0.8	6100	Al Mg Si 0,5 F22

Sections and Connectors

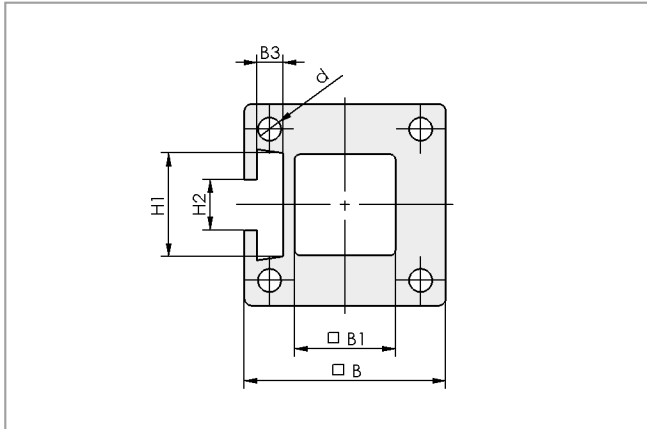


Mounting Sections MO-PROF

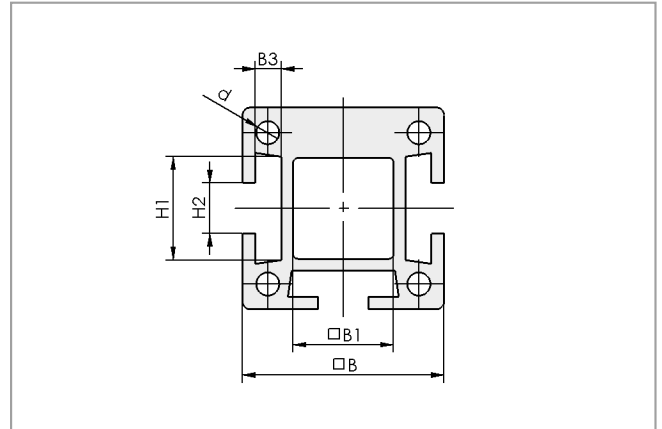
Cross-section: 40 x 40 mm und 80 x 40 mm



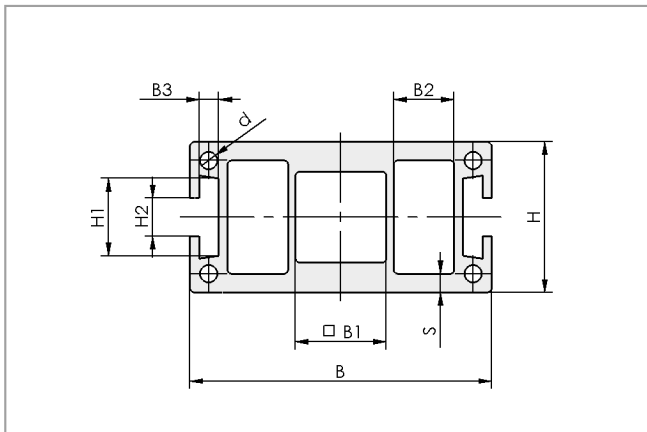
Design Data Mounting Sections MO-PROF



MO-PROF 40 x 40 1TN



MO-PROF 40 x 40 3TN



MO-PROF 80 x 40 2TN

Type	Dimensions in mm									
	B	B1	B2	B3	d	H	H1	H2	s	
MO-PROF 40 1TN AL-1	40	20	-	5.2	4.6	-	20.5	10	-	
MO-PROF 40 3TN AL-1	40	20	-	5.2	4.6	-	20.5	10	-	
MO-PROF 80x40 2TN AL-1	80	24	14.3	5.2	4.6	40	20.5	10	4	

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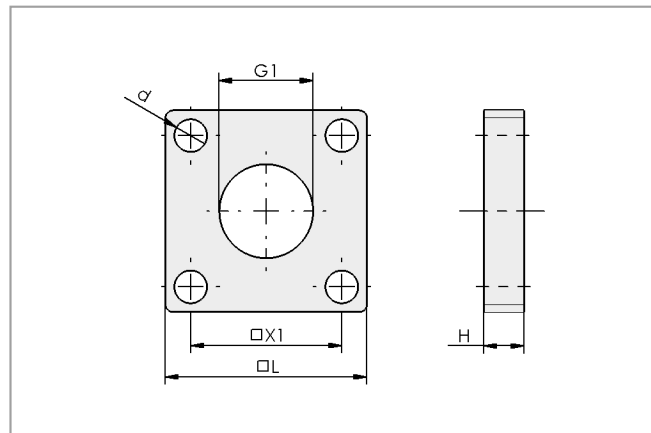
Sections and Connectors



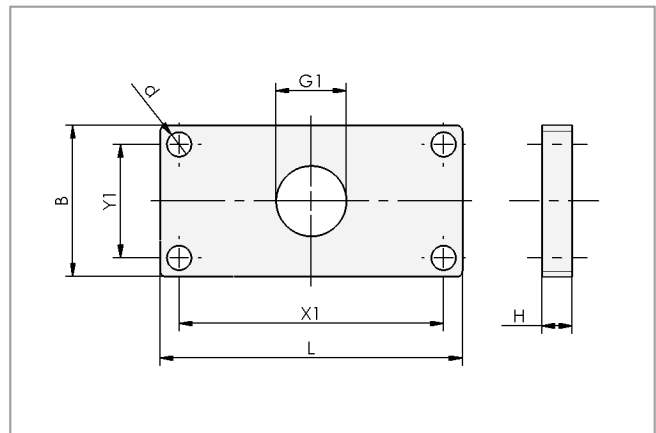
Mounting Sections MO-PROF

Cross-section: 40 x 40 mm und 80 x 40 mm

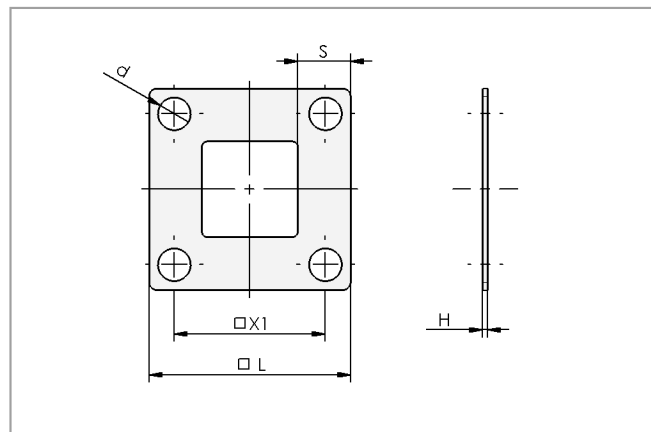
Design Data Accessories Mounting Sections MO-PROF



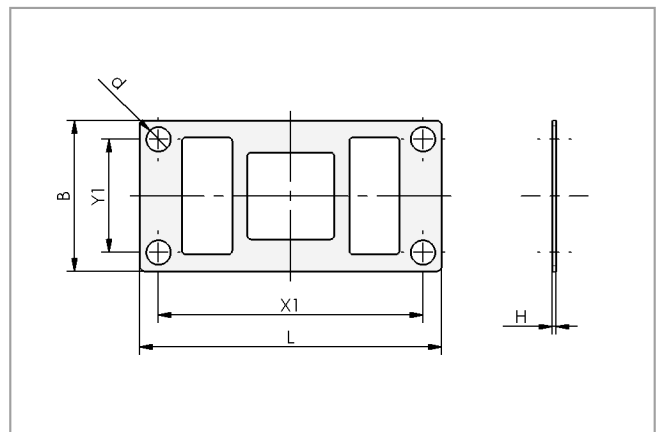
VRS-PL-40 (G1/2-IG) MO-PROF



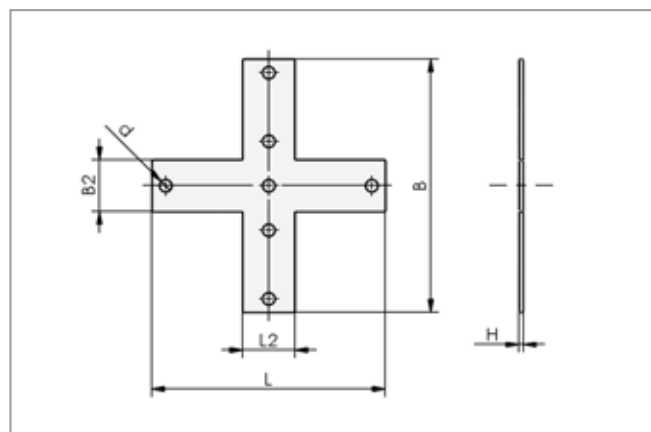
VRS-PL-80 x 40 (G1/2-IG) MO-PROF



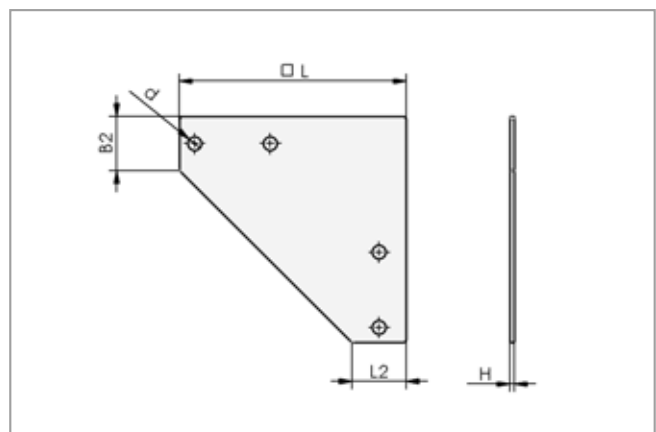
DI-RA 40 PPTA



DI-RA 80 x 40 PPTA



VBR-PR 185 x 185 x 3 K-FL



VBR-PR 150 x 3 E-FL

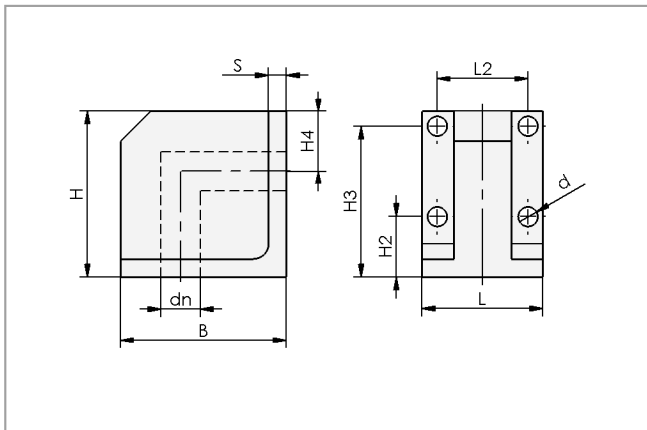
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Sections and Connectors

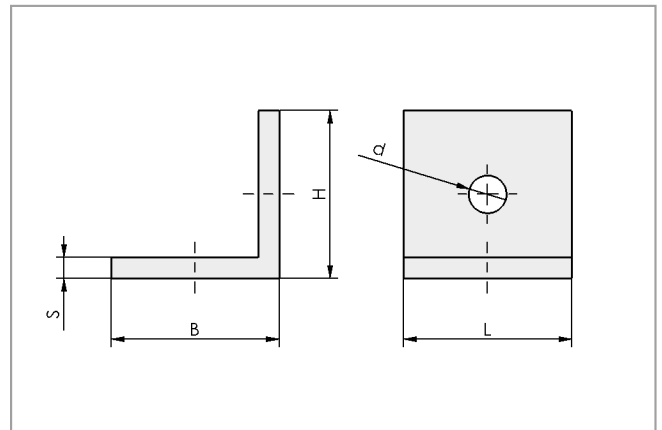


Mounting Sections MO-PROF

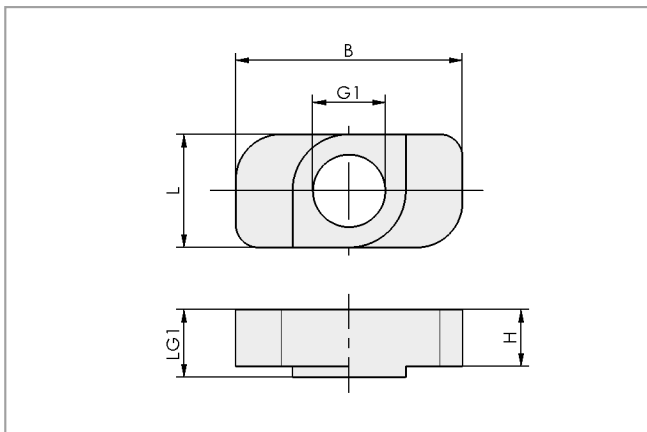
Cross-section: 40 x 40 mm und 80 x 40 mm



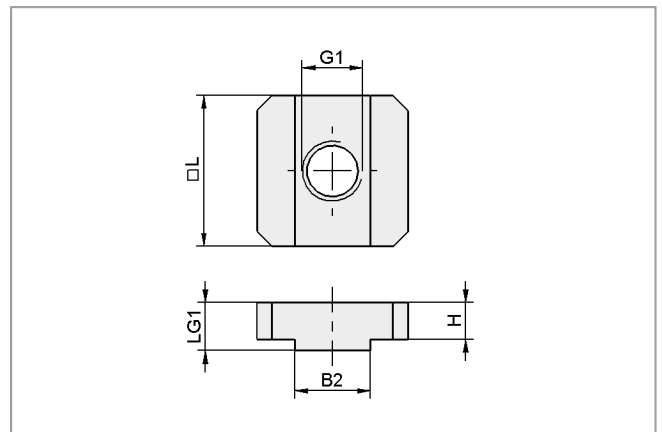
VBR-PR 40 x 55 x 55 E-V



BEF-WIN 40 x 40 x 40 5



NUT-STEI 20 x 10 M6-IG/ M8-IG 10



NUT-STEI 20 x 20 M8-IG 10

Type	Dimensions in mm															
	B	B2	d	dn	G1	H	H2	H3	H4	L1	L2	LG1	s	X1	Y1	
VRS-PL-40 MO-PROF	-	-	6.5	-	-	4.0	-	-	-	40.0	-	-	-	30.0	-	
VRS-PL-40 G1/2-IG MO-PROF	-	-	6.5	-	G1/2"-F	10.0	-	-	-	40.0	-	-	-	30.0	-	
VRS-PL-40x40 MO-PROF	40.0	-	-	-	-	20.0	-	-	-	40.0	-	-	-	-	-	
VRS-PL-80x40 MO-PROF	40.0	-	6.5	-	-	8.0	-	-	-	80.0	-	-	-	70.0	30.0	
VRS-PL-80x40 G1/2-IG MO-PROF	40.0	-	6.5	-	G1/2"-F	8.0	-	-	-	80.0	-	-	-	70.0	30.0	
DI-RA 40 PPTA	-	-	6.5	-	-	1.0	-	-	-	40.0	-	-	10.5	30.0	-	
DI-RA 80x40 PPTA	40.0	-	6.5	-	-	1.0	-	-	-	80.0	-	-	-	70.0	30.0	
SCHR WN1552 5x20 ST VZ T25	-	-	-	-	-	-	-	-	-	20.0	-	-	-	-	-	
VBR-PR 185x185x3 K-FL	185.0	38.0	9.0	-	-	3.0	-	-	-	185.0	38.0	-	-	-	-	
VBR-PR 150x3 E-FL	-	36.0	9.0	-	-	3.0	-	-	-	150.0	36.0	-	-	-	-	
VBR-PR 40x55x55 E-V	55.0	-	6.5	13.0	-	55.0	20.0	50.0	20.0	40.0	30.0	-	6.0	-	-	
BEF-WIN 40x40x40 5	40.0	-	9.0	-	-	40.0	-	-	-	40.0	-	-	5.0	-	-	
NUT-STEI 20x10 M6-IG 10	10.0	-	-	-	M6-F	5.0	-	-	-	20.0	-	6.0	-	-	-	
NUT-STEI 20x10 M8-IG 10	10.0	-	-	-	M8-F	5.0	-	-	-	20.0	-	6.0	-	-	-	
NUT-STEI 20x20 M8-IG 10	-	10.0	-	-	M8-F	4.9	-	-	-	20.0	-	6.4	-	-	-	
BOHR-SCHAB MO-PROF 40x40-1N	50.0	-	-	-	-	20.0	-	-	-	50.0	-	-	-	-	-	

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Selection Aid		Page
		468
Selection by Suction Capacity		
Ejector modules		
	Ejector Modules ecoPump SEP <ul style="list-style-type: none"> • Suction rate up to 309 l/min • For airtight or porous workpieces 	 <p>Efficient ejector with eco nozzle technology for space-saving installation directly on the suction cup or as an insert nozzle.</p>
Basic Ejectors		
	Basic Ejectors SEG <ul style="list-style-type: none"> • Suction capacity up to 370 l/min • Max. vacuum 85% • Body made of anodized aluminum 	 <p>Robust basic ejector with aluminum basic body for universal use, especially in systems with decentralized vacuum generation.</p>
	Basic Ejectors SBP <ul style="list-style-type: none"> • Suction capacity up to 215 l/min • Max. vacuum 85% • Plastic housing 	 <p>Compact basic ejector with plastic body for high-speed handling of suction-tight workpieces, especially in systems with decentralized vacuum generation.</p>
	Basic Ejectors SBP-C with Additional Functions <ul style="list-style-type: none"> • Suction capacity up to 215 l/min • Max. vacuum 85% • Body made of plastic • Integrated valve technology and vacuum monitoring 	 <p>Basic ejector with plastic body, integrated valve technology and vacuum switch for optimal cycle times.</p>
	Basic Ejectors SBPL <ul style="list-style-type: none"> • Suction capacity: 290 to 1,140 l/min • Max. vacuum: 61 to 90% • Body made of plastics 	    <p>Eco nozzle technology-equipped basic ejector with extremely high suction rate for handling air-tight or even porous workpieces, especially in systems with centralized vacuum generation.</p>

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Inline Ejectors



Inline Ejectors SLP

- Suction capacity up to 16 l/min
- Max. vacuum 85%
- Body made of plastic



Lightweight, compact inline ejector with plastic body for space-saving, decentralized vacuum generation directly in the hose line.

509



Inline Ejectors VR

- Suction capacity up to 24 l/min
- Max. vacuum 85%
- Body made of aluminum



Robust inline ejector with aluminum body for space-saving decentralized vacuum generation and mounting directly on the suction cup.

513

Decentralized Ejectors



Ejectors with Active Blow Off SEAC

- Suction capacity up to 35 l/min
- Max. vacuum 85%
- Body made of plastic



Ejector with plastic body and integrated active blow off function from compressed air is built in minimum size and weight for decentralized vacuum generation in highly dynamic processes.

517



Ejectors with Blow Off System SEAC RP

- Suction capacity: up to 35 l/min
- Max. vacuum 85%



Ejector with anodized aluminum body and integrated pneumatic air-saving regulation as well as active blow off using compressed air is built in minimum size for decentralized vacuum generation in highly dynamic processes.

522



Ejectors with Atmospheric Ventilation SEAC ECO

- Suction capacity up to 35 l/min
- Max. vacuum 85%
- With atmospheric ventilation



Ejector with anodized aluminum body and integrated atmospheric ventilation for lowest possible operating costs is built in minimum size, for decentralized vacuum generation in dynamic processes.

527

Compact Ejectors



Compact Ejectors SCPM

- Suction capacity 6 to 23 l/min
- Max. vacuum 85%
- Body made of aluminum



Lightweight compact ejector in minimum model size with optional system monitoring and optional air-saving regulation for dynamic processes in tight spaces.

532

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Vacuum Generators

At a Glance

	Compact Ejectors SCPS / SCPSi		536
<ul style="list-style-type: none"> • Suction capacity up to 67 l/min • Max. vacuum 85% • Body made of plastic 	Small compact ejector with efficient eco nozzle technology, air saving function, user-friendly display and optional IO-Link technology. For use in dynamic processes in confined spaces.	Schmalz - The Company	
	Compact Ejectors SCPSb		542
<ul style="list-style-type: none"> • Suction capacity up to 67 l/min • Max. vacuum 85% • Body made of plastic 	Small compact ejector with efficient eco nozzle technology for processes in confined spaces.	Vacuum Knowledge Vacuum Suction Cups	
	Compact Ejectors SCPi / SMPi		548
<ul style="list-style-type: none"> • Suction capacity up to 185 l/min • Max. vacuum 85% 	Lightweight, small compact ejector with integrated system monitoring, IO-Link, air-saving regulation and optional power blow off for highly dynamic, efficient processes.	Special Grippers Vacuum Gripping Systems	
	Compact Ejectors SCP / SMP		554
<ul style="list-style-type: none"> • Suction capacity up to 200 l/min • Max. vacuum 85% • Body made of aluminum 	Lightweight, small compact ejector with optional system monitoring and optional air-saving regulation for efficient processes.	Mounting Elements Vacuum Generators	
	Compact Ejectors SCP-FS		555
<ul style="list-style-type: none"> • Suction capacity up to 200 l/min • Max. vacuum 85% • Body made of aluminum 	Externally controlled compact ejector with optional system monitoring for control of pneumatic valves.	Valve Technology Switches and Monitoring	
	Compact Ejectors X-Pump SXPi / SXMPi with IO-Link		556
<ul style="list-style-type: none"> • Suction capacity up to 220 l/min • Max. vacuum 85% • Body made of plastic 	High end compact ejector with IO-Link interface, pressure monitoring and air saving function for comprehensive energy and process control. Mainly used in the automotive and sheet metal industries.	Filters and Connections Services	
	Compact Ejectors SEM-C	  	561
<ul style="list-style-type: none"> • Suction capacity up to 673 l/min • Max. vacuum 85% • Body made of aluminum • Multi-stage nozzle system 	Compact ejector with high suction rate and integrated system monitoring for handling of porous workpieces, especially in systems with centralized vacuum generation.	Contact Index of Products	

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Compact Terminals



Compact Terminal SCTMi



566

- Suction capacity 67 l/min
- Max. vacuum 85%
- Body made of plastic

Compact terminal consisting of 2 to 16 compact ejectors with eco nozzle technology, air saving function, energy and process control and IO-link interface. Output and configuration via smartphone using NFC technology. Use in dynamic and flexible processes.

Vacuum Units



Vacuum Units VE / VER



568

- Suction capacity 69 l/min
- Max. vacuum 80%

Complete vacuum unit with ejector, pressure-reducing valve and optional pneumatic control.

Vacuum Pumps



Dry-Running Vacuum Pumps EVE-TR



569

- Suction capacity up to 244 m³/h
- Max. vacuum 92%

Oil-free vacuum pump with integrated fan, permanently lubricated bearings, dry-running membrane and high efficiency for handling of dense parts.



Dry-Running Vacuum Pumps EVE-TR X



576

- Suction rate: 10 to 129 m³/h
- Max. vacuum: 92%

Oil-free vacuum pump with integrated fan, permanently lubricated bearings, significantly longer maintenance intervals thanks to minimized wear and high efficiency for handling dense parts.



Oil-Lubricated Vacuum Pumps EVE-OG



581

- Suction capacity up to 255 m³/h
- Max. vacuum 98%

Low-maintenance, oil-lubricated vacuum pump with oil separator, three-phase current drive and optionally with additional filter and motor protection switch for handling of dense parts.



Water-Ring Pumps EVE-WR



586

- Suction capacity up to 65 m³/h
- Max. vacuum 93%

Oil and maintenance-free as well as energy-saving water-ring pump with internal exhaust air drying and water refeeding for the highest standards for ambient air and temperature.

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Vacuum Generators

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	Vacuum Reservoirs VOL		587
	<ul style="list-style-type: none"> Capacities: 5 to 200 l 		Vacuum reservoir with non-return valve, manometer and dust filter for maintaining vacuum in case of power failure.
	Vacuum Centres VZ		588
	<ul style="list-style-type: none"> Suction capacity up to 165 m³/h Max. vacuum 98% Reservoir capacity up to 200 l 		Vacuum center with pump, vacuum reservoir and non-return valve as a complete product.
Vacuum Blowers			
	Vacuum Blowers SGBL-DG		591
	<ul style="list-style-type: none"> Suction capacity up to 540 m³/h Max. vacuum 46% 		Vacuum blower for handling of extremely porous workpieces using maximum volume flow.
	Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing		596
	<ul style="list-style-type: none"> Suction capacity up to 540 m³/h Max. vacuum 46% 		Vacuum blower with electro-pneumatic reversing valve for control of suction and blow off, handling extremely porous workpieces using maximum volume flow.
	Frequency-Regulated Vacuum Blowers SGBL-FU		601
	<ul style="list-style-type: none"> Suction capacity up to 335 m³/h Max. vacuum 50% 		Compact vacuum blower with frequency regulation for optimal performance adjustment to the given requirements.

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Vacuum Generators



Selection Aid

	Suction rate [l/min]	Nozzle size [mm]					Technical Data								
		1 – 10	11 – 100	101 – 500	501 – 1,000	1,001 – 5,000	5,001 – 10,0000	0 – 0.5	0.5 – 1	1 – 2	2 – 3	3 – 4	Max. vacuum [%]	Operating pressure [bar]	Operating temperature [°C]
Ejector modules															
SEP		13 – 309					0.3 – 1.6					60/91	3 – 5	0 – 60	0.8 – 22.8
Basic ejectors															
SEG		7 – 370						0.5 – 3				55/85	3 – 6	-10 – 80	10 – 404
SBP		8 – 215						0.5 – 2.5				85	3 – 6	0 – 60	7.5 – 50
SBP-C		8 – 215						0.5 – 2.5				85	3 – 6	0 – 60	87 – 143
SBPL			290 – 1,140						1.3 – 1.5 ¹⁾			60/91	3 – 5	0 – 60	750 – 1,500
Inline ejectors															
SLP		8 – 16						0.5 – 0.7				85	3 – 6	0 – 60	5
VR		7 – 21						0.5 – 0.9				87/90	3 – 6	0 – 60	15
Decentralized ejectors															
SEAC		35 – 63							1.0 – 1.5			85	3 – 6	0 – 50	62 – 157
SEAC RP		35 – 63							1.0 – 1.5			85	3 – 6	0 – 50	180
SEAC ECO		35							1.0			85	4 – 6	0 – 60	95
Feed ejectors															
SEC			215 – 8,640						6.0 – 75.0	→		5 – 25	2 – 6	-20 – 80	40 – 2,350
Compact ejectors															
SCPM		6 – 23						0.5 – 1.0				85	3 – 6	0 – 45	80
SCPS		16 – 67						0.7 – 1.5				85	2 – 6	0 – 50	195
SCPSi		16 – 67						0.7 – 1.5				85	2 – 6	0 – 50	195
SCPSb		16 – 67						0.7 – 1.5				85	2 – 6	0 – 50	165
SCPi/SMPi		75 – 195							1.5 – 2.5			85	4 – 7	0 – 50	560
SCP		37 – 200						1.0 – 3.0				85	4 – 7	0 – 45	465
SMP		65 – 200						1.5 – 3.0				85	4 – 7	0 – 45	275 – 465
SXPi/SXMPi		185 – 220						2.5 – 3.0				85	4 – 7	0 – 50	770 – 910
SEM-C			338 – 673						1.3 ²⁾			81 – 87	4 – 6	0 – 50	1,600 – 2,200
Pumps and blowers															
EVE-TR ⁵⁾		38 – 4,000										92	-	0 – 45	2.4 – 250
EVE-OG		166 – 4,250										98	-	-20 – 210	19 – 195
SGBL-DG			1,300 – 9,000									11 – 46	-	0 – 40	11 – 1,125

¹⁾The SBPL ejector can be expanded with up to 6 nozzles on a modular basis ²⁾The SEM-C ejector can be expanded with up to 4 nozzles on a modular basis ³⁾no filter, but sieve

Vacuum Generators

Selection Aid



Basic Functions									Additional Functions							i Series					Page	
Eco-nozzle technology	Silencer	Filter	LEDs	Idle valve position (NO)	Idle valve position (NC)	Idle valve position (IMP)	System monitoring function	Non-return valve	Air saving function (electrical)	Air saving function (pneumatic)	Blow-off module (electrical)	Blow-off module (pneumatic)	Automatic blow-off	Power blow-off module	Digital display	Manual mode possible	IO-Link connection	Condition Monitoring	Predictive Maintenance	Energy Monitoring		
●	●	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	471
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	482
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	488
○	●	○	●	●	●	○	●	○	○	○	●	○	●	○	○	○	○	○	○	○	○	494
●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	502
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	509
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	513
○	● ³⁾	○	○	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○	○	○	○	517
○	● ³⁾	○	●	○	○	○	●	●	○	●	○	●	○	○	○	○	○	○	○	○	○	522
○	● ³⁾	○	○	○	○	○	○	○	○	○	○	○	● ⁴⁾	○	○	○	○	○	○	○	○	527
○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	367
○	●	● ³⁾	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	532
○	●	● ³⁾	●	●	●	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	536
○	●	● ³⁾	●	●	●	○	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	536
○	●	● ³⁾	○	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	542
○	●	● ³⁾	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	548
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	554
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	554
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	556
○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	561
○																						569
○																						581
○																						591

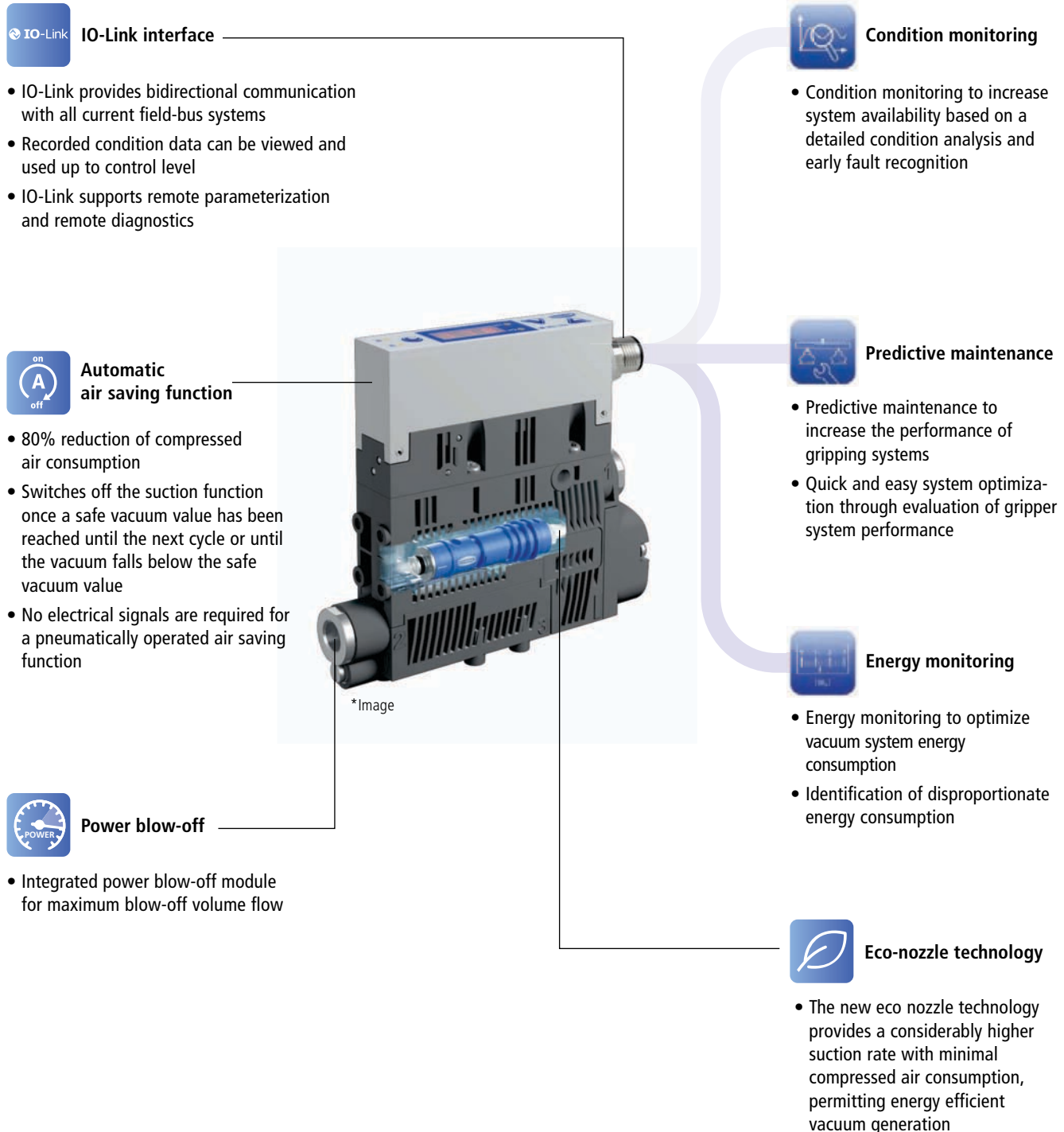
⁴⁾atmospheric ventilation ⁵⁾TR-X Version: Suction rate starts at 406 l/min

● Standard ● For selected parts ○ Function not available

Schmalz - The Company
Vacuum Knowledge
Vacuum Suction Cups
Vacuum Gripping Systems
Special Grippers
Mounting Elements
Vacuum Generators
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Explanatory information about the vacuum generator selection matrix

To make the selection of a vacuum generator as easy as possible please find below a selection matrix that will help choose the right generator. Below you find the explanation of terminology.



*The compact ejector SCPSi shown here is used to illustrate all of the important vacuum generator functions in a schematic diagram. Please note that not all of the functions are provided in the SCPSi shown.

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Ejector modules



Ejector Modules ecoPump SEP

Suction rate up to 309 l/min



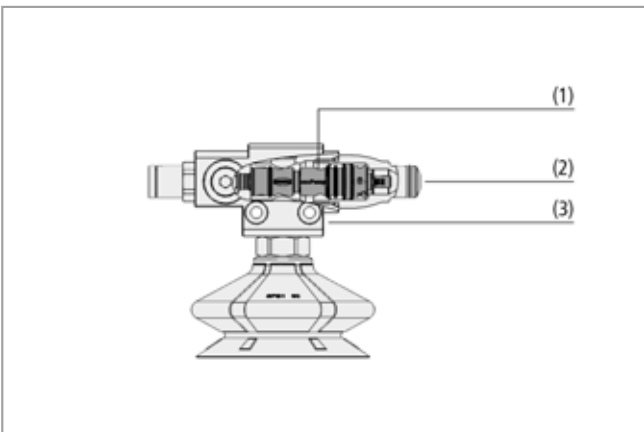
Suitable for Industry Specific Applications



Ejector modules ecoPump SEP

Applications

- Ejector module for energy-efficient vacuum generation with Schmalz eco nozzle technology
- Direct installation in gripping tools without separate housing
- Integration of the vacuum generation as close as possible to the suction cup
- For use in the packaging industry, e.g. in carton erectors or multi-circuit systems



System design ejector modules ecoPump SEP

Design

- Compact, lightweight plastic ejector nozzle (1)
- Available in three performance classes and two versions with optimized air consumption for airtight (HV) or porous (HF) materials
- Available with optional holder cap SHC (2) for fixation of the ejector nozzle, alternatively with silencer SD or with ecoPump housing SFE (3)



Vacuum generation by ejector modules SEP for handling ampoules

Our Highlights...

- High suction capacity with low air consumption
- Can be used for both airtight (HV) and porous (HF) work-pieces
- Fast, with powerful vacuum
- Resistant to dirt
- Lightweight and takes up little space
- One-piece nozzle fitting

Your Benefits...

- > Energy-efficient vacuum generation
- > Fast and reliable product selection for each application
- > Quickly reaches working vacuum; reliable compensation for leakages
- > Long service intervals, as well as simple, tool-free cleaning
- > Can be mounted directly on the suction cup
- > Fast and easy cleaning

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Ejector Modules

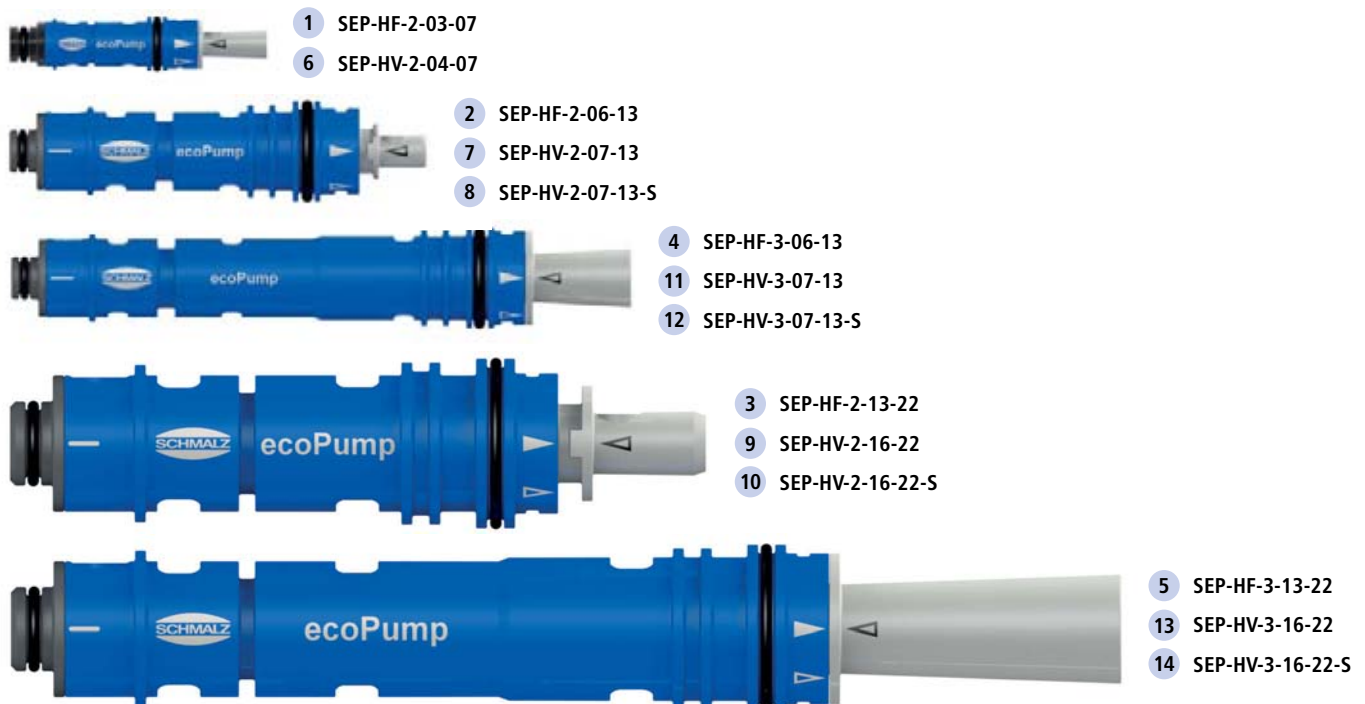


Ejector Modules ecoPump SEP

Selection Aid

Step 1 Define the area of application	Step 2 Define the distance from the suction point	Step 3 Select the performance class		Step 4 Air saving function can be implemented*	Product Recommendation	
		Max. suction capacity [l/min]	Max. vacuum [mbar]		Type	Part no. / Illustration
Porous workpieces E.g. cardboard, non-rigid bags, particle boards → High-flow version (HF) with high suction flow rate	Close to the suction cup Short hose lines with low air volume → Two-stage nozzle	15	550	no	SEP-HF-2-03-7 10.02.01.01341	1
		42	700	no	SEP-HF-2-06-13 10.02.01.01343	2
		175	610	no	SEP-HF-2-13-22 10.02.01.01347	3
	Far away from the suction cup Long hose lines with high air volume → Three-stage nozzle	67	700	no	SEP-HF-3-06-13 10.02.01.01344	4
		298	610	no	SEP-HF-3-13-22 10.02.01.01348	5
Airtight workpieces E.g. ampules, syringes and vials, plastic injection-molded parts, sheet metal parts → High-vacuum version (HV) with high vacuum level	Close to the suction cup Short hose lines with low air volume → Two-stage nozzle	13	790	no	SEP-HV-2-04-7 10.02.01.01393	6
		42	850	no	SEP-HV-2-07-13 10.02.01.01394	7
				yes	SEP-HV-2-07-13-S 10.02.01.01407	8
		153	900	no	SEP-HV-2-16-22 10.02.01.01396	9
				yes	SEP-HV-2-16-22-S 10.02.01.01410	10
		Far away from the suction cup Long hose lines with high air volume → Three-stage nozzle	77	850	no	SEP-HV-3-07-13 10.02.01.01395
	yes				SEP-HV-3-07-13-S 10.02.01.01407	12
	309		900	no	SEP-HV-3-16-22 10.02.01.01397	13
				yes	SEP-HV-3-16-22-S 10.02.01.01411	14

*Maintenance of the vacuum for airtight workpieces using additional safety non-return valve. An active blow-off pulse is required to release the workpiece.



Illustrations in original size

Ejector modules



Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

Designation Code Ejector Modules ecoPump SEP

Abbreviated designation	Version	Nozzle technology	Nozzle size	Hole diameter in mm	Additional function
Example SEP HF 2 03 7:					
SEP	HF	2	03	7	
SEP	HF High Flow	2 2-stage	03 0.3 mm	7	S Air saving function can be implemented
	HV High Vacuum	3 3-stage	04 0.4 mm	13	
			06 0.6 mm	22	
			07 0.7 mm		
			13 1.3 mm		
			16 1.6 mm		

Ordering Data Ejector Modules ecoPump SEP

Ejector modules ecoPump SEP are delivered as a ready to connect product.

Available accessories: holder cap SHC, silencer SD, ecoPump housing SFE, mounting bracket, mounting set, quick exhaust valve

Ejector Modules ecoPump SEP

Type	SEP HF for porous workpieces Part Number
SEP HF 2 03 7	10.02.01.01341
SEP HF 2 06 13	10.02.01.01343
SEP HF 3 06 13	10.02.01.01344
SEP HF 2 13 22	10.02.01.01347
SEP HF 3 13 22	10.02.01.01348

Type	SEP HV for airtight workpieces	
	Without safety non-return valve	With safety non-return valve (S)
SEP HV 2 04 7	10.02.01.01393	-
SEP HV 2 07 13	10.02.01.01394	10.02.01.01406
SEP HV 3 07 13	10.02.01.01395	10.02.01.01407
SEP HV 2 16 22	10.02.01.01396	10.02.01.01410
SEP HV 3 16 22	10.02.01.01397	10.02.01.01411

Ordering Data Accessories Ejector Modules ecoPump SEP

Type	Holder cap SHC	Silencer SD*	ecoPump Fixation Element SFE	Mounting bracket BEF-WIN	Mounting set SET	Quick exhaust valve SEV
SEP...2...7	10.02.01.01510	-	10.02.01.01464	10.08.03.00313	-	-
SEP...2...13	10.02.01.01496	10.02.01.01498	10.02.01.01419	10.08.03.00314	10.02.01.01579	10.02.01.01519
SEP...3...13	10.02.01.01497	10.02.01.01498	10.02.01.01419	10.08.03.00314	10.02.01.01579	10.02.01.01519
SEP...2...22	10.02.01.01512	10.02.01.01517	10.02.01.01421	10.08.03.00315	10.02.01.01577	10.02.01.01471
SEP...3...22	10.02.01.01514	10.02.01.01517	10.02.01.01421	10.08.03.00315	10.02.01.01577	10.02.01.01471

*Only possible in combination with holder cap SHC

Ejector modules



Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

Technical Data Ejector Modules ecoPump SEP

Type	Weight [g]	Operating temperature [°C]	Recomm. int. hose diameter compr. air [mm]	Recomm. int. hose diameter vacuum [mm]	Pressure range (operating pressure) [bar]	Noise level free [dB(A)]*	Noise level work-piece gripped [dB(A)]*
SEP...2...7	0.8	0 ... 60	2	4	2.0 ... 6.0	63	54
SEP...2...13	3.6	0 ... 60	4	6	2.0 ... 6.0	70	58
SEP...3...13	4.6	0 ... 60	4	6	2.0 ... 6.0	68	57
SEP...2...22	15.8	0 ... 60	6	12	2.0 ... 6.0	84	75
SEP...3...22	22.8	0 ... 60	6	12	2.0 ... 6.0	81	73

*Reduction of noise level by 2-4 db(A) due to holder cap SHC with silencer

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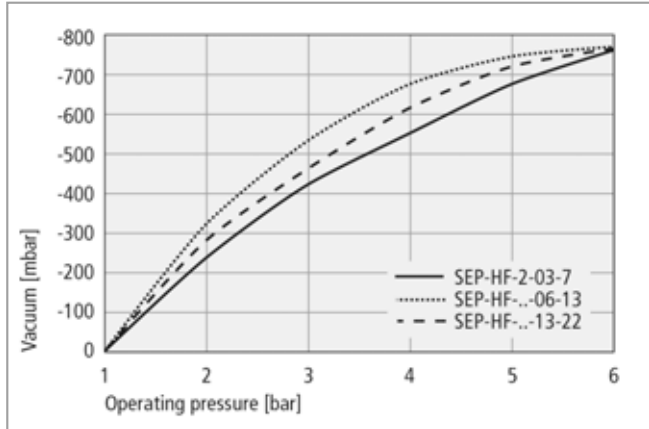
Ejector modules



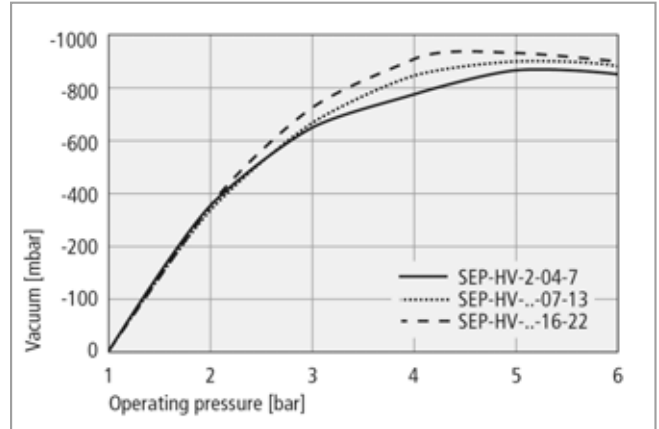
Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

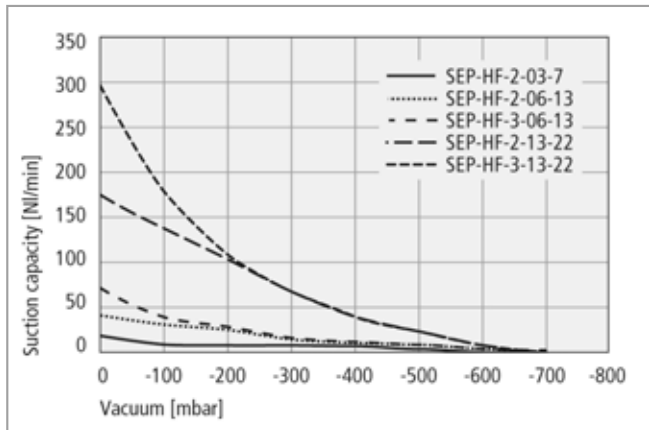
Performance Data Ejector Modules ecoPump SEP



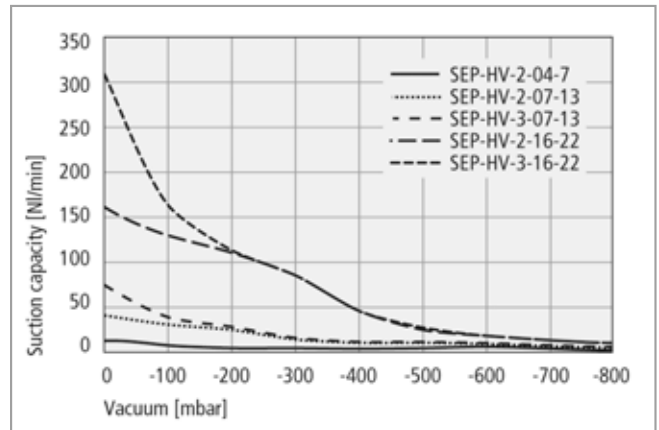
Achievable vacuum at various operating pressures (SEP HF)



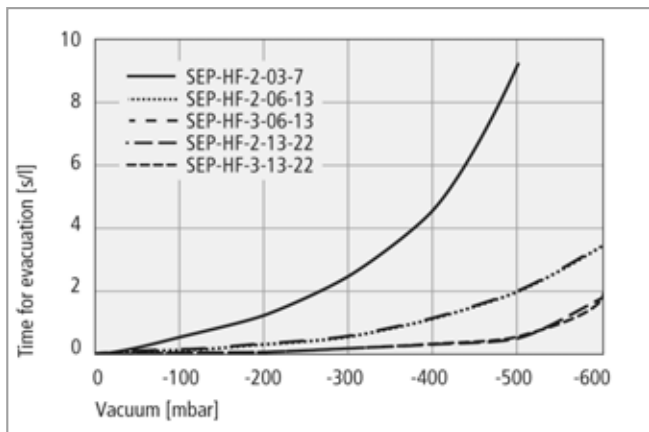
Achievable vacuum at various operating pressures (SEP HV)



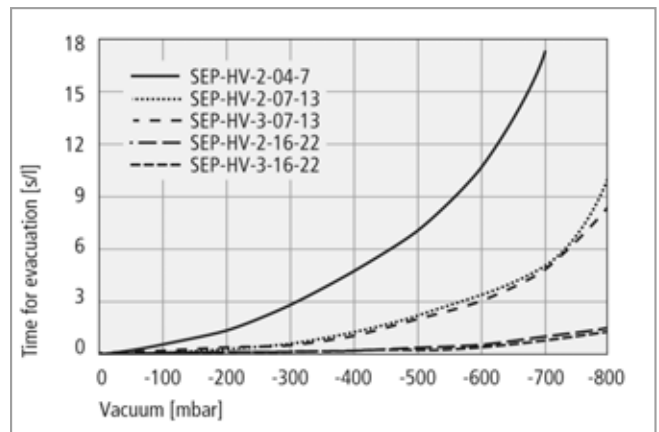
Suction capacity at various degrees of evacuation (SEP HF)



Suction capacity at various degrees of evacuation (SEP HV)



Evacuation times for various vacuum ranges (SEP HF)



Evacuation times for various vacuum ranges (SEP HV)

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Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

Suction Capacity in l/min at Various Degrees of Evacuation SEP HF

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar]							
				0	-100	-200	-300	-400	-500	-600	-700
SEP HF 2 03 7	3	410	4.0	12.6	5.1	3.8	2.6	0.6	-	-	-
	4	550	5.0	15.3	8.4	5.1	3.9	2.6	1.5	-	-
	5	670	6.0	16.5	10.8	6.1	4.8	3.8	2.6	1.5	-
SEP HF 2 06 13	3	530	14.7	36.9	29.4	15.5	9.2	5.2	1.2	-	-
	4	700	18.7	42.4	34.4	24.7	12.1	9.1	5.5	1.8	-
	5	750	22.8	45.9	38.4	30.6	21.6	10.6	7.7	4.4	1.7
SEP HF 3 06 13	3	530	14.7	57.4	30.4	17.0	9.2	5.2	1.2	-	-
	4	700	18.7	67.3	36.2	27.0	12.1	9.1	5.5	1.8	0.7
	5	750	22.8	74.6	45.3	32.7	21.6	10.6	7.7	4.4	1.7
SEP HF 2 13 22	3	460	58.6	158.6	122.8	76.1	48.3	21.0	-	-	-
	4	610	74.0	175.3	143.8	106.1	66.3	44.7	24.7	2.9	-
	5	720	89.5	180.7	158.6	129.0	89.1	49.4	34.9	19.3	4.9
SEP HF 3 13 22	3	460	58.6	253.7	128.2	76.1	48.3	21.0	-	-	-
	4	610	74.0	297.6	178.3	106.1	66.3	44.7	24.7	2.9	-
	5	720	89.5	325.6	187.3	129.0	89.1	49.4	34.9	19.3	4.9

Suction Capacity in l/min at Various Degrees of Evacuation SEP HV

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar]							
				0	-100	-200	-300	-400	-500	-600	-700
SEP HV 2 04 7	3	640	5.2	10.8	6.2	3.5	2.8	2.3	1.8	1.3	-
	4	790	6.5	13.2	9.5	4.4	3.4	2.9	2.3	1.7	1.2
	5	860	7.8	14.8	11.3	6.9	3.3	2.8	2.1	1.5	1.1
SEP HV 2 07 13	3	630	18.6	37.8	27.5	14.5	7.9	5.4	2.7	1.1	-
	4	850	23.5	42.5	33.7	25.0	13.8	8.8	7.3	4.6	2.7
	5	900	28.5	45.5	37.6	31.2	23.1	14.0	7.6	4.9	3.1
SEP HV 3 07 13	3	630	18.6	64.6	31.3	16.6	9.3	7.2	4.3	1.2	-
	4	850	23.5	76.8	37.2	27.0	16.6	9.3	7.6	5.1	3.1
	5	900	28.5	86.8	50.6	33.6	26.6	17.0	7.3	4.6	2.7
SEP HV 2 16 22	3	720	82.0	144.8	119.7	87.7	53.3	31.0	19.6	5.7	-
	4	900	103.0	152.6	137.4	112.7	81.2	43.0	25.6	17.7	11.1
	5	910	124.7	151.1	133.8	116.2	93.2	65.9	37.1	17.6	10.9
SEP HV 3 16 22	3	720	82.0	270.0	122.0	95.5	57.6	34.7	21.8	10.4	2.3
	4	900	103.0	308.8	155.1	115.5	88.9	50.5	27.5	18.2	11.1
	5	910	124.7	330.9	201.3	112.7	97.9	70.0	43.9	22.0	9.7

Ejector modules



Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

Evacuation Time in s/l for Various Vacuum Ranges SEP HF

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar]							
				-100	-200	-300	-400	-500	-600	-700	-800
SEP HF 2 03 7	3	410	4.0	0.62	1.70	3.42	11.13	-	-	-	-
	4	550	5.0	0.48	1.27	2.51	4.59	9.26	-	-	-
	5	670	6.0	0.42	1.06	2.03	3.42	5.64	10.43	-	-
SEP HF 2 06 13	3	530	14.7	0.14	0.36	0.88	1.74	3.96	-	-	-
	4	700	18.7	0.10	0.27	0.55	1.18	2.01	3.47	-	-
	5	750	22.8	0.09	0.23	0.43	0.82	1.63	2.65	4.23	-
SEP HF 3 06 13	3	530	14.7	0.14	0.36	0.88	1.74	3.96	-	-	-
	4	700	18.7	0.10	0.27	0.55	1.18	2.01	3.47	-	-
	5	750	22.8	0.09	0.23	0.43	0.82	1.63	2.65	4.23	-
SEP HF 2 13 22	3	460	58.6	0.05	0.10	0.18	0.38	-	-	-	-
	4	610	74.0	0.04	0.08	0.14	0.23	0.42	1.84	-	-
	5	720	89.5	0.05	0.09	0.13	0.22	0.35	0.57	1.26	-
SEP HF 3 13 22	3	460	58.6	0.05	0.10	0.19	0.41	-	-	-	-
	4	610	74.0	0.04	0.08	0.14	0.24	0.46	-	-	-
	5	720	89.5	0.03	0.07	0.11	0.19	0.34	0.59	-	-

Evacuation Time in s/l for Various Vacuum Ranges SEP HV

Type	Operating pressure [bar]	Max. vacuum [mbar]	Air consumption [l/min]	Degree of evacuation [mbar]							
				-100	-200	-300	-400	-500	-600	-700	-800
SEP HV 2 04 7	3	640	5.2	0.73	1.96	3.79	6.47	10.37	18.45	-	-
	4	790	6.5	0.53	1.34	2.79	4.71	7.16	10.68	17.73	-
	5	860	7.8	0.54	1.10	2.34	4.42	7.28	11.30	17.79	29.10
SEP HV 2 07 13	3	630	18.6	0.13	0.39	1.01	1.98	3.58	8.59	-	-
	4	850	23.5	0.09	0.26	0.56	1.22	2.08	3.21	5.09	9.71
	5	900	28.5	0.06	0.18	0.37	0.69	1.38	2.51	4.21	7.69
SEP HV 3 07 13	3	630	18.6	0.15	0.41	1.05	1.99	3.36	6.04	-	-
	4	850	23.5	0.11	0.28	0.53	1.11	1.94	3.01	4.71	8.47
	5	900	28.5	0.07	0.19	0.36	0.61	1.32	2.50	4.11	7.52
SEP HV 2 16 22	3	720	82.0	0.06	0.10	0.17	0.31	0.50	0.89	-	-
	4	900	103.0	0.06	0.09	0.14	0.23	0.40	0.61	0.94	1.49
	5	910	124.7	0.05	0.08	0.12	0.18	0.27	0.49	0.83	1.54
SEP HV 3 16 22	3	720	82.0	0.04	0.09	0.16	0.29	0.48	0.83	-	-
	4	900	103.0	0.04	0.08	0.12	0.21	0.36	0.58	0.90	1.46
	5	910	124.7	0.04	0.07	0.11	0.17	0.27	0.48	0.81	1.51

Ejector modules

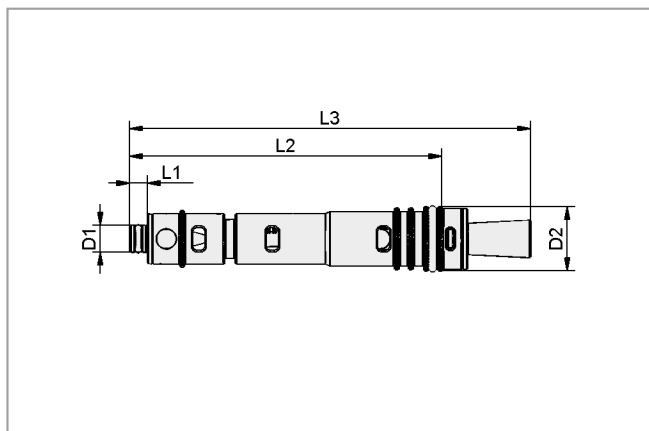


Ejector Modules ecoPump SEP

Suction rate up to 309 l/min



Design Data Ejector Modules ecoPump SEP



ecoPump SEP

Type	Dimensions in mm				
	D1	D2	L1	L2	L3
SEP...2...7	4.4	6.8	3.5	20.1	33.0
SEP...2...13	5.4	12.8	5.0	41.5	55.5
SEP...3...13	5.4	12.8	5.0	63.5	81.5
SEP...2...22	10.8	21.8	8.0	67.5	92.0
SEP...3...22	10.8	21.8	8.0	103.0	146.0

Ejector modules

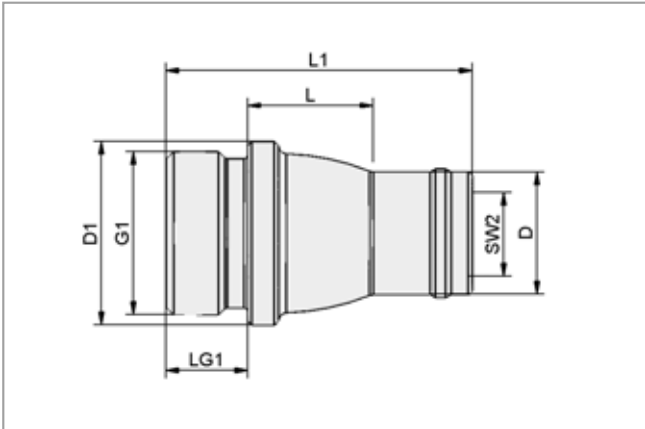


Ejector Modules ecoPump SEP

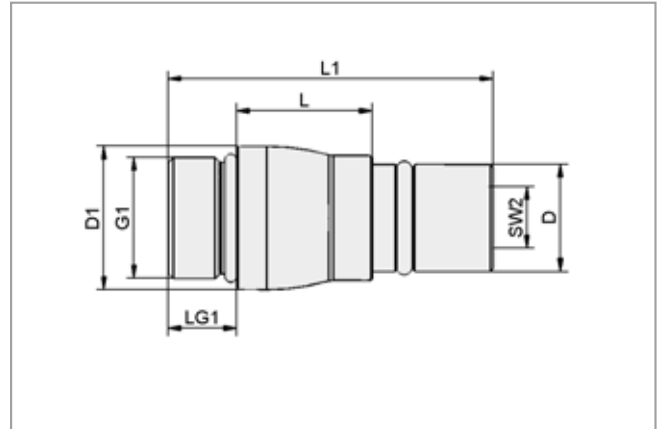
Suction rate up to 309 l/min



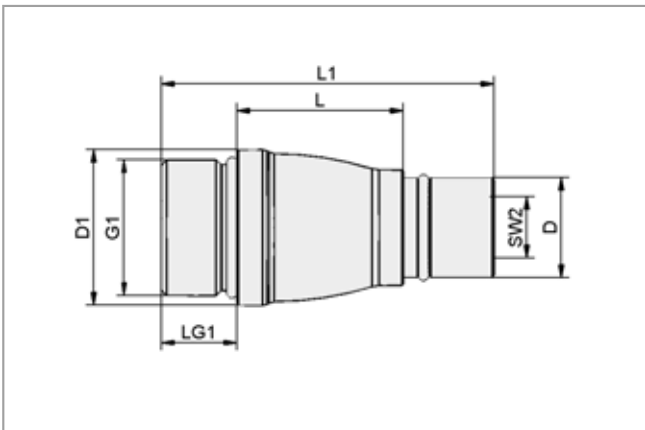
Design Data Holder Cap SHC



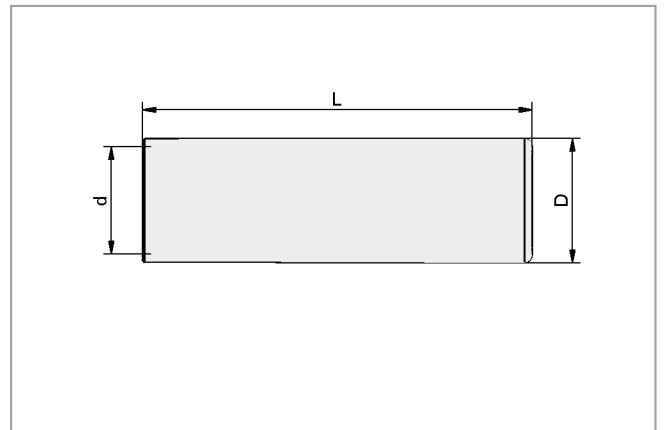
SHC 27



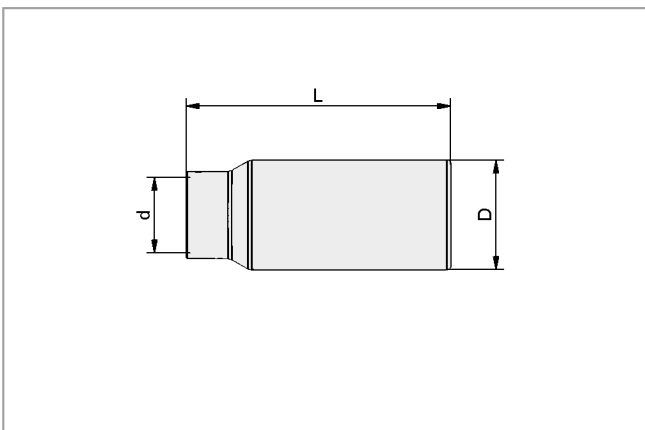
SHC 2/3 13



SHC 2/3 22



SD 16.5x51.5 SHC 13



SD 29x70 SHC 22

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Ejector modules



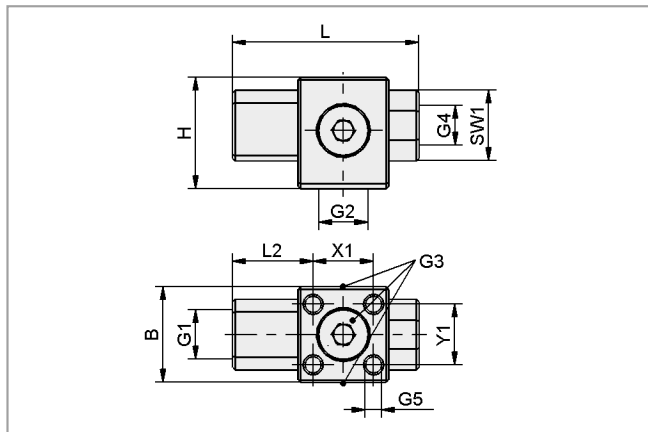
Ejector Modules ecoPump SEP

Suction rate up to 309 l/min

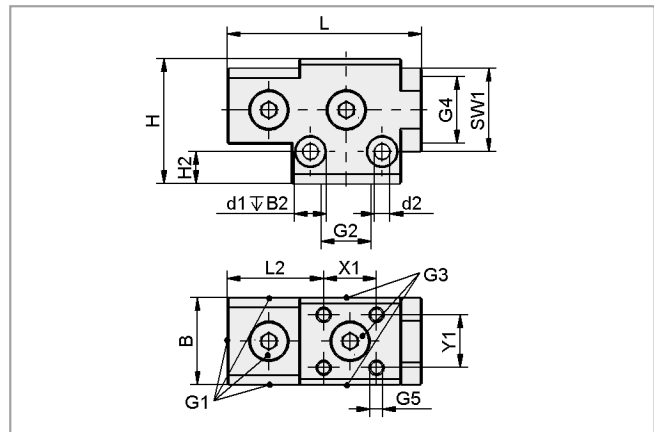
Design Data Holder Cap SHC

Type	Dimensions in mm								
	d	D	D1	G1	L	L1	LG1	SW2	
SHC 2 7	-	9	6	M8x0.5-M	6	15	4	4	
SHC 2 13	-	14	19	M16x1-M	18	43	9	8	
SHC 3 13	-	14	19	M16x1-M	37	62	9	8	
SHC 2 22	-	20	31	M27x1.5-M	33	66	15	12	
SHC 3 22	-	20	31	M27x1.5-M	73	106	15	14	
SD 16.5x51.5 SHC 13	14	17	-	-	52	-	-	-	
SD 29x70 SHC 22	20	29	-	-	70	-	-	-	

Design Data Housing ecoPump SFE



SFE 7



SFE 13 and 22

Type	Dimensions in mm															
	B	B2	d1	d2	G1	G2	G3	G4	G5	H	H2	L	L2	SW1	X1	Y1
SFE 7	19	-	-	-	G1/8"-F	G1/8"-F	G1/8"-F	M8x0.5-F	M4-F	22	-	37	16	14	12	12
SFE 13	23	4.4	8	4.2	G1/8"-F	G1/4"-F	G1/8"-F	M16x1-F	M4-F	33	9	52	26	22	14	14
SFE 22	35	6.4	11	6.4	G1/4"-F	G3/8"-F	G1/4"-F	M27x1.5-F	M6-F	44	10	88	35	32	22	22

Ejector modules

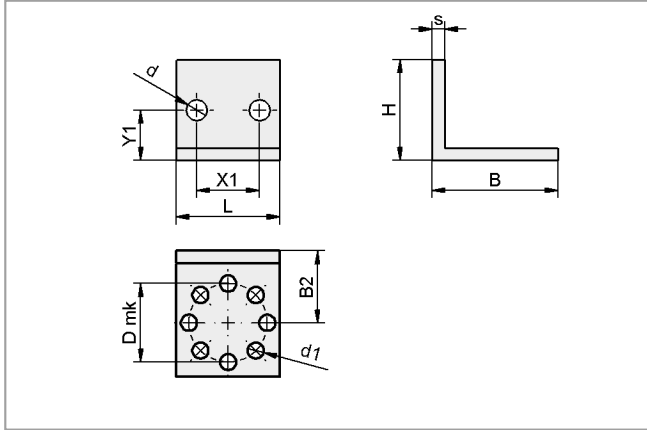


Ejector Modules ecoPump SEP

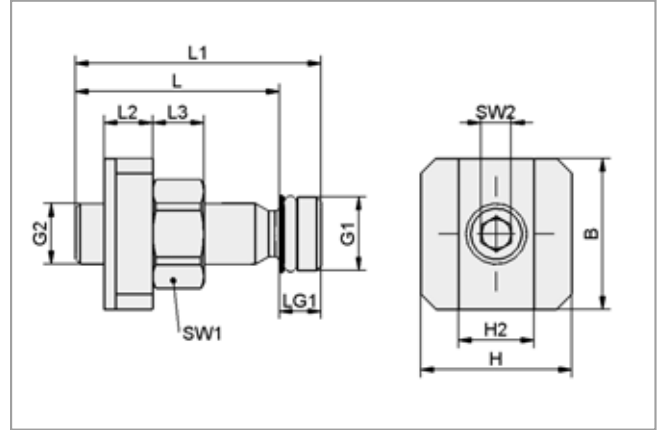
Suction rate up to 309 l/min



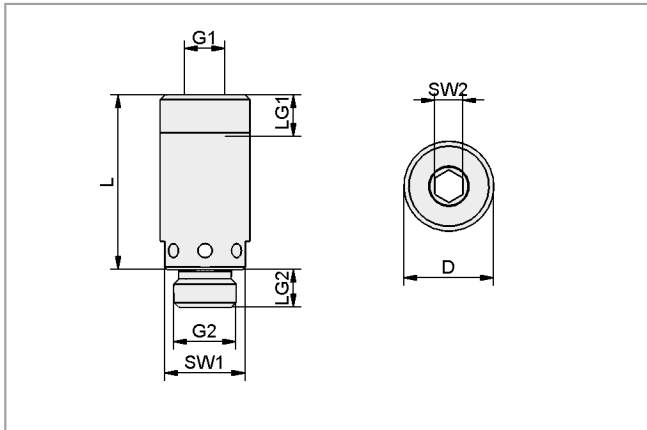
Design Data Accessories Ejector Modules ecoPump SEP



BEF-WIN



SET



SEV

Type	Dimensions in mm											
	B	B2	d	d1	D	D mk	G1	G2	H	H2	L	
BEF-WIN 30x40x25.5 4 SFE-7	30	40.0	6	5	-	17	-	-	40	-	26	
BEF-WIN 36x40x27 5 SFE-13	36	41.3	6	5	-	20	-	-	40	-	27	
BEF-WIN 50x40x41 5 SFE-22	50	28.5	8	6	-	31	-	-	40	-	41	
SET SFE 13	20	-	-	-	-	-	G1/8"-M	M8-M	20	10	27	
SET SFE 22	20	-	-	-	-	-	G1/4"-F	M8-M	20	10	34	
SEV G1/8-IG G1/8-AG	-	-	-	-	19	-	G1/8"-F	G1/8"-M	-	-	40	
SEV G1/8-IG G1/4-AG	-	-	-	-	19	-	G1/8"-F	G1/4"-M	-	-	37	

Type	Dimensions in mm									
	L1	L2	L3	LG1	LG2	s	SW1	SW2	X1	Y1
BEF-WIN 30x40x25.5 4 SFE-7	-	-	-	-	-	4	-	-	15	20
BEF-WIN 36x40x27 5 SFE-13	-	-	-	-	-	5	-	-	17	20
BEF-WIN 50x40x41 5 SFE-22	-	-	-	-	-	5	-	-	25	20
SET SFE 13	33	6	7	6	-	-	13	4	-	-
SET SFE 22	34	6	7	7	-	-	13	5	-	-
SEV G1/8-IG G1/8-AG	-	-	-	7	8	-	17	6	-	-
SEV G1/8-IG G1/4-AG	-	-	-	9	8	-	17	6	-	-

Basic Ejectors



Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min



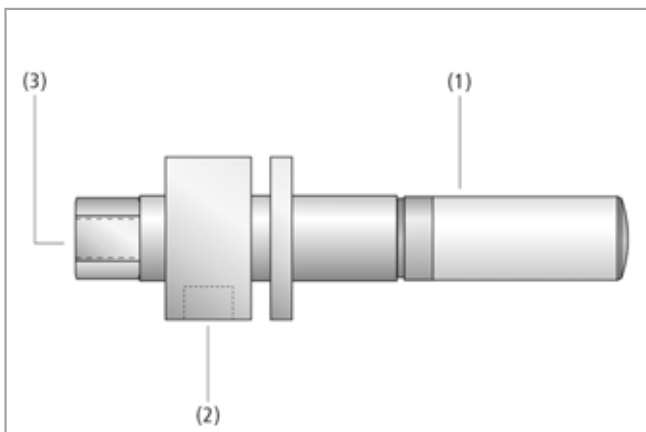
Suitable for Industry Specific Applications



Basic ejectors SEG

Applications

- Basic ejector for universal use in vacuum systems
- Various handling tasks in the automotive, metal sheet, wood, food and packing industries



System design basic ejectors SEG

Design

- Body made of anodized aluminum
- Nozzle system made of brass
- Plastic silencer (1)
- Vacuum connection (2)
- Compressed-air connection (3)



Decentral vacuum generation by means of basic ejectors SEG for handling plastic parts

Our Highlights...

- Body with Venturi nozzle and optionally with silencer
- Minimum size; low weight due to aluminum body
- Various models with different performance figures; optimized for maximum efficiency

Your Benefits...

- > No moving parts: no wear and no maintenance needed
- > Suitable for small spaces and highly dynamic movements, such as on manipulators, industrial robots, feeder systems, etc.
- > Very efficient: maximum suction capacity with minimum compressed-air consumption

Basic Ejectors



Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

Designation Code Basic Ejectors SEG

Abbreviated designation	Nozzle size	Shape	Version
Example SEG 10 HS:			
SEG	10	HS	
SEG	05 = 0.5 mm to 30 = 3.0 mm	HS high speed (high vacuum) HS-S high speed and narrow shape LS low speed (high suction capacity)	SDA silencer axial

Ordering Data Basic Ejectors SEG

The basic ejector SEG is delivered as a ready to connect product.

Available spare parts: silencer

Basic Ejectors SEG

Type	Part Number
SEG 05 HS-S	10.02.01.00272
SEG 05 HS-S SDA	10.02.01.00271
SEG 07 HS-S	10.02.01.00276
SEG 07 HS-S SDA	10.02.01.00275
SEG 07 HS	10.02.01.00255
SEG 07 HS SDA	10.02.01.00110
SEG 10 HS	10.02.01.00247
SEG 10 HS SDA	10.02.01.00111
SEG 15 HS	10.02.01.00248
SEG 15 HS SDA	10.02.01.00112
SEG 20 HS	10.02.01.00256
SEG 20 HS SDA	10.02.01.00113
SEG 20 LS	10.02.01.00252
SEG 20 LS SDA	10.02.01.00114
SEG 25 HS	10.02.01.00257
SEG 25 HS SDA	10.02.01.00115
SEG 25 LS	10.02.01.00259
SEG 25 LS SDA	10.02.01.00116
SEG 30 HS	10.02.01.00258
SEG 30 HS SDA	10.02.01.00117
SEG 30 LS	10.02.01.00260
SEG 30 LS SDA	10.02.01.00118

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Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

Ordering Data Spare Parts Basic Ejectors SEG

Type	Silencer
SEG 05 HS-S	-
SEG 05 HS-S SDA	10.02.01.00539
SEG 07 HS-S	-
SEG 07 HS-S SDA	10.02.01.00539
SEG 07 HS	-
SEG 07 HS SDA	10.02.01.00540
SEG 10 HS	-
SEG 10 HS SDA	10.02.01.00540
SEG 15 HS	-
SEG 15 HS SDA	10.02.01.00903
SEG 20 HS	-
SEG 20 HS SDA	10.02.01.00905
SEG 20 LS	-
SEG 20 LS SDA	10.02.01.00905
SEG 25 HS	-
SEG 25 HS SDA	10.02.01.00907
SEG 25 LS	-
SEG 25 LS SDA	10.02.01.00907
SEG 30 HS	-
SEG 30 HS SDA	10.02.01.00909
SEG 30 LS	-
SEG 30 LS SDA	10.02.01.00909

Technical Data Basic Ejectors SEG

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SEG 05 HS-S	0.5	82	7	0.4	13	0.8	3.0 ... 6.0	2	2	10	-10 ... 80
SEG 05 HS-S SDA	0.5	82	7	0.4	13	0.8	3.0 ... 6.0	2	2	11	-10 ... 80
SEG 07 HS-S	0.7	82	16	1.0	21	1.3	3.0 ... 6.0	2	2	10	-10 ... 80
SEG 07 HS-S SDA	0.7	82	16	1.0	21	1.3	3.0 ... 6.0	2	2	11	-10 ... 80
SEG 07 HS	0.7	85	14	0.8	21	1.3	3.0 ... 6.0	2	4	41	-10 ... 80
SEG 07 HS SDA	0.7	85	14	0.8	21	1.3	3.0 ... 6.0	2	4	45	-10 ... 80
SEG 10 HS	1.0	85	34	2.0	49	2.9	3.0 ... 6.0	2	4	46	-10 ... 80
SEG 10 HS SDA	1.0	85	34	2.0	49	2.9	3.0 ... 6.0	2	4	50	-10 ... 80
SEG 15 HS	1.5	85	69	4.1	102	6.1	3.0 ... 6.0	4	6	102	-10 ... 80
SEG 15 HS SDA	1.5	85	69	4.1	102	6.1	3.0 ... 6.0	4	6	110	-10 ... 80
SEG 20 HS	2.0	85	124	7.4	186	11.2	3.0 ... 6.0	4	9	118	-10 ... 80
SEG 20 HS SDA	2.0	85	124	7.4	186	11.2	3.0 ... 6.0	4	9	130	-10 ... 80
SEG 20 LS	2.0	55	170	10.2	186	11.2	3.0 ... 6.0	4	9	118	-10 ... 80
SEG 20 LS SDA	2.0	55	170	10.2	186	11.2	3.0 ... 6.0	4	9	130	-10 ... 80
SEG 25 HS	2.5	85	184	11.0	275	16.5	3.0 ... 6.0	6	12	273	-10 ... 80
SEG 25 HS SDA	2.5	85	184	11.0	275	16.5	3.0 ... 6.0	6	12	295	-10 ... 80
SEG 25 LS	2.5	55	260	15.6	275	16.5	3.0 ... 6.0	6	12	273	-10 ... 80
SEG 25 LS SDA	2.5	55	260	15.6	275	16.5	3.0 ... 6.0	6	12	295	-10 ... 80
SEG 30 HS	3.0	85	240	14.4	392	23.5	3.0 ... 6.0	6	12	352	-10 ... 80
SEG 30 HS SDA	3.0	85	240	14.4	392	23.5	3.0 ... 6.0	6	12	404	-10 ... 80
SEG 30 LS	3.0	55	370	22.2	392	23.5	3.0 ... 6.0	6	12	352	-10 ... 80
SEG 30 LS SDA	3.0	55	370	22.2	392	23.5	3.0 ... 6.0	6	12	404	-10 ... 80

*At optimal operating pressure

**For max. length 2 m

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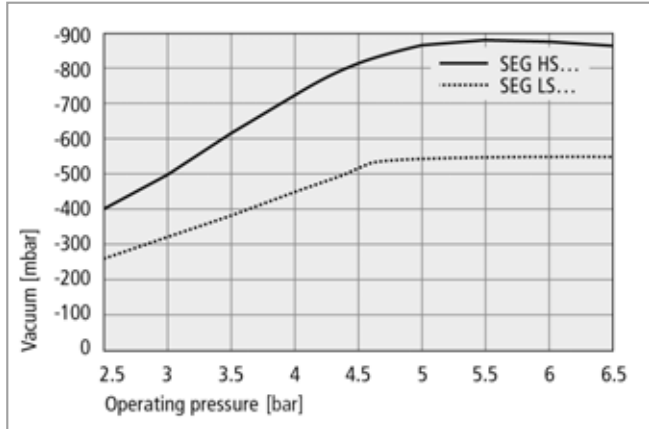
Basic Ejectors



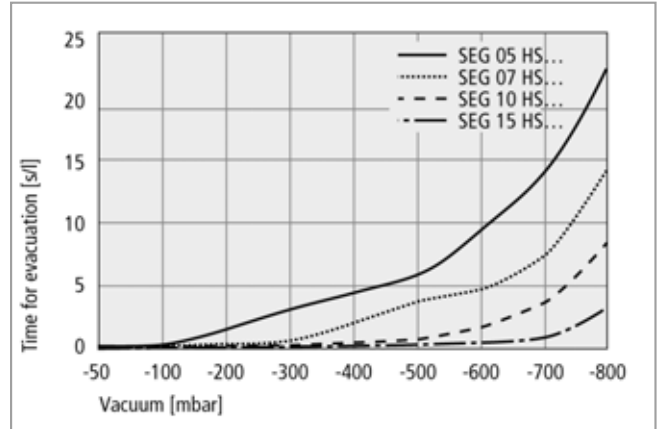
Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

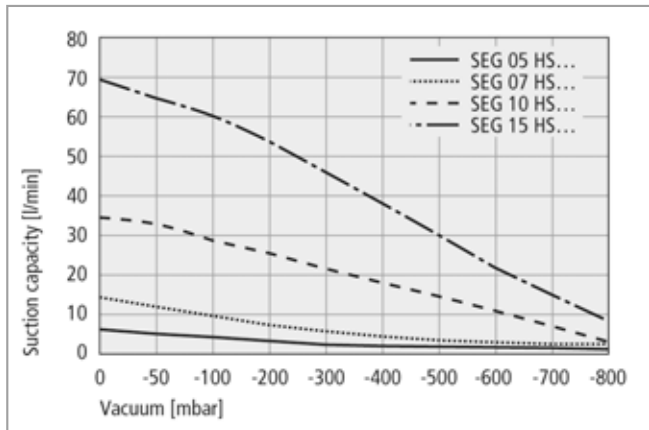
Performance Data Basic Ejectors SEG



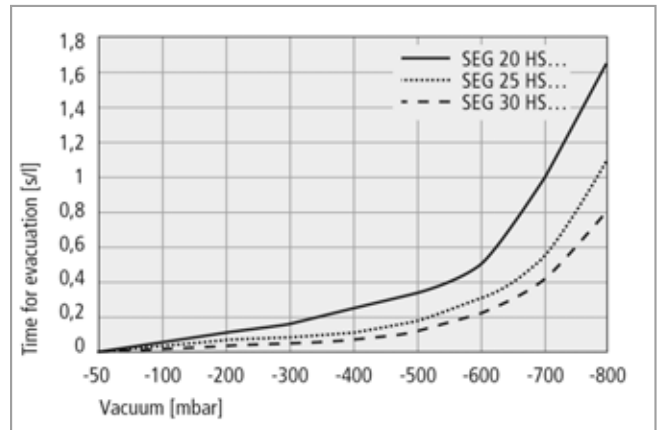
Achievable vacuum at various operating pressures



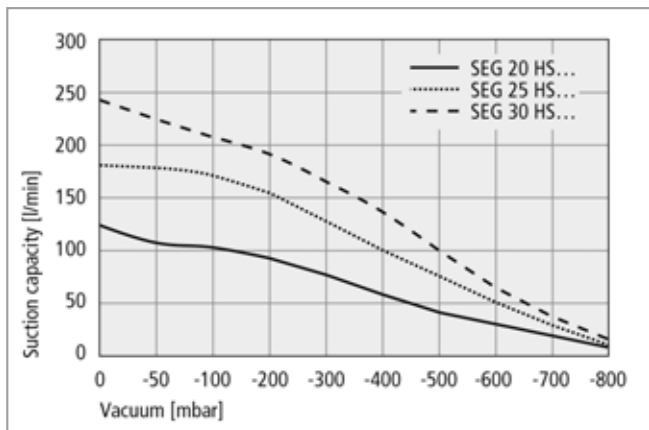
Evacuation times for various vacuum ranges



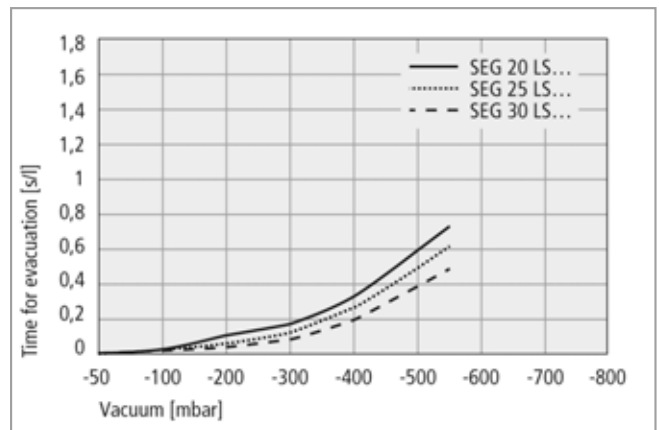
Suction capacity at various degrees of evacuation



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

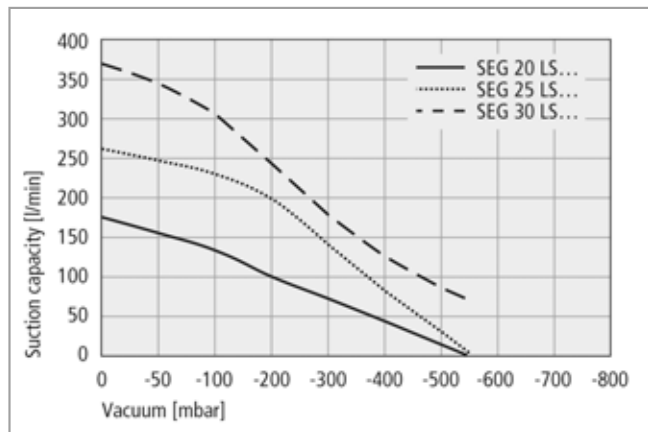


Evacuation times for various vacuum ranges

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Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEG 05 HS-S	7,0	5,9	5,1	4,3	3,4	2,6	1,9	1,4	0,5	0,2
SEG 07-HS-S	16,0	11,7	10,3	8,6	6,8	5,3	3,9	2,8	1,1	0,4
SEG 07 HS	14,0	11,7	10,3	8,6	6,8	5,3	3,9	2,8	1,1	0,4
SEG 10 HS	34,0	33,0	29,0	25,0	22,0	18,0	15,0	9,0	6,0	3,0
SEG 15 HS	69,0	64,0	60,0	53,0	43,0	36,0	30,0	22,0	16,0	8,0
SEG 20 HS	124,0	116,0	104,0	92,0	78,0	64,0	48,0	32,0	23,0	10,0
SEG 20 LS	170,0	155,0	138,0	100,0	75,0	46,0	8,0	-	-	-
SEG 25 HS	184,0	180,0	170,0	146,0	120,0	96,0	72,0	47,0	28,0	13,0
SEG 25 LS	260,0	248,0	233,0	182,0	121,0	62,0	28,0	-	-	-
SEG 30 HS	240,0	225,0	215,0	198,0	165,0	130,0	100,0	64,0	36,0	16,0
SEG 30 LS	370,0	345,0	315,0	242,0	173,0	102,0	80,0	-	-	-

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEG 05 HS-S	0.34	0.76	1.80	3.02	4.55	6.57	9.58	14.80	22.40
SEG 07-HS-S	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60
SEG 07 HS	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60
SEG 10 HS	0.09	0.16	0.34	0.59	0.96	1.42	2.03	3.30	7.36
SEG 15 HS	0.05	0.07	0.19	0.31	0.48	0.72	1.12	1.70	3.60
SEG 20 HS	0.03	0.05	0.11	0.16	0.24	0.35	0.50	1.08	1.65
SEG 20 LS	0.01	0.04	0.11	0.18	0.33	0.60	1.70	-	-
SEG 25 HS	0.03	0.04	0.07	0.09	0.14	0.20	0.30	0.49	1.10
SEG 25 LS	0.02	0.03	0.08	0.15	0.26	0.50	0.83	-	-
SEG 30 HS	0.01	0.02	0.04	0.06	0.10	0.15	0.21	0.42	0.80
SEG 30 LS	0.01	0.02	0.03	0.05	0.08	0.12	-	-	-

Basic Ejectors

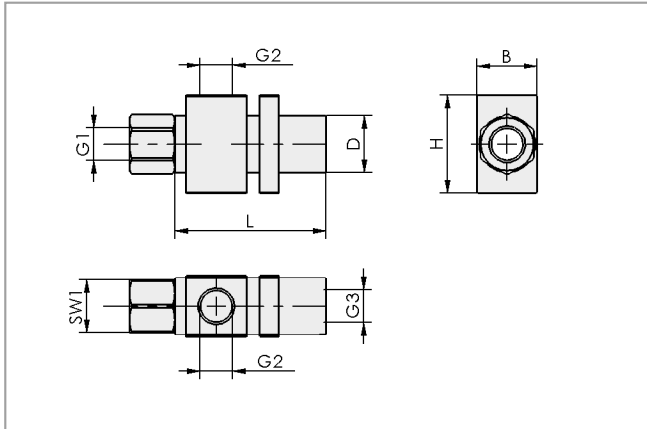


Basic Ejectors SEG

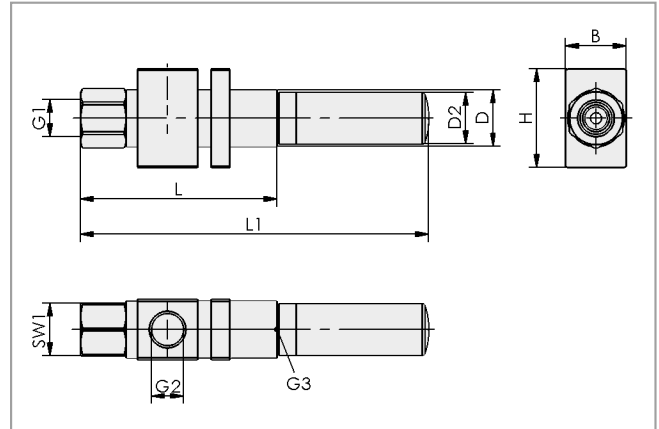
Suction rate from 7 l/min to 370 l/min



Design Data Basic Ejectors SEG



SEG 05 to 30



SEG 05 to 30 SDA

Type	Dimensions in mm										
	B	D	D2	G1	G2	G3	H	L	L1	SW1	
SEG 05 HS-S	10	7.0	-	M5-F	M5-F	M5-F	20	41	-	8	
SEG 05 HS-S SDA	10	9.0	8	M5-F	M5-F	M5-F	20	41	65	8	
SEG 07 HS-S	10	7.0	-	M5-F	M5-F	M5-F	20	41	-	8	
SEG 07 HS-S SDA	10	9.0	8	M5-F	M5-F	M5-F	20	41	65	8	
SEG 07 HS	16	16.0	-	G1/8"-F	G1/8"-F	G1/8"-F	26	52	-	14	
SEG 07 HS SDA	16	13.6	15	G1/8"-F	G1/8"-F	G1/8"-F	26	52	92	14	
SEG 10 HS	16	16.0	-	G1/8"-F	G1/8"-F	G1/8"-F	26	57	-	14	
SEG 10 HS SDA	16	13.6	15	G1/8"-F	G1/8"-F	G1/8"-F	26	57	97	14	
SEG 15 HS	22	21.0	-	G1/4"-F	G1/4"-F	G1/4"-F	38	75	-	17	
SEG 15 HS SDA	22	20.0	20	G1/4"-F	G1/4"-F	G1/4"-F	38	75	121	17	
SEG 20 HS	26	25.0	-	G1/4"-F	G1/4"-F	G3/8"-F	38	90	-	17	
SEG 20 HS SDA	26	20.0	20	G1/4"-F	G1/4"-F	G3/8"-F	38	90	146	17	
SEG 20 LS	26	25.0	-	G1/4"-F	G1/4"-F	G3/8"-F	38	90	-	17	
SEG 20 LS SDA	26	20.0	20	G1/4"-F	G1/4"-F	G3/8"-F	38	90	146	17	
SEG 25 HS	32	30.0	-	G3/8"-F	G1/2"-F	G1/2"-F	50	117	-	22	
SEG 25 HS SDA	32	27.0	28	G3/8"-F	G1/2"-F	G1/2"-F	50	117	180	22	
SEG 25 LS	32	30.0	-	G3/8"-F	G1/2"-F	G1/2"-F	50	117	-	22	
SEG 25 LS SDA	32	27.0	28	G3/8"-F	G1/2"-F	G1/2"-F	50	117	180	22	
SEG 30 HS	42	40.0	-	G3/8"-F	G1/2"-F	G3/4"-F	50	127	-	22	
SEG 30 HS SDA	42	31.0	32	G3/8"-F	G1/2"-F	G3/4"-F	50	127	217	22	
SEG 30 LS	42	40.0	-	G3/8"-F	G1/2"-F	G3/4"-F	50	127	-	22	
SEG 30 LS SDA	42	31.0	32	G3/8"-F	G1/2"-F	G3/4"-F	50	127	217	22	

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Basic Ejectors



Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min



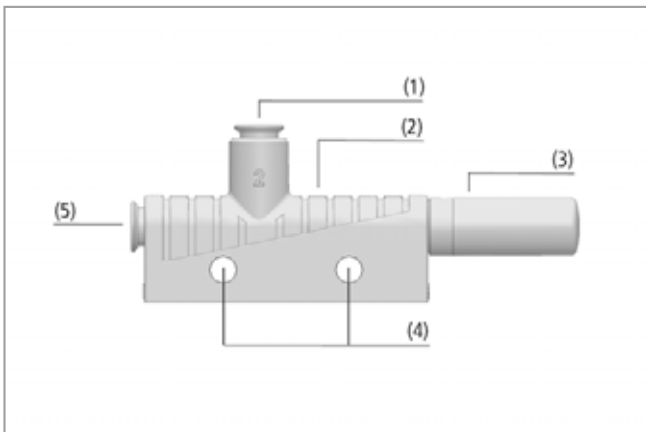
Suitable for Industry Specific Applications



Basic ejectors SBP

Applications

- Basic ejector with plastic housing for use in feeder systems
- Handling of electronic components
- Use in separation systems for plastic and sheet-metal machining
- Construction of ejector blocks for decentralized individual control of suction cups



System design basic ejectors SBP

Design

- One-piece housing (2) made of light, impact-resistant plastic
- Connection of compressed air (5) and vacuum (1) with quick-action push-in coupling (S01 to S03) or threaded holes (G01 to G03)
- Open silencer (3)
- Vacuum generator with single nozzle, available in six power ratings, 0.5 to 2.5 mm
- Can be fixed horizontally with mounting holes (4) or vertically with the base on a mounting plate
- Optional mounting with mounting plate and mounting kit on DIN top-hat rails



Central vacuum generation by basic ejectors SBP for handling plastic injection molded parts

Our Highlights...

- Plastic housing optimized for weight and size
- Ejector nozzles with six different power ratings
- Connections either with threaded holes or push-in couplings
- Open silencer

Your Benefits...

- > Ideal for decentralized vacuum generation in highly dynamic processes
- > Various power ratings for minimum air consumption
- > Space-saving and easy to install
- > Low noise levels and minimum maintenance requirements

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Basic Ejectors



Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

Designation Code Basic Ejectors SBP

Abbreviated designation	Nozzle size	Connection	System monitoring
Example SBP 05 G01 SDA:			
SBP	05	G01	SDA
SBP	05 = 0.5 mm to 25 = 2.5 mm	G01 connection thread 1 G02 connection thread 2 G03 connection thread 3 S01 quick-connect push-in coupling 1 S02 quick-connect push-in coupling 2 S03 quick-connect push-in coupling 3	SDA silencer axial

Ordering Data Basic Ejectors SBP

The basic ejector SBP is delivered as a ready to connect product.

Available spare parts: silencer

Available accessories: mounting plate, mounting set

Basic Ejectors SBP

Type	G01*	G02*	G03*	S01*	S02*	S03*
SBP 05 SDA	10.02.01.00599	-	-	10.02.01.00563	-	-
SBP 07 SDA	10.02.01.00600	-	-	10.02.01.00564	-	-
SBP 10 SDA	-	10.02.01.00601	-	-	10.02.01.00565	-
SBP 15 SDA	-	10.02.01.00602	-	-	10.02.01.00566	-
SBP 20 SDA	-	-	10.02.01.00603	-	-	10.02.01.00567
SBP 25 SDA	-	-	10.02.01.00604	-	-	10.02.01.00568

*Connection geometry: see design data of basic ejectors SBP

Ordering Data Spare Parts and Accessories Basic Ejectors SBP

Type	Silencer	Mounting plate BEF-PL	Mounting kit SET SBP/SBP-C M4-IG*
SBP 05/07 SDA	10.02.01.00539	10.02.01.00511**	10.02.01.00769
SBP 10/15 SDA	10.02.01.00540	10.02.01.00511***	10.02.01.00769
SBP 20/25 SDA	10.02.01.00719	10.02.01.00511****	10.02.01.00769

* Set with two retaining clips, two screws incl. washers

** suitable for 11x SBP 05/07

*** suitable for 7x SBP 10/15

**** suitable for 5x SBP 20/25

Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

Technical Data Basic Ejectors SBP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level workpiece gripped [dB]
SBP 05 SDA	0.5	85	8.0	0.5	14	0.8	53
SBP 07 SDA	0.7	85	16.0	1.0	22	1.3	59
SBP 10 SDA	1.0	85	37.7	2.3	48	2.9	59
SBP 15 SDA	1.5	85	71.0	4.3	105	6.3	65
SBP 20 SDA	2.0	85	127.0	7.6	197	11.8	68
SBP 25 SDA	2.5	85	215.0	12.9	311	18.7	70

*At optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SBP 05 SDA	58	3.0 ... 6.0	2	2	7.5	0 ... 60
SBP 07 SDA	65	3.0 ... 6.0	2	2	7.5	0 ... 60
SBP 10 SDA	65	3.0 ... 6.0	4	6	22.0	0 ... 60
SBP 15 SDA	72	3.0 ... 6.0	4	6	22.0	0 ... 60
SBP 20 SDA	77	3.0 ... 6.0	6	7	50.0	0 ... 60
SBP 25 SDA	78	3.0 ... 6.0	6	7	50.0	0 ... 60

*At optimal operating pressure

**For max. length 2 m

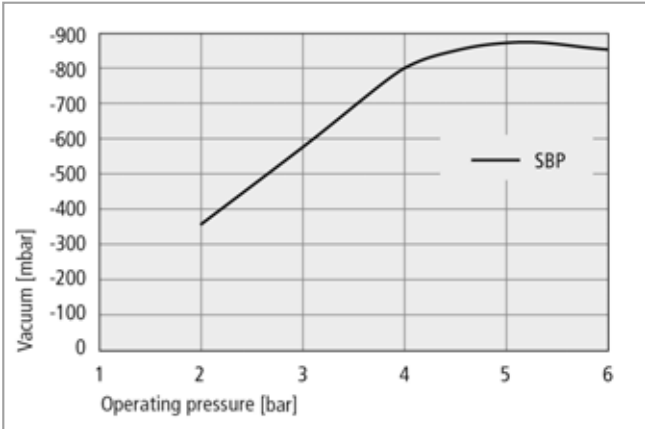
Basic Ejectors



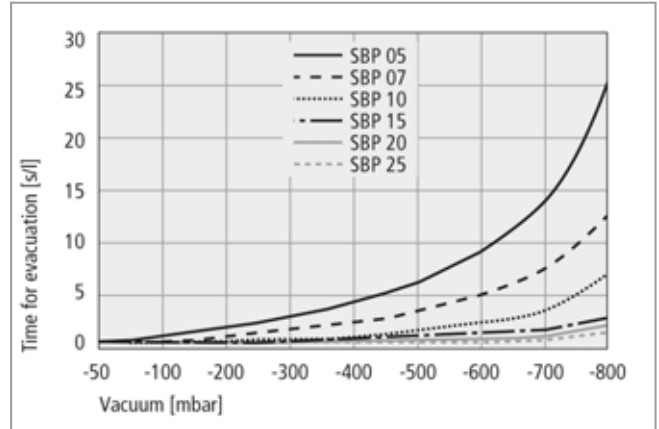
Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

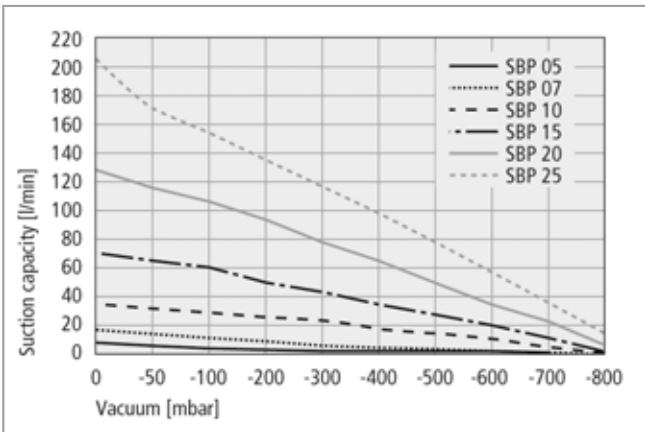
Performance Data Basic Ejectors SBP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP 05 SDA	8.00	6.62	5.64	4.74	3.81	3.01	2.28	1.42	0.40	0.10
SBP 07 SDA	16.10	13.60	11.37	9.03	7.25	5.63	3.97	2.65	1.10	0.30
SBP 10 SDA	37.70	33.20	30.10	26.70	23.00	18.60	14.90	9.80	5.20	1.61
SBP 15 SDA	71.00	65.00	60.10	52.00	44.00	36.50	29.00	20.50	11.40	2.18
SBP 20 SDA	127.00	117.80	106.00	94.20	79.10	65.30	49.87	35.99	23.00	8.36
SBP 25 SDA	215.00	172.00	156.10	138.70	118.50	99.10	79.36	58.90	37.24	16.24

Evacuation Time in s/l for Various Vacuum Ranges

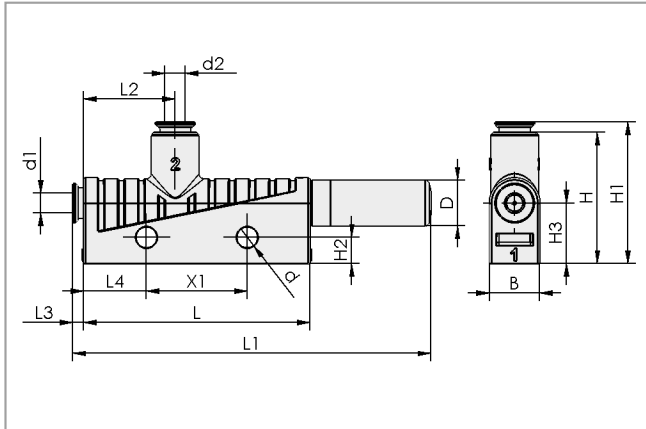
Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SBP 05 SDA	0.34	0.68	1.56	2.66	4.02	5.84	8.54	13.22	25.54	
SBP 07 SDA	0.20	0.38	0.84	1.46	2.24	3.26	4.66	6.84	12.56	
SBP 10 SDA	0.06	0.14	0.30	0.52	0.82	1.30	1.98	3.26	6.56	
SBP 15 SDA	0.05	0.08	0.16	0.26	0.40	0.60	0.86	1.30	2.54	
SBP 20 SDA	0.03	0.05	0.09	0.16	0.24	0.34	0.49	0.80	1.74	
SBP 25 SDA	0.03	0.04	0.07	0.09	0.14	0.20	0.28	0.42	0.99	

Basic Ejectors SBP

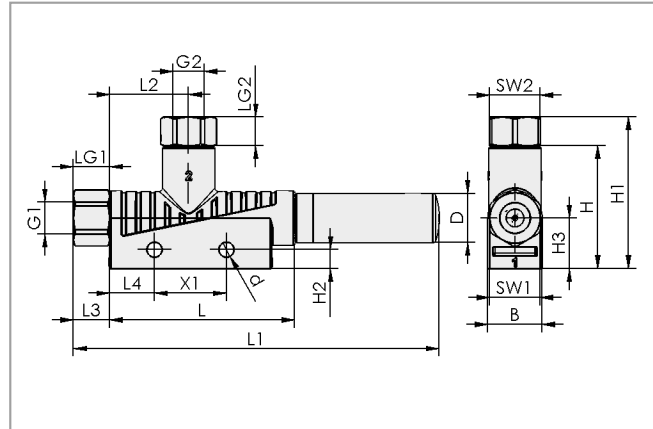
Suction rate from 8 l/min to 215 l/min



Design Data Basic Ejectors SBP



SBP S01...S03



SBP G01...G03

Type	Dimensions in mm											
	B	d	d1	d2	D	G1	G2	H	H1	H2	H3	
SBP 05/07 S01 SDA	10	4.2	4	4	9	-	-	26	28.0	5.2	12	
SBP 10/15 S02 SDA	15	4.2	6	8	14	-	-	34	40.0	5.2	14	
SBP 20/25 S03 SDA	20	4.2	8	10	20	-	-	39	45.5	5.2	17	
SBP 05/07 G01 SDA	10	4.2	-	-	9	M5-F	M5-F	26	31.0	5.2	12	
SBP 10/15 G02 SDA	15	4.2	-	-	14	G1/8"-F	G1/8"-F	34	42.0	5.2	14	
SBP 20/25 G03 SDA	20	4.2	-	-	20	G1/4"-F	G3/8"-F	39	53.5	5.2	17	

Type	Dimensions in mm									
	L	L1	L2	L3	L4	LG1	LG2	SW1	SW2	X1
SBP 05/07 S01 SDA	45.0	71	18.0	2.0	12.5	-	-	-	-	20
SBP 10/15 S02 SDA	51.5	97	22.0	5.5	12.5	-	-	-	-	20
SBP 20/25 S03 SDA	86.5	168	24.5	5.5	12.5	-	-	-	-	20
SBP 05/07 G01 SDA	45.0	74	18.0	5.0	12.5	5	5	8	8	20
SBP 10/15 G02 SDA	51.5	102	22.0	10.0	12.5	8	8	14	14	20
SBP 20/25 G03 SDA	86.5	176	24.5	13.0	12.5	9	10	17	19	20

Basic Ejectors

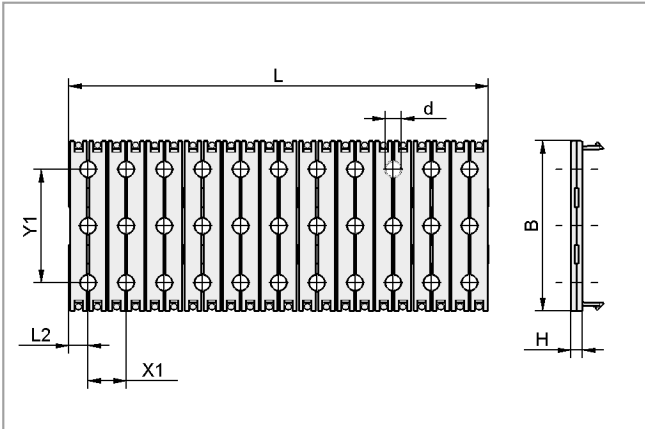


Basic Ejectors SBP

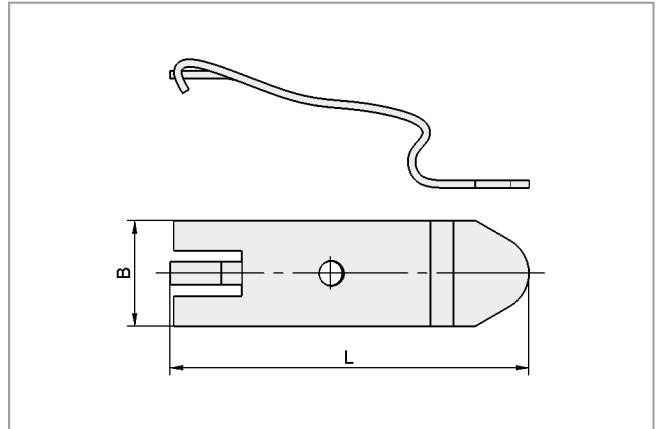
Suction rate from 8 l/min to 215 l/min



Design Data Spare Parts and Accessories Basic Ejectors SBP



BEF-PL



SET SBP/SBP-C M4-IG

Type	Dimensions in mm							
	B	d	H	L	L2	X1	Y1	
Mounting plate BEF-PL	45	4.2	3	111.1	5	10.1	30	
Mounting set SET SBP/SBP-C M4-IG	14	-	-	50.0	-	-	-	

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Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min



Suitable for Industry Specific Applications



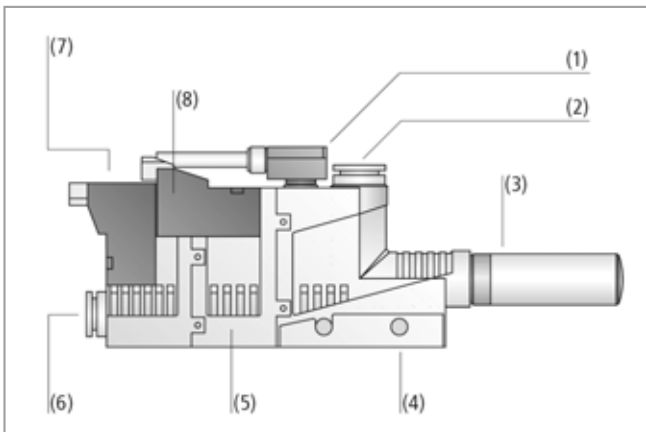
Basic ejectors SBP-C with additional functions

Applications

- Basic ejector with plastic housing, integrated valve technology and system monitoring for use in very high dynamic feeder systems
- Handling of all kind of airtight components
- For use in separating systems where space is restricted
- Construction of ejector blocks for centralized or decentralized individual control of suction cups

Design

- Ejector with single stage nozzle, available in six power ratings, from 0.5 to 2.5 mm nozzle diameter incl. silencer (3)
- Housing made of light, impact-resistant plastic
- Connection of compressed air (6) and vacuum (2) with push-in coupling or threads
- Basic housing with connection facility for a vacuum switch (1)
- Optionally available with suction (7) or blow-off pulse (8), blow-off reservoir (5) (on SBP-C 05 and 07) and vacuum switch (1)
- Can be fixed horizontal with mounting holes (4) or vertical with the base on a mounting plate
- Optional mounting with mounting plate and mounting kit on DIN top-hat rails



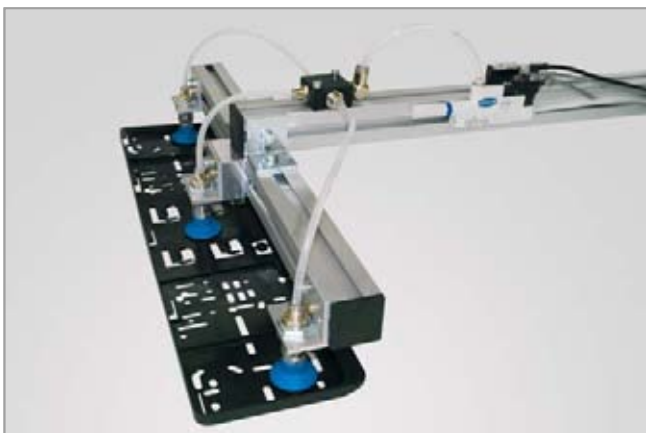
System design basic ejectors SBP-C with additional functions

Our Highlights...

- Weight-optimized plastic housing
- Ejector nozzles with six different power ratings
- Connections either with threaded holes or push-in couplings
- Integrated valve technology and vacuum monitoring

Your Benefits...

- > Ideal for decentralized vacuum generation in highly dynamic processes
- > Various power ratings for optimized air consumption
- > Space-saving and easy to install
- > The complete solution for optimized cycletimes



Central vacuum generation with basic ejector SBP-C for handling plastic injection molded parts

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Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Designation Code Basic Ejectors SBP-C with Additional Functions

Abbreviated designation	Nozzle size	Connection	Idle position suction valve	Blow off valve	System monitoring
Example SBP-C 10 S02 NO A VS-T:					
SBP-C	10	S02	NO	A	VS-T
SBP-C	05 = 0.5 mm to 25 = 2.5 mm	G01 connection thread 1 G02 connection thread 2 G03 connection thread 3 S01 quick-connect push-in coupling 1 S02 quick-connect push-in coupling 2 S03 quick-connect push-in coupling 3	NC normally closed NO normally open	A blow off valve AI blow off pulse	VS-T vacuum switch with Teachbutton (PNP)

Ordering Data Basic Ejectors SBP-C with Additional Functions

The basic ejector SBP-C is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer

Available accessories: mounting plate, mounting set, connection cable

Basic Ejectors SBP-C with Additional Functions

SBP-C 05		SBP-C 07		SBP-C 10	
Type	Part Number	Type	Part Number	Type	Part Number
SBP-C 05 G01 VS-T	10.02.01.00997	SBP-C 07 G01 VS-T	10.02.01.00998	SBP-C 10 G02 VS-T	10.02.01.00999
SBP-C 05 G01 NC	10.02.01.00611	SBP-C 07 G01 NC	10.02.01.00612	SBP-C 10 G02 NO A	10.02.01.00625
SBP-C 05 G01 NC AI	10.02.01.00623	SBP-C 07 G01 NC AI	10.02.01.00624	SBP-C 10 G02 NO A VS-T	10.02.01.01008
SBP-C 05 G01 NC VS-T	10.02.01.01003	SBP-C 07 G01 NC VS-T	10.02.01.01004	SBP-C 10 S02 VS-T	10.02.01.00983
SBP-C 05 G01 NC AI VS-T	10.02.01.01005	SBP-C 07 G01 NC AI VS-T	10.02.01.01006	SBP-C 10 S02 NO A	10.02.01.00589
SBP-C 05 S01 VS-T	10.02.01.00981	SBP-C 07 S01 VS-T	10.02.01.00982	SBP-C 10 S02 NO A VS-T	10.02.01.00993
SBP-C 05 S01 NC	10.02.01.00575	SBP-C 07 S01 NC	10.02.01.00576		
SBP-C 05 S01 NC AI	10.02.01.00587	SBP-C 07 S01 NC AI	10.02.01.00588		
SBP-C 05 S01 NC VS-T	10.02.01.00987	SBP-C 07 S01 NC VS-T	10.02.01.00988		
SBP-C 05 S01 NC AI VS-T	10.02.01.00989	SBP-C 07 S01 NC AI VS-T	10.02.01.00990		

SBP-C 15		SBP-C 20		SBP-C 25	
Type	Part Number	Type	Part Number	Type	Part Number
SBP-C 15 G02 VS-T	10.02.01.01000	SBP-C 20 G03 VS-T	10.02.01.01001	SBP-C 25 G03 VS-T	10.02.01.01002
SBP-C 15 G02 NO A	10.02.01.00626	SBP-C 20 G03 NO A	10.02.01.00627	SBP-C 25 G03 NO A	10.02.01.00628
SBP-C 15 G02 NO A VS-T	10.02.01.01009	SBP-C 20 G03 NO A VS-T	10.02.01.01010	SBP-C 25 G03 NO A VS-T	10.02.01.01011
SBP-C 15 S02 VS-T	10.02.01.00984	SBP-C 20 S03 VS-T	10.02.01.00985	SBP-C 25 S03 VS-T	10.02.01.00986
SBP-C 15 S02 NO A	10.02.01.00590	SBP-C 20 S03 NO A	10.02.01.00591	SBP-C 25 S03 NO A	10.02.01.00592
SBP-C 15 S02 NO A VS-T	10.02.01.00994	SBP-C 20 S03 NO A VS-T	10.02.01.00995	SBP-C 25 S03 NO A VS-T	10.02.01.00996

Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Ordering Data Spare Parts and Accessories Basic Ejectors SBP-C with Additional Functions

Type	Silencer	Mounting plate BEF-PL	Mounting kit SET SBP/SBP-C M4-IG****
SBP-C 05/07	10.02.01.00539	10.02.01.00511*	10.02.01.00769
SBP-C 10/15	10.02.01.00540	10.02.01.00511**	10.02.01.00769
SBP-C 20/25	10.02.01.00719	10.02.01.00511***	10.02.01.00769

* suitable for 11 SBP-C 05/07

** suitable for 7 SBP-C 10/15

*** suitable for 5 SBP-C 20/25

****Set with two retaining clips, two screws incl. washers

Ordering Data Accessories Plug Connector Basic Ejectors SBP-C with Additional Functions

Type	Connection cable for solenoid valves (3 m, PUR)	Number of connection cables*	Connection cable 4-pole for vacuum switch (5 m, PUR, straight)**
SBP-C 05 G01/S01 VS-T	-	-	10.06.02.00031
SBP-C 05 G01/S01 NC ...	21.04.06.00086	1 x	10.06.02.00031
SBP-C 07 G01/S01 VS-T	-	-	10.06.02.00031
SBP-C 07 G01/S01 NC ...	21.04.06.00086	1 x	10.06.02.00031
SBP-C 10 G02/S02 VS-T	-	-	10.06.02.00031
SBP-C 10 G02/S02 NO ...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 15 G02/S02 VS-T	-	-	10.06.02.00031
SBP-C 15 G02/S02 NO...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 20 G03/S03 VS-T	-	-	10.06.02.00031
SBP-C 20 G03/S03 NO...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 25 G03/S03 VS-T	-	-	10.06.02.00031
SBP-C 25 G03/S03 NO...	21.04.06.00086	2 x	10.06.02.00031

*For SBP-C 05/07...NC... order 1 x per ejector; For SBP-C 10/15/20/25...NO... order 2 x per ejector

**Order 1 x per ejector

Technical Data Basic Ejectors SBP-C with Additional Functions

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumption during evac. [l/min]*	Air consumption during evac. [m³/h]*
SBP-C 05	0.5	85	7	0.4	14	0.8
SBP-C 07	0.7	85	16	1.0	24	1.5
SBP-C 10	1.0	85	38	2.3	48	2.9
SBP-C 15	1.5	85	70	4.2	118	7.1
SBP-C 20	2.0	85	123	7.4	208	12.5
SBP-C 25	2.5	85	215	12.9	311	18.7

!The supply voltage for vacuum switches and solenoid valves is 24 VDC

*On version with solenoid valves SBP-C 07 (24) / SBP-C 25 (320) and optimal operating pressure

**For max. length 2 m

Type	Noise level work-piece gripped [dB]	Noise level free [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Operating temperature [°C]
SBP-C 05	53	58	3.0 ... 6.0	2	2	0 ... 50
SBP-C 07	59	65	3.0 ... 6.0	2	2	0 ... 50
SBP-C 10	59	65	3.0 ... 6.0	4	6	0 ... 50
SBP-C 15	65	72	3.0 ... 6.0	4	6	0 ... 50
SBP-C 20	68	77	3.0 ... 6.0	6	7	0 ... 50
SBP-C 25	70	78	3.0 ... 6.0	6	7	0 ... 50

!The supply voltage for vacuum switches and solenoid valves is 24 VDC

*On version with solenoid valves SBP-C 07 (24) / SBP-C 25 (320) and optimal operating pressure

**For max. length 2 m

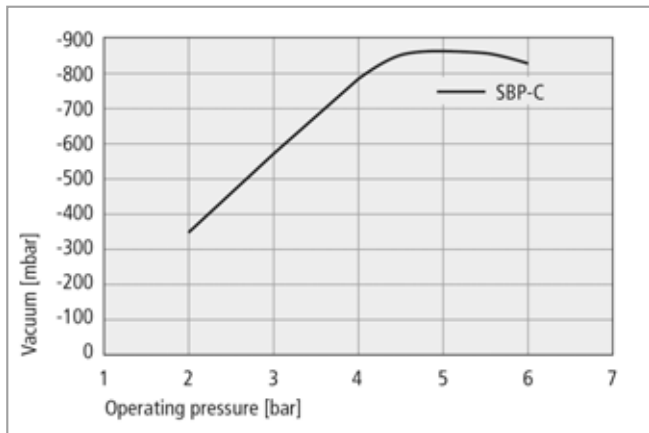
Basic Ejectors



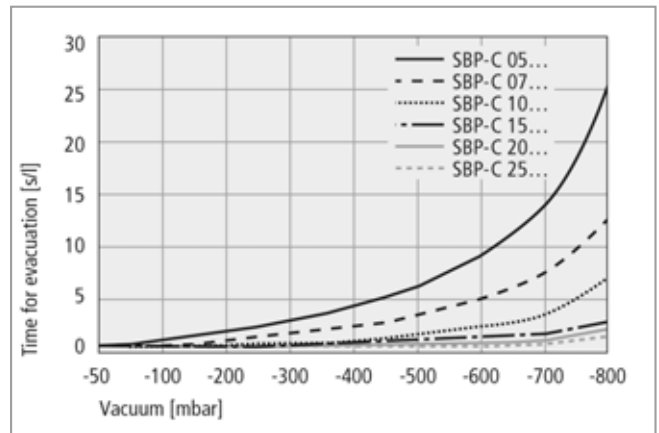
Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

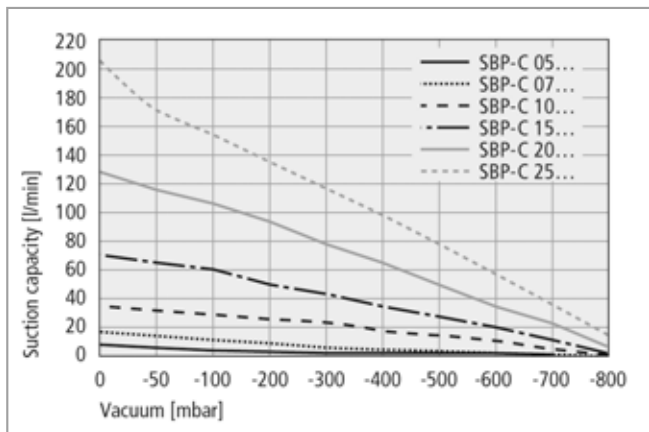
Performance Data Basic Ejectors SBP-C with Additional Functions



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP-C 05 ...	7.00	6.20	5.30	4.50	3.70	3.00	2.20	1.40	0.40	0.10
SBP-C 07 ...	16.00	13.60	11.37	9.03	7.25	5.63	3.97	2.65	1.10	0.30
SBP-C 10 ...	38.00	33.20	30.10	26.70	23.00	18.60	14.90	9.80	5.20	1.61
SBP-C 15 ...	70.00	65.00	60.10	52.00	44.00	36.50	29.00	20.50	11.40	2.18
SBP-C 20 ...	123.00	115.00	104.00	93.00	78.00	64.00	49.00	35.50	23.00	8.00
SBP-C 25 ...	215.00	175.00	157.50	139.50	119.00	99.50	79.60	59.00	37.30	16.30

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SBP-C 05 ...	0.34	0.68	1.56	2.66	4.02	5.84	8.54	13.22	25.54	
SBP-C 07 ...	0.20	0.38	0.84	1.46	2.24	3.26	4.66	6.84	12.56	
SBP-C 10 ...	0.06	0.14	0.30	0.52	0.82	1.30	1.98	3.26	6.56	
SBP-C 15 ...	0.05	0.08	0.16	0.26	0.40	0.60	0.86	1.30	2.54	
SBP-C 20 ...	0.03	0.05	0.09	0.16	0.24	0.34	0.49	0.80	1.74	
SBP-C 25 ...	0.02	0.03	0.06	0.09	0.14	0.20	0.28	0.42	0.99	

Basic Ejectors

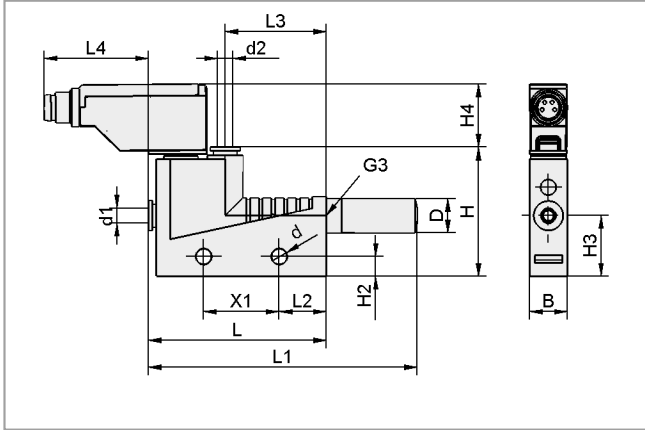


Basic Ejectors SBP-C with Additional Functions

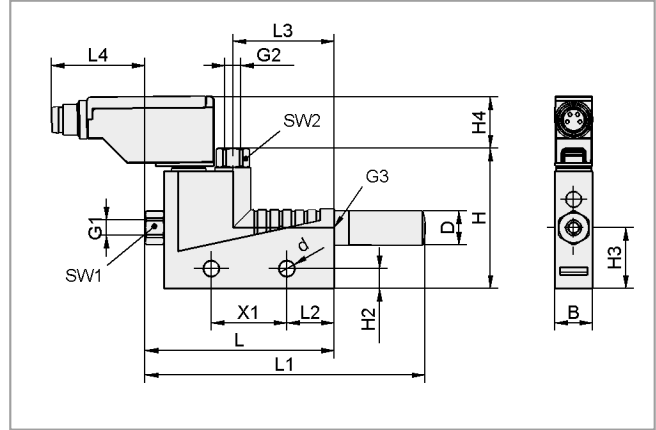
Suction rate from 7 l/min to 215 l/min



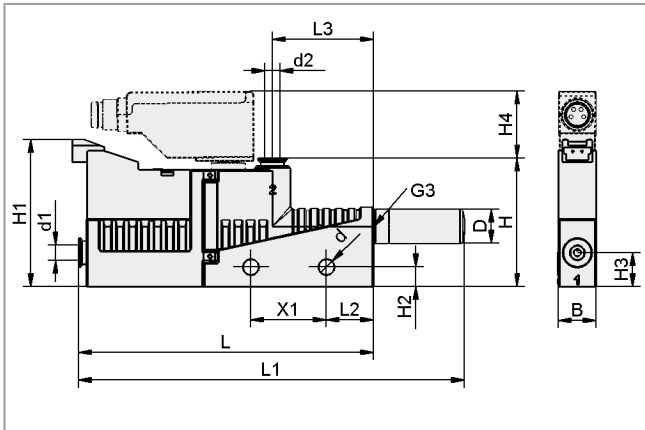
Design Data Basic Ejectors SBP-C with Additional Functions



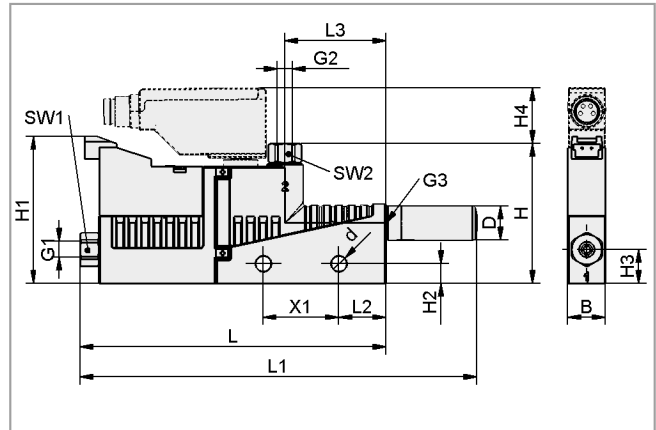
SBP-C 05/07 S01 VS-T; ... 10/15 S02 VS-T; ... 20/25 S03 VS-T



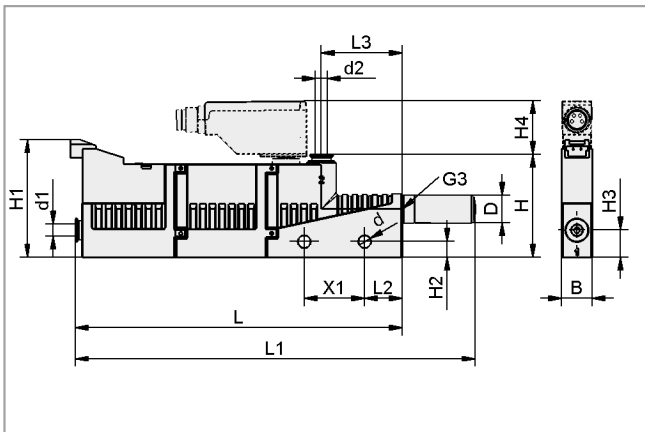
SBP-C 05/07 G01 VS-T; ... 10/15 G02 VS-T; ... 20/25 G03 VS-T



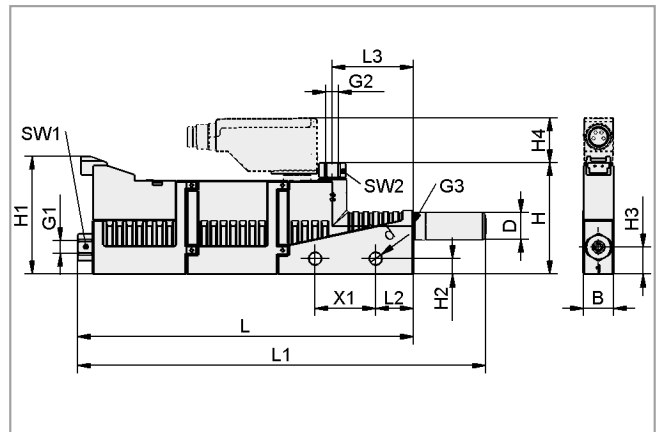
SBP-C 05/07 S01 NC (VS-T)



SBP-C 05/07 G01 NC (VS-T)



SBP-C 05/07 S01 NC AI (VS-T)



SBP-C 05/07 G01 NC AI (VS-T)

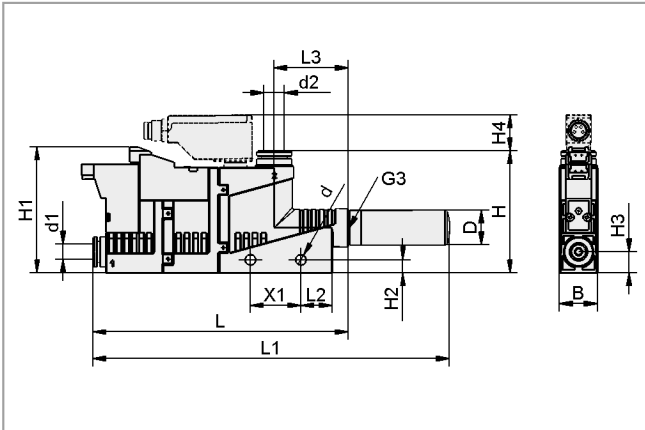
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Vacuum Generators
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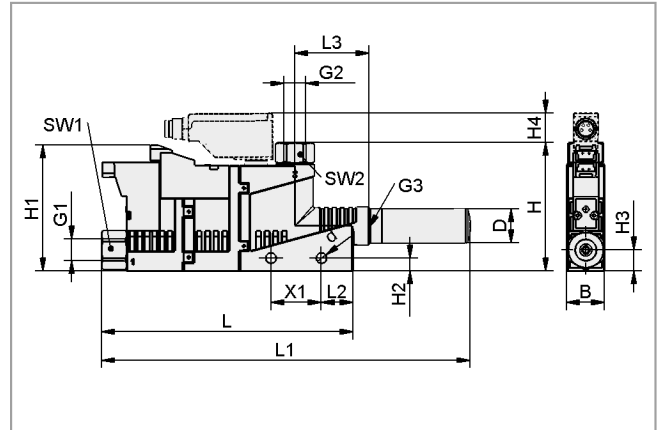


Basic Ejectors SBP-C with Additional Functions

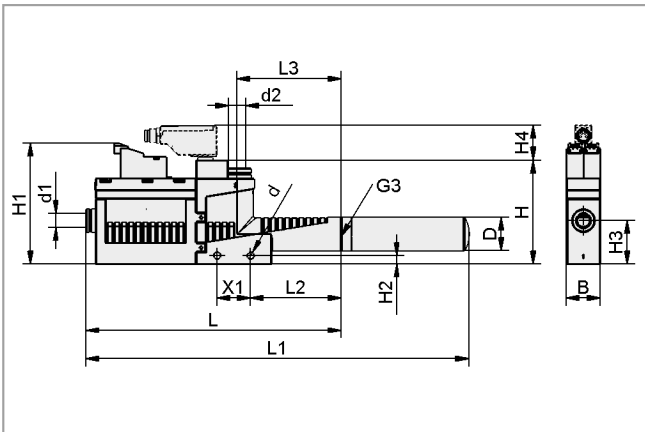
Suction rate from 7 l/min to 215 l/min



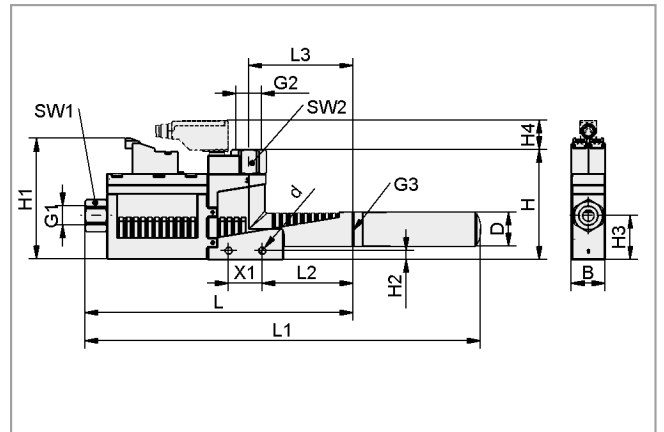
SBP-C 10/15 S02 NO A (VS-T)



SBP-C 10/15 G02 NO A (VS-T)



SBP-C 20/25 S03 NO A (VS-T)



SBP-C 20/25 G03 NO A (VS-T)

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Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Design Data Basic Ejectors SBP-C with Additional Functions

Type	Dimensions in mm										
	B	d	d1	d2	D	G1	G2	G3	H	H1	H2
SBP-C 05/07 G01 VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	-	5.2
SBP-C 05/07 G01 NC	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G01 NC AI	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G01 NC VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G01 NC AI VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 S01 VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	-	5.2
SBP-C 05/07 S01 NC	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S01 NC AI	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S01 NC VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S01 NC AI VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 10/15 G02 VS-T	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	-	5.2
SBP-C 10/15 G02 NO A	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	50	5.2
SBP-C 10/15 G02 NO A VS-T	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	50	5.2
SBP-C 10/15 S02 VS-T	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	-	5.2
SBP-C 10/15 S02 NO A	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	50	5.2
SBP-C 10/15 S02 NO A VS-T	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	50	5.2
SBP-C 20/25 G03 VS-T	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	-	5.2
SBP-C 20/25 G03 NO A	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	72	5.2
SBP-C 20/25 G03 NO A VS-T	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	72	5.2
SBP-C 20/25 S03 VS-T	20	4.2	8	10	20.0	-	-	G3/8"-F	62.0	-	5.2
SBP-C 20/25 S03 NO A	20	4.2	8	10	20.0	-	-	G3/8"-F	57.5	72	5.2
SBP-C 20/25 S03 NO A VS-T	20	4.2	8	10	20.0	-	-	G3/8"-F	62.0	72	5.2

Type	Dimensions in mm										
	H3	H4	L	L1	L2	L3	L4	SW1	SW2	X1	Weight [g]
SBP-C 05/07 G01 VS-T	16.0	14.8	50.0	74.0	12.5	27.0	24.8	8	8	20	87
SBP-C 05/07 G01 NC	9.0	-	81.0	105.0	12.5	27.0	-	8	8	20	28
SBP-C 05/07 G01 NC AI	9.0	-	111.0	135.0	12.5	27.0	-	8	8	20	36
SBP-C 05/07 G01 NC VS-T	9.0	14.3	81.0	105.0	12.5	27.0	-	8	8	20	104
SBP-C 05/07 G01 NC AI VS-T	9.0	14.3	111.0	135.0	12.5	27.0	-	8	8	20	112
SBP-C 05/07 S01 VS-T	16.0	17.7	47.0	71.0	12.5	27.0	27.7	-	-	20	86
SBP-C 05/07 S01 NC	9.0	-	78.0	102.0	12.5	27.0	-	-	-	20	27
SBP-C 05/07 S01 NC AI	9.0	-	108.0	132.0	12.5	27.0	-	-	-	20	35
SBP-C 05/07 S01 NC VS-T	9.0	17.7	78.0	102.0	12.5	27.0	-	-	-	20	103
SBP-C 05/07 S01 NC AI VS-T	9.0	17.7	108.0	132.0	12.5	27.0	-	-	-	20	111
SBP-C 10/15 G02 VS-T	18.0	11.8	61.5	101.5	19.0	29.5	19.8	14	14	20	105
SBP-C 10/15 G02 NO A	8.5	-	106.0	146.0	19.0	29.5	-	14	14	20	70
SBP-C 10/15 G02 NO A VS-T	8.5	11.8	106.0	146.0	19.0	29.5	-	14	14	20	145
SBP-C 10/15 S02 VS-T	18.0	14.1	57.0	97.0	19.0	29.5	24.6	-	-	20	100
SBP-C 10/15 S02 NO A	8.5	-	101.5	141.5	19.0	29.5	-	-	-	20	65
SBP-C 10/15 S02 NO A VS-T	8.5	14.2	101.5	141.5	12.5	29.5	-	-	-	20	140
SBP-C 20/25 G03 VS-T	18.0	17.3	99.5	175.5	54.0	62.0	17.8	17	19	20	143
SBP-C 20/25 G03 NO A	8.5	-	159.5	235.5	54.0	62.0	-	17	19	20	144
SBP-C 20/25 G03 NO A VS-T	26.0	17.3	159.5	235.5	54.0	62.0	-	17	19	20	220
SBP-C 20/25 S03 VS-T	18.0	21.0	92.0	168.0	54.0	62.0	25.2	-	-	20	145
SBP-C 20/25 S03 NO A	26.0	-	152.0	228.0	54.0	62.0	-	-	-	20	146
SBP-C 20/25 S03 NO A VS-T	26.0	21.0	152.0	228.0	54.0	62.0	-	-	-	20	222

Basic Ejectors

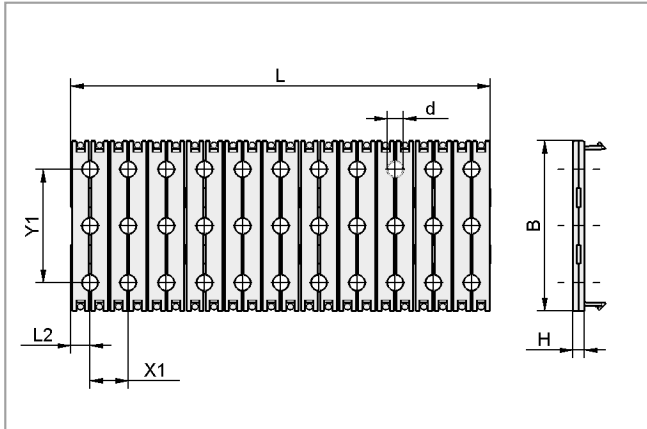


Basic Ejectors SBP-C with Additional Functions

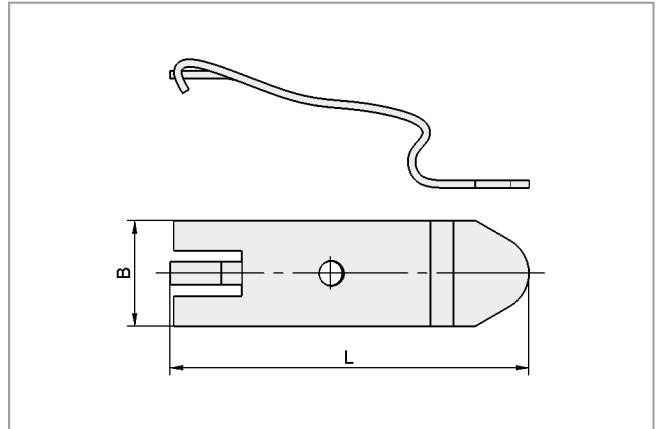
Suction rate from 7 l/min to 215 l/min



Design Data Spare Parts and Accessories Basic Ejectors SBP-C with Additional Functions



BEF-PL



SET SBP/SBP-C M4-IG

Type	Dimensions in mm							
	B	d	H	L	L2	X1	Y1	
Mounting plate BEF-PL	45	4.2	3	111.1	5	10.1	30	
Mounting set SET SBP/SBP-C M4-IG	14	-	-	50.0	-	-	-	

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Basic Ejectors



Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min



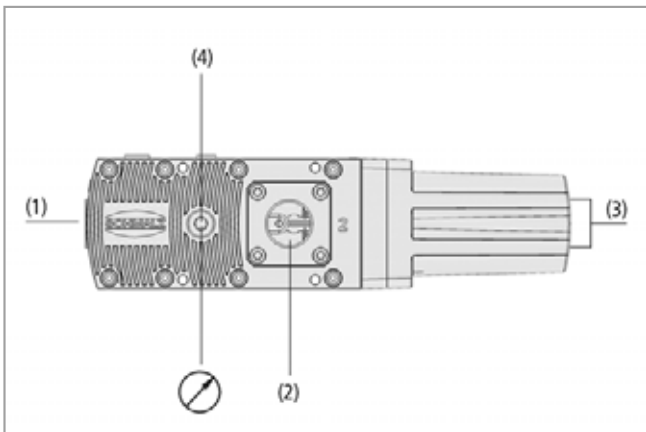
Suitable for Industry Specific Applications



Basic ejectors SBPL

Applications

- Basic ejector with highest suction rate for handling cardboard, packaging materials, insulation materials and other porous workpieces
- For processes that require high flow rates at minimized energy consumption



System design basic ejectors SBPL

Design

- Basic body and nozzle system made of high-strength plastic
- Pneumatic connections for compressed air (1), vacuum (2) and exhaust air (silencer) (3)
- Connections for valve, vacuum switch or vacuum manometer (4)
- Optional accessories: vacuum switch, vacuum manometer, quick-release valves, electromagnetic valves



Centralized vacuum generation by means of basic ejectors SBPL

Our Highlights...

- Ejector family with high suction capacity
- Area of operation for air tight (HV) or porous (HF) workpieces
- Integrated eco nozzle technology
- Fast, with powerful vacuum
- Modular product design

Your Benefits...

- > Quick and safe handling of porous workpieces
- > Reduced air consumption due to an optimized ejector operating area
- > Highest energy efficiency in vacuum generation
- > Quickly reaches working vacuum
- > Quick and easy maintenance

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Basic Ejectors



Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min

Designation Code Basic Ejectors SBPL

Abbreviated designation	Size	Version	Special thread
Example SBPL 100 HF:			
SBPL	100	HF	NPT
SBPL	25	HF High Flow	
	50	HV High Vacuum	
	75		
	100		
	125		
	150		

Ordering Data Basic Ejectors SBPL

The basic ejector SBPL is delivered as a ready to connect product.

Available accessories: vacuum manometer, quick-release valves, electromagnetic valves, mounting bracket

Basic Ejectors SBPL

SBPL 25		SBPL 50		SBPL 75	
Type	Part Number	Type	Part Number	Type	Part Number
SBPL 25 HF	10.02.01.01596	SBPL 50 HF	10.02.01.01597	SBPL 75 HF	10.02.01.01650
SBPL 25 HV	10.02.01.01586	SBPL 50 HV	10.02.01.01590	SBPL 75 HV	10.02.01.01649
SBPL 25 HF NPT	10.02.01.01604	SBPL 50 HF NPT	10.02.01.01605	SBPL 75 HF NPT	10.02.01.01654
SBPL 25 HV NPT	10.02.01.01600	SBPL 50 HV NPT	10.02.01.01601	SBPL 75 HV NPT	10.02.01.01653

SBPL 100		SBPL 125		SBPL 150	
Type	Part Number	Type	Part Number	Type	Part Number
SBPL 100 HF	10.02.01.01598	SBPL 125 HF	10.02.01.01652	SBPL 150 HF	10.02.01.01599
SBPL 100 HV	10.02.01.01591	SBPL 125 HV	10.02.01.01651	SBPL 150 HV	10.02.01.01592
SBPL 100 HF NPT	10.02.01.01606	SBPL 125 HF NPT	10.02.01.01656	SBPL 150 HF NPT	10.02.01.01607
SBPL 100 HV NPT	10.02.01.01602	SBPL 125 HV NPT	10.02.01.01655	SBPL 150 HV NPT	10.02.01.01603

Ordering Data Accessories Basic Ejectors SBPL

Type	Type	Part Number
Vacuum gauge (electronic)	VAM-D 30x30 VP10 G1/8-AG	10.07.02.00055
Vacuum gauge	VAM 40 V H	10.07.02.00007
Solenoid valve pressure	EMV 3 24V-DC 2/2 NC K-2P	10.05.01.00366
Quick exhaust valve	SEV G1/8-IG G1/4-AG	10.02.01.01471
Mounting bracket	BEF-WIN 25x77x72 3 SBPL	10.02.01.01657

Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min

Technical Data Basic Ejectors SBPL

Type	Degree of evacuation [%]	Max. suction rate [l/min]*	Max. suction rate [m³/h]*	Air consumpt. during evac. [l/min]**	Air consumpt. during evac. [m³/h]**	Noise level free [dB]
SBPL 25 HF ...	60	290 (325)	18.0 (19.5)	80	5.0	61
SBPL 25 HV ...	90	300 (330)	18.5 (19.8)	105	6.5	65
SBPL 50 HF ...	60	500 (650)	30.5 (39.0)	160	9.8	65
SBPL 50 HV ...	90	510 (660)	31.0 (39.6)	210	13.0	66
SBPL 75 HF ...	60	710 (975)	43.5 (58.5)	230	14.0	67
SBPL 75 HV ...	90	720 (990)	44.0 (59.4)	305	18.8	68
SBPL 100 HF ...	60	860 (1300)	53.0 (78.0)	300	18.5	69
SBPL 100 HV ...	90	870 (1320)	53.5 (79.2)	395	24.5	70
SBPL 125 HF ...	60	1010 (1625)	62.0 (97.5)	370	22.8	70
SBPL 125 HV ...	90	1010 (1650)	62.0 (99.0)	470	29.0	72
SBPL 150 HF ...	60	1120 (1950)	69.0 (117.0)	435	26.8	71
SBPL 150 HV ...	90	1140 (1980)	70.0 (118.8)	545	33.5	73

*The information regarding the suction capacity are values measured under operating conditions. The value in brackets represents the calculated suction capacity of the installed ejector modules. The measured value should always be applied for designs.

**At optimal operating pressure

Type	Noise level work-piece gripped [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]***	Recomm. int. hose diameter vacuum [mm]***	Weight [kg]	Operating temperature [°C]
SBPL 25 HF ...	54	2.0 ... 6.0	4	20	0.8	0 ... 60
SBPL 25 HV ...	55	2.0 ... 6.0	4	20	0.8	0 ... 60
SBPL 50 HF ...	55	2.0 ... 6.0	6	25	0.8	0 ... 60
SBPL 50 HV ...	59	2.0 ... 6.0	6	25	0.8	0 ... 60
SBPL 75 HF ...	57	2.0 ... 6.0	6	32	1.1	0 ... 60
SBPL 75 HV ...	62	2.0 ... 6.0	6	32	1.1	0 ... 60
SBPL 100 HF ...	58	2.0 ... 6.0	6	32	1.1	0 ... 60
SBPL 100 HV ...	64	2.0 ... 6.0	6	32	1.1	0 ... 60
SBPL 125 HF ...	60	2.0 ... 6.0	9	32	1.5	0 ... 60
SBPL 125 HV ...	65	2.0 ... 6.0	9	32	1.5	0 ... 60
SBPL 150 HF ...	61	2.0 ... 6.0	9	32	1.5	0 ... 60
SBPL 150 HV ...	66	2.0 ... 6.0	9	32	1.5	0 ... 60

***For max. length 2 m

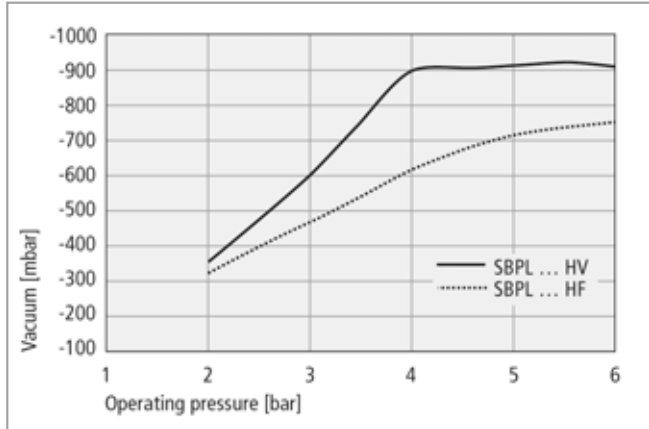
Basic Ejectors



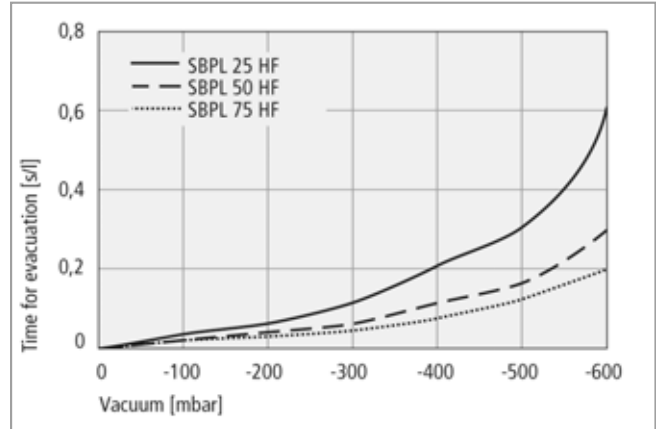
Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min

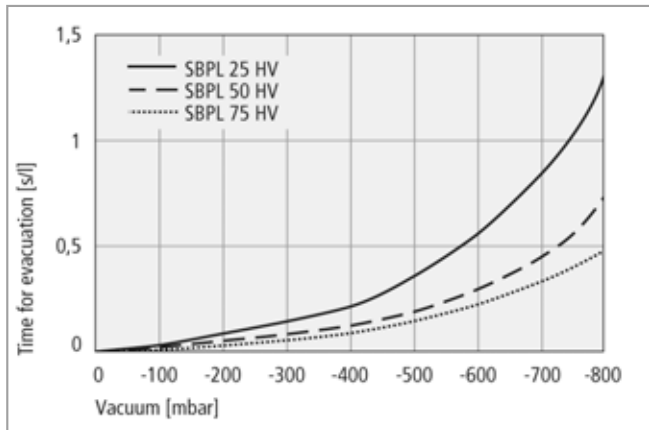
Performance Data Basic Ejectors SBPL



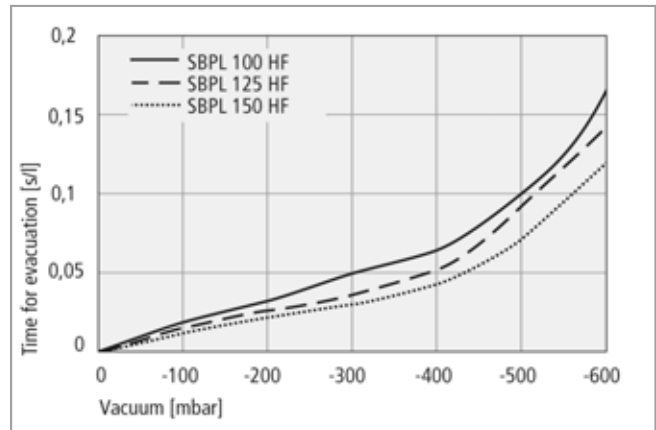
Achievable vacuum at various vacuum ranges



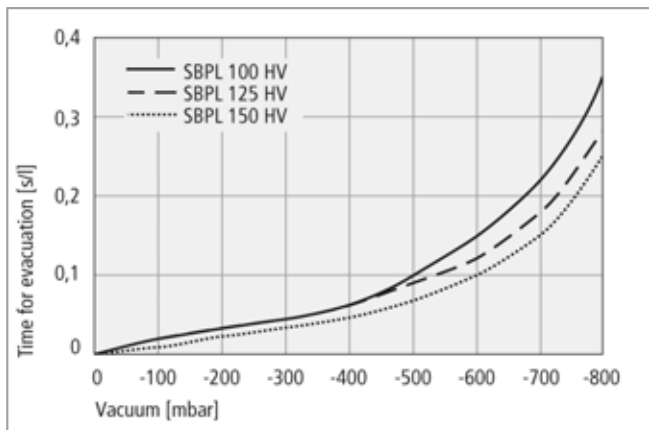
Evacuation times for various vacuum ranges



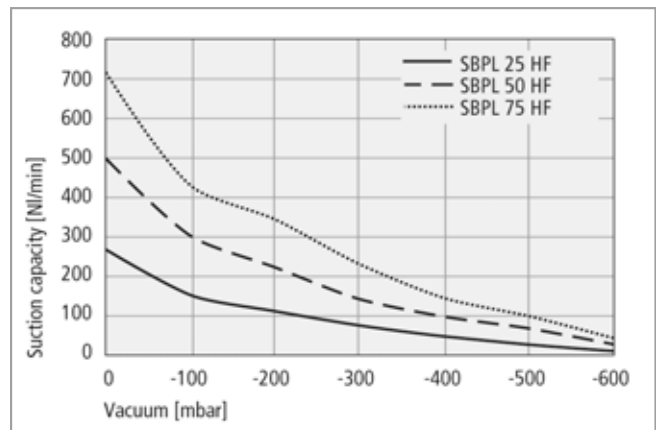
Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

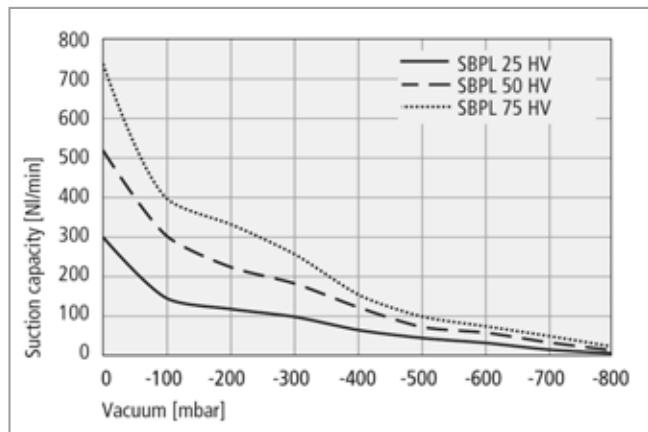
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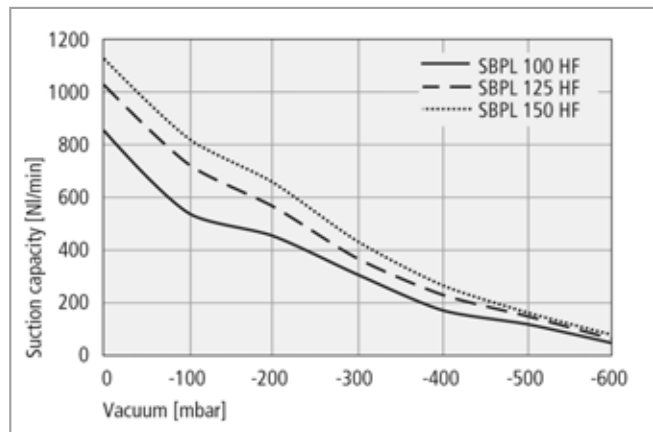


Basic Ejectors SBPL

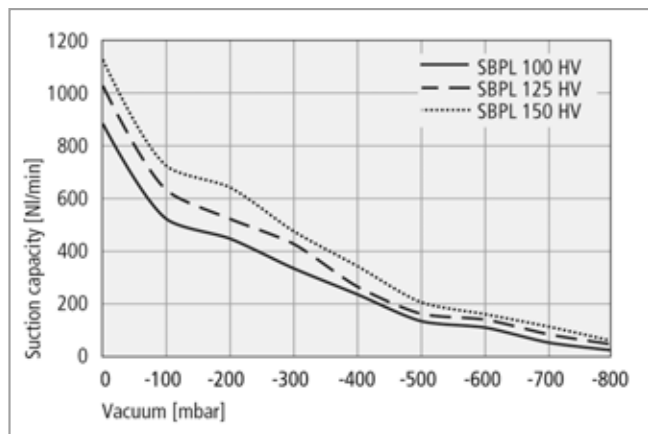
Suction rate from 290 l/min to 1,140 l/min



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBPL 25 HF	0.020	0.030	0.060	0.110	0.210	0.350	0.610	-	-
SBPL 25 HV	0.030	0.040	0.080	0.120	0.190	0.320	0.540	0.840	1.380
SBPL 50 HF	0.010	0.020	0.040	0.060	0.110	0.180	0.300	-	-
SBPL 50 HV	0.020	0.030	0.050	0.070	0.110	0.180	0.280	0.430	0.710
SBPL 75 HF	0.010	0.020	0.003	0.040	0.070	0.120	0.200	-	-
SBPL 75 HV	0.000	0.000	0.000	0.100	0.200	0.350	0.650	1.200	2.300
SBPL 100 HF	0.020	0.020	0.030	0.040	0.060	0.100	0.160	-	-
SBPL 100 HV	0.020	0.020	0.030	0.040	0.060	0.100	0.150	0.220	0.350
SBPL 125 HF	0.010	0.015	0.025	0.035	0.055	0.090	0.140	-	-
SBPL 125 HV	0.020	0.020	0.030	0.040	0.060	0.090	0.120	0.180	0.280
SBPL 150 HF	0.010	0.010	0.020	0.030	0.040	0.070	0.120	-	-
SBPL 150 HV	0.010	0.010	0.020	0.030	0.040	0.070	0.100	0.150	0.250

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- Mounting Elements
- Vacuum Generators**
- Valve Technology
- Switches and Monitoring
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- Index of Products

Basic Ejectors



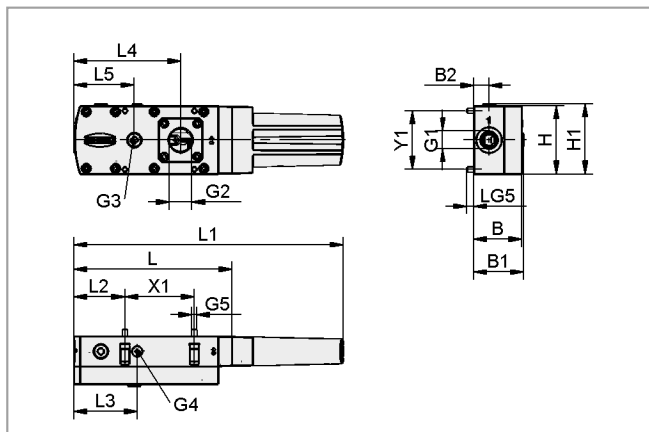
Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min

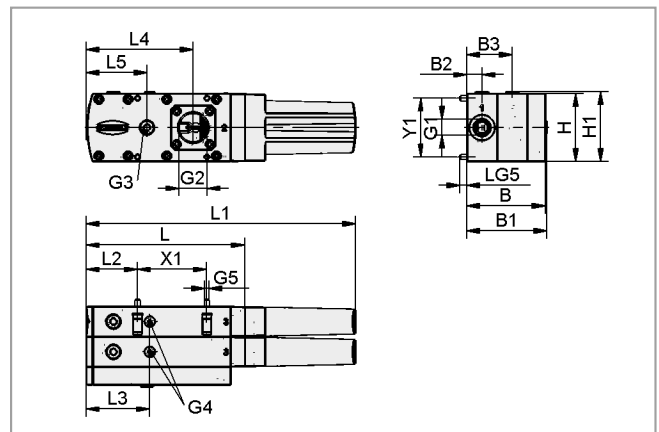
Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBPL 25 HF	210	150	130	85	50	30	10	-	-
SBPL 25 HV	225	150	125	100	70	50	35	20	7,5
SBPL 50 HF	375	300	240	165	100	70	20	-	-
SBPL 50 HV	400	300	230	190	120	70	55	35	15
SBPL 75 HF	550	425	350	240	145	100	30	-	-
SBPL 75 HV	540	400	340	270	165	100	83	57	25
SBPL 100 HF	680	570	465	305	190	125	50	-	-
SBPL 100 HV	650	520	450	350	220	135	110	75	35
SBPL 125 HF	820	720	580	380	235	150	60	-	-
SBPL 125 HV	760	620	530	425	245	170	140	95	45
SBPL 150 HF	890	805	670	425	275	175	70	-	-
SBPL 150 HV	850	720	635	475	265	205	160	110	40

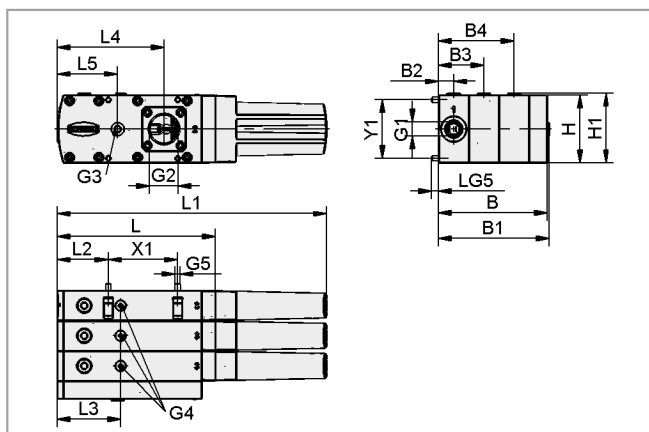
Design Data Basic Ejectors SBPL



SBPL 25/50..



SBPL 75/100..



SBPL 125/150..

Basic Ejectors SBPL

Suction rate from 290 l/min to 1,140 l/min

Design Data Basic Ejectors SBPL

Type	Dimensions in mm										
	B	B1	B2	B3	B4	G1	G2	G3	G4	G5	H
SBPL 25 HF	51	53	16	-	-	G3/8"-F	G3/4"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 25 HV	51	53	16	-	-	G3/8"-F	G3/4"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 25 HF NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 25 HV NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 50 HF	51	53	16	-	-	G3/8"-F	G3/4"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 50 HV	51	53	16	-	-	G3/8"-F	G3/4"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 50 HF NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 50 HV NPT	51	53	16	-	-	NPT3/8-F	NPT3/4-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 75 HF	83	85	16	48	-	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 75 HV	83	85	16	48	-	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 75 HF NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 75 HV NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 100 HF	83	85	16	48	-	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 100 HV	83	85	16	48	-	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 100 HF NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 100 HV NPT	83	85	16	48	-	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 125 HF	115	117	16	48	80	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 125 HV	115	117	16	48	80	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 125 HF NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 125 HV NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 150 HF	115	117	16	48	80	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 150 HV	115	117	16	48	80	G3/8"-F	G1"-F	G1/4"-F	G1/8"-F	M5-M	72
SBPL 150 HF NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72
SBPL 150 HV NPT	115	117	16	48	80	NPT3/8-F	NPT1-F	NPT1/4-F	G1/8"-F	M5-M	72

Type	Dimensions in mm									
	H1	L	L1	L2	L3	L4	L5	LG5	X1	Y1
SBPL 25 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 25 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 50 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 75 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 100 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 125 HV NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HF	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HV	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HF NPT	74	168	285	54	67	113	64	7.4	74	62
SBPL 150 HV NPT	74	168	285	54	67	113	64	7.4	74	62

Inline Ejectors



Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min



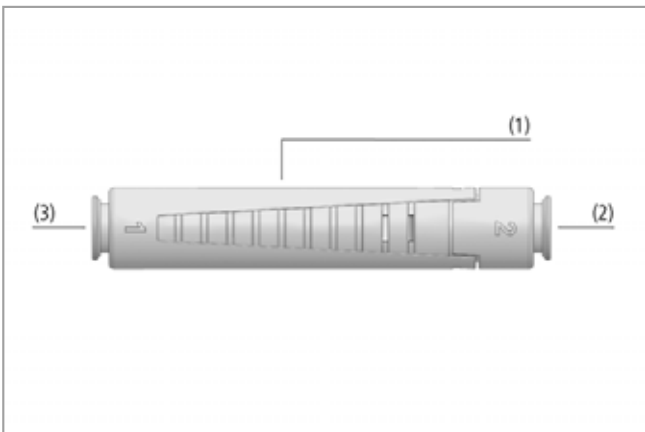
Suitable for Industry Specific Applications



Inline ejectors SLP

Applications

- Inline ejector for mounting directly in the hose line
- Handling of electronic components
- Vacuum generation in handling systems with restricted space
- Use in separation systems for plastic and sheet-metal machining



System design inline ejectors SLP

Design

- Two-piece housing made of light, impact-resistant plastic (1)
- Axial connection of compressed air (3) and vacuum (2) with quick-action push-in couplings for hose diameter 4 mm
- Vacuum generator with single nozzle in two power ratings, 0.5 and 0.7 mm diameter
- Air outlet with good flow characteristics
- Pleasing industrial design, only 10 mm thick



Decentralized vacuum generation with inline ejectors SLP for handling plastic injection molded parts

Our Highlights...

- Inline vacuum generator with axial connections
- Low device weight (5 g)
- Nozzles with high suction capacity at high vacuum values
- Slimline plastic housing
- Connection by means of push-in couplings
- Air outlet optimized

Your Benefits...

- > Direct installation in the vacuum hose
- > Ideal for highly dynamic processes
- > Minimum air consumption
- > Suitable for installation in restricted spaces
- > No need for additional connecting elements
- > Low noise output

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Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min

Designation Code Inline Ejectors SLP

Abbreviated designation	Nozzle size	Connection
Example SPL 05 S01:		
SLP	05	S01
SLP	05 = 0.5 mm 07 = 0.7 mm	S01 quick-connect push-in coupling

Ordering Data Inline Ejectors SLP

Inline ejector SLP is delivered as a ready to connect product.

Inline Ejectors SLP

Type	Part Number
SLP 05 S01	10.02.01.00561
SLP 07 S01	10.02.01.00562

Technical Data Inline Ejectors SLP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*
SLP 05 S01	0.5	85	8	0.5	13	0.8
SLP 07 S01	0.7	85	16	1.0	25	1.5

*At optimal operating pressure

**Up to a length of 2 m

Type	Noise level work-piece gripped [dB]	Noise level free [dB]	Opt. pressure [bar]	Recomm. int. hose diameter compr. air / vacuum [mm]**	Weight [g]	Operating temperature [°C]
SLP 05 S01	52	60	4.5	2	5	0 ... 60
SLP 07 S01	63	63	4.5	2	5	0 ... 60

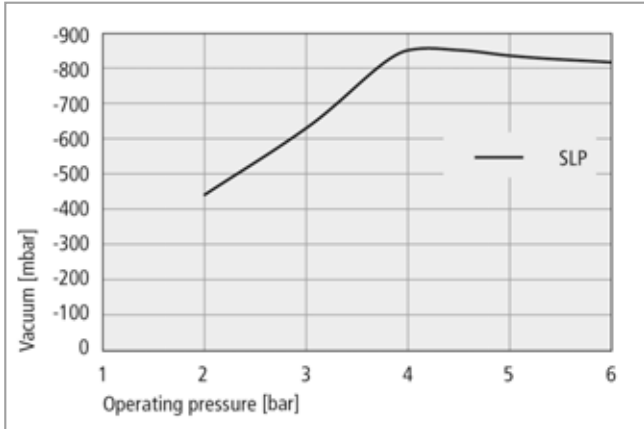
*At optimal operating pressure

**Up to a length of 2 m

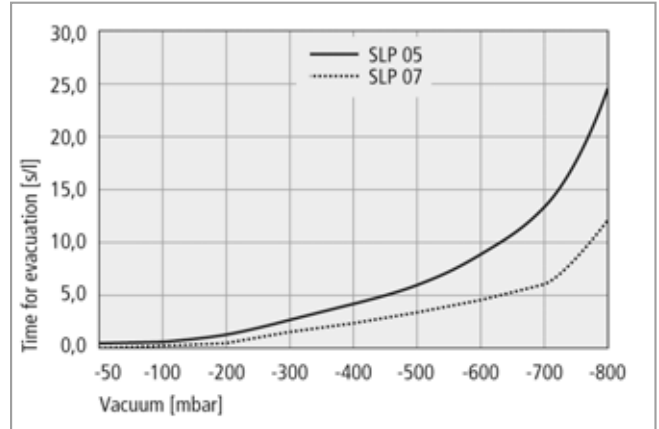
Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min

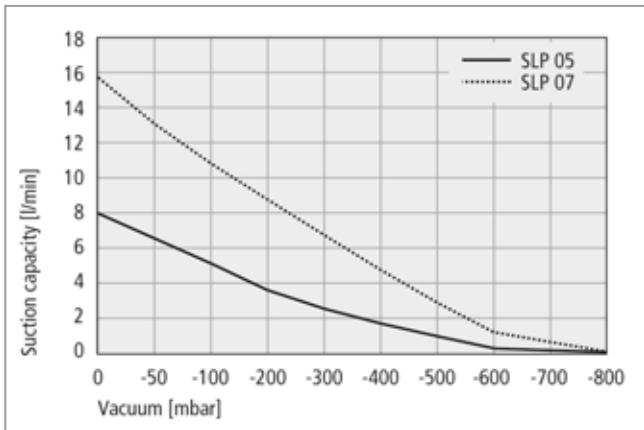
Performance Data Inline Ejectors SLP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SLP 05	8.00	6.42	4.97	3.76	2.65	1.79	1.06	0.32	0.10	0.05
SLP 07	15.90	13.30	10.89	8.70	6.67	4.65	2.88	1.29	0.55	0.06

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SLP 05	0.4	0.7	1.6	2.7	4.0	5.8	8.5	13.1	24.5	
SLP 07	0.2	0.4	0.8	1.4	2.2	3.2	4.6	6.7	12.7	

Inline Ejectors

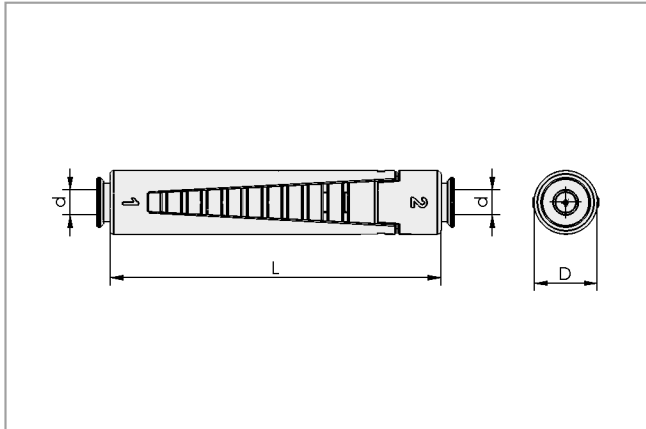


Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min



Design Data Inline Ejectors SLP



SLP

Type	Dimensions in mm		
	d	D	L
SLP 05 S01	4	10	57
SLP 07 S01	4	10	57

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Inline Ejectors



Inline Ejectors VR

Suction rate from 7 l/min to 24 l/min



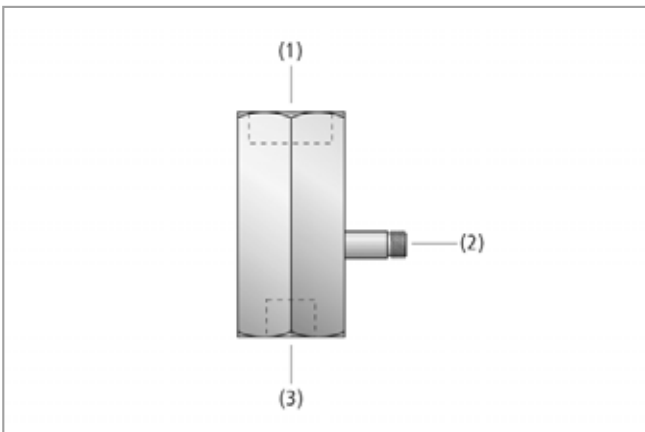
Suitable for Industry Specific Applications



Inline ejectors VR

Applications

- Inline ejector for installation between suction cup and compressed air supply
- Handling of all types of workpieces with manipulators, industrial robots and feeder systems



Design eiettori in linea VR

Design

- Body made of anodized aluminum
- Nozzle system made of brass
- Vacuum generator with single nozzle
- Compressed air inlet (1)
- Exhaust air outlet (2)
- Vacuum inlet (3)



Decentralized vacuum generation with inline ejector VR for handling plastic parts

Our Highlights...

- Inline ejector for installation between suction cup and compressed-air supply
- Minimum size and low weight due to aluminum body

Your Benefits...

- > No costly hose installation necessary; vacuum is generated directly at the point of use
- > Extremely space-saving installation; ideal for restricted spaces and highly dynamic movements

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

Switches and Monitoring

Filters and Connections

Services

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Inline Ejectors VR

Suction rate from 7 l/min to 24 l/min

Designation Code Inline Ejectors VR

Abbreviated designation	Nozzle size
Example VR 05:	
VR	05
VR	05 = 0.5 mm
	07 = 0.7 mm
	09 = 0.9 mm

Ordering Data Inline Ejectors VR

Inline ejector VR is delivered as a ready to connect product.

Inline Ejectors VR

Type	Part Number
VR 05	10.02.01.00075
VR 07	10.02.01.00001
VR 09	10.02.01.00077

Technical Data Inline Ejectors VR

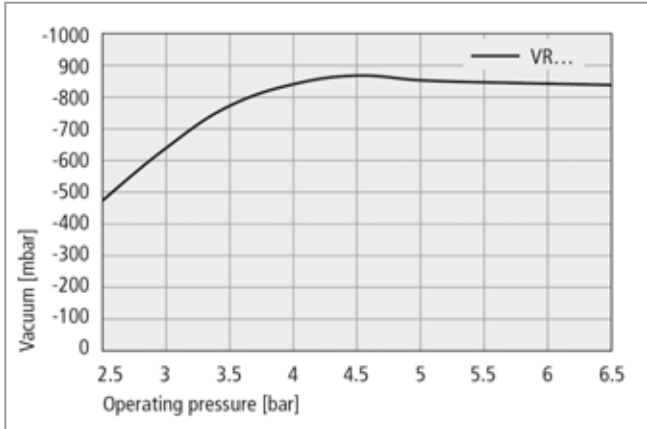
Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Opt. pressure [bar]	Weight [g]	Operating temperature [°C]
VR 05	0.5	87	7	0.4	12	0.7	5	15	0 ... 60
VR 07	0.7	90	14	0.8	21	1.3	5	15	0 ... 60
VR 09	0.9	89	21	1.3	36	2.2	5	15	0 ... 60

*At optimal operating pressure

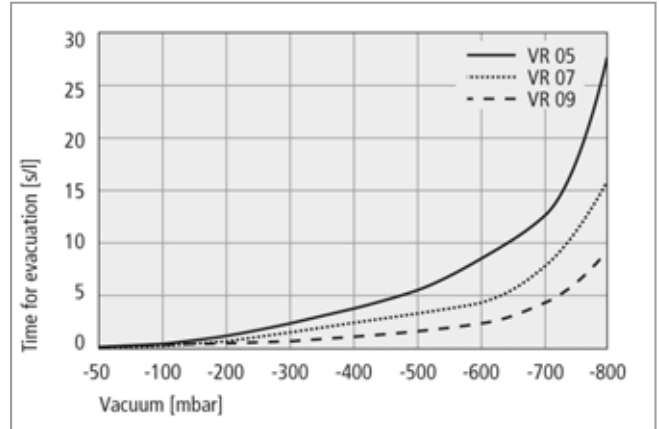
Inline Ejectors VR

Suction rate from 7 l/min to 24 l/min

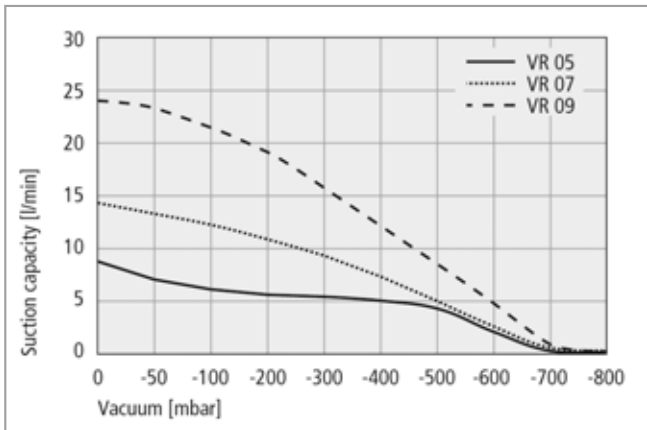
Performance Data Inline Ejectors VR



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
VR 05	8.00	7.00	6.50	6.00	5.70	5.00	4.00	2.00	0.30	0.10
VR 07	14.00	13.00	12.50	11.00	9.50	7.40	5.00	3.00	0.45	0.20
VR 09	24.00	23.00	21.00	19.00	16.00	12.00	8.00	5.00	1.10	0.24

Evacuation Time in s/l for Various Vacuum Ranges

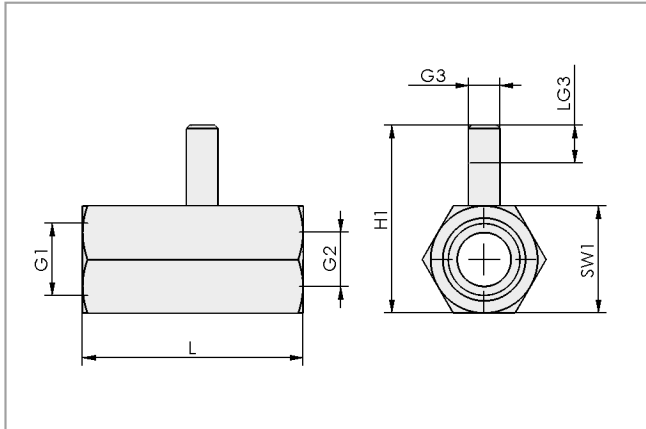
Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
VR 05	0.37	0.73	1.53	2.55	3.83	5.55	7.84	12.61	27.25	
VR 07	0.21	0.41	0.84	1.41	2.17	3.17	4.77	7.79	15.65	
VR 09	0.10	0.22	0.49	0.81	1.25	1.83	2.75	4.45	8.62	

Inline Ejectors VR

Suction rate from 7 l/min to 24 l/min



Design Data Inline Ejectors VR



VR 05 to 09

Type	Dimensions in mm						
	G1	G2	G3	H1	L	LG3	SW1
VR 05	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17
VR 07	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17
VR 09	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17

Decentralized Ejectors



Ejectors with Active Blow Off SEAC

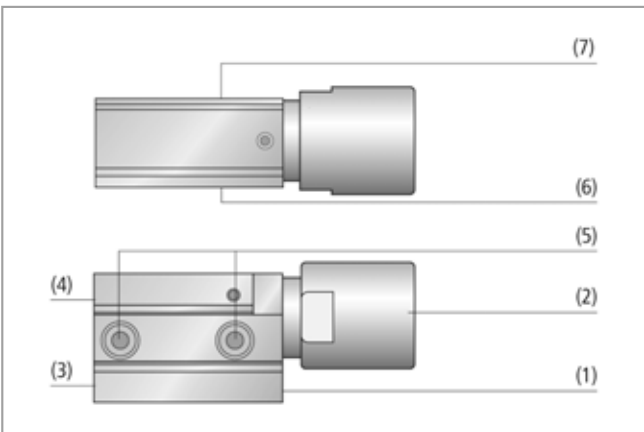
Suction rate 35 l/min



Suitable for Industry Specific Applications



Ejectors with active blow off SEAC



System design ejectors with active blow off SEAC

Applications

- Ejector for many different applications with active blow off to realize shortest cycle times, e.g. in sheet-metal handling, the automotive industry, in packaging machines and robot technology

Design

- Main body (1) made of plastic; smallest possible dimensions and low weight
- Silencer (2) made of anodized aluminium
- Compressed air connection for blow off (3)
- Compressed air connection for suction (4)
- Two holes (5) for connecting to tooling
- Vacuum connection (6)
- Two M4 mounting screws included in delivery
- Optional with vacuum switch (7) with fixed switching point at 600 mbar, 3 m connection cable and protective cover with pull-relief (SEAC VE-SH)

Our Highlights...

- Short gripping and blow off times
- Main body made of plastic
- Suitable for holder system HTS
- With silencer
- Optional available with vacuum switch

Your Benefits...

- > Very short cycle times in automated operations
- > Minimum size and low weight particularly suitable for highly dynamic systems
- > Direct mounting of suction cup and connector
- > Reduced noise level
- > Part present signal for optimization of processes



Decentral vacuum generation by ejector SEAC directly at the suction cup

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Decentralized Ejectors



Ejectors with Active Blow Off SEAC

Suction rate 35 l/min

Designation Code Ejectors with Active Blow Off SEAC

Abbreviated designation	Nozzle size	System monitoring
Example SEAC 10 VE-SH: SEAC	10	VE-SH
SEAC	10 = 1.0 mm	VE-SH vacuum switch with cover

Ordering Data Ejectors with Active Blow Off SEAC

Ejector SEAC is delivered as a ready to connect product.

Accessories: Holder

Ejectors with Active Blow Off SEAC

Type	Ejector
SEAC 10	10.02.02.03875
SEAC 10 VE-SH	10.02.02.03876

Ordering Data Holders Ejectors with Active Blow Off SEAC

Type	Part Number
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	10.02.02.03483
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	10.02.02.03484
ADP-EJ 38x20x11-G1/4-IG SEAC	10.02.02.04067
ADP-EJ 38x20x11-G1/8-IG SEAC	10.02.02.04068

Technical Data Ejectors with Active Blow Off SEAC

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Max. air consumpt. blow off [l/min]**	Pressure range (operating pressure) [bar]	Weight [g]
SEAC 10	1.0	85	35	2.1	52	60	4.0 ... 6.0	62
SEAC 10 VE-SH	1.0	85	35	2.1	52	60	4.0 ... 6.0	157

*At optimal operating pressure (4,5 bar)

**Additional air consumption during blow-off

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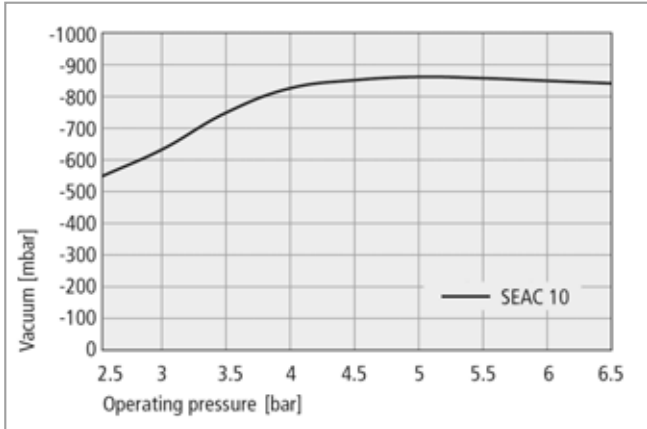
Decentralized Ejectors



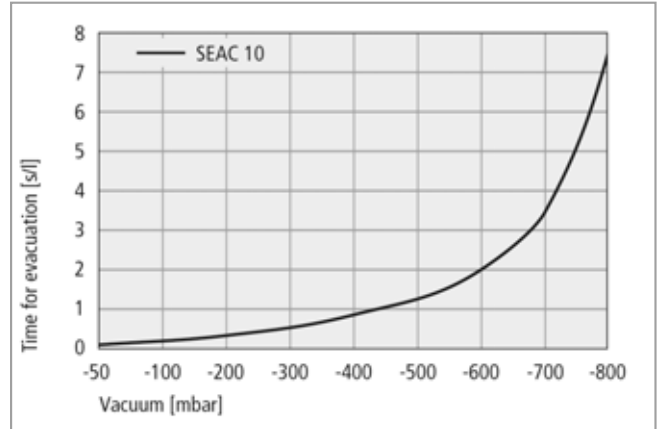
Ejectors with Active Blow Off SEAC

Suction rate 35 l/min

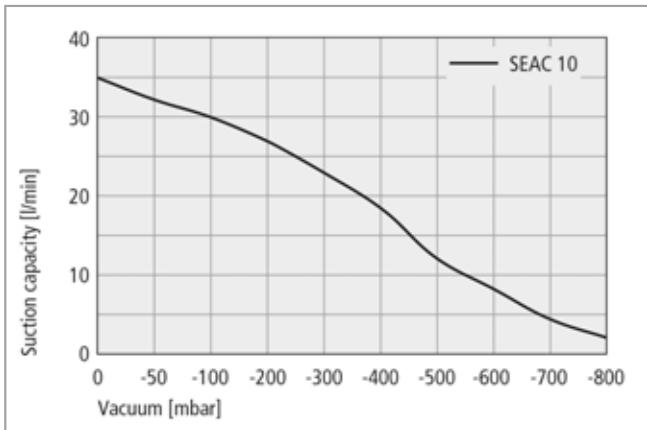
Performance Data Ejectors with Active Blow Off SEAC



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Typ	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10	35.0	32.0	30.0	27.0	23.5	18.0	12.0	8.0	4.5	2.0

Evacuation Time in s/l for Various Vacuum Ranges

Typ	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SEAC 10	0.09	0.16	0.34	0.59	0.96	1.42	2.03	3.30	7.36	

Decentralized Ejectors

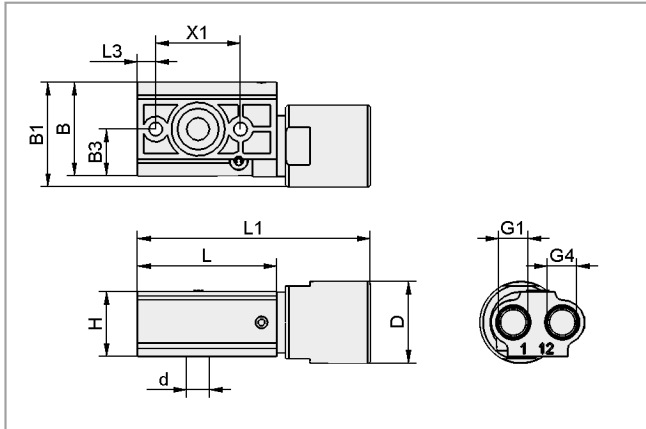


Ejectors with Active Blow Off SEAC

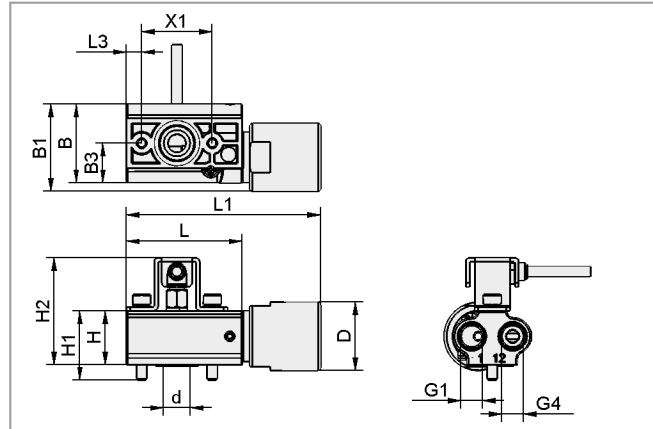
Suction rate 35 l/min



Design Data Ejectors with Active Blow Off SEAC



SEAC 10



SEAC 10 VE-SH

Type	Dimensions in mm														
	B	B1	B3	d	D	G1	G4	H	H1	H2	L	L1	L3	X1	
SEAC 10	31	34.6	15.5	7.5	27	G1/8"-F	G1/8"-F	21.5	-	-	46	77	6	28	
SEAC 10 VE-SH	31	34.6	15.5	7.5	27	G1/8"-F	G1/8"-F	21.5	27.5	42.5	46	77	6	28	

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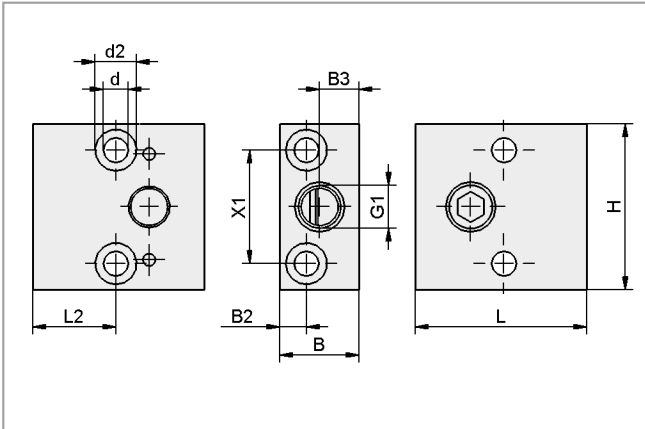


Ejectors with Active Blow Off SEAC

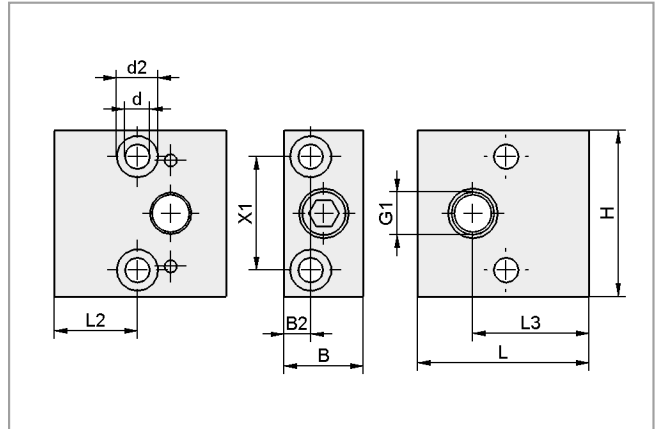
Suction rate 35 l/min



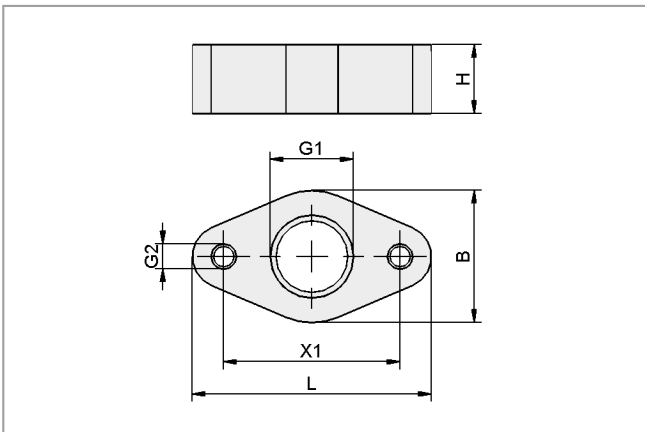
Design Data Accessories Ejectors with Active Blow Off SEAC



ADP-EJ 45.5x21x44 SEAC L



ADP-EJ 45.5x21x44 SEAC S



ADP-EJ 38x20x11...SEAC

Type	Dimensions in mm											
	B	B2	B3	d	d2	G1	G2	H	L	L2	L3	X1
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	21	7	10.5	6.6	11	G1/4"-F	-	44	46	22	-	30
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	21	7	-	6.6	11	G1/4"-F	-	44	46	22	31	30
ADP-EJ 38x20x11-G1/4-IG SEAC	20	-	-	-	-	G1/4"-F	M4-F	11	38	-	-	28
ADP-EJ 38x20x11-G1/8-IG SEAC	20	-	-	-	-	G1/8"-F	M4-F	11	38	-	-	28

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Decentralized Ejectors



Ejectors with Blow Off System SEAC RP

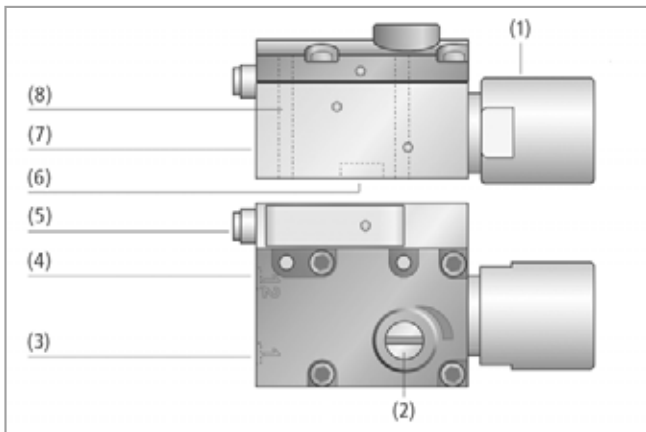
Suction rate 35 l/min



Suitable for Industry Specific Applications



Ejectors with blow off system SEAC RP



System design ejectors with blow off system SEAC RP



Decentralized vacuum generation with ejector SEAC RP with blow off system right on suction cup

Applications

- Ejector for vacuum generation in many different applications on tooling-systems with short cycle times, such as in sheet-metal working, the automotive industry, in packaging machines and robot technology
- Decentral vacuum generation with integrated pneumatical air saving function

Design

- Body made of anodized aluminium (7)
- Integrated blow-off function
- Optional vacuum switch VS-V-AH-T-PNP-S (5) with adjustable switching point (connection cable not included in delivery)
- Two mounting screws included in delivery
- Passage for fixation (8)
- Integrated Silencer (1)
- Vacuum connection (6)
- Compressed-air inlet for suction (3) and Compressed-air inlet blow-off (4)
- Adjusting screw for air-saving function (2)

Our Highlights...

- Integrated pneumatical air saving function
- Short gripping and blow off times
- Minimum size and low weight
- Suitable for modular ejector-holder system
- With silencer
- Optionally available with vacuum switch

Your Benefits...

- > Minimum compressed air consumption, minimal requiring of fitting
- > Very short cycle times in automated operations
- > Particularly suitable for highly dynamic systems
- > Direct mounting of suction cup and connector
- > Reduced noise level
- > System monitoring function for optimisation of cycle times

Decentralized Ejectors



Ejectors with Blow Off System SEAC RP

Suction rate 35 l/min

Designation Code Ejectors with Blow Off System SEAC RP

Abbreviated designation	Nozzle size	Additional function	Product addition	Mounting orientation
Example SEAC 10 RP VS-T R:				
SEAC	10	RP	VS-T	R
SEAC	10 = 1.0 mm	RP pneumatic air-saving regulation	VS-T vacuum switch	L left R right

Ordering Data Ejectors with Blow Off System SEAC RP

Ejector SEAC RP is delivered as a ready to connect product.

Available accessories: connection cable, holder

Ejectors with Blow Off System SEAC RP

Type	Part Number
SEAC 10 RP R	10.02.02.03289
SEAC 10 RP VS-T R	10.02.02.03290
SEAC 10 RP L	10.02.02.03296
SEAC 10 RP VS-T L	10.02.02.03297

Ordering Data Accessories Ejectors with Blow Off System SEAC RP

Type*	Part Number
Connection cable	10.06.02.00031

*For SEAC RP VS-T... order 1x per ejector

Ordering Data Holders Ejectors with Blow Off System SEAC RP

Type	Part Number
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	10.02.02.03483
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	10.02.02.03484
ADP-EJ 38x20x11-G1/4-IG SEAC	10.02.02.04067
ADP-EJ 38x20x11-G1/8-IG SEAC	10.02.02.04068

Technical Data Ejectors with Blow Off System SEAC RP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumption during evac. [l/min]*	Air consumption during evac. [m³/h]*	Max. air consumption blow off [l/min]	Pressure range (operating pressure) [bar]	Weight [g]
SEAC 10 RP...	1.0	85	35	2.1	65	3.9	92	4.0 ... 6.0	180

*At optimal operating pressure

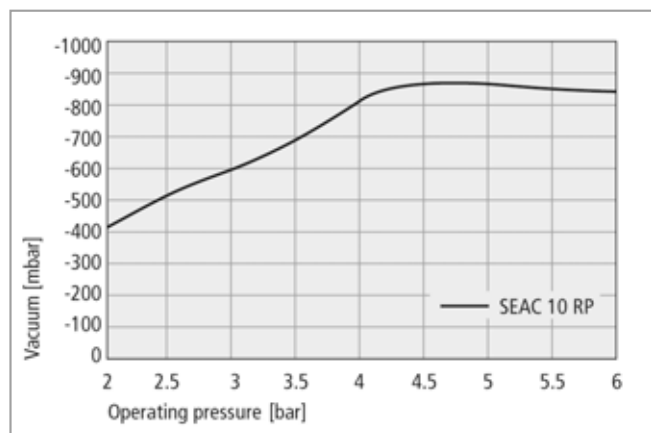
Decentralized Ejectors



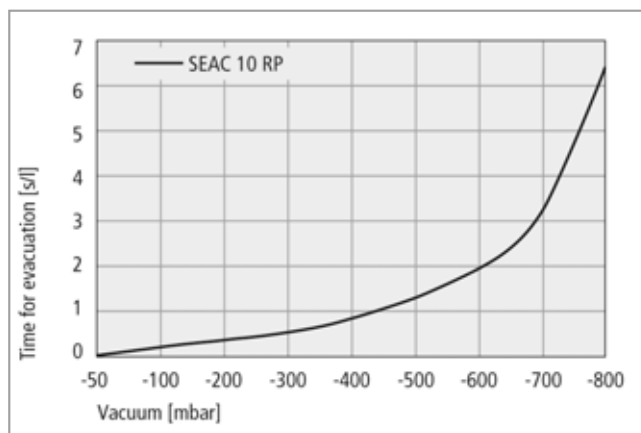
Ejectors with Blow Off System SEAC RP

Suction rate 35 l/min

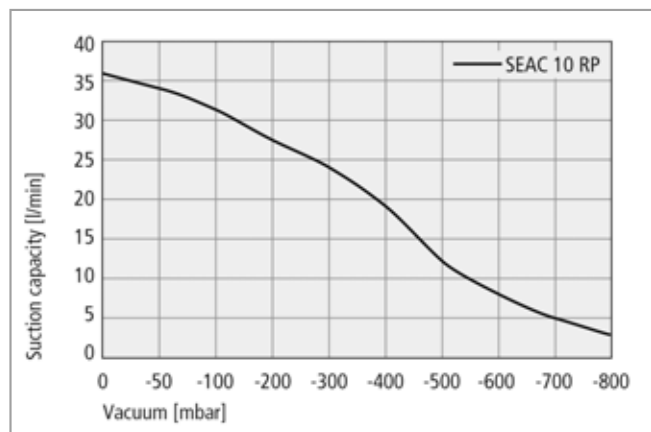
Performance Data Ejectors with Blow Off System SEAC RP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 RP	35.0	34.0	32.0	27.5	24.0	19.5	12.0	8.0	5.0	3.0

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SEAC 10 RP	0.12	0.20	0.39	0.62	0.93	1.35	1.98	3.26	6.50	

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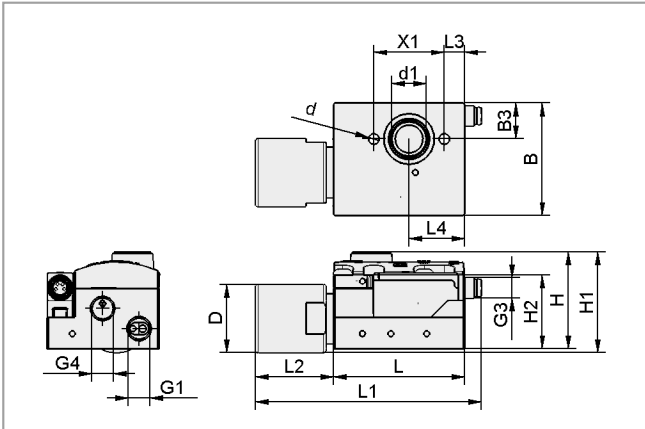


Ejectors with Blow Off System SEAC RP

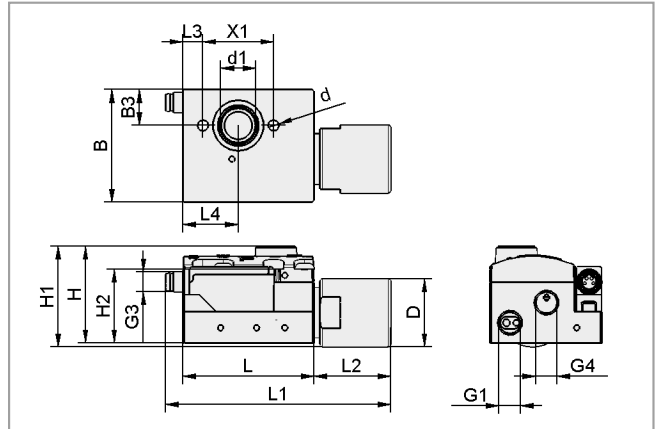
Suction rate 35 l/min



Design Data Ejectors with Blow Off System SEAC RP



SEAC 10 RP (VS-T) R



SEAC 10 RP (VS-T) L

Type	Dimensions in mm																
	B	B3	d	d1	D	G1	G3	G4	H	H1	H2	L	L1	L2	L3	L4	X1
SEAC 10 RP...	44.5	14.2	4.3	13.8	27	G1/8"-F	-	G1/8"-F	38.3	39.8	29.3	52	-	29.5	8	22	28
SEAC 10 RP VS-T...	44.5	14.2	4.3	13.8	27	G1/8"-F	M8-M	G1/8"-F	38.3	39.8	29.3	52	88.1	29.5	8	22	28

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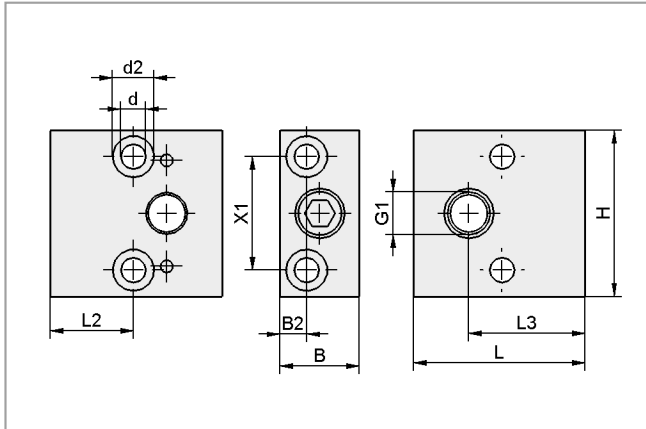


Ejectors with Blow Off System SEAC RP

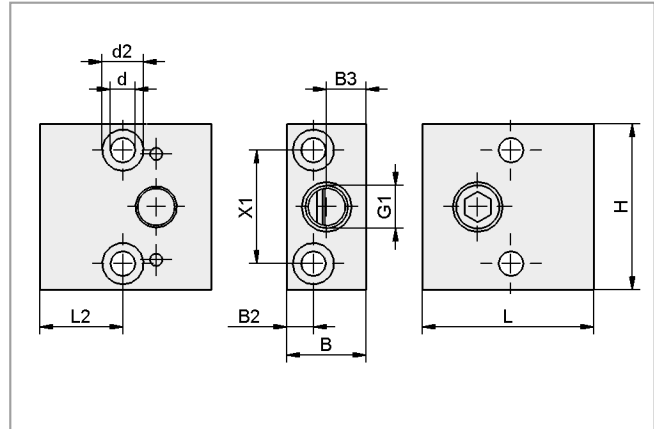
Suction rate 35 l/min



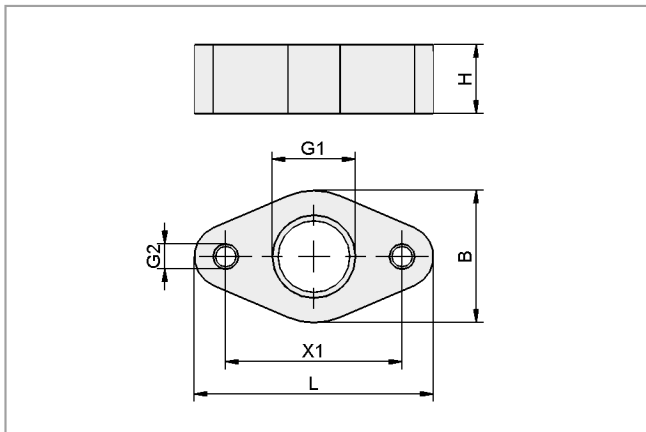
Design Data Accessories Ejectors with Blow Off System SEAC RP



ADP-EJ 45.5x21x44 SEAC S



ADP-EJ 45.5x21x44 SEAC L



ADP-EJ 38x20x11...SEAC

Type	Dimensions in mm											
	B	B2	B3	d	d2	G1	G2	H	L	L2	L3	X1
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	21	7	10.5	6.6	11	G1/4"-F	-	44	46	22	-	30
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	21	7	-	6.6	11	G1/4"-F	-	44	46	22	31	30
ADP-EJ 38x20x11-G1/4-IG SEAC	20	-	-	-	-	G1/4"-F	M4-F	11	38	-	-	28
ADP-EJ 38x20x11-G1/8-IG SEAC	20	-	-	-	-	G1/8"-F	M4-F	11	38	-	-	28

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Decentralized Ejectors



Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min



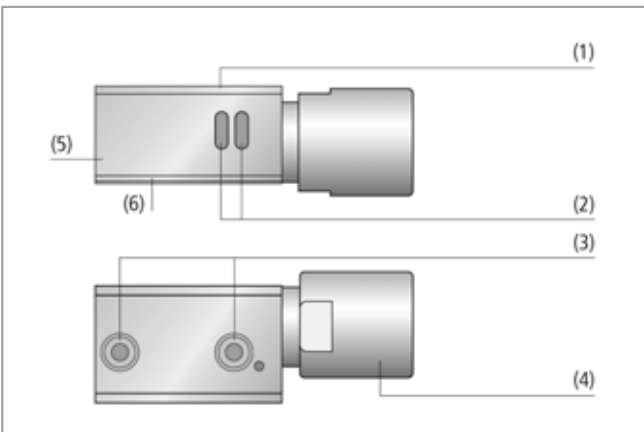
Suitable for Industry Specific Applications



Ejectors with atmospheric ventilation SEAC ECO

Applications

- Ejector for decentralized vacuum generation for the use in many different applications with short cycle times
- In vacuum systems as economic solution thanks to the automatic release using atmospheric ventilation



System design ejectors with atmospheric ventilation SEAC ECO

Design

- Main body (1) made of anodized aluminum; smallest possible dimensions and low weight
- Openings for atmospheric ventilation (2)
- Two holes for connecting to holder (3)
- Silencer (4) made of anodized aluminum
- Compressed air connection (5)
- Vacuum connection (6)
- Two securing screws and one o-ring included in delivery



Decentral vacuum generation by ejectors SEAC ECO directly at the suction cup

Our Highlights...

- Operation with only one compressed air line
- Atmospheric ventilation
- Connection to holder system HTS with the proven "back-pack concept"
- No filter, no spare parts

Your Benefits...

- > Half installation effort and reduced costs for pneumatic installation material such as valves, hoses etc.
- > Reduced energy costs by more than 50%, since no air is consumed during quick and accurate release of parts
- > Flexible adaptation to all common toolings; holder does not have to be adjusted again if the ejector is replaced
- > Maintenance-free operation, thus reduced costs of maintenance and spare parts

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Decentralized Ejectors



Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min

Designation Code Ejectors with Atmospheric Ventilation SEAC ECO

Abbreviated designation	Nozzle size
Example SEAC 10 ECO: SEAC ECO	10
SEAC ECO	10 = 1.0 mm

Ordering Data Ejectors with Atmospheric Ventilation SEAC ECO

Ejector SEAC ECO is delivered as a ready to connect product.

Accessoires: Holder

Ejectors with Atmospheric Ventilation SEAC ECO

Type	Part Number
SEAC 10 ECO	10.02.02.03702

Ordering Data Holders Ejectors with Atmospheric Ventilation SEAC ECO

Type	Part Number
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	10.02.02.03483
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	10.02.02.03484
ADP-EJ 38x20x11-G1/4-IG SEAC	10.02.02.04067
ADP-EJ 38x20x11-G1/8-IG SEAC	10.02.02.04068

Technical Data Ejectors with Atmospheric Ventilation SEAC ECO

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Pressure range (operating pressure) [bar]	Weight [g]
SEAC 10 ECO	1.0	85	35	2.1	52	4.0 ... 6.0	95

*At optimal operating pressure (4,5 bar)

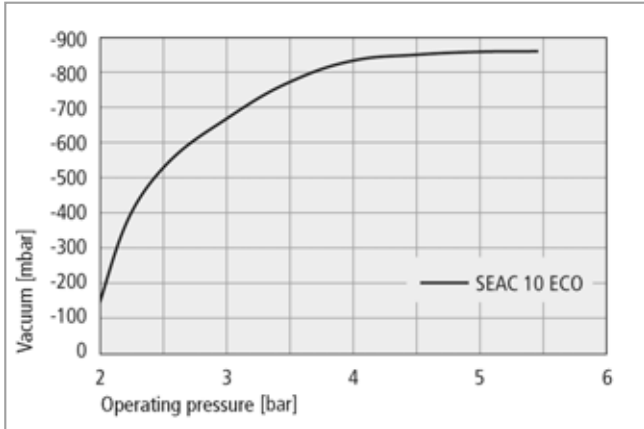
Decentralized Ejectors



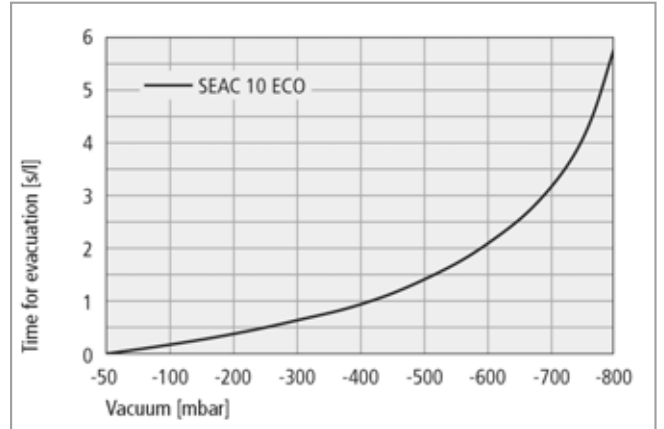
Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min

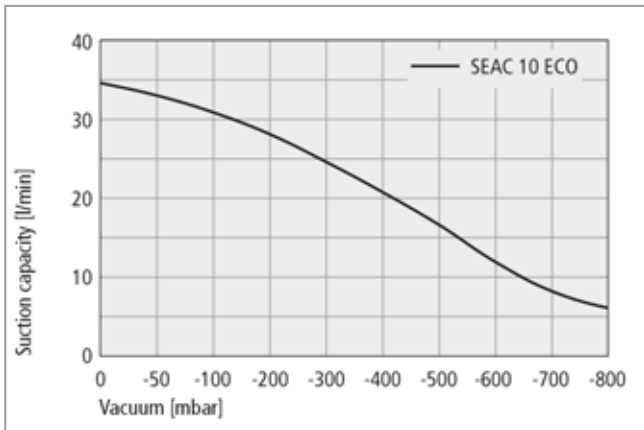
Performance Data Ejectors with Atmospheric Ventilation SEAC ECO



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Typ	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 ECO	35.0	33.0	31.6	28.0	24.3	20.7	16.8	12.0	8.2	6.5

Evacuation Time in s/l for Various Vacuum Ranges

Typ	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SEAC 10 ECO	0.10	0.18	0.36	0.61	0.95	1.42	2.10	3.13	5.80	

Decentralized Ejectors

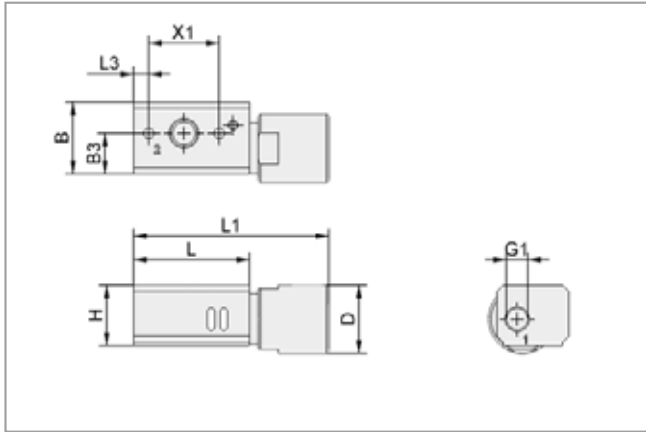


Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min



Design Data Ejectors with Atmospheric Ventilation SEAC ECO



SEAC 10 ECO

Type	Dimensions in mm								
	B	B3	D	G1	H	L	L1	L3	X1
SEAC 10 ECO	28.5	16.1	27	G1/8"-F	24	46	77.5	6	28

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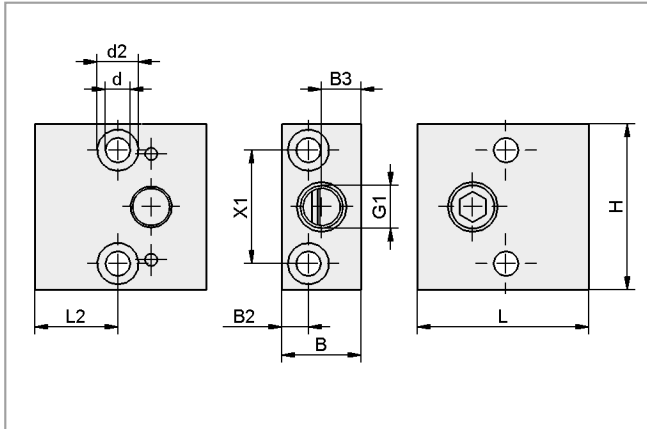


Ejectors with Atmospheric Ventilation SEAC ECO

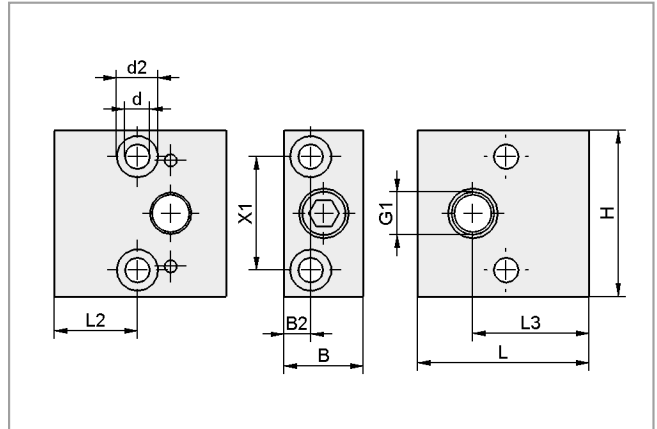
Suction rate 35 l/min



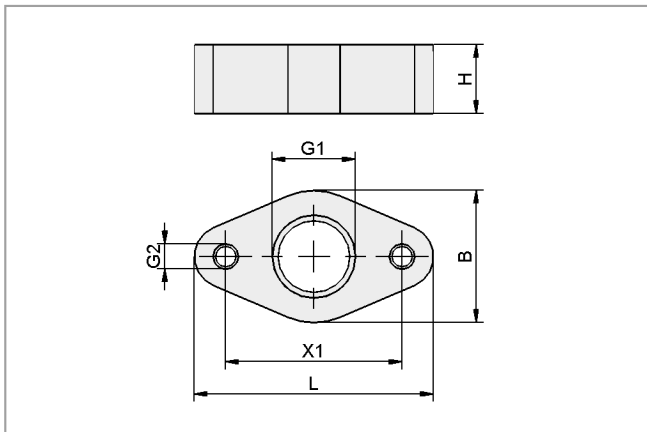
Design Data Accessories Ejectors with Atmospheric Ventilation SEAC ECO



ADP-EJ 45.5x21x44 SEAC L



ADP-EJ 45.5x21x44 SEAC S



ADP-EJ 38x20x11...SEAC

Type	Dimensions in mm											
	B	B2	B3	d	d2	G1	G2	H	L	L2	L3	X1
ADP-EJ 45.5x21x44-G1/4-IG SEAC L	21	7	10.5	6.6	11	G1/4"-F	-	44	46	22	-	30
ADP-EJ 45.5x21x44-G1/4-IG SEAC S	21	7	-	6.6	11	G1/4"-F	-	44	46	22	31	30
ADP-EJ 38x20x11-G1/4-IG SEAC	20	-	-	-	-	G1/4"-F	M4-F	11	38	-	-	28
ADP-EJ 38x20x11-G1/8-IG SEAC	20	-	-	-	-	G1/8"-F	M4-F	11	38	-	-	28

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Compact Ejectors



Compact Ejectors SCPM

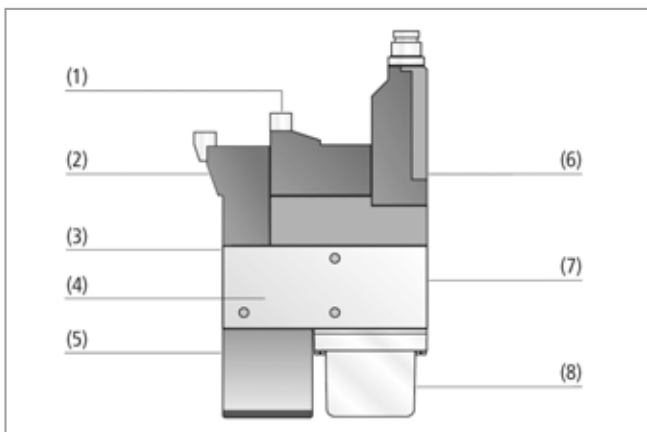
Suction rate from 6 l/min to 23 l/min



Suitable for Industry Specific Applications



Compact ejectors SCPM



System design compact ejectors SCPM



Central vacuum generation by compact ejectors SCPM

Applications

- Compact ejector for use in applications with very dynamic movements and restricted spaces
- Usage for handling with industrial robots, linear axes and in pick-and-place systems

Design

- Blow-off valve (1) in idle position, normally closed (NC)
- Suction valve (2) in idle position, can be normally open (NO) or closed (NC)
- Compressed air connection (3)
- Basic body (4) made from anodized aluminum
- Integrated silencer (5) and filter (8)
- Vacuum connection (7)
- Can be connected to a collective connection plate (battery mounting)
- Optionally with integrated vacuum switch (6)

Our Highlights...

- Minimum size and very low weight
- Versatile modular system
- Integrated valves and vacuum monitoring
- Wide range of models with different performance figures

Your Benefits...

- > Optimum vacuum generation, suitable for very dynamic movements
- > Flexible adaptation to customer requirements
- > Complete solution for very simple installation
- > Optimum air consumption thanks to various models with differing suction capacities

Compact Ejectors



Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

Designation Code Compact Ejectors SCPM

Abbreviated designation	Nozzle size	Idle position suction valve	Blow off valve	System monitoring
Example SCPM 07 NO A:				
SCPM	07	NO	A	
SCPM	05 = 0.5 mm 07 = 0.7 mm 10 = 1.0 mm	NC normally closed NO normally open	A blow off valve	VS-T electronic vacuum switch

Ordering Data Compact Ejectors SCPM

Compact ejector SCPM is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer, filter

Available accessories: connection cable

Compact Ejectors SCPM

SCPM 05...		SCPM 07...		SCPM 10...	
Type	Part Number	Type	Part Number	Type	Part Number
SCPM 05 NO A	10.02.02.01072	SCPM 07 NO A	10.02.02.01068	SCPM 10 NO A	10.02.02.01064
SCPM 05 NC A	10.02.02.01071	SCPM 07 NC A	10.02.02.01067	SCPM 10 NC A	10.02.02.01063
SCPM 05 NO A VS-T	10.02.02.02499	SCPM 07 NO A VS-T	10.02.02.02501	SCPM 10 NO A VS-T	10.02.02.02503
SCPM 05 NC A VS-T	10.02.02.02498	SCPM 07 NC A VS-T	10.02.02.02500	SCPM 10 NC A VS-T	10.02.02.02502

Ordering Data Spare Parts and Accessories Compact Ejectors SCPM

Type	Connection cable for solenoid valves* (3 m, PUR)	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Replacement silencer	Replacement filter element
SCPM 05 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 05 NO/NC A VS-T	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037
SCPM 07 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 07 NO/NC A VS-T	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037
SCPM 10 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 10 NO/NC A VS-T	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037

*Order 2 x per ejector.

Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

Technical Data Compact Ejectors SCPM

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SCPM 05...	0.5	85	6	0.4	13	0.8	26
SCPM 07...	0.7	85	12	0.7	21	1.3	26
SCPM 10...	1.0	85	23	1.4	46	2.8	26

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

**For max. length 2 m

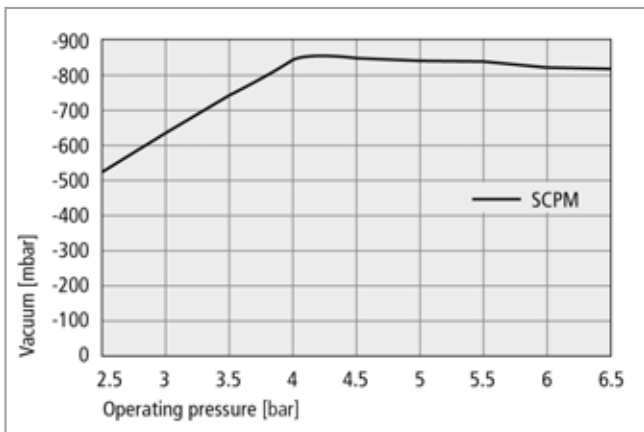
Type	Noise level work-piece gripped [dB]	Noise level free [dB]	Opt. pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SCPM 05...	62	62	4.5	2	2	80	0 ... 45
SCPM 07...	67	70	4.5	2	2	80	0 ... 45
SCPM 10...	73	76	4.5	2	4	80	0 ... 45

!The supply voltage for vacuum switches and solenoid valves is 24V DC

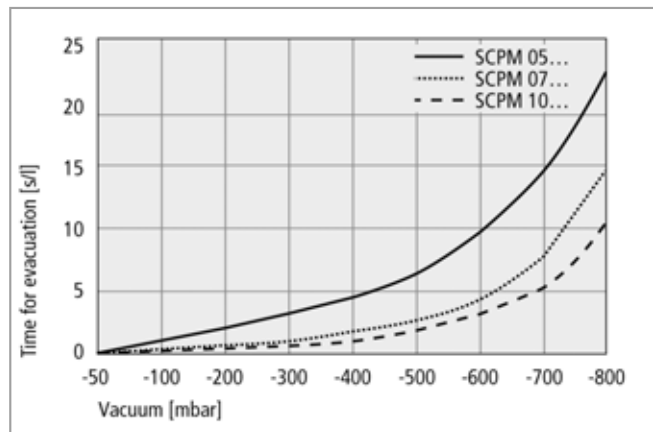
*At optimal operating pressure

**For max. length 2 m

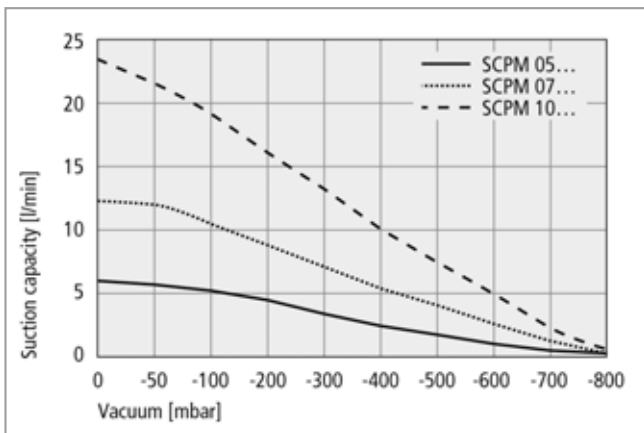
Performance Data Compact Ejectors SCPM



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

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Compact Ejectors



Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

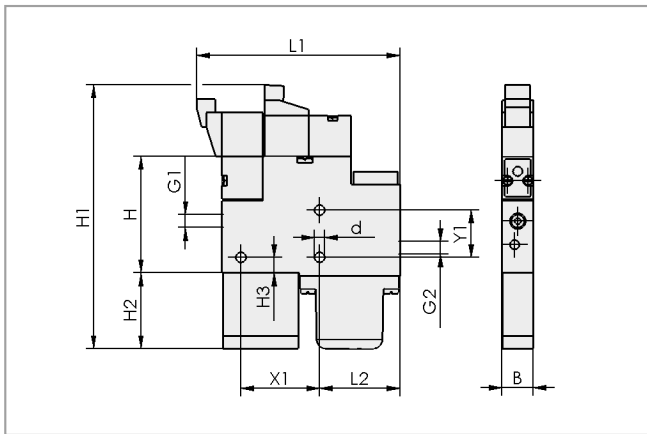
Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPM 05...	6.0	5.9	5.1	4.3	3.4	2.6	1.9	1.4	0.5	0.2
SCPM 07...	12.0	11.7	10.3	8.6	6.8	5.3	3.9	2.8	1.1	0.4
SCPM 10...	23.0	22.2	19.6	16.4	13.0	10.0	7.4	5.4	2.0	0.8

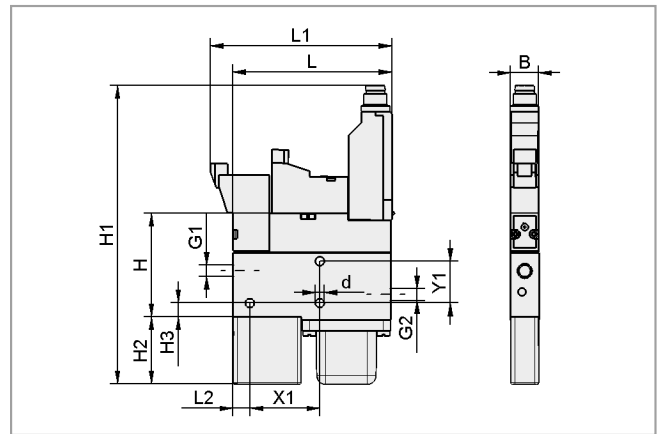
Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SCPM 05...	0.34	0.76	1.80	3.02	4.55	6.57	9.58	14.80	22.40	
SCPM 07...	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60	
SCPM 10...	0.11	0.24	0.56	0.96	1.49	2.38	3.38	5.32	11.54	

Design Data Compact Ejectors SCPM



SCPM 05 to 10 NC/NO A



SCPM 05 to 10 NC/NO A VS-T

Type	Dimensions in mm												
	B	d	G1	G2	H	H1	H2	H3	L	L1	L2	X1	Y1
SCPM 05 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 07 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 10 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 05 NC/NO A VS-T	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15
SCPM 07 NC/NO A VS-T	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15
SCPM 10 NC/NO A VS-T	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15

Compact Ejectors



Compact Ejectors SCPS / SCPSi

Suction rate from 16 l/min to 67 l/min



Suitable for Industry Specific Applications

Applications

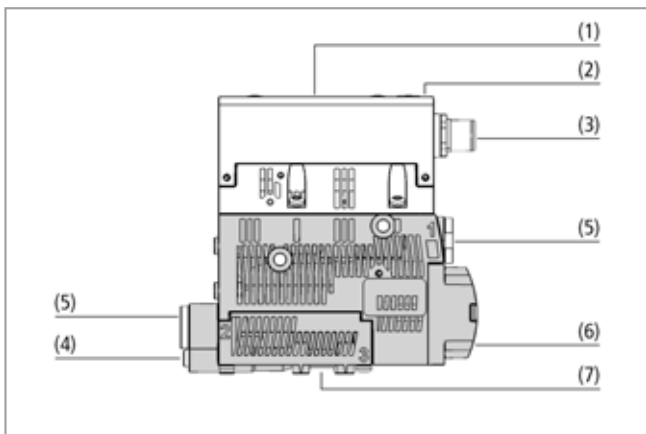
- Compact ejector for handling of airtight and slightly porous workpieces
- Generation and monitoring of vacuum in automated systems
- Use in robotic handling applications and on linear axes
- Pick-and-place applications with extremely short cycle times
- For systems that require highly dynamic gripping of workpieces and where space is limited
- Typically for use in fully-automated small parts handling applications



Compact ejectors SCPS / SCPSi

Design

- Basic module made of high-strength plastic
- Display screen or LED bar display (1)
- Keyboard (2) makes it easy to set the system parameters
- Electrical connection via standard M12 plug (3)
- Integrated pneumatic valves for switching functions NO or NC
- Screw (4) to adjust blow off for lightweight pieces
- Pneumatic connections (G1/8") with protective screens (5)
- Open silencer (6)
- Can optionally be mounted using DIN rails (7)



System design compact ejectors SCPS / SCPSi

Our Highlights...

- Efficient eco nozzle technology
- Integrated air saving function
- IO-Link device for communicating with an existing field-bus via IO-Link master
- Brightly-lit display screen or LED bar display
- Large operating elements and an intuitive user menu
- Compact size, made of extremely durable plastic
- Automatic blow off function

Your Benefits...

- > Higher suction rate with minimal compressed air consumption
- > Reduction of compressed air consumption by up to 80 %
- > Simple and quick installation, device and process parameters can be transferred
- > Highly visible display of important vacuum parameters
- > Easy and time-saving manual adjustments on the ejector
- > Compact and durable unit; can be mounted directly on the handling system
- > One less signal output is required per ejector



Centralized vacuum generation by means of compact ejector SCPSi

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Compact Ejectors



Compact Ejectors SCPS / SCPSi

Suction rate from 16 l/min to 67 l/min

Designation Code Compact Ejectors SCPS / SCPSi

Abbreviated designation	Nozzle size	Connection	Idle position suction valve	Connection electrical	Switching function
Example SCPSi 2-07 G02 NO M12-5 PNP:					
SCPSi	2-07	G02	NO	M12-5	PNP
SCPS	07 = 0.7 mm 10 = 1.0 mm 15 = 1.5 mm 2-07 = 0.7 mm 2-09 = 0.9 mm 2-14 = 1.4 mm	G02 connection thread 2	NC normally closed NO normally open	M12-5 M12, 5-pole	PNP switches to plus

Ordering Data Compact Ejectors SCPS / SCPSi

Compact ejector SCPS / SCPSi is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, distributor, DIN rail mount, filter, compressed-air connection plate, mounting set, exhaust air set

Compact Ejectors SCPS / SCPSi

SCPS... Type	Part Number	SCPSi... Type	Part Number
SCPS 07 G02 NO M12-5 PNP	10.02.02.04111	SCPSi 07 G02 NO M12-5	10.02.02.04120
SCPS 07 G02 NC M12-5 PNP	10.02.02.04112	SCPSi 07 G02 NC M12-5	10.02.02.04121
SCPS 10 G02 NO M12-5 PNP	10.02.02.04113	SCPSi 10 G02 NO M12-5	10.02.02.04122
SCPS 10 G02 NC M12-5 PNP	10.02.02.04114	SCPSi 10 G02 NC M12-5	10.02.02.04123
SCPS 15 G02 NO M12-5 PNP	10.02.02.04115	SCPSi 15 G02 NO M12-5	10.02.02.04124
SCPS 15 G02 NC M12-5 PNP	10.02.02.04116	SCPSi 15 G02 NC M12-5	10.02.02.04125
SCPS 2-07 G02 NO M12-5 PNP	10.02.02.04359	SCPSi 2-07 G02 NO M12-5	10.02.02.04365
SCPS 2-07 G02 NC M12-5 PNP	10.02.02.04360	SCPSi 2-07 G02 NC M12-5	10.02.02.04366
SCPS 2-09 G02 NO M12-5 PNP	10.02.02.04361	SCPSi 2-09 G02 NO M12-5	10.02.02.04367
SCPS 2-09 G02 NC M12-5 PNP	10.02.02.04362	SCPSi 2-09 G02 NC M12-5	10.02.02.04368
SCPS 2-14 G02 NO M12-5 PNP	10.02.02.04363	SCPSi 2-14 G02 NO M12-5	10.02.02.04369
SCPS 2-14 G02 NC M12-5 PNP	10.02.02.04364	SCPSi 2-14 G02 NC M12-5	10.02.02.04370

Ordering Data Accessories Compact Ejectors SCPS / SCPSi

Type	Connection Cable	Distributor 2xM12	DIN Rail mount*	Filter 6/4	Filter 8/6	Compressed air connection plate	Mounting set	Exhaust air set
SCPS...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04216
SCPSi...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04216
SCPS 2...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04667
SCPSi 2...	21.04.05.00080	10.02.02.03490	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04667

*With mounting screws

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Compact Ejectors SCPS / SCPSi

Suction rate from 16 l/min to 67 l/min

Technical Data Compact Ejectors SCPS / SCPSi

Type	Nozzle size	Degree of evacuation [%]*	Max. suction rate [m³/h]*	Max. suction rate [l/min]*	Air consumpt. during evac. [m³/h]*	Air consumpt. during evac. [l/min]*	Air consumption blow off [m³/h]*
SCPS/SCPSi 07...	07	85	0.98	16.0	1.35	22.0	7.25
SCPS/SCPSi 10...	10	85	2.21	36.0	2.85	46.0	7.25
SCPS/SCPSi 15...	15	85	4.03	65.5	6.03	98.0	7.25
SCPS/SCPSi 2-07...	2-07	85	2.28	37.0	1.35	22.0	7.25
SCPS/SCPSi 2-09...	2-09	85	3.05	49.5	2.49	40.5	7.25
SCPS/SCPSi 2-14...	2-14	85	4.40	71.5	5.04	82.0	7.25

*At optimal operating pressure (4 bar)

**For max. length 2 m

Type	Noise level free [dB(A)]*	Noise level work-piece gripped [dB(A)]*	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SCPS/SCPSi 07...	63	58	2.0 ... 6.0	4	4	0.195	0 ... 50
SCPS/SCPSi 10...	73	60	2.0 ... 6.0	4	4	0.195	0 ... 50
SCPS/SCPSi 15...	73	65	2.0 ... 6.0	4	6	0.195	0 ... 50
SCPS/SCPSi 2-07...	63	58	2.0 ... 6.0	4	4	0.195	0 ... 50
SCPS/SCPSi 2-09...	73	60	2.0 ... 6.0	4	4	0.195	0 ... 50
SCPS/SCPSi 2-14...	75	65	2.0 ... 6.0	4	6	0.195	0 ... 50

*At optimal operating pressure (4 bar)

**For max. length 2 m

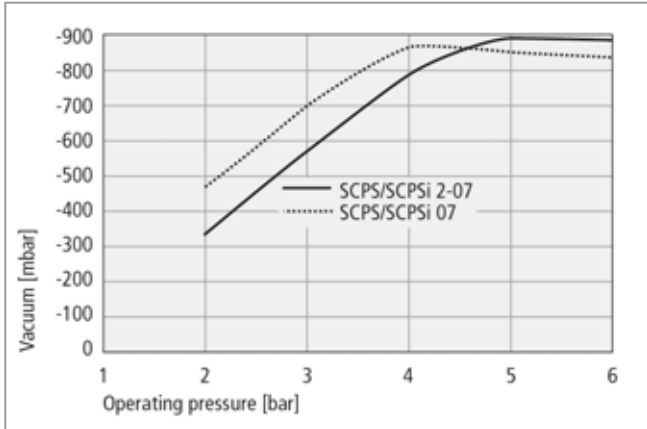
Compact Ejectors



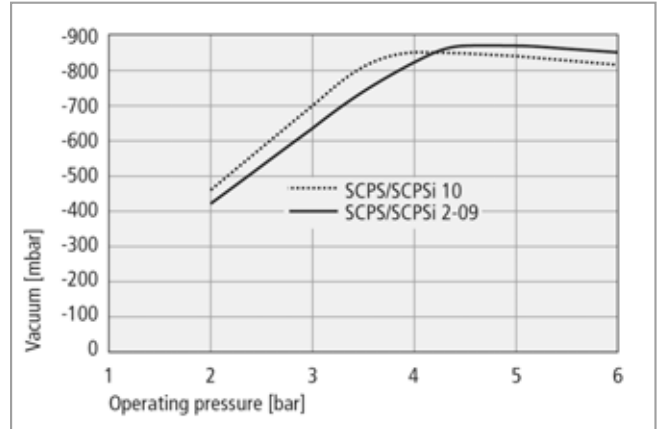
Compact Ejectors SCPS / SCPSi

Suction rate from 16 l/min to 67 l/min

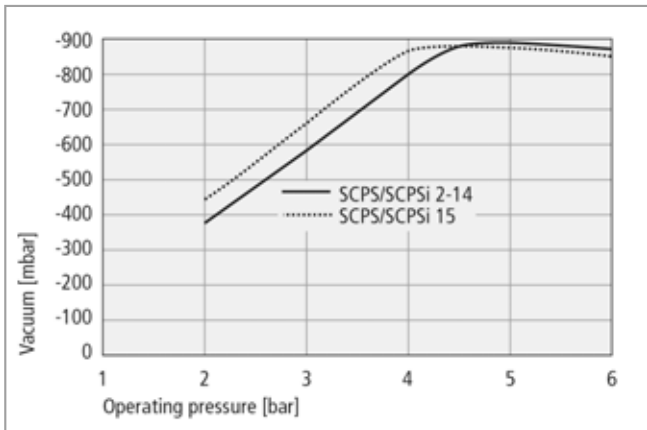
Performance Data Compact Ejectors SCPS / SCPSi



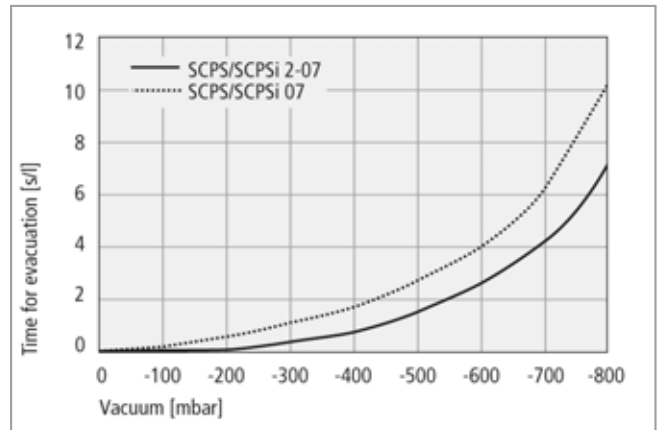
Achievable vacuum at various operating pressures



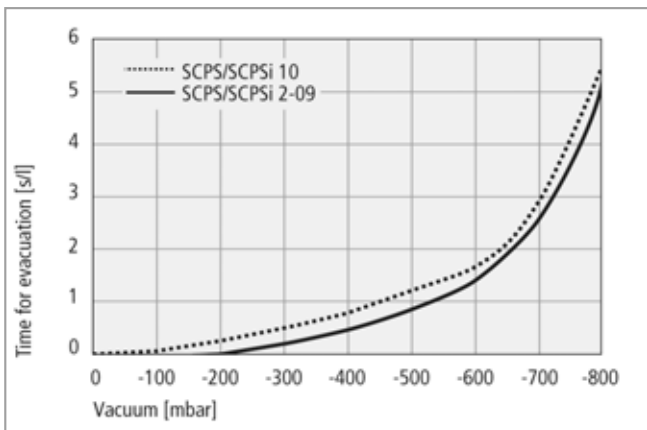
Achievable vacuum at various operating pressures



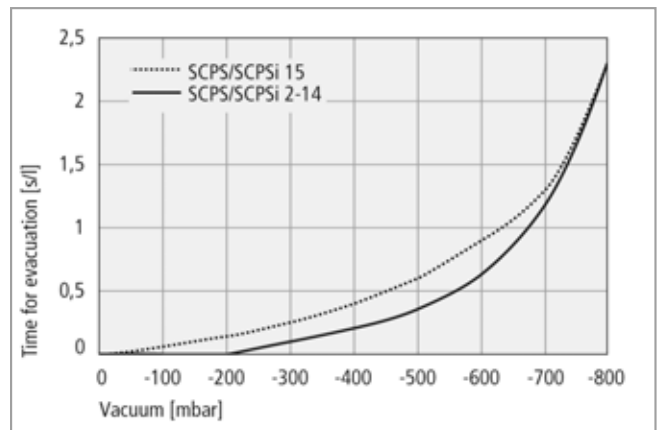
Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges



Evacuation times for various vacuum ranges

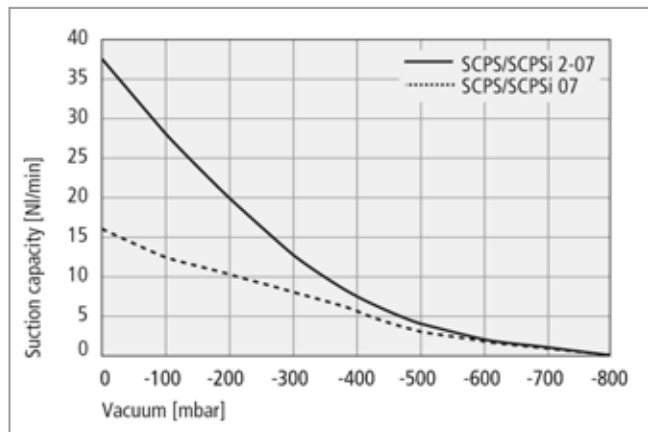
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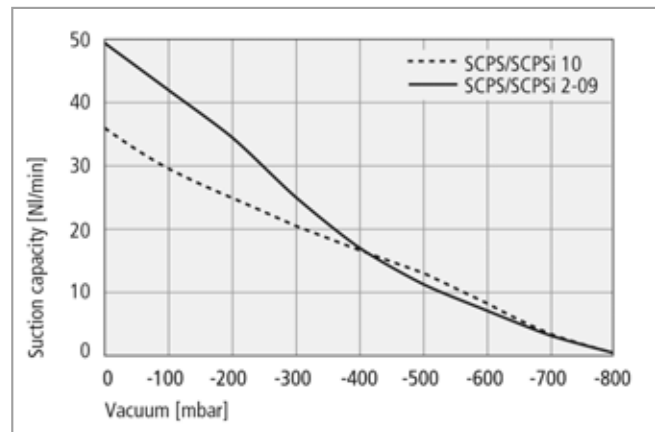


Compact Ejectors SCPS / SCPSi

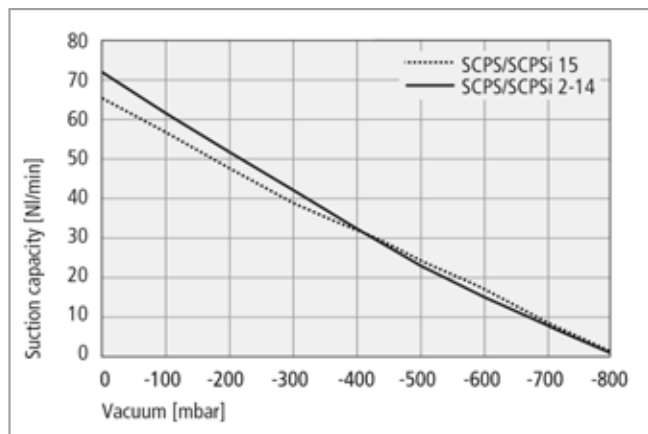
Suction rate from 16 l/min to 67 l/min



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPS/SCPSi 07	16	13.5	12.3	10.5	8.0	6.0	3.8	1.9	1.0	0.3
SCPS/SCPSi 10	36.1	32.4	29.5	25.9	20.8	16.9	13.0	8.1	3.4	0.5
SCPS/SCPSi 15	65.5	60.2	57.1	47.4	39.3	32.0	25.3	17.0	8.8	1.5
SCPS/SCPSi 2-07	37.2	32.3	28.1	19.9	12.5	7.5	3.9	2.0	1.0	0.3
SCPS/SCPSi 2-09	49.6	45.3	42.1	34.4	24.7	17.0	11.6	7.2	3.3	0.5
SCPS/SCPSi 2-14	71.8	66.3	61.4	52.5	42.2	31.9	23.5	15.3	8.5	1.2

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SCPS/SCPSi 07	0.15	0.30	0.65	1.10	1.75	2.75	4.00	6.15	10.50	
SCPS/SCPSi 10	0.05	0.15	0.30	0.50	0.80	1.20	1.75	2.80	5.50	
SCPS/SCPSi 15	0.05	0.07	0.15	0.25	0.40	0.60	0.90	1.30	2.30	
SCPS/SCPSi 2-07	0.00	0.00	0.15	0.40	0.85	1.75	2.70	4.20	7.20	
SCPS/SCPSi 2-09	0.00	0.00	0.00	0.20	0.45	0.85	1.45	2.50	5.00	
SCPS/SCPSi 2-14	0.00	0.00	0.00	0.10	0.20	0.35	0.65	1.20	2.30	

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Compact Ejectors

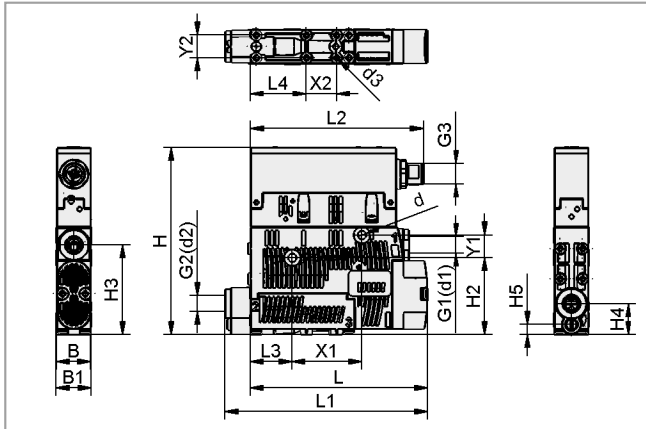


Compact Ejectors SCPS / SCPSi

Suction rate from 16 l/min to 67 l/min



Design Data Compact Ejectors SCPS / SCPSi



SCPS / SCPSi...

Type	Dimensions in mm										
	B	B1	d	d3	G1	G2	G3	H	H2	H3	H4
SCPS...	18	18.6	4.4	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5	16.5
SCPS 2...	18	18.6	4.4	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5	16.5
SCPSi...	18	18.6	4.4	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5	16.5
SCPSi 2...	18	18.6	4.4	2.6	G1/8"-F	G1/8"-F	M12x1-M	99	40.8	47.5	16.5

Type	Dimensions in mm									
	H5	L	L1	L2	L3	L4	X1	X2	Y1	Y2
SCPS...	5.5	84	105.0	91.5	22	29.5	36.9	16	12	12
SCPS 2...	5.5	93	106.0	91.5	22	29.5	36.9	16	12	12
SCPSi...	5.5	84	105.0	91.5	22	29.5	36.9	16	12	12
SCPSi 2...	5.5	93	106.0	91.5	22	29.5	36.9	16	12	12

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Compact Ejectors



Compact Ejectors SCPSb

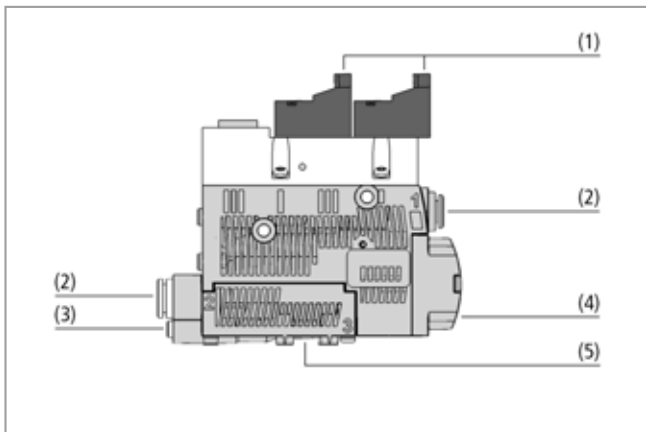
Suction rate from 16 l/min to 67 l/min



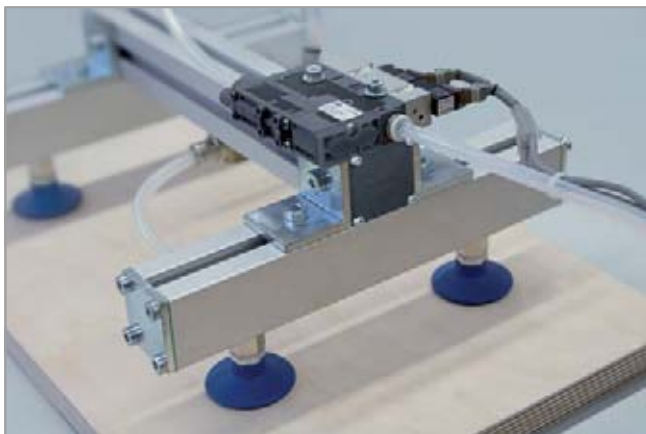
Suitable for Industry Specific Applications



Compact ejectors SCPSb



System design compact ejectors SCPSb



Centralized vacuum generation through compact ejector SCPSb

Applications

- Handling of airtight and slightly porous workpieces
- Generation of vacuum in automated systems
- Use in robotic handling applications and on linear axes
- For systems that require highly dynamic gripping of workpieces and where space is limited

Design

- Basic module made of high-strength plastic
- Integrated pneumatic valves (1) for switching functions NO or NC
- Pneumatic connections (2) via push-in quick-connect couplings
- Screw (3) to adjust blow off for lightweight pieces
- Open silencer (4)
- Can optionally be mounted using DIN rails (5)

Our Highlights...

- Efficient eco nozzle technology
- Compact size, made of extremely durable plastic
- Optimized fluidic design for efficient vacuum generation
- Push-in connections
- Attachment point for DIN rails

Your Benefits...

- > Higher suction rate with minimal compressed air consumption
- > Compact and durable unit; can be mounted directly on the handling system
- > Enables extremely short cycle times and high cycle frequencies
- > Saving in additional screw unions
- > Simple installation; can also be installed in the switch cabinet

Compact Ejectors



Compact Ejectors SCPSb

Suction rate from 16 l/min to 67 l/min

Designation Code Compact Ejectors SCPSb

Abbreviated designation	Nozzle size	Connection	Idle position suction valve
Example SCPSb 2-07 S04 NO:			
SCPSb	2-07	S04	NO
SCPSb	07 = 0.7 mm 10 = 1.0 mm 15 = 1.5 mm 2-07 = 0.7 mm 2-09 = 0.9 mm 2-14 = 1.4 mm	S02 quick-connect push-in coupling 2 S04 quick-connect push-in coupling 4	NC normally closed NO normally open

Ordering Data Compact Ejectors SCPSb

Compact ejector SCPSb is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, DIN rail mount, filter, compressed-air connection plate, mounting set, exhaust air set

Compact Ejectors SCPSb

Type	Part Number
SCPSb 07 S04 NO	10.02.02.04129
SCPSb 07 S04 NC	10.02.02.04130
SCPSb 10 S04 NO	10.02.02.04131
SCPSb 10 S04 NC	10.02.02.04132
SCPSb 15 S02 NO	10.02.02.04133
SCPSb 15 S02 NC	10.02.02.04134
SCPSb 2-07 S04 NO	10.02.02.04371
SCPSb 2-07 S04 NC	10.02.02.04372
SCPSb 2-09 S04 NO	10.02.02.04373
SCPSb 2-09 S04 NC	10.02.02.04374
SCPSb 2-14 S02 NO	10.02.02.04375
SCPSb 2-14 S02 NC	10.02.02.04376

Ordering Data Accessories Compact Ejectors SCPSb

Type	Connection cable*	DIN Rail mount**	Filter 6/4	Filter 8/6	Compressed air connection plate	Mounting set	Exhaust air set
SCPSb...	21.04.06.00086	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04216
SCPSb 2...	21.04.06.00086	10.02.02.04149	10.07.01.00241	10.07.01.00245	10.02.02.04338	10.02.02.04343	10.02.02.04667

*Will be required twice
**With mounting screws

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Compact Ejectors SCPSb

Suction rate from 16 l/min to 67 l/min

Technical Data Compact Ejectors SCPSb

Type	Nozzle size	Degree of evacuation [%]*	Max. suction rate [m³/h]*	Max. suction rate [l/min]*	Air consumpt. during evac. [m³/h]*	Air consumpt. during evac. [l/min]*	Air consumption blow off [m³/h]*
SCPSb 07...	07	85	0.98	16.0	1.35	22.0	7.25
SCPSb 10...	10	85	2.21	36.0	2.85	46.0	7.25
SCPSb 15...	15	85	4.03	65.5	6.03	98.5	7.25
SCPSb 2-07...	2-07	85	2.28	37.0	1.35	22.0	7.25
SCPSb 2-09...	2-09	85	3.05	49.5	2.49	40.5	7.25
SCPSb 2-14...	2-14	85	4.40	71.5	5.04	82.0	7.25

*At optimal operating pressure (4 bar)

**For max. length 2 m

Type	Noise level free [dB(A)]*	Noise level workp. gripped [dB(A)]*	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SCPSb 07...	63	58	2.0 ... 6.0	4	4	0.165	0 ... 50
SCPSb 10...	73	60	2.0 ... 6.0	4	4	0.165	0 ... 50
SCPSb 15...	75	65	2.0 ... 6.0	4	6	0.165	0 ... 50
SCPSb 2-07...	63	58	2.0 ... 6.0	4	4	0.165	0 ... 50
SCPSb 2-09...	73	60	2.0 ... 6.0	4	4	0.165	0 ... 50
SCPSb 2-14...	75	65	2.0 ... 6.0	4	6	0.165	0 ... 50

*At optimal operating pressure (4 bar)

**For max. length 2 m

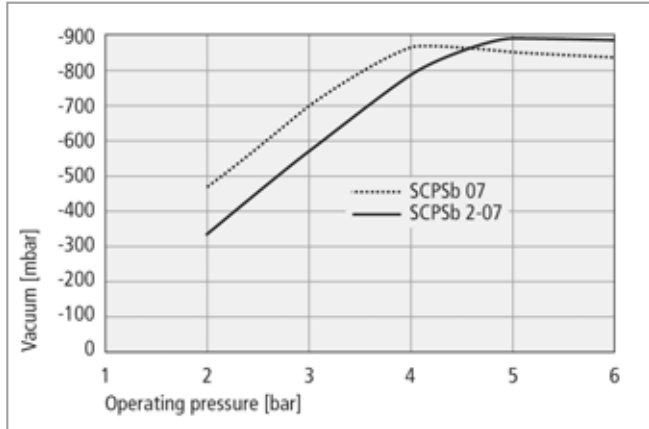
Compact Ejectors



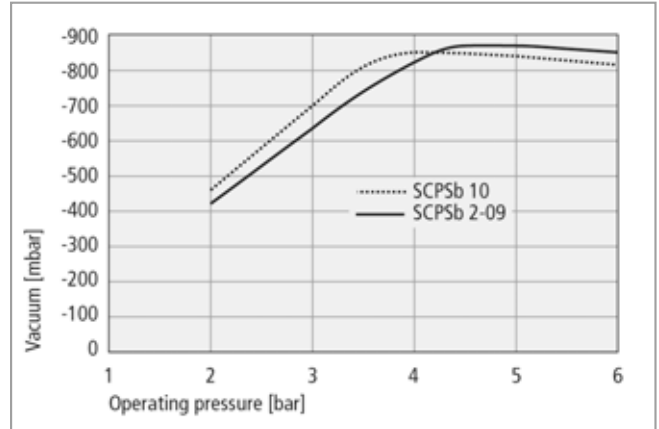
Compact Ejectors SCPSb

Suction rate from 16 l/min to 67 l/min

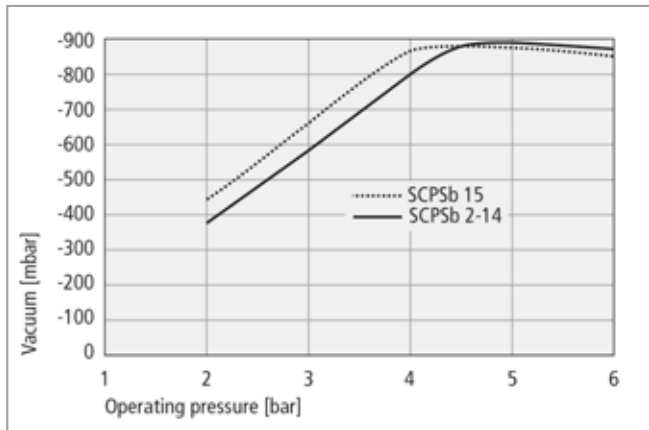
Performance Data Compact Ejectors SCPSb



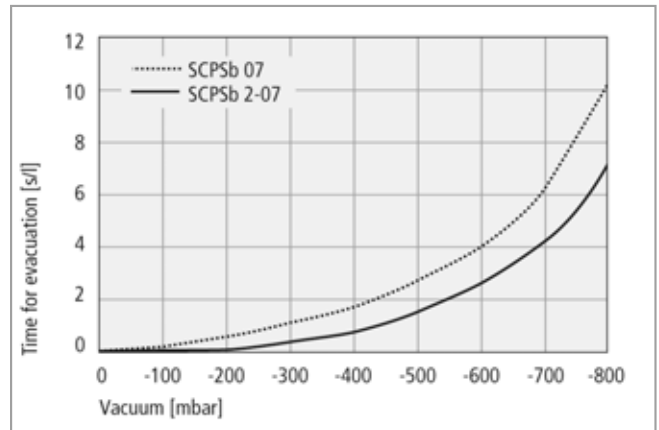
Achievable vacuum at various operating pressures



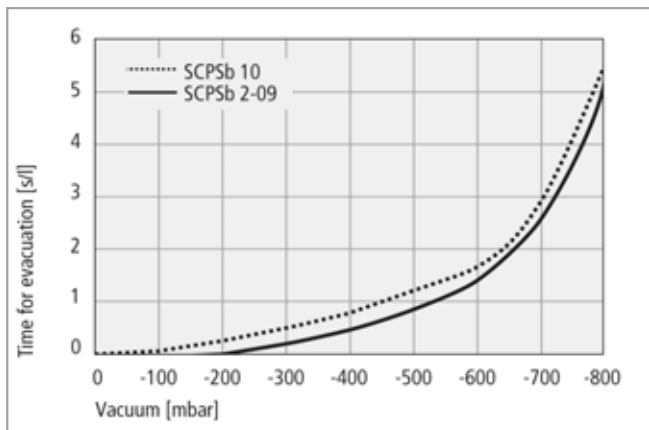
Achievable vacuum at various operating pressures



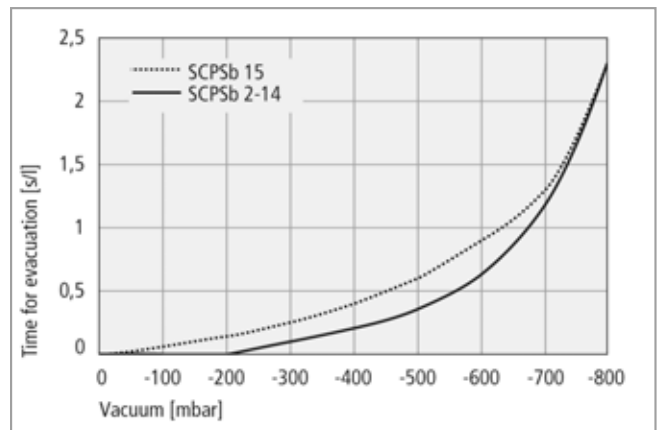
Achievable vacuum at various operating pressures



Evacuation time for various vacuum ranges



Evacuation time for various vacuum ranges



Evacuation time for various vacuum ranges

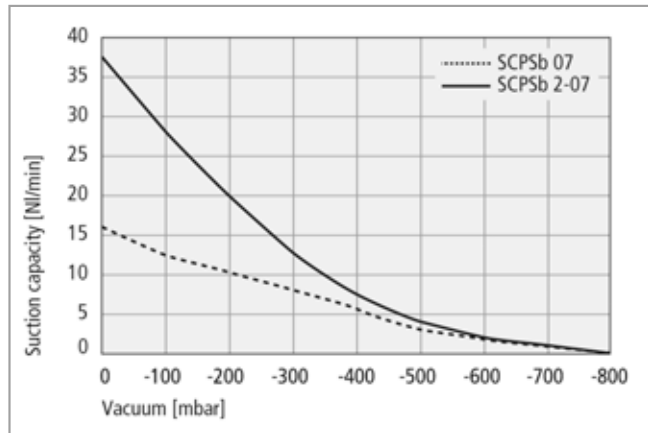
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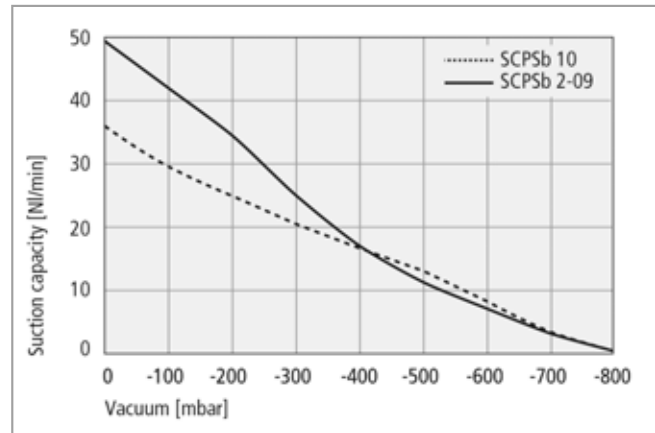


Compact Ejectors SCPSb

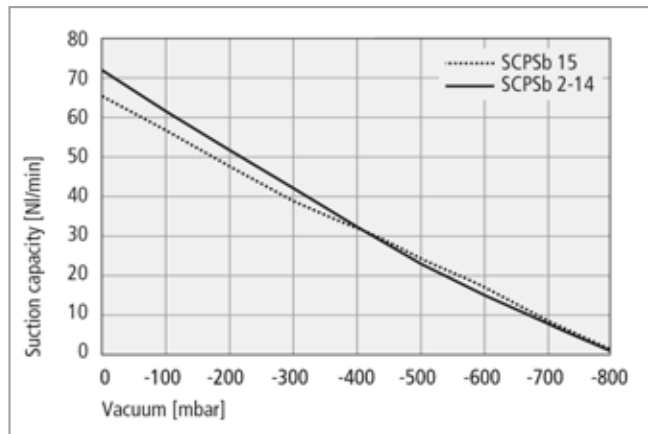
Suction rate from 16 l/min to 67 l/min



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPSb 07	16	13.5	12.3	10.5	8.0	6.0	3.8	1.9	1.0	0.3
SCPSb 10	36.1	32.4	29.5	25.9	20.8	16.9	13.0	8.1	3.4	0.5
SCPSb 15	65.5	60.2	57.1	47.4	39.3	32.0	25.3	17.0	8.8	1.5
SCPSb 2-07	37.2	32.3	28.1	19.9	12.5	7.5	3.9	2.0	1.0	0.3
SCPSb 2-09	49.6	45.3	42.1	34.4	24.7	17.0	11.6	7.2	3.3	0.5
SCPSb 2-14	71.8	66.3	61.4	52.5	42.2	31.9	23.5	15.3	8.5	1.2

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SCPSb 07	0.15	0.30	0.65	1.10	1.75	2.75	4.00	6.15	10.50	
SCPSb 10	0.05	0.15	0.30	0.50	0.80	1.20	1.75	2.80	5.50	
SCPSb 15	0.05	0.07	0.15	0.25	0.40	0.60	0.90	1.30	2.30	
SCPSb 2-07	0.00	0.00	0.15	0.40	0.85	1.75	2.70	4.20	7.20	
SCPSb 2-09	0.00	0.00	0.00	0.20	0.45	0.85	1.45	2.50	5.00	
SCPSb 2-14	0.00	0.00	0.00	0.10	0.20	0.35	0.65	1.20	2.30	

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Compact Ejectors

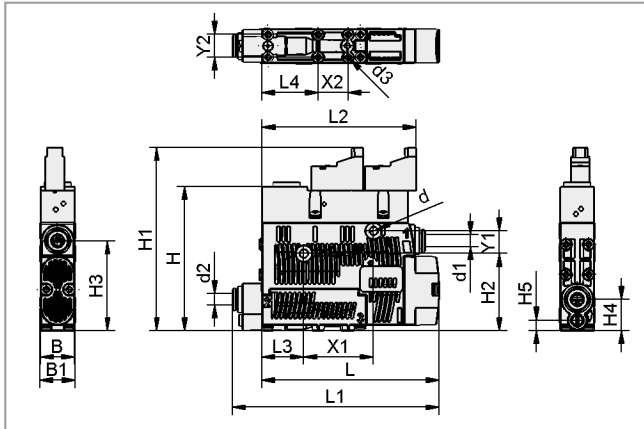


Compact Ejectors SCPSb

Suction rate from 16 l/min to 67 l/min



Design Data Compact Ejectors SCPSb



SCPSb...

Type	Dimensions in mm																				
	B	B1	d	d1	d2	d3	H	H1	H2	H3	H4	H5	L	L1	L2	L3	L4	X1	X2	Y1	Y2
SCPSb 07 S04 NO	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 07 S04 NC	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 10 S04 NO	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 10 S04 NC	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 15 S02 NO	18	18.6	4.4	6	8	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 15 S02 NC	18	18.6	4.4	6	8	2.6	77.5	97	40.8	47.5	16.5	5.5	86	102.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-07 S04 NO	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-07 S04 NC	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-09 S04 NO	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-09 S04 NC	18	18.6	4.4	6	6	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-14 S02 NO	18	18.6	4.4	6	8	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12
SCPSb 2-14 S02 NC	18	18.6	4.4	6	8	2.6	77.5	97	40.8	47.5	16.5	5.5	94	109.5	81.4	22	29.5	36.9	16	12	12

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Compact Ejectors



Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 195 l/min



Suitable for Industry Specific Applications



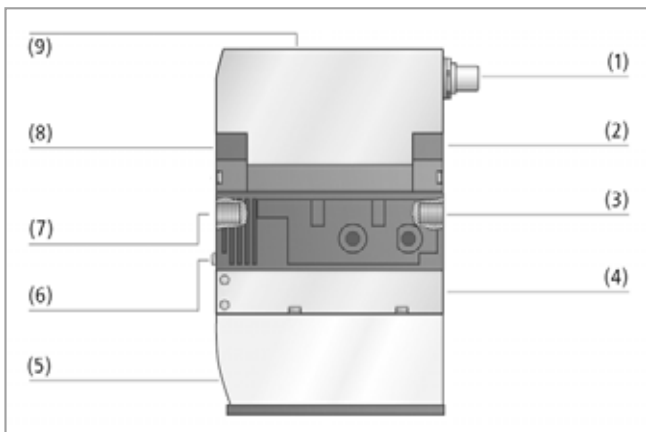
Compact ejectors SCPi / SMPi

Applications

- Handling of air-tight as well as porous workpieces
- Vacuum supply and vacuum monitoring in automated systems
- For use in sheet metal processing, the automotive industry, with packaging machines, and in various robotic applications
- Pick-and-place applications with very short cycle times (fast gripping and release realized by means of the power blow-off function)

Design

- Main body made of high-strength plastic
- User display (9) with seven segments, operating keyboard and luminous display that indicates system status
- Electrical connection (1) via standard M12 plug, optional with potential separation of sensor and actor power supply
- Integrated pneumatic valves for NO, NC or pulse switch functions (2) and (8)
- Power blow-off piston for type SMPi (4) provides extremely high blow-off capacity for reduced cycle times
- Adjusting screw to adjust the blow-off capacity (6)
- Pneumatic connections (G3/8" and G1/4") with protective filters (3) and (7)
- Integrated silencer (5)



System design compact ejectors SCPi / SMPi

Our Highlights...

- IO-Link function with remote parameterisation
- Clearly structured user display with setting buttons
- Integrated air-saving function
- Compact disk design
- Weight-optimized housing
- Suction function as pulse version is available

Your Benefits...

- > Connection to bus systems and fast data synchronisation
- > Easy to enter and read vacuum parameters
- > Reduced energy costs
- > Minimal space requirements
- > Minimal stress during high accelerations
- > No undesired air consumption in case the machine is stopped



Centralized vacuum generation by means of compact ejectors SMPi

Compact Ejectors



Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 195 l/min

Designation Code Compact Ejectors SCPi / SMPi

Abbreviated designation	Nozzle size	Idle position suction valve	System monitoring	Connection electrical
Example SMPi 15 NO VD M12-5:				
SMPi	15	NO	VD	M12-5
SCPi without power blow off	15 = 1.5 mm	IMP bistable, switched with pulse	RD air saving function with digital vacuum switch	M12-5 M12, 5-pole
SMPi with power blow off	20 = 2.0 mm 25 = 2.5 mm	NC normally closed NO normally open	VD digital vacuum switch	

Ordering Data Compact Ejectors SCPi / SMPi

Compact ejector SCPi / SMPi is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, compressed air connection plate, ejector blanking plate, quick change connection, ejector tester

Compact Ejectors SCPi / SMPi

SCPi 15...		SCPi 20...		SCPi 25...	
Type	Part Number	Type	Part Number	Type	Part Number
SCPi 15 NO VD M12-5	10.02.02.03342	SCPi 20 NO VD M12-5	10.02.02.03354	SCPi 25 NO VD M12-5	10.02.02.03366
SCPi 15 NC VD M12-5	10.02.02.03343	SCPi 20 NC VD M12-5	10.02.02.03355	SCPi 25 NC VD M12-5	10.02.02.03367
SCPi 15 IMP VD M12-5	10.02.02.03344	SCPi 20 IMP VD M12-5	10.02.02.03356	SCPi 25 IMP VD M12-5	10.02.02.03368
SCPi 15 NO RD M12-5	10.02.02.03345	SCPi 20 NO RD M12-5	10.02.02.03357	SCPi 25 NO RD M12-5	10.02.02.03369
SCPi 15 NC RD M12-5	10.02.02.03346	SCPi 20 NC RD M12-5	10.02.02.03358	SCPi 25 NC RD M12-5	10.02.02.03370
SCPi 15 IMP RD M12-5	10.02.02.03347	SCPi 20 IMP RD M12-5	10.02.02.03359	SCPi 25 IMP RD M12-5	10.02.02.03371

SMPi 15...		SMPi 20...		SMPi 25...	
Type	Part Number	Type	Part Number	Type	Part Number
SMPi 15 NO VD M12-5	10.02.02.03336	SMPi 20 NO VD M12-5	10.02.02.03348	SMPi 25 NO VD M12-5	10.02.02.03360
SMPi 15 NC VD M12-5	10.02.02.03337	SMPi 20 NC VD M12-5	10.02.02.03349	SMPi 25 NC VD M12-5	10.02.02.03361
SMPi 15 IMP VD M12-5	10.02.02.03338	SMPi 20 IMP VD M12-5	10.02.02.03350	SMPi 25 IMP VD M12-5	10.02.02.03362
SMPi 15 NO RD M12-5	10.02.02.03339	SMPi 20 NO RD M12-5	10.02.02.03351	SMPi 25 NO RD M12-5	10.02.02.03363
SMPi 15 NC RD M12-5	10.02.02.03340	SMPi 20 NC RD M12-5	10.02.02.03352	SMPi 25 NC RD M12-5	10.02.02.03364
SMPi 15 IMP RD M12-5	10.02.02.03341	SMPi 20 IMP RD M12-5	10.02.02.03353	SMPi 25 IMP RD M12-5	10.02.02.03365

Compact Ejectors



Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 195 l/min

Ordering Data Accessories Compact Ejectors SCPi / SMPi

Accessories	Part Number	Weight [kg]
Connecting cable M12, 5-pole	21.04.05.00080	0.240
Connection distributor 3xM12, 4-pole	10.02.02.03372	0.170
Connection distributor 2xM12, 4-pole	10.02.02.03490	0.100
Compressed air connection plate GP 2	10.02.02.00917	0.375
Compressed air connection plate GP 3	10.02.02.00918	0.481
Compressed air connection plate GP 4	10.02.02.00919	0.595
Compressed air connection plate GP 5	10.02.02.00920	0.700
Compressed air connection plate GP 6	10.02.02.00921	0.807
Ejector blanking plate EJEK-PL*	10.02.02.00728	0.017
Quick Change connection ADP-Q**	10.02.02.03463	0.163
Ejector tester EJEK-TEST SMPi/SCPi	10.02.02.03588	0.755

*Plate for covering unused connections when using compressed air connection plates

**For additional quick-mounting function (tool-free change of ejectors). When using with compressed air connection plates, order 1x per ejector.

Technical Data Compact Ejectors SCPi / SMPi

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SMPi 15...	1.5	85	75	4.5	115	7.2	200
SMPi 20...	2.0	85	135	8.1	180	10.8	200
SMPi 25...	2.5	85	185	11.1	290	17.4	200
SCPi 15...	1.5	85	75	4.5	115	7.2	200
SCPi 20...	2.0	85	140	8.4	180	11.7	200
SCPi 25...	2.5	85	195	11.7	290	17.4	200

!The supply voltage is 24V DC

*At optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Noise level work-piece gripped [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SMPi 15...	75	74	4.0 ... 7.0	6	6	0.56	0 ... 50
SMPi 20...	75	70	4.0 ... 7.0	6	8	0.56	0 ... 50
SMPi 25...	78	77	4.0 ... 7.0	8	9	0.56	0 ... 50
SCPi 15...	75	70	4.0 ... 7.0	6	6	0.56	0 ... 50
SCPi 20...	75	65	4.0 ... 7.0	6	8	0.56	0 ... 50
SCPi 25...	78	75	4.0 ... 7.0	8	9	0.56	0 ... 50

!The supply voltage is 24V DC

*At optimal operating pressure

**For max. length 2 m

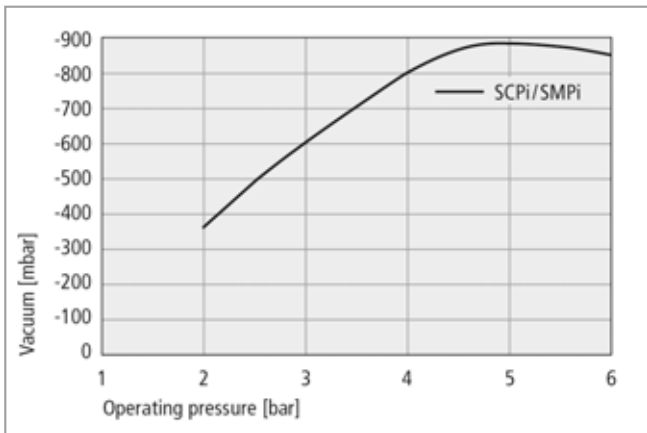
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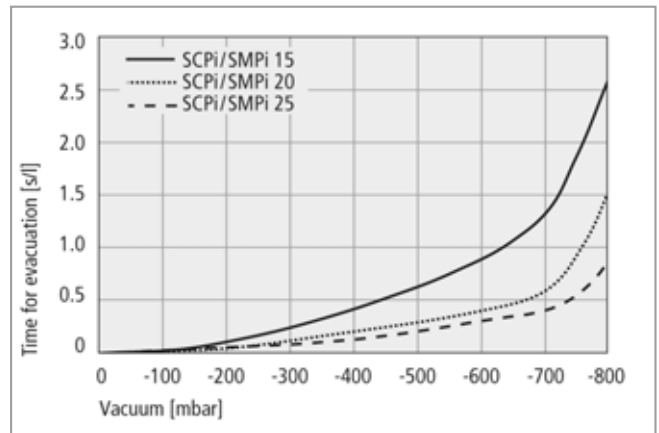
Compact Ejectors SCPI / SMPi

Suction rate from 75 l/min to 195 l/min

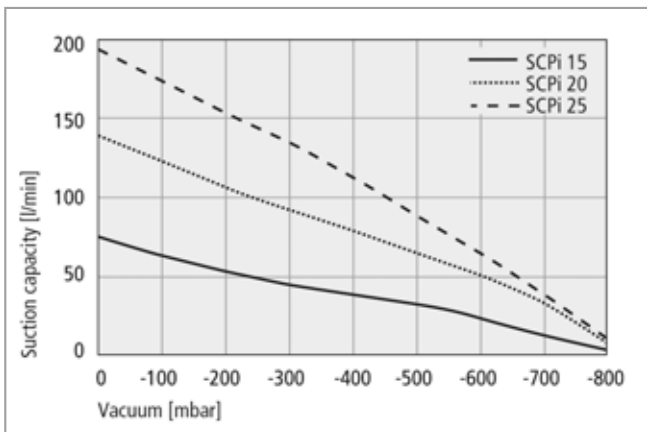
Performance Data Compact Ejectors SCPI / SMPi



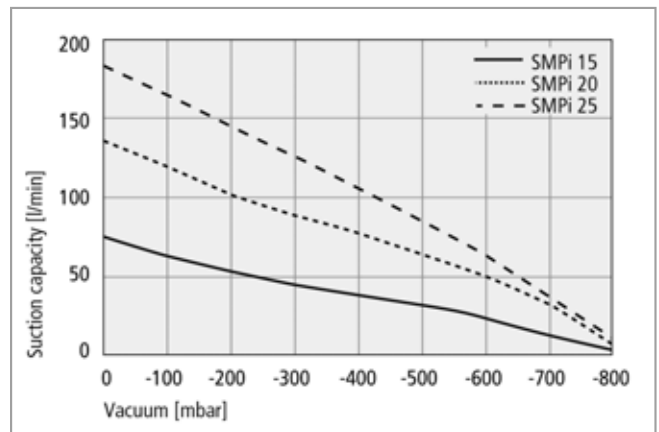
Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity SCPI... at various degrees of evacuation



Suction capacity SMPi... at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPI 15	75.0	70.3	65.4	55.2	46.3	38.3	31.2	23.9	13.5	3.4
SCPI 20	139.0	131.3	123.1	106.8	92.5	79.3	65.2	51.9	32.1	8.5
SCPI 25	195.0	188.2	176.8	153.6	133.6	112.0	89.3	67.4	39.7	11.7
SMPi 15	75.0	70.3	65.4	55.2	46.3	38.3	31.2	23.9	13.5	3.4
SMPi 20	135.0	127.5	119.5	103.7	89.8	77.0	63.3	50.4	31.1	8.2
SMPi 25	185.0	178.6	167.8	145.8	126.7	106.2	84.7	64.0	37.6	11.1

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SCPI/SMPi 15	0.03	0.07	0.16	0.27	0.42	0.63	0.91	1.37	2.60	
SCPI/SMPi 20	0.02	0.04	0.08	0.14	0.22	0.31	0.44	0.66	1.54	
SCPI/SMPi 25	0.01	0.02	0.05	0.09	0.14	0.20	0.28	0.42	0.86	

Compact Ejectors

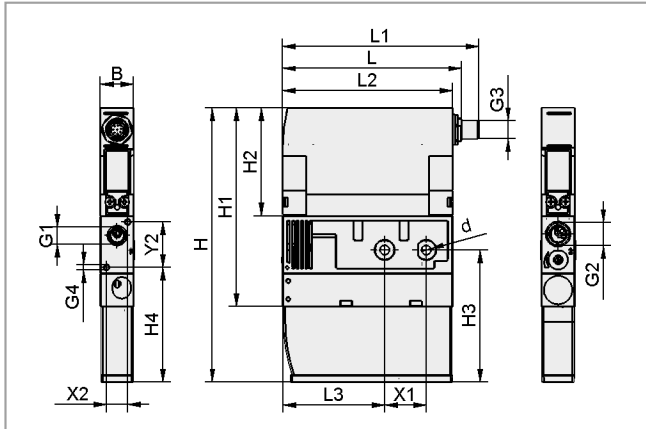


Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 195 l/min



Design Data Compact Ejectors SCPi / SMPi



SCPi.../SMPi...

Type	Dimensions in mm																	
	B	d	G1	G2	G3	G4	H	H1	H2	H3	H4	L	L1	L2	L3	X1	X2	Y2
SMPi 15...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SMPi 20...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SMPi 25...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 15...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 20...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 25...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30

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Compact Ejectors

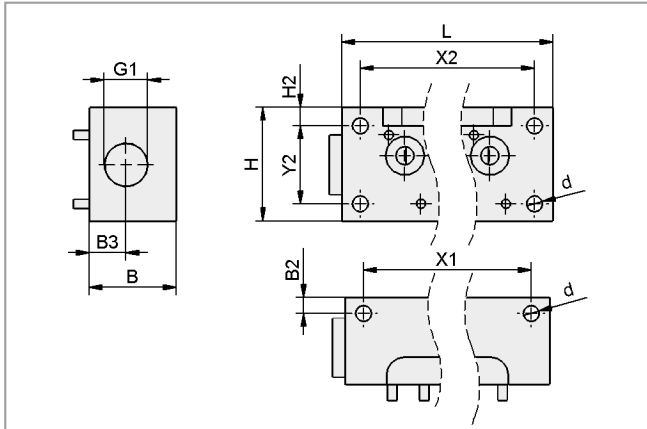


Compact Ejectors SCPi / SMPi

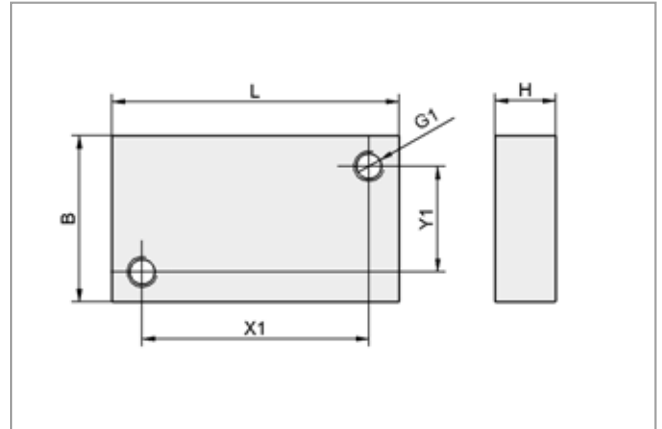
Suction rate from 75 l/min to 195 l/min



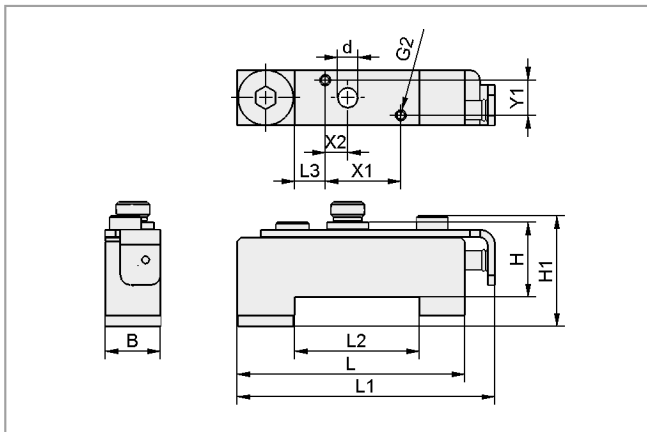
Design Data Accessories Compact Ejectors SCPi / SMPi



GP...



EJEK-PL...



ADP-Q1...

Type	Dimensions in mm									
	B	B2	B3	d	G1	G2	H	H1	H2	
GP 2 SMP 15..30/SCP 20..30	38	7	16	7	G1/2"-F	-	49.5	-	8	
GP 3 SMP 15..25/SCP 20..25	38	7	16	7	G1/2"-F	-	49.5	-	8	
GP 4 SMP 15..20/SCP 20	38	7	16	7	G1/2"-F	-	49.5	-	8	
GP 5 SMP 15	38	7	16	7	G1/2"-F	-	49.5	-	8	
GP 6 SMP 15	38	7	16	7	G1/2"-F	-	49.5	-	8	
EJEK-PL SMP(i)15..30/SCP(i)20..30	22	-	-	-	M4-F	-	8.0	-	-	
ADP-Q 90.5x22x29.7 SMPi/SCPi	22	-	-	8	-	M5-F	29.7	43.9	-	
EJEK-TEST SMPi/SCPi	90	-	-	-	-	-	50.0	-	-	

Type	Dimensions in mm								
	L	L1	L2	L3	X1	X2	Y1	Y2	
GP 2 SMP 15..30/SCP 20..30	78.0	-	-	-	62	62	-	34	
GP 3 SMP 15..25/SCP 20..25	101.0	-	-	-	85	85	-	34	
GP 4 SMP 15..20/SCP 20	124.0	-	-	-	108	108	-	34	
GP 5 SMP 15	147.0	-	-	-	131	131	-	34	
GP 6 SMP 15	170.0	-	-	-	154	154	-	34	
EJEK-PL SMP(i)15..30/SCP(i)20..30	38.0	-	-	-	30	-	14	-	
ADP-Q 90.5x22x29.7 SMPi/SCPi	90.5	102.5	49.6	12.1	30	9	14	-	
EJEK-TEST SMPi/SCPi	120.0	-	-	-	-	-	-	-	

Compact Ejectors



Compact Ejectors SCP / SMP

Suction rate from 37 l/min to 200 l/min



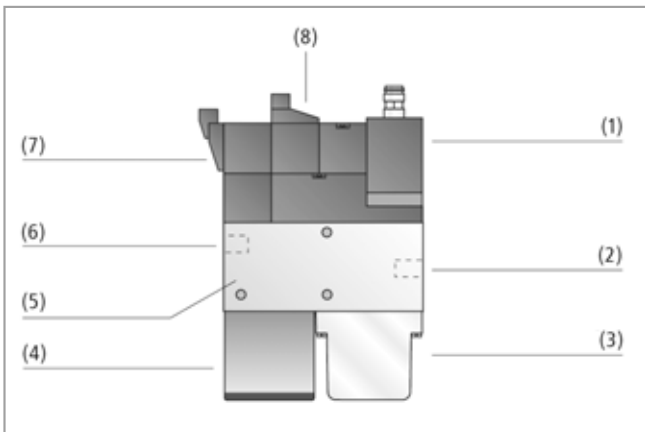
Suitable for Industry Specific Applications



Compact ejectors SCP / SMP

Applications

- Compact ejector for handling of airtight or slightly porous workpieces in the electronics, electrical engineering, packing, robotics and automobile industries



System design compact ejectors SCP / SMP

Design

- Basic body made from anodized aluminum (5)
- Suction valve optionally as a normally open (NO) or normally closed (NC) valve (7)
- Blow off valve NC (8), filter (3), silencer (4) and non-return valve all integrated
- Optional: electronic vacuum switch (1), integrated air-saving function, mounting plate for block installation
- Compact ejectors with air-saving function incl. cable
- Vacuum inlet (2) and compressed air inlet (6)
- Power function for reduction of the blow-off time by about 50%

Overview of Technical Data

Suction rate in mm	Suction rate in l/min	Max. vacuum	Idle position suction valve	Additional Functions	Dimensions in mm	Weight in g
1.0 to 3.0	37 to 200	85%	NO NC	<ul style="list-style-type: none"> • Air saving function with digital vacuum switch • Air saving function with electronic vacuum switch • Digital vacuum switch • Electronic vacuum switch • SMP with power blow-off function 	LxBxH: 129x22x182	485

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Compact Ejectors



Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min



Suitable for Industry Specific Applications



Compact ejectors SCP-FS

Applications

- Compact ejector for handling of airtight or slightly porous workpieces
- For use in the automobile, packaging and robotics industries

Design

- Anodized aluminum body with ejector nozzle, filter, silencer, non-return valve and power function
- Optional vacuum switch for system monitoring
- Control plate with threaded connections for control of the functions "grip" and "blow-off" by means of external compressed-air pulses

Our Highlights...

- Externally controlled compact ejector
- High suction and blow-off capacity
- Wide range of performance values
- Optional vacuum monitoring

Your Benefits...

- > Optimum integration into field-bus systems
- > Fast evacuation and blowing off reduce the cycle times
- > Optimum range of models with different performance figures for adaptation to the intended task
- > Increased process safety



Overview of Technical Data

Nozzle size in mm	Suction rate in l/min	Max. vacuum	Actuation	Additional Functions	Dimensions in mm	Weight in g
1.0 to 3.0	37 to 200	85%	External control with pneumatic pulse	<ul style="list-style-type: none"> • Air saving function with pneumatic vacuum switch • Digital vacuum switch • Electronic vacuum switch 	(max.) LxBxH: 113x25x184	410

Find more information about this product at:

www.schmalz.com/scp-fs

Compact Ejectors



Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min



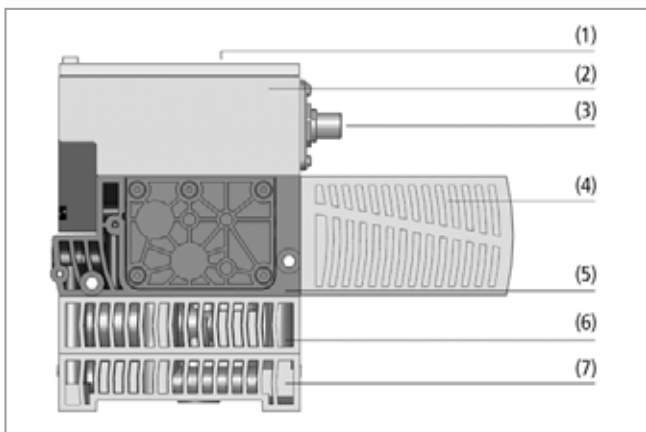
Suitable for Industry Specific Applications



Compact ejectors X-Pump SXPi / SXMPi

Applications

- High-performance vacuum generator for handling suction-tight workpieces under extreme conditions, e. g. in vacuum systems in press lines for handling metal sheets
- In pick-and-place applications with short cycle times
- In automated systems for preparation and precise monitoring of the vacuum system



System design compact ejectors X-Pump SXPi / SXMPi

Design

- User display (1) with large-scale operating and display elements
- Control electronics (2) with diverse monitoring functions
- Electrical connection (3) via M12 plug
- Removable silencer (4)
- Basic body (5) made of extremely robust plastic
- Compact ejector SXMPi is additionally equipped with the power blow off module (6)
- Horizontal connection plate with vacuum and compressed air connection (7); optional with quick-change adapter
- Optional integrated pressure sensor



Central vacuum generation by compact ejectors X-Pump SXPi / SXMPi

Our Highlights...

- Communication via IO-Link technology
- Integrated air-saving function
- Condition monitoring functions with internal and external evaluation options
- Integrated voltage regulator
- Integrated pressure monitoring (optional)
- Suction function as impulse version (optional)

Your Benefits...

- > Input and output of process-specific data
- > Significant reduction of energy consumption
- > Process and system monitoring to avoid downtimes
- > Compensation of variations in voltage
- > Additional information on operating status
- > No undesired air consumption in the event of power loss

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Compact Ejectors



Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

Designation Code Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Abbreviated designation	Nozzle size	Idle position suction valve	Connection pneumatical	Additional function	Connection electrical
Example SXPi 25 NO H M12-8:					
SXPi	25	NO	H	-	M12-8
SXPi without power module	25 = 2.5 mm	IMP bistable switched with pulse	H horizontal	PC pressure monitoring	M12-8 M12, 8-pole
SXMPi with power module	30 = 3.0 mm	NC normally closed	Q quick-change		2xM12-5 2xM12, 5-pole
		NO normally open			

Ordering Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Compact ejector SXPi / SXMPi is delivered as a ready to connect product (without connection cable).

Available spare parts: connection cable, base plate, ejector tester

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

SXPi 25		SXPi 30	
Type	Part Number	Type	Part Number
SXPi 25 NO H M12-8	10.02.02.03776	SXPi 30 NO H M12-8	10.02.02.03780
SXPi 25 NO Q M12-8	10.02.02.03777	SXPi 30 NO Q M12-8	10.02.02.03781
SXPi 25 NO H 2xM12-5	10.02.02.03778	SXPi 30 NO H 2xM12-5	10.02.02.03782
SXPi 25 NO Q 2xM12-5	10.02.02.03779	SXPi 30 NO Q 2xM12-5	10.02.02.03783
SXPi 25 NC H M12-8	10.02.02.03784	SXPi 30 NC H M12-8	10.02.02.03788
SXPi 25 NC Q M12-8	10.02.02.03785	SXPi 30 NC Q M12-8	10.02.02.03789
SXPi 25 NC H 2xM12-5	10.02.02.03786	SXPi 30 NC H 2xM12-5	10.02.02.03790
SXPi 25 NC Q 2xM12-5	10.02.02.03787	SXPi 30 NC Q 2xM12-5	10.02.02.03791
SXPi 25 IMP H M12-8	10.02.02.03792	SXPi 30 IMP H M12-8	10.02.02.03796
SXPi 25 IMP Q M12-8	10.02.02.03793	SXPi 30 IMP Q M12-8	10.02.02.03797
SXPi 25 IMP H 2xM12-5	10.02.02.03794	SXPi 30 IMP H 2xM12-5	10.02.02.03798
SXPi 25 IMP Q 2xM12-5	10.02.02.03795	SXPi 30 IMP Q 2xM12-5	10.02.02.03799

Note: All variants listed above can also be optionally configured as "PC" variants

SXMPi 25		SXMPi 30	
Type	Part Number	Type	Part Number
SXMPi 25 NO H M12-8	10.02.02.03800	SXMPi 30 NO H M12-8	10.02.02.03804
SXMPi 25 NO Q M12-8	10.02.02.03801	SXMPi 30 NO Q M12-8	10.02.02.03805
SXMPi 25 NO H 2xM12-5	10.02.02.03802	SXMPi 30 NO H 2xM12-5	10.02.02.03806
SXMPi 25 NO Q 2xM12-5	10.02.02.03803	SXMPi 30 NO Q 2xM12-5	10.02.02.03807
SXMPi 25 NC H M12-8	10.02.02.03808	SXMPi 30 NC H M12-8	10.02.02.03812
SXMPi 25 NC Q M12-8	10.02.02.03809	SXMPi 30 NC Q M12-8	10.02.02.03813
SXMPi 25 NC H 2xM12-5	10.02.02.03810	SXMPi 30 NC H 2xM12-5	10.02.02.03814
SXMPi 25 NC Q 2xM12-5	10.02.02.03811	SXMPi 30 NC Q 2xM12-5	10.02.02.03815
SXMPi 25 IMP H M12-8	10.02.02.03816	SXMPi 30 IMP H M12-8	10.02.02.03820
SXMPi 25 IMP Q M12-8	10.02.02.03817	SXMPi 30 IMP Q M12-8	10.02.02.03821
SXMPi 25 IMP H 2xM12-5	10.02.02.03818	SXMPi 30 IMP H 2xM12-5	10.02.02.03822
SXMPi 25 IMP Q 2xM12-5	10.02.02.03819	SXMPi 30 IMP Q 2xM12-5	10.02.02.03823

Note: All variants listed above can also be optionally configured as "PC" variants

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

Compact Ejectors SXPi/SXMPi X-Pump with IO-Link Technology and Pressure Monitoring "PC"

Type	Part Number
SXMPi 25 IMP H PC 2xM12-5	10.02.02.04022
SXMPi 25 IMP Q PC 2xM12-5	10.02.02.04563
SXMPi 25 NC H PC 2xM12-5	10.02.02.04021
SXMPi 25 NC H PC M12-8	10.02.02.04189
SXMPi 25 NC Q PC 2xM12-5	10.02.02.04024
SXMPi 25 NC Q PC M12-8	10.02.02.04025
SXMPi 25 NO H PC 2xM12-5	10.02.02.04023
SXMPi 30 IMP H PC 2xM12-5	10.02.02.04097
SXMPi 30 IMP H PC M12-8	10.02.02.04561

Ordering Data Accessories Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Accessories	Part Number	Weight [kg]
Connecting cable M12, 8-pole	21.04.05.00079	0.28
Connecting cable M12, 5-pole	21.04.05.00080	0.24
Connecting cable M12, 8-pole to 5-pole*	21.04.05.00167	0.35
Single base plate with quick-change connections	10.02.02.02473	0.18
Double base plate with quick-change connections	10.02.02.02154	0.47
Ejector tester	10.02.02.03588	0.75

*For IO-Link

Technical Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SXPi 25	2.5	85	185	11.1	290	17.4	200
SXPi 30	3.0	85	220	13.2	380	22.8	200
SXMPi 25	2.5	85	185	11.1	290	17.4	320
SXMPi 30	3.0	85	220	13.2	380	22.8	320

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure (4.5 bar)

**For max. length 2 m

Type	Noise level free [dB]	Pressure range (operating pressure) [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SXPi 25	67	3.0 ... 6.0	8	9	0.77	0 ... 50
SXPi 30	72	3.0 ... 6.0	8	9	0.77	0 ... 50
SXMPi 25	67	3.0 ... 6.0	8	9	0.91	0 ... 50
SXMPi 30	72	3.0 ... 6.0	8	9	0.91	0 ... 50

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure (4.5 bar)

**For max. length 2 m

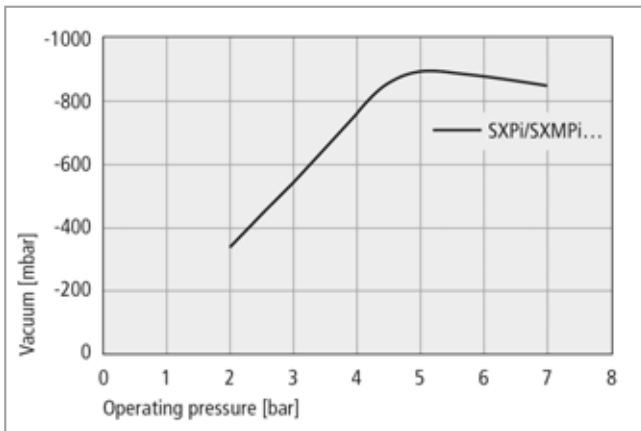
Compact Ejectors



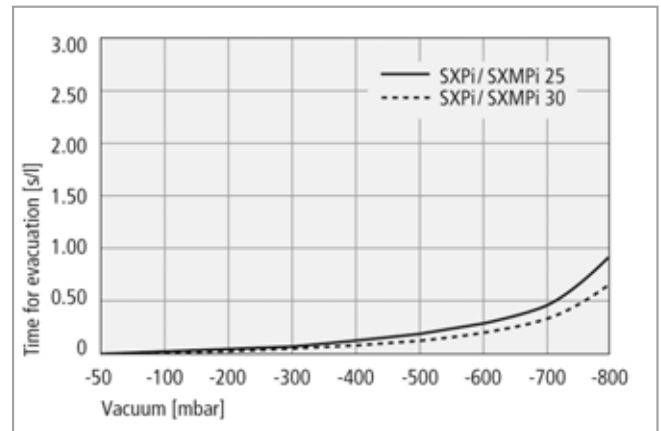
Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

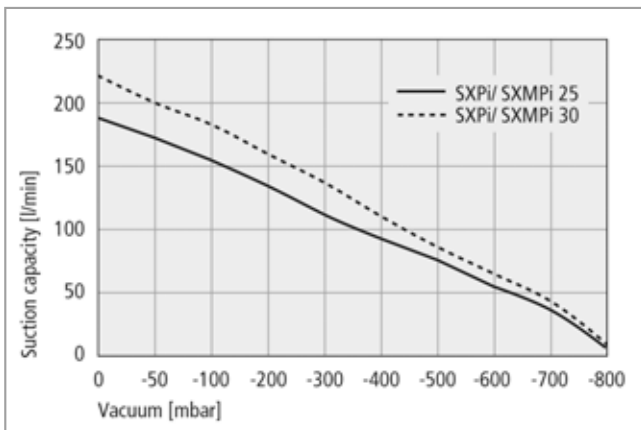
Performance Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SXPi/SXMPi 25	185	170	158	135	114	95	76	56	33	10
SXPi/SXMPi 30	220	199	184	160	138	115	91	63	39	15

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SXPi/SXMPi 25	0.02	0.03	0.06	0.10	0.15	0.18	0.26	0.46	0.87	
SXPi/SXMPi 30	0.01	0.02	0.05	0.08	0.11	0.15	0.22	0.37	0.69	

Compact Ejectors

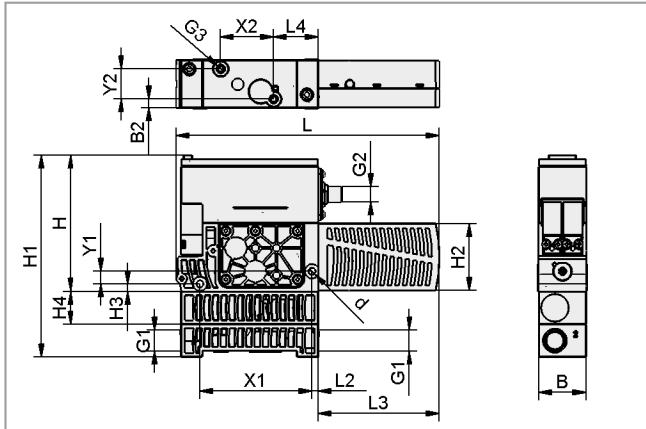


Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

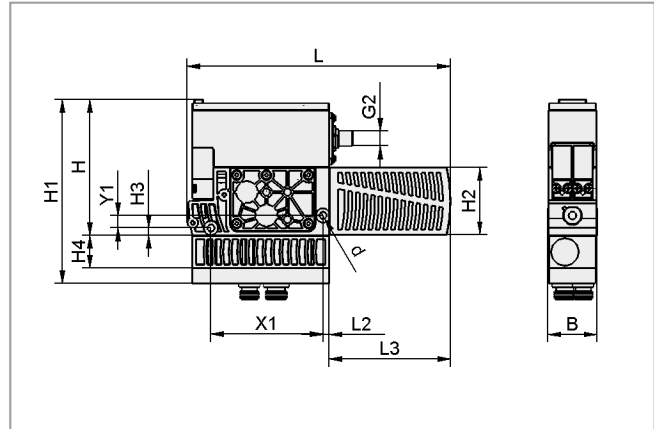
Suction rate from 185 l/min to 220 l/min



Design Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link



SX(M)Pi H



SX(M)Pi Q

Type	Dimensions in mm																		
	B	B2	d	G1	G2	G3	H	H1	H2	H3	H4	L	L2	L3	L4	X1	X2	Y1	Y2
SXPi...H...	39	6.8	5.5	G3/8"-F	M12x1-M	M5-F	108	134	54	6	-	210	5	97	35.5	89	42	10	24
SXPi...Q...	39	-	5.5	-	M12x1-M	-	108	120	54	6	-	210	5	97	-	89	-	10	-
SXMPi...H...	39	6.8	5.5	G3/8"-F	M12x1-M	M5-F	160	160	54	6	26	210	5	97	35.5	89	42	10	24
SXMPi...Q...	39	-	5.5	-	M12x1-M	-	146	160	54	6	26	210	5	97	-	89	-	10	-

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Compact Ejectors



Compact Ejectors SEM-C

Suction rate from 338 l/min to 673 l/min



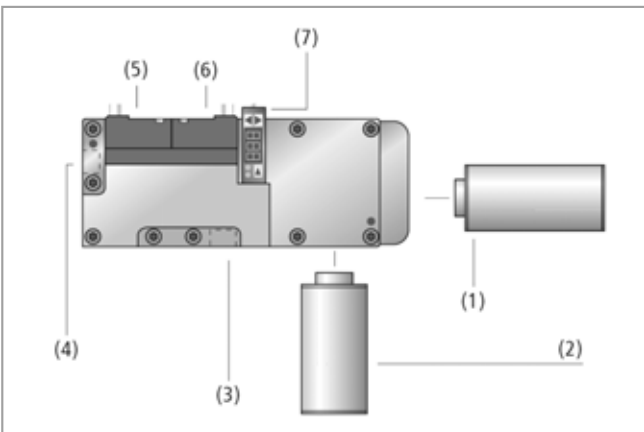
Suitable for Industry Specific Applications



Compact ejectors SEM-C with additional functions

Applications

- Compact ejector with integrated valve technology and system monitoring for handling of cardboard, packing materials, insulating materials and other porous items



System design compact ejectors SEM-C with additional functions

Design

- Aluminium nozzle system
- Gaskets and valve flaps made of NBR
- Silencer can be mounted axially (1) or on the side (2)
- Functional mounting plate with suction valve (5) (NO or NC) and blow-off valve NC (6)
- Optional vacuum switch (7)
- Vacuum-connection (3)
- Compressed-air connection (4)



Centralized vacuum generation by ejectors SEM-C for handling particle boards

Our Highlights...

- Ejector family with a very high suction capacity
- Multi-stage ejector nozzle with high efficiency
- Integrated control valves and vacuum switch
- Optional automatic air-saving function

Your Benefits...

- > Fast and safe handling of all porous materials
- > Fast evacuation in the lower vacuum range, cost reductions and shorter cycle times
- > Compact unit for space-saving installation
- > Lower energy consumption when handling air-tight parts

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Compact Ejectors



Compact Ejectors SEM-C

Suction rate from 338 l/min to 673 l/min

Designation Code Compact Ejectors SEM-C

Abbreviated designation	Size	Version	Idle position suction valve	Blow off- and safety non-return valve	System monitoring
Example SEM-C 25 SDA NO AS VD:					
SEM-C	25	SDA	NO	AS	VD
SEM-C	25	SDA silencer	NC normally closed	AS blow off- and safety non-return valve	VD digital vacuum switch
	50		NO normally open		
	100				

Ordering Data Compact Ejectors SEM-C

Compact ejector SEM-C is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer

Available accessories: connection cable, distributor

Compact Ejectors SEM-C

Type	Part Number
SEM-C 25 SDA NO AS	10.02.02.03204
SEM-C 25 SDA NC AS	10.02.02.03203
SEM-C 25 SDA NO AS VD	10.02.02.03206
SEM-C 25 SDA NC AS VD	10.02.02.03205
SEM-C 50 SDA NO AS	10.02.02.02966
SEM-C 50 SDA NC AS	10.02.02.03207
SEM-C 50 SDA NO AS VD	10.02.02.03057
SEM-C 50 SDA NC AS VD	10.02.02.03208
SEM-C 100 SDA NO AS	10.02.02.03209
SEM-C 100 SDA NC AS	10.02.02.03215
SEM-C 100 SDA NO AS VD	10.02.02.03211
SEM-C 100 SDA NC AS VD	10.02.02.03210

Ordering Data Spare Parts Compact Ejectors SEM-C

Type	Silencer*
SEM-C 25 SDA NO AS	10.02.01.00309
SEM-C 25 SDA NC AS	10.02.01.00309
SEM-C 25 SDA NO AS VD	10.02.01.00309
SEM-C 25 SDA NC AS VD	10.02.01.00309
SEM-C 50 SDA NO AS	10.02.01.00312
SEM-C 50 SDA NC AS	10.02.01.00312
SEM-C 50 SDA NO AS VD	10.02.01.00312
SEM-C 50 SDA NC AS VD	10.02.01.00312
SEM-C 100 SDA NO AS	10.02.01.00312
SEM-C 100 SDA NC AS	10.02.01.00312
SEM-C 100 SDA NO AS VD	10.02.01.00312
SEM-C 100 SDA NC AS VD	10.02.01.00312

*The silencers can be mounted axially or on the side, as desired

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Compact Ejectors



Compact Ejectors SEM-C

Suction rate from 338 l/min to 673 l/min

Ordering Data Accessories Compact Ejectors SEM-C

Type	Connection cable for solenoid valves* (5 m, PVC)	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Distributor for air saving function**
SEM-C 25 SDA NO AS	21.04.06.00084	-	-	-
SEM-C 25 SDA NC AS	21.04.06.00084	-	-	-
SEM-C 25 SDA NO AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01291
SEM-C 25 SDA NC AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01287
SEM-C 50 SDA NO AS	21.04.06.00084	-	-	-
SEM-C 50 SDA NC AS	21.04.06.00084	-	-	-
SEM-C 50 SDA NO AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01291
SEM-C 50 SDA NC AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01287
SEM-C 100 SDA NO AS	21.04.06.00084	-	-	-
SEM-C 100 SDA NC AS	21.04.06.00084	-	-	-
SEM-C 100 SDA NO AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01291
SEM-C 100 SDA NC AS VD	21.04.06.00084	10.06.02.00031	10.06.02.00032	10.02.02.01287

*Order 2 x per ejector

**Required for the automatic air-saving function; must be ordered separately as an accessory. No further cables then required!

Technical Data Compact Ejectors SEM-C

Type	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level free [dB]
SEM-C 25 SDA NO AS	87	338	20.2	100	6.0	80
SEM-C 25 SDA NC AS	87	338	20.2	100	6.0	80
SEM-C 25 SDA NO AS VD	87	338	20.2	100	6.0	80
SEM-C 25 SDA NC AS VD	87	338	20.2	100	6.0	80
SEM-C 50 SDA NO AS	86	554	33.2	190	11.4	84
SEM-C 50 SDA NC AS	86	554	33.2	190	11.4	84
SEM-C 50 SDA NO AS VD	86	554	33.2	190	11.4	84
SEM-C 50 SDA NC AS VD	86	554	33.2	190	11.4	84
SEM-C 100 SDA NO AS	81	673	40.3	246	14.8	83
SEM-C 100 SDA NC AS	81	673	40.3	246	14.8	83
SEM-C 100 SDA NO AS VD	81	673	40.3	246	14.8	83
SEM-C 100 SDA NC AS VD	81	673	40.3	246	14.8	83

*At optimal operating pressure

**For max. length 2 m

Type	Noise level work-piece gripped [dB]	Opt. pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SEM-C 25 SDA NO AS	70	5.0	4	20	1.6	0 ... 50
SEM-C 25 SDA NC AS	70	5.0	4	20	1.6	0 ... 50
SEM-C 25 SDA NO AS VD	70	5.0	4	20	1.7	0 ... 50
SEM-C 25 SDA NC AS VD	70	5.0	4	20	1.7	0 ... 50
SEM-C 50 SDA NO AS	60	5.0	6	25	1.9	0 ... 50
SEM-C 50 SDA NC AS	60	5.0	6	25	1.9	0 ... 50
SEM-C 50 SDA NO AS VD	60	5.0	6	25	2.0	0 ... 50
SEM-C 50 SDA NC AS VD	60	5.0	6	25	2.0	0 ... 50
SEM-C 100 SDA NO AS	63	5.0	6	32	2.2	0 ... 50
SEM-C 100 SDA NC AS	63	5.0	6	32	2.2	0 ... 50
SEM-C 100 SDA NO AS VD	63	5.0	6	32	2.2	0 ... 50
SEM-C 100 SDA NC AS VD	63	5.0	6	32	2.2	0 ... 50

*At optimal operating pressure

**For max. length 2 m

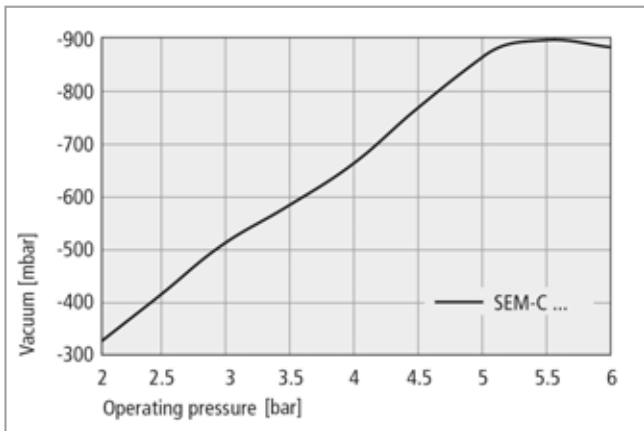
Compact Ejectors



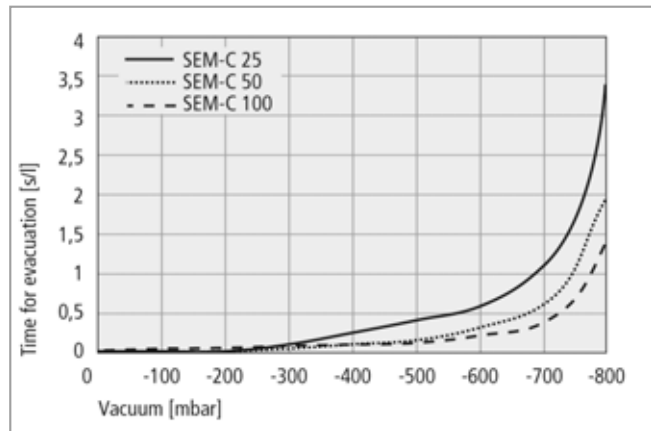
Compact Ejectors SEM-C

Suction rate from 338 l/min to 673 l/min

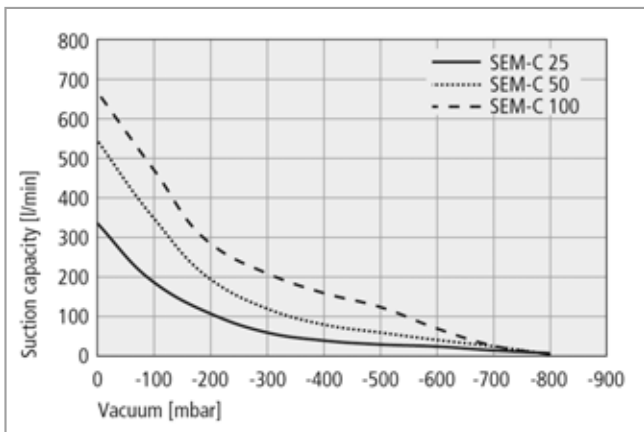
Performance Data Compact Ejectors SEM-C



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM-C 25 SD	338	263	199	104	66	47	34	24	16	11
SEM-C 50 SD	554	460	349	195	123	87	63	41	21	8
SEM-C 100 SD	673	580	471	289	205	164	127	75	20	7

Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar									
	-50	-100	-200	-300	-400	-500	-600	-700	-800	
SEM-C 25 SD	0.03	0.06	0.08	0.13	0.26	0.42	0.66	1.18	3.44	
SEM-C 50 SD	0.02	0.05	0.06	0.09	0.13	0.19	0.32	0.64	1.93	
SEM-C 100 SD	0.03	0.05	0.06	0.08	0.13	0.17	0.23	0.4	1.34	

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Compact Ejectors

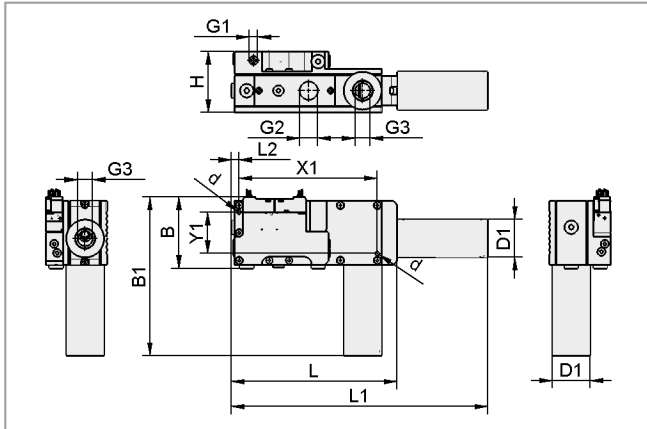


Compact Ejectors SEM-C

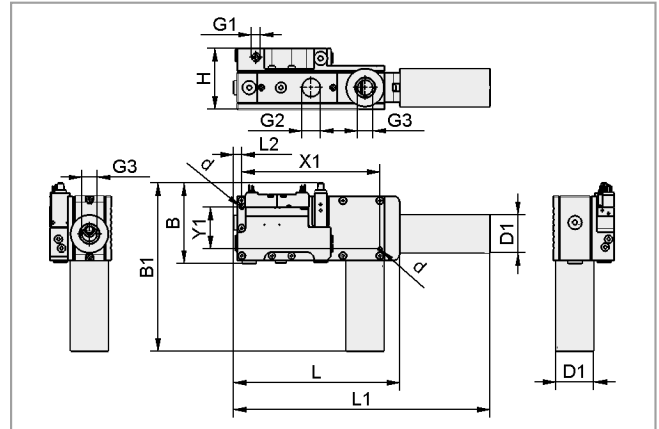
Suction rate from 338 l/min to 673 l/min



Design Data Compact Ejectors SEM-C



SEM-C 25 to 100 SD NO/NC AS



SEM-C 25 to 100 SD NO/NC AS VD

Type	Dimensions in mm												
	B	B1	d	D1	G1	G2	G3	H	L	L1	L2	X1	Y1
SEM-C 25 SDA NO AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SDA NC AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SDA NO AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SDA NC AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 50 SDA NO AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SDA NC AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SDA NO AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SDA NC AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 100 SDA NO AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SDA NC AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SDA NO AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SDA NC AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55

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Compact Terminal



Schmalz SCTMi Compact Terminal

Fully networked and flexible vacuum generation

An increasing variety of variants, the optimization of production processes and continuous energy and process control represent the challenges of the future. In order to meet those needs, extremely powerful, flexible and energy efficient handling systems are required.

The answer to these challenges is our SCTMi Compact Terminal, a compact unit comprising several vacuum generators for simultaneously and independently handling different parts with one single vacuum system.



Highlights of the SCTMi Compact Terminal

Lean

- Central compressed air and energy supply for up to 16 ejectors with just one connection each
- Compact design and low weight that allows it to be used in a huge range of applications
- Low number of interface and connection materials (leads, plugs and periphery devices), saving on costs during design and operation

Modular

- System is capable of modular upgrades with upto 16 vacuum circuits for handling different parts with ease
- Easy to replace and maintain components
- Less time and effort for integration (1x plug instead of 16x wires)
- Individual ejectors can be selected based on nozzle size, NO, NC and nozzle type

Networked

- Communication and process transparency thanks to the IO-Link connection, making it ready for integration in a huge variety of fieldbus systems
- Process and device parameters can be configured quickly via IO-Link or NFC

Intelligent

- All suction circuits can be individually controlled and configured (up to 16 ejectors)
- Process transparency, energy consumption control and a variety of diagnostics functions for use in Industry 4.0 environments

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- Mounting Elements
- Vacuum Generators**
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Compact Terminal

Schmalz SCTMi Compact Terminal



Simplified integration using IO-Link

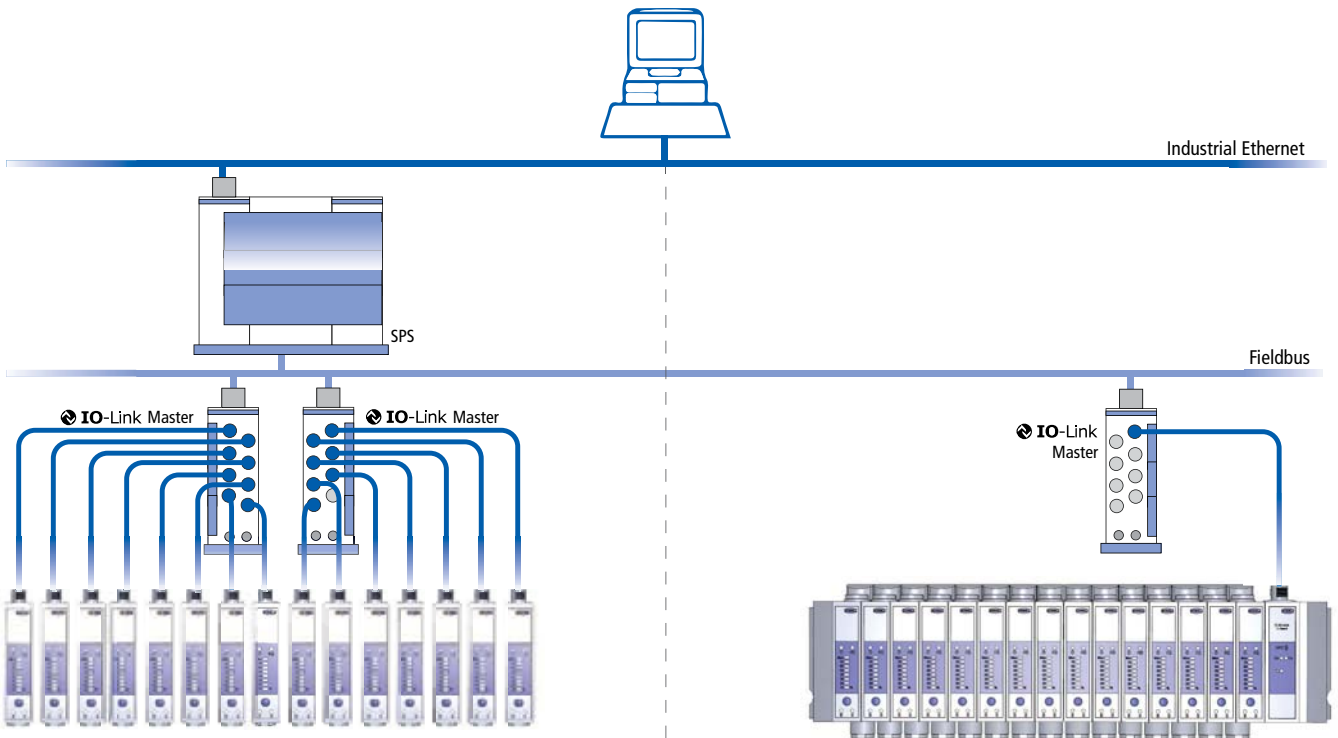
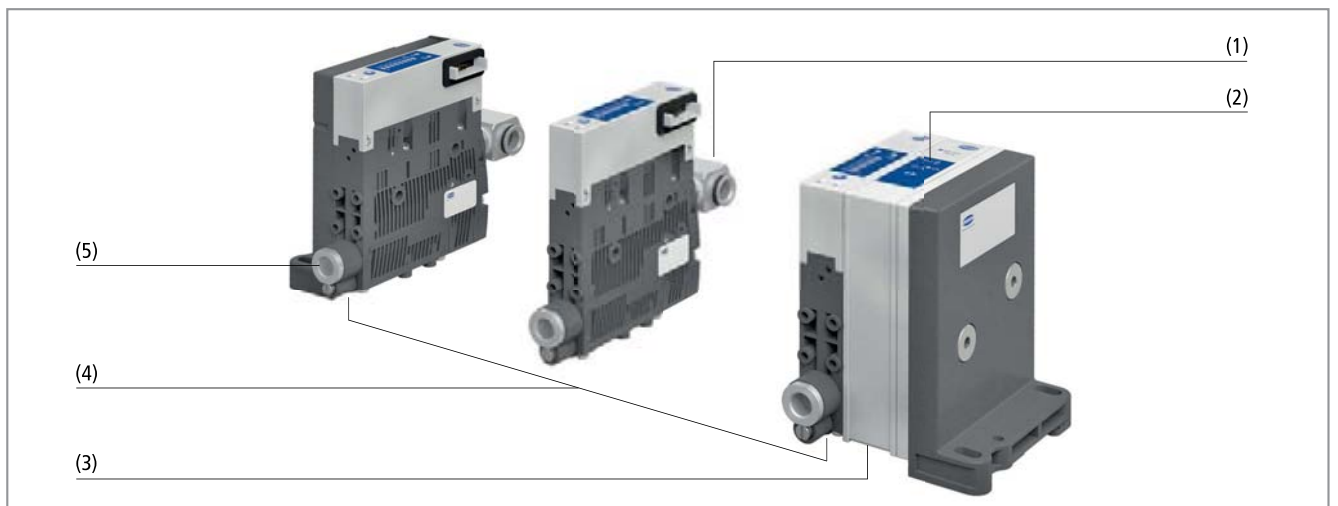


Diagram: A comparison of the connection of individual ejectors and SCTMi

Design

- Sleek and central compressed air supply (1)
- NFC-Chip (2) for reading and writing process information
- Central energy supply and IO-Link connection M12, 5-pin, using the control module (3)
- Vacuum connections (5) using threaded connectors
- Compact vacuum terminal consisting of up to 16 block-mounted compact ejectors (4)



System design of the SCTMi Compact Terminal

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Vacuum Units



Vacuum Units VE / VER

Suction rate 69 l/min



Suitable for Industry Specific Applications



Vacuum units VE / VER

Applications

- Vacuum unit for use as pneumatically driven vacuum generator with internal regulation
- Vacuum is generated only when a load is connected
- Suitable for all vacuum clamping and handling tasks

Design

- Brass nozzle system
- Steel housing
- Safety non-return valve
- Manometer
- Type VER 15 with internal regulation with the aid of an adjustable pneumatic vacuum switch
- Coating RAL 7035

Our Highlights...

- Complete vacuum generation system with ejector, monitoring and regulation functions
- Internal automatic air-saving function (optional)

Your Benefits...

- > The "stand-alone solution" for universal use in all clamping and handling applications
- > Economical use in continuous operation: compressed air is switched off when not needed, vacuum is regulated automatically

Overview of Technical Data

Suction rate in l/min	Max. vacuum	Additional Functions	Dimensions in mm	Weight in kg
69	80%	With air saving function	(max.) LxBxH: 260x158x120	(max.) 3.3

Vacuum Pumps



Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h



Suitable for Industry Specific Applications



Dry-running vacuum pumps EVE-TR

Applications

- Vacuum pump for making the vacuum available in universal use in a wide range of different applications in the sector of manual and automatic handling
- Handling of airtight workpieces
- Rapid evacuation of vacuum systems
- Mobile use for picking up and clamping workpieces (EVE-TR-T)

Design

- Dry-running vacuum pump, with or without additional filter
- Available in versions for single-phase AC, three-phase AC or DC power supplies
- Pump available as a multi-cell compressor with very little vibration and constant output or as a compact diaphragm pump
- Compact design with integrated cooling fan and permanently lubricated bearings
- Mounting holes with integrated damping elements
- Should preferably be mounted with the motor shaft horizontal
- Coating RAL 7035
- Version EVE-TR-T with carrying handle and control cable

Our Highlights...

- Dry-running (oil-free) vacuum pump
- Multi-cell compression principle of the rotary vane pumps
- Permanently lubricated bearings and powerful cooling fan
- Wide range of models with various outputs
- Dry-running rotary vane pump with excellent efficiency

Your Benefits...

- > Robust and requiring little maintenance
- > Vibration-free operation and continuous output with little pulsation
- > Excellent heat dissipation
- > Suction capacity adaptable to meet customer requirements
- > Low current consumption, economical continuous operation



Designation Code Dry-Running Vacuum Pumps EVE-TR

Abbreviated designation	Pump type	Suction capacity in m ³ /h	Supply voltage	Product addition
Example EVE-TR 40 AC3 F:				
EVE	TR	10	AC3	F
EVE	TR dry-running TR-M diaphragm pump TR-T transportable	2.3 to 250	AC single-phase AC3 three-phase DC direct current	F additional filter

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Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

Ordering Data Dry-Running Vacuum Pumps EVE-TR

Vacuum pump EVE-TR is delivered as a ready to connect product.

Available spare parts: filter insert, set of parts subject to wear

Available accessories: vacuum regulation valve

Dry-Running Vacuum Pumps EVE-TR

Type	Vacuum pump	Vacuum pump with additional filter
EVE-TR-M 2.3 DC 12	10.03.01.00195	-
EVE-TR-M 2.3 DC 24	10.03.01.00192	-
EVE-TR 4 AC	10.03.01.00120	10.03.01.00114
EVE-TR 4 AC3	10.03.01.00111	10.03.01.00113
EVE-TR-T 4 AC	-	10.03.01.00197
EVE-TR 8 AC	10.03.01.00121	10.03.01.00117
EVE-TR 8 AC3	10.03.01.00112	10.03.01.00116
EVE-TR 8 DC	10.03.01.00288	10.03.01.00044
EVE-TR 10 AC	10.03.01.00138	10.03.01.00144
EVE-TR 10 AC3	10.03.01.00137	10.03.01.00143
EVE-TR 16 AC	10.03.01.00140	10.03.01.00146
EVE-TR 16 AC3	10.03.01.00139	10.03.01.00145
EVE-TR 25 AC3	10.03.01.00141	10.03.01.00147
EVE-TR 40 AC3	10.03.01.00142	10.03.01.00148

Type	Vacuum pump (type 1)	Vacuum pump (type 2)	Vacuum pump (type 3)	Vacuum pump with additional filter (type 1)	Vacuum pump with additional filter (type 2)	Vacuum pump with additional filter (type 3)
EVE-TR 80	10.03.01.00249	10.03.01.00250	10.03.01.00251	10.03.01.00252	10.03.01.00253	10.03.01.00254
EVE-TR 100	10.03.01.00255	10.03.01.00256	10.03.01.00257	10.03.01.00258	10.03.01.00259	10.03.01.00260
EVE-TR 140	10.03.01.00261	10.03.01.00262	10.03.01.00263	10.03.01.00264	10.03.01.00265	10.03.01.00266
EVE-TR 250*	-	-	-	10.03.01.00267	10.03.01.00268	10.03.01.00269

*different voltage ranges for type 1

Ordering Data Spare Parts Dry-Running Vacuum Pumps EVE-TR

Type	Set of parts subject to wear	Filter insert for additional filter
EVE-TR-M 2.3	-	-
EVE-TR 4	10.03.01.00108	10.07.01.00013
EVE-TR-T 4	10.03.01.00108	10.07.01.00013
EVE-TR 8	10.03.01.00109	10.07.01.00014
EVE-TR 10	10.03.01.00132	10.07.01.00017
EVE-TR 16	10.03.01.00133	10.07.01.00017
EVE-TR 25	10.03.01.00134	10.07.01.00017
EVE-TR 40	10.03.01.00135	10.07.01.00018
EVE-TR 80	22.09.01.00031	10.07.01.00018
EVE-TR 100	22.09.01.00033	10.07.01.00018
EVE-TR 140	22.09.01.00035	10.07.01.00018
EVE-TR 250	10.03.01.00299	-

Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

Ordering Data Accessories Dry-Running Vacuum Pumps EVE-TR

Type	Vacuum regulation valve
EVE-TR-M 2.3	-
EVE-TR 4	10.03.01.00107
EVE-TR-T 4	10.03.01.00107
EVE-TR 8	10.03.01.00107
EVE-TR 10	10.03.01.00136
EVE-TR 16	10.03.01.00136
EVE-TR 25	10.03.01.00136
EVE-TR 40	10.03.01.00136
EVE-TR 80	10.03.01.00153
EVE-TR 100	10.03.01.00153
EVE-TR 140	10.03.01.00153
EVE-TR 250	-

Technical Data Dry-Running Vacuum Pumps EVE-TR

Type	Max. vacuum [mbar]	Suction rate at DC [m ³ /h]	Suction rate at 50 Hz [m ³ /h]	Suction rate at 60 Hz [m ³ /h]	Voltage (DC)	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-TR-M 2.3 DC 12	-780	2.0	-	-	12V - DC	-	2.4	-
EVE-TR-M 2.3 DC 24	-780	2.0	-	-	24V - DC	-	2.4	-
EVE-TR 4 AC	-850	-	4.1	4.7	-	IP 54	7.0	59
EVE-TR 4 AC3	-850	-	4.1	4.7	-	IP 54	7.0	59
EVE-TR-T 4 AC	-850	-	4.0	4.7	-	IP 54	8.5	59
EVE-TR 8 AC	-850	-	7.6	8.7	-	IP 54	11.5	58
EVE-TR 8 AC3	-850	-	7.6	8.7	-	IP 54	11.5	58
EVE-TR 8 DC	-830	8.0	-	-	24V - DC	IP 54	7.5	70
EVE-TR 10 AC	-850	-	10.0	12.0	-	IP 54	16.0	60
EVE-TR 10 AC3	-850	-	10.0	12.0	-	IP 54	16.0	60
EVE-TR 16 AC	-850	-	16.0	19.0	-	IP 54	22.4	61
EVE-TR 16 AC3	-850	-	16.0	19.0	-	IP 54	22.4	61
EVE-TR 25 AC3	-850	-	25.0	30.0	-	IP 55	26.0	62
EVE-TR 40 AC3	-850	-	40.0	48.0	-	IP 55	38.5	67
EVE-TR 80 AC3	-920	-	67.0	80.0	-	IP 54	69.0	72
EVE-TR 100 AC3	-920	-	98.0	112.0	-	IP 54	101.0	75
EVE-TR 140 AC3	-920	-	129.0	154.0	-	IP 54	111.0	76
EVE-TR 250 AC3	-800	-	244.0	286.0	-	IP 55	250.0	77

*Specifications for 230 V / 230 V or 400 V

Type	Type 1: Europe, China, India	Type 2: USA, Canada	Type 3: Japan, Korea, Brazil
EVE-TR 80	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)
EVE-TR 100	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)
EVE-TR 140	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)
EVE-TR 250*	S001/S071/S001 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)

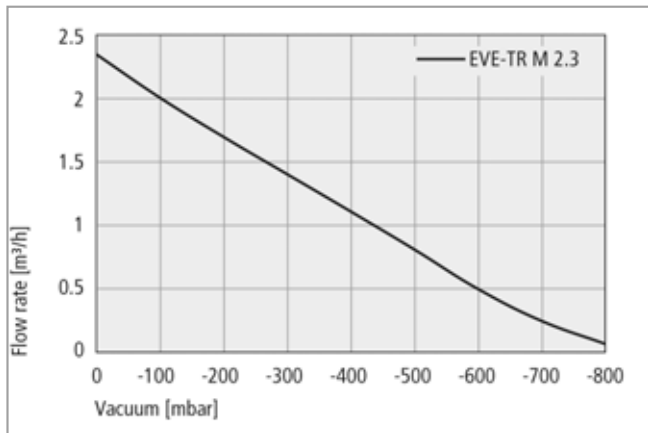
*different voltage ranges for type 1

Type	Type 1: Europe, China, India	Type 2: USA, Canada	Type 3: Japan, Korea, Brazil
50Hz with IE2	230V / Y400V (+/-10%)	-	220V / Y380-400V (+/-10%)
50Hz without IE2	-	-	200V / Y350V (+/-10%)
60Hz with IE2	265V / Y460V (+/-10%)	YY230V / Y460V (+/-10%)	-
60Hz without IE2	230V / Y400V (+/-10%)	YY208V (+/-10%)	200V / Y350V (+/-10%)

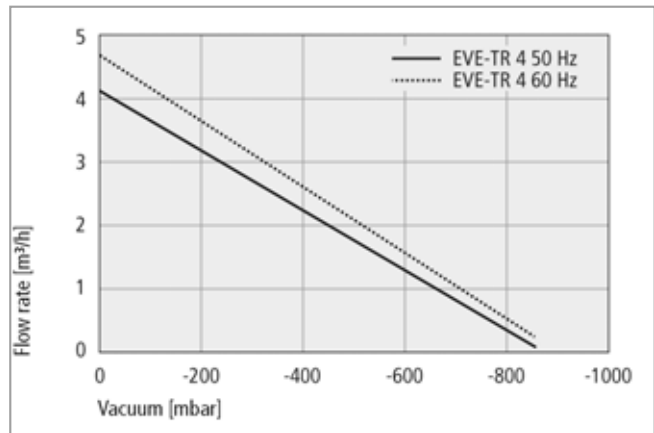
Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

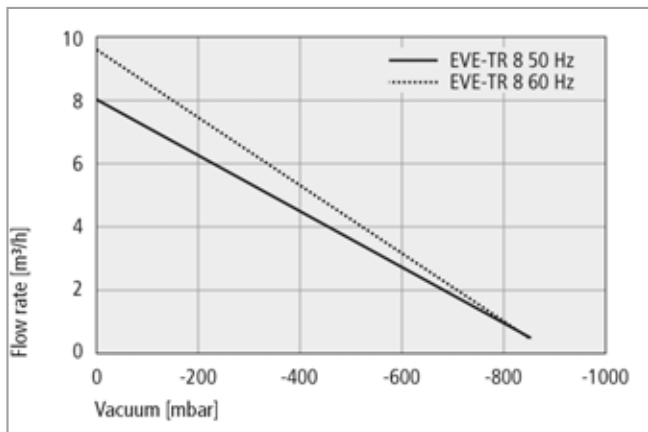
Performance Data Dry-Running Vacuum Pumps EVE-TR



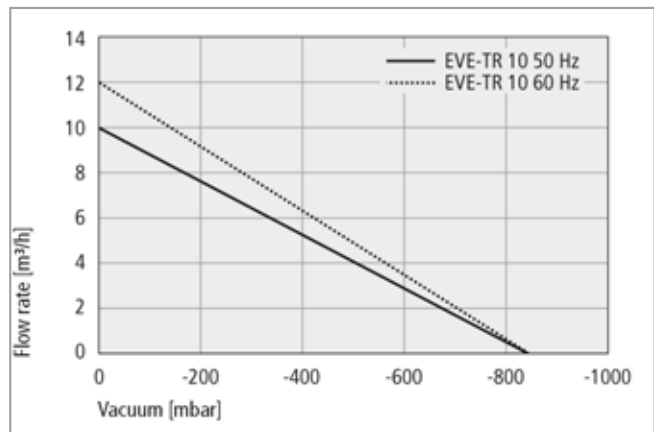
Suction capacity at various degrees of evacuation



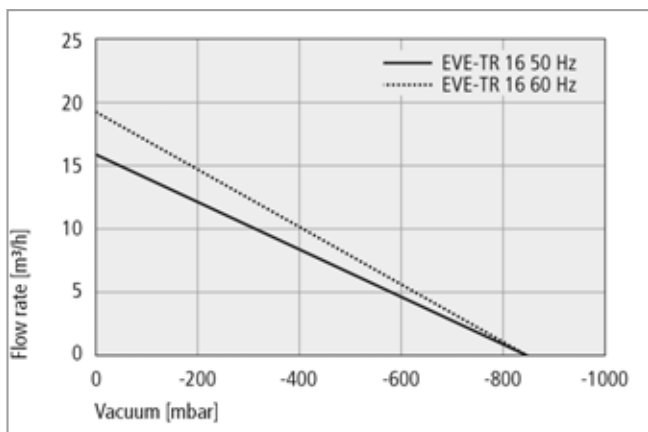
Suction capacity at various degrees of evacuation



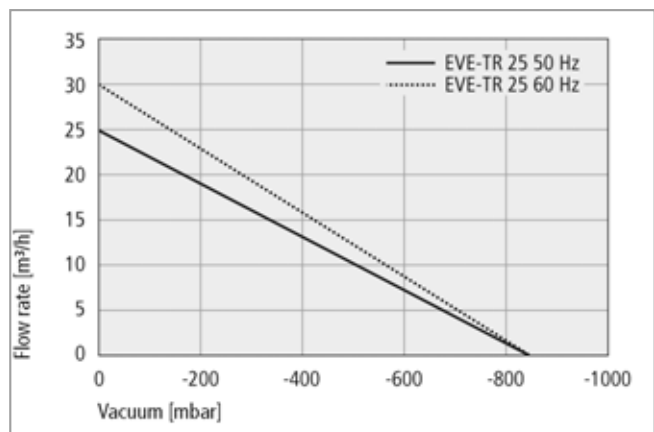
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



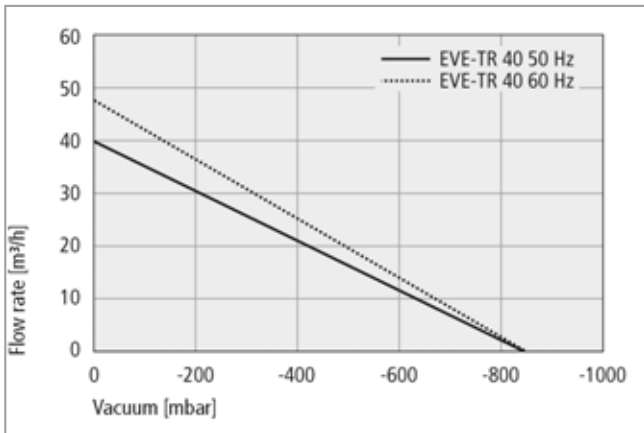
Suction capacity at various degrees of evacuation

Vacuum Pumps

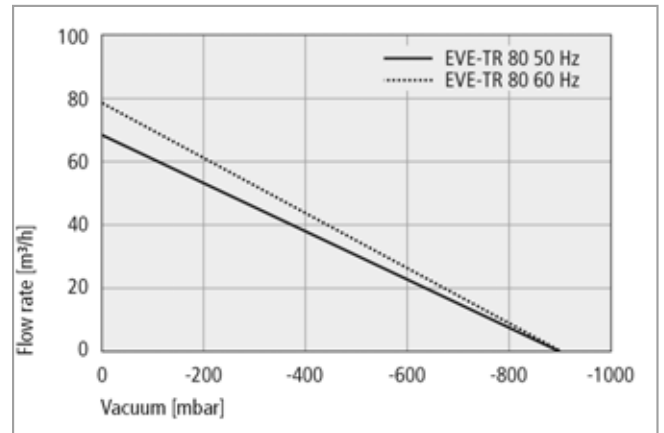


Dry-Running Vacuum Pumps EVE-TR

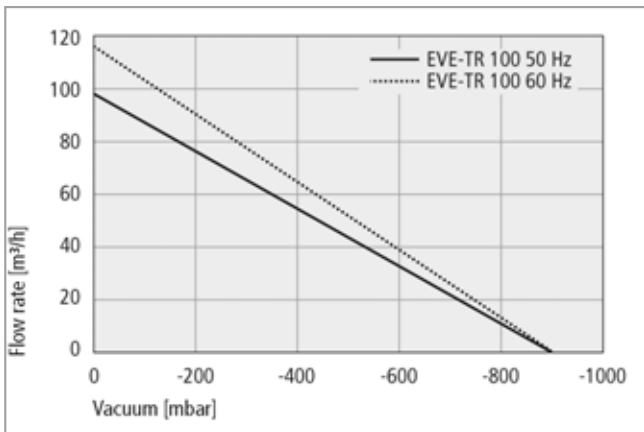
Suction rate from 2.3 m³/h to 244 m³/h



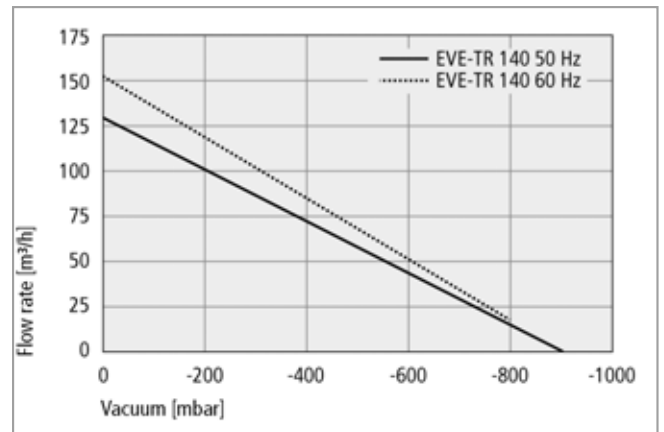
Suction capacity at various degrees of evacuation



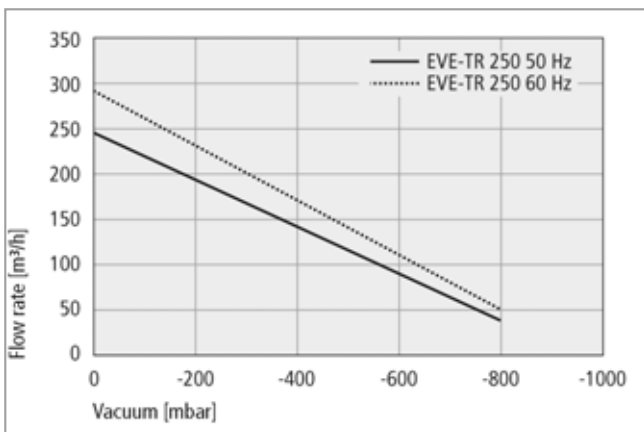
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

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Vacuum Pumps

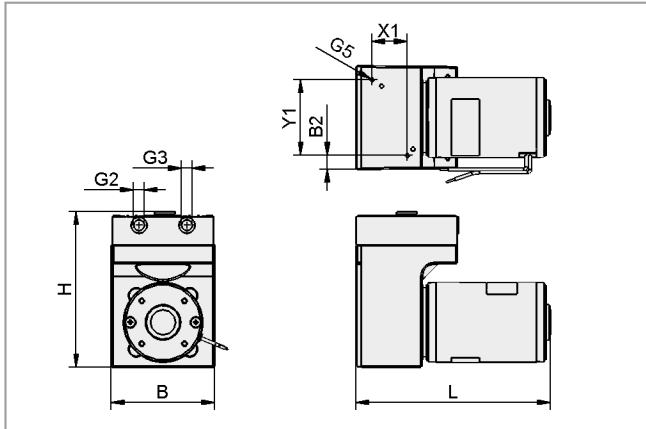


Dry-Running Vacuum Pumps EVE-TR

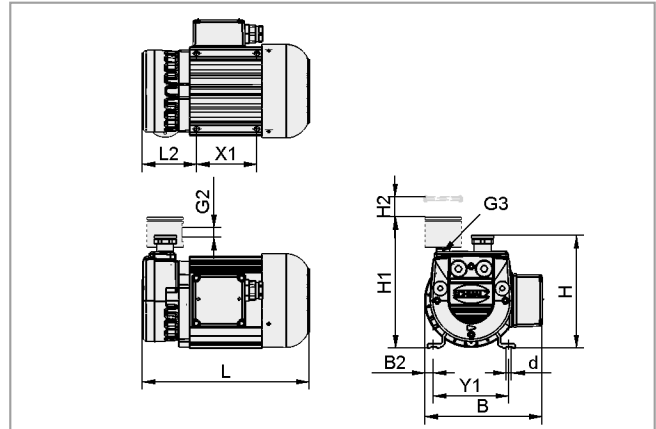
Suction rate from 2.3 m³/h to 244 m³/h



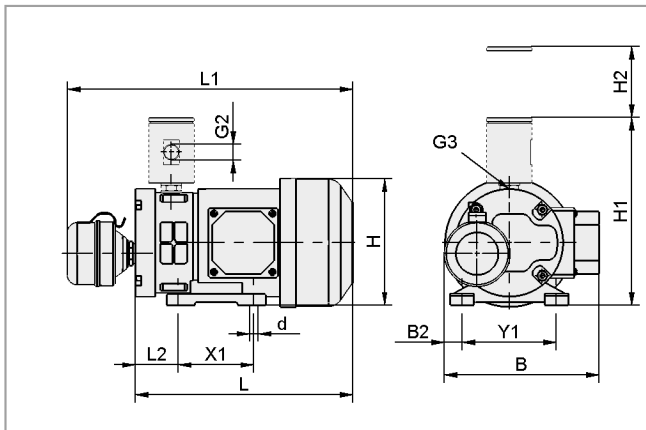
Design Data Dry-Running Vacuum Pumps EVE-TR



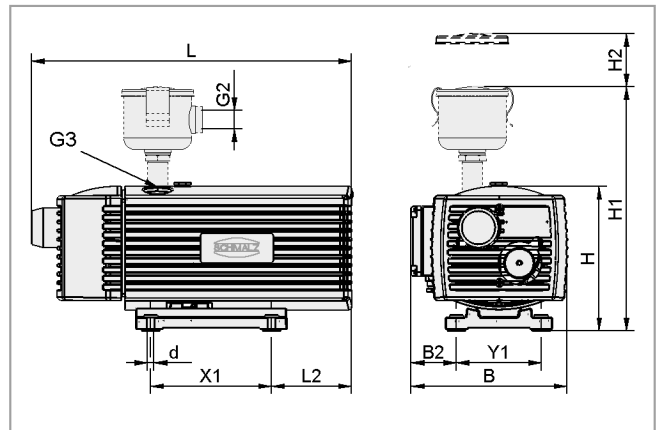
EVE-TR-M 2.3



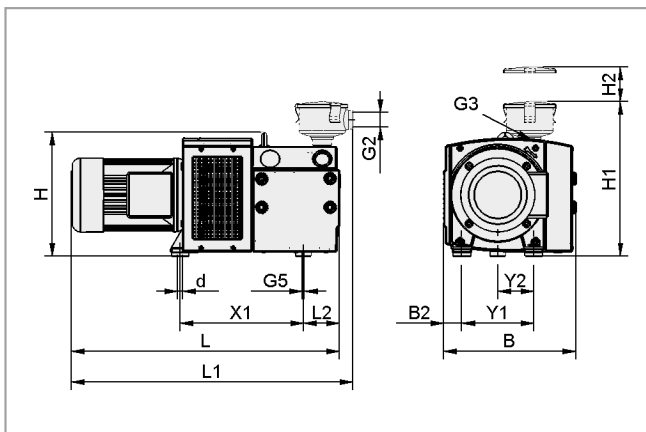
EVE-TR 4/8 ... (F)



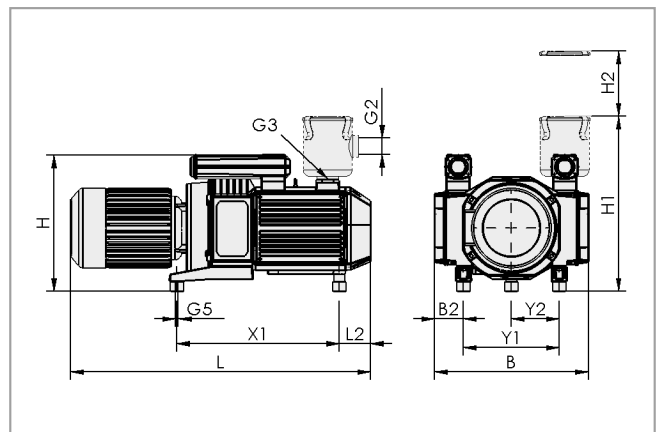
EVE-TR 8 DC (F)



EVE-TR 10 to 40 (F)



EVE-TR 80 to 140 (F)



EVE-TR 250

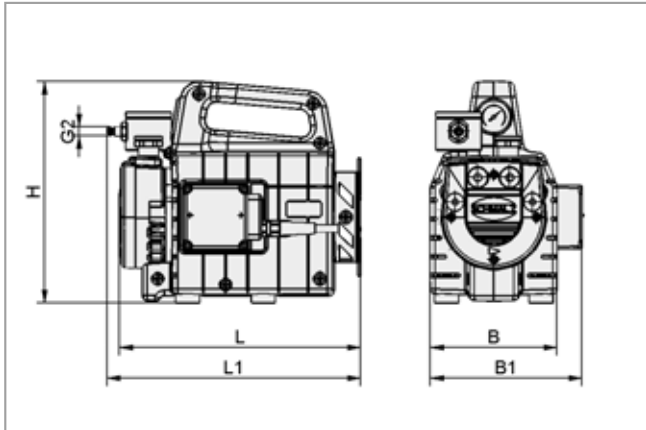
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Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h



EVE-TR-T



Design Data Dry-Running Vacuum Pumps EVE-TR

Type	Dimensions in mm																
	B	B1	B2	d	G2	G3	G5	H	H1	H2	L	L1	L2	X1	Y1	Y2	
EVE-TR-M 2.3 ...	82	-	11.0	-	G1/8"-F	G1/8"-F	M4-F	123	-	-	154	-	-	28	60	-	
EVE-TR 4 ...	155	-	-	7	-	G1/4-F	-	148	-	-	222	-	-	80	100	-	
EVE-TR 4 ... F	155	-	11.5	7	G1/4-F	G1/4-F	-	148	172	41	222	-	72	80	100	-	
EVE-TR-T 4 ... F	134	160.5	-	-	G1/4"-M	-	-	235	-	-	255	269	-	-	-	-	
EVE-TR 8 ...	155	-	11.5	7	-	G3/8-F	-	172	-	-	251	-	80	80	100	-	
EVE-TR 8 ... F	155	-	11.5	7	G3/8-F	G3/8-F	-	154	201	62	251	-	80	80	100	-	
EVE-TR 8 DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
EVE-TR 8 DC F	163	-	18.5	9	G3/8-F	G3/8-F	-	134	197	55	230	302	46	80	100	-	
EVE-TR 10 ...	206	-	60.0	7	-	G1/2-F	-	195	-	-	429	-	106	160	112	-	
EVE-TR 10 ... F	206	-	60.0	7	G3/4-F	G1/2-F	-	198	325	70	429	-	106	160	112	-	
EVE-TR 16 ...	231	-	66.0	7	-	G1/2-F	-	211	-	-	452	-	73	202	125	-	
EVE-TR 16 ... F	231	-	66.0	7	G3/4-F	G1/2-F	-	214	345	70	452	-	73	202	125	-	
EVE-TR 25 ...	260	-	40.0	7	-	G3/4-F	-	290	-	-	505	-	96	220	190	-	
EVE-TR 25 ... F	260	-	40.0	7	G3/4"-F	G3/4"-F	-	293	380	70	505	-	96	220	208	-	
EVE-TR 40 ...	280	-	51.0	7	-	G3/4"-F	-	290	-	-	572	-	131	220	190	-	
EVE-TR 40 ... F	280	-	51.0	7	G1-1/4"-F	G3/4"-F	-	293	425	70	572	-	131	220	190	-	
EVE-TR 80 ...	353	-	48.0	12	-	G1-F	M8-F	328	-	-	709	-	96	326	190	95	
EVE-TR 80 ... F	353	-	48.0	12	G1-1/4-F	G1-F	M8-F	328	420	75	709	745	96	326	190	95	
EVE-TR 100 ...	470	-	110.0	12	-	G1-1/2-F	M8-F	336	-	-	835	-	140	398	245	123	
EVE-TR 100 ... F	470	-	110.0	12	G1-1/4-F	G1-1/2-F	M8-F	336	466	75	835	890	140	398	245	123	
EVE-TR 140 ...	470	-	110.0	12	-	G1-1/2-F	M8-F	336	-	-	873	-	140	398	245	123	
EVE-TR 140 ... F	470	-	110.0	12	G1-1/4-F	G1-1/2-F	M8-F	336	437	75	873	851	140	398	245	123	
EVE-TR 250 ...	644	-	126.0	-	-	G2-1/2"-F	M10-F	527	-	-	1192	-	124	645	360	180	
EVE-TR 250 ... F	644	-	126.0	-	-	G2-1/2"-F	M10-F	527	-	-	1192	-	124	645	360	180	

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Vacuum Pumps



Dry-Running Vacuum Pumps EVE-TR X

Suction rate from 10 m³/h to 129 m³/h



Suitable for Industry Specific Applications



Dry-running vacuum pumps EVE-TR-X

Applications

- Vacuum pump for providing vacuum power in a wide variety of applications in automatic and manual handling
- Handling of airtight workpieces
- Rapid evacuation of vacuum systems

Design

- Vacuum pump in a dry-running design with or without an additional filter
- In a three-phase version
- Pump acting as a sliding-vane compressor with especially vibration-free operation and constant feed volumes
- Compact design with integrated fan and permanently lubricated bearing
- Mounting hole with integrated damping element
- Installation position preferable horizontally with the motor shaft
- Coating: RAL 7035

Our Highlights...

- Fully honed housing and gate valve made from resin-bonded carbon
- Sliding-vane compressor principle of the rotary vane pumps
- Permanently lubricated bearings and high-performance fan
- Wide area of application
- Minimum wear and reduced friction

Your Benefits...

- > Significantly longer rotary vane service life
- > Vibration-free operation and continuous low-pulsation conveyance
- > Outstanding heat removal
- > Suction capacity can be adapted to customer requirements
- > Hardly any atmospheric contamination thanks to the dusk-free design

Designation Code Dry-Running Vacuum Pumps EVE-TR X

Abbreviated designation	Pump type	Suction capacity in m ³ /h	Supply voltage	Product addition
Example EVE-TR-X 40 AC3 F:				
EVE	TR-X	40	AC3	F
EVE	TR-X dry-running	10 to 140	AC3 three-phase	F additional filter

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Dry-Running Vacuum Pumps EVE-TR X

Suction rate from 10 m³/h to 129 m³/h

Ordering Data Dry-Running Vacuum Pumps EVE-TR X

Vacuum pump EVE-TR-X is delivered as a ready to connect product.

Available spare parts: filter insert, set of parts subject to wear

Available accessories: vacuum regulation valve

Dry-Running Vacuum Pumps EVE-TR X

Type	Vacuum pump	Vacuum pump with additional filter
EVE-TR-X 10	10.03.01.00209	10.03.01.00210
EVE-TR-X 16	10.03.01.00212	10.03.01.00213
EVE-TR-X 25	10.03.01.00215	10.03.01.00216
EVE-TR-X 40	10.03.01.00218	10.03.01.00219

Type	Vacuum pump (type 1)	Vacuum pump (type 2)	Vacuum pump (type 3)	Vacuum pump with additional filter (type 1)	Vacuum pump with additional filter (type 2)	Vacuum pump with additional filter (type 3)
EVE-TR-X 80	10.03.01.00221	10.03.01.00273	10.03.01.00274	10.03.01.00222	10.03.01.00275	10.03.01.00276
EVE-TR-X 100	10.03.01.00239	10.03.01.00277	10.03.01.00278	10.03.01.00240	10.03.01.00279	10.03.01.00280
EVE-TR-X 140	10.03.01.00241	10.03.01.00281	10.03.01.00282	10.03.01.00242	10.03.01.00283	10.03.01.00284

Ordering Data Spare Parts Dry-Running Vacuum Pumps EVE-TR X

Type	Set of parts subject to wear	Filter insert for additional filter
EVE-TR-X 10	10.03.01.00223	10.03.01.00228
EVE-TR-X 16	10.03.01.00224	10.03.01.00229
EVE-TR-X 25	10.03.01.00225	10.03.01.00230
EVE-TR-X 40	10.03.01.00226	10.03.01.00230
EVE-TR-X 80	10.03.01.00227	10.03.01.00231
EVE-TR-X 100	10.03.01.00233	10.03.01.00235
EVE-TR-X 140	10.03.01.00234	10.03.01.00235

Ordering Data Accessories Dry-Running Vacuum Pumps EVE-TR X

Type	Vacuum regulation valve
EVE-TR-X 10	10.03.01.00136
EVE-TR-X 16	10.03.01.00136
EVE-TR-X 25	10.03.01.00136
EVE-TR-X 40	10.03.01.00136
EVE-TR-X 80	10.03.01.00153
EVE-TR-X 100	10.03.01.00153
EVE-TR-X 140	10.03.01.00153

Dry-Running Vacuum Pumps EVE-TR X

Suction rate from 10 m³/h to 129 m³/h

Technical Data Dry-Running Vacuum Pumps EVE-TR X

Type	Max. vacuum [mbar]	Suction rate at 50 Hz [m ³ /h]	Suction rate at 60 Hz [m ³ /h]	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-TR-X 10	850	10.0	12.0	IP 54	16.0	60
EVE-TR-X 16	850	16.0	19.0	IP 54	22.5	61
EVE-TR-X 25	850	25.0	30.0	IP 54	26.0	62
EVE-TR-X 40	850	40.0	48.0	IP 54	38.5	67
EVE-TR-X 80	900	67.0	78.5	IP 55	76.0	71
EVE-TR-X 100	900	98.0	112.0	IP 55	100.0	75
EVE-TR-X 140	900	129.0	154.0	IP 55	111.0	76

*Specifications for 230 V / 230 V or 400 V

Type	Type 1: Europe, China, India	Type 2: USA, Canada	Type 3: Japan, Korea, Brazil
EVE-TR-X 80	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)
EVE-TR-X 100	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)
EVE-TR-X 140	S064/S065/S072 (IE2)	S067/S068 (IE2)	S070/S069/S070 (IE2)

Type	Type 1: Europe, China, India	Type 2: USA, Canada	Type 3: Japan, Korea, Brazil
50Hz with IE2	230V / Y400V (+/-10%)	-	220V / Y380-400V (+/-10%)
50Hz without IE2	-	-	200V / Y350V (+/-10%)
60Hz with IE2	265V / Y460V (+/-10%)	YY230V / Y460V (+/-10%)	-
60Hz without IE2	230V / Y400V (+/-10%)	YY208V (+/-10%)	200V / Y350V (+/-10%)

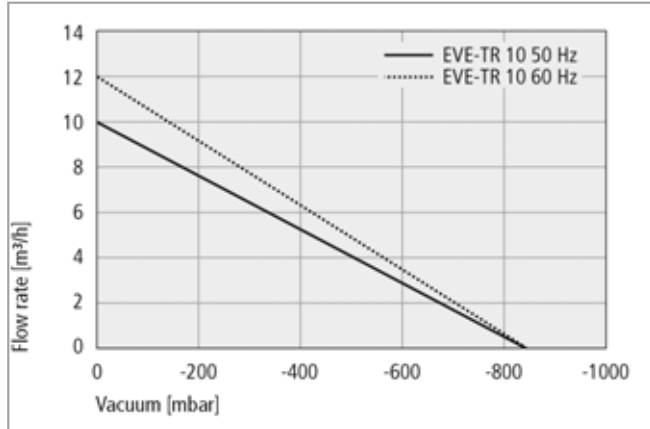
Vacuum Pumps



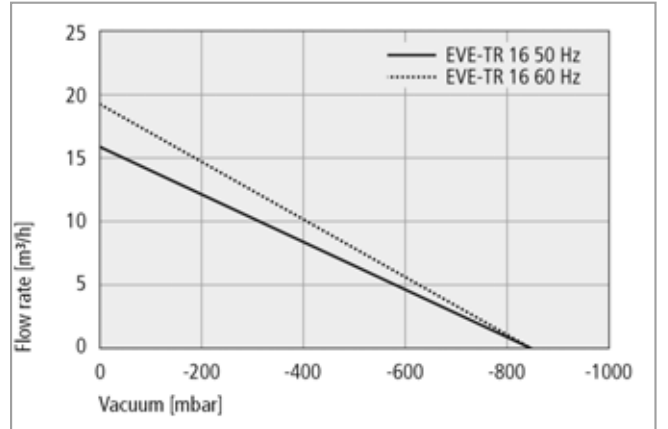
Dry-Running Vacuum Pumps EVE-TR X

Suction rate from 10 m³/h to 129 m³/h

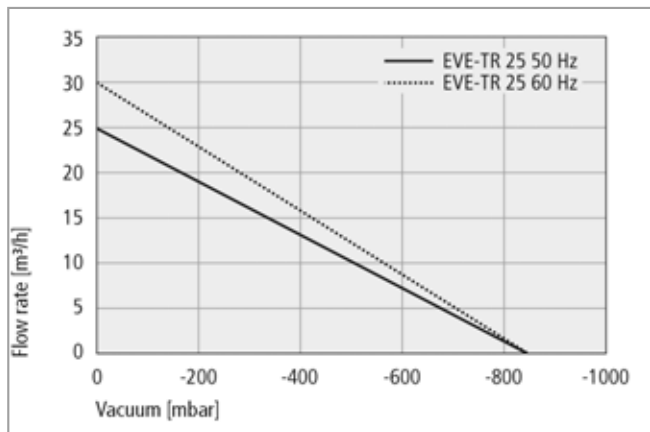
Performance Data Dry-Running Vacuum Pumps EVE-TR X



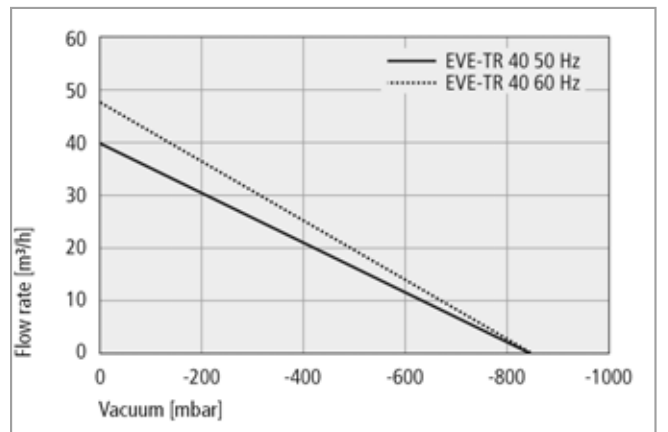
Suction capacity at various degrees of evacuation



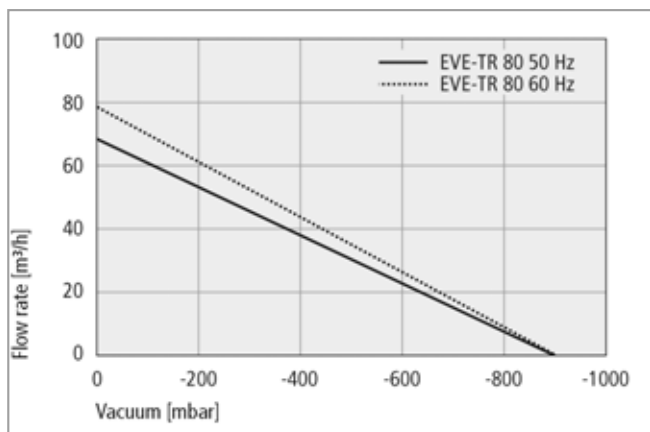
Suction capacity at various degrees of evacuation



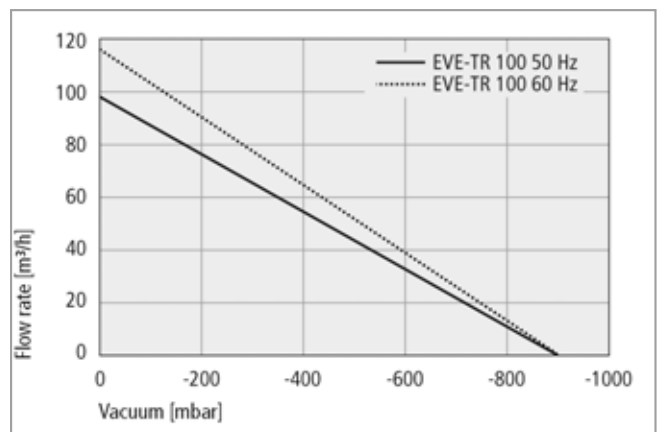
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

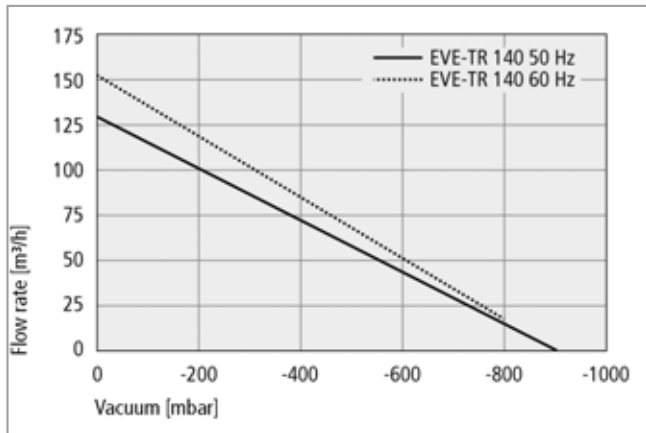
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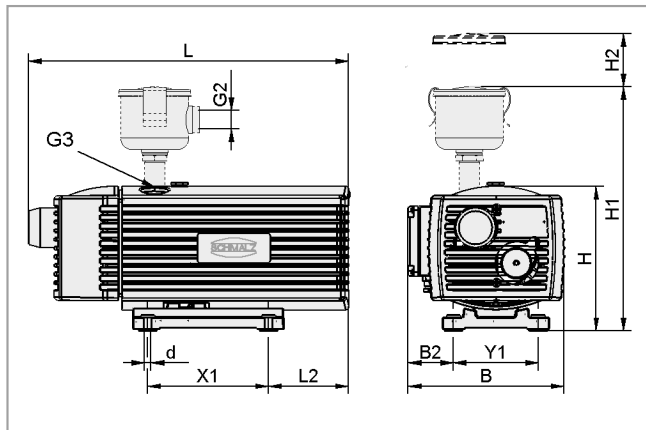
Dry-Running Vacuum Pumps EVE-TR X

Suction rate from 10 m³/h to 129 m³/h

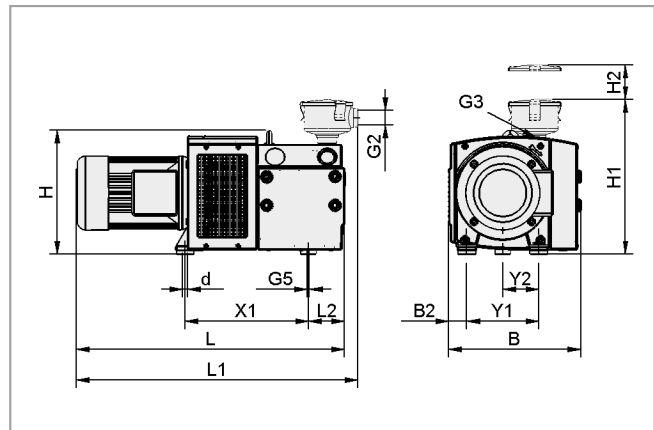


Suction capacity at various degrees of evacuation

Design Data Dry-Running Vacuum Pumps EVE-TR X



EVE-TR-X 10 to 40 (F)



EVE-TR-X 80 to 140 (F)

Type	Dimensions in mm														
	B	B2	d	G2	G3	G5	H	H1	H2	L	L1	L2	X1	Y1	Y2
EVE-TR-X 10	206	60	7	-	G1/2"-F	-	189	-	-	429	-	106	160	112	-
EVE-TR-X 10 F	206	60	7	G3/4"-F	G1/2"-F	-	189	325	70	429	-	106	160	112	-
EVE-TR-X 16	231	66	7	-	G1/2"-F	-	205	-	-	452	-	73	202	125	-
EVE-TR-X 16 F	231	66	7	G3/4"-F	G1/2"-F	-	205	345	70	452	-	73	202	125	-
EVE-TR-X 25	260	40	7	-	G3/4"-F	-	290	-	-	505	-	96	220	199	-
EVE-TR-X 25 F	260	40	7	G3/4"-F	G3/4"-F	-	290	380	70	505	-	96	220	199	-
EVE-TR-X 40	280	51	7	-	G3/4"-F	-	290	-	-	572	-	131	220	199	-
EVE-TR-X 40 F	280	51	7	G1-1/4"-F	G3/4"-F	-	290	425	70	572	-	131	220	199	-
EVE-TR-X 80	353	48	12	-	G1"-F	M8-F	328	-	-	709	-	96	328	190	95
EVE-TR-X 80 F	353	48	12	G1-1/4"-F	G1"-F	M8-F	328	420	75	709	745	96	328	190	95
EVE-TR-X 100	470	108	12	-	G1-1/2"-F	M8-F	336	-	-	835	-	140	398	245	123
EVE-TR-X 100 F	470	108	12	G1-1/4"-F	G1-1/2"-F	M8-F	336	466	75	835	890	140	398	245	123
EVE-TR-X 140	470	108	12	-	G1-1/2"-F	M8-F	336	-	-	873	-	140	398	245	123
EVE-TR-X 140 F	470	108	12	G1-1/4"-F	G1-1/2"-F	M8-F	336	437	75	873	851	140	398	245	123

Vacuum Pumps



Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h



Suitable for Industry Specific Applications



Oil-lubricated vacuum pumps EVE-OG

Applications

- Vacuum pump for universal use in a wide range of different applications in the sector of manual and automatic handling
- Handling of air-tight and porous workpieces
- For use as a central vacuum generator with high maximum vacuum

Design

- Oil-lubricated vacuum pump with integrated oil separator, three-phase power supply, optionally available with additional filter and motor-protection circuit
- Multi-vane rotary vacuum pump with constant, low-pulsation output; very little vibration
- Compact design with integrated cooling fan and permanently lubricated bearings

Our Highlights...

- Oil-lubricated vacuum pump
- Multi-vane rotary pump
- Permanently lubricated bearings and powerful cooling fan
- Wide range of models with various outputs

Your Benefits...

- > Robust and requiring very little maintenance for almost constant vacuum generation at high vacuum values
- > Vibration-free operation and continuous, low-pulsation output
- > Excellent heat dissipation
- > Input volume flow rate can be adapted to meet customer requirements



Designation Code Oil-Lubricated Vacuum Pumps EVE-OG

Abbreviated designation	Pump type	Suction capacity in m ³ /h	Supply voltage	Product addition
Example EVE-OG 40 AC3 F:				
EVE	OG	40	AC3	F
EVE	OG oil-lubricated	10 16 25 40 63 100 165 255	AC3 three-phase	F additional filter

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Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

Ordering Data Oil-Lubricated Vacuum Pumps EVE-OG

Vacuum pump EVE-OG is delivered as a ready to connect product.

Available spare parts: filter cartridge, replacement oil, maintenance kit
Available accessories: motor protection switch, filter resistance gauge

Oil-Lubricated Vacuum Pumps EVE-OG

Type*	Vacuum pump**	Vacuum pump with additional filter**
EVE-OG 10 AC3	10.03.02.00067	10.03.02.00082
EVE-OG 16 AC3	10.03.02.00047	10.03.02.00083
EVE-OG 25 AC3	10.03.02.00084	10.03.02.00020
EVE-OG 40 AC3	10.03.02.00026	10.03.02.00031
EVE-OG 63 AC3	10.03.02.00027	10.03.02.00032
EVE-OG 100 AC3	10.03.02.00028	10.03.02.00033
EVE-OG 165 AC3	10.03.02.00048	10.03.02.00049
EVE-OG 255 AC3	10.03.02.00051	10.03.02.00052

*Motorprotection with thermoelement as standard

**50 Hz standard, 60 Hz on request

Ordering Data Spare Parts and Accessories Oil-Lubricated Vacuum Pumps EVE-OG

Type	Filter cartridge for additional filter	Replacement oil**	Maintenance kit for vacuum pumps*	Type	Motor protection switch**	Filter resistance gauge
EVE-OG 10 AC3	10.07.01.00017	27.02.01.00055	10.03.02.00075	EVE-OG 10 AC3	10.04.04.00118	10.07.02.00050
EVE-OG 16 AC3	10.07.01.00017	27.02.01.00055	10.03.02.00075	EVE-OG 16 AC3	10.04.04.00119	10.07.02.00050
EVE-OG 25 AC3	10.07.01.00017	27.02.01.00055	10.03.02.00075	EVE-OG 25 AC3	10.04.04.00120	10.07.02.00050
EVE-OG 40 AC3	10.07.01.00018	27.02.01.00055	10.03.02.00060	EVE-OG 40 AC3	10.04.04.00120	10.07.02.00050
EVE-OG 63 AC3	10.07.01.00018	27.02.01.00055	10.03.02.00055	EVE-OG 63 AC3	10.04.04.00121	10.07.02.00050
EVE-OG 100 AC3	10.07.01.00018	27.02.01.00055	10.03.02.00055	EVE-OG 100 AC3	10.04.04.00122	10.07.02.00050
EVE-OG 165 AC3	10.07.01.00020	27.02.01.00056	10.03.02.00057	EVE-OG 165 AC3	10.04.04.00123	10.07.02.00051
EVE-OG 255 AC3	10.07.01.00020	27.02.01.00056	10.03.02.00057	EVE-OG 255 AC3	10.04.04.00124	10.07.02.00051

*Contains parts of the pump which are subject to wear

**EVE-OG 10-40: 1l, EVE-OG 63-100: 2l, EVE-OG 165-255: 7l | 27.02.01.00055: 1l, 27.02.01.00056: 5l

**For voltage 400 V / 50 Hz

Technical Data Oil-Lubricated Vacuum Pumps EVE-OG

Type	Max. vacuum [mbar]	Suction rate at 50 Hz [m ³ /h]	Voltage at 50 Hz	Current range (50 Hz)	Rated power [kW] at 50 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-OG 10 AC3	-980	10	230/400V AC	1,9A or 1,1A	0.4	IP 54	19	49
EVE-OG 16 AC3	-980	16	230/400V AC	2,8A or 1,6A	0.6	IP 54	19	53
EVE-OG 25 AC3	-980	25	230/400V AC	3,2A or 1,86A	0.8	IP 54	34	60
EVE-OG 40 AC3	-980	40	230/400±10%	4,8A or 2,8A	1.1	IP 54	38	64
EVE-OG 63 AC3	-980	63	230/400±10%	6,2A or 3,6A	1.5	IP 54	52	65
EVE-OG 100 AC3	-980	100	230/400±10%	8,8A or 5,0A	2.2	IP 54	70	67
EVE-OG 165 AC3	-980	165	200-240V or 345-420V	16,6A or 9,6A	4.0	IP 54	160	70
EVE-OG 255 AC3	-980	255	200-240V or 345-420V	23,8A or 13,8A	5.5	IP 54	195	72

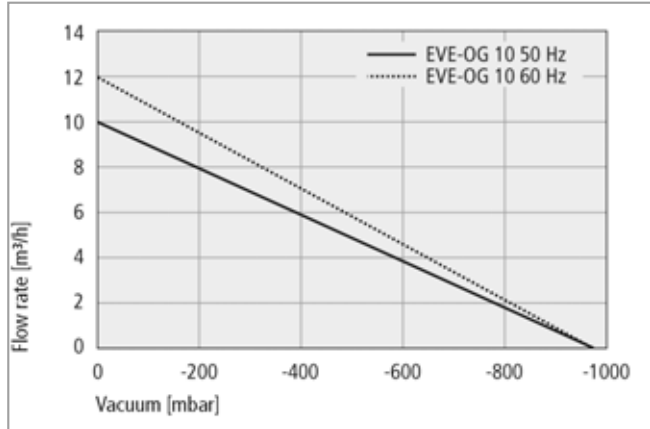
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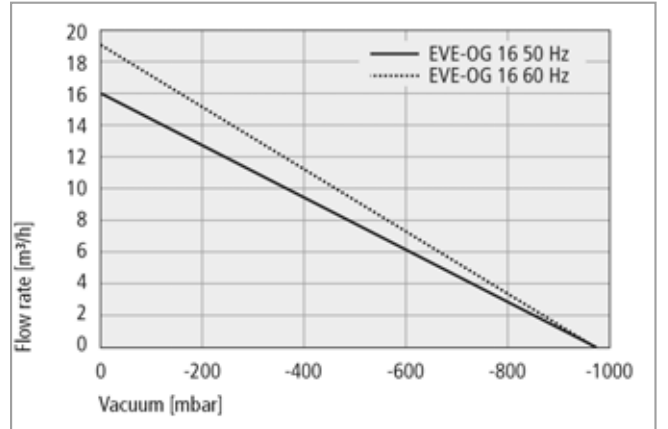
Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

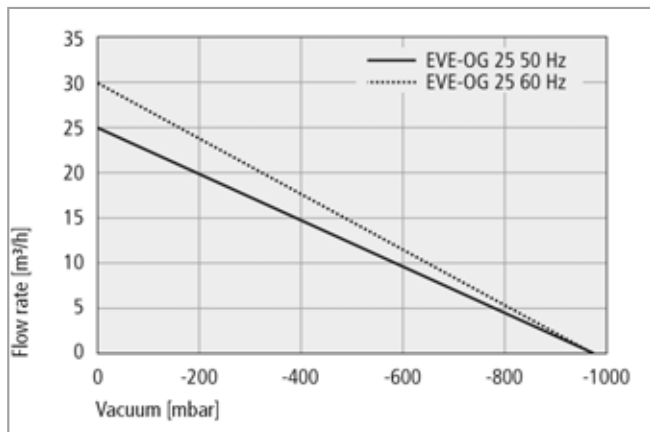
Performance Data Oil-Lubricated Vacuum Pumps EVE-OG



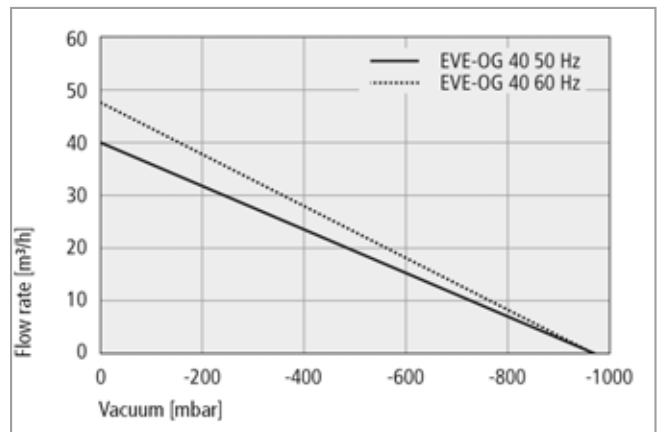
Suction capacity at various degrees of evacuation



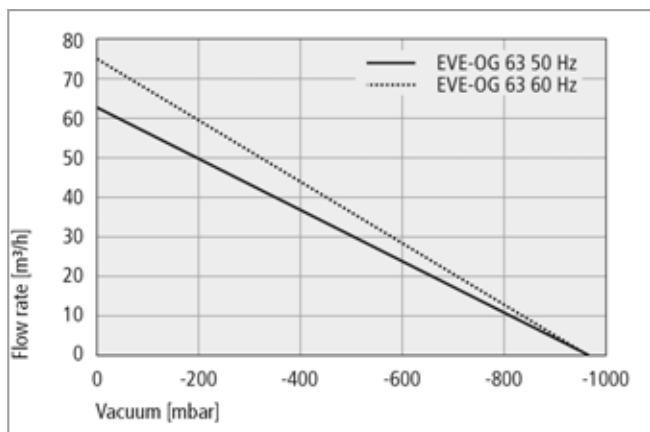
Suction capacity at various degrees of evacuation



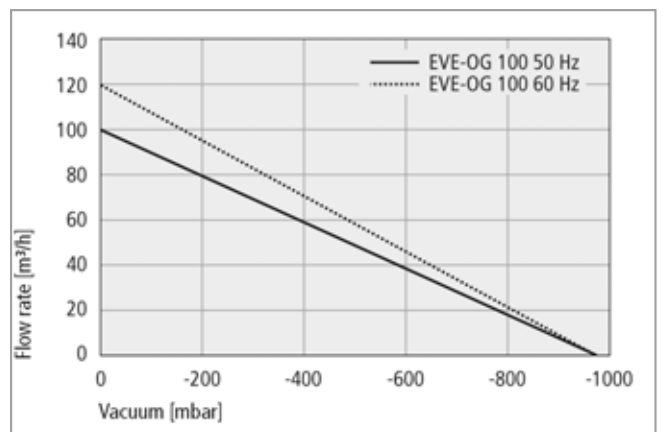
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

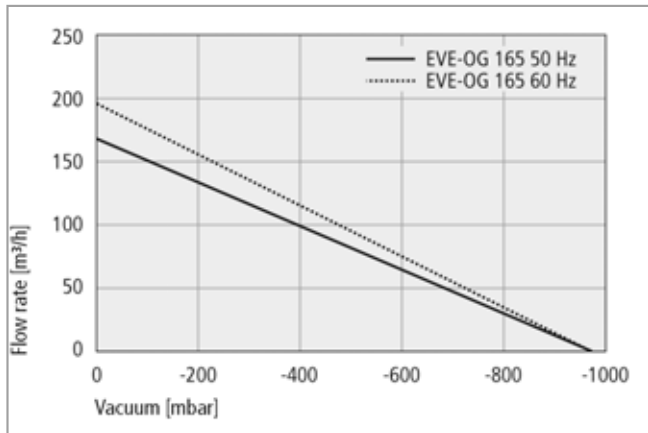
- Schmalz - The Company
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- Vacuum Suction Cups
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators**
- Valve Technology
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Vacuum Pumps

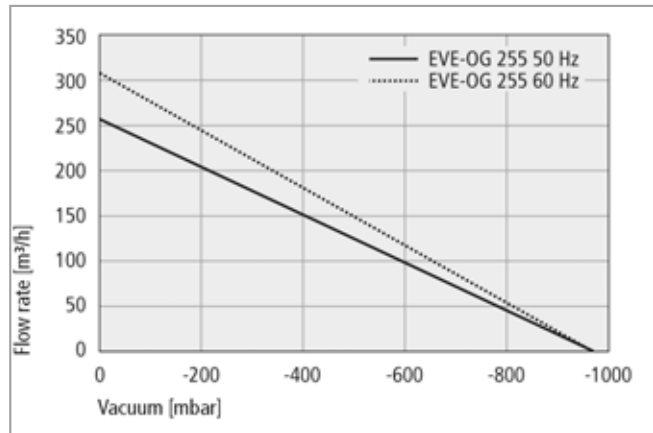


Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

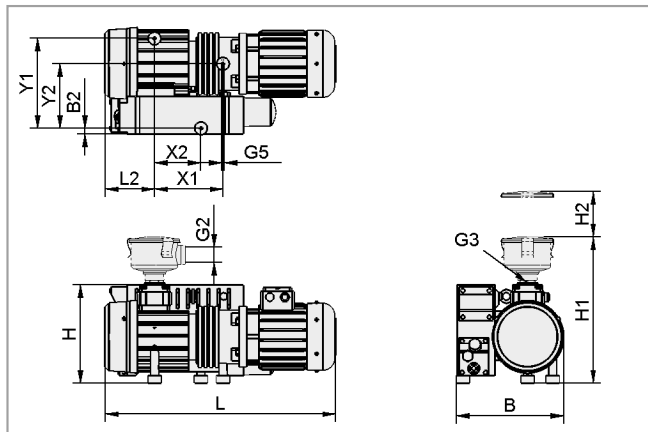


Suction capacity at various degrees of evacuation

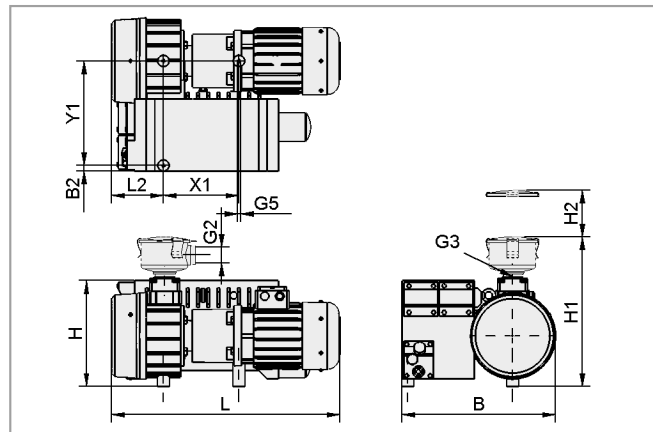


Suction capacity at various degrees of evacuation

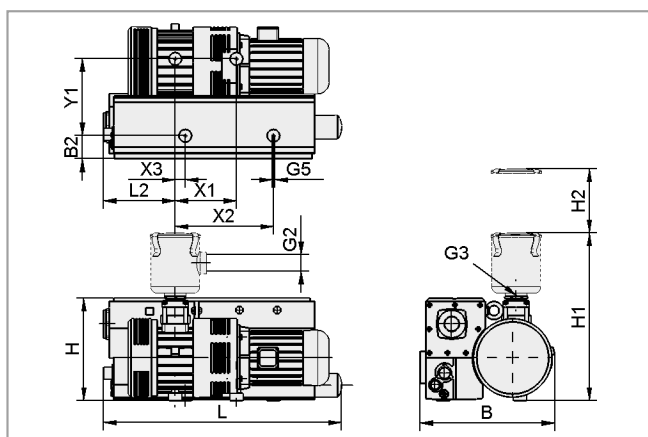
Design Data Oil-Lubricated Vacuum Pumps EVE-OG



EVE-OG 10 to 40 AC3 (F)



EVE-OG 63 to 100 AC3 (F)



EVE-OG 165 to 255 AC3 (F)

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Vacuum Pumps



Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h



Design Data Oil-Lubricated Vacuum Pumps EVE-OG

Type	Dimensions in mm														
	B	B2	G2	G3	G5	H	H1	H2	L	L2	X1	X2	X3	Y1	Y2
EVE-OG 10 AC3	212	26	-	G3/4"-F	M8-F	173	-	-	422	63	176	-	-	111	-
EVE-OG 10 AC3 F	212	26	G3/4"-F	G3/4"-F	M8-F	173	320	70	422	63	176	-	-	111	-
EVE-OG 16 AC3	212	26	-	G3/4"-F	M8-F	234	-	-	422	63	176	-	-	111	-
EVE-OG 16 AC3 F	212	26	G3/4"-F	G3/4"-F	M8-F	234	320	70	422	63	176	-	-	111	-
EVE-OG 25 AC3	284	17	-	G1-1/4"-F	M8-F	260	-	-	568	131	159	120	-	238	171
EVE-OG 25 AC3 F	284	17	G3/4"-F	G1-1/4"-F	M8-F	260	380	75	568	131	159	120	-	238	171
EVE-OG 40 AC3	284	15	-	G1-1/4"-F	M8-F	260	-	-	625	130	179	123	-	238	171
EVE-OG 40 AC3 F	284	15	G1-1/4"-F	G1-1/4"-F	M8-F	260	390	75	625	130	179	123	-	238	171
EVE-OG 63 AC3	406	15	-	G1-1/4"-F	M8-F	280	-	-	614	137	199	-	-	277	-
EVE-OG 63 AC3 F	406	15	G1-1/4"-F	G1-1/4"-F	M8-F	280	417	75	614	137	199	-	-	277	-
EVE-OG 100 AC3	406	15	-	G1-1/4"-F	M8-F	280	-	-	696	170	226	-	-	277	-
EVE-OG 100 AC3 F	406	15	G1-1/4"-F	G1-1/4"-F	M8-F	280	417	75	696	170	226	-	-	277	-
EVE-OG 165 AC3	554	92	-	G2-F	M10-F	418	-	-	921	285	243	390	40	305	-
EVE-OG 165 AC3 F	554	92	G2-1/2-F	G2-F	M10-F	418	680	240	921	285	243	390	40	305	-
EVE-OG 255 AC3	583	47	-	G2-F	M10-F	418	-	-	1056	300	303	390	-	350	-
EVE-OG 255 AC3 F	583	47	G2-1/2-F	G2-F	M10-F	418	680	240	1056	300	303	390	-	350	-

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Vacuum Pumps



Water-Ring Pumps EVE-WR

Suction rate from 25 m³/h to 65 m³/h



Suitable for Industry Specific Applications



Water-ring pumps EVE-WR

Applications

- Vacuum pump for use in handling and packing tasks in the foodstuffs sector
- For applications with high demands with respect to the surrounding air and ambient temperature
- Suitable for continuous operation at high outputs without additional overload protection

Design

- Water-ring pump with internal drying of the exhaust air and water recovery
- Three-phase drive motor
- Multi-vane compressor with very little vibration and constant output with little pulsation
- Wear-resistant, replaceable sealing elements in the pump body
- Inlet regulator for water-level control

Our Highlights...

- Vacuum pump in the form of a water-ring pump
- Non-contact compression
- Internal water cooling permits continuous operation at high loads
- Wide range of models with various outputs
- With water-inlet regulation as standard

Your Benefits...

- > Robust and maintenance-free design for the highest demands with respect to the surrounding air and the ambient temperature, such as in the foodstuffs industry
- > Needs no lubrication, no replacement of parts
- > Particularly suitable for lifting and holding loads for long periods
- > The inlet volume flow rate can be adjusted to meet customer requirements
- > Permits maintenance-free operation

Overview of Technical Data

Suction rate in m ³ /h	Max. vacuum	Supply voltage	Additional Functions	Dimensions in mm	Weight in kg
25 to 65	93%	AC3 Three-phase	<ul style="list-style-type: none"> • Additional filter • Motor protection switch 	(max.) LxBxH: 764x572x436	(max.): 68

Find more information about this product at:

www.schmalz.com/eve-wr

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Vacuum Pumps



Vacuum Reservoirs VOL

Reservoir volume from 5 l to 200 l



Suitable for Industry Specific Applications



Vacuum reservoirs VOL

Applications

- Vacuum reservoir for use as a safety backup in the case of sudden power failures
- Use where increased requirements for safety and reliability exist
- Suitable for use as a buffer for handling peak demands

Design

- Vacuum reservoir consisting of a steel tank with safety non-return valve, manometer and dust filter
- Coating RAL 7035

Our Highlights...

- Vacuum reservoir for use as a safety device
- Integrated non-return valve
- Large buffer volume

Your Benefits...

- > Prevents release of workpieces in the case of a sudden power failure
- > Prevents the vacuum from escaping through the vacuum generator
- > No need to dimension the vacuum generator to handle short-term peak demands



Overview of Technical Data

Capacities in l	Dimensions in mm	Weight in kg
5 to 200	(max.) LxBxH: 910x1015x495	(max.) 97

Find more information about this product at:

www.schmalz.com/vol

Vacuum Pumps



Vacuum Centres VZ

Suction rate from 4 m³/h to 165 m³/h



Suitable for Industry Specific Applications



Vacuum centres VZ

Applications

- Vacuum centre for use wherever there is a demand for high performance, safety and reliability

Design

- Vacuum centre, consisting of vacuum pump, vacuum reservoir, safety non-return valve, filter and manometer
- Motor-protection switch and vacuum-regulated motor switch (adjustable) available as options
- Coating RAL 7035

Our Highlights...

- Complete solution with pump, reservoir, manometer, filter and (optional) regulation
- Integrated dry-running or oil-lubricated vacuum pump
- Integrated vacuum reservoir
- Internal electrical regulation (automatic energy-saving function, optional)

Your Benefits...

- > Universal use in vacuum clamping and handling applications
- > Vibration-free operation; continuous output with little pulsation
- > Optimum protection against short-term leaks and power failures
- > Economical use in continuous operation due to automatic pump switching and automatic regulation

Designation Code Vacuum Centres VZ

Abbreviated designation	Pump type	Suction capacity in m ³ /h	Supply voltage	Reservoir volume	Product addition
Example VZ-TR 40 AC3 50:					
VZ	TR	40	AC3	50	
VZ	OG oil-lubricated	4	AC single-phase	5 = 5 l	MS motor protection switch
	TR dry-running	to 165	AC3 three-phase	15 = 15 l	GMS vacuum regulated motor protection switch
				50 = 50 l	
				100 = 100 l	
				200 = 200 l	

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Vacuum Centres VZ

Suction rate from 4 m³/h to 165 m³/h



Ordering Data Vacuum Centres VZ

Vacuum centre VZ is delivered as a ready to connect product.

Available spare parts: replacement cartridge for air cleaner, replacement cartridge for oil filter

Available accessories: filter cartridge for vacuum reservoir

Vacuum Centres VZ

Type	Vacuum centre without motor protection switch	with motor protection switch*	with vacuum regulated motor circuit**
VZ-TR 4 AC 5	10.03.04.00202	-	10.03.04.00203
VZ-TR 8 AC 5	10.03.04.00193	-	-
VZ-TR 10 AC3 15	10.03.04.00174	10.03.04.00175	10.03.04.00173
VZ-TR 25 AC3 50	10.03.04.00136	10.03.04.00142	10.03.04.00119
VZ-TR 40 AC3 50	10.03.04.00137	10.03.04.00143	10.03.04.00120
VZ-TR 80 AC3 100***	10.03.04.00199	10.03.04.00200	10.03.04.00172
VZ-OG 63 AC3 100	10.03.04.00138	10.03.04.00144	10.03.04.00121
VZ-OG 100 AC3 100	10.03.04.00139	10.03.04.00145	10.03.04.00122
VZ-OG 165 AC3 200	10.03.04.00166	10.03.04.00167	10.03.04.00165

*For 400 V / 50 Hz voltage

**Maximum vacuum for item numbers 10.03.04.00121, 10.03.04.00122, 10.03.04.00165 = -750 mbar

***Voltage 1: 50 Hz (IE2) 230 V / Y 400 V (+/-10 %) | 60 Hz (IE2) 265 V / Y 460 V (+/-10 %) | 60 Hz (without IE2) 230 V / Y 400 V (+/-10 %)



Ordering Data Spare Parts and Accessories Vacuum Centres VZ

Type	Replacement cartridge for air cleaner	Replacement cartridge for oil filter	Filter cartridge for vacuum reservoir
VZ-TR 4 AC 5	-	-	10.07.01.00014
VZ-TR 8 AC 5	-	-	10.07.01.00014
VZ-TR 10 AC3 15	-	-	10.07.01.00017
VZ-TR 25 AC3 50	10.03.01.00023	-	10.07.01.00018
VZ-TR 40 AC3 50	10.03.01.00023	-	10.07.01.00018
VZ-TR 80 AC3 100	-	-	10.07.01.00018
VZ-OG 63 AC3 100	-	10.03.02.00009	10.07.01.00018
VZ-OG 100 AC3 100	-	10.03.02.00009	10.07.01.00018
VZ-OG 165 AC3 200	10.03.02.00057	10.03.02.00011	10.07.01.00020



Technical Data Vacuum Centres VZ

Type	Max. vacuum [mbar]	Voltage	Motor power [kW]	Volume [l]	Protection IP	Weight [kg]
VZ-TR 4 AC 5	-850	230 V, 50 Hz	0.18	5	IP 54	17
VZ-TR 8 AC 5	-850	230 V, 50 Hz	0.30	5	IP 54	17
VZ-TR 10 AC3 15	-850	230/400 V, 50 Hz	0.37	15	IP 54	37
VZ-TR 25 AC3 50	-850	230/400 V, 50 Hz	0.75	50	IP 54	69
VZ-TR 40 AC3 50	-850	230/400 V, 50 Hz	1.25	50	IP 54	82
VZ-TR 80 AC3 100***	-850	230/400V ±10%	3.00	100	IP 54	129
VZ-OG 63 AC3 100	-980	230/400 V, 50 Hz	1.50	100	IP 54	112
VZ-OG 100 AC3 100	-980	230/400 V, 50 Hz	2.20	100	IP 54	130
VZ-OG 165 AC3 200	-980	230/400 V, 50 Hz	4.00	200	IP 54	271

***Voltage 1: 50 Hz (IE2) 230 V / Y 400 V (+/-10 %) | 60 Hz (IE2) 265 V / Y 460 V (+/-10 %) | 60 Hz (without IE2) 230 V / Y 400 V (+/-10 %)

Vacuum Pumps

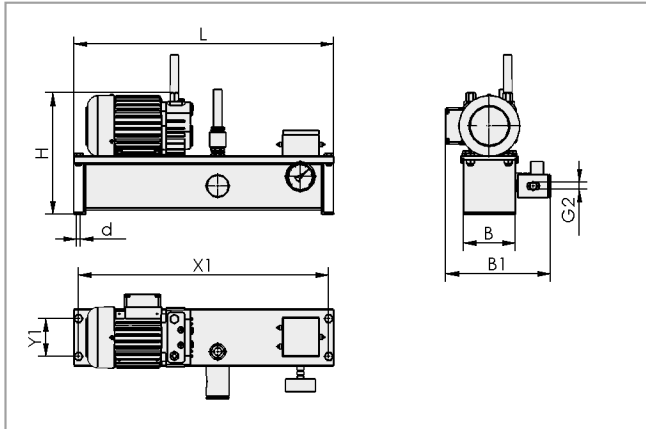


Vacuum Centres VZ

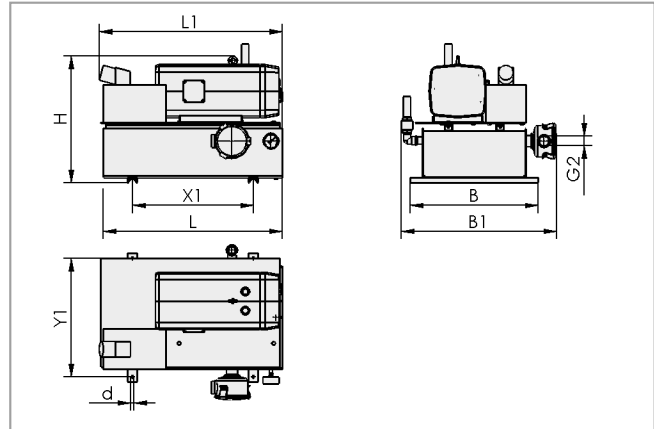
Suction rate from 4 m³/h to 165 m³/h



Design Data Vacuum Centres VZ



VZ-TR 4 and 8 AC 5



VZ-TR 10 AC3 15 to VZ-OG 165 AC3 200

Type	Dimensions in mm								
	B	B1	d	G2	H	L	L1	X1	Y1
VZ-TR 4 AC 5	110	225	9	G3/8-F	275	550	-	530	80
VZ-TR 8 AC 5	110	224	9	G3/8-F	263	550	-	530	80
VZ-TR 10 AC3 15	400	490	11	G3/4-F	440	430	430	280	360
VZ-TR 25 AC3 50	510	630	11	G1-1/4-F	580	710	730	480	470
VZ-TR 40 AC3 50	510	630	11	G1-1/4-F	580	710	770	480	470
VZ-TR 80 AC3 100	610	720	11	G1-1/4"-F	690	710	715	480	570
VZ-OG 63 AC3 100	610	750	11	G1-1/4-F	700	710	720	480	570
VZ-OG 100 AC3 100	610	750	11	G1-1/4-F	700	710	750	480	570
VZ-OG 165 AC3 200	710	1040	11	G2-1/2-F	950	910	1040	592	670

Vacuum Blowers



Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h



Suitable for Industry Specific Applications



Vacuum blowers SGBL-DG

Applications

- Vacuum blower for handling of cardboard boxes, foam materials, insulating materials, recycling materials and other extremely porous materials
- Enormous suction capacity easily compensates for any leaks

Design

- Vacuum blower in the form of a directly driven side-channel compressor, housing and impeller made of high-precision pressure-cast aluminium
- Pressure relief valve included
- Motor-protection switch and reversing valve with neutral position available as options

Our Highlights...

- Blower with a very high suction capacity
- Housing and impeller made of high-precision pressure-cast aluminium
- Wide range of models with different ratings

Your Benefits...

- > Reliable handling of porous materials
- > Vibration-free operation and high suction capacity
- > Optimization to match customer requirements



Designation Code Vacuum Blowers SGBL-DG

Abbreviated designation	Blower type	Suction capacity in m ³ /h	Maximum vacuum in mbar	Rated power in kW	Product addition
Example SGBL-DG 310-360-4:					
SGBL	DG	310	360	4	
SGBL	DG directly driven	80 to 540	110 to 465	0.25 to 7.5	DBV Pressure-limiter valve



Ordering Data Vacuum Blowers SGBL-DG

Vacuum blower SGBL-DG is delivered as a ready to connect product.

Available accessories: silencer box, filter

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

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Vacuum Gripping Systems

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Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

Vacuum Blowers SGBL-DG

Type	Part Number
SGBL-DG-80-110-0.25	10.04.01.00008
SGBL-DG-145-120-0.7-DBV	10.04.01.00009
SGBL-DG-155-400-3	10.04.02.00067
SGBL-DG-165-180-0.95	10.04.01.00001
SGBL-DG-220-465-4	10.04.02.00068
SGBL-DG-310-270-3-DBV	10.04.01.00011
SGBL-DG-310-360-4	10.04.02.00002
SGBL-DG-310-420-5.5	10.04.02.00086
SGBL-DG-410-225-4	10.04.02.00077
SGBL-DG-490-370-7.5	10.04.02.00003
SGBL-DG-540-200-4	10.04.01.00012

Ordering Data Accessories Vacuum Blowers SGBL-DG

Type	Silencer box	Recommended filter
SGBL-DG-80-110-0.25	-	10.07.01.00008
SGBL-DG-145-120-0.7-DBV	-	10.07.01.00259
SGBL-DG-155-400-3	10.04.04.00108	10.07.01.00259
SGBL-DG-165-180-0.95	-	10.07.01.00259
SGBL-DG-220-465-4	10.04.04.00109	10.07.01.00259
SGBL-DG-310-270-3-DBV	10.04.04.00031	10.07.01.00260
SGBL-DG-310-360-4	10.04.04.00031	10.07.01.00260
SGBL-DG-310-420-5.5	10.04.04.00031	10.07.01.00260
SGBL-DG-410-225-4	10.04.04.00127	10.07.01.00260
SGBL-DG-490-370-7.5	10.04.04.00056	10.07.01.00263
SGBL-DG-540-200-4	10.04.04.00077	10.07.01.00263

Technical Data Vacuum Blowers SGBL-DG

Type	Suction rate at 50 Hz [m ³ /h]	Suction rate at 60 Hz [m ³ /h]	Max. vacuum [mbar] permanent (> 90 s)	Voltage at 50 Hz	Voltage at 60 Hz
SGBL-DG-80-110-0.25	78	98	-110	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-145-120-0.7-DBV	145	177	-120	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-155-400-3	155	187	-400	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-165-180-0.95	165	195	-180	230V or 400V	277V or 480V
SGBL-DG-220-465-4	220	262	-465	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-310-270-3-DBV	310	380	-270	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-310-360-4	310	380	-360	380-420V or 660-725V	440-480V
SGBL-DG-310-420-5.5	320	420	-420	345-415V o. 600-720V	380-480V o. 660-720V
SGBL-DG-410-225-4	410	502	-225	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-490-370-7.5	490	610	-370	345-415V o. 600-720V	380-480V o. 660-720V
SGBL-DG-540-200-4	540	630	-200	345-415V or 690V	380-480V

*Reduction with silencer box down to approximately 65 %

Vacuum Blowers



Vacuum Blowers SGBL-DG

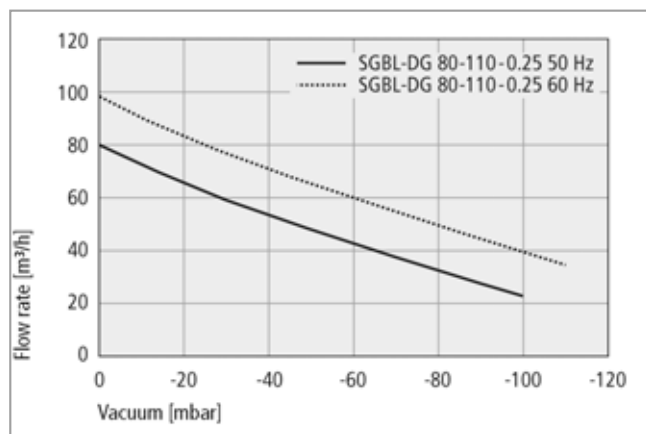
Suction rate from 78 m³/h to 540 m³/h

Technical Data Vacuum Blowers SGBL-DG

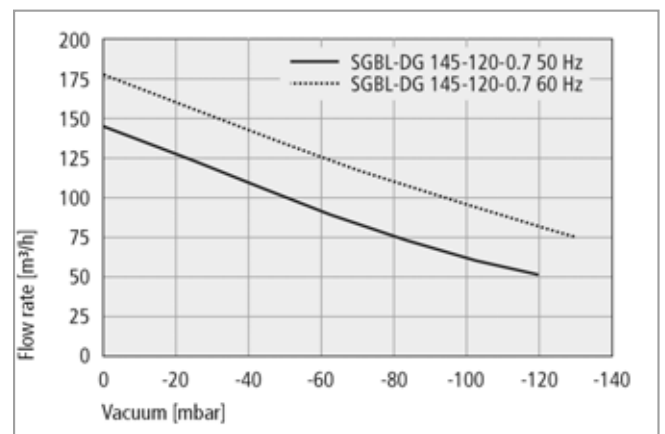
Type	Rated power [kW] at 50 Hz	Rated power [kW] at 60 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]*
SGBL-DG-80-110-0.25	0.25	0.29	IP 55	11	53
SGBL-DG-145-120-0.7-DBV	0.70	0.83	IP 55	15	63
SGBL-DG-155-400-3	3.00	3.60	IP 55	47	62
SGBL-DG-165-180-0.95	0.95	1.60	IP 54	30	72
SGBL-DG-220-465-4	4.00	4.80	IP 55	68	74
SGBL-DG-310-270-3-DBV	3.00	3.45	IP 55	38	70
SGBL-DG-310-360-4	4.00	4.80	IP 55	55	75
SGBL-DG-310-420-5.5	5.50	6.30	IP 55	70	75
SGBL-DG-410-225-4	4.00	4.60	IP 55	71	68
SGBL-DG-490-370-7.5	7.50	8.60	IP 55	187	75
SGBL-DG-540-200-4	4.00	4.60	IP 55	112	71

*Reduction with silencer box down to approximately 65 %

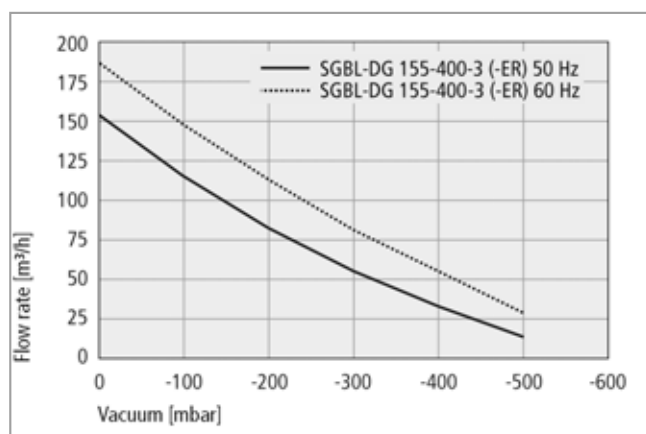
Performance Data Vacuum Blowers SGBL-DG



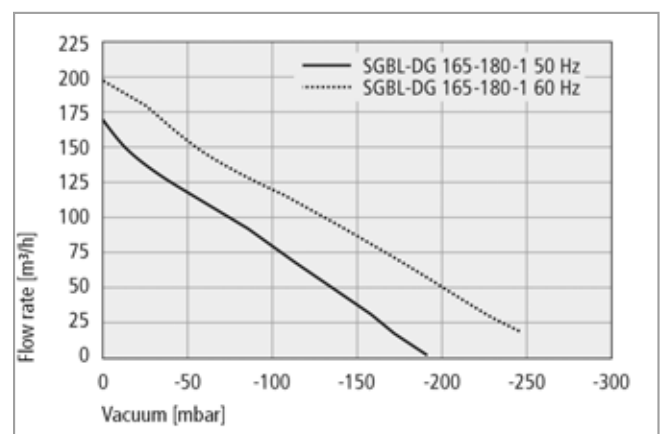
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation

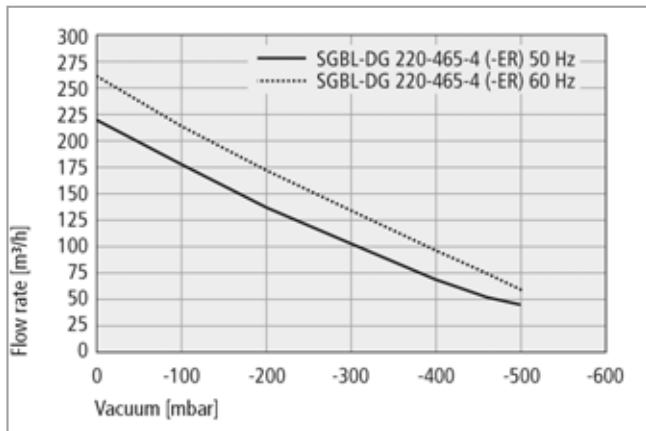
Vacuum Blowers



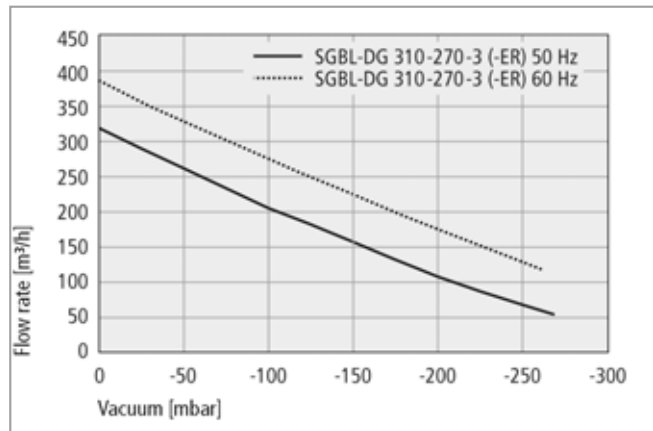
Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

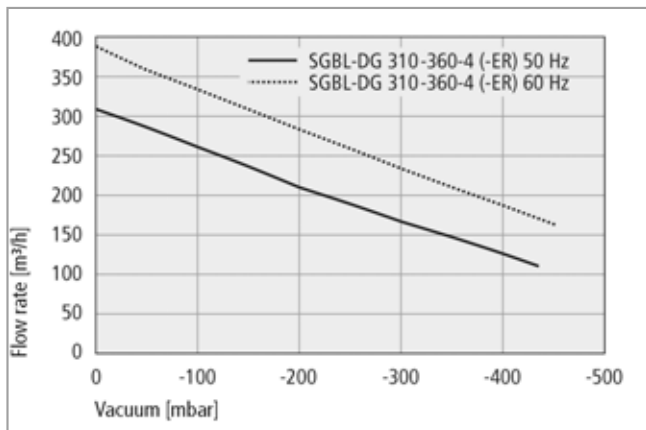
Performance Data Vacuum Blowers SGBL-DG



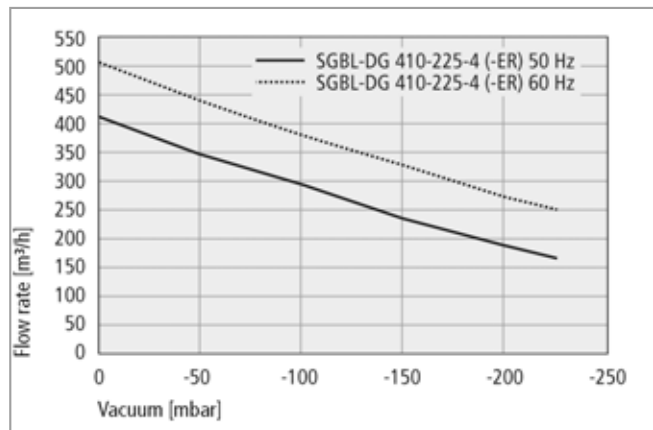
Flow rate at various degrees of evacuation



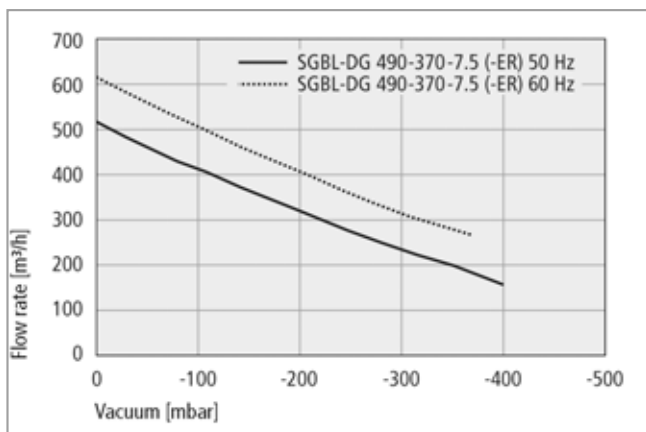
Flow rate at various degrees of evacuation



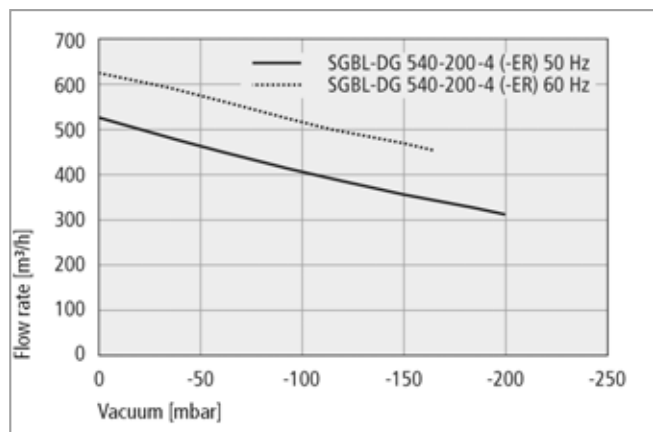
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation

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Vacuum Blowers

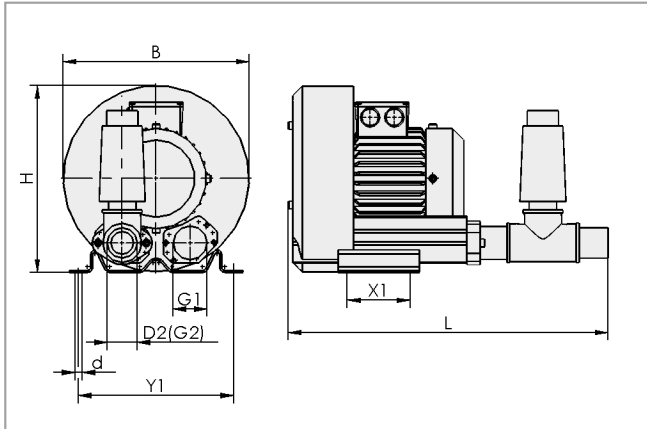


Vacuum Blowers SGBL-DG

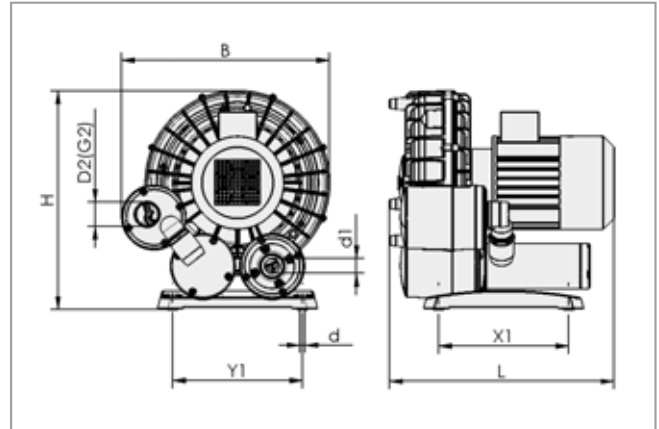
Suction rate from 78 m³/h to 540 m³/h



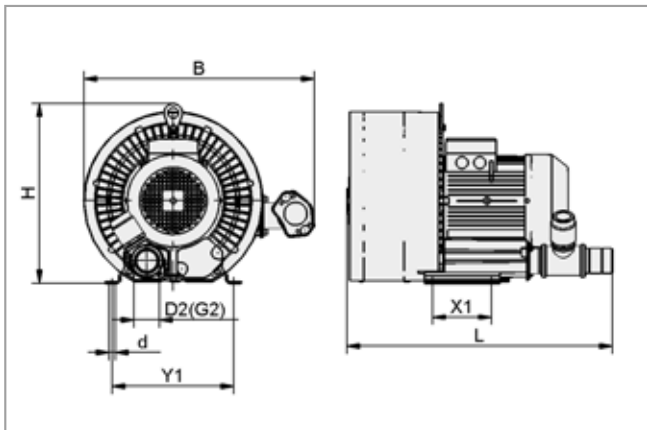
Design Data Vacuum Blowers SGBL-DG



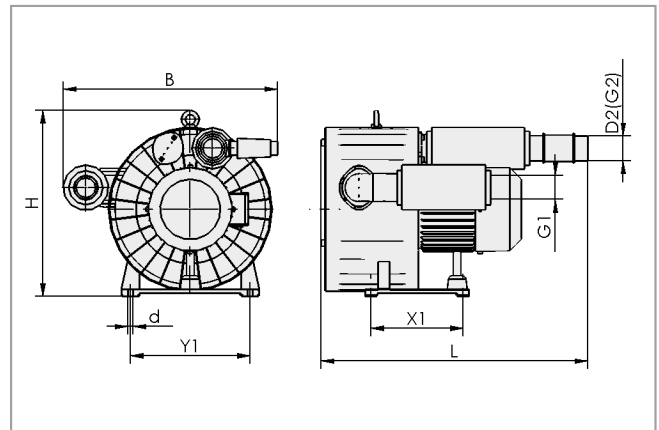
SGBL-DG 80-110-0.25; SGBL-DG 145-120-0.7; SGBL-DG 310-270-3; SGBL-DG 540-200-4



SGBL-DG 155-400-3; SGBL-DG 165-180-1; SGBL-DG 220-465-4; SGBL-DG 410-225-4



SGBL-DG 310-360-4; SGBL-DG 310-420-5.5



SGBL-DG 490-370-7.5

Type	Dimensions in mm										
	B	d	d1	D2	G1	G2	H	L	X1	Y1	
SGBL-DG-80-110-0.25	246	10	-	40	G1-1/2"-F	G1-1/4"-F	247	425	83	205	
SGBL-DG-145-120-0.7-DBV	285	12	-	60	G1-1/2"-F	G2"-M	302	460	95	225	
SGBL-DG-155-400-3	427	12	-	60	-	G2"-M	450	522	290	290	
SGBL-DG-165-180-0.95	358	11	40	50	-	G1-1/2"-F	375	357	120	220	
SGBL-DG-220-465-4	496	12	35	60	-	G2"-M	522	520	310	310	
SGBL-DG-310-270-3-DBV	381	15	-	60	G2"-F	G2"-F	384	542	140	290	
SGBL-DG-310-360-4	550	15	-	60	-	G2"-M	420	633	140	290	
SGBL-DG-310-420-5.5	541	15	-	60	G2"-F	G2"-F	429	780	140	290	
SGBL-DG-410-225-4	496	12	35	60	-	G2"-M	522	520	310	310	
SGBL-DG-490-370-7.5	655	15	-	75	G2-1/2"-M	G2-1/2"-M	566	810	280	365	
SGBL-DG-540-200-4	498	15	-	75	G2-1/2"-F	G2-1/2"-F	566	792	280	365	

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h



Suitable for Industry Specific Applications



Vacuum blowers SGBL-DG with electro-pneumatic reversing

Applications

- Vacuum blower for handling of cardboard, foam materials, insulating materials, recycling materials and other extremely porous materials
- Good compensation for leakages thanks to the enormous suction capacity
- Blower is controlled (vacuum on, blowing off, neutral position) with an electro-pneumatic reversing valve
- Use in gripping systems which need a high vacuum flow rate

Design

- Directly driven slide-channel compressor with very high suction capacity
- With reversing valve
- Housing and rotor made of extremely precise pressure-cast aluminium

Our Highlights...

- Vacuum blower with directly driven side-channel compressor
- Housing and rotor made of precise pressure-cast aluminium
- Electro-pneumatic reversing valve integrated

Your Benefits...

- > Reliable handling of porous materials
- > Vibration-free operation and high suction capacity, free of oil and quiet-running
- > Control of the functions vacuum on, blow off and neutral position (air circulation without pressure)

Designation Code Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Abbreviated designation	Blower type	Suction capacity in m ³ /h	Maximum vacuum in mbar	Rated power in kW	Product addition
Example SGBL-DG 310-360-4 ER:					
SGBL	DG	310	360	4	ER
SGBL	DG directly driven	155 to 540	200 to 465	3 to 7.5	ER with electro-pneumatically reversing valve

Ordering Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Vacuum blower SGBL-DG with electro-pneumatic reversing is delivered as a ready to connect product.

Available accessories: silencer box, filter

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Part Number
SGBL-DG-155-400-3-ER	10.04.02.00071
SGBL-DG-220-465-4-ER	10.04.02.00072
SGBL-DG-310-270-3-ER	10.04.01.00024
SGBL-DG-310-360-4-ER	10.04.02.00054
SGBL-DG-410-225-4-ER	10.04.02.00078
SGBL-DG-490-370-7.5-ER	10.04.02.00055
SGBL-DG-540-200-4-ER	10.04.01.00025

Ordering Accessories Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Silencer box	Filter (Overpressure safely)
SGBL-DG-155-400-3-ER	-	10.07.01.00231
SGBL-DG-220-465-4-ER	-	10.07.01.00231
SGBL-DG-310-270-3-ER	-	10.07.01.00231
SGBL-DG-310-360-4-ER	-	10.07.01.00231
SGBL-DG-410-225-4-ER	-	10.07.01.00231
SGBL-DG-490-370-7.5-ER	10.04.04.00061	10.07.01.00231
SGBL-DG-540-200-4-ER	-	10.07.01.00231

Technical Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Suction rate at 50 Hz [m ³ /h]	Suction rate at 60 Hz [m ³ /h]	Max. vacuum [mbar] permanent (> 90 s)	Voltage at 50 Hz	Voltage at 60 Hz	Rated power [kW] at 50 Hz	Rated power [kW] at 60 Hz
SGBL-DG-155-400-3-ER	155	187.0	-400	190-255V or 330-440V	190-290V or 330-500V	3.0	3.6
SGBL-DG-220-465-4-ER	220	262.0	-465	190-255V or 330-440V	190-290V or 330-500V	4.0	4.8
SGBL-DG-310-270-3-ER	310	380.0	-270	200-240V or 345-415V	220-275V or 380-480V	3.0	3.5
SGBL-DG-310-360-4-ER	310	380.0	-360	345-415V or 690V	440-480V	4.0	4.8
SGBL-DG-410-225-4-ER	410	502.0	-225	190-255V or 330-440V	190-290V or 330-500V	4.0	4.6
SGBL-DG-490-370-7.5-ER	490	610.0	-370	345-415V or 690V	380-480V	7.5	8.6
SGBL-DG-540-200-4-ER	540	630.0	-200	345-415V or 690V	380-480V	4.0	4.6

*Reduction with silencer box down to approximately 65 %

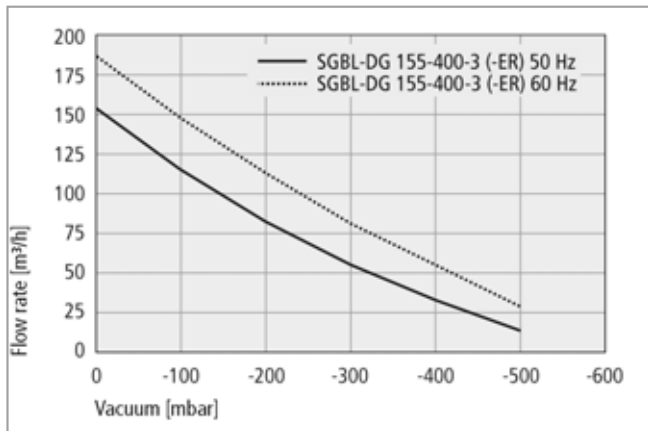
Type	Control voltage reversing	Current consumption reversing [mA]	Control pressure range [bar]	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]*
SGBL-DG-155-400-3-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	52	66
SGBL-DG-220-465-4-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	73	72
SGBL-DG-310-270-3-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	38	74
SGBL-DG-310-360-4-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	66	79
SGBL-DG-410-225-4-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	76	72
SGBL-DG-490-370-7.5-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	200	79
SGBL-DG-540-200-4-ER	24V-DC	0.3	2.5 ... 3.0	IP 55	117	75

*Reduction with silencer box down to approximately 65 %

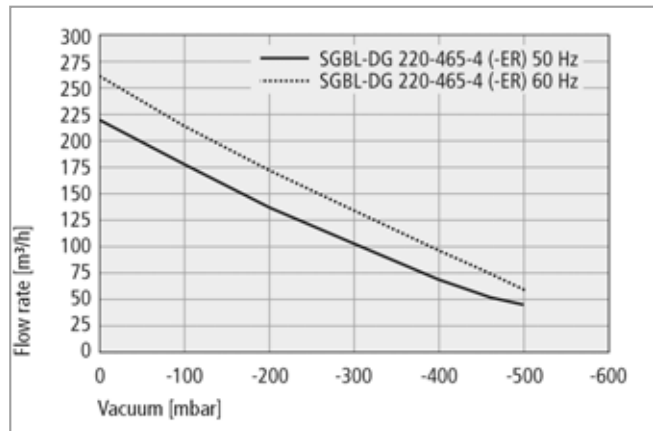
Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

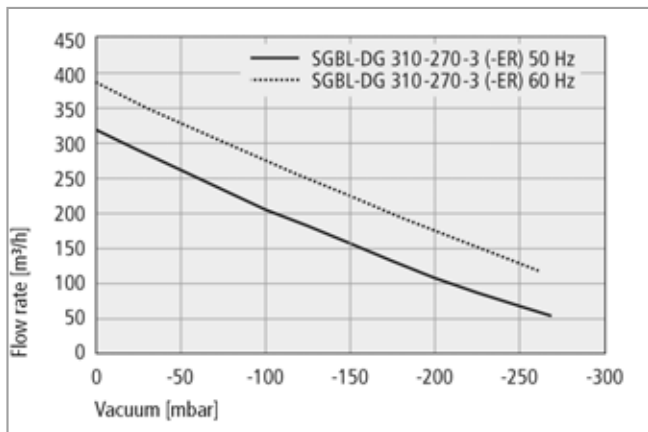
Performance Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing



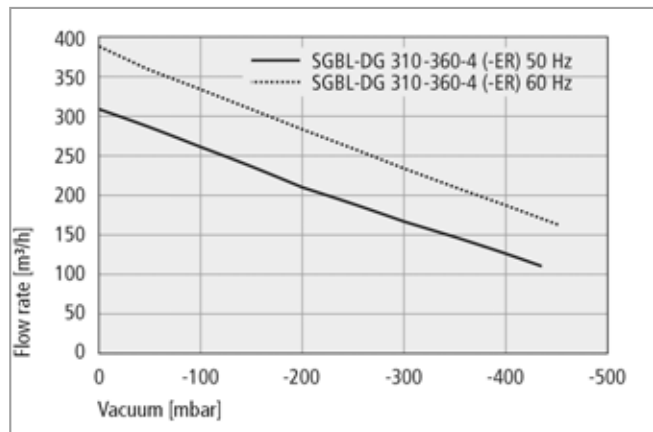
Flow rate at various degrees of evacuation



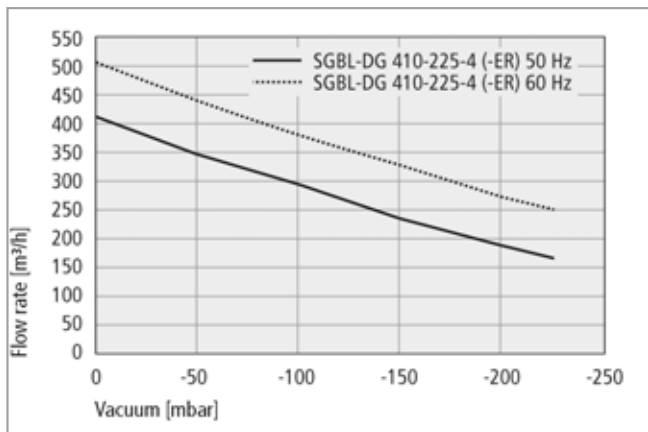
Flow rate at various degrees of evacuation



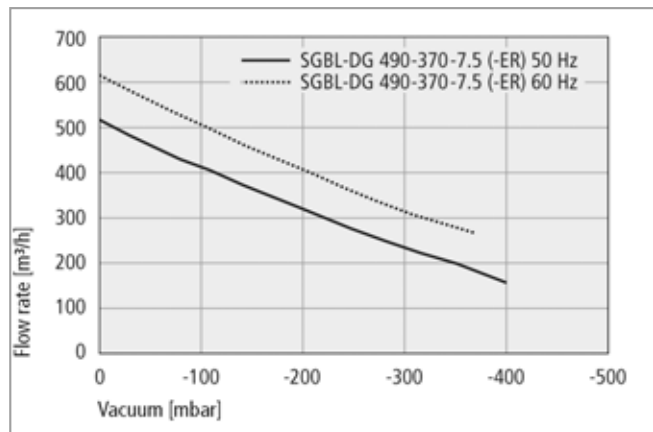
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



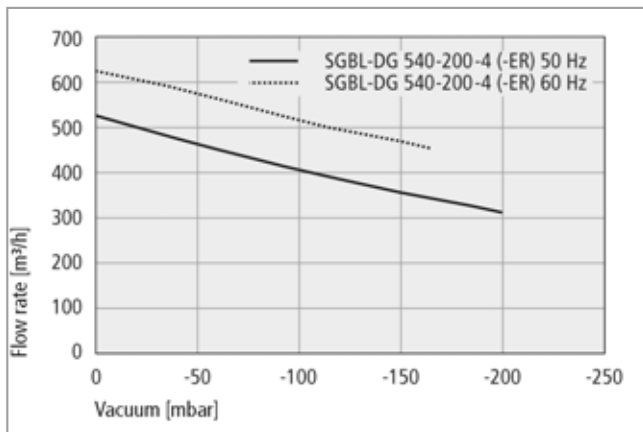
Flow rate at various degrees of evacuation

Vacuum Blowers



Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h



Flow rate at various degrees of evacuation

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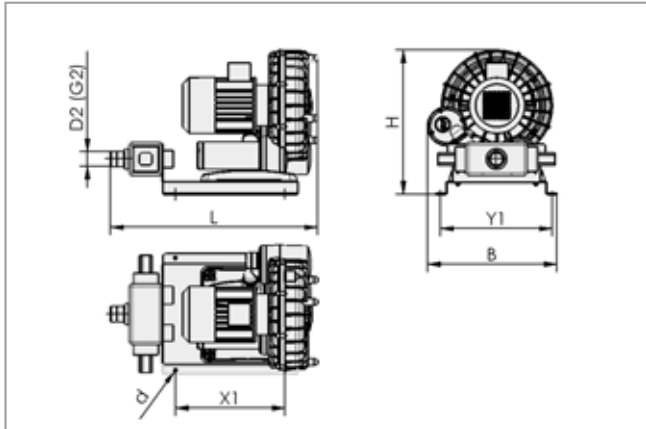


Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

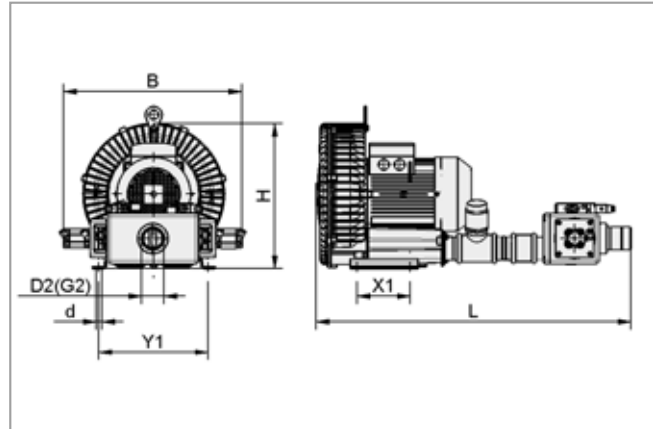
Suction rate from 155 m³/h to 540 m³/h



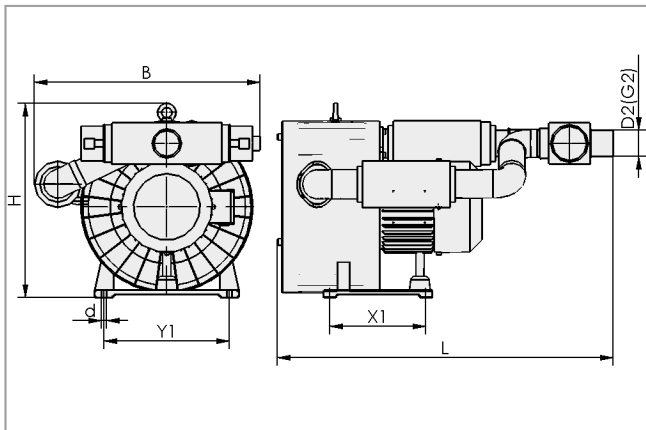
Design Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing



SGBL-DG 155-400-3-ER; SGBL-DG 220-465-4-ER; SGBL-DG 410-225-4-ER



SGBL-DG 310-270-3-ER; SGBL-DG 310-360-4-ER; SGBL-DG 540-200-4-ER



SGBL-DG 490-370-7.5-ER

Type	Dimensions in mm							
	B	d	D2	G2	H	L	X1	Y1
SGBL-DG-155-400-3-ER	520	13	60	G2"-M	500	790	435	446
SGBL-DG-220-465-4-ER	520	13	60	G2"-M	580	830	435	446
SGBL-DG-310-270-3-ER	471	15	60	G2"-M	384	834	140	290
SGBL-DG-310-360-4-ER	612	15	60	G2"-M	420	859	140	290
SGBL-DG-410-225-4-ER	496	12	60	G2"-M	522	520	310	310
SGBL-DG-490-370-7.5-ER	656	15	76	G2-1/2"-M	567	1200	280	365
SGBL-DG-540-200-4-ER	500	15	76	G2-1/2"-M	566	880	280	365

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Vacuum Blowers



Frequency-Regulated Vacuum Blowers SGBL-FU

Suction rate from 180 m³/h to 335 m³/h



Suitable for Industry Specific Applications



Frequency-regulated vacuum blowers SGBL-FU

Applications

- Vacuum blower for handling of cardboard, foam materials, insulating materials, recycled materials and other porous materials
- Handling of various materials due to flexible regulation of suction capacity

Design

- Vacuum blower in the form of a directly driven side-channel compressor with integrated frequency converter
- Vacuum restriction and motor-overload protection is provided automatically by the frequency converter
- Compact and lightweight design

Our Highlights...

- Integrated frequency converter, controlled locally or by an external controller
- Energy savings at low speed
- Wide range of models with varying performance

Your Benefits...

- > Optimum adjustment of the volume flow rate or the vacuum value to meet customer requirements
- > Reduced electricity costs and noise output levels
- > Safety for every application



Overview of Technical Data

Suction rate in m ³ /h	Max. vacuum	Additional Functions	Dimensions in mm	Weight in kg
180 to 335	50%	With electropneumatically reversing valve	(max.) LxBxH: 800x480x475	(max.) 48

Find more information about this product at:

www.schmalz.com/sgbl-fu

Valve Technology

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

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Valve Technology

At a Glance

Selection Aid			Page
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Overview Valves			
Solenoid Valves			
	Inline Valves IV <ul style="list-style-type: none"> Nominal diameter: 3 mm Nominal flow rate: 2 m³/h Voltage: 24 V 		607
Inline valve in compact design for control of the vacuum directly on the suction cup.			
	Solenoid Valves EMV <ul style="list-style-type: none"> Nominal diameter: 2 to 25 mm Nominal flow rate: 1 to 88 m³/h Voltages =/~ 24/230 V 		610
Directly controlled solenoid valve with short opening and closing times, possible to control suction, venting and blow-off of the suction cup.			
	Solenoid Valves EMVO <ul style="list-style-type: none"> Nominal diameter: 12 to 25 mm Nominal flow rate: 21 to 101 m³/h Voltages =/~ 24/230 V 		614
Directly controlled solenoid valve with large nominal diameter for high flow rates, possible to control suction and venting of the suction cup.			
	Solenoid Valves EMVP <ul style="list-style-type: none"> Nominal diameter: 5 to 50 mm Nominal flow rate: 3 to 310 m³/h Voltages =/~ 24/230 V 		616
Pneumatically controlled solenoid valve with extremely short opening and closing times, as well as high nominal flow rates; possible to control of suction and venting of the suction cup.			
Check Valves and Flow Restrictors			
	Check Valves SVK, SVKG, SVV <ul style="list-style-type: none"> Max. blow-off flow rate: 4.8 to 47.4 m³/h Connection thread: M5 to G1/2" 		622
Check valve for sealing the vacuum line as well as for reduction of the volume flow and maintenance of the vacuum if not all suction cups are covered.			
















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Valve Technology

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Vacuum Suction Cups	Touch Valves			
Special Grippers		Touch Valves TV / TVN		632
Vacuum Gripping Systems	Non-Return Valves			
Mounting Elements		Non-Return Valves RSV		636
Vacuum Generators	Manually Actuated Valves			
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Valve Technology

At a Glance



Manual Slide Valves HSV

- Nominal diameter: 7 to 24 mm
- Nominal flow rate: 6 to 50 m³/h



Manual sliding valve for manually switching entire vacuum or pressure circuits or individual suction cups on or off.

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Overview Valves

Application	Check Valves	Flow Restrictors	Sensing Valves
Handling of porous workpieces such as chipboards and MDF panels	● (If type SVN is used)	●	
Handling of air-tight workpieces such as sheets of metal of varying sizes	●		●
Handling of cardboard sheets and boxes of varying sizes		●	
Handling operations with very short cycle times	●		●
Cases where some of the suction cups are not fully in contact with the workpiece	●	●	
Cases where the workpiece is to be blown off for faster release	●	Restricted by the reduced cross-section	

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Solenoid Valves



Inline Valves IV

Nominal diameter 3 mm



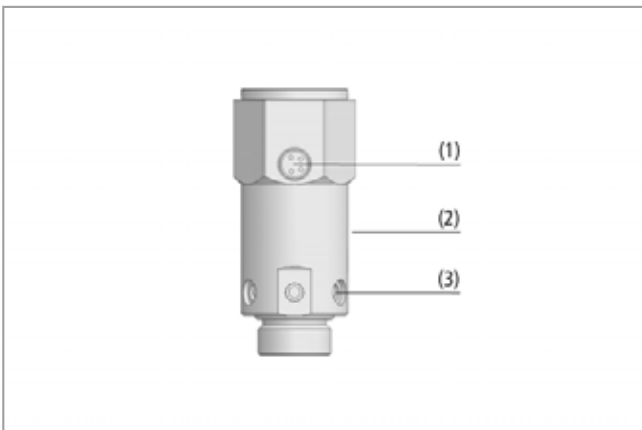
Suitable for Industry Specific Applications



Inline valves IV

Applications

- Inline valve for deactivation of unused suction cups
- Individual control of the suction cups of a "vacuum carpet", e.g. when picking items from stock
- System monitoring in vacuum spiders by active activation and deactivation of suction cups



System design inline valves IV

Design

- Attachment facility for vacuum sensor
- External body made of aluminum (2)
- Integrated filter (3) for ventilation
- 4-pin M8 connector (1)
- Nominal diameter 3 mm; nominal flow rate 2 m³/h



Suction cups with inline valves IV being used for handling car bodywork parts

Our Highlights...

- Direct mounting in a suction cup
- Compact construction, simple installation
- Integrated filter screen to protect against dirt
- Decentralized vacuum control and system monitoring with a valve and an optional Mini-Sensor

Your Benefits...

- > Individual control of single suction cups
- > Minimum space requirements; simple installation
- > Increased functional safety
- > Improved process reliability and reduced standstill times of vacuum systems

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Inline Valves IV

Nominal diameter 3 mm

Designation Code Inline Valves IV

Abbreviated designation	Nominal size in mm	Version	Vacuum connection	Suction cup connection	Voltage in V
Example IV 3 3/2 G3/8-IG G3/8-AG 24V-DC:					
IV	3	3/2	G3/8-IG	G3/8-AG	24V-DC
IV	3	3/2 3/2-way valve	G3/8-IG (IG = female (F)) G1/4-IG	G3/8-AG (AG = male (M))	24V-DC

Ordering Data Inline Valves IV

Inline valve IV is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, vacuum sensors

Inline Valves IV

Type	Part Number
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	10.05.01.00172
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	10.05.01.00173

Ordering Data Accessories Inline Valves IV

Type	Connection cable, 5 m, M8 straight	Connection cable, 5 m, M8 90°	Vacuum sensors analogue VS-V SA M5*	Vacuum sensors digital VS-V SD 60 M5*
IV3 G3/8-IG G3/8-AG 24V-DC	10.06.02.00031	10.06.02.00032	10.06.02.00224	10.06.02.00257
IV3 G1/4-IG G3/8-AG 24V-DC	10.06.02.00031	10.06.02.00032	10.06.02.00224	10.06.02.00257

*See section "Switches and system monitoring" for further details

Technical Data Inline Valves IV

Type	Nominal size [mm]	Principle of operation	Voltage	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Weight [kg]
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	3	Normally open	24V - DC	2	33	4.5	0.074
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	3	Normally open	24V - DC	2	33	4.5	0.074

Solenoid Valves

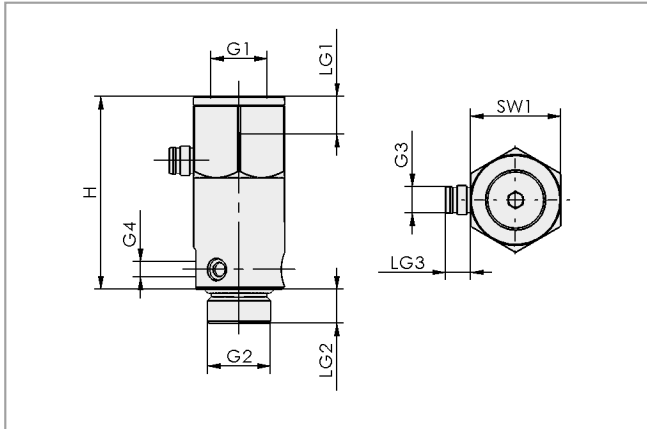


Inline Valves IV

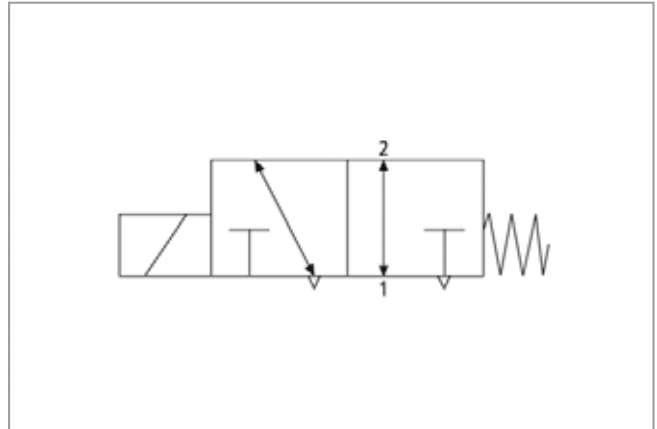
Nominal diameter 3 mm



Design Data and Functional Circuit Diagramm Inline Valves IV



IV 3



Circuit diagram IV 3 (1 = vacuum generator; 2 = suction cup)

Type	Dimensions in mm									
	G1	G2	G3	G4	H	LG1	LG2	LG3	SW1	
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	G3/8"-F	G3/8"-M	M8-M	M5-F	51	9	9	6.5	24	
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	G1/4"-F	G3/8"-M	M8-M	M5-F	51	9	9	6.5	24	

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Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm



Suitable for Industry Specific Applications



Solenoid valves EMV

Applications

- Control of vacuum, blow-off and venting of the suction cup
- Control of compressed air or vacuum in lines with smaller cross-sections
- NO function ensures workpiece is held even in the case of a power failure
- For handling tasks with short switching times
- Suitable for neutral or filtered air

Design

- Directly controlled solenoid valve
- Valve EMV 2 and EMV 3 always with NC switching function
- Degree of protection IP 65
- Connection socket complies with DIN 43 650, Form A
- Supplied complete with plug connector and (for DC operation) a quenching diode

Our Highlights...

- Seat valve in robust metal housing
- Directly controlled
- 3/2-way valve (exception: EMV 3 is a 2/2-way valve)
- Switching function NO (exception: EMV 2 and EMV 3 are NC)

Your Benefits...

- > Suitable for vacuum and compressed air
- > Short opening and closing times
- > Control of on/off and venting functions
- > Safety in the case of a power failure

Designation Code Solenoid Valves EMV

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMV 5 24V-DC 3/2 NO:				
EMV	5	24V-DC	3/2	NO
EMV	2 to 25	24V-DC direct current 230V-AC single-phase	2/2 2/2-way-valve 3/2 3/2-way-valve	NC normally closed NO normally open

Ordering Data Solenoid Valves EMV

Solenoid valve EMV is delivered as a ready to connect product.

Available accessories: venting filter

Solenoid Valves



Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

Solenoid Valves EMV

Type	Operating voltage	
	230V-AC	24V-DC
EMV 2	-	10.05.01.00290
EMV 3	10.05.01.00067	10.05.01.00066
EMV 5	10.05.01.00069	10.05.01.00068
EMV 10	10.05.01.00071	10.05.01.00070
EMV 15	10.05.01.00073	10.05.01.00072
EMV 20	10.05.01.00075	10.05.01.00074
EMV 25	10.05.01.00077	10.05.01.00076

Ordering Accessories Data Solenoid Valves EMV

Type	Venting filter with mounting kit
EMV 2	-
EMV 3	-
EMV 5	10.05.01.00060
EMV 10	10.05.01.00061
EMV 15	10.05.01.00062
EMV 20	10.05.01.00063
EMV 25	10.05.01.00064

Technical Data Solenoid Valves EMV

Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m ³ /h]	Nominal flow rate [l/min]	Power consumption DC [W]	Closing time [ms]	Weight [kg]
EMV 2	2	Normally closed	1	17	2.2	10	0.150
EMV 3	3	Normally closed	2	33	5.0	20	0.200
EMV 5	5	Normally open	4	67	8.0	20	0.518
EMV 10	10	Normally open	20	333	32.0	25	2.510
EMV 15	15	Normally open	34	567	38.4	80	4.665
EMV 20	20	Normally open	53	883	40.8	100	6.375
EMV 25	25	Normally open	88	1467	63.8	135	9.600

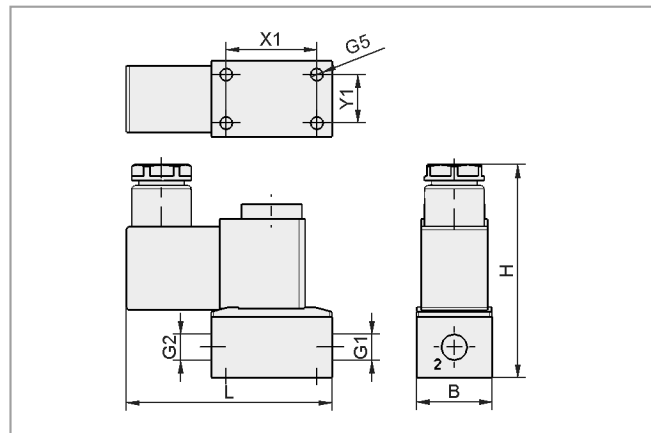
Solenoid Valves



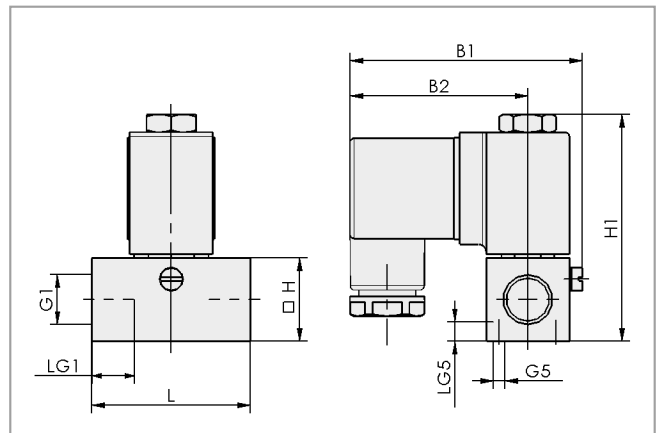
Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

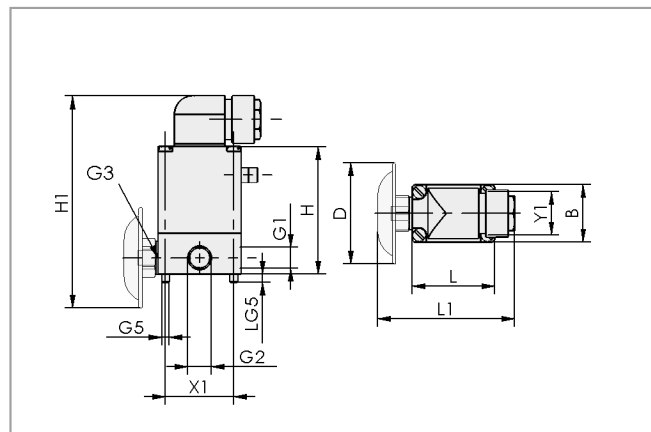
Design Data Solenoid Valves EMV



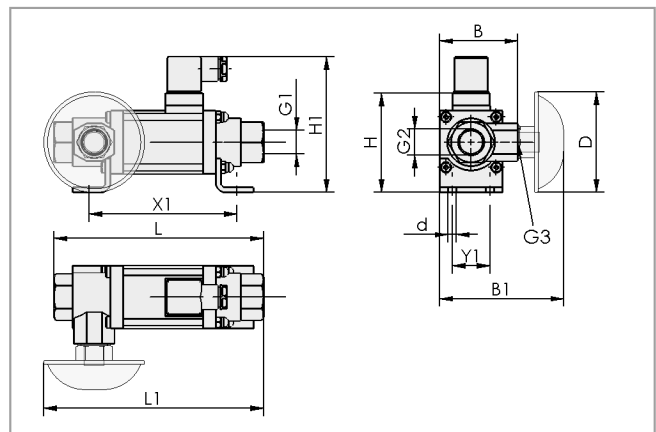
EMV 2



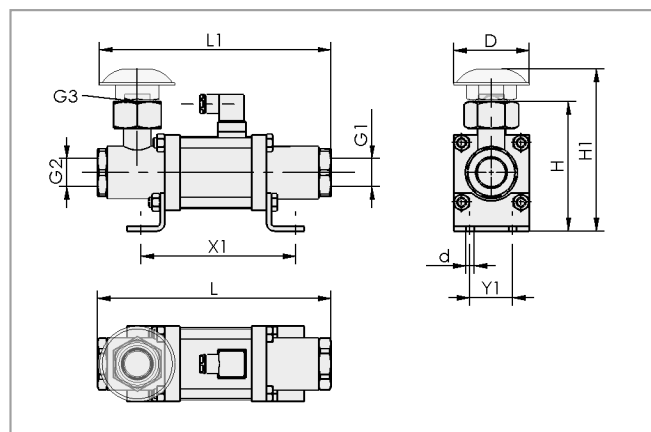
EMV 3



EMV 5



EMV 10



EMV 15 to 25

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Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

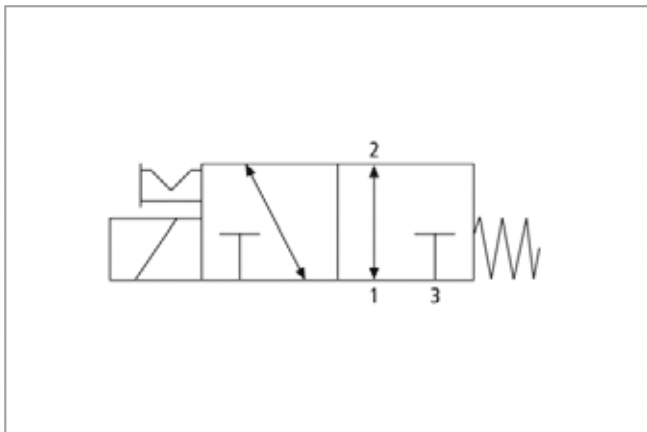


Design Data Solenoid Valves EMV

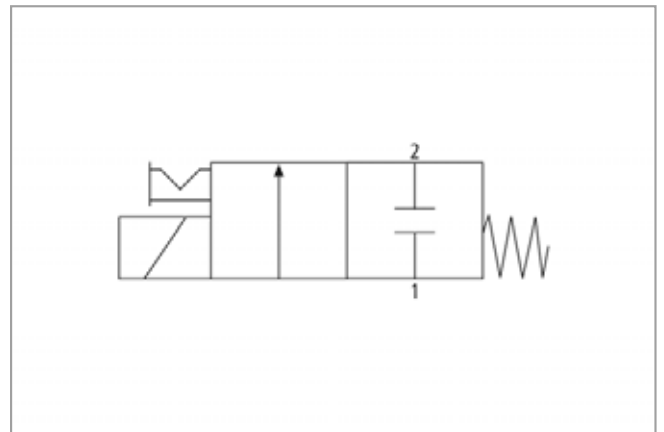
Type	Dimensions in mm																
	B	B1	B2	d	D	G1	G2	G3	G5	H	H1	L	L1	LG1	LG5	X1	Y1
EMV 2	25	-	-	-	-	G1/8"-F	G1/8"-F	-	M5-F	70	-	68.0	-	-	-	30.0	16
EMV 3	-	61.5	47	-	-	G1/4"-F	-	-	M3-F	22	60.0	42.0	-	12	5	-	-
EMV 5	32	-	-	-	56	G1/4"-F	G1/4"-F	G1/4"-F	M4-F	71	118.0	46.0	76.0	-	5	38.0	24
EMV 10	62	98.5	-	7.0	80	G1/2"-F	G1/2"-F	G1/2"-F	-	79	108.0	166.5	174.5	-	-	117.5	30
EMV 15	-	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	-	114	140.0	209.0	211.0	-	-	133.0	40
EMV 20	-	-	-	8.5	80	G1"-F	G1"-F	G1"-F	-	137	172.0	247.0	245.0	-	-	148.0	45
EMV 25	-	-	-	8.5	80	G1-1/4"-F	G1-1/4"-F	G1-1/4"-F	-	167	200.0	281.0	271.5	-	-	178.0	50



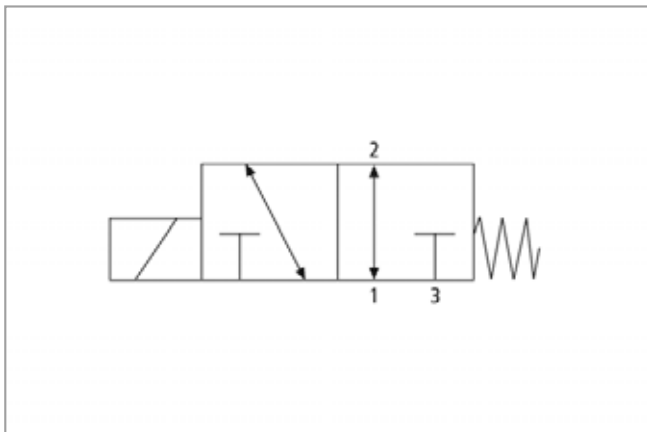
Functional Circuit Diagram Solenoid Valves EMV



EMV 2 and EMV 5 (1 = vacuum generator; 2 = suction cup; 3 = ventilation)



EMV 3 (1 = vacuum generator; 2 = suction cup)



EMV 10 to 25 (1 = vacuum generator; 2 = suction cup; 3 = ventilation)

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Solenoid Valves



Solenoid Valves EMVO

Nominal diameter from 12 mm to 25 mm



Suitable for Industry Specific Applications



Solenoid valves EMVO

Applications

- Solenoid valve for use at high volume flow rates in systems with large cross-sections
- Control of vacuum, blow-off and venting of the suction cup
- Suitable for neutral or filtered air

Design

- Directly controlled solenoid valve
- Switching function (NC)
- Seat valve in housing made of brass and aluminum
- Degree of protection IP 65
- Connection socket complies with DIN 43 650, Form A
- Supplied complete with plug connector

Our Highlights...

- 3/2-way valve
- Valve with large nominal diameter
- Directly controlled

Your Benefits...

- > Control of vacuum on/off or venting function
- > Suitable for lines with large nominal flow rates
- > Short opening and closing times

Designation Code Solenoid Valves EMVO

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMVO 12 230V-AC 3/2 NC:				
EMVO	12	230V-AC	3/2	NC
EMVO	12	24V-DC direct current	3/2 3/2-way-valve	NC normally closed
	20	230V-AC single-phase		NO normally open
	25			

Ordering Data Solenoid Valves EMVO

Solenoid valve EMVO is delivered as a ready to connect product.

Available accessories: venting filter

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Solenoid Valves EMVO

Nominal diameter from 12 mm to 25 mm

Solenoid Valves EMVO

Type	Operating voltage	
	230V-AC	24V-DC
EMVO 12	10.05.01.00052	10.05.01.00049
EMVO 20	10.05.01.00053	10.05.01.00050
EMVO 25	-	10.05.01.00051

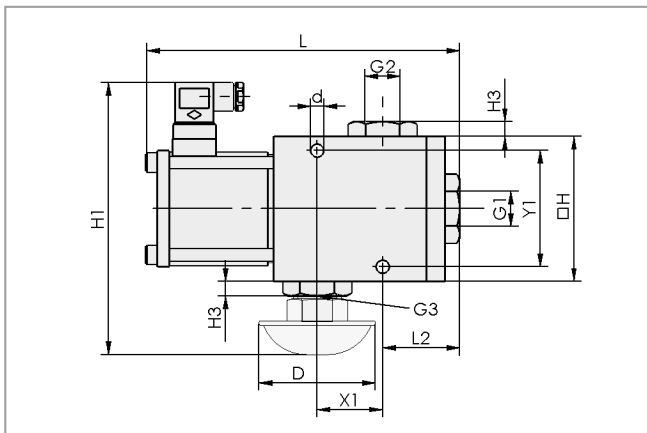
Ordering Data Accessories Solenoid Valves EMVO

Type	Venting filter with mounting kit
EMVO 12	10.05.01.00061
EMVO 20	10.05.01.00062
EMVO 25	10.05.01.00063

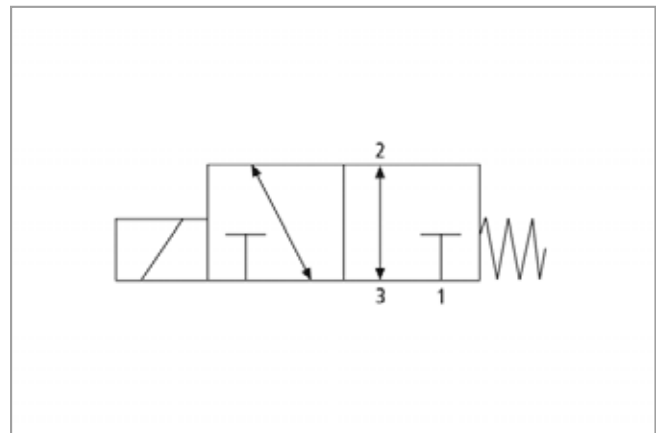
Technical Data Solenoid Valves EMVO

Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Power consumption AC3 [W]	Weight [kg]
EMVO 12	12	Normally closed	21	350	18.3	35.2	1.2
EMVO 20	20	Normally closed	72	1200	40.8	35.2	5.8
EMVO 25	25	Normally closed	101	1683	40.8	35.2	5.7

Design Data and Functional Circuit Diagram Solenoid Valves EMVO



EMVO 12 to 25



Circuit diagram EMVO (1 = vacuum generator; 2 = suction cup; 3 = ventilation)

Type	Dimensions in mm											
	d	D	G1	G2	G3	H	H1	H3	L	L2	X1	Y1
EMVO 12	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	60	135.5	-	122	32	24	40
EMVO 20	9.0	80	G3/4"-F	G3/4"-F	G3/4"-F	100	187.5	10	206	43	45	80
EMVO 25	9.0	80	G1"-F	G1"-F	G1"-F	100	172.0	-	206	43	45	80

Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm



Suitable for Industry Specific Applications



Solenoid valves EMVP

Applications

- Solenoid valve for control at high nominal flow rates
- Control of vacuum, blow-off and venting of the suction cup
- NO function ensures the workpiece is held even in the case of a power failure
- For handling tasks with very short switching times
- Suitable for neutral or filtered gases

Design

- Solenoid valve with pneumatic pilot control
- Seat valve in aluminum housing (EMVP 5-15) as well as plastic housing EMVP 20 to 50
- Degree of protection IP 65 according to EN 60529
- Terminal box EMVP 5/8 and all IMPs conform with DIN EN 175301 Form "C"
- Terminal box EMVP 10-25 NO/NC conforms with DIN 43650 form "B"
- Terminal box EMVP 32-50 NO conforms with DIN 43650 form "B"
- Supplied complete with plug connector and (for DC operation) a quenching diode

Our Highlights...

- Pilot control with compressed air ($p = 5 \text{ bar}$)
- Wide range of nominal diameters
- 3/2-way valve
- Bistable impulse valve (only for IMP version)

Your Benefits...

- > Extremely short opening and closing times
- > Also suitable for high volume flow rates
- > Control of vacuum on/off or venting functions
- > Prevention of air consumption in case of power failures (only for IMP version)

Designation Code Solenoid Valves EMVP

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMVP 15 24V-DC 3/2 NC:				
EMVP	15	24V-DC	3/2	NC
EMVP	5 to 50	24V-DC direct current 230V-AC single-phase	3/2 3/2-way-valve 5/2 5/2-way-valve	IMP bistable, switched with pulse normally closed NC normally closed NO normally open

Solenoid Valves



Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm



Ordering Data Solenoid Valves EMVP

Solenoid valve EMVP is delivered as a ready to connect product.

Available accessories: venting filter, connection cable for solenoid valves, socket with M12-connection

Solenoid Valves EMVP

Type	Part Number
EMVP 5 24V-DC 3/2 NC	10.05.02.00162
EMVP 5 24V-DC 5/2 IMP	10.05.02.00163
EMVP 8 24V-DC 3/2 NC	10.05.02.00164
EMVP 8 24V-DC 5/2 IMP	10.05.02.00165
EMVP 10 230V-AC 3/2 NO/NC	10.05.02.00143
EMVP 10 24V-DC 3/2 NO/NC	10.05.02.00144
EMVP 15 230V-AC 3/2 NO/NC	10.05.02.00145
EMVP 15 24V-DC 3/2 NO/NC	10.05.02.00146
EMVP 15 24V-DC 3/2 IMP	10.05.02.00147
EMVP 20 230V-AC 3/2 NO/NC	10.05.02.00148
EMVP 20 24V-DC 3/2 NO/NC	10.05.02.00149
EMVP 20 24V-DC 3/2 IMP	10.05.02.00167
EMVP 25 230V-AC 3/2 NO/NC	10.05.02.00150
EMVP 25 24V-DC 3/2 NO/NC	10.05.02.00151
EMVP 25 24V-DC 3/2 IMP	10.05.02.00152
EMVP 32 230V-AC 3/2 NO	10.05.02.00074
EMVP 32 24V-DC 3/2 NO	10.05.02.00068
EMVP 50 230V-AC 3/2 NO	10.05.02.00075
EMVP 50 24V-DC 3/2 NO	10.05.02.00069



Ordering Data Accessories Solenoid Valves EMVP

Type	Venting filter with mounting kit	Connection cable for solenoid valves (3 m, PUR)	Socket with M12-connection
EMVP 5 24V-DC 3/2 NC	-	-	-
EMVP 5 24V-DC 5/2 IMP	-	21.04.06.00084	-
EMVP 8 24V-DC 3/2 NC	-	-	-
EMVP 8 24V-DC 5/2 IMP	-	21.04.06.00084	-
EMVP 10 230V-AC 3/2 NO/NC	10.05.01.00065	-	-
EMVP 10 24V-DC 3/2 NO/NC	10.05.01.00065	-	10.05.02.00157
EMVP 15 230V-AC 3/2 NO/NC	10.05.01.00061	-	-
EMVP 15 24V-DC 3/2 NO/NC	10.05.01.00061	-	10.05.02.00157
EMVP 15 24V-DC 3/2 IMP	10.05.01.00061	21.04.06.00084	-
EMVP 20 230V-AC 3/2 NO/NC	10.05.01.00062	-	-
EMVP 20 24V-DC 3/2 NO/NC	10.05.01.00062	-	10.05.02.00157
EMVP 20 24V-DC 3/2 IMP	10.05.01.00062	21.04.06.00084	-
EMVP 25 230V-AC 3/2 NO/NC	10.05.01.00063	-	-
EMVP 25 24V-DC 3/2 NO/NC	10.05.01.00063	-	10.05.02.00157
EMVP 25 24V-DC 3/2 IMP	10.05.01.00063	21.04.06.00084	-
EMVP 32 230V-AC 3/2 NO	10.05.01.00062	-	-
EMVP 32 24V-DC 3/2 NO	10.05.01.00062	-	10.05.02.00157
EMVP 50 230V-AC 3/2 NO	10.05.01.00064	-	-
EMVP 50 24V-DC 3/2 NO	10.05.01.00064	-	-

Solenoid Valves



Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm

Technical Data Solenoid Valves EMVP

Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Closing time [ms]	Weight [kg]
EMVP 5 24V-DC 3/2 NC	5	Normally closed	3	50	1	19	0.11
EMVP 5 24V-DC 5/2 IMP	5	Double pilot valve	3	50	1	13	0.16
EMVP 8 24V-DC 3/2 NC	8	Normally closed	6	100	1	19	0.15
EMVP 8 24V-DC 5/2 IMP	8	Double pilot valve	6	100	1	11	0.27
EMVP 10 230V-AC 3/2 NO/NC	10	Optionally NO/NC	10	167	5	22	0.42
EMVP 10 24V-DC 3/2 NO/NC	10	Optionally NO/NC	10	167	5	22	0.42
EMVP 15 230V-AC 3/2 NO/NC	15	Optionally NO/NC	20	333	5	90	0.39
EMVP 15 24V-DC 3/2 NO/NC	15	Optionally NO/NC	20	333	5	90	0.39
EMVP 15 24V-DC 3/2 IMP	15	Double pilot valve	20	333	5	110	0.55
EMVP 20 230V-AC 3/2 NO/NC	20	Optionally NO/NC	40	667	5	90	0.37
EMVP 20 24V-DC 3/2 NO/NC	20	Optionally NO/NC	40	667	5	90	0.37
EMVP 20 24V-DC 3/2 IMP	20	Double pilot valve	40	667	5	110	0.53
EMVP 25 230V-AC 3/2 NO/NC	25	Optionally NO/NC	90	1500	5	80	0.52
EMVP 25 24V-DC 3/2 NO/NC	25	Optionally NO/NC	90	1500	5	80	0.52
EMVP 25 24V-DC 3/2 IMP	25	Double pilot valve	90	1500	5	100	0.68
EMVP 32 230V-AC 3/2 NO	32	Normally open	130	2167	5	300	0.50
EMVP 32 24V-DC 3/2 NO	32	Normally open	130	2167	5	300	0.50
EMVP 50 230V-AC 3/2 NO	50	Normally open	310	5167	5	500	1.36
EMVP 50 24V-DC 3/2 NO	50	Normally open	310	5167	5	500	1.36

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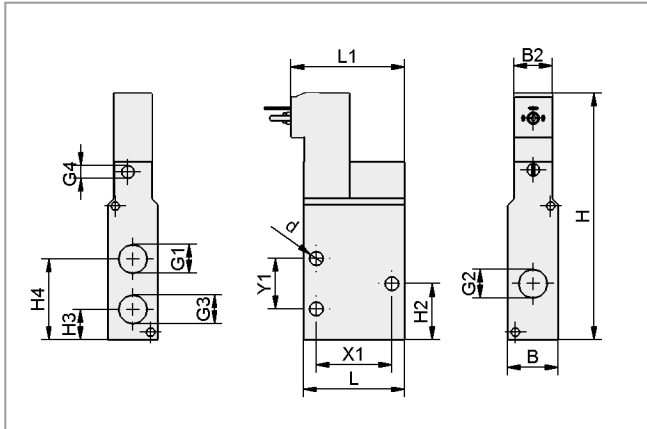


Solenoid Valves EMVP

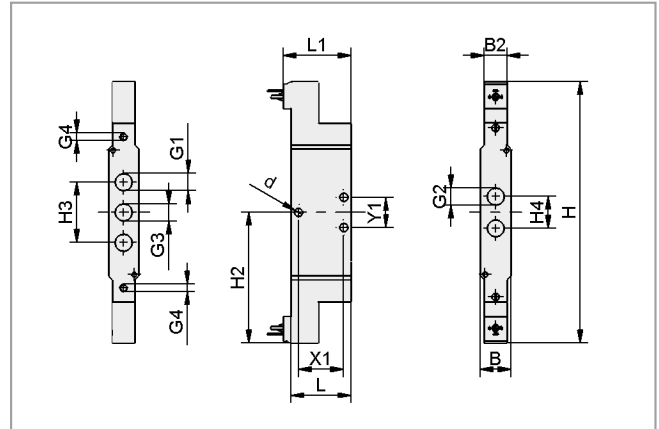
Nominal diameter from 5 mm to 50 mm



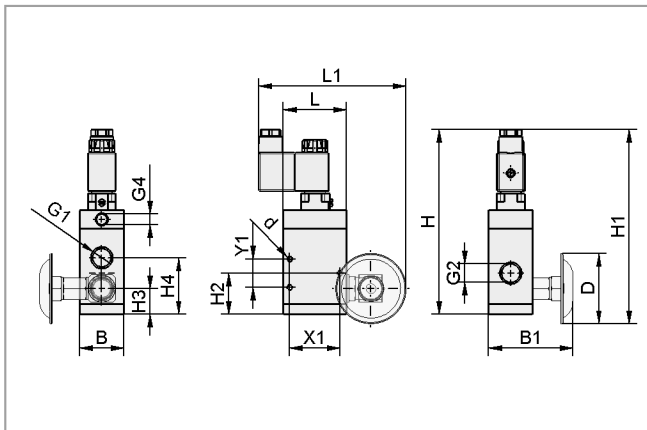
Design Data Solenoid Valves EMVP



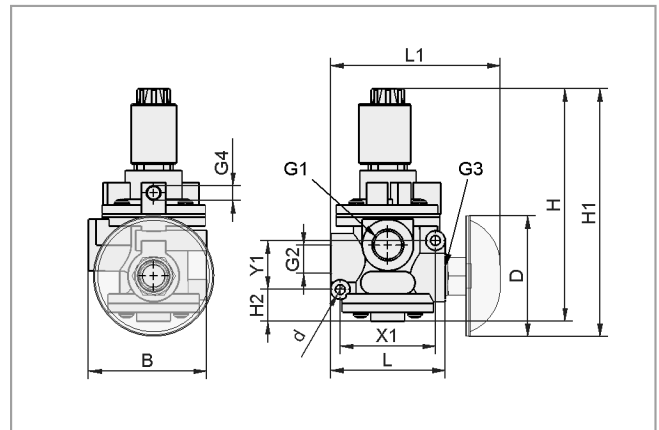
EMVP 5/8...NC



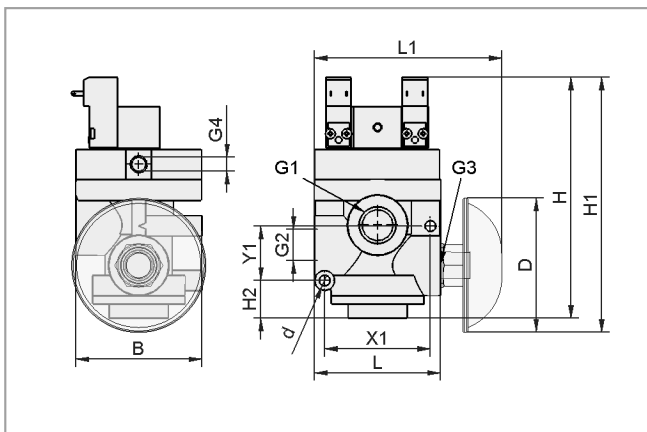
EMVP 5/8...IMP



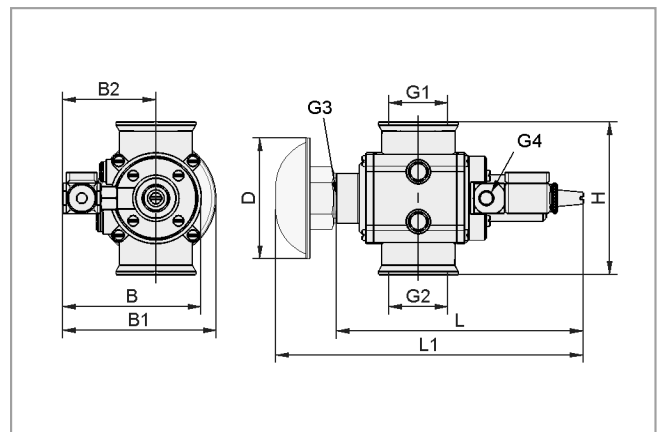
EMVP 10



EMVP 15/20/25...NO/NC



EMVP 15/20/25...IMP



EMVP 32 and 50

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Solenoid Valves



Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm



Design Data Solenoid Valves EMVP

Type	Dimensions in mm								
	B	B1	B2	d	D	G1	G2	G3	G4
EMVP 5 24V-DC 3/2 NC	15.0	-	15.0	4.3	-	G1/8"-F	G1/8"-F	G1/8"-F	M5-F
EMVP 5 24V-DC 5/2 IMP	15.2	-	15.2	4.3	-	G1/8"-F	G1/8"-F	G1/8"-F	M5-F
EMVP 8 24V-DC 3/2 NC	20.0	-	15.2	5.5	-	G1/4"-F	G1/4"-F	G1/4"-F	M5-F
EMVP 8 24V-DC 5/2 IMP	20.0	-	15.2	5.5	-	G1/4"-F	G1/4"-F	G1/4"-F	M5-F
EMVP 10 230V-AC 3/2 NO/NC	35.0	67	-	4.3	56	G3/8"-F	G3/8"-F	-	G1/8"-F
EMVP 10 24V-DC 3/2 NO/NC	35.0	67	-	4.3	56	G3/8"-F	G3/8"-F	-	G1/8"-F
EMVP 15 230V-AC 3/2 NO/NC	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 15 24V-DC 3/2 NO/NC	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 15 24V-DC 3/2 IMP	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 20 230V-AC 3/2 NO/NC	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 20 24V-DC 3/2 NO/NC	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 20 24V-DC 3/2 IMP	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 25 230V-AC 3/2 NO/NC	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 25 24V-DC 3/2 NO/NC	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 25 24V-DC 3/2 IMP	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 32 230V-AC 3/2 NO	90.5	101	61.5	-	80	G1-1/4"-F	G1-1/4"-F	G3/4"-F	G1/8"-F
EMVP 32 24V-DC 3/2 NO	90.5	101	61.5	-	80	G1-1/4"-F	G1-1/4"-F	G3/4"-F	G1/8"-F
EMVP 50 230V-AC 3/2 NO	114.0	151	105.5	-	80	G2"-F	G2"-F	G1-1/4"-F	G1/8"-F
EMVP 50 24V-DC 3/2 NO	114.0	151	105.5	-	80	G2"-F	G2"-F	G1-1/4"-F	G1/8"-F

Type	Dimensions in mm								
	H	H1	H2	H3	H4	L	L1	X1	Y1
EMVP 5 24V-DC 3/2 NC	88	-	20	12.0	27	32	37	23	15
EMVP 5 24V-DC 5/2 IMP	153	-	76	30.0	15	32	37	23	15
EMVP 8 24V-DC 3/2 NC	98	-	22	12.0	32	40	45	30	20
EMVP 8 24V-DC 5/2 IMP	173	-	86	40.0	21	40	45	30	20
EMVP 10 230V-AC 3/2 NO/NC	147	154.5	33	20.5	45	50	117	40	23
EMVP 10 24V-DC 3/2 NO/NC	147	154.5	33	20.5	45	50	117	40	23
EMVP 15 230V-AC 3/2 NO/NC	166	173.8	23	-	-	75	112	63	33
EMVP 15 24V-DC 3/2 NO/NC	166	173.8	23	-	-	75	112	63	33
EMVP 15 24V-DC 3/2 IMP	144	152.1	23	-	-	75	112	63	33
EMVP 20 230V-AC 3/2 NO/NC	166	178.3	23	-	-	75	116	63	33
EMVP 20 24V-DC 3/2 NO/NC	166	178.3	23	-	-	75	116	63	33
EMVP 20 24V-DC 3/2 IMP	144	152.1	23	-	-	75	116	63	33
EMVP 25 230V-AC 3/2 NO/NC	190	195.5	22	-	-	94	132	76	37
EMVP 25 24V-DC 3/2 NO/NC	190	195.5	22	-	-	94	132	76	37
EMVP 25 24V-DC 3/2 IMP	167	173.8	22	-	-	94	132	76	37
EMVP 32 230V-AC 3/2 NO	101	-	-	-	-	163	204	-	-
EMVP 32 24V-DC 3/2 NO	101	-	-	-	-	163	204	-	-
EMVP 50 230V-AC 3/2 NO	142	-	-	-	-	225	260	-	-
EMVP 50 24V-DC 3/2 NO	142	-	-	-	-	225	260	-	-

Solenoid Valves

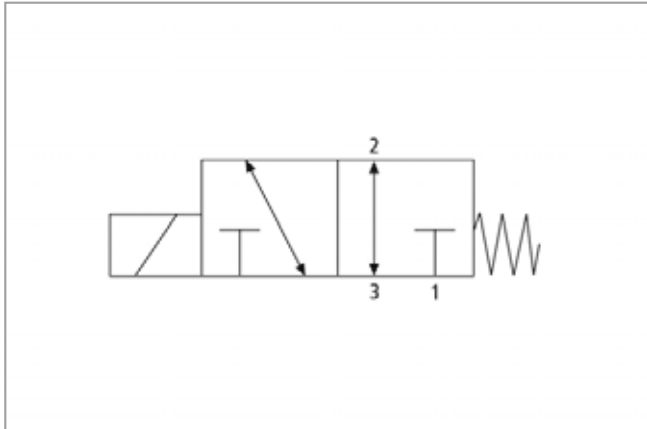


Solenoid Valves EMVP

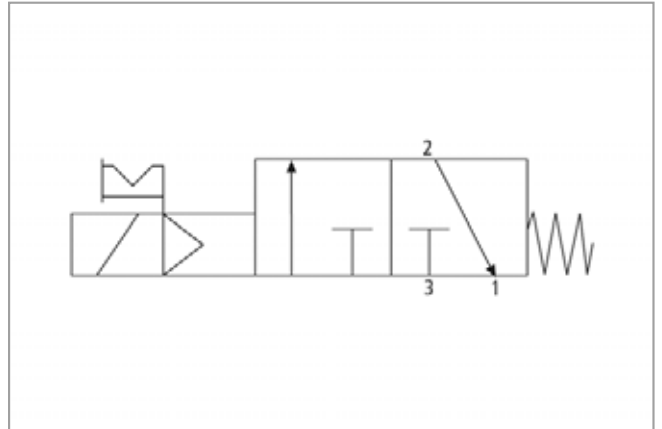
Nominal diameter from 5 mm to 50 mm



Functional Circuit Diagram Solenoid Valves EMVP



Circuit diagram EMVP 5 and EMVP 8 (1 = vacuum generator; 2 = suction cup; 3 = ventilation)



Circuit diagram EMVP 10 to 50 NO/NC (1 = vacuum generator; 2 = suction cup; 3 = ventilation)

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Check Valves and Flow Restrictors



Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"



Suitable for Industry Specific Applications



Check valves SVK, SVKG, SVV

Applications

- Check valve for applications where some of the suction cups may not be in contact with the workpiece
- Deactivation of unused suction cups, the system vacuum is maintained
- Handling of workpieces with varying sizes and shapes with the same gripper system

Design

- Ball seat valve
- Ball in brass seat, installed in a space-saving manner in an aluminum body
- On the type SVV, the flow rate can be adjusted continuously with an adjusting screw
- Suitable for installation in any orientation

Our Highlights...

- Check valve in the form of a ball seat valve
- Reaction dependent on the volume flow rate
- Wide range of nominal sizes
- Available with male thread at the top (type SVK) or bottom (type SVKG)

Your Benefits...

- > Closing of vacuum lines leading to unused suction cups to maintain the system vacuum
- > Low leakage rate which can be compensated with the aid of a bypass
- > Also suitable for use in applications with high nominal flow rates
- > Can be connected to all common suction cups and plates



Designation Code Check Valves SVK, SVKG, SVV

Abbreviated designation	Connection thread
Example SVK M5-IG:	
SVK	M5-IG
SVK male thread at the top	M5-AG (AG = male (M))
SVKG male thread at the bottom	M5-IG (IG = female (F))
SVV adjusting screw	G1/8-AG
	G1/8-IG
	G1/4-AG
	G1/4-IG
	G3/8-AG
	G3/8-IG
	G1/2-AG
	G1/2-IG

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Check Valves and Flow Restrictors



Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"



Ordering Data Check Valves SVK, SVKG, SVV

Check valve SVK, SVKG, SVV is delivered as a ready to connect product.

Check Valves SVK, SVKG, SVV

Type	Part Number
SVK M5-IG	10.05.03.00033
SVK G1/8-IG	10.05.03.00034
SVK G1/4-IG	10.05.03.00035
SVK G3/8-IG	10.05.03.00036
SVK G1/2-IG	10.05.03.00037
SVKG M5-AG	10.05.03.00166
SVKG G1/8-AG	10.05.03.00128
SVKG G1/4-AG	10.05.03.00131
SVKG G3/8-AG	10.05.03.00135
SVKG G1/2-AG	10.05.03.00133
SVV G1/4-IG	10.05.03.00003



Technical Data Check Valves SVK, SVKG, SVV

Type	Required evacuation rate for $p_u = -0,3$ bar [m ³ /h]	Required evacuation rate for $p_u = -0,3$ bar [l/min]	Required evacuation rate for $p_u = -0,6$ bar [m ³ /h]	Required evacuation rate for $p_u = -0,6$ bar [l/min]	Max. flow rate [m ³ /h] when blowing off*	Max. flow rate [l/min] when blowing off*	Weight [g]
SVK M5-IG	0.07	1.2	0.08	1.3	4.8	80	2.2
SVK G1/8-IG	0.14	2.3	0.15	2.5	18.6	310	11.2
SVK G1/4-IG	0.17	2.9	0.20	3.4	20.4	340	17.5
SVK G3/8-IG	0.44	7.3	0.48	8.0	35.4	590	30.3
SVK G1/2-IG	0.49	8.1	0.54	9.0	47.4	790	47.4
SVKG M5-AG	0.07	1.2	0.08	1.3	4.8	80	2.2
SVKG G1/8-AG	0.14	2.3	0.15	2.5	18.6	310	11.2
SVKG G1/4-AG	0.17	2.9	0.20	3.4	20.4	340	17.5
SVKG G3/8-AG	0.44	7.3	0.48	8.0	35.4	590	30.3
SVKG G1/2-AG	0.49	8.1	0.54	9.0	47.4	790	47.4
SVV G1/4-IG	1.36	22.6	1.72	28.6	24.0	400	24.7

*Blow-off pressure 5 bar

Check Valves and Flow Restrictors

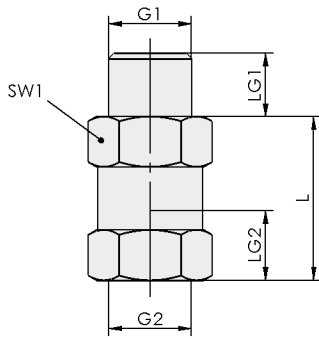


Check Valves SVK, SVKG, SVV

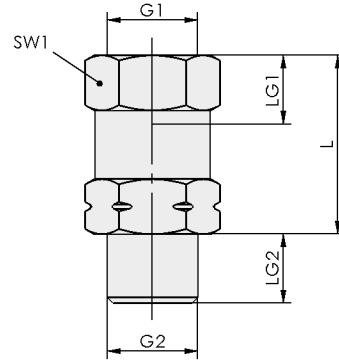
Connection thread from M5 to G1/2"



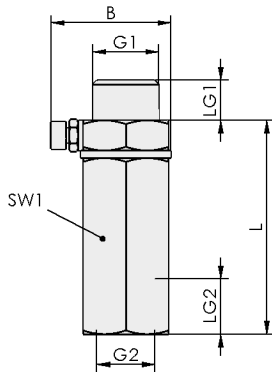
Design Data Check Valves SVK, SVKG, SVV



SVK M5 to G1/2



SVKG M5 to G1/2



SVV G1/4

Type	Dimensions in mm						
	B	G1	G2	L	LG1	LG2	SW1
SVK M5-IG	-	M5-M	M5-F	15.5	4.5	4.5	8
SVK G1/8-IG	-	G1/8"-M	G1/8"-F	26.0	8.0	8.5	14
SVK G1/4-IG	-	G1/4"-M	G1/4"-F	26.0	10.0	11.0	17
SVK G3/8-IG	-	G3/8"-M	G3/8"-F	29.0	10.0	12.0	22
SVK G1/2-IG	-	G1/2"-M	G1/2"-F	29.0	12.0	14.0	27
SVKG M5-AG	-	M5-F	M5-M	20.0	4.5	4.5	8
SVKG G1/8-AG	-	G1/8"-F	G1/8"-M	26.0	8.5	8.0	14
SVKG G1/4-AG	-	G1/4"-F	G1/4"-M	26.0	11.0	10.0	17
SVKG G3/8-AG	-	G3/8"-F	G3/8"-M	29.0	12.0	10.0	22
SVKG G1/2-AG	-	G1/2"-F	G1/2"-M	29.0	14.0	12.0	27
SVV G1/4-IG	23.9	G1/4"-M	G1/4"-F	42.5	8.0	11.0	17

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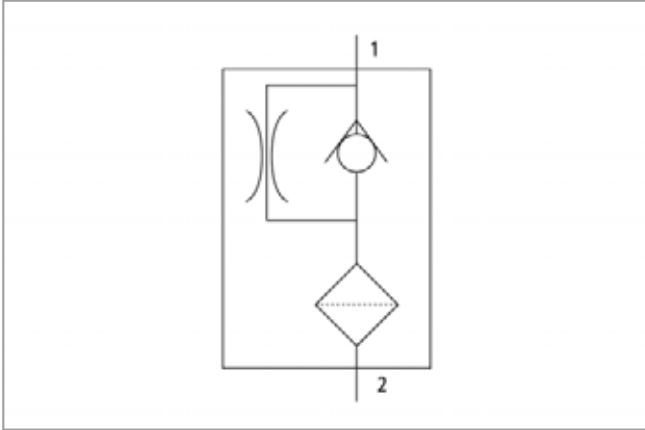
Check Valves and Flow Restrictors



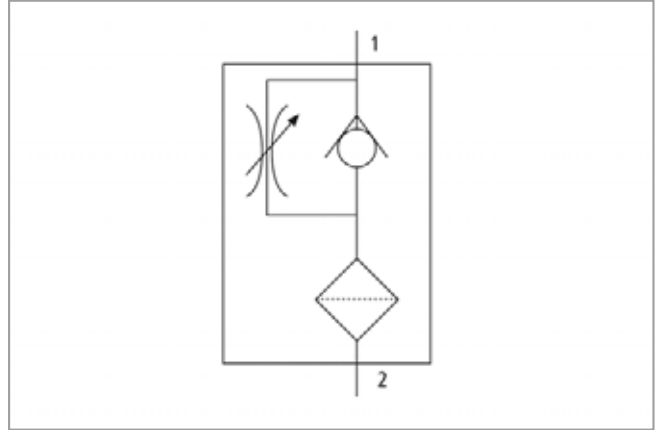
Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"

Functional Circuit Diagram Check Valves SVK, SVKG, SVV



Circuit diagram SVK/SVKG (1 = vacuum generator; 2 = suction cup)



Circuit diagram SVV (1 = vacuum generator; 2 = suction cup)

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Check Valves and Flow Restrictors



Check Valves SVN

Connection thread G1/4"



Suitable for Industry Specific Applications



Check valves SVN

Applications

- Check valves for handling porous workpieces
- Deactivation of unused suction cups, the system vacuum is maintained

Design

- Flying-ball valve mounted in a space-saving manner in an aluminum body
- Blow-off function provides self-cleaning effect for use in dusty surroundings
- Molded-on nipple for various types of suction cups (size identical to that of a standard nipple)

Our Highlights...

- Special check valve with flying ball
- Integrated nipple for connection of a suction cup
- Check valve with self-cleaning effect
- Reaction dependent on the volume flow rate
- Minimum size

Your Benefits...

- > Reduction of the cross-section of the vacuum line leading to an unused suction cup; special version for porous workpieces
- > No additional nipple needed for many different types of suction cup
- > Special version for use in dusty surroundings
- > Not triggered by the normal leakage encountered when handling porous workpieces
- > Also suitable for use in restricted spaces



Designation Code Check Valves SVN

Abbreviated designation	Connection thread	Nipple family
Example SVN G1/4-AG N011:		
SVN	G1/4-AG	N011
SVN	G1/4-AG M10x1.25 (AG = male (M))	N009
	G1/4-AG	to N019



Ordering Data Check Valves SVN

Check valve SVN is delivered as a ready to connect product.

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Check Valves and Flow Restrictors



Check Valves SVN

Connection thread G1/4"

Check Valves SVN

Type	Part Number
SVN G1/4-AG N011	10.05.03.00068
SVN G1/4-AG N012	10.05.03.00074
SVN G1/4-AG N013	10.05.03.00066
SVN G1/4-AG N014	10.05.03.00070
SVN G1/4-AG N015	10.05.03.00072
SVN G1/4-AG N018	10.05.03.00054
SVN G1/4-AG N019	10.05.03.00056
SVN G1/4-AG M10x1.25-AG N009	10.05.03.00060

Technical Data Check Valves SVN

Type	Required evacuation rate for pu = -0,3 bar [m³/h]	Required evacuation rate for pu = -0,3 bar [l/min]	Required evacuation rate for pu = -0,6 bar [m³/h]	Required evacuation rate for pu = -0,6 bar [l/min]	Max. flowrate [m³/h] when blowing off*	Max. flowrate [l/min] when blowing off*	Weight [g]
SVN G1/4-AG N011	2.3	38.3	3.3	55	27	450	8
SVN G1/4-AG N012	2.3	38.3	3.3	55	27	450	15
SVN G1/4-AG N013	2.3	38.3	3.3	55	27	450	9
SVN G1/4-AG N014	2.3	38.3	3.3	55	27	450	12
SVN G1/4-AG N015	2.3	38.3	3.3	55	27	450	18
SVN G1/4-AG N018	2.3	38.3	3.3	55	27	450	8
SVN G1/4-AG N019	2.3	38.3	3.3	55	27	450	18
SVN G1/4-AG M10x1.25-AG N009	2.3	38.3	3.3	55	27	450	10

*Blow-off pressure 5 bar

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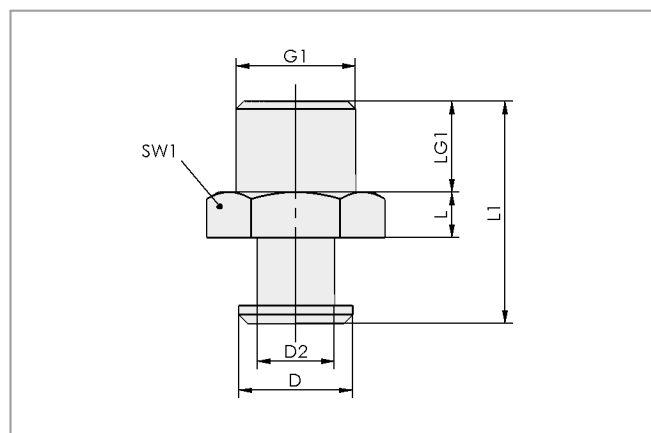
Check Valves and Flow Restrictors



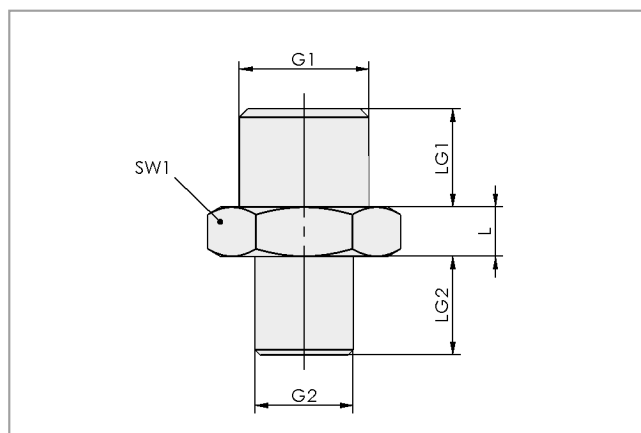
Check Valves SVN

Connection thread G1/4"

Design Data Check Valves SVN



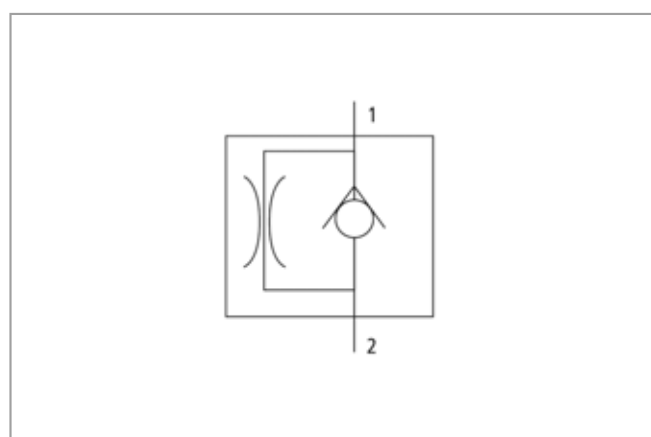
SVN G1/4-AG N011 to N019



SVN G1/4-AG M10x1.25-AG N009

Type	Dimensions in mm								
	D	D2	G1	G2	L	LG1	LG2	L1	SW1
SVN G1/4-AG N011	12.5	8.5	G1/4"-M	-	5.0	10.0	-	25.0	17.0
SVN G1/4-AG N012	18.0	13.0	G1/4"-M	-	5.0	10.0	-	29.5	22.0
SVN G1/4-AG N013	12.5	8.5	G1/4"-M	-	5.0	10.0	-	28.5	17.0
SVN G1/4-AG N014	16.5	12.5	G1/4"-M	-	5.0	10.0	-	29.5	17.0
SVN G1/4-AG N015	16.5	13.0	G1/4"-M	-	5.0	10.0	-	37.5	22.0
SVN G1/4-AG N018	14.0	9.0	G1/4"-M	-	5.0	11.0	-	29.0	17.0
SVN G1/4-AG N019	20.0	13.5	G1/4"-M	-	6.0	11.0	-	40.0	21.0
SVN G1/4-AG M10x1.25-AG N009	-	-	G1/4"-M	M10x1.25-M	5.0	10.0	10.0	-	17.0

Functional Circuit Diagram Check Valves SVN



Circuit diagram SVN (1 = vacuum generator; 2 = suction cup)

Check Valves and Flow Restrictors



Flow Restrictors SW

Nominal diameter from 0.25 mm to 2 mm



Suitable for Industry Specific Applications



Flow restrictors SW

Applications

- Flow restrictor for handling of porous workpieces
- Reduction of the flow rate through individual suction cups in order to maintain the vacuum in the overall system
- May be installed in any orientation

Design

- Double-ended threaded nipple with reduced flow cross section
- Large gradation of different flow cross sections

Our Highlights...

- No moving parts
- Acts as a flow restrictor with a reduced cross-section
- Minimum size

Your Benefits...

- > Robust design with long operating lifetime
- > Reduction of the cross-section of the vacuum line, particularly useful when handling porous workpieces
- > Also suitable for use in restricted spaces



Designation Code Flow Restrictors SW

Abbreviated designation	Nominal size	Connection thread
Example SW 25 G1/8-AG:		
SW	25	G1/8-AG
SW	25 = 0.25 mm to 200 = 2.00 mm	G1/8-AG (AG = male (M)) G1/4-AG



Ordering Data Flow Restrictors SW

Flow restrictor SW is delivered as a ready to connect product.

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Flow Restrictors SW

Nominal diameter from 0.25 mm to 2 mm

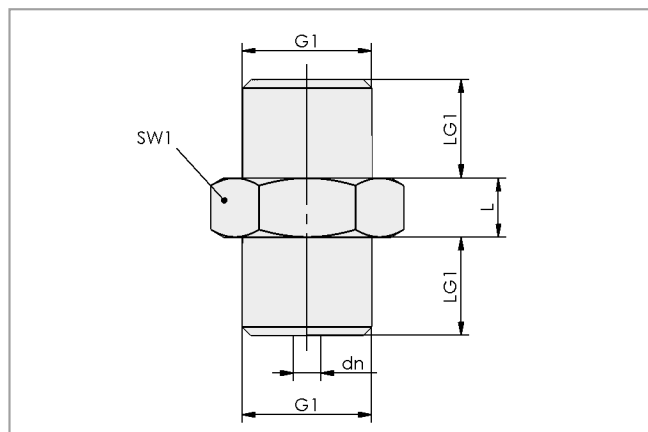
Flow Restrictors SW

Type	Connection	
	G1/4"-M	G1/8"-M
SW 25	-	10.05.04.00034
SW 40	10.05.04.00010	10.05.04.00001
SW 50	10.05.04.00011	10.05.04.00002
SW 60	10.05.04.00012	10.05.04.00003
SW 70	10.05.04.00013	10.05.04.00004
SW 80	10.05.04.00014	10.05.04.00005
SW 90	10.05.04.00015	10.05.04.00006
SW 100	10.05.04.00016	10.05.04.00007
SW 110	10.05.04.00017	10.05.04.00008
SW 120	10.05.04.00018	10.05.04.00009
SW 150	10.05.04.00029	-
SW 200	10.05.04.00019	-

Technical Data Flow Restrictors SW

Type	Nominal size	Required evacuation rate for $p_u = -0,3$ bar [m^3/h]	Required evacuation rate for $p_u = -0,3$ bar [l/min]	Required evacuation rate for $p_u = -0,6$ bar [m^3/h]	Required evacuation rate for $p_u = -0,6$ bar [l/min]
SW 25	0.25 mm	0.01	0.2	0.02	0.3
SW 40	0.40 mm	0.06	1.0	0.08	1.3
SW 50	0.50 mm	0.13	2.2	0.15	2.5
SW 60	0.60 mm	0.18	3.0	0.19	3.1
SW 70	0.70 mm	0.24	4.0	0.26	4.3
SW 80	0.80 mm	0.30	4.9	0.32	5.3
SW 90	0.90 mm	0.39	6.5	0.42	7.0
SW 100	1.00 mm	0.47	7.8	0.50	8.4
SW 110	1.10 mm	0.62	10.3	0.63	10.5
SW 120	1.20 mm	0.74	12.3	0.76	12.7
SW 150	1.50 mm	1.32	22.0	1.40	23.4
SW 200	2.00 mm	2.05	34.1	2.18	36.4

Design Data Flow Restrictors SW



SW 25 to 200

Check Valves and Flow Restrictors



Flow Restrictors SW

Nominal diameter from 0.25 mm to 2 mm

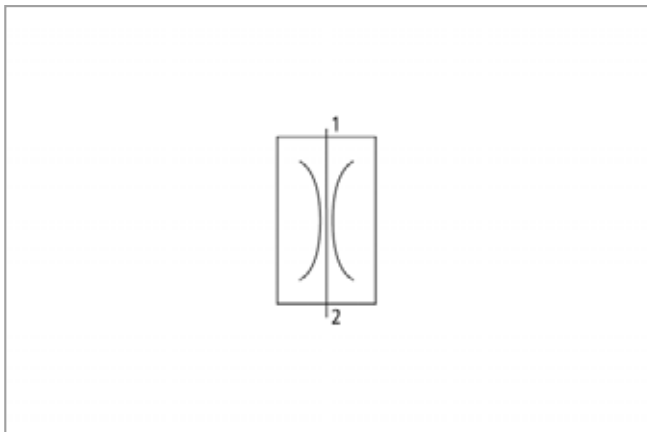


Design Data Flow Restrictors SW

Type	Dimensions in mm				
	dn	G1	L	LG1	SW1
SW 25 G1/8-AG	0.25	G1/8"-M	6.0	9.5	14
SW 40 G1/8-AG	0.40	G1/8"-M	6.0	9.5	14
SW 50 G1/8-AG	0.50	G1/8"-M	6.0	9.5	14
SW 60 G1/8-AG	0.60	G1/8"-M	6.0	9.5	14
SW 70 G1/8-AG	0.70	G1/8"-M	6.0	9.5	14
SW 80 G1/8-AG	0.80	G1/8"-M	6.0	9.5	14
SW 90 G1/8-AG	0.90	G1/8"-M	6.0	9.5	14
SW 100 G1/8-AG	1.00	G1/8"-M	6.0	9.5	14
SW 110 G1/8-AG	1.10	G1/8"-M	6.0	9.5	14
SW 120 G1/8-AG	1.20	G1/8"-M	6.0	9.5	14
SW 40 G1/4-AG	0.40	G1/4"-M	6.0	10.0	17
SW 50 G1/4-AG	0.50	G1/4"-M	6.0	10.0	17
SW 60 G1/4-AG	0.60	G1/4"-M	6.0	10.0	17
SW 70 G1/4-AG	0.70	G1/4"-M	6.0	10.0	17
SW 80 G1/4-AG	0.80	G1/4"-M	6.0	10.0	17
SW 90 G1/4-AG	0.90	G1/4"-M	6.0	10.0	17
SW 100 G1/4-AG	1.00	G1/4"-M	6.0	10.0	17
SW 110 G1/4-AG	1.10	G1/4"-M	6.0	10.0	17
SW 120 G1/4-AG	1.20	G1/4"-M	6.0	10.0	17
SW 150 G1/4-AG	1.50	G1/4"-M	5.0	9.0	17
SW 200 G1/4-AG	2.00	G1/4"-M	5.0	9.0	17



Functional Circuit Diagram Flow Restrictors SW



Circuit diagram SW 25 to 200 (1 = vacuum generator; 2 = suction cup)

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Touch Valves



Touch Valves TV / TVN

Rated flow from 12 l/min to 160 l/min



Suitable for Industry Specific Applications



Touch valves TV / TVN

Applications

- Touch valve for applications where some of the suction cups may not always be in contact with the workpiece
- Vacuum line to a suction cup is opened only if a workpiece is detected by a mechanical sensor
- May be installed in any orientation

Design

- Touch valve with spring-loaded plunger and protective cap
- Type TVN with molded-on suction-cup nipple for direct mounting
- Does not react if the suction cup is only partially in contact with the workpiece

Our Highlights...

- Touch valve with spring-loaded plunger
- Reaction is unaffected by the workpiece material
- Minimum size

Your Benefits...

- > The vacuum line is opened only if the suction cup is in contact with the workpiece (mechanical sensing)
- > Can also be used for porous workpieces
- > Also suitable for use in restricted spaces

Designation Code Touch Valves TV / TVN

Abbreviated designation	Connection thread	Plunger stroke in mm	Nipple family
Example TV G1/4-AG 5:			
TV	G1/4-AG	5	
TV without suction cup nipple	G1/8-AG (AG = male (M))	5	N007
TVN with molded-on suction cup nipple	G1/4-AG	to	N008
	G1/2-AG	13	N009
			N041

Ordering Data Touch Valves TV / TVN

Touch valve TV / TVN is delivered as a ready to connect product.

Touch Valves



Touch Valves TV / TVN

Rated flow from 12 l/min to 160 l/min

Touch Valves TV / TVN

Type	Part Number
TV G1/4-AG 5	10.05.10.00064
TV G1/4-AG 13	10.05.10.00061
TV G1/2-AG 13	10.05.10.00038
TVN G1/8-AG 6 N007	10.05.10.00021
TVN G1/8-AG 6.5 N008	10.05.10.00023
TVN G1/4-AG 8.4 N041	10.05.10.00058
TVN G1/4-AG 9 N009	10.05.10.00065

Technical Data Touch Valves TV / TVN

Type	Nominal flow rate [m ³ /h]	Nominal flow rate [l/min]
TV G1/4-AG 5	3.3	55
TV G1/4-AG 13	3.3	55
TV G1/2-AG 13	9.6	160
TVN G1/8-AG 6 N007	0.7	12
TVN G1/8-AG 6.5 N008	0.7	12
TVN G1/4-AG 8.4 N041	4.6	78
TVN G1/4-AG 9 N009	4.6	78

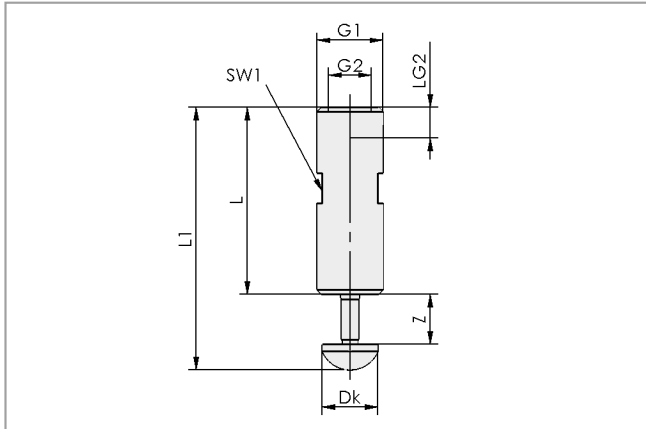
- Schmalz - The Company
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- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
- Valve Technology**
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Touch Valves TV / TVN

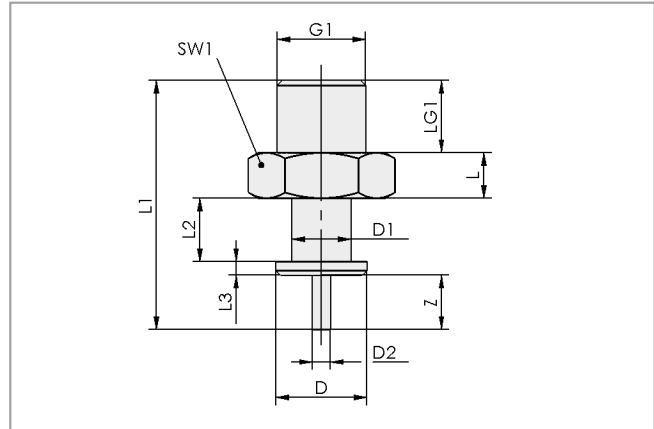
Rated flow from 12 l/min to 160 l/min



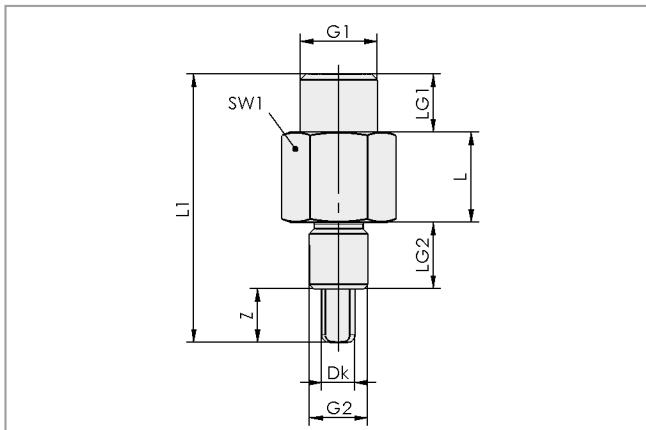
Design Data Touch Valves TV / TVN



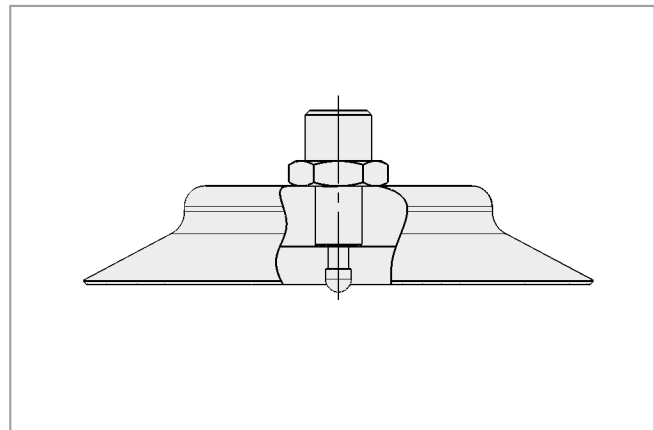
TV G1/4 and G1/2



TVN G1/8-AG-6, G1/8-AG-6.5 and G1/4-AG-8.4



TVN G1/4-AG-9



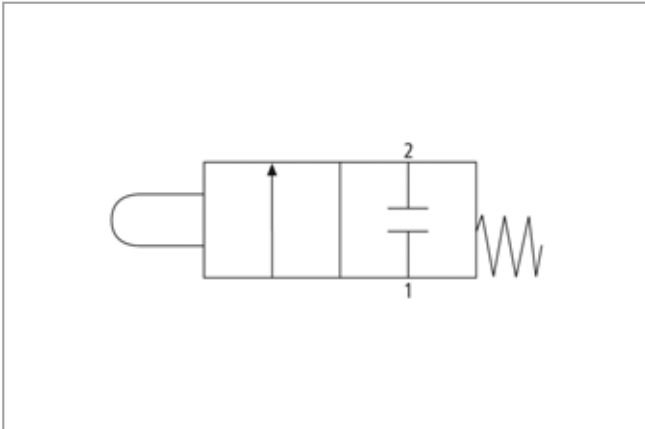
Installation example, touch valve in flat suction cup

Type	Dimensions in mm													
	D	D1	D2	Dk	G1	G2	L	L1	L2	L3	LG1	LG2	SW1	Z
TV G1/4-AG 5	-	-	-	11	G1/4"-M	G1/8"-F	45.5	55.6	-	-	-	6	11	5.0
TV G1/4-AG 13	-	-	-	11	G1/4"-M	G1/8"-F	45.5	63.5	-	-	-	6	11	13.0
TV G1/2-AG 13	-	-	-	11	G1/2"-M	G3/8"-F	54.5	67.5	-	-	-	12	19	13.0
TVN G1/8-AG 6 N007	10	6.5	2.0	-	G1/8"-M	-	5.0	27.5	7.0	1.5	8	-	14	6.0
TVN G1/8-AG 6.5 N008	14	8.5	2.0	-	G1/8"-M	-	5.0	28.5	7.0	1.5	8	-	14	6.5
TVN G1/4-AG 8.4 N041	17	8.7	6.0	-	G1/4"-M	-	10.0	45.7	12.3	3.0	11	-	17	8.4
TVN G1/4-AG 9 N009	-	-	-	6	G1/4"-M	M10x1.25-M	15.5	47.0	-	-	10	12	17	9.0

Touch Valves TV / TVN

Rated flow from 12 l/min to 160 l/min

Functional Circuit Diagram Touch Valves TV / TVN



Circuit diagram TV/TVN (1 = vacuum generator; 2 = suction cup)

Recommended Suction Cup Connections TVN

Touch valve with nipple TVN	Suction cup type*
TVN G1/8-AG 6	PFG 25
TVN G1/8-AG 6	PFG 30
TVN G1/8-AG 6	PFG 35
TVN G1/8-AG 6	PFG 40
TVN G1/8-AG 6.5	PFG 50
TVN G1/4-AG 8.7	SHFN 50, SHFN 70, SHFN 85
TVN G1/4-AG 9	PFG 60, SHFN 70 E, SHFN 85 E
TVN G1/4-AG 9	PFG 80, SHFN 70 E, SHFN 85 E
TVN G1/4-AG 9	PFG 95, SHFN 70 E, SHFN 85 E

*Except PFG VU1

Non-Return Valves



Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm



Suitable for Industry Specific Applications



Non-return valves RSV

Applications

- Non-return valve for maintaining the vacuum in the case of a power failure or a failure of the vacuum generator
- Can also be used with energy-saving systems when handling non-porous materials
- May be installed in any orientation

Design

- Spring-loaded seat valve
- Brass body (RSV 6, which is made of aluminum)
- Seat made of synthetic rubber, gasket made of nylon
- Stainless-steel spring

Our Highlights...

- Seat-type non-return valve
- Wide range of nominal diameters
- Very small size

Your Benefits...

- > Closure of the vacuum line in order to maintain the system vacuum in the case, for example, of a power failure
- > Very low to very high nominal flow rates possible
- > Also suitable for use in restricted spaces



Designation Code Non-Return Valves RSV

Abbreviated designation	Nominal size in mm	Connection thread
Example RSV 6 G1/4-IG:		
RSV	6	G1/4-IG
RSV	6 to 54	G1/4-IG (IG = female (F)) G3/8-IG G1/2-IG G3/4-IG G1-IG G1-1/4-IG G1-1/2-IG G2-IG



Ordering Data Non-Return Valves RSV

Non-return valve RSV is delivered as a ready to connect product.

Schmalz - The Company
Vacuum Knowledge
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Special Grippers
Vacuum Gripping Systems
Mounting Elements
Vacuum Generators
Valve Technology
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Non-Return Valves



Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm

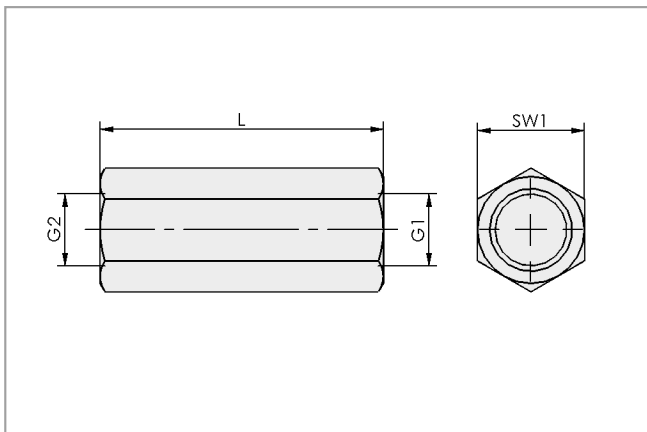
Non-Return Valves RSV

Type	Part Number
RSV 6 G1/4-IG	10.05.05.00001
RSV 14 G3/8-IG	10.05.05.00002
RSV 18 G1/2-IG	10.05.05.00003
RSV 20 G3/4-IG	10.05.05.00004
RSV 28 G1-IG	10.05.05.00005
RSV 36 G1-1/4-IG	10.05.05.00006
RSV 42 G1-1/2-IG	10.05.05.00007
RSV 54 G2-IG	10.05.05.00008

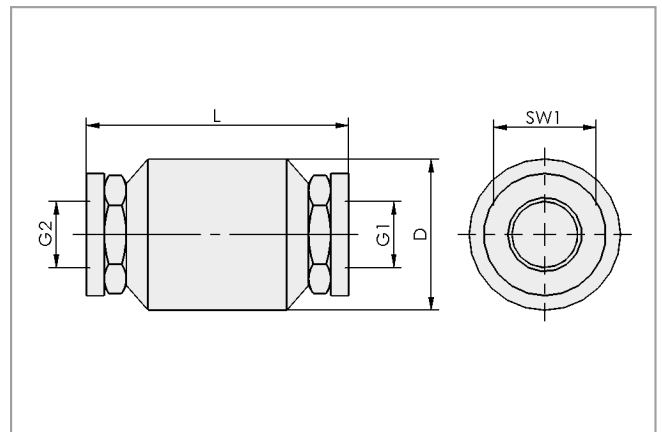
Technical Data Non-Return Valves RSV

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Opening pressure [mbar]	Operating temperature [°C]	Weight [kg]
RSV 6 G1/4-IG	6	5	83	200	-20 ... 100	0.02
RSV 14 G3/8-IG	14	20	333	20	-20 ... 100	0.18
RSV 18 G1/2-IG	18	26	433	20	-20 ... 100	0.19
RSV 20 G3/4-IG	20	45	750	20	-20 ... 100	0.27
RSV 28 G1-IG	28	75	1250	20	-20 ... 100	0.49
RSV 36 G1-1/4-IG	36	125	2083	20	-20 ... 100	0.74
RSV 42 G1-1/2-IG	42	200	3333	20	-20 ... 100	0.98
RSV 54 G2-IG	54	350	5833	20	-20 ... 100	1.10

Design Data Non-Return Valves RSV



RSV 6



RSV 14 to 54

Type	Dimensions in mm				
	D	G1	G2	L	SW1
RSV 6 G1/4-IG	-	G1/4"-F	G1/4"-F	45	17
RSV 14 G3/8-IG	34	G3/8"-F	G3/8"-F	59	23
RSV 18 G1/2-IG	34	G1/2"-F	G1/2"-F	62	27
RSV 20 G3/4-IG	41	G3/4"-F	G3/4"-F	69	33
RSV 28 G1-IG	52	G1"-F	G1"-F	84	40
RSV 36 G1-1/4-IG	63	G1-1/4"-F	G1-1/4"-F	88	50
RSV 42 G1-1/2-IG	71	G1-1/2"-F	G1-1/2"-F	96	50
RSV 54 G2-IG	87	G2"-F	G2"-F	100	70

Non-Return Valves

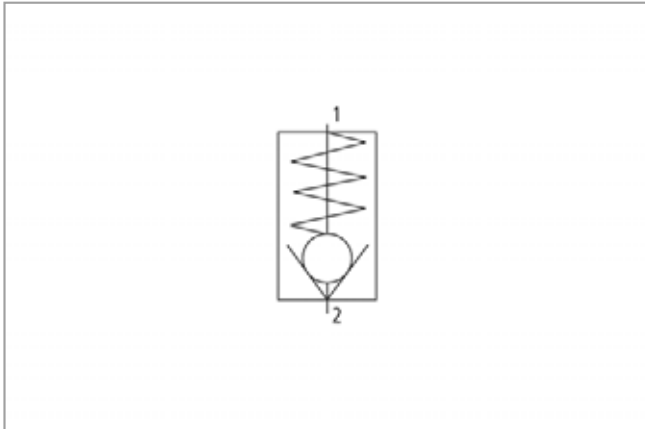


Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm



Functional Circuit Diagram Non-Return Valves RSV



Circuit diagram RSV (1 = vacuum generator; 2 = suction cup)

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Manually Actuated Valves



Two-Way Ball Valves KVZ

Nominal diameter from 8 mm to 50 mm



Suitable for Industry Specific Applications



Two-way ball valves KVZ

Applications

- Two-way ball valve for manual connection and disconnection of vacuum and compressed air circuits
- For use in vacuum spiders and handling devices
- May be installed in any orientation

Design

- Ball valve made of brass (body and ball)
- Teflon gaskets
- 2/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust brass construction

Your Benefits...

- > Absolutely tight: no leaks
- > Optimum matching to nominal flow rate
- > Robust and free of wear



Designation Code Two-Way Ball Valves KVZ

Abbreviated designation	Nominal size in mm	Version
Example KVZ 8 2/2:		
KVZ	8	2/2
KVZ	8	2/2 2/2-way-valve
	20	
	32	
	50	



Ordering Data Two-Way Ball Valves KVZ

Two-way ball valve KVZ is delivered as a ready to connect product.

Two-Way Ball Valves KVZ

Type	Part Number
KVZ 8 2/2	10.05.08.00018
KVZ 20 2/2	10.05.08.00007
KVZ 32 2/2	10.05.08.00008
KVZ 50 2/2	10.05.08.00009

Manually Actuated Valves



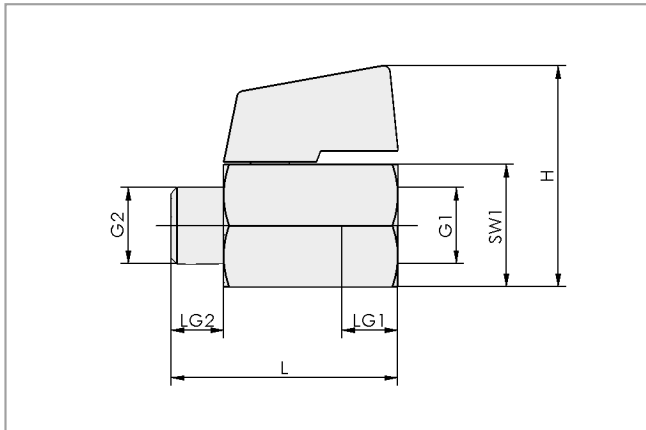
Two-Way Ball Valves KVZ

Nominal diameter from 8 mm to 50 mm

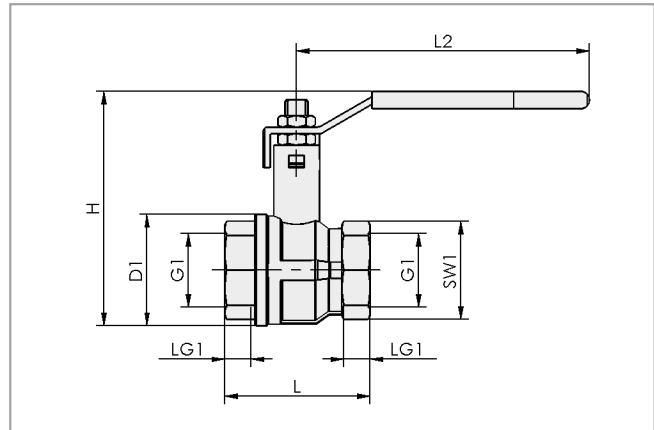
Technical Data Two-Way Ball Valves KVZ

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Pressure range (operating pressure) [bar]	Weight [kg]
KVZ 8 2/2	8	10	167	-0.95 ... 15.00	0.077
KVZ 20 2/2	20	45	750	-0.95 ... 15.00	0.280
KVZ 32 2/2	32	100	1667	-0.95 ... 15.00	0.700
KVZ 50 2/2	50	310	5167	-0.95 ... 15.00	1.470

Design Data Two-Way Ball Valves KVZ



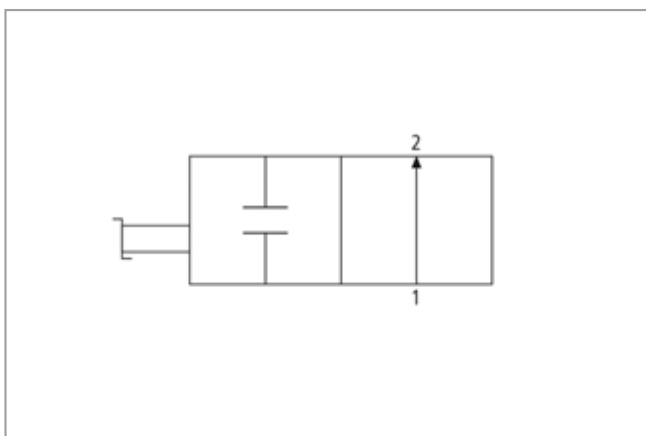
KVZ 8



KVZ 20 to 50

Type	Dimensions in mm									
	D1	G1	G2	H	L	L2	LG1	LG2	SW1	
KVZ 8 2/2	-	G1/4"-F	G1/4"-M	38.0	39	-	10.5	9	21	
KVZ 20 2/2	39	G3/4"-F	-	69.3	54	120	12.0	-	31	
KVZ 32 2/2	59	G1-1/4"-F	-	124.2	77	155	15.5	-	48	
KVZ 50 2/2	86	G2"-F	-	151.0	106	155	19.5	-	66	

Functional Circuit Diagram Two-Way Ball Valves KVZ



Circuit diagram KVZ (1 = vacuum generator; 2 = suction cup)

Manually Actuated Valves



Three-Way Ball Valves KVD

Nominal diameter from 6 mm to 25 mm



Suitable for Industry Specific Applications



Three-way ball valves KVD

Applications

- Three-way ball valve for manual connection and disconnection of vacuum and compressed air circuits
- Activation and venting of individual suction cups
- For use in vacuum spiders and handling devices
- May be installed in any orientation

Design

- Ball valve made of brass (body and ball)
- Teflon gaskets
- Aluminium handle
- 3/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust brass construction
- Venting function

Your Benefits...

- > Absolutely tight: no leaks
- > Optimal matching to the nominal flow rate
- > Robust and free of wear
- > Venting function for quick release of parts



Designation Code Three-Way Ball Valves KVD

Abbreviated designation	Nominal size in mm	Version
Example KVD 6 3/2:		
KVD	6	3/2
KVD	6	3/2 3/2-way-valve
	10	
	15	
	20	
	25	



Ordering Data Three-Way Ball Valves KVD

Three-way ball valve KVD is delivered as a ready to connect product.

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

Switches and Monitoring

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Manually Actuated Valves



Three-Way Ball Valves KVD

Nominal diameter from 6 mm to 25 mm

Three-Way Ball Valves KVD

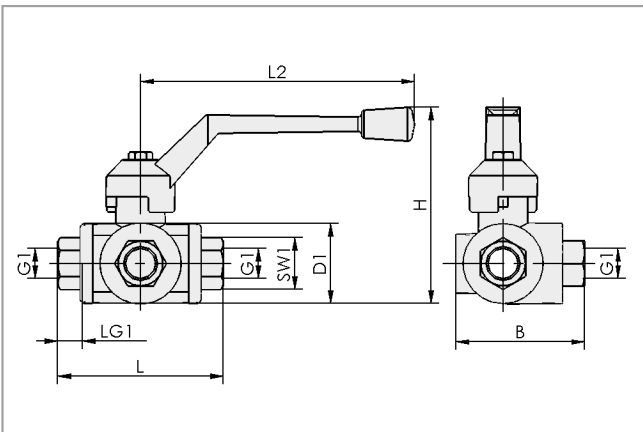
Type	Part Number
KVD 6 3/2	10.05.08.00001
KVD 10 3/2	10.05.08.00002
KVD 15 3/2	10.05.08.00003
KVD 20 3/2	10.05.08.00004
KVD 25 3/2	10.05.08.00005

Technical Data Three-Way Ball Valves KVD

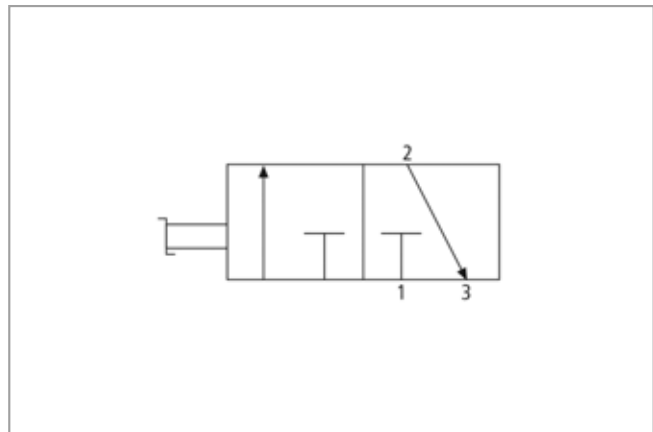
Type	Nominal size [mm]	Nominal flow rate [m³/h]*	Nominal flow rate [l/min]*	Pressure range (operating pressure) [bar]	Weight [kg]
KVD 6 3/2	6	5	83	-0.95 ... 16.00	0.081
KVD 10 3/2	10	15	250	-0.95 ... 16.00	0.810
KVD 15 3/2	15	22	367	-0.95 ... 16.00	0.810
KVD 20 3/2	20	45	750	-0.95 ... 16.00	1.260
KVD 25 3/2	25	55	917	-0.95 ... 16.00	1.930

*In the case of a pressure drop of 50 mbar

Design Data Three-Way Ball Valves KVD



KVD 6 to 25



Circuit diagram KVD (1 = vacuum generator; 2 = suction cup; 3 = ventilation)

Type	Dimensions in mm								
	B	D1	G1	H	L	L2	LG1	SW1	
KVD 6 3/2	58	39	G1/4"-F	85.0	77	125	19	22	
KVD 10 3/2	58	39	G3/8"-F	85.0	77	125	19	22	
KVD 15 3/2	58	39	G1/2"-F	85.0	77	125	19	29	
KVD 20 3/2	70	47	G3/4"-F	107.0	92	145	23	34	
KVD 25 3/2	80	55	G1"-F	124.0	104	170	25	41	

Manually Actuated Valves



Manual Slide Valves HSV

Nominal diameter from 7 mm to 24 mm



Suitable for Industry Specific Applications



Manual slide valves HSV

Applications

- Manual slide valve for manual switching of vacuum or compressed air circuits
- Robust construction permits high switching frequencies
- For use in vacuum gripping systems and handling devices
- May be installed in any orientation

Design

- Manual slide valve made of brass and aluminium
- Additional lock possible (HSV 12 and 24 3/2 S)
- Easily-actuated sliding sleeve
- 3/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust metal construction
- Small size
- Venting function

Your Benefits...

- > Absolutely vacuum-tight: no leaks
- > Optimum matching to the nominal flow rate
- > Robust and free of wear
- > Space-saving and ergonomical
- > Venting function for quick release of parts



Designation Code Manual Slide Valves HSV

Abbreviated designation	Nominal size in mm	Version	Product addition
Example HSV 7 3/2:			
HSV	7	3/2	
HSV	7	3/2 3/2-way-valve	Lock
	8		
	12		
	24		



Ordering Data Manual Slide Valves HSV

Manual slide valve HSV is delivered as a ready to connect product.

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

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Manually Actuated Valves



Manual Slide Valves HSV

Nominal diameter from 7 mm to 24 mm

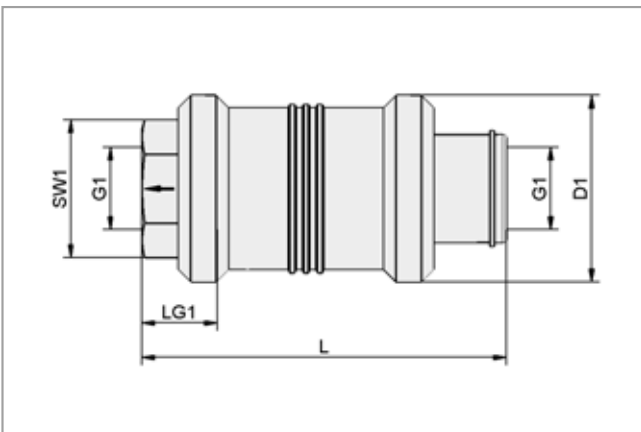
Manual Slide Valves HSV

Type	Part Number
HSV 7 3/2	10.05.07.00034
HSV 8 3/2	10.05.07.00035
HSV 12 3/2	10.05.07.00036
HSV 12 3/2 S	10.05.07.00037
HSV 24 3/2 S	10.05.07.00038

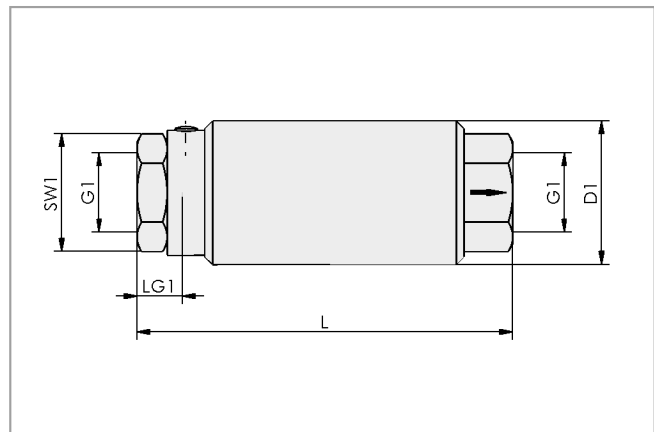
Technical Data Manual Slide Valves HSV

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Pressure range (operating pressure) [bar]	Weight [kg]
HSV 7 3/2	7	6	100	-0.95 ... 10.00	0.097
HSV 8 3/2	8	10	167	-0.95 ... 10.00	0.156
HSV 12 3/2	12	16	267	-0.95 ... 10.00	0.230
HSV 12 3/2 S	12	16	267	-0.95 ... 10.00	0.356
HSV 24 3/2 S	24	50	833	-0.95 ... 10.00	0.513

Design Data Manual Slide Valves HSV



HSV 7 3/2 to 12 3/2



HSV 12 3/2 S and HSV 24 3/2 S

Type	Dimensions in mm					
	D1	G1	L	LG1	SW1	
HSV 7 3/2	30	G1/4"-F	58.0	12	19	
HSV 8 3/2	35	G3/8"-F	70.7	15	22	
HSV 12 3/2	40	G1/2"-F	80.0	16	27	
HSV 12 3/2 S	38	G1/2"-F	99.5	15	27	
HSV 24 3/2 S	45	G3/4"-F	110.0	16	32	

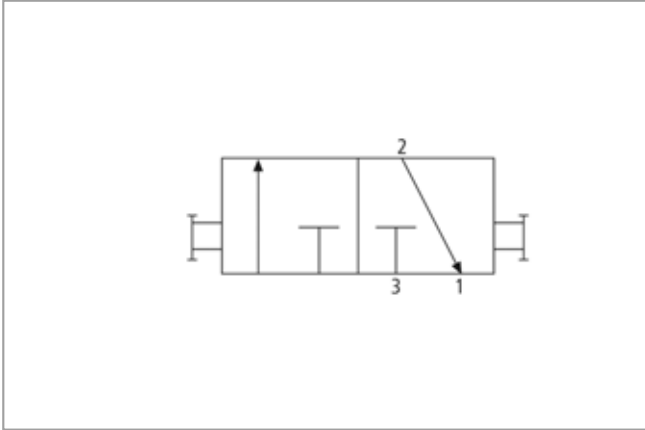
Manually Actuated Valves



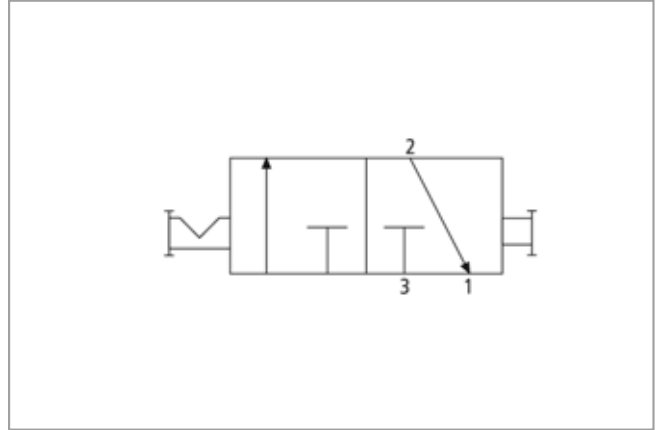
Manual Slide Valves HSV

Nominal diameter from 7 mm to 24 mm

Functional Circuit Diagram Manual Slide Valves HSV



Circuit diagram HSV (1 = vacuum generator; 2 = suction cup; 3 = ventilation)



Circuit diagram HSV-S (1 = vacuum generator; 2 = suction cup; 3 = ventilation)

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- Vacuum Suction Cups
- Special Grippers
- Vacuum Gripping Systems
- Mounting Elements
- Vacuum Generators
- Valve Technology**
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Switches and System Monitoring

Index of Products	Contact	Services	Filters and Connections	Switches and Monitoring	Valve Technology	Vacuum Generators	Mounting Elements	Vacuum Gripping Systems	Special Grippers	Vacuum Suction Cups	Vacuum Knowledge	Schmalz - The Company
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Overview of Section 9



Switches and System Monitoring

At a Glance

Selection Aid		Page
	Checklist for Selection of measuring and control devices	650
Mechanic Vacuum Switches		
	Vacuum Switches VS-V-PM / EM-ST <ul style="list-style-type: none"> • Vacuum switch in electro-mechanical and pneumatical version • Measuring range: from -1 to 0 bar 	 Mechanical vacuum switch in electrical and pneumatic version with adjustable switching point.
Vacuum and Pressure Sensors		
	Vacuum Sensor VS-V-SA <ul style="list-style-type: none"> • Miniature electronic vacuum switch • Measuring range: from -1 to 0 bar 	 Vacuum sensor in minimum design with analog switching output.
	Vacuum and Pressure Sensors VS <ul style="list-style-type: none"> • Vacuum and pressure sensor with analog output signal • Measuring range: -1 to 10 bar 	 Electronic sensor for constant and precise measurement of vacuum and overpressure; output via smartphone using NFC technology.
Electronic Vacuum/Pressure Switches		
	Vacuum and Pressure Switches VSi <ul style="list-style-type: none"> • Electronic vacuum and pressure switch with and without display • Measuring range: -1 to 10 bar • Switching function: PNP, NPN 	 Electronic vacuum and pressure switch with IO-Link interface for measuring and monitoring vacuum and overpressure in automation and handling systems; output and configuration via smartphone using NFC technology.
	Vacuum Switches VS-V-SD <ul style="list-style-type: none"> • Miniature electronic vacuum switch • Measuring range: from -1 to 0 bar 	 Vacuum switch in minimum design with digital switching output.












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 Vacuum Knowledge
 Vacuum Suction Cups
 Special Grippers
 Vacuum Gripping Systems
 Mounting Elements
 Vacuum Generators
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Overview of Section 9



Switches and System Monitoring

At a Glance

Schmalz - The Company		Vacuum and Pressure Switches VS-V/P-AH/AV-T		668
Vacuum Knowledge		<ul style="list-style-type: none"> • Electronic vacuum and pressure switch • Measuring range: from -1 to 10 bar • Switching function: PNP 		Vacuum and pressure switch with two digital switch outputs, teach button for fast adjustment of the switching point and two-color LED indicator.
Vacuum Suction Cups		Vacuum and Pressure Switches VS-V/P-D		672
Special Grippers		<ul style="list-style-type: none"> • Electronic vacuum and pressure switch • Measuring range: from -1 to 10 bar • Switching function: PNP, NPN 		Vacuum and pressure switch with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.
Vacuum Gripping Systems		Vacuum and Pressure Switches VS-V/P-W-D		675
Mounting Elements		<ul style="list-style-type: none"> • Electronic vacuum and pressure switch • Measuring range: from -1 to 10 bar • Switching function: PNP, NPN 		Vacuum and pressure switch (cubical design) with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.
Vacuum Generators		Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)		679
Valve Technology		<ul style="list-style-type: none"> • Electronic vacuum and pressure switch • Measuring range: from -1 to 10 bar • Switching function: PNP, NPN 		Vacuum and pressure switch with two separately programmable digital outputs, digital display, adjustable switching point and adjustable hysteresis.
Switches and Monitoring	Measuring and Control Devices			
Filters and Connections		Vacuum Regulators VR		684
Services		<ul style="list-style-type: none"> • Adjustment range: -990 to -14 mbar 		Mechanically adjustable vacuum controller with very high accuracy to compensate for design-related pressure fluctuations.
Contact		Manometers VAM		686
Index of Products		<ul style="list-style-type: none"> • Measuring range: from -1 to 0 bar 		Manometer with different scales for analog measurement and monitoring of the vacuum value.
Index of Products		Manometer VAM-D		690
		<ul style="list-style-type: none"> • Electronic manometer • Measuring range: from -1 to 10 bar 		Electronic manometer with digital display for use in vacuum and pressure systems for recording and displaying of vacuum (-1 to 0 bar) and pressure (0 to 10 bar).

Overview of Section 9



Switches and System Monitoring

At a Glance



Pressure-Reduction Valves DM



693

- Max. pressure: 10 bar
- Work area: 0.5 to 10 bar

Mechanically adjustable pressure reducer for regulation of compressed air in compressed air systems.

Warning Devices



Warning Devices, Acoustic-Electronic WN-E



695

- Monitoring range: -1 to 0 bar
- Audible warning signal with 100 dBA

Electronic warning device with acoustic signal for monitoring vacuum systems.

Connectors and Adapters for Vacuum Switches



Cables and Plugs for Vacuum Switches



697

- Connecting cables
- Adapter plugs

Connection of the various types of switches, adaptation to customer requirements.

Checklist for Selection of Measuring and Control Devices

Which measuring range is required?	Vacuum only, pressure only or both? Is overpressure resistance necessary?
Which functions are needed?	Switch with a digital switching output? Switch with two digital outputs? Switch with one digital and one analogue output? With adjustable hysteresis?
Which output signals are required? How should the switch be set?	Adjustment with potentiometer? Programming with keypad? Quick setting with teach button?
What is the supply voltage and which signal voltages are needed?	Voltage range? Switching voltages for the controller? Which switching capacity is needed (switched current in mA)?
Which measuring accuracy is necessary?	Hysteresis? Repeatability? Temperature stability?
Which connection facilities exist?	Connection cable (pin assignments, material)? Interchangeability?
Which size and weight restrictions apply?	Mounting facilities? Is on-site adjustment possible?

Mechanic Vacuum Switches



Vacuum Switches VS-V-PM / EM-ST

Measurement range from -1 bar to 0 bar



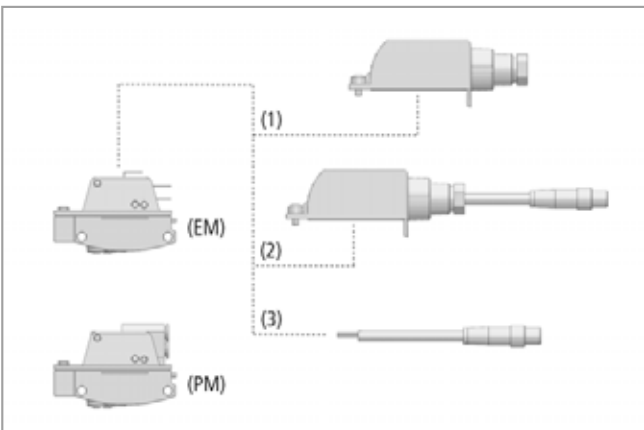
Suitable for Industry Specific Applications



Vacuum switches VS-V-PM / EM-ST

Applications

- Mechanical vacuum switch for process monitoring
- Optimization of cycle times or regulation circuits
- Application in processes where an electric or pneumatic signal related to a defined vacuum value is required
- Can be used as a measuring and switching element



System design vacuum switches VS-V-PM / EM-ST

Design

- Vacuum switch in electro-mechanical (EM) and pneumatic (PM) version
- VS-V-EM-ST with one digital switching output in NO/NC version
- VS-V-PM with pneumatic output in NO or alternatively NC version
- Robust and hard-wearing plastic housing
- Cover (1) for IP-protection and strain relief of the connection cable (optional for EM version)
- Cover (2) for IP-protection and mounted M8 4-pin plug (optional for EM version)
- 2 m cable (3) with M8 plug, 4-pin (optional for EM version)



Mounting example vacuum switch VS-V-PM

Our Highlights...

- Robust plastic housing
- Electro-mechanical version
- Pneumatical version
- Adjustable switching point
- Modular design with optional accessories

Your Benefits...

- > Solid construction, precise operation
- > Switching of DC and AC with one version
- > No electric connections required, pure pneumatic operation
- > Individually adaptable to process parameter
- > Customizable to process requirements

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Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

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Mechanic Vacuum Switches



Vacuum Switches VS-V-PM / EM-ST

Measurement range from -1 bar to 0 bar

Designation Code Vacuum Switches VS-V-PM / EM-ST

Abbreviated designation	Measuring range in bar	Principle of operation	Electrical connection
Example VS-V-EM-ST:			
VS	V	EM	ST
VS	V -1 to 0	EM electro-mechanical PM pneumatical	NC normally closed NO normally open ST contact of flat-pin plug (for EM version)

Ordering Data Vacuum Switches VS-V-PM / EM-ST

Vacuum switch VS-V-PM / EM-ST is delivered as a ready to connect product (without connection cable).

Available accessories: cover, connection cable

Vacuum Switches VS-V-PM / EM-ST

Type	Part Number
VS-V-PM-NC	10.06.02.00455
VS-V-PM-NO	10.06.02.00456
VS-V-EM-ST	10.06.02.00457

Ordering data accessories Vacuum Switches VS-V-PM / EM-ST

Type	Cover ABDK-ST	Cover ABDK-M8-4	Connection cable (2 m) 4-pole, M8 plug
VS-V-PM-NC	-	-	-
VS-V-PM-NO	-	-	-
VS-V-EM-ST	10.06.02.00453	10.06.02.00454	10.06.02.00460

Technical Data Vacuum Switches VS-V-PM / EM-ST

Type	VS-V-PM-NC	VS-V-PM-NO	VS-V-EM-ST
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	-1.0 ... 0.0	-1.00 ... 0.00
Max. overpressure resistance [bar]	6	6	6
Repeatability	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Hysteresis	Fixed: approx. 40 mbar	Fixed: approx. 10 mbar	Fixed: 60...80 mbar
Switching capacity [A]	-	-	10
Switching frequency [Hz]	-	-	1
Electrical connection	-	-	Plug-in connection
Control pressure range [bar]	1.5 ... 8.0	1.5 ... 8.0	-
Voltage	-	-	max. 30V DC/ 250V AC
Max. flow rate [l/min]	100	100	-
Protection IP	-	-	IP 65 (with cover)
Operating temperature [°C]	0 ... 50	0 ... 50	0 ... 60
Weight [g]	33	33	33

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Mechanic Vacuum Switches

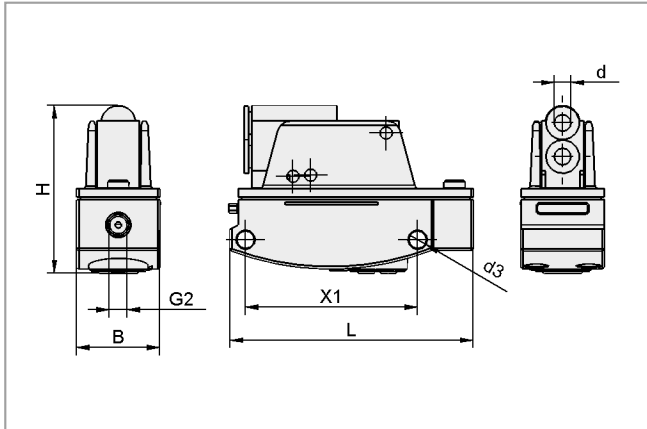


Vacuum Switches VS-V-PM / EM-ST

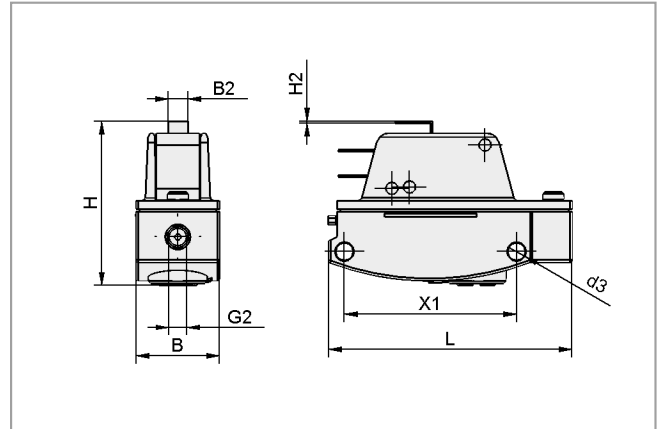
Measurement range from -1 bar to 0 bar



Design Data Vacuum Switches VS-V-PM / EM-ST



VS-V-PM...

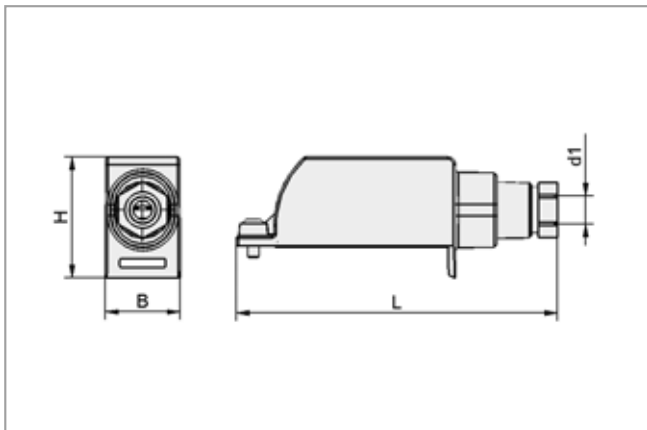


VS-V-EM-ST

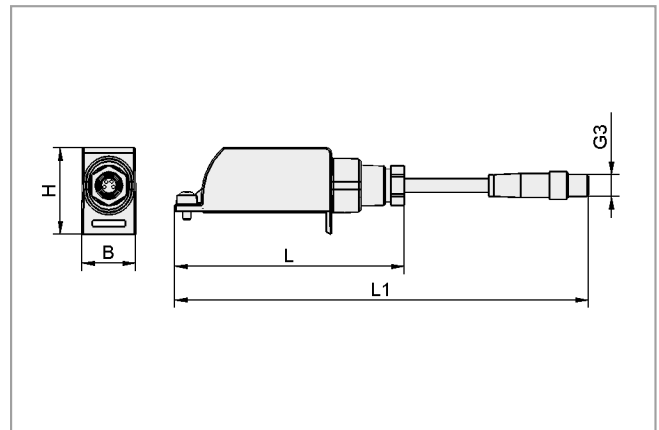
Type	Dimensions in mm									
	B	B2	d	d3	G2	H	H2	L	X1	
VS-V-PM-NC	19.8	-	4	4.2	M5-F	40.0	-	58	41	
VS-V-PM-NO	19.8	-	4	4.2	M5-F	40.0	-	58	41	
VS-V-EM-ST	19.8	4.8	-	4.2	M5-F	36.1	0.5	58	41	



Design Data Accessories Vacuum Switches VS-V-PM / EM-ST



ABDK-ST



ABDK-M8-4

Type	Dimensions in mm						
	B	d1	G3	H	L	L1	
ABDK-ST	19.8	6	-	32	85	-	
ABDK-M8-4	19.8	-	M8-M	32	85	154	

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Vacuum and Pressure Sensors



Vacuum Sensor VS-V-SA

Measuring range from -1 bar to 0 bar



Suitable for Industry Specific Applications



Vacuum sensors VS-V-SA

Applications

- Electronic vacuum sensor for measurement of vacuum values close to the suction cup
- Remote evaluation of the signals
- Processing of output signals for example a stored-program controller
- Ideal for monitoring the vacuum curve within a handling process
- For use in all areas of automated handling

Design

- Mini-sensor with housing and connection cable
- Available with either screw connector or plug connector
- Analog output signal (voltage output)

Our Highlights...

- Minimum size and low weight
- High measuring accuracy
- Vacuum connection with M3 or M5 thread or with diameter 4 or 6 mm plug-in tubes, according to version

Your Benefits...

- > Optimum installation in vacuum systems, even those subject to high rates of acceleration
- > Precise output signals
- > Flexible mounting facilities

Designation Code Vacuum sensor VS-V-SA

Abbreviated designation	Measuring range in bar	Principle of function	Vacuum connection
Example VS-V-SA-M5-AG:			
VS	V	SA	M5-AG
VS	V -1 to 0	SA sensor analogue	STR4 plug-in tube STR6 plug-in tube M3-AG(AG = male (M)) M5-AG

Ordering Data Vacuum sensor VS-V-SA

Vacuum switch VS-V-SA is delivered as a ready to connect product.

Vacuum sensor VS-V-SA

Type	Part Number
VS-V-SA M3-AG	10.06.02.00225
VS-V-SA M5-AG	10.06.02.00224
VS-V-SA STR4	10.06.02.00226
VS-V-SA STR6	10.06.02.00227

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Vacuum and Pressure Sensors



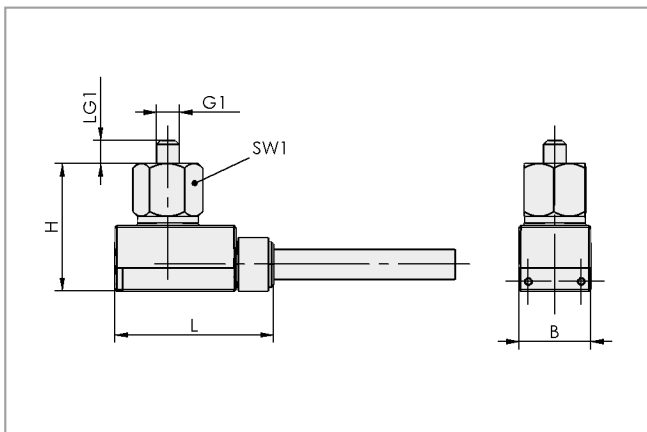
Vacuum Sensor VS-V-SA

Measuring range from -1 bar to 0 bar

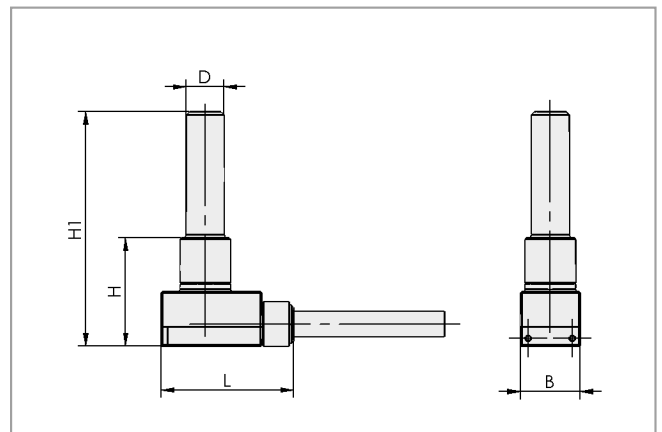
Technical Data Vacuum sensor VS-V-SA

Type	VS-V-SA-M...	VS-V-SA-STR...
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.00 ... 0.00	-1.00 ... 0.00
Max. overpressure resistance [bar]	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Output signal	Analog: 1...5 V	Analog: 1...5 V
Electrical connection	Cable	Cable
Voltage	10-24V DC	10-24V DC
Protection IP	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0 ... 50	0 ... 50
Lk (Length of cable [m])	3	3
Weight [g]	5	5

Design Data Vacuum sensor VS-V-SA



VS-V-SA-M3 and M5



VS-V-SA-STR4 and STR6

Type	Dimensions in mm								
	B	D	G1	H	H1	L	LG1	SW1	
VS-V-SA M3-AG	9.5	-	M3-M	16.9	-	21	3	8	
VS-V-SA M5-AG	9.5	-	M5-M	16.9	-	21	5	8	
VS-V-SA STR4	9.5	4	-	17.2	32.2	21	-	-	
VS-V-SA STR6	9.5	6	-	17.2	37.2	21	-	-	

Vacuum and Pressure Switches VS/VSi



Modular. Visible. Easy to integrate.

Measuring range from -1 to 10 bar

Keep everything at your finger tips with the new VS and VSi vacuum and pressure switches from Schmalz: The electronic switches are modular in design, simple to integrate in the automation environment and trackable throughout the entire process thanks to the use of innovative communication technology.



Sensor without display, digital (VSi) and analog (VS) switching output

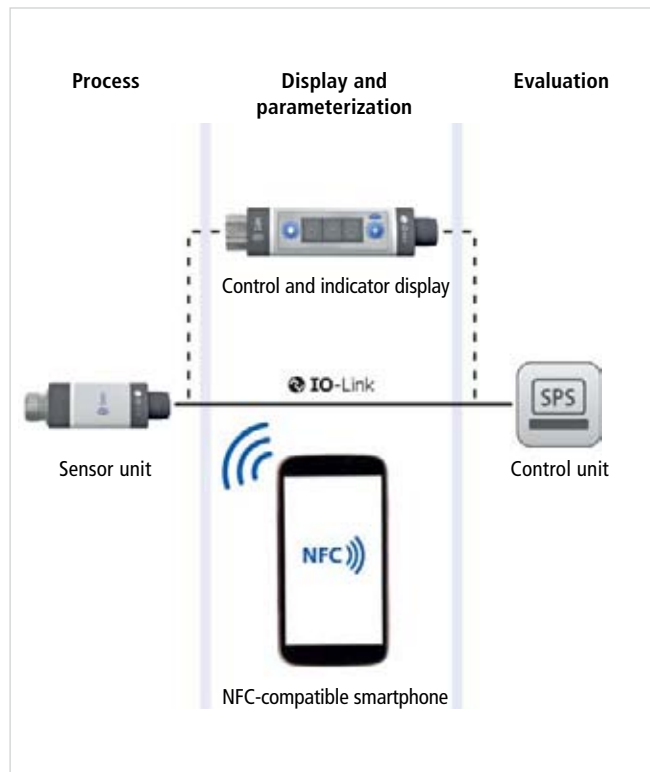


Switch (VSi) for data reading during the process, digital switching output with external display (SDI) for the display in the field of vision, IO-link interface



Switch with integrated display, digital switching output, IO-link interface

- Measuring range -1 to 10 bar
- Protection class IP 65



IO-Link and NFC technology provide innovative communication methods

Modular

- Switch in three versions: without a display, with an integrated display or an external display
- Compact sensor unit for installation directly on the suction cup, for measurement with no line losses
- External control and indicator display for integration in the user interface

Visible

- Device and process information available in real time because the switch performs measurements directly in the process and communicates to any controls via IO-link
- Device and process information can be parameterized and exported via NFC on a smartphone
- Current vacuum or pressure level visible on the display

Easy to integrate

- Switch can be integrated into a system quickly and easily via IO-link
- Process and device parameters can be configured quickly via IO-link, NFC or an external display

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Vacuum and Pressure Switches



Vacuum and Pressure Switches VS / VSi

Measuring range -1 to 10 bar

Selection Aid							
Step 1 Select type	Step 2 Decide on measurement point	Step 3 Select display options	Step 4 Select electrical connection	Article no. / Illustration V = vacuum P = pressure VP = vacuum / pressure			
Analog vacuum and pressure sensors VS Output 1x analog	Measurement directly in the process Compact sensor unit for installation directly on the suction cup	No display ✓ PLC (analog) ✓ Smartphone (via NFC)	M8-4	VS-V-SA-M8-4 10.06.02.00560 1			
				VS-P-SA-M8-4 10.06.02.00561 2			
				VS-VP-SA-M8-4 10.06.02.00562 3			
Digital vacuum and pressure switches with IO-Link VSi Outputs 2x standard IO (SIO) 1x IO-Link (IO)	Measurement directly in the process Compact sensor unit for installation directly on the suction cup. Version with external control and indicator display for installation in the user interface available as an option	No display ✓ PLC (via SIO/IO) ✓ Smartphone (via NFC)	M8-4	VSi-V-M8-4 10.06.02.00567 4			
				VSi-P-M8-4 10.06.02.00568 5			
				VSi-VP-M8-4 10.06.02.00569 6			
				M12-4	VSi-V-M12-4 10.06.02.00570 7		
				VSi-P-M12-4 10.06.02.00571 8			
				VSi-VP-M12-4 10.06.02.00572 9			
			M12-4	VSi-V-M12-4-SDI 10.06.02.00587 10			
				VSi-P-M12-4-SDI 10.06.02.00588 11			
				VSi-VP-M12-4-SDI 10.06.02.00589 12			
				Measurement on the user interface Sensor unit with integrated control and indicator display for integration in the user interface	With integrated display ✓ PLC (via SIO/IO) ✓ Smartphone (via NFC) ✓ Integrated display	M8-4	VSi-V-D-M8-4 10.06.02.00577 13
							VSi-P-D-M8-4 10.06.02.00578 14
							VSi-VP-D-M8-4 10.06.02.00579 15
	M12-4	VSi-V-D-M12-4 10.06.02.00580 16					
		VSi-P-D-M12-4 10.06.02.00581 17					
		VSi-VP-D-M12-4 10.06.02.00582 18					



VS... / VSi... without display

- 1** VS-V-SA-M8-4
- 2** VS-P-SA-M8-4
- 3** VS-VP-SA-M8-4
- 4** VSi-V-M8-4
- 5** VSi-P-M8-4
- 6** VSi-VP-M8-4
- 7** VSi-V-M12-4
- 8** VSi-P-M12-4
- 9** VSi-VP-M12-4



VSi...SDI with external display



- 10** VSi-V-M12-4-SDI
- 11** VSi-P-M12-4-SDI
- 12** VSi-VP-M12-4-SDI



VSi...D with integrated display

- 13** VSi-V-D-M8-4
- 14** VSi-P-D-M8-4
- 15** VSi-VP-D-M8-4
- 16** VSi-V-D-M12-4
- 17** VSi-P-D-M12-4
- 18** VSi-VP-D-M12-4

Illustrations in original size

Vacuum and Pressure Sensors VS

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and Pressure Sensors VS

Design

- Compact sensor unit with robust fiberglass reinforced plastic housing
- Operating mode display using LED that is visible from all sides
- M8-4 pin connection plug
- Installation via stainless steel vacuum/compressed air connection

Our Highlights...

- Electronic vacuum and pressure sensor with analog output
- Output on smartphone using NFC technology
- Compact size and low weight
- LED operation indicator visible from all sides

Your Benefits...

- > Constant and precise monitoring of vacuum and overpressure in automated processes
- > Simple access to service and maintenance information; mobile display of detailed error messages
- > Use in decentralized systems directly in the process; use in handling systems with maximum dynamics
- > Fast detection of operating state

Designation Code Vacuum and Pressure Sensors VS

Abbreviated designation	Measuring range in bar	Principle of function	Electrical connection
Example VS-V-SA-M8-4:			
VS	V	SA	M8-4
VS	V -1 to 0 VP -1 to 8 P 0 to 10	SA sensor analog	M8-4 male connect. M8, 4 pole

Ordering Data Vacuum and Pressure Sensors VS

Vacuum and pressure sensor VS is delivered as a ready to connect product (without connection cable). The product consists of:

- Vacuum and pressure sensor of type VS - available as vacuum version, pressure version or combined version

Available accessories: connection cable, mounting bracket

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Vacuum and Pressure Sensors



Vacuum and Pressure Sensors VS

Measuring range from -1 bar to 10 bar

Vacuum and Pressure Sensors VS

Type	Part Number
VS V SA M8-4	10.06.02.00560
VS P SA M8-4	10.06.02.00561
VS VP SA M8-4	10.06.02.00562

Ordering Data Accessories Vacuum and Pressure Sensors VS

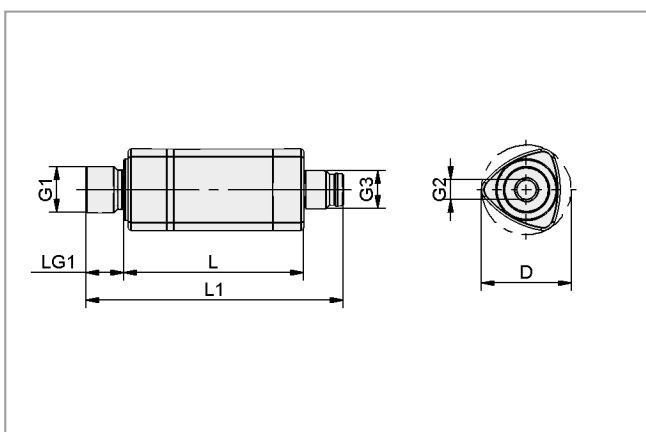
Type	Description	Part Number
Connection cable VS...*	ASK B-M8-4 3000 PUR GE	10.06.02.00472
Mounting bracket	BEF-WIN 21x34.5x59 1.5	10.06.02.00061

*M8-4 socket, open cable end, screened

Technical Data Vacuum and Pressure Sensors VS

Type	VS V SA M8-4	VS P SA M8-4	VS VP SA M8-4
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	0.0 ... 8.0	-1.0 ... 8.0
Max. overpressure resistance [bar]	8	15	12
Repeatability	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Output signal	1 analog	1 analog	1 analog
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Connection	G1/8"-M + M5-F	G1/8"-M + M5-F	G1/8"-M + M5-F
Voltage	15-30V DC	15-30V DC	15-30V DC
Current consumption [mA]	10	10	10
Protection IP	IP 65	IP 65	IP 65
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0 ... 60	0 ... 60	0 ... 60
Weight [g]	16	16	16

Design Data Vacuum and Pressure Sensors VS



VS...

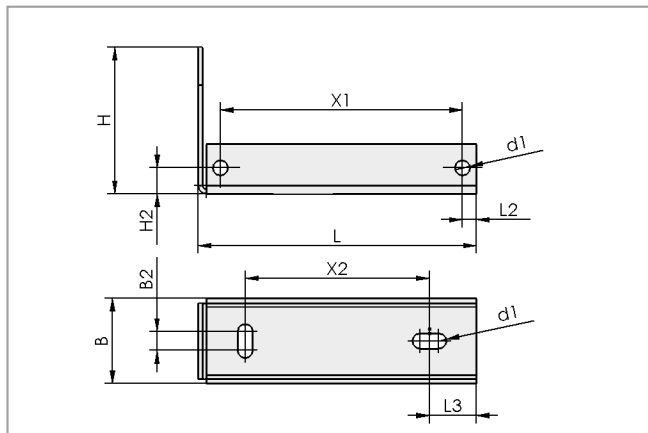
Type	Dimensions in mm						
	D	G1	G2	G3	L	L1	LG1
VS V SA M8-4	19.0	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8.0
VS P SA M8-4	19.0	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8.0
VS VP SA M8-4	19.0	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8.0

Vacuum and Pressure Sensors VS

Measuring range from -1 bar to 10 bar



Design Data Accessories Vacuum and Pressure Sensors VS



BEF-WIN

Type	Dimensions in mm									
	B	B2	d1	H	H2	L	L2	L3	X1	X2
BEF-WIN 21x34.5x59 1.5	21	4	3.2	34.5	5.5	59	3	10	52	39

Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VSi

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and Pressure Switches VSi

Applications

- Electronic vacuum and pressure switch with IO-Link interface for measuring and monitoring vacuum and overpressure in automation and handling systems
- Input and output of parameters via the controller
- Sensor unit can be positioned independently from the control and indicator display in the system
- Compact sensor unit for installation directly on the suction cup, particularly in decentralized vacuum systems
- Setting and programming of the vacuum and pressure switch even at points in the process that are difficult to work on manually
- Output of device data such as type or operating instructions via smartphone, even with variants without display

Design

- Switch with compact sensor unit in three designs: without display, with integrated or external control and indicator display
- Robust fiberglass reinforced plastic housing
- Installation via stainless steel vacuum/compressed air connection and with optional additional mounting bracket
- M8-4 pin or M12-4 pin connection plug
- Mode and switching point display using LEDs that are visible from all sides

Our Highlights...

- Electronic vacuum and pressure switch, available with and without display
- Version with external control and indicator display with copy function
- Communication in all standard field bus systems via IO-Link interface
- Output and configuration via smartphone using NFC technology
- Switch can be rotated once installed

Your Benefits...

- > Precise measurement and output of digital signals; visualization of vacuum and pressure values
- > Precise measurement directly in the process; installation of the display in the user's field of view; settings such as switching points can be transferred to other switches
- > Input and output of all relevant process data via the controller; minimum installation and set-up effort required
- > Simple access to service and maintenance information; mobile display of detailed error messages
- > Display is easy to read in any installation position

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Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VSi

Measuring range from -1 bar to 10 bar

Designation Code Vacuum and Pressure Switches VSi

Abbreviated designation	Measuring range in bar	Display	Electronical connection	Additional function
Example VSi-V-D-M8-4:				
VSi	V	D	M8-4	
VSi	V -1 to 0 VP -1 to 8 P 0 to 10	D with integrated display	M8-4 male connect. M8, 4 pole M12-4 male connect. M12, 4 pole	SDI with external display

Ordering Data Vacuum and Pressure Switches VSi

Vacuum and pressure switch VSi is delivered as a ready to connect product (without connection cable). The product consists of:

- Vacuum and pressure switch of type VSi - available as vacuum version, pressure version or combined version without display, with integrated display or with external display

Available accessories: external display (smart device interface), connection cable, mounting bracket

Vacuum and Pressure Switches VSi

Type	Pressure switch	Vac./Press. switch	Vacuum switch
VSi...M8-4	10.06.02.00568	10.06.02.00569	10.06.02.00567
VSi...M12-4	10.06.02.00571	10.06.02.00572	10.06.02.00570
VSi...D...M8-4	10.06.02.00578	10.06.02.00579	10.06.02.00577
VSi...D...M12-4	10.06.02.00581	10.06.02.00582	10.06.02.00580
VSi...M12-4...SDI	10.06.02.00588	10.06.02.00589	10.06.02.00587

Ordering Data Accessories Vacuum and Pressure Switches VSi

Type	Designation	Part Number	Description
Smart Device Interface	SDI-D M12-5	10.06.02.00594	-
Connection cable VSi...	ASK B-M8-4 5000 PUR GE	10.06.02.00031	M8-4 socket, open cable end
Connection cable VSi...	ASK B-M12-4 5000 PUR GE	21.04.05.00263	M12-4 socket, open cable end
Connection cable VSi...SDI	ASK-S B-M8-4 5000 M12-4 PUR	21.04.05.00264	M8-4 socket to M12-4 connector
Connection cable VSi...SDI	ASK-S B-M12-4 5000 M12-4 PUR	21.04.05.00265	M12-4 socket to M12-4 connector
Connection cable SDI-D	ASK B-M12-5 5000 PUR GE	21.04.05.00080	M12-5 socket, open cable end
Connection cable SDI-D	ASK-S B-M12-5 2000 M12-5 PUR	21.04.05.00211	M12-5 socket to M12-5 connector
mounting bracket	BEF-WIN 21x34.5x59 1.5	10.06.02.00061	-

Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VSi

Measuring range from -1 bar to 10 bar

Technical Data Vacuum and Pressure Switches VSi

Type	VSi...V	VSi...P	VSi...VP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	0.0 ... 10.0	-1.0 ... 8.0
Max. overpressure resistance [bar]	8	15	12
Repeatability	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Hysteresis	Adjustable	Adjustable	Adjustable
Output signal	2 digital	2 digital	2 digital
Switching capacity [mA]	200	200	200
Indication	LED	LED	LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Connection	G1/8"-M + M5-F	G1/8"-M + M5-F	G1/8"-M + M5-F
Voltage	10-30V DC	10-30V DC	10-30V DC
Current consumption [mA]	20	20	20
Protection IP	IP 65	IP 65	IP 65
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0 ... 60	0 ... 60	0 ... 60
Weight [g]	16	16	16

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Electronic Vacuum/Pressure Switches

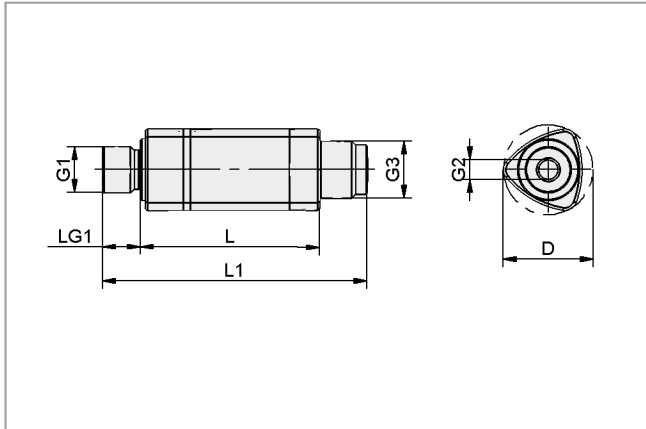


Vacuum and Pressure Switches VSi

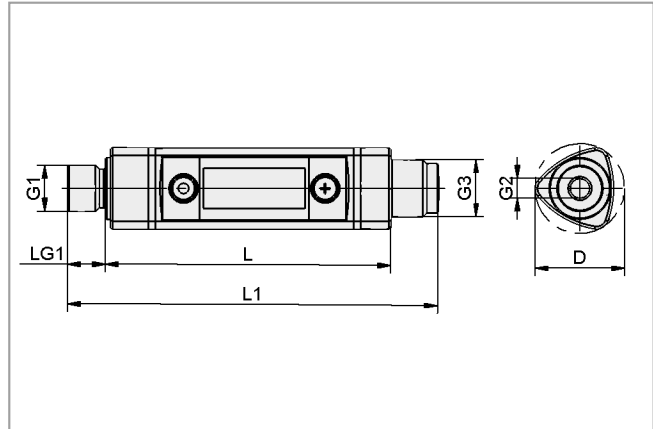
Measuring range from -1 bar to 10 bar



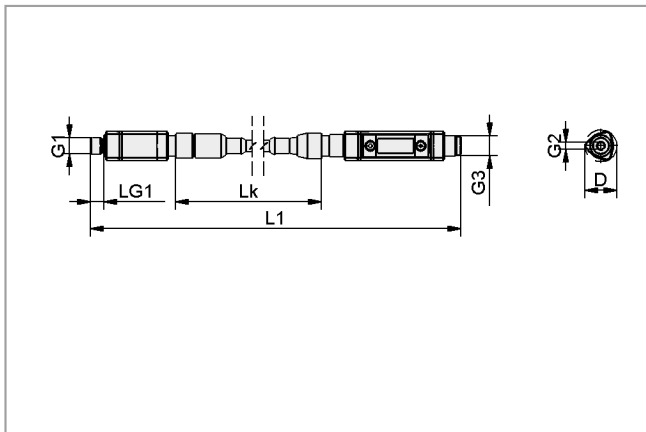
Design Data Vacuum and Pressure Switches VSi



VSi...



VSi...D



VSi...SDI

Type	Dimensions in mm							
	D	G1	G2	G3	L	L1*	LG1	Lk (Length of cable [m])
VSi V M8-4	19	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8	-
VSi VP M8-4	19	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8	-
VSi P M8-4	19	G1/8"-M	M5-F	M8x1-M	38.0	56.0	8	-
VSi V M12-4	19	G1/8"-M	M5-F	M12x1-M	38.0	56.0	8	-
VSi VP M12-4	19	G1/8"-M	M5-F	M12x1-M	38.0	56.0	8	-
VSi P M12-4	19	G1/8"-M	M5-F	M12x1-M	38.0	56.0	8	-
VSi V D M8-4	19	G1/8"-M	M5-F	M8x1-M	60.5	78.5	8	-
VSi VP D M8-4	19	G1/8"-M	M5-F	M8x1-M	60.5	78.5	8	-
VSi P D M8-4	19	G1/8"-M	M5-F	M8x1-M	60.5	78.5	8	-
VSi V D M12-4	19	G1/8"-M	M5-F	M12x1-M	60.5	78.5	8	-
VSi VP D M12-4	19	G1/8"-M	M5-F	M12x1-M	60.5	78.5	8	-
VSi P D M12-4	19	G1/8"-M	M5-F	M12x1-M	60.5	78.5	8	-
VSi V M12-5 SDI	19	G1/8"-M	M5-F	M12x1-M	-	5200.0	8	5
VSi VP M12-5 SDI	19	G1/8"-M	M5-F	M12x1-M	-	5200.0	8	5
VSi P M12-5 SDI	19	G1/8"-M	M5-F	M12x1-M	-	5200.0	8	5

*At type VSi...SDI: Total length with connection cable

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Electronic Vacuum/Pressure Switches

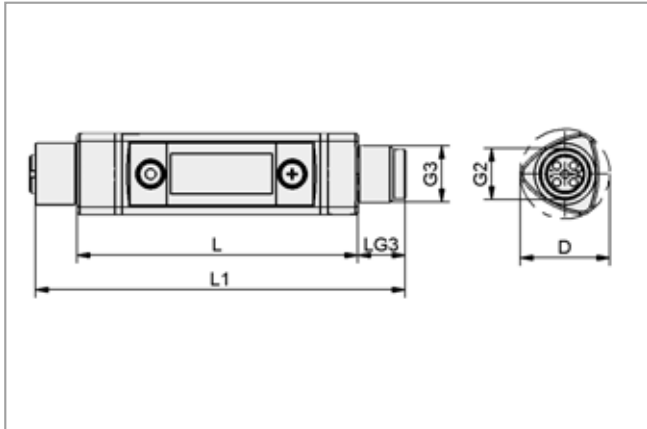


Vacuum and Pressure Switches VS*i*

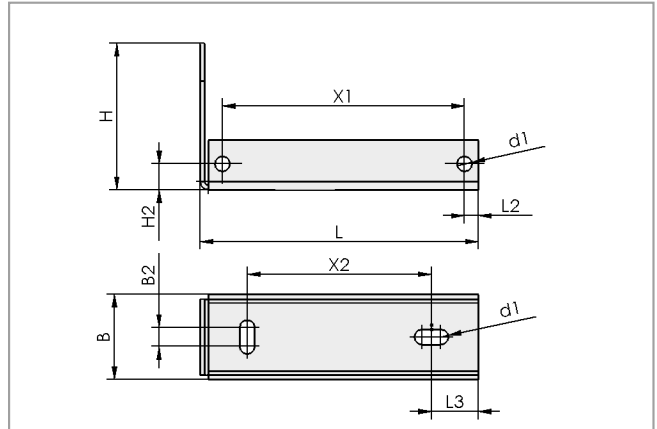
Measuring range from -1 bar to 10 bar



Design Data Accessories Vacuum and Pressure Switches VS*i*



SDI-D



BEF-WIN

Type	Dimensions in mm															
	B	B2	d1	D	G2	G3	H	H2	L	L1	L2	L3	LG3	X1	X2	
SDI D M12-5	-	-	-	19	M12x1-F	M12x1-M	-	-	59.5	78.5	-	-	10	-	-	
BEF-WIN 21x34.5x59 1.5	21	4	3.2	-	-	-	34.5	5.5	59.0	-	3	10	-	52	39	

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Electronic Vacuum/Pressure Switches



Vacuum Switches VS-V-SD

Measuring range from -1 bar to 0 bar



Suitable for Industry Specific Applications



Vacuum switch VS-V-SD

Applications

- Electronic vacuum switch for measurement of vacuum values close to the suction cup
- Remote evaluation of the signals
- Processing of output signals for example a stored-program controller
- Ideal for outputting part-presence signals
- For use in all areas of automated handling

Design

- Mini switch with housing and firmly attached connection cable (3 m)
- Available with either screw connector or plug connector
- Digital output signal (permanently set to -600 mbar)

Our Highlights...

- Minimum size and low weight
- High measuring accuracy
- Vacuum connection with M3 or M5 thread or with diameter 4 or 6 mm plug-in tubes, according to version

Your Benefits...

- > Optimum installation in vacuum systems, even those subject to high rates of acceleration
- > Precise output signals
- > Flexible mounting facilities

Designation Code Vacuum Switches VS-V-SD

Abbreviated designation	Measuring range in bar	Principle of function	Switching point in mbar	Vacuum connection
Example VS-V-SD-60-STR6:				
VS	V	SD	60	STR6
VS	V -1 to 0	SD sensor digital	60 switching point -600	STR4 plug-in tube STR6 plug-in tube M3-AG (AG = male (M)) M5-AG

Ordering Data Vacuum Switches VS-V-SD

Vacuum switch VS-V-SD is delivered as a ready to connect product.

Vacuum Switches VS-V-SD

Type	Part Number
VS-V-SD 60 M3-AG	10.06.02.00258
VS-V-SD 60 M5-AG	10.06.02.00257
VS-V-SD 60 STR4	10.06.02.00259
VS-V-SD 60 STR6	10.06.02.00260

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Electronic Vacuum/Pressure Switches



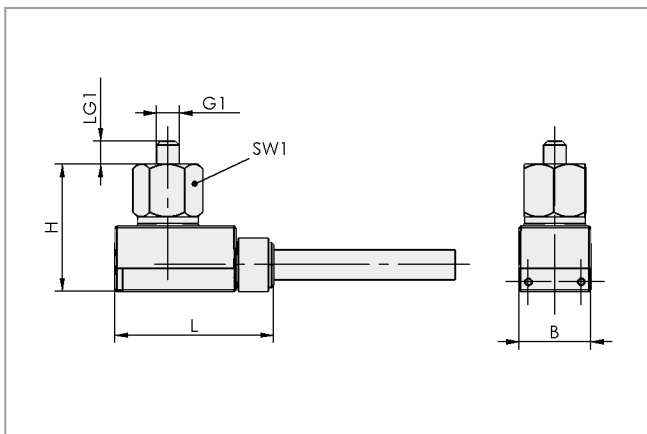
Vacuum Switches VS-V-SD

Measuring range from -1 bar to 0 bar

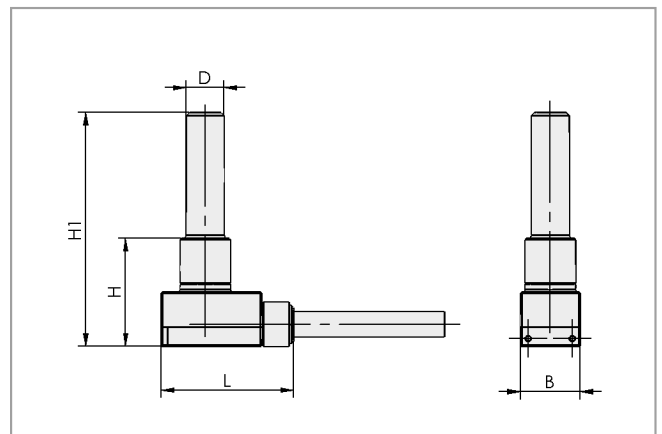
Technical Data Vacuum Switches VS-V-SD

Type	VS-V-SD-60-M...	VS-V-SD-60-STR...
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	-1.0 ... 0.0
Max. overpressure resistance [bar]	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Fixed: approx. 20 mbar	Fixed: approx. 20 mbar
Output signal	1 digital	1 digital
Switching capacity [mA]	60	60
Point attitude	- 600 mbar	- 600 mbar
Indication	LED	LED
Electrical connection	Cable	Cable
Voltage	10-24V DC	10-24V DC
Protection IP	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0 ... 50	0 ... 50
Lk (Length of cable [m])	3	3
Weight [g]	5	5

Design Data Vacuum Switches VS-V-SD



VS-V-SD-M3 and M5



VS-V-SD-STR4 and STR6

Type	Dimensions in mm								
	B	D	G1	H	H1	L	LG1	SW1	
VS-V-SD 60 M3-AG	9.5	-	M3-M	16.9	-	21	3	8	
VS-V-SD 60 M5-AG	9.5	-	M5-M	16.9	-	21	5	8	
VS-V-SD 60 STR4	9.5	4	-	17.2	32.2	21	-	-	
VS-V-SD 60 STR6	9.5	6	-	17.2	37.2	21	-	-	

Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VS-V/P-AH/AV-T

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and Pressure Switches VS-V/P-AH/AV-T

Applications

- Electronic process monitoring, optimization of cycle times, energy-saving functions
- Can be used as a measuring and switching element
- Suitable for use in very dynamic handling systems

Design

- Plastic housing in 10 mm design
- Adapter plate for quick mounting, either vertically or horizontally
- Teach button integrated into the cover
- Transparent cover over the LED indicator
- Power and control connections via 4-pin M8 connector
- Optionally available with M5 vacuum/pressure connection or 6 mm plug-in tube

Our Highlights...

- Switching points adjustable with the "teach" button
- Two digital switch outputs
- Two-color LED indicator
- For vertical or horizontal mounting
- Electronic vacuum/pressure sensor
- Current switching capacity 200 mA

Your Benefits...

- > Quick adjustment of the process
- > Makes further switching elements unnecessary
- > Easily visible status indication
- > Space-saving installation
- > Very precise switching and repeatability
- > Direct switching possible

Designation Code Vacuum and Pressure Switches VS-V/P-AH/AV-T

Abbreviated designation	Measuring range in bar	Connection	Switching point adjustment	Switching function	Product addition
Example VS-V-AV-T-PNP-S:					
VS	V	AV	T	PNP	
VS	V -1 to 0 P10 0 to 10	AH horizontal AV vertical	T teach button	PNP switches to plus	S hysteresis fixed

Ordering Data Vacuum and Pressure Switches VS-V/P-AH/AV-T

Vacuum and pressure switch VS-V/P-AH/AV-T is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection adapter

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Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VS-V/P-AH/AV-T

Measuring range from -1 bar to 10 bar

Vacuum and Pressure Switches VS-V/P-AH/AV-T

Type	Part Number
VS-V-AH-T-PNP M8-4	10.06.02.00295
VS-V-AH-T-PNP M8-4 S	10.06.02.00294
VS-V-AV-T-PNP M8-4	10.06.02.00293
VS-V-AV-T-PNP M8-4 S	10.06.02.00292
VS-P10-AH-T-PNP M8-4	10.06.02.00383
VS-P10-AH-T-PNP M8-4 S	10.06.02.00382
VS-P10-AV-T-PNP M8-4	10.06.02.00385
VS-P10-AV-T-PNP M8-4 S	10.06.02.00384

Ordering Data Accessories Vacuum and Pressure Switches VS-V/P-AH/AV-T

Connection cable 4-pole Material PUR, 5 m, straight 10.06.02.00031	Material PUR, 5 m, 90° 10.06.02.00032	Connection adapter Plug-in tube STR6 10.06.02.00300	Screw thread M5-AG 10.06.02.00299
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Accessories Vacuum and Pressure Switches VS-V/P-AH/AV-T



VS-V/P-AV-T-PNP with plug-in tube STR6



VS-V/P-AH-T-PNP with screw thread M5-AG

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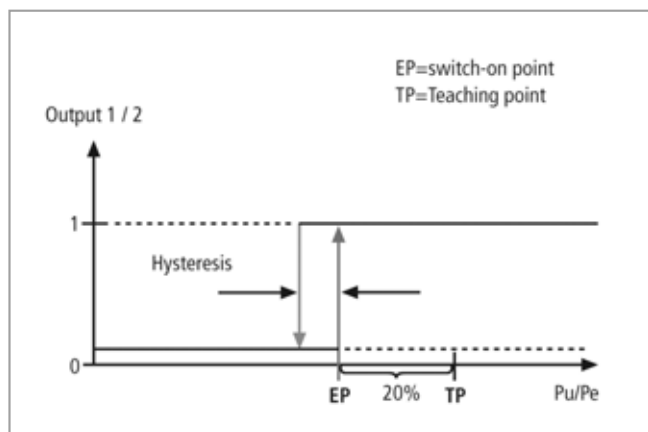
Vacuum and Pressure Switches VS-V/P-AH/AV-T

Measuring range from -1 bar to 10 bar

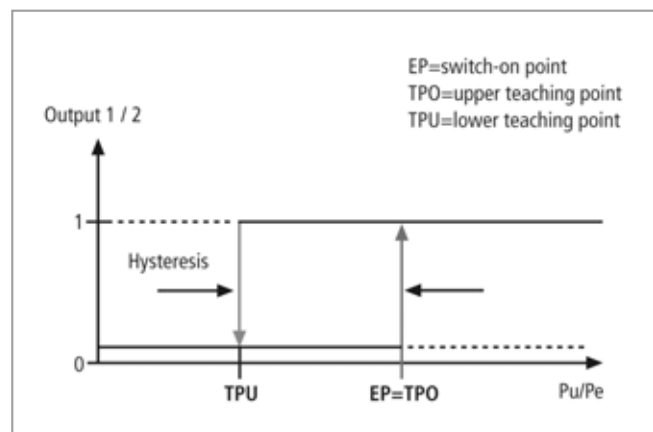
Technical Data Vacuum and Pressure Switches VS-V/P-AH/AV-T

Type	VS-V-...-T-PNP	VS-V-...-T-PNP-S	VS-P10-...-T-PNP	VS-P10-...-T-PNP-S
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	-1.0 ... 0.0	0.0 ... 10.0	0.0 ... 10.0
Max. overpressure resistance [bar]	5	5	15	15
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable	Fixed: approx. 20 mbar	Adjustable	Fixed: 2% of full-scale value
Output signal	2 digital	2 digital	2 digital	2 digital
Switching capacity [mA]	200	200	200	200
Indication	LED	LED	2xLED	2xLED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Voltage	10-30V DC	10-30V DC	10-30V DC	10-30V DC
Current consumption [mA]	20	20	-	-
Protection IP	IP 40	IP 40	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0 ... 60	0 ... 60	0 ... 60	0 ... 60
Weight [g]	6	6	6	6

Switching-Point Adjustment Vacuum and Pressure Switches VS-V/P-AH/AV-T



VS-V/P-AH/AV-T-S (Switching function: fixed hysteresis)



VS-V/P-AH/AV-T (Switching function: adjustable hysteresis)

Electronic Vacuum/Pressure Switches

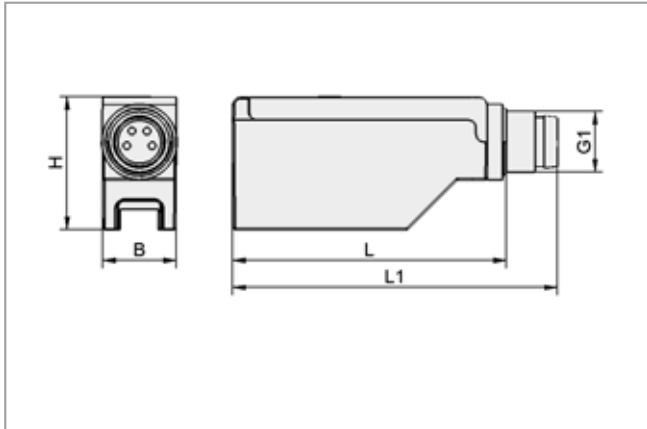


Vacuum and Pressure Switches VS-V/P-AH/AV-T

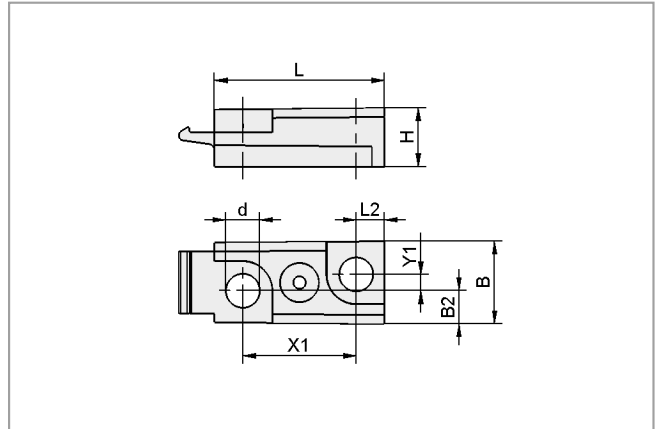
Measuring range from -1 bar to 10 bar



Design Data Vacuum and Pressure Switches VS-V/P-AH/AV-T



VS-V... and VS-P10...

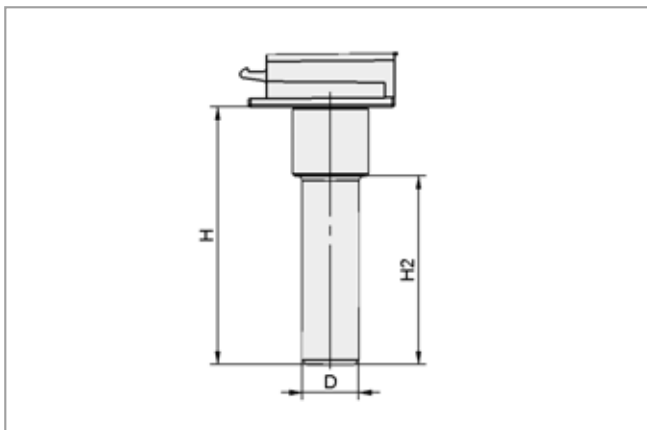


FLAN-PL

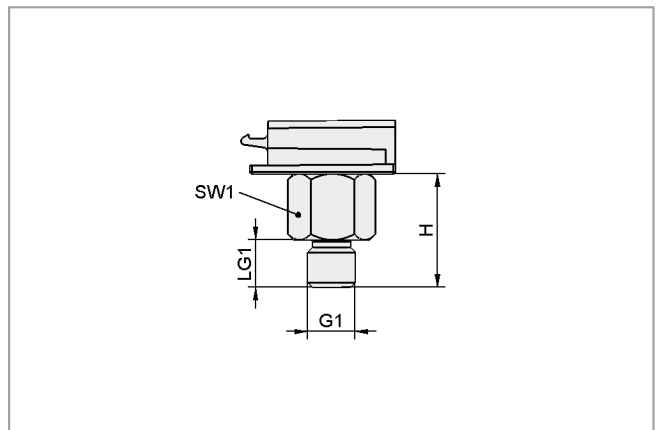
Type	Dimensions in mm										
	B	B2	G1	d	H	L	L1	L2	X1	Y1	
VS-V-AH-T-PNP-S	10	-	M8-M	-	17.5	36.2	43	-	-	-	
VS-V-AH-T-PNP	10	-	M8-M	-	17.5	36.2	43	-	-	-	
VS-V-AV-T-PNP-S	10	-	M8-M	-	16.4	41.2	48	-	-	-	
VS-V-AV-T-PNP	10	-	M8-M	-	16.4	41.2	48	-	-	-	
VS-P10-AH-T-PNP-S	10	-	M8-M	-	17.5	36.2	43	-	-	-	
VS-P10-AH-T-PNP	10	-	M8-M	-	17.5	36.2	43	-	-	-	
VS-P10-AV-T-PNP-S	10	-	M8-M	-	16.4	41.2	48	-	-	-	
VS-P10-AV-T-PNP	10	-	M8-M	-	16.4	41.2	48	-	-	-	
FLAN-PL	7	2.5	-	2.7	4.6	13.5	-	2.3	9	1.3	



Design Data Accessories Vacuum and Pressure Switches VS-V/P-AH/AV-T



STR6



M5-AG

Type	Dimensions in mm					
	D	G1	H	H2	LG1	SW1
STR6	6	-	27.3	20.0	-	-
M5-AG	-	M5-M	12.0	-	5.0	8

Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VS-V/P-D

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and pressure switches VS-V/P-D

Applications

- Electronic vacuum and pressure switch for system monitoring of vacuum and pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency of systems
- For use in all areas of automated handling

Design

- Electronic vacuum and pressure switch in a robust polycarbonate housing
- Connection with G1/8" male thread; additional M5 female thread
- 3-digit display and foil keypad on the front for adjustment of the settings
- Integrated LED for indication of the switching state
- Supply voltage via 4-pin M8 screw connector
- Compact construction and low weight

Our Highlights...

- Electronic vacuum and pressure switch with digital display
- Switching point and hysteresis programmable with the foil keypad
- Two separately programmable digital outputs
- Special functions programmable

Your Benefits...

- > Precise switching with two separate switch outputs
- > Easily adapted to meet customer requirements
- > Upper and lower limit values can be displayed
- > Further adaptation possible

Designation Code Vacuum and Pressure Switches VS-V/P-D

Abbreviated designation	Measuring range in bar	Display	Switching function	Product addition
Example VS-V-D-NPN:				
VS	V	D	NPN	
VS	V -1 to 0 P10 0 to 10	D digital display	NPN switches to minus PNP switches to plus	C with PIN-code protection

Ordering Data Vacuum and Pressure Switches VS-V/P-D

Vacuum and pressure switch VS-V/P-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, mounting set, connection hose

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Vacuum and Pressure Switches VS-V/P-D

Measuring range from -1 bar to 10 bar

Vacuum and Pressure Switches VS-V/P-D

Type	Part Number
VS-V-D-PNP M8-4	10.06.02.00049
VS-V-D-NPN M8-4	10.06.02.00055
VS-V-D-PNP M8-4 C	10.06.02.00270
VS-P10-D-PNP M8-4	10.06.02.00056

Ordering Data Accessories Vacuum and Pressure Switches VS-V/P-D

Type	Part Number
Connection cable material PUR, 5 m, straight, with union nut	10.06.02.00031
Connection cable material PUR, 5 m, 90°, with union nut	10.06.02.00032
Mounting set* for VS-V-D-PNP	10.06.02.00061
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

*Set consists of mounting bracket and G1/8" nut

Note: See "connector and adapter" in this section for more connection possibilities.

Technical Data Vacuum and Pressure Switches VS-V/P-D

Type	VS-V-D-PNP M8-4	VS-V-D-NPN M8-4	VS-V-D-PNP M8-4 C	VS-P10-D-PNP M8-4
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	-1.0 ... 0.0	-1.0 ... 0.0	0.0 ... 10.0
Max. overpressure resistance [bar]	5	5	5	16
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital	2 digital	2 digital
Switching capacity [mA]	180	180	180	180
Indication	2xLED	2xLED	2xLED	2xLED
Display resolution	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 1 psi, 0.05 kgf/cm ² , 0.01 Mpa
Display units	bar, mmHg, inHg, kPa	bar, mmHg, inHg, kPa	bar, mmHg, inHg, kPa	bar, psi, kgf/cm ² , Mpa
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Connection	G1/8"-M + M5-F	G1/8"-M + M5-F	G1/8"-M + M5-F	G1/8"-M + M5-F
Voltage	10.8-30V DC	10.8-30V DC	10.8-30V DC	10.8-30V DC
Current consumption [mA]	30	30	30	55
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C
Operating temperature [°C]	0 ... 50	0 ... 50	0 ... 50	0 ... 50
Weight [g]	25	25	25	25

Electronic Vacuum/Pressure Switches

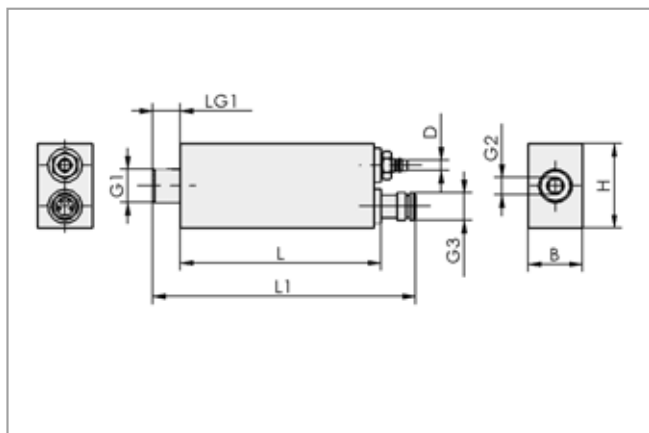


Vacuum and Pressure Switches VS-V/P-D

Measuring range from -1 bar to 10 bar



Design Data Vacuum and Pressure Switches VS-V/P-D

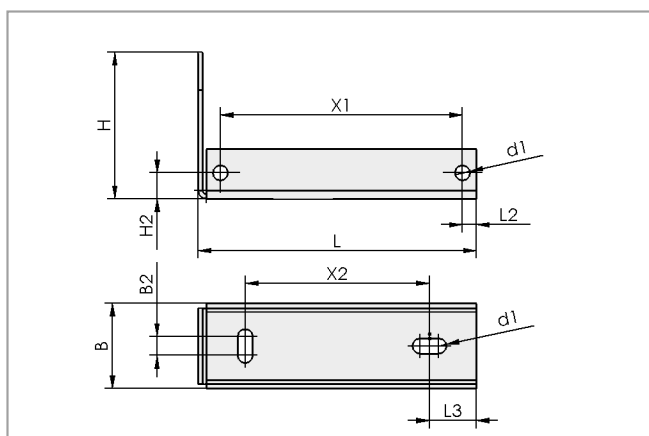


VS-V/P-D

Type	Dimensions in mm									
	B	D	G1	G2	G3	H	L	L1	LG1	
VS-V/P-D	16	-	G1/8"-M	M5-F	M8x1-M	24.7	58.5	75.5	8	



Design Data Accessories Vacuum and Pressure Switches VS-V/P-D



BEF-WIN

Type	Dimensions in mm										
	B	B2	d1	H	H2	L	L2	L3	X1	X2	
BEF-WIN 21x34.5x59 1.5	21	4	3.2	34.5	6	59.0	3	10	52	39	

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Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VS-V/P-W-D

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and pressure switches VS-V/P-W-D

Applications

- Electronic vacuum and pressure switch for system monitoring of vacuum and pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency
- Cubical design also suitable for panel mounting
- For use in all areas of automated handling

Design

- Electronic vacuum and pressure switch in a robust polycarbonate housing
- Connection with G 1/8" female thread
- 3-digit display and foil keypad on the front for adjustment of the settings
- Integrated LED for indication of the switching state
- Supply voltage via 4-pin M8 screw connector
- Compact construction and low weight

Our Highlights...

- Electronic vacuum and pressure switch with digital display
- Switching point and hysteresis programmable with the foil keypad
- Two separately programmable digital outputs
- Special functions programmable

Your Benefits...

- > Precise switching with two separate switch outputs
- > Can be adapted easily to meet customer requirements
- > Upper and lower limit values can be displayed
- > Further adaptation possible



Designation Code Vacuum and Pressure Switches VS-V/P-W-D

Abbreviated designation	Measuring range in bar	Shape	Display	Switching function	Product addition
Example VS-V-W-D-PNP-C:					
VS	V	W	D	PNP	C
VS	V -1 to 0 P10 0 to 10	W cube shape	D digital display	NPN switches to minus PNP switches to plus	C with PIN-code-protection



Ordering Data Vacuum and Pressure Switches VS-V/P-W-D

Vacuum and pressure switch VS-V/P-W-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, flange plate, mounting frame, mounting bracket, connection hose

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Special Grippers

Vacuum Gripping Systems

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Vacuum and Pressure Switches VS-V/P-W-D

Measuring range from -1 bar to 10 bar

Vacuum and Pressure Switches VS-V/P-W-D

Type	Part Number
VS-V-W-D-M8-4-PNP	10.06.02.00113
VS-V-W-D-M8-4-NPN	10.06.02.00126
VS-V-W-D-M8-4-PNP-C	10.06.02.00271
VS-V-W-D-PNP	10.06.02.00192
VS-P10-W-D-M8-4-PNP	10.06.02.00114
VS-P10-W-D-M8-4-NPN	10.06.02.00127



Ordering Data Accessories Vacuum and Pressure Switches VS-V/P-W-D

Type	Type	Part Number
Connection cable PUR, 5 m, straight, with mounting nut M8	ASK B-M8-4 5000 PUR GE	10.06.02.00031
Connection cable PUR, 5 m, 90°, with mounting nut M8	ASK B-M8-4 5000 PUR W	10.06.02.00032
Flange plate for dir. mount. and press. conn. G1/8" -IG on the side*	FLAN-PL 30x14x30 VS AL-EL	10.06.02.00116
Mounting frame	EINB-RAx25.6x36 VS	10.06.02.00115
Mounting bracket	BEF-WIN 16x43.5x29 1.5	10.06.02.00154
Connection hose for reference air (for IP65), ordering unit: metres	VSL 4-2.7 PA	10.07.09.00063

!Note: See "Connectors and adapters" in this section for more connection possibilities

*Complete with 2 screws M3x6 and O-ring seal 10x1.5



Technical Data Vacuum and Pressure Switches VS-V/P-W-D

Type	VS-V-W-D	VS-P-W-D
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	0.0 ... 10.0
Max. overpressure resistance [bar]	5	16
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital
Switching capacity [mA]	180	180
Indication	2xLED	2xLED
Display resolution	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 1 psi, 0.05 kgf/cm ² , 0.01 Mpa
Display units	bar, mmHg, inHg, kPa	bar, psi, kgf/cm ² , Mpa
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole
Voltage	10.8-30V DC	10.8-30V DC
Current consumption [mA]	55	55
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C
Weight [g]	25	25

Electronic Vacuum/Pressure Switches

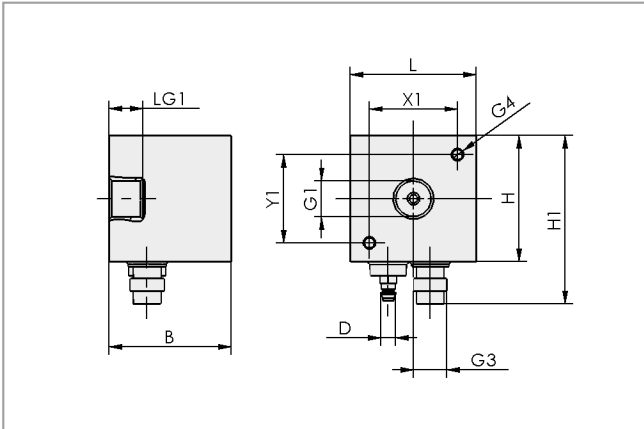


Vacuum and Pressure Switches VS-V/P-W-D

Measuring range from -1 bar to 10 bar



Design Data Vacuum and Pressure Switches VS-V/P-W-D



VS-V/P-W-D

Type	Dimensions in mm										
	B	D	G1	G3	G4	H	H1	L	LG1	X1	Y1
VS-V-W-D	29	3.4	G1/8"-F	M8x1-M	M3-F	30	40	30	8	21	21
VS-P-W-D	29	3.4	G1/8"-F	M8x1-M	M3-F	30	40	30	8	21	21

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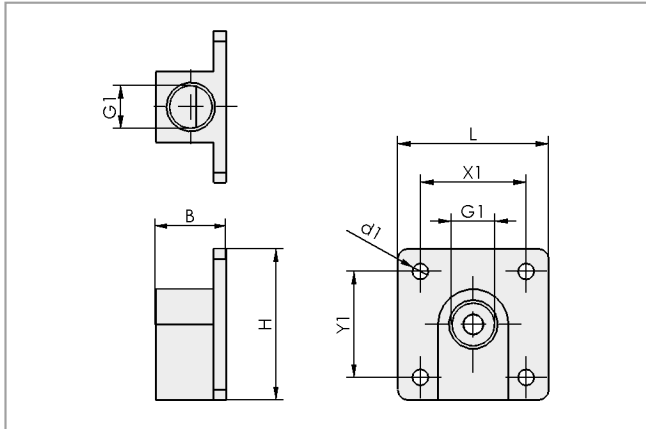


Vacuum and Pressure Switches VS-V/P-W-D

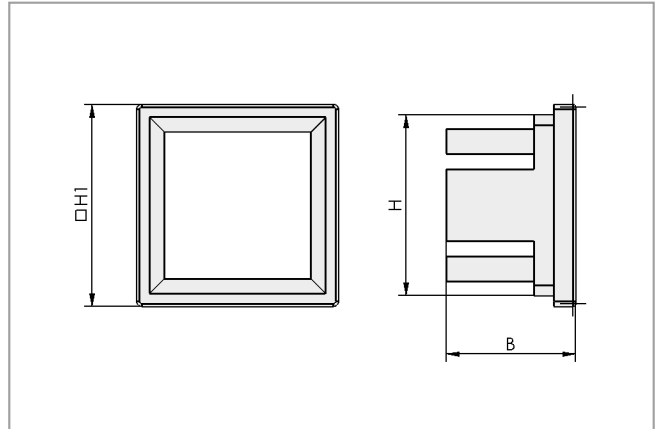
Measuring range from -1 bar to 10 bar



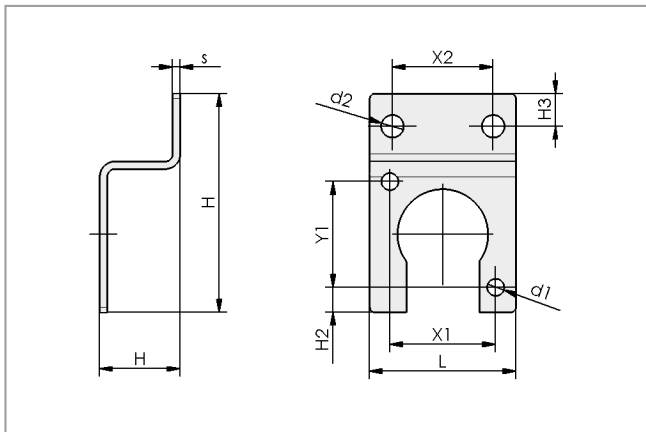
Design Data Accessories Vacuum and Pressure Switches VS-V/P-W-D



FLAN-PL



EINB-RA



BEF-WIN

Type	Dimensions in mm															
	B	d	d1	d2	G1	H	H1	H2	H3	L	L2	s	X1	X2	Y1	
FLAN-PL 30x14x30 VS AL-EL	14.0	-	-	-	G1/8"-F	30	-	-	-	30	-	-	21	-	21	
EINB-RAx25.6x36 VS	25.6	-	-	-	-	36	40	-	-	-	-	-	-	-	-	
BEF-WIN 16x43.5x29 1.5	16.0	18	3.4	4.5	-	44	-	5	6.5	29	-	1.5	21	20	21	

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Electronic Vacuum/Pressure Switches



Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Vacuum and pressure switches VS-V/P-W-D-K(-2C)

Design

- Electronic switch in a stable plastic housing made from polycarbonate
- Switch with either a one- or two-color display
- Connection for measuring with G1/8" female thread (switch with one-color display) or G1/8" male thread (switch with two-color display)
- Hysteresis and comparator mode
- 2 m connection cable
- Mounting bracket and mounting frame for mounting into switch panel available as accessories

Applications

- Vacuum and pressure switch for use in vacuum and pressure systems for process monitoring and optimizing cycle times
- Creating control circuits to improve the efficiency of systems
- The switch can be mounted in panels due to its cubic construction; optional mounting frame with a transparent protective cap
- Can be installed in handling systems directly thanks to its small design and low weight

Our Highlights...

- Vacuum and pressure switch with a digital display, also available with a two-color display
- All functions are set using an intelligent menu structure
- Integrated automatic setting of switching point
- Anti-chattering function with adjustable response times
- Switch function with freely-adjustable switching points, in either hysteresis or comparator mode

Your Benefits...

- > Clear visual monitoring of the system and the process
- > Fast and easy installation or adjusting of any settings
- > Optimal switching points are determined automatically using the process parameters without programming manually
- > Stable switching output even in the event of sudden, brief fluctuations in the main vacuum
- > Optimal adjustment of switching points and output signals

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Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Measuring range from -1 bar to 10 bar

Designation Code Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Abbreviated designation	Measuring range in bar	Shape	Display	Cable	Display	Switching-function
Example VS-V-W-D-K-2C-PNP:						
VS	V	W	D	K	2C	PNP
VS	V -1 to 0 P10 0 to 10	W cube shape	D digital display	K Cable	2C two-colored display	NPN switches to minus PNP switches to plus

Ordering Data Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Vacuum and pressure switch VS-V/P-W-D-K(-2C) is delivered as a ready to connect product.

Available accessories: mounting bracket, mounting frame

Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Type	Part Number
VS-V-W-D-K-NPN	10.06.02.00417
VS-V-W-D-K-PNP	10.06.02.00418
VS-V-W-D-K-NPN	10.06.02.00421
VS-V-W-D-K-PNP	10.06.02.00422
VS-P10-W-D-K-NPN	10.06.02.00419
VS-P10-W-D-K-PNP	10.06.02.00420
VS-P10-W-D-K-NPN	10.06.02.00423
VS-P10-W-D-K-PNP	10.06.02.00424

Ordering Data Accessories Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Type	Mounting bracket*	Mounting frame for mounting into switch panel
VS-V-W-D-K-NPN	10.06.02.00425	10.06.02.00426
VS-V-W-D-K-PNP	10.06.02.00425	10.06.02.00426
VS-V-W-D-K-NPN	10.06.02.00425	10.06.02.00427
VS-V-W-D-K-PNP	10.06.02.00425	10.06.02.00427
VS-P10-W-D-K-NPN	10.06.02.00425	10.06.02.00426
VS-P10-W-D-K-PNP	10.06.02.00425	10.06.02.00426
VS-P10-W-D-K-NPN	10.06.02.00425	10.06.02.00427
VS-P10-W-D-K-PNP	10.06.02.00425	10.06.02.00427

*Set comprises two mounting brackets (see accessories design data)

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Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Measuring range from -1 bar to 10 bar

Technical Data Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

Type	VS-V-W-D-K-NPN	VS-V-W-D-K-PNP	VS-V-W-D-K-NPN	VS-V-W-D-K-PNP	VS-P10-W-D-K-NPN	VS-P10-W-D-K-PNP	VS-P10-W-D-K-NPN	VS-P10-W-D-K-PNP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 0.0	-1.0 ... 0.0	-1.0 ... 0.0	-1.0 ... 0.0	0.0 ... 10.0	0.0 ... 10.0	0.0 ... 10.0	0.0 ... 10.0
Max. overpress. resistance [bar]	3	3	3	3	15	15	15	15
Repeatability	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital	1 digital	1 digital	2 digital	2 digital	1 digital	1 digital
Switching capacity [mA]	80	80	125	125	80	80	125	125
Indication	2xLED	2xLED	-	-	2xLED	2xLED	-	-
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Cable	Cable	Cable	Cable	Cable	Cable	Cable	Cable
Connection	G1/8"-F	G1/8"-F	G1/8"-M	G1/8"-M	G1/8"-F	G1/8"-F	G1/8"-M	G1/8"-M
Voltage	12-24V DC	12-24V DC	12-24V DC	12-24V DC	12-24V DC	12-24V DC	12-24V DC	12-24V DC
Current consumption [mA]	55	55	45	45	55	55	45	45
Protection IP	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40	IP 40
Operating temperature [°C]	0 ... 50	0 ... 50	0 ... 50	0 ... 50	0 ... 50	0 ... 50	0 ... 50	0 ... 50
Weight [g]	105	105	75	75	105	105	75	75

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Electronic Vacuum/Pressure Switches

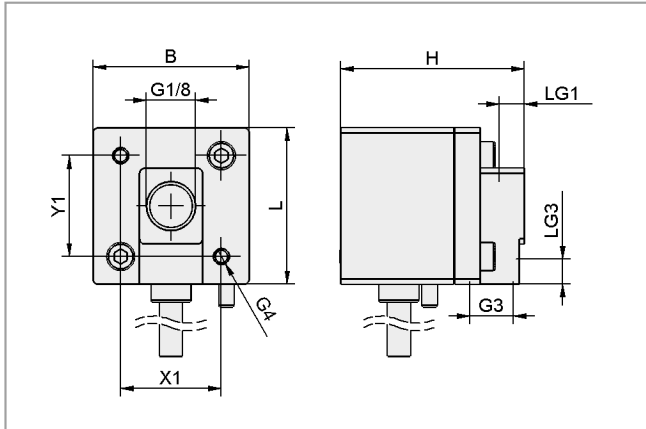


Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

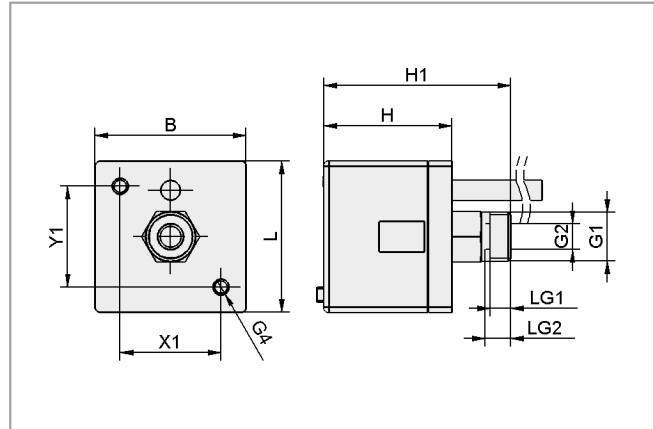
Measuring range from -1 bar to 10 bar



Design Data Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)



VS-V/P-W-D-K



VS-V/P-W-D-K-2C

Type	Dimensions in mm						
	B	G1	G2	G3	G4	H	H1
VS-V-W-D-K	31	G1/8"-F	-	G1/8"-F	M3-F	36.5	-
VS-V-W-D-K-2C	30	G1/8"-M	M5-F	-	M3-F	25.4	37.1
VS-P10-W-D-K	31	G1/8"-F	-	G1/8"-F	M3-F	36.5	-
VS-P10-W-D-K-2C	30	G1/8"-M	M5-F	-	M3-F	25.4	37.1

Type	Dimensions in mm					
	L	LG1	LG2	LG3	X1	Y1
VS-V-W-D-K	31	5	-	5	20	20
VS-V-W-D-K-2C	30	4	5	-	20	20
VS-P10-W-D-K	31	5	-	5	20	20
VS-P10-W-D-K-2C	30	4	5	-	20	20

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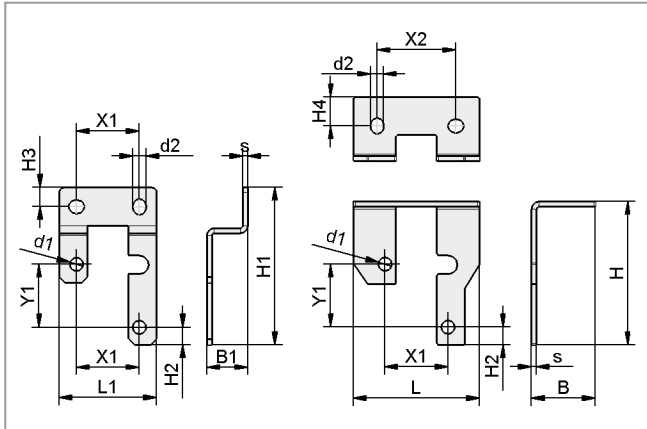


Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)

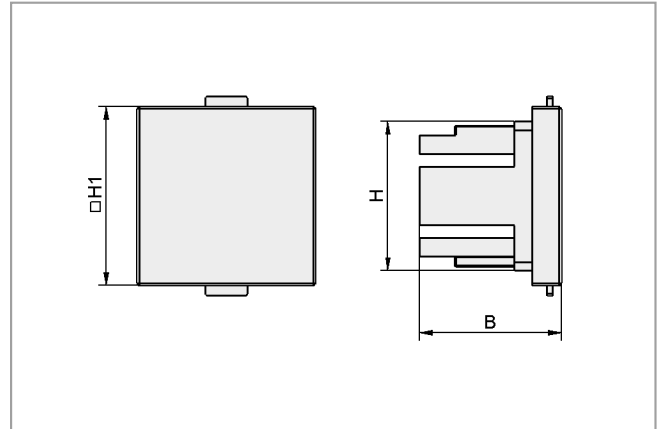
Measuring range from -1 bar to 10 bar



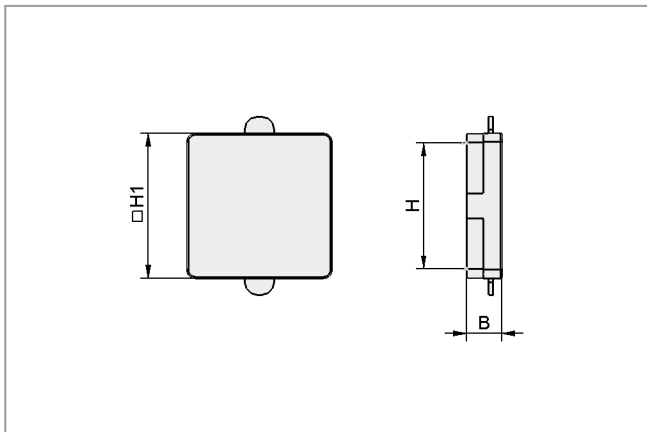
Design Data Accessories Vacuum and Pressure Switches VS-V/P-W-D-K(-2C)



BEF-WIN



EINB-RAx33.8x35.4 VS for VS-V/P-W-D-K



EINB-RAx8.5x30 VS for VS-V/P-W-D-K-2C

Type	Dimensions in mm							
	B	B1	d1	d2	H	H1	H2	H3
BEF-WIN 20.3x45.5x40 1.6	20	13.0	4.3	4.2	45.5	50.0	6	6.1
EINB-RAx33.8x35.4 VS	34	-	-	-	35.4	42.5	-	-
EINB-RAx8.5x30 VS	9	-	-	-	30.0	34.5	-	-

Type	Dimensions in mm							
	H4	L	L1	s	X1	X2	Y1	
BEF-WIN 20.3x45.5x40 1.6	9.1	40	31	1.6	20	25	20	
EINB-RAx33.8x35.4 VS	-	-	-	-	-	-	-	
EINB-RAx8.5x30 VS	-	-	-	-	-	-	-	

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Vacuum Regulators VR

Working range from -990 mbar to -14 mbar



Suitable for Industry Specific Applications



Vacuum regulators VR

Applications

- Compensation for the pressure variations inherent in vacuum generators
- Also suitable for measuring and testing tasks

Design

- Vacuum regulator in a robust aluminum housing; diaphragm made of FPM
- Continuous adjustment with the aid of a spindle

Our Highlights...

- Mechanically adjustable vacuum regulator
- Constant regulation of the vacuum

Your Benefits...

- > Precise manual adjustment with very good repeatability
- > Very precise maintenance of the set value, unaffected by pressure variations caused by the vacuum generator

Designation Code Vacuum Regulators VR

Abbreviated designation	Connection thread	Mounting possibility
Example VR G1/4-IG HW:		
VR	G1/4-IG	HW
VR	G1/4-IG (IG = female (F))	HW holding angle
	G3/8-IG	

Ordering Data Vacuum Regulators VR

Vacuum regulator VR is delivered as a ready-to-connection product, including holding angle.

Vacuum Regulators VR

Type*	Part Number
VR G1/4-IG HW	10.05.05.00075
VR G3/8-IG HW	10.05.05.00026

*Suitable manometers can be found under "Manometer VAM"

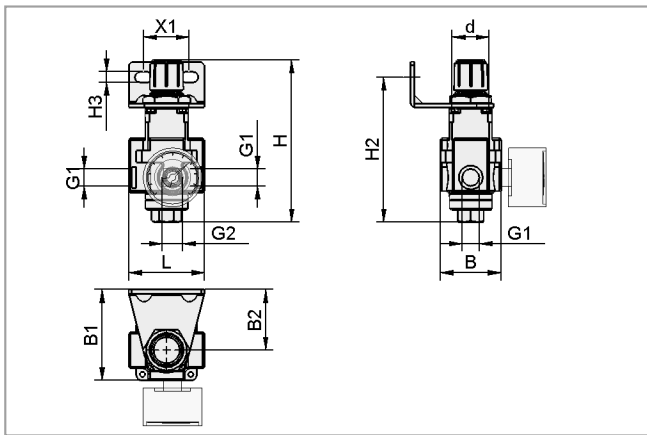
Vacuum Regulators VR

Working range from -990 mbar to -14 mbar

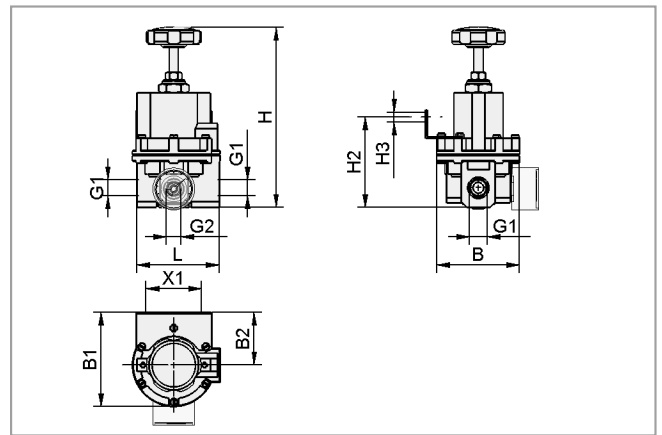
Technical Data Vacuum Regulators VR

Type	Vacuum range	Repeatability	Max. flow rate [l/min]	Max. flow rate [m³/h]	Operating temp.	Weight [kg]	Max. pressure [bar]
VR G1/4-IG HW	-950 ... -25	± 2% of full-scale value	200	12.0	5 ... 60	0.20	5
VR G3/8-IG HW	-990 ... -14	5.0 mbar	270	16.2	5 ... 60	0.65	5

Design Data Vacuum Regulators VR



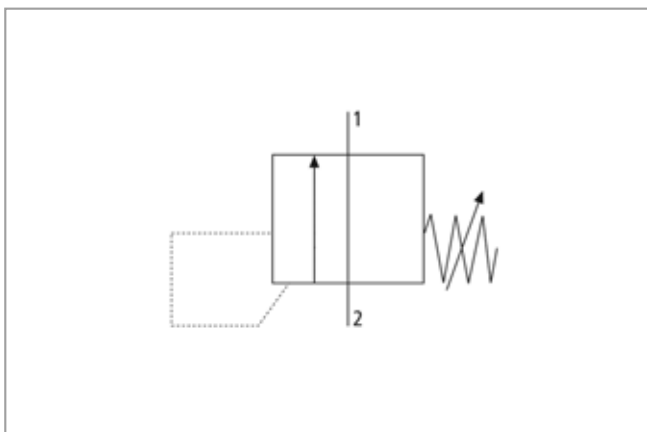
VR G1/4-IG



VR G3/8-IG

Type	Dimensions in mm										
	B	B1	B2	d	G1	G2	H	H2	H3	L	X1
VR G1/4-IG HW	40.0	60.0	40	24	G1/4"-F	G1/4"-F	109	95.7	7	50	30
VR G3/8-IG HW	76.4	87.2	49	-	G3/8"-F	G1/4"-F	175	83.4	9	76	45

Functional Circuit Diagram Vacuum Regulators VR



Circuit diagram VR

Manometers VAM

Measuring range from -1,000 mbar to 0 mbar



Suitable for Industry Specific Applications



Manometers VAM

Applications

- Vacuum manometer for analogue measurement and monitoring of vacuum values
- Universal use in vacuum systems

Design

- Vacuum manometer VAM 67 V H-SE is a spring-tube manometer
- VAM 100 V250 and VAM 63 V400 are capsule-element manometers with zero adjustment
- VAM 67 V H-SE has a fixed front ring
- Vacuum connection either at the rear (-H) or the bottom (-U)

Our Highlights...

- Conventional spring-tube or capsule-element vacuum manometers
- Standardized dimensions and connections
- Various measuring ranges

Your Benefits...

- > Simple and reliable; proven in many years of use
- > Suitable for all existing vacuum applications
- > Function is matched to customer requirements

Designation Code Manometers VAM

Abbreviated designation	Diameter in mm	Measuring range in mbar	Vacuum connection	Scale unit	Shape
Example VAM 100 V250 U:					
VAM	100	V250	U		
VAM	40	V250 -250 to 0	H back	- mbar	SE for panel mounting
	63	V400 -400 to 0	U bottom	PSI PSI	
	67	V1000 -1000 to 0			
	100				

Ordering Data Manometers VAM

Manometer VAM is delivered as a ready to connect product.

Available accessories: pressure-limiter valve

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Manometers VAM

Measuring range from -1,000 mbar to 0 mbar

Manometers VAM

Type	Part Number
VAM 40 V H	10.07.02.00007
VAM 40 V DR	10.07.02.00035
VAM 63 V250 H	10.07.02.00006
VAM 63 V400 H	10.07.02.00002
VAM 63 V H PSI	10.07.02.00003
VAM 63 V U PSI	10.07.02.00004
VAM 67 V H-SE	10.07.02.00016
VAM 100 V250 U	10.07.02.00001

Ordering Data Accessories Manometers VAM

Type	Type	Part Number
Pressure-limiter valve	DBV-M G1/4-AG MS	10.05.05.00057

Technical Data Manometers VAM

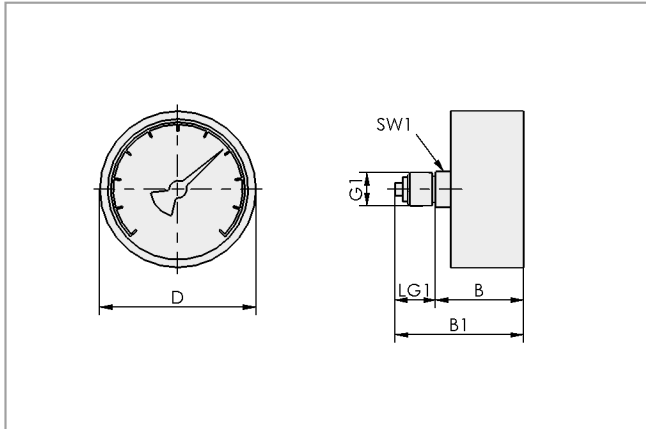
Type	Measuring range [bar]
VAM 40 V H	-1.00 ... 0.00
VAM 40 V DR	-1.00 ... 0.00
VAM 63 V250 H	-0.25 ... 0.00
VAM 63 V400 H	-0.40 ... 0.00
VAM 63 V H PSI	-1.00 ... 0.00
VAM 63 V U PSI	-1.00 ... 0.00
VAM 67 V H-SE	-1.00 ... 0.00
VAM 100 V250 U	-0.25 ... 0.00

Manometers VAM

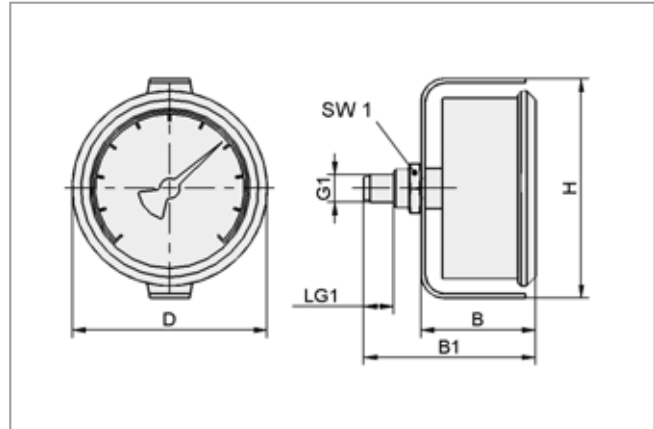
Measuring range from -1,000 mbar to 0 mbar



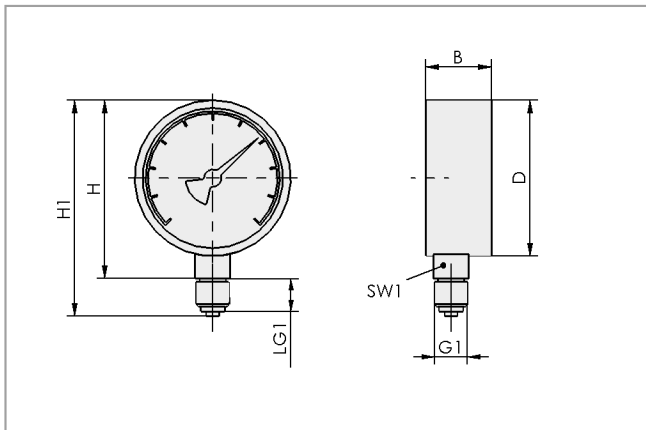
Design Data Manometers VAM



VAM 40H and 63H



VAM 67 V H-SE



VAM 63U and 100U

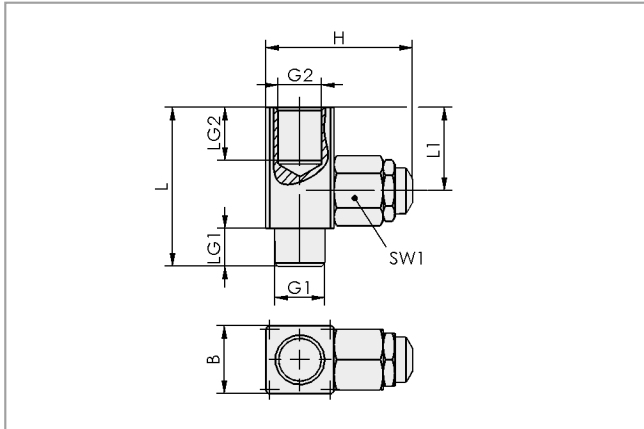
Type	Dimensions in mm								
	B	B1	D	G1	H	H1	LG1	SW1	
VAM 40 V H	30	40	40	G1/8"-M	-	-	10	12	
VAM 40 V DR	30	40	40	G1/8"-M	-	-	9	12	
VAM 63 V250 H	34	46	63	G1/4"-M	-	-	12	14	
VAM 63 V400 H	34	46	63	G1/4"-M	-	-	12	14	
VAM 63 V H PSI	35	48	63	G1/4"-M	-	-	13	14	
VAM 63 V U PSI	26	-	63	G1/4"-M	68	82.5	13	14	
VAM 67 V H-SE	40	59	67	G1/8"-M	76	-	10	14	
VAM 100 V250 U	87	-	100	G1/2"-M	112	142.0	25	22	

Manometers VAM

Measuring range from -1,000 mbar to 0 mbar



Design Data Accessories Manometers VAM



DBV-M

Type	Dimensions in mm								
	B	G1	G2	H	L	L1	LG1	LG2	SW1
DBV-M G1/4-AG MS	18	G1/4"-M	G1/4"-F	46	42	22	10	14	16

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

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Manometer VAM-D

Measuring range from -1 bar to 10 bar



Suitable for Industry Specific Applications



Manometers VAM-D

Applications

- Electronic manometer with digital display for use in vacuum and pressure systems for recording and displaying of vacuum (-1 to 0 bar) and pressure (0-10 bar)
- Installation into panels due to cubic design
- Installation in handling systems directly at the site thanks to minimal size and low weight
- Ideal for mobile use (battery operated)
- Quick and easy troubleshooting in vacuum and pressure systems (optionally available in set)

Design

- Battery powered digital manometer in a robust polycarbonate housing
- Connection of the measuring medium (vacuum and pressure) with male thread G1/8" or female thread M5
- Mounting bracket and mounting frame available as accessory for switch panel mounting
- Integrated battery indicator on the display (changeable battery)
- LCD display showing 3 1/2 digits and seven segments

Our Highlights...

- Electronic manometer with digital display
- Compact design, very light weight (only 40 g) and battery-operated
- Recording and display of vacuum or pressure values
- Manometer optionally available in the set for troubleshooting

Your Benefits...

- > Clear, visual monitoring of the system and the process
- > Ideal for mobile use; no external power source required
- > For universal use in vacuum and pressure systems
- > Quick and easy troubleshooting directly on site by all necessary components ("Plug & Play")



Designation Code Manometer VAM-D

Abbreviated designation	Dimensions in mm	Measuring range in bar	Connection thread	Product addition
Example VAM-D 30x30 VP G1/8-AG:				
VAM-D	30x30	VP	G1/8-AG	
VAM-D	30x30	VP -1 to 10	G1/8-AG(AG = male (M))	SET set for troubleshooting



Ordering Data Manometer VAM-D

Electronic manometer VAM-D is delivered as a ready to connect product.

Available accessories: mounting bracket, mounting frame

Manometer VAM-D

Measuring range from -1 bar to 10 bar

Manometer VAM-D

Type	Part Number
VAM-D 30x30 VP10 G1/8-AG	10.07.02.00055
VAM-D 30x30 VP10 G1/8-AG SET*	10.07.02.00057

*Set consists of manometer VAM-D, suitable screw in push fittings, plugs and needle probe

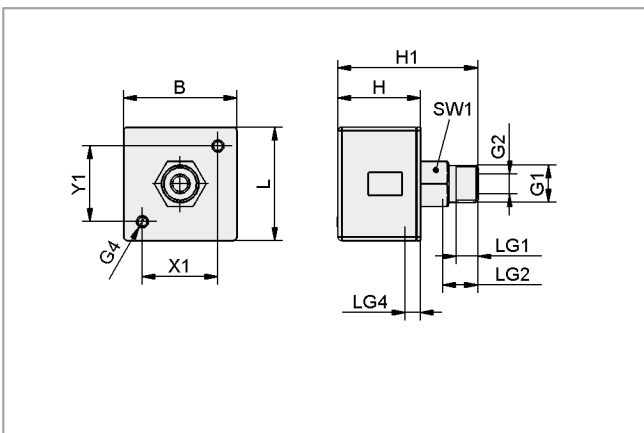
Ordering Data Accessories Manometer VAM-D

Type	Type	Part Number
Mounting bracket	BEF-WIN 20.3x45.5x40 1.6	10.06.02.00425
Mounting frame	EINB-RAx8.5x30 VS	10.06.02.00427

Technical Data Manometer VAM-D

Type	VAM-D 30x30 VP G1/8-AG
Measured medium	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1.0 ... 10.0
Operating temperature [°C]	0 ... 50
Max. overpressure resistance [bar]	3
Measured-value display	3-digit 7-segment LED
Protection IP	IP 40/65 (with hose)
Repeatability	± 1% of full-scale value
Weight [g]	40

Design Data Manometer VAM-D



VAM-D 30 x 30 VP

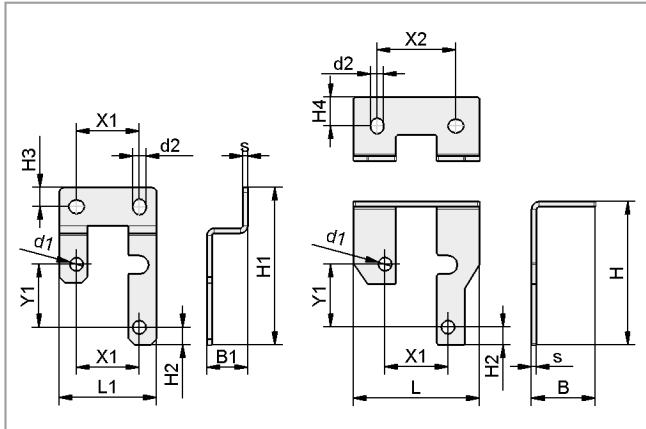
Type	Dimensions in mm												
	B	G1	G2	G4	H	H1	L	LG1	LG2	LG4	SW1	X1	Y1
VAM-D 30x30 VP10 G1/8-AG	30	G1/8"-M	M5-F	M3-F	22	37	30	6	9	4	12	20	20

Manometer VAM-D

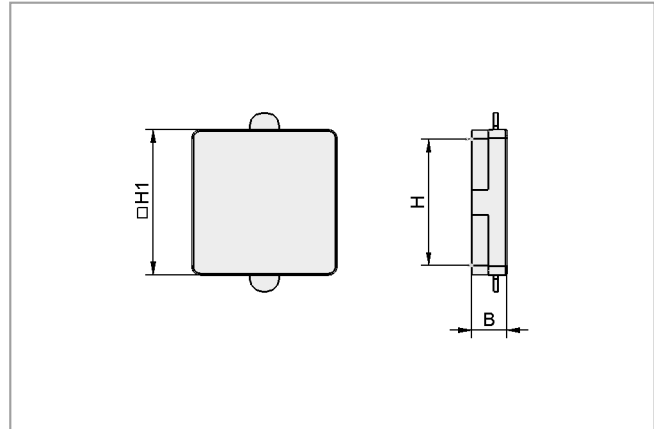
Measuring range from -1 bar to 10 bar



Design Data Accessories Manometer VAM-D



BEF-WIN



EINB-RA

Type	Dimensions in mm													
	B	B1	d1	d2	H	H1	H2	H3	H4	L	L1	X1	X2	Y1
BEF-WIN 20.3x45.5x40 1.6	20.3	13	4.3	4.2	46	50.0	6	6.1	9.1	40	31	20	25	20
EINB-RAx8.5x30 VS	8.5	-	-	-	30	34.5	-	-	-	-	-	-	-	-

Pressure-Reduction Valves DM

Working range from 0.5 bar to 10.0 bar



Suitable for Industry Specific Applications



Pressure-reduction valves DM

Applications

- Pressure-reduction valve for manual control of compressed air in systems
- Targeted supply of compressed air through precise pressure control, for pneumatic vacuum generators, etc.
- For use in testing and measuring applications, such as testing for leaks

Design

- Pressure-reduction valve with robust aluminum housing
- Precise pressure adjustment with lockable control handle
- Pressure gauge and bracket included with delivery

Our Highlights...

- Mechanically adjustable pressure-reduction valve
- Precise control of the pressure
- Independent from primary pressure and relievable

Your Benefits...

- > Manual adjustment with very high repeatability
- > Set value is maintained with high degree of accuracy
- > Easy installation in any position



Designation Code Pressure-Reduction Valves DM

Abbreviated designation	Working area	Threaded connection
Example DM 0.5...10 G1/2-IG:		
DM	0.5...10	G1/2-IG
DM	0.5...10 0.5 to 10.0 bar	G1/2-IG (IG = female (F))



Ordering Data Pressure-Reduction Valves DM

Pressure-reduction valve DM is delivered as a ready to connect product, including mounting bracket.

Pressure-Reduction Valves DM

Type	Part Number
DM 0.5...10 G1/2-IG	10.07.11.00025



Technical Data Pressure-Reduction Valves DM

Type	Work area	Max. flow rate [l/min]*	Max. flow rate [m³/h]*	Operating temp.	Weight [kg]	Max. pressure [bar]
DM 0.5...10 G1/2-IG	0.5 ... 10.0	1300	78	-10 ... 60	0.74	10

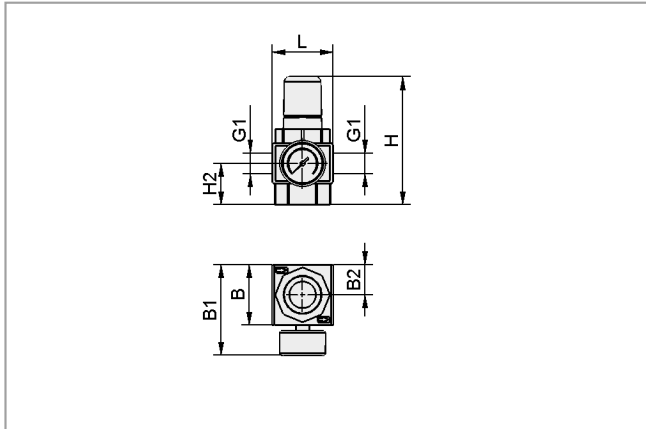
*Input pressure 10 bar and output pressure 6,3 bar

Pressure-Reduction Valves DM

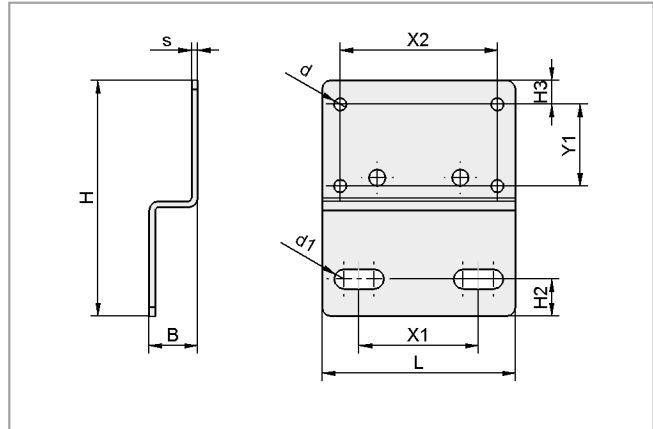
Working range from 0.5 bar to 10.0 bar



Design Data Pressure-Reduction Valves DM



DM 0.5...10.0 G1/2

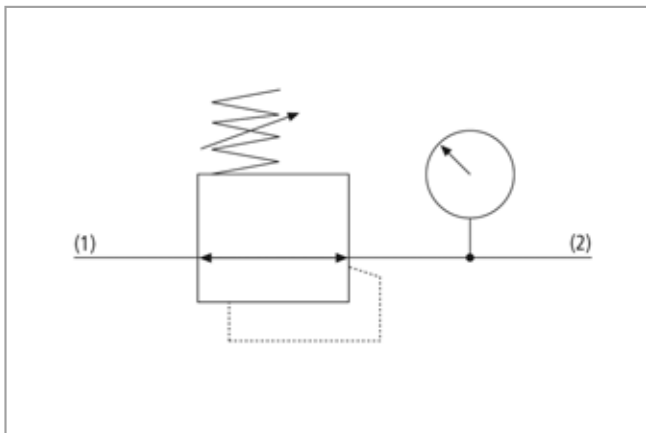


BEF-WIN 16x78x64 2

Type	Dimensions in mm														
	B	B1	B2	d	d1	G1	H	H2	H3	L	s	X1	X2	Y1	
DM 0.5...10 G1/2-IG	64.0	96.0	32.0	-	-	G1/2"-F	135.5	43.5	-	64.0	-	-	-	-	
BEF-WIN 16x78x64 2	16.0	-	-	4.2	6.5	-	78.0	12.3	8.0	64.0	2.0	39.5	52.0	27.0	



Functional Circuit Diagram Pressure-Reduction Valves DM



Circuit diagram DM (1 = pressure; 2 = vacuum)

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Warning Devices



Warning Devices, Acoustic-Electronic WN-E

Measuring range from -1 bar to 0 bar



Suitable for Industry Specific Applications



Warning devices, acoustic-electronic WN-E

Applications

- Warning device for system monitoring with warning if the vacuum drops or the electric power fails
- Monitoring of vacuum systems

Design

- Electronic warning device with integrated electronic vacuum switch
- Electronics mounted in a robust, impact-resistant macrolon housing
- Power cable and hose for vacuum connection enter housing via a cable gland

Our Highlights...

- Loud, audible warning signal (100 dB)
- Integrated voltage monitor
- Switching point adjustable in the range -1 to 0 bar
- Electronic warning device

Your Benefits...

- > Reliable warning, even in very noisy surroundings
- > Audible warning signal also sounds in the case of a power failure
- > Flexible use at various vacuum values
- > Reliable monitoring of vacuum systems



Designation Code Warning Devices, Acoustic-Electronic WN-E

Abbreviated designation	Principle of function	Voltage
Example WN-E AKUST -1...0 AC:		
WN-E	AKUST	-1...0 AC
WN-E	AKUSTacoustic-electronic	-1...0 AC single-phase -1...0 DC direct current



Ordering Data Warning Devices, Acoustic-Electronic WN-E

Warning device WN-E is delivered as a ready to connect product.

Warning Devices, Acoustic-Electronic WN-E

Type	Part Number
WN-E AKUST -1...0 AC	10.07.05.00012
WN-E AKUST -1...0 DC	10.07.05.00016

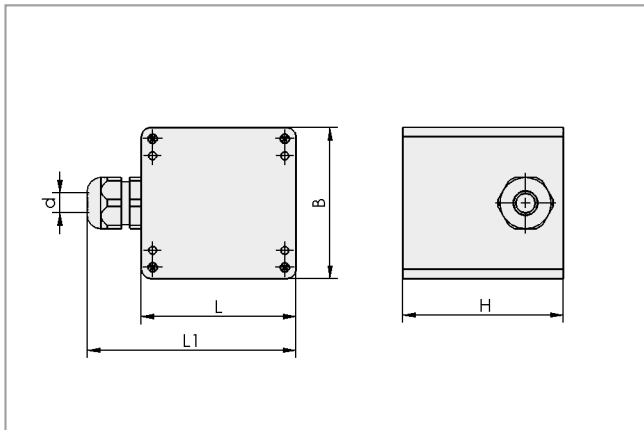
Warning Devices, Acoustic-Electronic WN-E

Measuring range from -1 bar to 0 bar

Technical Data Warning Devices, Acoustic-Electronic WN-E

Type	WN-E AKUST -1...0 AC	WN-E AKUST -1...0 DC
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range [bar]	-1 ... 0.00	-1 ... 0.00
Max. overpressure resistance [bar]	5	5
Repeatability	5 mbar	5 mbar
Hysteresis	Fixed: approx. 20 mbar	Fixed: approx. 20 mbar
On time [ms]	1	1
Voltage	200-280V - AC	24V - DC
Current consumption [mA]	100	100
Protection IP	IP 40/53 (assembled)	IP 40/53 (assembled)
Lk (Length of cable [m])	3	3
Length vacuum hose [m]	1	1
Temperature influence	1 mbar/°C	1 mbar/°C
Operating temperature [°C]	0 ... 40	0 ... 40
Weight [g]	430	430

Design Data Warning Devices, Acoustic-Electronic WN-E



WN-E AKUST -1...0

Type	Dimensions in mm				
	B	d	H	L	L1
WN-E AKUST -1...0 AC	80	10	85	82	111
WN-E AKUST -1...0 DC	80	10	85	82	111

Connectors and Adapters for Vacuum Switches



Cables and Plugs for Vacuum Switches



Suitable for Industry Specific Applications



Cables and plugs for vacuum switches

Applications

- Electrical connection of vacuum and pressure switches
- Adaptation of the connectors to customer requirements

Design

- Electrical connection cables with screw-in M8 connector (to meet IP 65 requirements) or plug-in connector
- Various lengths available
- Available with PUR (for high dynamic requirements)
- Adapter from M8 to M12 available as an option

Our Highlights...

- Electrical connection cables and adapters
- Wide range of different versions

Your Benefits...

- > Accessories for all switch types
- > For adaptation to customer requirements and local standards



Ordering Data Cables and Plugs for Vacuum Switches

Type	Type*	Part Number
Connection cable	ASK B-M8-4 5000 PUR GE	10.06.02.00031
Connection cable	ASK B-M8-4 5000 PUR W	10.06.02.00032
Connection cable	ASK B-M8-4 5000 PUR W-LED	10.06.02.00047
Connection cable	ASK B-M8-4 2000 PUR GE	10.06.02.00084
Connection plug	ASS B-M8-4 M12-4	10.06.02.00048

*5000 = 5 m long; 2000 = 2 m long GE = straight cable outlet; W = angled (90°) cable outlet; W-LED = angled (90°) cable outlet with LED indicator

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- Switches and Monitoring**
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Filters and Connections

Index of Products	Contact	Services	Filters and Connections	Switches and Monitoring	Valve Technology	Vacuum Generators	Mounting Elements	Vacuum Gripping Systems	Special Grippers	Vacuum Suction Cups	Vacuum Knowledge	Schmalz - The Company
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Overview of Section 10



Filters and Connections

At a Glance

Selection Aid		Page
	Checklist for Selection of Filters	701
Vacuum Filters		
	Vacuum Filters VF / STF / STF-D <ul style="list-style-type: none"> • Nominal flow rates: from 6 m³/h to 480 m³/h • Pore sizes: 3 to 30 µm 	 702 <p>Vacuum filter for use in very dusty environments with a degree of separation of almost 100%; central installation in the vacuum system for protection of the vacuum generator.</p>
	Vacuum Cup Filters VFT <ul style="list-style-type: none"> • Pore size: 80 and 100 µm • Connection thread: 1/8" to 3/4" • Material: PE and stainless steel • Nominal flow rate: 45 to 770 l/min 	 705 <p>Vacuum cup filter for central integration in vacuum systems with light to medium degrees of contamination for protection of the vacuum generator; filter elements can be cleaned.</p>
	Inline Filters VFI <ul style="list-style-type: none"> • Nominal flow rates: from 32 to 66 l/min • Filter mesh: 50 µm • Connection options: hose 4/2, 6/4 or 8/6 	 708 <p>Inline filter for simple, decentralized installation directly on the suction cup, in vacuum systems with light to medium degrees of contamination for protection of the vacuum generator.</p>
Vacuum Distributors		
	Vacuum / Compressed-Air Distributors VTR <ul style="list-style-type: none"> • 5-way and 9-way manifolds • Connections G1/8" and G1/4" 	 711 <p>Distributor for vacuum supply of several suction cups for central vacuum generation.</p>
Hoses and Connectors		
	Vacuum / Compressed-Air Hoses VSL <ul style="list-style-type: none"> • External/internal diameters from 4/2 to 85/75 • Materials: PA, PE, PU, PVC 	 713 <p>Vacuum / compressed air hose made from PA, PE, PU or PVC, optionally reinforced with hard PVC spirals, wire spirals or fabric lining.</p>

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Overview of Section 10



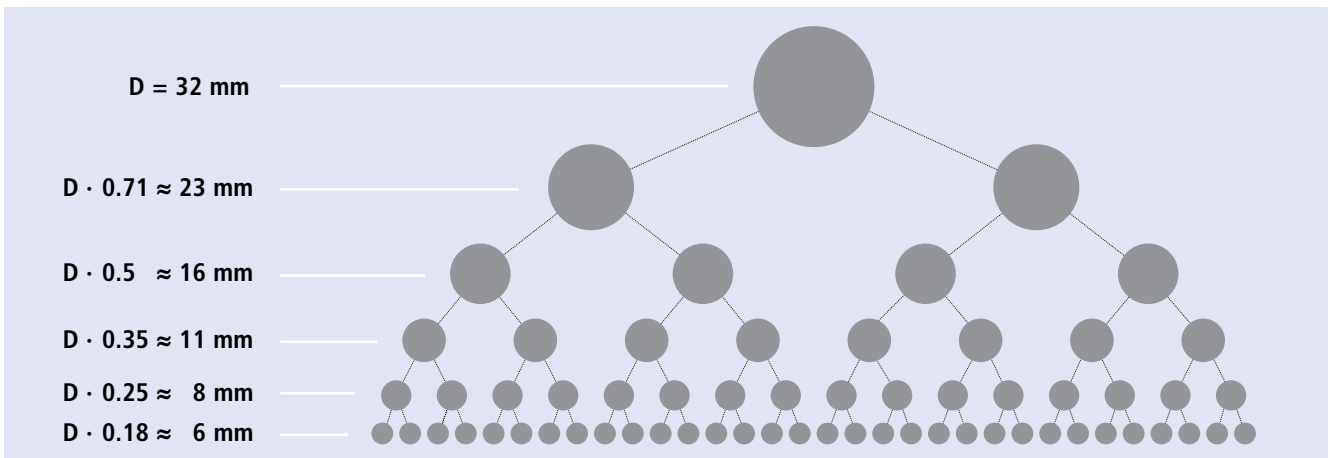
Filters and Connections

At a Glance

Schmalz - The Company		Hose Clamps SSB / SSD		717
Vacuum Knowledge		<ul style="list-style-type: none">• Clamping diameters from 10 to 84 mm	Hose clamps with stable threaded spindle for securing smooth or wire-reinforced hose lines on hose nozzles.	
Vacuum Suction Cups		Screw in Push Fittings		720
Special Grippers		<ul style="list-style-type: none">• Connection thread M5 to G1/2"• Material: nickel-plated brass	Screw in push fittings for quick, tool-free connection of hoses.	
Vacuum Gripping Systems		Accessories for Screw Unions		728
Special Grippers		<ul style="list-style-type: none">• Connection thread M5 to 1 1/2"• Material: nickel-plated brass	Accessories for screw fittings for closing, reducing, enlarging and extending threaded holes.	
Mounting Elements		Rotary Inlets DEF		738
Vacuum Generators		<ul style="list-style-type: none">• Rotation speed: 21 to 3,500 rpm	High-strength aluminum or steel rotary connections for connecting hose lines.	
Valve Technology		Sealing Rings DR		740
Switches and Monitoring		<ul style="list-style-type: none">• Internal diameters: 3.5 to 48 mm• Material: PA	Sealing rings for sealing of connection nipples and other connection elements.	

Filters and Connections
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Overview Flow Resistance in Hoses



Aid for the dimensioning of distribution hoses:

Example: A hose with an internal diameter $D = 32$ mm has the same internal flow rate as 32 hoses with an internal diameter of 6 mm or 4 hoses with an internal diameter of 16 mm.

Checklist for Selection of Hoses

Criterion/material	PVC	PU	PE	PA
Resistance to oil	Good	Excellent	Good	Very good
Resistance to fuels and natural gas	Medium	Very good	Medium	Good
Resistance to weathering	Medium	Excellent	Medium	Medium
Behaviour at low temperatures	Freezes at -20 °C	Similar to a hard plastic at -35 to -40 °C, but no embrittlement	Freezes at -50 °C	Freezes at -40 °C
Behaviour at high temperatures	Withstands 70 °C for long periods	Withstands 80 °C for long periods, for short periods up to 100 °C	Withstands 70 °C for long periods	Withstands 85 °C for long periods
Dynamic stress resistance	Tensile strength: good; Ductile yield: very good; suitable for static installation	Tensile strength: excellent Ductile yield: excellent, very high elasticity, excellent creepage resistance, thus suitable for trailing cable installations	Tensile strength: very good Ductile yield: very good, suitable for static installation	Tensile strength: very good Ductile yield: good, suitable for static installation
Resistance to abrasion	Good	Excellent	Good	Good

Vacuum Filters



Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min



Suitable for Industry Specific Applications



Vacuum filters VF / STF / STF-D

Applications

- Vacuum filter for protection of easily damaged vacuum generators (such as pumps and blowers) by filtering the incoming air
- For use in dusty surroundings; removal of almost 100% of the dust and dirt

Design

- Vacuum filter type VF: aluminium filter house, cover screwed on, filter cartridge with wire mesh or paper filter
- Vacuum filter type STF N: sheet-steel filter housing, cover clipped on, filter cartridge with special paper filter
- Vacuum filter types STF P: plastic filter housing, cover clipped on, with mounting bracket, filter cartridge with special paper filter, large-size connections
- Type STF-D P: with additional pressure monitor for measuring the degree of contamination

Our Highlights...

- Wide range of sizes with various performance figures
- Replaceable filter cartridges
- Filter elements with almost 100% removal of dust and dirt
- Optionally with monitoring of the degree of contamination of the filter cartridge

Your Benefits...

- > The right filter for each vacuum generator
- > Low operating costs, environmentally friendly design
- > Optimum protection of vacuum generators against dust and dirt
- > Maximum system availability



Ordering Data Vacuum Filters VF / STF / STF-D

Vacuum filter VF / STF / STF-D is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge
Available accessories: mounting bracket

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Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min

Vacuum Filters VF / STF / STF-D

Type*	Part Number
VF-6 G1/4-IG 15	10.07.01.00003
VF-10 G3/8-IG 30	10.07.01.00004
STF G3/4-IG N	10.07.01.00007
STF G1-1/4-IG N	10.07.01.00008
STF G2-1/2-IG N	10.07.01.00010
STF 60 P 4.5 SSD	10.07.01.00259
STF 60 P 6.0 SSD	10.07.01.00260
STF 75 P 8.0 SSD	10.07.01.00263
STF-D 60 P 4.5 F SSD	10.07.01.00266
STF-D 60 P 6.0 F SSD	10.07.01.00262
STF-D 75 P 8.0 F SSD	10.07.01.00265

*STF-D: incl. differential pressure monitor to control the filter

Ordering Data Spare Parts and Accessories Vacuum Filters VF / STF / STF-D

Type	Mounting bracket	Type	Replacement filter cartridge
VF-6 G1/4-IG 15	10.07.01.00011	VF-6 G1/4-IG 15	10.07.01.00013
VF-10 G3/8-IG 30	10.07.01.00011	VF-10 G3/8-IG 30	10.07.01.00014
STF G3/4-IG N	-	STF G3/4-IG N	10.07.01.00017
STF G1-1/4-IG N	-	STF G1-1/4-IG N	10.07.01.00018
STF G2-1/2-IG N	-	STF G2-1/2-IG N	10.07.01.00020
STF 60 P 4.5 SSD	-	STF 60 P 4.5 SSD	10.07.01.00060
STF 60 P 6.0 SSD	-	STF 60 P 6.0 SSD	10.07.01.00054
STF 75 P 8.0 SSD	-	STF 75 P 8.0 SSD	10.07.01.00079
STF-D 60 P 4.5 F SSD	-	STF-D 60 P 4.5 F SSD	10.07.01.00060
STF-D 60 P 6.0 F SSD	-	STF-D 60 P 6.0 F SSD	10.07.01.00054
STF-D 75 P 8.0 F SSD	-	STF-D 75 P 8.0 F SSD	10.07.01.00079

Technical Data Vacuum Filters VF / STF / STF-D

Type	Filter pore size [µm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Weight [kg]
VF-6 G1/4-IG 15	15	6	100	-950	6.0	0.13
VF-10 G3/8-IG 30	30	10	166	-950	6.0	0.22
STF G3/4-IG N	3	42	700	-950	1.0	0.50
STF G1-1/4-IG N	3	96	1600	-950	1.0	1.00
STF G2-1/2-IG N	3	360	6000	-950	1.0	4.30
STF 60 P 4.5 SSD	3	270	4500	-500	0.3	2.00
STF 60 P 6.0 SSD	3	360	6000	-500	0.3	2.40
STF 75 P 8.0 SSD	3	480	8000	-500	0.3	2.60
STF-D 60 P 4.5 F SSD	3	270	4500	-500	0.3	2.10
STF-D 60 P 6.0 F SSD	3	360	6000	-500	0.3	2.40
STF-D 75 P 8.0 F SSD	3	480	8000	-500	0.3	2.60

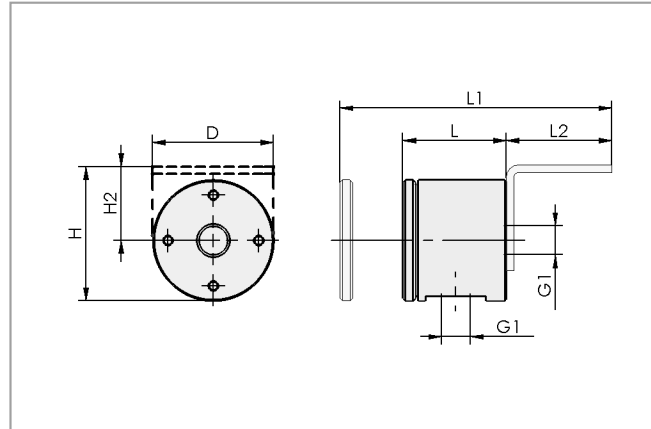
Vacuum Filters



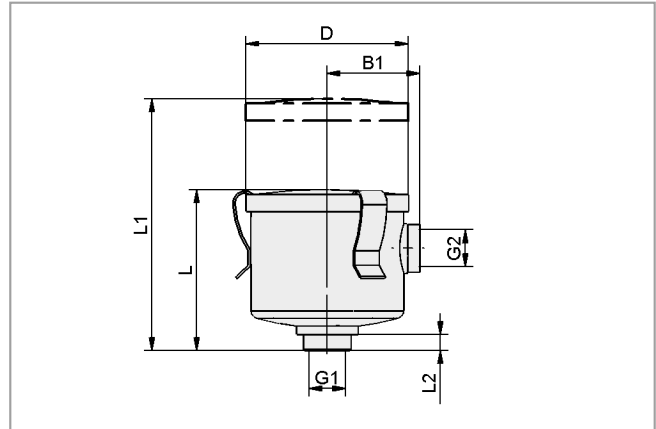
Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min

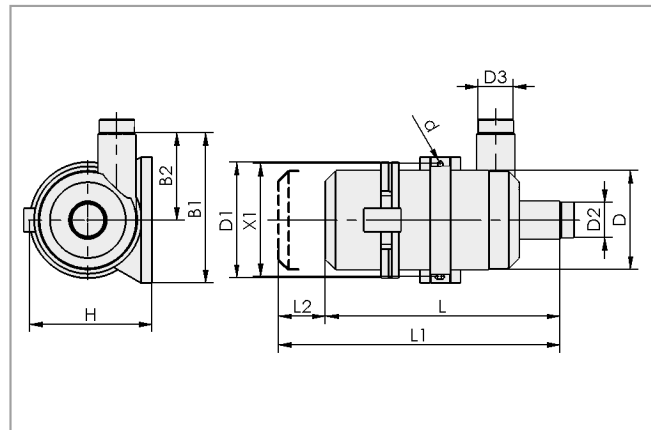
Design Data Vacuum Filters VF / STF / STF-D



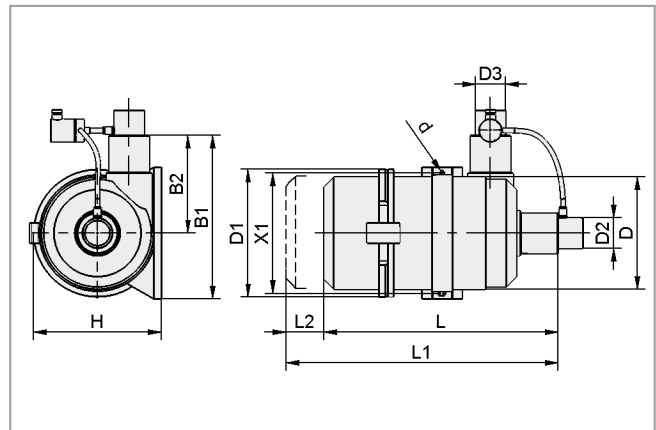
VF G1/4 and G3/8



STF G3/4 to STF G2-1/2



STF 60 and STF 75



STF-D 60 and STF-D 75

Type	Dimensions in mm															
	B1	B2	d	D	D1	D2	D3	G1	G2	H	H2	L	L1	L2	X1	
VF-6 G1/4-IG 15	-	-	-	48	-	-	-	G1/4"-F	-	54	30	41	108	42	-	
VF-10 G3/8-IG 30	-	-	-	48	-	-	-	G3/8"-F	-	54	30	70	157	42	-	
STF G3/4-IG N	59	-	-	97	-	-	-	G3/4"-F	G3/4"-F	-	-	89	159	6	-	
STF G1-1/4-IG N	81	-	-	136	-	-	-	G1-1/4"-F	G1-1/4"-F	-	-	116	191	17	-	
STF G2-1/2-IG N	123	-	-	200	-	-	-	G2-1/2"-F	G2-1/2"-F	-	-	250	490	12	-	
STF 60 P 4.5 SSD	221	112	9	170	198	60	60	-	-	218	-	355	658	303	192	
STF 60 P 6.0 SSD	265	142	9	200	229	60	60	-	-	253	-	390	741	351	220	
STF 75 P 8.0 SSD	280	148	9	228	248	75	75	-	-	260	-	415	774	359	237	
STF-D 60 P 4.5 F SSD	221	112	9	170	198	60	60	-	-	218	-	355	658	303	192	
STF-D 60 P 6.0 F SSD	265	142	9	200	229	75	75	-	-	253	-	390	741	351	220	
STF-D 75 P 8.0 F SSD	280	148	9	228	248	75	75	-	-	260	-	415	774	359	237	

Vacuum Filters



Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min



Suitable for Industry Specific Applications



Vacuum cup filters VFT

Applications

- Vacuum cup filter for protection of easily damaged vacuum generators (such as pumps and blowers) by filtering the incoming air
- Filtering of vacuum and compressed air at pressures up to 7 bar
- Filtering light to medium contaminated air with pore size 80 µm
- Filtering heavy contaminated air with pore size 100 µm

Design

- Vacuum cup filter with filter cup made of clear nylon
- Filter cartridge made of polyethylene (pore size 80 µm) or stainless steel (pore size 100 µm)
- Stainless steel cartridge can be cleaned and reused several times

Our Highlights...

- Wide range of sizes
- Filter elements with very good separation
- Filter pore sizes 80 and 100 µm
- Filter elements made of stainless steel (100 µm) and polyethylene (80 µm)
- Filter cup made of clear nylon

Your Benefits...

- > Suitable filter for all vacuum generators
- > Optimum protection of vacuum generators against dust and dirt
- > Ideal for use as pre-filters and fine filters for air with varying degrees of contamination
- > Long-life filter elements which can be cleaned and reused
- > Degree of contamination easily visible



Designation Code Vacuum Cup Filters VFT

Abbreviated designation	Connection thread	Filter fineness in µm
Example VFT G1/8-IG 80: VFT	G1/8-IG	80
VFT	G1/8-IG (IG = female (F)) G1/4-IG G3/8-IG G1/2-IG G3/4-IG	80 100

Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min



Ordering Data Vacuum Cup Filters VFT

Vacuum filter VFT is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge

Available accessories: holder

Vacuum Cup Filters VFT

Type	Part Number
VFT G1/8-IG 80	10.07.01.00116
VFT G1/8-IG 100	10.07.01.00117
VFT G1/4-IG 80	10.07.01.00119
VFT G1/4-IG 100	10.07.01.00120
VFT G3/8-IG 80	10.07.01.00122
VFT G3/8-IG 100	10.07.01.00123
VFT G1/2-IG 80	10.07.01.00125
VFT G1/2-IG 100	10.07.01.00126
VFT G3/4-IG 80	10.07.01.00128
VFT G3/4-IG 100	10.07.01.00129



Ordering Data Spare Parts and Accessories Vacuum Cup Filters VFT

Type	Holder*	Type	Replacement filter cartridge
VFT G1/8-IG 80	10.07.01.00228	VFT G1/8-IG 80	10.07.01.00141
VFT G1/8-IG 100	10.07.01.00228	VFT G1/8-IG 100	10.07.01.00132
VFT G1/4-IG 80	10.07.01.00228	VFT G1/4-IG 80	10.07.01.00141
VFT G1/4-IG 100	10.07.01.00228	VFT G1/4-IG 100	10.07.01.00132
VFT G3/8-IG 80	10.07.01.00228	VFT G3/8-IG 80	10.07.01.00143
VFT G3/8-IG 100	10.07.01.00228	VFT G3/8-IG 100	10.07.01.00135
VFT G1/2-IG 80	10.07.01.00228	VFT G1/2-IG 80	10.07.01.00143
VFT G1/2-IG 100	10.07.01.00228	VFT G1/2-IG 100	10.07.01.00135
VFT G3/4-IG 80	10.07.01.00229	VFT G3/4-IG 80	10.07.01.00145
VFT G3/4-IG 100	10.07.01.00229	VFT G3/4-IG 100	10.07.01.00138

*complete with 2 mounting screws



Technical Data Vacuum Cup Filters VFT

Type	Filter pore size [µm]	Nominal flow rate [l/min]	Nominal flow rate [m³/h]	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Max. overpressure at 50°C [bar]	Weight [g]
VFT G1/8-IG 80	80	45	2.7	-990	7	5	49
VFT G1/8-IG 100	100	50	3.0	-990	7	5	49
VFT G1/4-IG 80	80	110	6.6	-990	7	5	47
VFT G1/4-IG 100	100	140	8.4	-990	7	5	47
VFT G3/8-IG 80	80	245	14.7	-990	7	5	79
VFT G3/8-IG 100	100	290	17.4	-990	7	5	79
VFT G1/2-IG 80	80	300	18.0	-990	7	5	76
VFT G1/2-IG 100	100	320	19.2	-990	7	5	76
VFT G3/4-IG 80	80	600	36.0	-990	7	5	164
VFT G3/4-IG 100	100	770	46.2	-990	7	5	164

Vacuum Filters

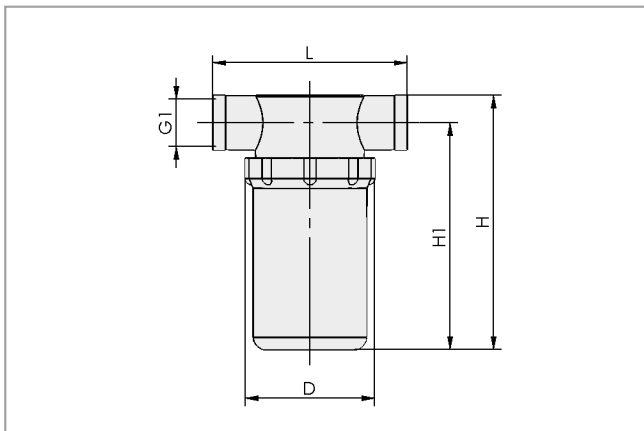


Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min



Design Data Vacuum Cup Filters VFT

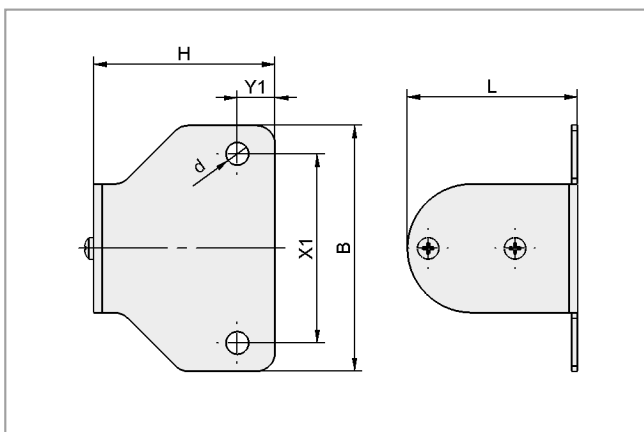


VFT G1/8 to G3/4

Type	Dimensions in mm				
	D	G1	H	H1	L
VFT G1/8-IG 80	48.0	G1/8"-F	60	50	76.0
VFT G1/8-IG 100	48.0	G1/8"-F	60	50	76.0
VFT G1/4-IG 80	48.0	G1/4"-F	60	50	76.0
VFT G1/4-IG 100	48.0	G1/4"-F	60	50	76.0
VFT G3/8-IG 80	48.5	G3/8"-F	101	88	77.2
VFT G3/8-IG 100	48.5	G3/8"-F	101	88	77.2
VFT G1/2-IG 80	48.0	G1/2"-F	101	88	77.2
VFT G1/2-IG 100	48.5	G1/2"-F	101	88	77.2
VFT G3/4-IG 80	75.0	G3/4"-F	137	118	90.5
VFT G3/4-IG 100	75.0	G3/4"-F	137	118	90.5



Design Data Accessories Filter Holders



HTR-FIL

Type	Dimensions in mm					
	B	d	H	L	X1	Y1
HTR-FIL 2S WI VFT1/8-1/2	65	6	48	45	50	10
HTR-FIL 2S WI VFT3/4	85	6	52	70	70	10

Vacuum Filters



Inline Filters VFI

Rated flow from 32 l/min to 66 l/min



Suitable for Industry Specific Applications



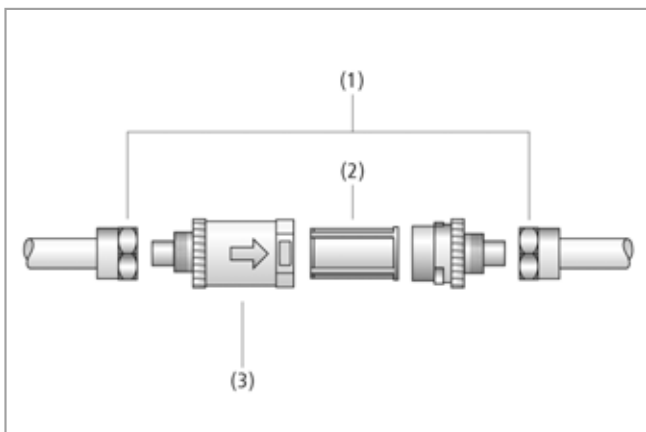
Inline filters VFI

Applications

- Inline filter for use in vacuum systems with light to medium dirt levels
- Can be mounted on individual suction cups for the handling of dirty workpieces
- Simple hose connection

Design

- Nozzles with union nuts (1) on both ends for connection of hoses (internal hose diameter 4 and 6 mm); alternatively available with a push-in hose connection
- Transparent filter housing with arrow for indication of the flow direction (3)
- Filter head with knurled screw cap
- Slide-in filter element (2) made of transparent material for visual monitoring



System design inline filter VFI

Our Highlights...

- Fast and easily replaceable filter insert
- Indication of degree of contamination through transparent housing
- Simple hose connection
- Vacuum filter capable of withstanding short-term pressures of up to seven bar

Your Benefits...

- > Low operating costs, environmentally friendly product
- > Fast identification allows efficient maintenance
- > Quick installation
- > Suitable for universal use in systems with vacuum and pressure



Mounting example inline filters VFI

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Inline Filters VFI

Rated flow from 32 l/min to 66 l/min

Designation Code Inline Filters VFI

Abbreviated designation	Diameter in mm	Filter fineness in μm
Example VFI CN6/4 50:		
VFI	CN6/4	50
VFI	CN6/4 outside/inside	50
	CN8/6	
	4/2 quick-action push-in coupling (\varnothing 4/2)	
	6/4 quick-action push-in coupling (\varnothing 6/4)	

Ordering Data Inline Filters VFI

Inline filter VFI is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge

Inline Filters VFI

Type	Part Number
VFI CN6/4 50	10.07.01.00241
VFI CN8/6 50	10.07.01.00245
VFI 4/2 50	10.07.01.00329
VFI 6/4 50	10.07.01.00328

Ordering Data Spare Parts Inline Filters VFI

Type	Replacement filter cartridge*
VFI CN6/4 50	10.07.01.00244
VFI CN8/6 50	10.07.01.00248
VFI 4/2 50	10.07.01.00244
VFI 6/4 50	10.07.01.00248

*Packaging unit: 5 pieces

Technical Data Inline Filters VFI

Type	Filter pore size $[\mu\text{m}]$	Nominal flow rate $[\text{l}/\text{min}]^*$	Nominal flow rate $[\text{m}^3/\text{h}]^*$	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Max. overpressure at 50°C [bar]	Weight [g]
VFI CN6/4 50	50	32	1.92	-990	7	5	6
VFI CN8/6 50	50	66	3.96	-990	7	5	10
VFI 4/2 50	50	32	1.92	-990	7	5	6
VFI 6/4 50	50	66	3.96	-990	7	5	17

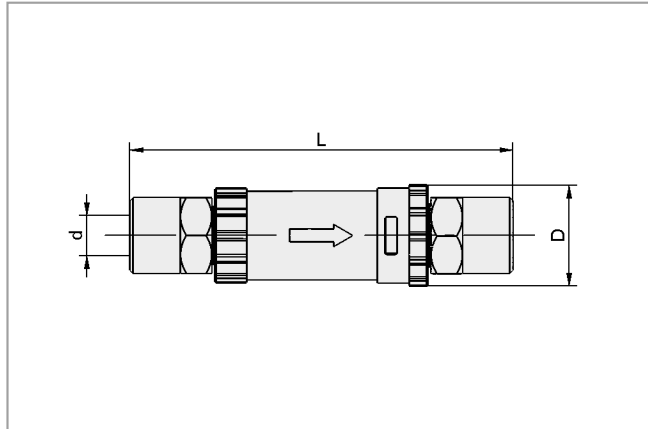
*In the case of a pressure drop of max. 40 mbar while gripping

Inline Filters VFI

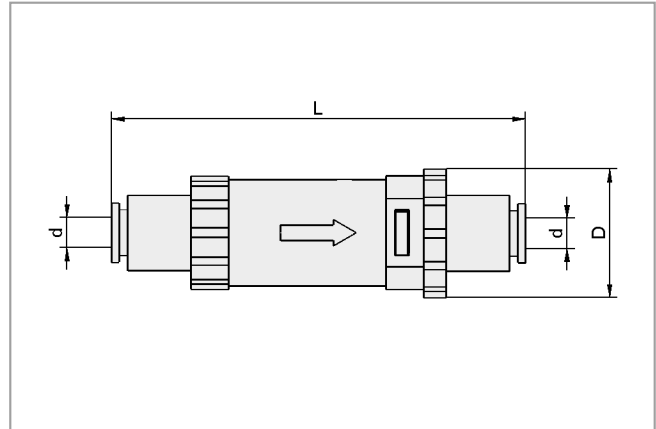
Rated flow from 32 l/min to 66 l/min



Design Data Inline Filters VFI



VFI CN6/4 and VFI CN8/6



VFI 4/2 and VFI 6/4

Type	Dimensions in mm		
	d	D	L
VFI CN6/4 50	6	16	61
VFI CN8/6 50	8	23	68
VFI 4/2 50	4	17	55
VFI 6/4 50	6	25	69

Vacuum Distributors



Vacuum / Compressed-Air Distributors VTR

No. of threads from 5 to 9



Suitable for Industry Specific Applications



Vacuum / compressed-air distributors VTR

Applications

- Distribution of vacuum in systems with a central vacuum generator and several suction cups
- Distribution of compressed air in systems with several distributed vacuum generators

Design

- Distributor made of high-strength aluminium with mounting holes

Our Highlights...

- Large cross-sections and matched inlets and outlets
- Two different sizes available
- Sizes matched to other accessories

Your Benefits...

- > Reduces and optimizes the flow resistance
- > Permits optimisation for fast evacuation times and low flow resistance
- > The ideal solution for a complete installation



Designation Code Vacuum / Compressed-Air Distributors VTR

Abbreviated designation	Connection thread 1	Number of threads	Connection thread 2
Example VTR G1/4-IG 5xG1/8:			
VTR	G1/4-IG	5x	G1/8-IG
VTR	G1/4-IG (IG = female (F))	5x	G1/8-IG (IG = female (F))
	G3/8-IG	9x	G1/4-IG



Ordering Data Vacuum / Compressed-Air Distributors VTR

Vacuum / compressed-air distributor VTR is delivered as a ready to connect product.

Vacuum / Compressed-Air Distributors VTR

Type	Part Number
VTR G1/4-IG 5xG1/8	10.09.03.00058
VTR G3/8-IG 5xG1/4	10.09.03.00060
VTR G1/4-IG 9xG1/8	10.09.03.00056
VTR G3/8-IG 9xG1/4	10.09.03.00054

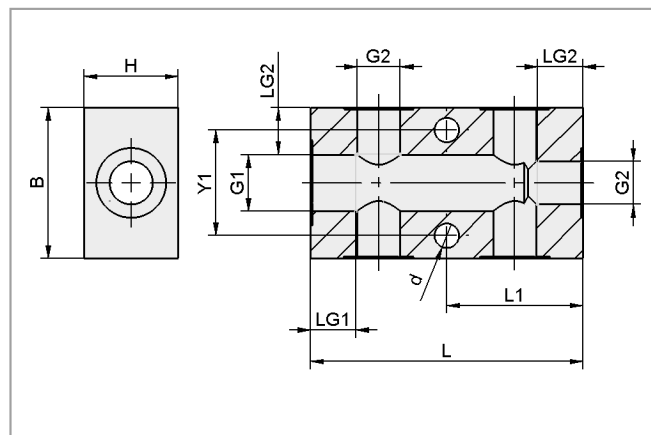
Vacuum / Compressed-Air Distributors VTR

No. of threads from 5 to 9

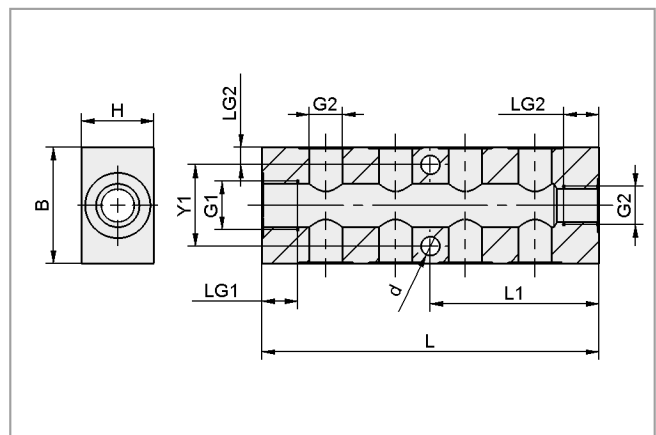
Technical Data Vacuum / Compressed-Air Distributors VTR

Type	Distributor type	Weight [g]
VTR G1/4-IG 5xG1/8	5 x thread G1/8"-F	90
VTR G3/8-IG 5xG1/4	5 x thread G1/4"-F	110
VTR G1/4-IG 9xG1/8	9 x thread G1/8"-F	120
VTR G3/8-IG 9xG1/4	9 x thread G1/4"-F	240

Design Data Vacuum / Compressed-Air Distributors VTR



VTR 5



VTR 9

Type	Dimensions in mm									
	B	d	G1	G2	H	L	L1	LG1	LG2	Y1
VTR G1/4-IG 5xG1/8	35	6.5	G1/4"-F	G1/8"-F	20	60	30	10	9	22
VTR G3/8-IG 5xG1/4	40	6.5	G3/8"-F	G1/4"-F	25	72	36	13	11	27
VTR G1/4-IG 9xG1/8	35	6.5	G1/4"-F	G1/8"-F	20	90	45	13	9	22
VTR G3/8-IG 9xG1/4	40	6.5	G3/8"-F	G1/4"-F	25	116	58	13	11	27

Hoses and Connectors



Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC



Suitable for Industry Specific Applications



Vacuum / compressed-air hoses VSL

Applications

- Hose connections in vacuum systems
- Polyurethane (PU) hoses for energy distribution systems

Design

- Vacuum hoses made of PVC, PU, PA and PE, some in the form of a hard PVC spiral (PS), with a wire spiral (DS) or a textile layer (G)

Our Highlights...

- Vacuum hoses with internal diameters from 2 to 75 mm
- Wide range of materials

Your Benefits...

- > Wide range of sizes permits optimization for best evacuation time and flow resistance
- > Suitable hoses for all applications



Designation Code Vacuum / Compressed-Air Hoses VSL

Abbreviated designation	Diameter in mm	Material	Product addition
Example VSL 15-9 PVC-G:			
VSL	15-9	PVC	G
VSL	4-2 outside-inside to 87-75	PA polyamide PE polyethylene PU polyurethane PVC polyvinyl chloride	DS wire spirale G textile layer PS PVC spiral



Ordering Data Vacuum / Compressed-Air Hoses VSL

Vacuum/compressed-air hose VSL is delivered in the desired length.

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Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Vacuum / Compressed-Air Hoses VSL

Type	Part Number	Hose clamps
VSL 4-2 PE	10.07.09.00013	-
VSL 4-2 PU	10.07.09.00001	-
VSL 4-2.7 PA	10.07.09.00063	-
VSL 6-4 PE	10.07.09.00014	-
VSL 6-4 PU	10.07.09.00002	-
VSL 8-6 PE	10.07.09.00015	-
VSL 8-6 PU	10.07.09.00003	-
VSL 10-7 PE	10.07.09.00083	-
VSL 10-7 PU	10.07.09.00084	-
VSL 12-9 PE	10.07.09.00050	-
VSL 12-9 PU	10.07.09.00037	-
VSL 14-11 PU	10.07.09.00038	10.07.10.00001
VSL 15-9 PVC-G	10.07.09.00005	10.07.10.00001
VSL 18-12 PVC-DS	10.07.09.00016	10.07.10.00002
VSL 21-12 PVC-G	10.07.09.00006	10.07.10.00002
VSL 26-19 PVC-DS	10.07.09.00007	10.07.10.00003
VSL 27-20 PU-DS*	10.07.09.00047	10.07.10.00086
VSL 34-25 PVC-DS	10.07.09.00041	10.07.10.00004
VSL 33-25 PU-DS*	10.07.09.00051	10.07.10.00087
VSL 41-32 PVC-DS	10.07.09.00008	10.07.10.00004
VSL 42-32 PU-DS*	10.07.09.00036	10.07.10.00018
VSL 42-35 PVC-PS	10.07.09.00010	10.07.10.00018
VSL 44-38 PU-DS*	10.07.09.00031	10.07.10.00019
VSL 47-38 PU-DS	10.07.09.00052	10.07.10.00020
VSL 48-38 PVC-DS	10.07.09.00009	10.07.10.00004
VSL 48-40 PVC-PS	10.07.09.00011	10.07.10.00020
VSL 60-50 PU-DS*	10.07.09.00020	10.07.10.00036
VSL 60-50 PU-DS	10.07.09.00076	10.07.10.00036
VSL 61-50 PVC-DS	10.07.09.00033	10.07.10.00036
VSL 71-60 PVC-DS	10.07.09.00012	-
VSL 71-60 PU-DS*	10.07.09.00034	-
VSL 71-60 PU-DS	10.07.09.00065	-
VSL 85-75 PVC-PS	10.07.09.00048	10.07.10.00037
VSL 85-75 PU-DS*	10.07.09.00054	10.07.10.00037
VSL 87-75 PU-DS	10.07.09.00061	-

*For use in energy distribution systems

Hoses and Connectors



Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Technical Data Vacuum / Compressed-Air Hoses VSL

Type	Material	Pressure range (operating pressure) [bar]*	Operating temperature [°C]	Min. bend radius [mm]**	Length (max) [m]***
VSL 4-2 PE	PE	-0.95 ... 10.00	-40 ... 90	20	100
VSL 4-2 PU	PU	-0.95 ... 10.00	-20 ... 90	20	50
VSL 4-2.7 PA	PA	-0.95 ... 20.00	-40 ... 90	30	50
VSL 6-4 PE	PE	-0.95 ... 10.00	-50 ... 65	35	100
VSL 6-4 PU	PU	-0.95 ... 10.00	-20 ... 90	35	500
VSL 8-6 PE	PE	-0.95 ... 10.00	-50 ... 65	45	100
VSL 8-6 PU	PU	-0.95 ... 10.00	-20 ... 90	45	500
VSL 10-7 PE	PE	-0.95 ... 10.00	-30 ... 70	60	50
VSL 10-7 PU	PU	-0.95 ... 10.00	-40 ... 85	60	50
VSL 12-9 PE	PE	-0.95 ... 10.00	-20 ... 70	70	100
VSL 12-9 PU	PU	-0.95 ... 10.00	-20 ... 90	70	50
VSL 14-11 PU	PU	-0.95 ... 10.00	-20 ... 90	100	100
VSL 15-9 PVC-G	PVC, with textile layer	-0.95 ... 10.00	-20 ... 70	50	50
VSL 18-12 PVC-DS	PVC, with wire spiral	-0.90 ... 5.00	-20 ... 70	85	30
VSL 21-12 PVC-G	PVC, with textile layer	-0.95 ... 10.00	-20 ... 70	80	50
VSL 26-19 PVC-DS	PVC, with wire spiral	-0.90 ... 5.00	-20 ... 70	85	30
VSL 27-20 PU-DS	PU, with wire spiral	-0.95 ... 4.00	-20 ... 90	70	10
VSL 34-25 PVC-DS	PVC, with wire spiral	-0.85 ... 4.00	-20 ... 70	95	30
VSL 33-25 PU-DS	PU, with wire spiral	-0.95 ... 4.00	-40 ... 90	75	10
VSL 41-32 PVC-DS	PVC, with wire spiral	-0.85 ... 4.00	-20 ... 70	110	30
VSL 42-32 PU-DS	PU, with wire spiral	-0.95 ... 3.20	-20 ... 90	95	10
VSL 42-35 PVC-PS	PVC, with PVC spiral	-0.50 ... 0.50	-20 ... 70	65	50
VSL 44-38 PU-DS	PU, with wire spiral	-0.82 ... 3.12	-20 ... 90	95	10
VSL 47-38 PU-DS	PU, with wire spiral	-0.94 ... 4.39	-20 ... 90	115	15
VSL 48-38 PVC-DS	PVC, with wire spiral	-0.88 ... 7.00	-20 ... 70	120	30
VSL 48-40 PVC-PS	PVC, with PVC spiral	-0.49 ... 1.00	-20 ... 70	70	50
VSL 60-50 PU-DS	PU, with wire spiral	-0.78 ... 2.90	-20 ... 90	95	20
VSL 60-50 PU-DS	PU, with wire spiral	-0.96 ... 3.20	-20 ... 90	145	15
VSL 61-50 PVC-DS	PVC, with wire spiral	-0.78 ... 1.50	-20 ... 70	90	10
VSL 71-60 PVC-DS	PVC, with wire spiral	-0.73 ... 1.27	-20 ... 70	110	25
VSL 71-60 PU-DS	PU, with wire spiral	-0.74 ... 2.55	-20 ... 90	105	20
VSL 71-60 PU-DS	PU, with wire spiral	-0.89 ... 3.60	-20 ... 90	170	15
VSL 85-75 PVC-PS	PVC, with PVC spiral	-0.59 ... 1.00	-20 ... 70	130	10
VSL 85-75 PU-DS	PU, with wire spiral	-0.59 ... 2.00	-20 ... 90	130	10
VSL 87-75 PU-DS	PU, with wire spiral	-0.96 ... 3.20	-20 ... 90	210	15

*In reference to media and ambient temperature of +20°C

**Referred to the inner side of the hose bend in a static state

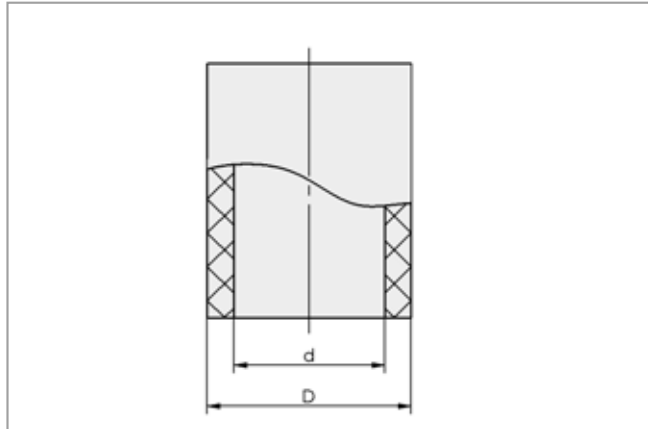
***Please indicate the tube length when placing the order!

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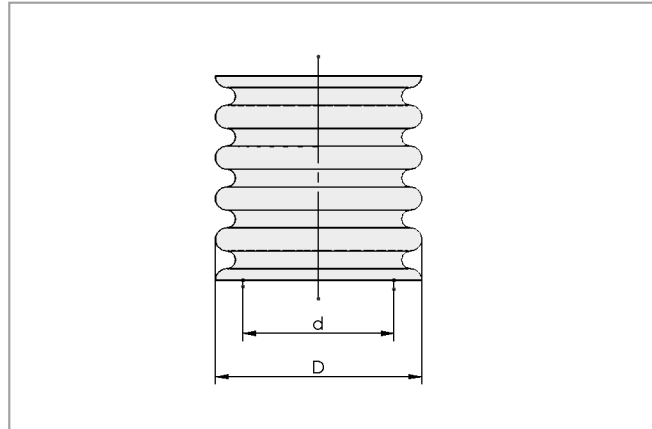
Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Design Data Vacuum / Compressed-Air Hoses VSL



VSL 4-2 to 21-12



VSL 26-19 to 87-75 with wire or hard-PVC spiral

Type	Dimensions in mm	
	d	D
VSL 4-2 PE	2	4
VSL 4-2 PU	2	4
VSL 4-2.7 PA	3	4
VSL 6-4 PE	4	6
VSL 6-4 PU	4	6
VSL 8-6 PE	6	8
VSL 8-6 PU	6	8
VSL 10-7 PE	7	10
VSL 10-7 PU	7	10
VSL 12-9 PE	9	12
VSL 12-9 PU	9	12
VSL 14-11 PU	11	14
VSL 15-9 PVC-G	9	15
VSL 18-12 PVC-DS	12	18
VSL 21-12 PVC-G	12	21
VSL 26-19 PVC-DS	19	26
VSL 27-20 PU-DS	20	27
VSL 34-25 PVC-DS	25	34
VSL 33-25 PU-DS	25	33
VSL 41-32 PVC-DS	32	41
VSL 42-32 PU-DS	32	42
VSL 42-35 PVC-PS	35	42
VSL 44-38 PU-DS	38	44
VSL 47-38 PU-DS	38	47
VSL 48-38 PVC-DS	38	48
VSL 48-40 PVC-PS	40	48
VSL 60-50 PU-DS	50	60
VSL 60-50 PU-DS	50	60
VSL 61-50 PVC-DS	50	61
VSL 71-60 PVC-DS	60	71
VSL 71-60 PU-DS	60	71
VSL 71-60 PU-DS	60	71
VSL 85-75 PVC-PS	75	85
VSL 85-75 PU-DS	75	85
VSL 87-75 PU-DS	75	87

Hoses and Connectors



Hose Clamps SSB / SSD

Clamping range from 10 mm to 84 mm



Suitable for Industry Specific Applications



Hose clamps SSB / SSD

Applications

- Hose clamp SSB for securing smooth hoses
- Hose clamp SSD for securing hoses with wire reinforcement

Design

- Hose clamp made of galvanized steel
- Robust clamping screw for safe clamping

Our Highlights...

- Hose clamps with diameters up to 84 mm
- High clamping forces due to robust clamping screw

Your Benefits...

- > Fitting for all vacuum hoses in our product range
- > Secure clamping of all vacuum hoses, including those with wire spirals



Designation Code Hose Clamps SSB / SSD

Abbreviated designation	Clamping range in mm
Example SSB 10-16:	
SSB	10-16
SSB smooth hoses	10-16
SSD hoses with wire reinforcement	to 76.5-84



Ordering Data Hose Clamps SSB / SSD

Hose clamp SSB / SSD is delivered in the desired diameter.

Schmalz - The Company
Vacuum Knowledge
Vacuum Suction Cups
Special Grippers
Vacuum Gripping Systems
Mounting Elements
Vacuum Generators
Valve Technology
Switches and Monitoring
Filters and Connections
Services
Contact
Index of Products

Hose Clamps SSB / SSD

Clamping range from 10 mm to 84 mm

Hose Clamps SSB / SSD

Type	Part Number	Protection caps
SSB 10-16 ST-VZ	10.07.10.00001	20.12.01.00036
SSB 16-27 ST-VZ	10.07.10.00002	20.12.01.00036
SSB 20-32 ST-VZ	10.07.10.00003	20.12.01.00036
SSB 35-50 ST-VZ	10.07.10.00004	20.12.01.00036
SSB 40-60 ST-VZ	10.07.10.00005	20.12.01.00036
SSB 60-80 ST-VZ	10.07.10.00006	20.12.01.00036
SSD 24-27	10.07.10.00086	-
SSD 28-32	10.07.10.00087	-
SSD 35-40	10.07.10.00018	-
SSD 38-43	10.07.10.00019	-
SSD 43-49	10.07.10.00020	-
SSD 54-60	10.07.10.00036	-
SSD 60-68	10.07.10.00017	-
SSD 76.5-84	10.07.10.00037	-

Technical Data Hose Clamps SSB / SSD

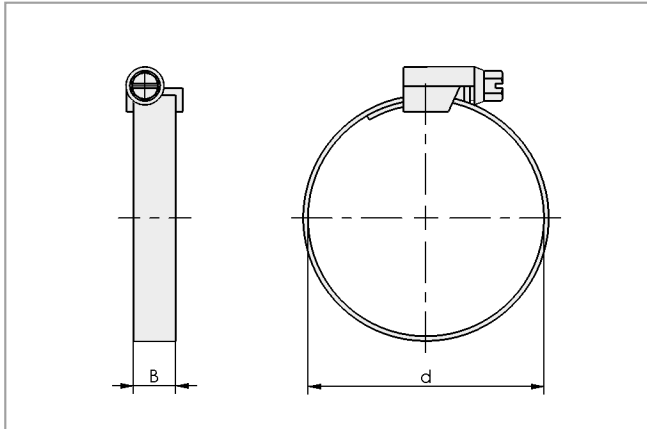
Type	Clamping range	Material
SSB 10-16 ST-VZ	10 - 16 mm	Steel galvanised
SSB 16-27 ST-VZ	16 - 27 mm	Steel galvanised
SSB 20-32 ST-VZ	20 - 32 mm	Steel galvanised
SSB 35-50 ST-VZ	35 - 50 mm	Steel galvanised
SSB 40-60 ST-VZ	40 - 60 mm	Steel galvanised
SSB 60-80 ST-VZ	60 - 80 mm	Steel galvanised
SSD 24-27	24 - 27 mm	Steel galvanised
SSD 28-32	28 - 32 mm	Steel galvanised
SSD 35-40	35 - 40 mm	Steel galvanised
SSD 38-43	38 - 43 mm	Steel galvanised
SSD 43-49	43 - 49 mm	Steel galvanised
SSD 54-60	54 - 60 mm	Steel galvanised
SSD 60-68	60 - 68 mm	Steel galvanised
SSD 76.5-84	76.5 - 84 mm	Steel galvanised

Hose Clamps SSB / SSD

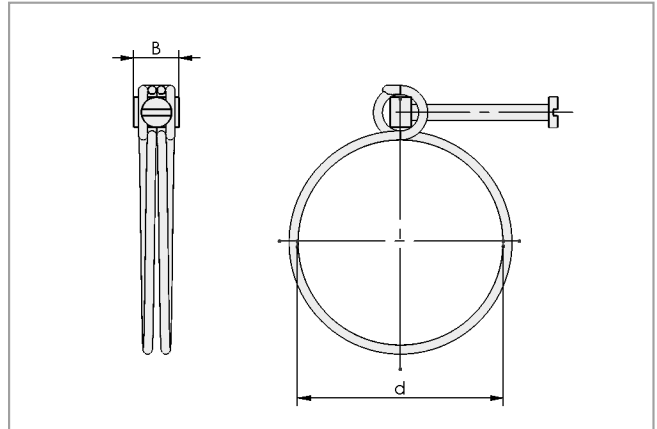
Clamping range from 10 mm to 84 mm



Design Data Hose Clamps SSB / SSD



SSB 10-16 to 60-80



SSD 24-27 to 76.5-84

Type	Dimensions in mm	
	B	d
SSB 10-16 ST-VZ	9	16
SSB 16-27 ST-VZ	9	27
SSB 20-32 ST-VZ	9	32
SSB 35-50 ST-VZ	9	50
SSB 40-60 ST-VZ	9	60
SSB 60-80 ST-VZ	9	80
SSD 24-27	12	27
SSD 28-32	12	33
SSD 35-40	13	40
SSD 38-43	13	43
SSD 43-49	15	49
SSD 54-60	15	60
SSD 60-68	15	68
SSD 76.5-84	18	84

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm



Suitable for Industry Specific Applications



Screw in push fittings

Applications

- Screw in push fittings for quick connection of smooth hoses without the need for tools
- For use as a connecting element in vacuum systems
- Suitable for hoses with external tolerances in accordance with CETOP RP 54 P

Design

- Screw in push fitting, clamping clip and unlocking element made of nickel-plated brass
- Hose-connection sealed with an NBR gasket
- Whitworth pipe thread

Our Highlights...

- Screw in push fittings with integrated clamping clip
- Hoses clamped on the outside
- Absolutely vacuum-tight, shaped for optimum flow
- Body and clamping clip made of nickel-plated brass
- Various versions available

Your Benefits...

- > Quick and safe connection and disconnection of all smooth hoses without the need for tools
- > No pinching of the hose: full cross-section remains open
- > Specially designed for vacuum applications
- > Suitable for very rough use; long lifetime; re-usable
- > The right connection for every application

Technical Data Screw in Push Fittings

Type	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Material
Screw in Push Fittings	-0.95 ... 15.00	-20 ... 80	Brass

Screw in Push Fittings

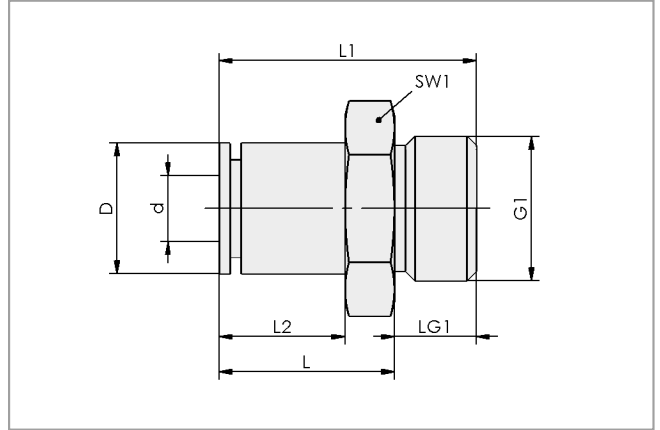
Hose outer diameter from 4 mm to 14 mm



Design Data Screw in Push Fittings STV-GE



Screw in push fittings STV-GE



STV-GE

Type	Dimensions in mm								
	d	D	G1	L	L1	L2	LG1	SW1	
STV-GE M5-AG 4	4	7.9	M5-M	15.0	19.5	11.4	4.5	8	
STV-GE M5-AG 6	6	9.9	M5-M	18.8	23.3	14.3	4.5	10	
STV-GE G1/8-AG 4	4	7.9	G1/8"-M	13.7	19.2	9.5	5.5	13	
STV-GE G1/8-AG 6	6	11.4	G1/8"-M	16.4	21.9	12.1	5.5	13	
STV-GE G1/8-AG 8	8	14.0	G1/8"-M	20.7	26.2	16.4	5.5	14	
STV-GE G1/4-AG 4	4	8.6	G1/4"-M	11.8	19.6	7.3	7.8	17	
STV-GE G1/4-AG 6	6	11.2	G1/4"-M	15.2	23.0	10.7	7.8	17	
STV-GE G1/4-AG 8	8	13.9	G1/4"-M	17.8	25.2	12.8	7.4	17	
STV-GE G1/4-AG 10	10	16.5	G1/4"-M	23.4	30.8	18.4	7.4	17	
STV-GE G1/4-AG 12	12	19.5	G1/4"-M	29.0	36.0	21.1	7.0	20	
STV-GE G3/8-AG 8	8	14.6	G3/8"-M	17.4	25.0	11.8	7.6	20	
STV-GE G3/8-AG 10	10	16.5	G3/8"-M	20.1	27.6	14.6	7.5	20	
STV-GE G3/8-AG 12	12	19.5	G3/8"-M	23.6	31.0	17.6	7.4	20	
STV-GE G3/8-AG 14	14	21.5	G3/8"-M	30.5	37.8	22.1	7.3	22	
STV-GE G1/2-AG 10	10	16.5	G1/2"-M	18.5	28.0	12.5	9.5	24	
STV-GE G1/2-AG 12	12	19.5	G1/2"-M	24.0	33.5	18.0	9.5	24	
STV-GE G1/2-AG 14	14	21.5	G1/2"-M	25.0	34.5	19.0	9.6	24	

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm

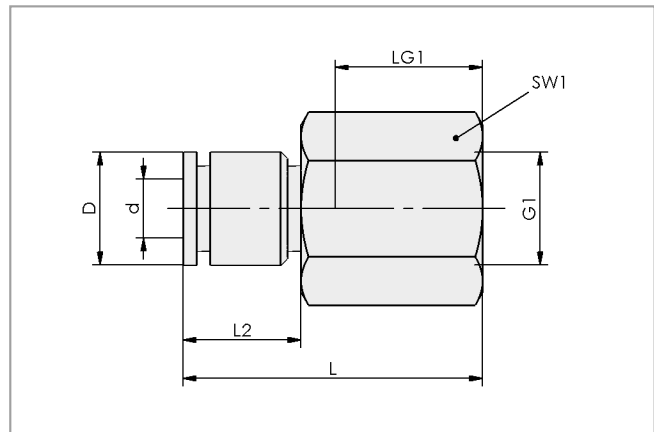
Ordering Data Screw in Push Fittings STV-GE

Type	Part Number
STV-GE M5-AG 4	10.08.02.00200
STV-GE M5-AG 6	10.08.02.00201
STV-GE G1/8-AG 4	10.08.02.00202
STV-GE G1/8-AG 6	10.08.02.00204
STV-GE G1/8-AG 8	10.08.02.00206
STV-GE G1/4-AG 4	10.08.02.00203
STV-GE G1/4-AG 6	10.08.02.00205
STV-GE G1/4-AG 8	10.08.02.00207
STV-GE G1/4-AG 10	10.08.02.00251
STV-GE G1/4-AG 12	10.08.02.00208
STV-GE G3/8-AG 8	10.08.02.00237
STV-GE G3/8-AG 10	10.08.02.00252
STV-GE G3/8-AG 12	10.08.02.00209
STV-GE G3/8-AG 14	10.08.02.00211
STV-GE G1/2-AG 10	10.08.02.00253
STV-GE G1/2-AG 12	10.08.02.00210
STV-GE G1/2-AG 14	10.08.02.00300

Design Data Screw in Push Fittings STVI-GE



Screw in push fittings STVI-GE



STVI-GE

Type	Dimensions in mm						
	d	D	G1	L	L2	LG1	SW1
STVI-GE G1/8-IG 4	4	8.5	G1/8"-F	23.5	9.5	8	14
STVI-GE G1/8-IG 6	6	11.5	G1/8"-F	26.5	12.0	8	14
STVI-GE G1/8-IG 8	8	14.5	G1/8"-F	29.5	15.0	8	14
STVI-GE G1/4-IG 4	4	8.5	G1/4"-F	30.5	9.5	12	17
STVI-GE G1/4-IG 6	6	11.5	G1/4"-F	30.5	12.0	12	17
STVI-GE G1/4-IG 8	8	14.5	G1/4"-F	33.5	15.0	12	17
STVI-GE G1/4-IG 10	10	16.5	G1/4"-F	37.0	17.5	12	17

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm



Ordering Data Screw in Push Fittings STVI-GE

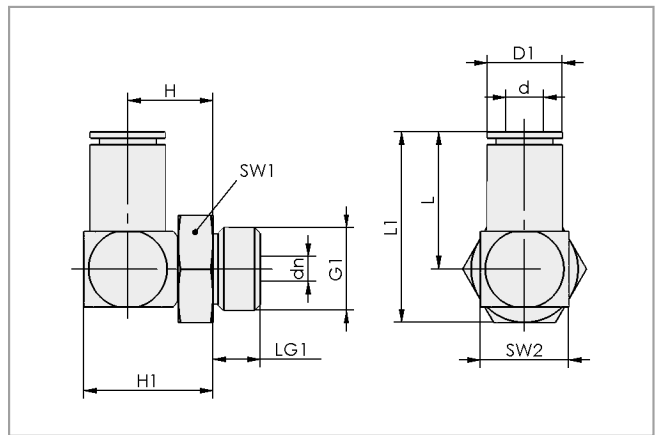
Type	Part Number
STVI-GE G1/8-IG 4	10.08.02.00149
STVI-GE G1/8-IG 6	10.08.02.00150
STVI-GE G1/8-IG 8	10.08.02.00151
STVI-GE G1/4-IG 4	10.08.02.00152
STVI-GE G1/4-IG 6	10.08.02.00153
STVI-GE G1/4-IG 8	10.08.02.00154
STVI-GE G1/4-IG 10	10.08.02.00260



Design Data Screw in Push Fittings STV-W



Screw in push fittings STV-W



Screw in push fitting STV-W

Type	Dimensions in mm										
	d	dn	D1	G1	H	H1	L	L1	LG1	SW1	SW2
STV-W M5-AG 4	4	2.5	8.5	M5-M	8.7	13.6	16.4	21.4	4.7	8	10
STV-W M5-AG 6	6	2.5	9.9	M5-M	8.7	13.6	19.7	24.7	4.7	8	10
STV-W M5-AG 6	6	4.0	11.5	M5-M	13.0	16.5	20.8	25.5	4.0	8	8
STV-W G1/8-AG 4	4	3.0	8.5	G1/8"-M	10.7	15.7	16.4	27.1	5.7	13	10
STV-W G1/8-AG 6	6	4.0	11.5	G1/8"-M	12.5	16.5	20.8	27.5	6.0	13	8
STV-W G1/8-AG 6	6	4.1	11.3	G1/8"-M	12.8	19.9	20.1	27.1	5.7	13	14
STV-W G1/8-AG 8	8	5.5	14.6	G1/8"-M	13.7	21.8	24.0	32.0	5.7	13	16
STV-W G1/4-AG 4	4	3.0	8.5	G1/4"-M	11.5	16.8	16.4	25.5	7.5	17	10
STV-W G1/4-AG 6	6	4.1	11.3	G1/4"-M	13.5	20.4	20.2	29.4	7.5	17	14
STV-W G1/4-AG 8	8	6.5	14.6	G1/4"-M	14.8	22.7	24.0	33.2	7.5	17	16
STV-W G1/4-AG 10	10	8.0	16.6	G1/4"-M	15.5	24.5	27.2	36.3	7.5	17	18
STV-W G1/4-AG 12	12	8.5	19.8	G1/4"-M	17.0	27.0	34.5	44.5	7.5	17	20
STV-W G3/8-AG 8	8	6.5	14.3	G3/8"-M	16.0	23.9	23.7	34.6	7.5	20	16
STV-W G3/8-AG 10	10	8.0	16.5	G3/8"-M	17.0	26.0	35.1	46.0	7.5	20	18
STV-W G3/8-AG 12	12	9.0	19.8	G3/8"-M	18.0	27.9	34.1	45.0	7.5	20	20
STV-W G1/2-AG 10	10	8.0	16.6	G1/2"-M	17.6	26.5	27.0	40.0	9.5	24	18
STV-W G1/2-AG 12	12	9.0	19.8	G1/2"-M	18.5	28.5	34.3	47.3	9.5	24	20

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm

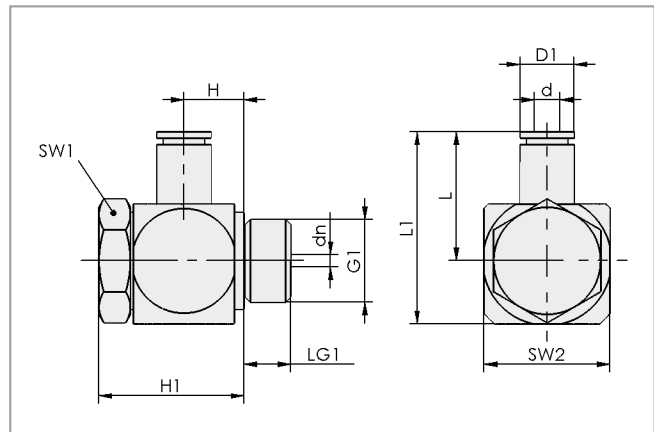
Ordering Data Screw in Push Fittings STV-W

Type	Part Number
STV-W M5-AG 4	10.08.02.00155
STV-W M5-AG 6	10.08.02.00235
STV-W M5-AG 6	10.08.02.00296
STV-W G1/8-AG 4	10.08.02.00156
STV-W G1/8-AG 6	10.08.02.00288
STV-W G1/8-AG 6	10.08.02.00158
STV-W G1/8-AG 8	10.08.02.00160
STV-W G1/4-AG 4	10.08.02.00157
STV-W G1/4-AG 6	10.08.02.00159
STV-W G1/4-AG 8	10.08.02.00161
STV-W G1/4-AG 10	10.08.02.00254
STV-W G1/4-AG 12	10.08.02.00162
STV-W G3/8-AG 8	10.08.02.00236
STV-W G3/8-AG 10	10.08.02.00255
STV-W G3/8-AG 12	10.08.02.00163
STV-W G1/2-AG 10	10.08.02.00256
STV-W G1/2-AG 12	10.08.02.00164

Design Data Screw in Push Fittings STV-WF



Screw in push fitting STV-WF



STV-WF

Type	Dimensions in mm										
	d	dn	D1	G1	H	H1	L	L1	LG1	SW1	SW2
STV-WF M5-AG 4	4	2.5	8.6	M5-M	8.4	16.6	16.5	20.1	3.5	8	8.5
STV-WF G1/8-AG 4	4	5.4	8.6	G1/8"-M	9.8	23.6	17.4	25.3	5.0	14	16.0
STV-WF G1/8-AG 6	6	5.4	11.4	G1/8"-M	9.8	23.6	21.4	25.3	5.0	14	16.0
STV-WF G1/8-AG 8	8	5.4	14.3	G1/8"-M	9.8	23.6	23.4	31.3	5.0	14	16.0
STV-WF G1/8-AG 10	10	10.0	16.7	G1/8"-M	9.8	23.6	25.2	33.6	5.0	14	17.0
STV-WF G1/4-AG 4	4	7.2	8.5	G1/4"-M	9.8	23.9	19.5	29.4	6.7	17	20.0
STV-WF G1/4-AG 6	6	7.2	11.8	G1/4"-M	9.8	23.9	22.9	32.9	6.7	17	20.0
STV-WF G1/4-AG 8	8	7.2	14.5	G1/4"-M	9.8	23.9	25.6	35.5	6.7	17	20.0
STV-WF G1/4-AG 10	10	7.2	16.6	G1/4"-M	10.0	23.9	27.8	37.7	6.7	17	20.0
STV-WF G3/8-AG 8	8	9.4	14.3	G3/8"-M	10.0	24.9	26.7	37.6	6.7	22	22.0
STV-WF G3/8-AG 10	10	9.4	16.7	G3/8"-M	10.0	24.9	29.2	40.1	6.7	22	22.0

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm



Ordering Data Plug-In Screw Unions STV-WF

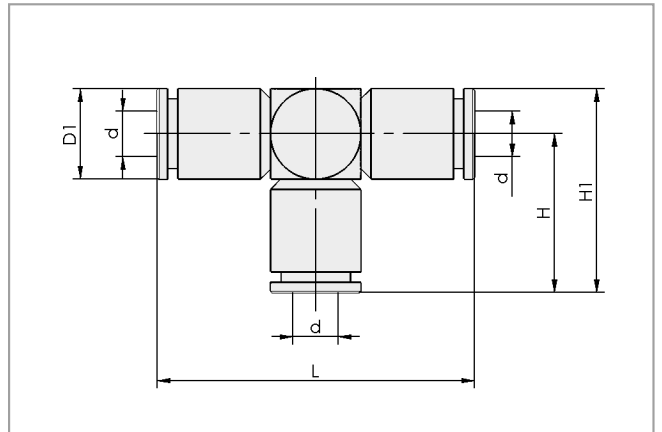
Type	Part Number
STV-WF M5-AG 4	10.08.02.00165
STV-WF G1/8-AG 4	10.08.02.00166
STV-WF G1/8-AG 6	10.08.02.00168
STV-WF G1/8-AG 8	10.08.02.00170
STV-WF G1/8-AG 10	10.08.02.00257
STV-WF G1/4-AG 4	10.08.02.00167
STV-WF G1/4-AG 6	10.08.02.00169
STV-WF G1/4-AG 8	10.08.02.00171
STV-WF G1/4-AG 10	10.08.02.00258
STV-WF G3/8-AG 8	10.08.02.00234
STV-WF G3/8-AG 10	10.08.02.00259



Design Data Plug-In Unions SVB-T



Plug-in connector SVB-T



SVB-T

Type	Dimensions in mm					
	d	D1	H	H1	L	
SVB-T 4	4	8.6	16.3	20.6	34.0	
SVB-T 6	6	11.9	21.0	27.0	42.0	
SVB-T 8	8	14.4	24.7	31.9	49.0	
SVB-T 10	10	16.7	27.7	36.0	55.5	
SVB-T 12	12	19.9	34.0	44.0	69.0	
SVB-T 14	14	21.3	36.0	46.5	72.0	



Ordering Data Plug-in unions SVB-T

Type	Part Number
SVB-T 4	10.09.02.00020
SVB-T 6	10.09.02.00021
SVB-T 8	10.09.02.00022
SVB-T 10	10.09.02.00025
SVB-T 12	10.09.02.00023
SVB-T 14	10.09.02.00046

Screw in Push Fittings

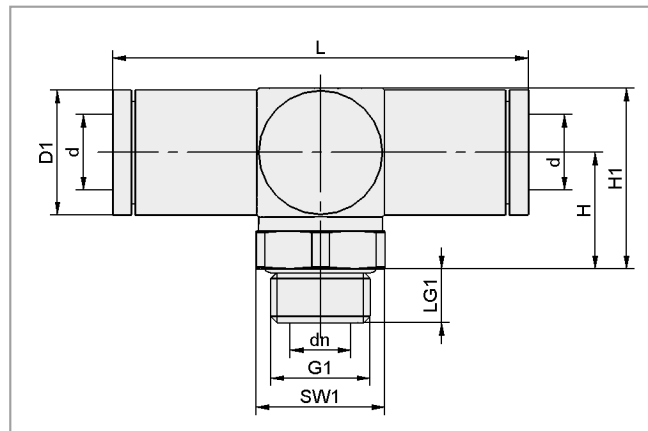
Hose outer diameter from 4 mm to 14 mm



Design Data Screw in Push Fittings STV-T



Screw in push fitting STV-T



STV-T

Type	Dimensions in mm								
	d	dn	D1	G1	H	H1	L	LG1	SW1
STV-T M5-AG 4	4	2.0	8.7	M5-M	9.6	14.0	34.0	4.5	8
STV-T G1/8-AG 4	4	3.0	8.7	G1/8"-M	11.7	16.0	32.5	5.5	13
STV-T G1/8-AG 6	6	4.0	12.0	G1/8"-M	14.0	20.0	41.5	5.5	13
STV-T G1/8-AG 8	8	5.5	14.1	G1/8"-M	15.0	22.0	48.7	5.5	13
STV-T G1/4-AG 6	6	4.0	11.3	G1/4"-M	12.6	18.4	41.0	7.6	17
STV-T G1/4-AG 8	8	6.5	14.1	G1/4"-M	16.1	23.2	48.5	7.6	17
STV-T G1/4-AG 10	10	8.0	16.5	G1/4"-M	15.0	23.2	54.9	7.6	17
STV-T G1/4-AG 12	12	8.4	19.6	G1/4"-M	16.8	26.6	69.0	7.6	17



Ordering Data Screw in Push Fittings STV-T

Type	Part Number
STV-T M5-AG 4	10.09.02.00038
STV-T G1/8-AG 4	10.09.02.00039
STV-T G1/8-AG 6	10.09.02.00040
STV-T G1/8-AG 8	10.09.02.00041
STV-T G1/4-AG 6	10.09.02.00042
STV-T G1/4-AG 8	10.09.02.00043
STV-T G1/4-AG 10	10.09.02.00044
STV-T G1/4-AG 12	10.09.02.00045

Screw in Push Fittings

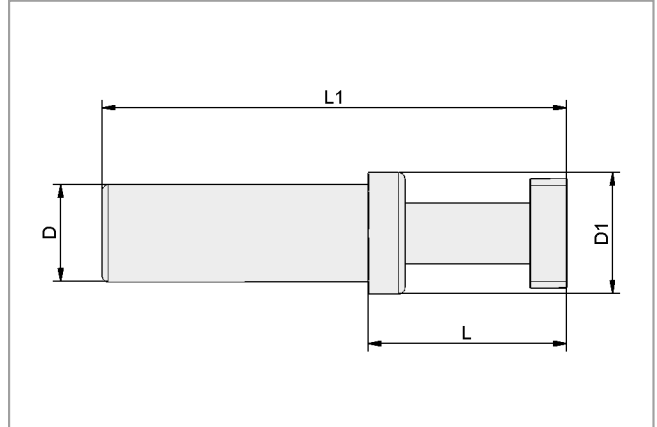
Hose outer diameter from 4 mm to 14 mm



Design Data Sealing Plugs VRS-STE C



Sealing plug VRS-STE C



VRS-STE C

Type	Dimensions in mm				
	D	D1	L	L1	
VRS-STE C 4x14.9	4	6	15	34	
VRS-STE C 6x14.4	6	8	14	34	
VRS-STE C 8x16.4	8	10	16	38	
VRS-STE C 10x18	10	10	18	42	
VRS-STE C 12x16.5	12	14	17	44	



Ordering Data Sealing Plugs VRS-STE C

Type	Part Number
VRS-STE C 4x14.9	10.08.06.00011
VRS-STE C 6x14.4	10.08.06.00012
VRS-STE C 8x16.4	10.08.06.00013
VRS-STE C 10x18	10.08.06.00060
VRS-STE C 12x16.5	10.08.06.00041

Accessories for Screw Unions

Connection thread M5 to G1-1/2"



Suitable for Industry Specific Applications



Accessories for screw unions

Applications

- Accessories for screw-in unions are used wherever it is necessary to seal threaded holes, to convert to a smaller or larger thread or to extend the unions

Design

- Accessories made of robust brass with nickel-plated surfaces

Our Highlights...

- Wide range of accessories
- All accessories made of brass with nickel-plated surfaces

Your Benefits...

- > All accessories from a single source
- > Long lifetime, reusable, mechanically strong and with a good-looking finish

Technical Data Accessories for Screw Unions

Type	Pressure range (operating pressure) [bar]	Operating temperature [°C]	Material
Accessories Screw in Push Fittings	-0.95 ... 16.00	-20 ... 80	Brass

Accessories for Screw Unions

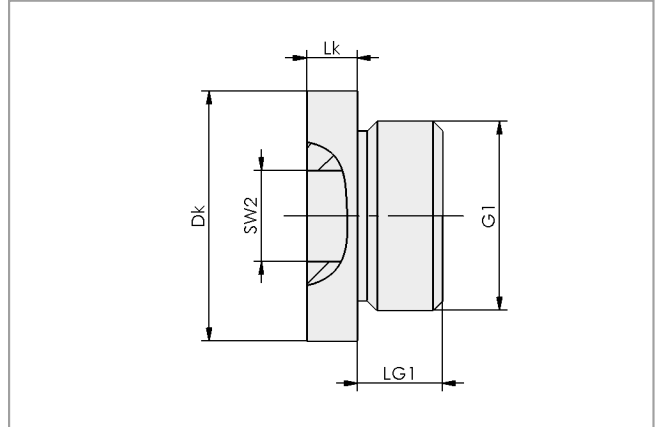
Connection thread M5 to G1-1/2"



Design Data Sealing Screws with Collar VRS-SB



Sealing screw with collar VRS-SB



Sealing screw with collar VRS-SB

Type	Dimensions in mm					
	Dk	G1	LG1	Lk	SW2	
VRS-SB M5-AG ISKT O-Ring	8	M5-M	5.0	2.5	3	
VRS-SB G1/8-AG ISKT O-Ring	14	G1/8"-M	5.5	3.5	5	
VRS-SB G1/4-AG ISKT O-Ring	18	G1/4"-M	7.5	4.5	6	
VRS-SB G3/8-AG ISKT O-Ring	22	G3/8"-M	7.5	4.5	8	
VRS-SB G1/2-AG ISKT O-Ring	27	G1/2"-M	14.0	5.0	10	



Ordering Data Sealing Screws with Collar VRS-SB

Type	Part Number
VRS-SB M5-AG ISKT O-Ring	10.08.06.00064
VRS-SB G1/8-AG ISKT O-Ring	10.08.06.00043
VRS-SB G1/4-AG ISKT O-Ring	10.08.06.00044
VRS-SB G3/8-AG ISKT O-Ring	10.08.06.00045
VRS-SB G1/2-AG ISKT O-Ring	10.08.06.00046

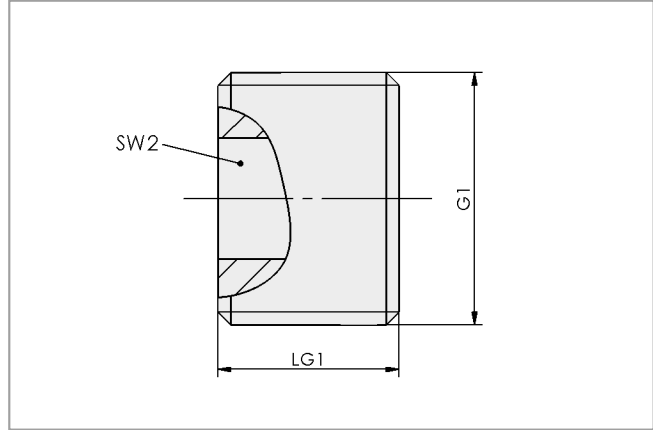
Accessories for Screw Unions

Connection thread M5 to G1-1/2"

Design Data Sealing Screws without Collar VRS-S



Sealing screw without collar VRS-S



Sealing screw without collar VRS-S

Type	Dimensions in mm		
	G1	LG1	SW2
VRS-S G1/8-AG	G1/8"-M	6	5
VRS-S G1/4-AG	G1/4"-M	9	6
VRS-S G3/8-AG	G3/8"-M	10	8
VRS-S G1/2-AG	G1/2"-M	12	10
VRS-S G3/4-AG	G3/4"-M	10	12

Ordering Data Sealing Screws without Collar VRS-S

Type	Part Number
VRS-S G1/8-AG	10.08.06.00047
VRS-S G1/4-AG	10.08.06.00048
VRS-S G3/8-AG	10.08.06.00049
VRS-S G1/2-AG	10.08.06.00050
VRS-S G3/4-AG	10.08.06.00051

Accessories for Screw Unions

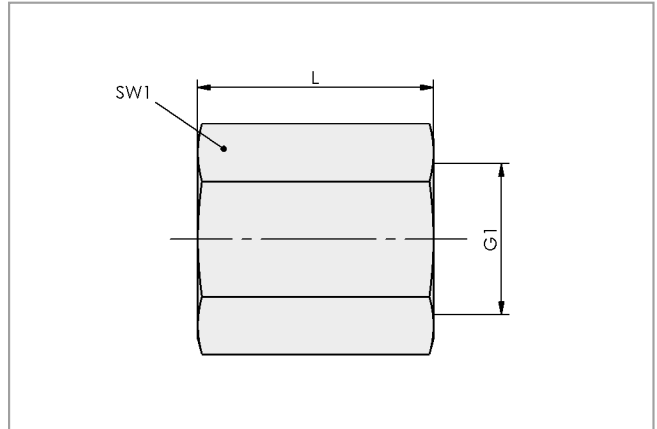
Connection thread M5 to G1-1/2"



Design Data Bushings MUF-S



Sleeve with hexagon MUF-S



Sleeve with hexagon MUF-S

Type	Dimensions in mm		
	G1	L	SW1
MUF-S M5-IG 9 SW8 MS-V	M5-F	9	8
MUF-S G1/8-IG 18 SW14 MS-V	G1/8"-F	18	14
MUF-S G1/4-IG 26 SW17 MS-V	G1/4"-F	26	17
MUF-S G3/8-IG 26 SW22 MS-V	G3/8"-F	26	22
MUF-S G1/2-IG 30 SW27 MS-V	G1/2"-F	30	27
MUF-S G3/4-IG 28 SW32 MS-V	G3/4"-F	28	32
MUF-S G1-IG 33 SW41 MS-V	G1"-F	33	41



Ordering Data Bushings MUF-S

Type	Part Number
MUF-S M5-IG 9 SW8 MS-V	10.08.05.00124
MUF-S G1/8-IG 18 SW14 MS-V	10.08.05.00125
MUF-S G1/4-IG 26 SW17 MS-V	10.08.05.00126
MUF-S G3/8-IG 26 SW22 MS-V	10.08.05.00127
MUF-S G1/2-IG 30 SW27 MS-V	10.08.05.00128
MUF-S G3/4-IG 28 SW32 MS-V	10.08.05.00129
MUF-S G1-IG 33 SW41 MS-V	10.08.05.00130

Accessories for Screw Unions

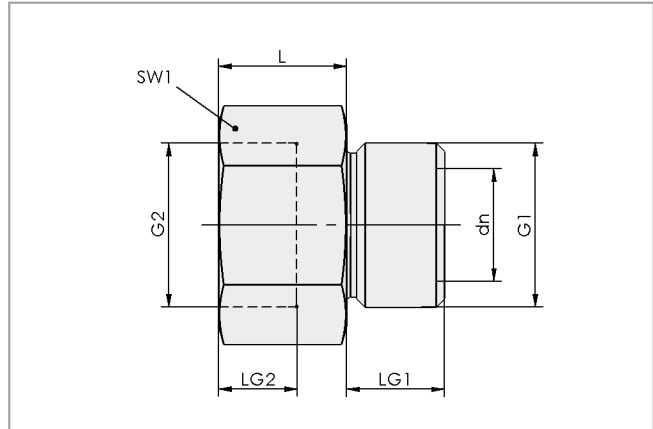
Connection thread M5 to G1-1/2"



Design Data Extension Hexagon Flats VRL-S



Extension with hexagon flats VRL-S



Extension with hexagon flats VRL-S

Type	Dimensions in mm						
	dn	G1	G2	L	LG1	LG2	SW1
VRL-Sx8 MS-V	2.5	M5-M	M5-F	8	4.5	6.6	8
VRL-Sx15 MS-V	5.0	G1/8"-M	G1/8"-F	15	8.0	13.0	14
VRL-Sx18 MS-V	7.0	G1/4"-M	G1/4"-F	18	10.0	15.0	17
VRL-Sx22 MS-V	12.0	G1/2"-M	G1/2"-F	22	12.0	16.3	24



Ordering Data Extension Hexagon Flats VRL-S

Type	Part Number
VRL-Sx8 MS-V	10.08.04.00088
VRL-Sx15 MS-V	10.08.04.00090
VRL-Sx18 MS-V	10.08.04.00092
VRL-Sx22 MS-V	10.08.04.00097

Accessories for Screw Unions

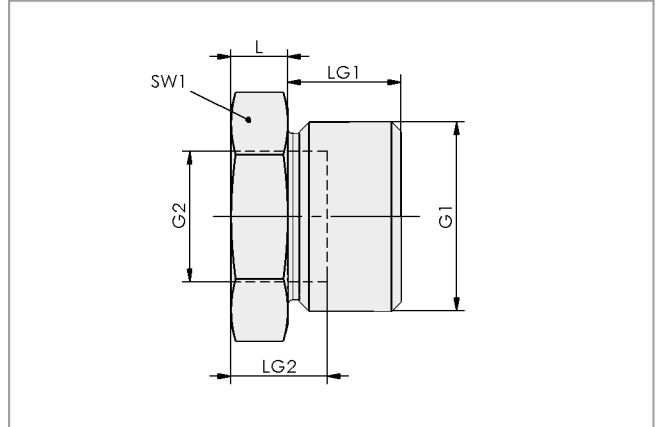
Connection thread M5 to G1-1/2"



Design Data Reduction Pieces RED-STK



Reduction piece with hexagon RED-STK



Reduction piece with hexagon RED-STK

Type	Dimensions in mm					
	G1	G2	L	LG1	LG2	SW1
RED-STK G1/8-AG M5-IG MS-V	G1/8"-M	M5-F	3.5	6.5	10	14
RED-STK G1/4-AG G1/8-IG MS-V	G1/4"-M	G1/8"-F	4.0	10.0	14	17
RED-STK G3/8-AG G1/8-IG MS-V	G3/8"-M	G1/8"-F	5.0	10.0	15	19
RED-STK G3/8-AG G1/4-IG MS-V	G3/8"-M	G1/4"-F	5.0	10.0	15	19
RED-STK G1/2-AG G1/4-IG MS-V	G1/2"-M	G1/4"-F	6.0	12.0	18	24
RED-STK G1/2-AG G3/8-IG MS-V	G1/2"-M	G3/8"-F	6.0	12.0	18	24
RED-STK G3/4-AG G3/8-IG MS-V	G3/4"-M	G3/8"-F	7.0	14.0	21	32
RED-STK G3/4-AG G1/2-IG MS-V	G3/4"-M	G1/2"-F	7.0	14.0	21	32
RED-STK G1-AG G1/2-IG MS-V	G1"-M	G1/2"-F	8.0	16.0	24	41
RED-STK G1-AG G3/4-IG MS-V	G1"-M	G3/4"-F	8.0	16.0	-	41



Ordering Data Reduction Pieces RED-STK

Type	Part Number
RED-STK G1/8-AG M5-IG MS-V	10.08.04.00089
RED-STK G1/4-AG G1/8-IG MS-V	10.08.04.00091
RED-STK G3/8-AG G1/8-IG MS-V	10.08.04.00093
RED-STK G3/8-AG G1/4-IG MS-V	10.08.04.00094
RED-STK G1/2-AG G1/4-IG MS-V	10.08.04.00095
RED-STK G1/2-AG G3/8-IG MS-V	10.08.04.00096
RED-STK G3/4-AG G3/8-IG MS-V	10.08.04.00098
RED-STK G3/4-AG G1/2-IG MS-V	10.08.04.00099
RED-STK G1-AG G1/2-IG MS-V	10.08.04.00100
RED-STK G1-AG G3/4-IG MS-V	10.08.04.00101

Accessories for Screw Unions

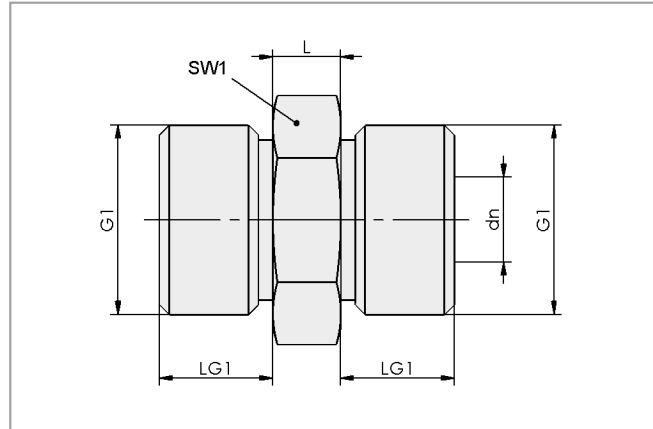
Connection thread M5 to G1-1/2"



Design Data Double Fittings DOP-NIP



Double nipple with hexagon DOP-NIP



Double nipple with hexagon DOP-NIP

Type	Dimensions in mm					
	dn	G1	L	LG1	SW1	
DOP-NIP-S M5-AGx4	2.5	M5-M	4	4.5	8	
DOP-NIP-S G1/8-AGx5	4.6	G1/8"-M	5	6.5	14	
DOP-NIP-S G1/4-AGx5	7.6	G1/4"-M	5	10.0	17	
DOP-NIP-S G3/8-AGx5	11.0	G3/8"-M	5	9.0	19	
DOP-NIP-S G1/2-AGx6	12.0	G1/2"-M	6	12.0	24	
DOP-NIP-S G3/4-AGx8	15.0	G3/4"-M	8	14.0	32	
DOP-NIP-S G1-AGx10	20.0	G1"-M	10	16.0	41	



Ordering Data Double Fittings DOP-NIP

Type	Part Number
DOP-NIP-S M5-AGx4	10.08.05.00131
DOP-NIP-S G1/8-AGx5	10.08.05.00132
DOP-NIP-S G1/4-AGx5	10.08.05.00133
DOP-NIP-S G3/8-AGx5	10.08.05.00134
DOP-NIP-S G1/2-AGx6	10.08.05.00135
DOP-NIP-S G3/4-AGx8	10.08.05.00136
DOP-NIP-S G1-AGx10	10.08.05.00137

Accessories for Screw Unions

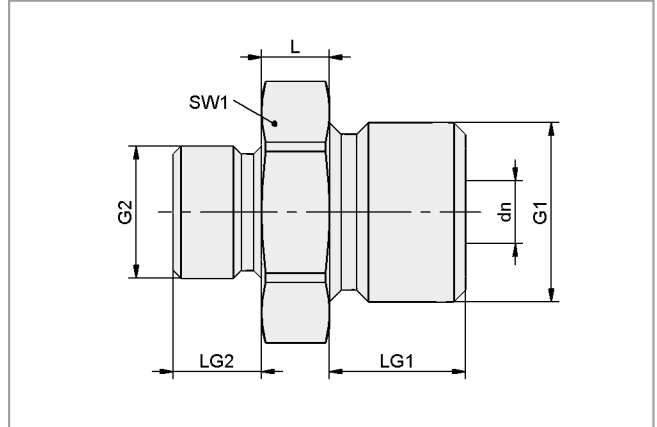
Connection thread M5 to G1-1/2"



Design Data Reduction Nipples RED-NIP



Reduction nipple with hexagon RED-NIP



Reduction nipple with hexagon RED-NIP

Type	Dimensions in mm							
	dn	G1	G2	L	LG1	LG2	SW1	
RED-NIP-S G1/8-AG M5-AG MS V	2.5	G1/8"-M	M5-M	4	6.5	4.5	14	
RED-NIP-S G1/4-AG G1/8-AG MS V	4.6	G1/4"-M	G1/8"-M	5	10.0	6.5	17	
RED-NIP-S G3/8-AG G1/4-AG MS V	7.5	G3/8"-M	G1/4"-M	6	10.0	10.0	19	
RED-NIP-S G1/2-AG G1/4-AG MS V	7.5	G1/2"-M	G1/4"-M	6	12.0	10.0	24	
RED-NIP-S G1/2-AG G3/8-AG MS V	10.0	G1/2"-M	G3/8"-M	6	12.0	10.0	24	
RED-NIP-S G3/4-AG G1/2-AG MS V	12.0	G3/4"-M	G1/2"-M	8	14.0	12.0	32	
RED-NIP-S G1-AG G1/2-AG MS V	12.0	G1"-M	G1/2"-M	10	16.0	12.0	41	
RED-NIP-S G1-AG G3/4-AG MS V	17.0	G1"-M	G3/4"-M	10	16.0	14.0	41	



Ordering Data Reduction Nipples RED-NIP

Type	Part Number
RED-NIP-S G1/8-AG M5-AG MS V	10.08.05.00138
RED-NIP-S G1/4-AG G1/8-AG MS V	10.08.05.00139
RED-NIP-S G3/8-AG G1/4-AG MS V	10.08.05.00141
RED-NIP-S G1/2-AG G1/4-AG MS V	10.08.05.00140
RED-NIP-S G1/2-AG G3/8-AG MS V	10.08.05.00142
RED-NIP-S G3/4-AG G1/2-AG MS V	10.08.05.00143
RED-NIP-S G1-AG G1/2-AG MS V	10.08.05.00144
RED-NIP-S G1-AG G3/4-AG MS V	10.08.05.00145

Accessories for Screw Unions

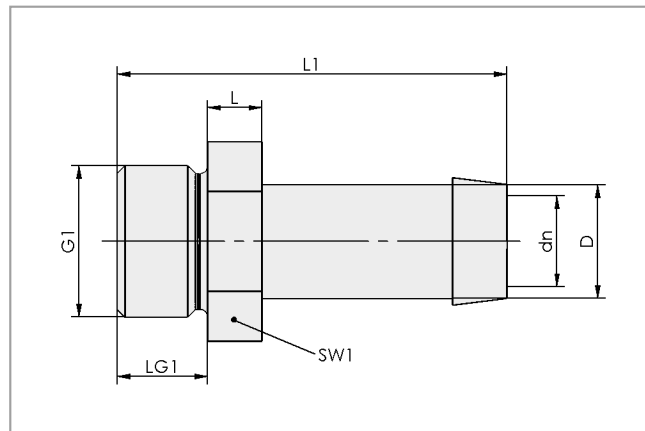
Connection thread M5 to G1-1/2"



Design Data Hose Nozzles ST



Hose nozzle ST



Hose nozzle ST

Type	Dimensions in mm								Recom. internal hose diameter d [mm]
	dn	D	G1	L	L1	LG1	SW1		
ST M3-AG 2 MS-V	1.2	2.4	M3-M	2.0	10.8	3.5	5	2	
ST M5-AG 4 MS-V	2.2	4.4	M5-M	3.3	18.4	4.4	8	4	
ST G1/8-AG 4 MS-V	3.5	4.5	G1/8"-M	5.0	34.0	8.0	14	4	
ST G1/8-AG 6 MS-V	4.4	5.4	G1/8"-M	5.0	34.0	8.0	14	6	
ST G1/8-AG 9 MS-V	4.0	8.3	G1/8"-M	5.0	34.0	8.0	14	9	
ST G1/4-AG 6 MS-V	4.5	5.5	G1/4"-M	5.0	42.0	10.0	17	6	
ST G1/4-AG 9 MS-V	7.5	8.5	G1/4"-M	5.0	42.0	10.0	17	9	
ST G1/4-AG 12 MS-V	7.5	13.0	G1/4"-M	5.5	42.0	10.0	17	12	
ST G3/8-AG 9 MS-V	7.4	8.5	G3/8"-M	6.0	43.0	10.0	19	9	
ST G3/8-AG 12 MS-V	10.0	13.0	G3/8"-M	5.9	43.0	10.0	19	12	
ST G1/2-AG 9 MS-V	7.5	8.6	G1/2"-M	6.1	45.0	11.9	24	9	
ST G1/2-AG 12 MS-V	11.0	12.0	G1/2"-M	6.0	45.0	12.0	24	12	
ST G1/2-AG 19 MS-V	14.3	19.0	G1/2"-M	10.0	58.0	12.0	24	19	
ST G3/4-AG 12 MS-V	10.4	13.0	G3/4"-M	8.0	60.0	16.0	32	12	
ST G3/4-AG 19 MS-V	16.0	19.0	G3/4"-M	7.8	60.0	15.8	32	19	
ST G3/4-AG 25 MS-V	18.5	25.0	G3/4"-M	8.5	60.0	16.0	32	25	
ST G1-AG 25 MS-V	22.0	25.0	G1"-M	10.1	62.0	15.8	36	25	
ST G1-AG 32 MS-V	26.0	32.0	G1"-M	10.5	62.0	16.0	36	32	
ST G1-1/4-AG 32 MS-V	27.9	32.0	G1-1/4"-M	10.3	62.0	15.9	46	32	
ST G1-1/4-AG 38 MS-V	32.8	38.2	G1-1/4"-M	8.0	60.0	12.0	48	38	
ST G1-1/2-AG 38 MS-V	29.9	38.0	G1-1/2"-M	12.2	64.0	15.5	50	38	

Accessories for Screw Unions

Connection thread M5 to G1-1/2"



Ordering Data Hose Nozzles ST

Type	Part Number
ST M3-AG 2 MS-V	10.08.03.00151
ST M5-AG 4 MS-V	10.08.03.00152
ST G1/8-AG 4 MS-V	10.08.03.00153
ST G1/8-AG 6 MS-V	10.08.03.00154
ST G1/8-AG 9 MS-V	10.08.03.00155
ST G1/4-AG 6 MS-V	10.08.03.00156
ST G1/4-AG 9 MS-V	10.08.03.00157
ST G1/4-AG 12 MS-V	10.08.03.00158
ST G3/8-AG 9 MS-V	10.08.03.00159
ST G3/8-AG 12 MS-V	10.08.03.00160
ST G1/2-AG 9 MS-V	10.08.03.00161
ST G1/2-AG 12 MS-V	10.08.03.00162
ST G1/2-AG 19 MS-V	10.08.03.00163
ST G3/4-AG 12 MS-V	10.08.03.00164
ST G3/4-AG 19 MS-V	10.08.03.00165
ST G3/4-AG 25 MS-V	10.08.03.00166
ST G1-AG 25 MS-V	10.08.03.00167
ST G1-AG 32 MS-V	10.08.03.00168
ST G1-1/4-AG 32 MS-V	10.08.03.00169
ST G1-1/4-AG 38 MS-V	10.08.03.00123
ST G1-1/2-AG 38 MS-V	10.08.03.00170

Schmalz - The Company

Vacuum Knowledge

Vacuum Suction Cups

Special Grippers

Vacuum Gripping Systems

Mounting Elements

Vacuum Generators

Valve Technology

Switches and Monitoring

Filters and Connections

Services

Contact

Index of Products

Rotary Inlets DEF

Max. rotation speed 3,500/min



Suitable for Industry Specific Applications



Rotary inlets DEF

Applications

- Supplying fast-moving machine parts or rotating gripper systems with compressed air or vacuum

Design

- Rotary inlet with steel rotor and body made of high-strength aluminium

Our Highlights...

- Rotary inlet for connection to rotating machine elements
- Made of high-strength aluminium and steel

Your Benefits...

- > Connection of compressed air or vacuum even to fast-moving machine elements or grippers
- > Long lifetime, no maintenance needed



Designation Code Rotary Inlets DEF

Abbreviated designation	Shape	Maximal speed
Example DEF R 3500:		
DEF	R	3500
DEF	GE straight	21
	L left-handed thread	250
	R right-handed thread	3500
	W angled	



Ordering Data Rotary Inlets DEF

Type	Part Number
DEF R 250	10.07.03.00001
DEF R 3500	10.07.03.00002
DEF L 3500	10.07.03.00003
DEF GE 21	10.07.03.00005
DEF W 21	10.07.03.00006

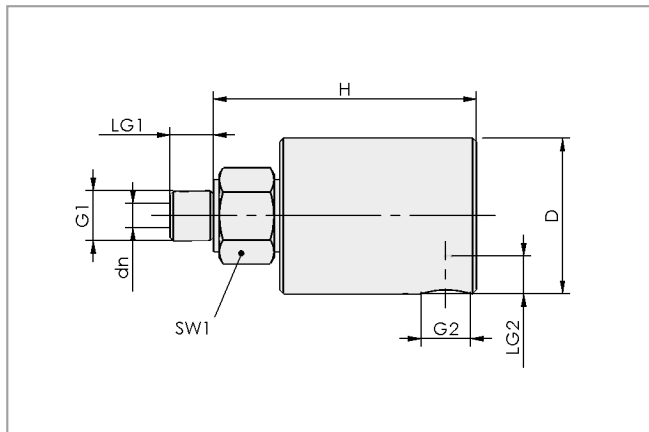
Rotary Inlets DEF

Max. rotation speed 3,500/min

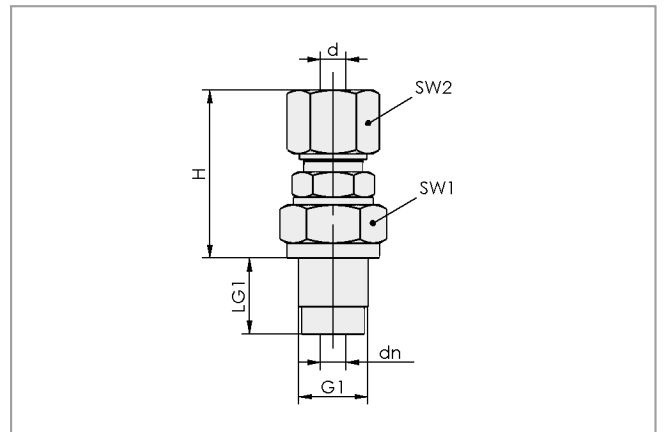
Technical Data Rotary Inlets DEF

Type	Max. speed [1/min]	Weight [g]
DEF R 250	250	300
DEF R 3500	3500	400
DEF L 3500	3500	400
DEF GE 21	21	100
DEF W 21	21	100

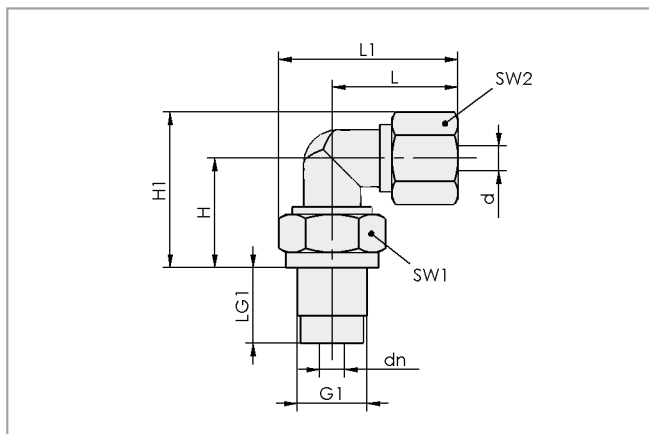
Design Data Rotary Inlets DEF



DEF R 250, R 3500 and L 3500



DEF GE 21



DEF W 21

Type	Dimensions in mm												
	D	d	dn	G1	G2	H	H1	L	L1	LG1	LG2	SW1	SW2
DEF R 250	38.0	-	8.0	M16x2-M	R1/4"-F	68.0	-	-	-	14.5	14.5	22	-
DEF R 3500	41.2	-	6.4	G1/4"-M	R1/4"-F	69.5	-	-	-	11.5	20.6	22	-
DEF L 3500	41.2	-	6.4	G1/4"-M	R1/4"-F	69.5	-	-	-	11.5	20.6	22	-
DEF GE 21	-	8	6.0	G3/8"-M	-	40.0	-	-	-	18.0	-	22	19
DEF W 21	-	8	6.0	G3/8"-M	-	26.0	37	30	43	18.0	-	22	19

Sealing Rings DR

For thread from M3 to G1 1/2"



Suitable for Industry Specific Applications



Sealing rings DR

Applications

- Sealing of connection nipples and other connecting elements

Design

- Polyamide sealing ring Easy-Fix with internal locking element to secure the ring on the thread

Our Highlights...

- Sealing rings made of polyamide PA
- Optionally available with integrated fixing facility (Easy-Fix)
- Wide range of diameters

Your Benefits...

- > Excellent sealing properties
- > Sealing ring cannot be lost when mounting and removing the connecting element
- > The ideal solution for complete hose-connection systems



Designation Code Sealing Rings DR

Abbreviated designation	Connection thread	Product addition
Example DR M5:		
DR	M5	
DR	M3 to G1 1/2	Easy-Fix



Ordering Data Sealing Rings DR

Type	Sealing ring DR	Sealing ring DR Easy-Fix*
DR M3	10.07.08.00018	-
DR M5	10.07.08.00019	10.07.08.00245
DR G1/8	10.07.08.00020	10.07.08.00247
DR G1/4	10.07.08.00021	10.07.08.00248
DR G3/8	10.07.08.00022	10.07.08.00249
DR G1/2	10.07.08.00023	10.07.08.00250
DR G3/4	10.07.08.00024	10.07.08.00251
DR G1	10.07.08.00025	10.07.08.00252
DR G1 1/4	10.07.08.00026	-
DR G1 1/2	10.07.08.00027	-

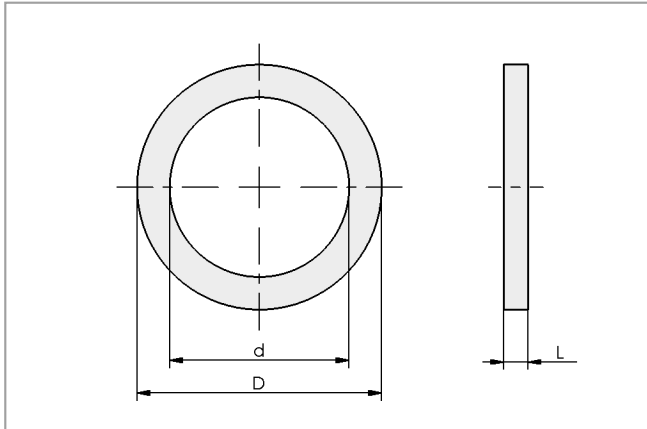
*Sealing ring with inner centering pins. Ensures optimal sealing. Cannot slip off the thread when the screw connection is opened.

Sealing Rings DR

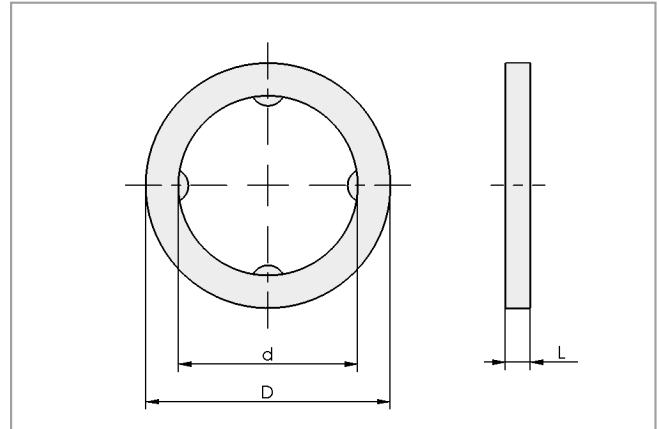
For thread from M3 to G1 1/2"



Design Data Sealing Rings DR



DR



DR Easy-Fix

Type	Dimensions in mm		
	d	D	L
DR M3	3.5	6	1.0
DR M5	5.0	8	1.2
DR G1/8	10.0	15	1.5
DR G1/4	13.5	18	1.5
DR G3/8	17.0	22	2.0
DR G1/2	21.5	26	1.5
DR G3/4	27.0	33	2.0
DR G1	34.0	39	2.0
DR G1 1/4	42.0	49	2.0
DR G1 1/2	48.0	55	2.0

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Services

Services for Your Vacuum System

Service – Throughout a Product's Life

Service is included in every Schmalz product. Benefit from our expertise as system providers and years of experience as component manufacturers.

Purchasing from Schmalz gives you real competitive advantages. Our highly qualified system consultants offer quality advice regarding all your vacuum system needs. This goes from planning and design to installation, commissioning and beyond. Thanks to our future-oriented approach with a sharp focus on technological innovation and functional performance Schmalz customers can count on an economical system design and efficient processes – throughout the entire product service life.



Consultation

- Catalogs
- Product inquiries
- CAD data
- Project planning aids
- Set-up time optimization



Procurement

- Online shop
- Delivery service
- Financing / Leasing
- Used devices
- Test sets



Commissioning

- Project planning
- Function and durability tests
- System solutions
- Design solutions
- Start-up on site

Test Center – Function Tests with Your Original Parts



Function tests on a vacuum layer gripping system in the company's own testing laboratory



Standardized durability test cycles on the original workpiece for disruption-free production processes

Function Tests of Complete Systems

Function tests with original workpieces are a standard part of the project. This ensures excellent performance and a high degree of safety. In order to carry out the tests under working conditions of the actual application environment, Schmalz operates its own test center at its headquarters. Potential challenges are identified there and solutions applied and retested.

Endurance Tests

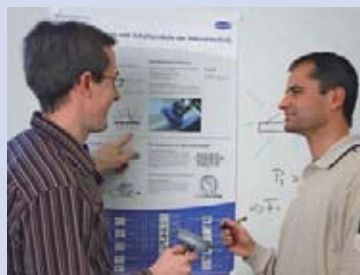
Our products are subject to endurance testing as part of their development. Suction cups for example are tested for wear- and chemical resistance to various environmental conditions. Ejectors are tested for their performance capability and leak-tightness.

www.schmalz.com/service



Operation

- Maintenance
- Preventative maintenance
- Certified approval
- Energy efficiency
- Spare parts



Training

- Training courses
- Seminars
- Customer-specific training
- Training materials
- How-to videos



Repair service

- Emergency service
- Repair service
- Seamless returns management
- Warranty

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Selecting Suitable Vacuum Components for the Packaging Industry

Modern production processes are placing increasingly higher demands on vacuum suction cups. This is especially true in the packaging industry, where specific demands are created by the need to handle extremely different materials such as cardboard boxes of various weights and sizes, blister packs and foils.

With the "Suction Cups for the Packaging Industry" test set, Schmalz enables you to waste no time in identifying and choosing the best suction cup for your particular application in the packaging industry.

The set contains every component you need for the suction test:

- More than 80 vacuum suction cups in various shapes and materials to cover almost all applications
- Three ejectors with differing suction capacities create the vacuum directly via a compressed air connection
- A vacuum gauge up to -1 bar, a polyurethane vacuum hose and a number of connection elements complete the test set



Ordering information

Type	Part no.
Test Set Packaging	30.02.03.00226

Selecting Suitable Vacuum Components for Other Industries

Of course, we have also developed suitable test sets for other industries. Contact us to find out more and we will select the appropriate components for your tests from our product range.

Schmalz Customer Center
 Phone: +49 7443 2403-105
 Fax: +49 7443 2403-9105
kundencenter@schmalz.de

Starter Set for Vacuum End Effectors

Whether used directly on the robot or as a handy design tool – with the VEE starter set, you have all of the most important components for quickly assembling your end effector right at your fingertips.

www.schmalz.com/vee

With the VEE starter set, you can instantly configure vacuum end effectors for the fastest possible packaging processes.

Contents:

- 120-piece starter kit with all components for installing up to two VEE vacuum end effectors
- 8 SPB4f-30 vacuum suction grippers for bags and other non-rigid types of packaging
- Quick-change adapter with bayonet fastener
- Supplied in a sturdy plastic case with detailed assembly instructions



Ordering information

Type	Part no.
VEE Starter Set	10.01.36.00030

Teaching and Learning Aids

Vacuum Training Set from Schmalz

The vacuum training set is an aid for training courses on the subject of vacuum technology in the field of automation. Designed to accompany lessons, it consists of a portable set of suitcases with various vacuum components for assembling sample applications. With the aid of a detailed exercise book, students are introduced to vacuum technology step by step and can work independently on self-contained lessons that build on each other.

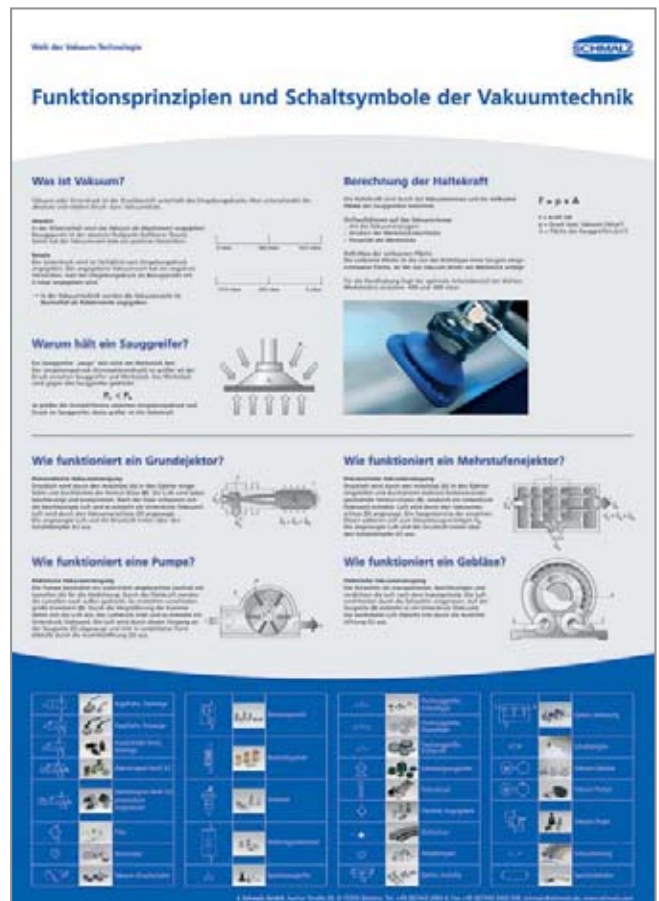
The training set allows for practical learning – from the simple assembly of a vacuum system to a complex system solution that requires students to optimize the components selected.



Educational Poster "Operating principles and schematic symbols in vacuum technology"

Concise specialist knowledge is taught in the workplace directly: What is vacuum? How does a suction cup work? How does a blower work? What do the different schematic symbols mean? This DIN A1 Schmalz educational poster answers these questions and covers further principles of vacuum technology.

The educational poster is available in German and English.



Ordering information

Type	Part no.
Training Set	10.02.02.03043
Educational Poster German	29.01.03.00546
Educational Poster English	29.01.03.00608

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Qualified, motivated employees with a high level of expertise and technical knowledge are vital for an innovative and competitive business. They form the basis for commercial success. Schmalz imparts knowledge – carefully tailored to meet the needs of your company's employees.

Training Courses and Seminars with a Vacuum Specialist

Schmalz has extensive knowledge about vacuum technology. The functions and application areas of vacuum components, how these can be used effectively in automation systems and the efficient design and conception of complex vacuum systems, are particular areas of expertise. This gives participants on Schmalz training courses the chance to benefit from years of knowledge and intensive individual support.

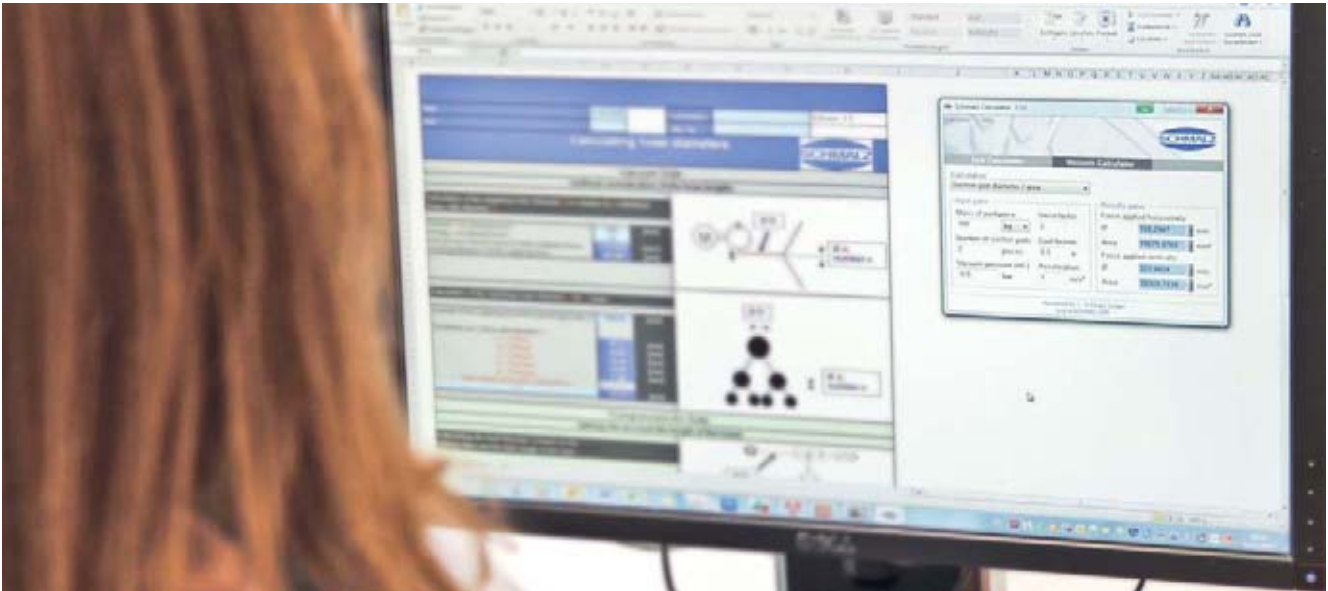
Get in touch with us; we would be happy to offer a seminar tailored to your requirements.

You can find our contact information in the chapter "Contact".



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Schmalz Calculator



The Schmalz Calculator is a program by Schmalz which is free of charge. It permits easy and quick conversion of system variables and calculations for the layout of vacuum systems.

Numerous units and variables are clearly arranged in 14 primary groups on the Schmalz Calculator. These primary groups are located in the "Units Calculator". With just a few clicks, you can convert units here. For example, you can convert various units in the areas of flow rate, pressure, output, area, time, distance, energy, power, mass, etc. in no time at all.

Calculation of these general variables, however, is only one of the Schmalz Calculator's functions. When solving vacuum-specific calculations, the calculator turns out to be the real "expert".

The "vacuum calculator" provides you with information on:

- Evacuation time for pumps
- Suction capacity and area
- Suction force
- Suction capacity for pumps
- Hose diameter

Schmalz's expert knowledge of vacuum technology and its long-time experience in the area of system layouts also form the basis for this calculator's programming. Values for the vacuum sector can hardly be calculated faster and more confidently.

Additional highlights:

- Frequently used or needed start and target values can be assigned to the "user-defined" area.
- Custom-created entries are possible, i.e., the user can define a start and target value himself, assign a conversion factor, calculate using this value and/or delete the entries again.
- Decimal places can be set from 0 to 5.
- The Schmalz Calculator contains an integrated help.

Download the Schmalz Calculator free of charge and test it!

www.schmalz.com/calculator

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Schmalz Products and Services

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- Practical applications in detail
- Complete product range
- All technical details
- CAD model downloads
- Quick access to catalogues and operating instructions
- Information about accessories and spare parts
- Overview of Schmalz services



Your Personal Online Shop Account

- Check price and availability in real time
- Order center with all orders, including their status (even for fax and telephone orders)
- Online order tracking
- Place additional orders and order spare parts quickly and easily
- Security and data protection



Schmalz News and Vacuum Technology News

- Product news
- All about the Schmalz Group worldwide
- List of international trade fair appearances
- Vacuum technology newsletter
- International job listings

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● **Schmalz Headquarters**
 J. Schmalz GmbH
 Aacher Strasse 29
 72293 Glatten
 Tel +49 7443 2403-0
 Fax +49 7443 2403-259
 schmalz@schmalz.de

● **Schmalz Subsidiaries**

Canada
 Schmalz Vacuum Technology Ltd.
 17-3190 Ridgeway Drive
 ON L5L 5S8 Mississauga
 Ontario
 Tel +1 905 569 9520
 Fax +1 905 569 8256
 schmalz@schmalz.ca

China
 Schmalz (Shanghai) Co. Ltd.
 No. 1 Chunquan Road
 201210 Pudong, Shanghai
 Tel +86 21 510999 33
 Fax +86 21 503988 82
 schmalz@schmalz.net.cn

Finland
 Oy Schmalz Ab
 Hakkilankaari 2
 01380 VANTAA
 Tel +358 10 231 2011
 Fax +358 9 85746 94
 schmalz@schmalz.fi

France
 Schmalz S.A.S.
 Le Prométhée
 65 Avenue du Général de Gaulle
 77420 Champs-sur-Marne
 Tel +33 1 6473 1730
 Fax +33 1 6006 6371
 schmalz@schmalz.fr

● **Schmalz Sales Partners**
 You can find the Schmalz sales partner in your country at
www.schmalz.com/salesnetwork

India
 Schmalz India Pvt. Ltd.
 EL – 38 'J' Block MIDC
 Bhosari
 411026 Pune
 Tel +91 20 4072 5500
 Fax +91 20 4072 5588
 schmalz@schmalz.co.in

Italy
 Schmalz S.r.l. a Socio Unico
 Via delle Americhe 1
 28100 Novara
 Tel +39 0321 621 510
 Fax +39 0321 621 714
 schmalz@schmalz.it

Japan
 Schmalz K.K.
 3595 Ikonobe-cho
 Tsuzuki-ku
 224-0053 Yokohama
 Tel +81 45 308-9940
 Fax +81 45 308-9941
 schmalz@schmalz.co.jp

Mexico
 Schmalz S. de R.L. de C.V.
 Pirineos 500, Bodega 18
 Parque Industrial Benito Juarez
 Micro Parque Santiago II
 76120 Querétaro
 Tel +52 442 209 5218
 schmalz@schmalz.com.mx

The Netherlands
 Schmalz B.V.
 Lansinkesweg 4
 7553 AE Hengelo
 Tel +31 74 25557 57
 Fax +31 74 25557 58
 schmalz@schmalz.nl

Poland
 Schmalz Sp.z.o.o.
 Ul. Kobaltowa 4
 Zlotniki
 62-002 Suchy Las (Poznan)
 Tel +48 22 460 49 72
 Fax +48 22 460 49 79
 schmalz@schmalz.pl

Russia
 Schmalz Representation
 ul. 26 Bakinskikh Komissarov, 9
 Office 109
 119571, Moscow
 Tel +7 495 96712 48
 Fax +7 495 96712 49
 schmalz@schmalz.ru

South Korea
 Schmalz Co. Ltd.
 Room 728
 775-1 Janghang 2-dong
 IlsandongGu
 Goyang KyungkiDo
 Tel +82 31 816 2403
 Fax +82 31 816 2404
 schmalz@schmalz.co.kr

Spain
 Schmalz S.A.
 Avda. Ribera de Axpe. 49
 P.A.E. UDONDO-Edificio B-Nave 2
 48950 Erandio (Vizcaya)
 Tel +34 94 480 5585
 Fax +34 94 480 7264
 schmalz@schmalz.es

Switzerland
 Schmalz GmbH
 Eigentlstrasse 1
 8309 Nürensdorf
 Tel +41 44 88875 25
 Fax +41 44 88875 29
 schmalz@schmalz.ch

Turkey
 Schmalz Vakum
 San. ve Tic. Ltd. Şti.
 Aydınlı Mah. Patlayıcı
 Maddeler Yolu
 Dumankaya Botanik A-89
 34953 - TUZLA - İSTANBUL
 Tel +90 216 34001 21
 Fax +90 216 34001 24
 schmalz@schmalz.com.tr

United States
 Schmalz Inc.
 5850 Oak Forest Drive
 Raleigh, NC 27616
 Tel +1 919 713 0880
 Fax +1 919 713 0883
 schmalz@schmalz.us

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All contents and technical data were correct when the catalog went into print. Great care has been taken in the compilation of the catalog and all technical and other information was thoroughly checked. However, Schmalz accepts no liability for faulty or incomplete information, mistakes or printing errors.

Schmalz reserves the right to make changes for the sake of the further product development.

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Publisher:

J. Schmalz GmbH
Aacher Strasse 29
72293 Glatten
Germany
Tel. +49 7443 2403-0
Fax +49 7443 2403-259
schmalz@schmalz.de
www.schmalz.com

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General Terms and Conditions of Sale and Delivery

All prices and benefits are based on the general business terms and conditions which can be downloaded from our website www.schmalz.com/terms or requested directly from us.

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
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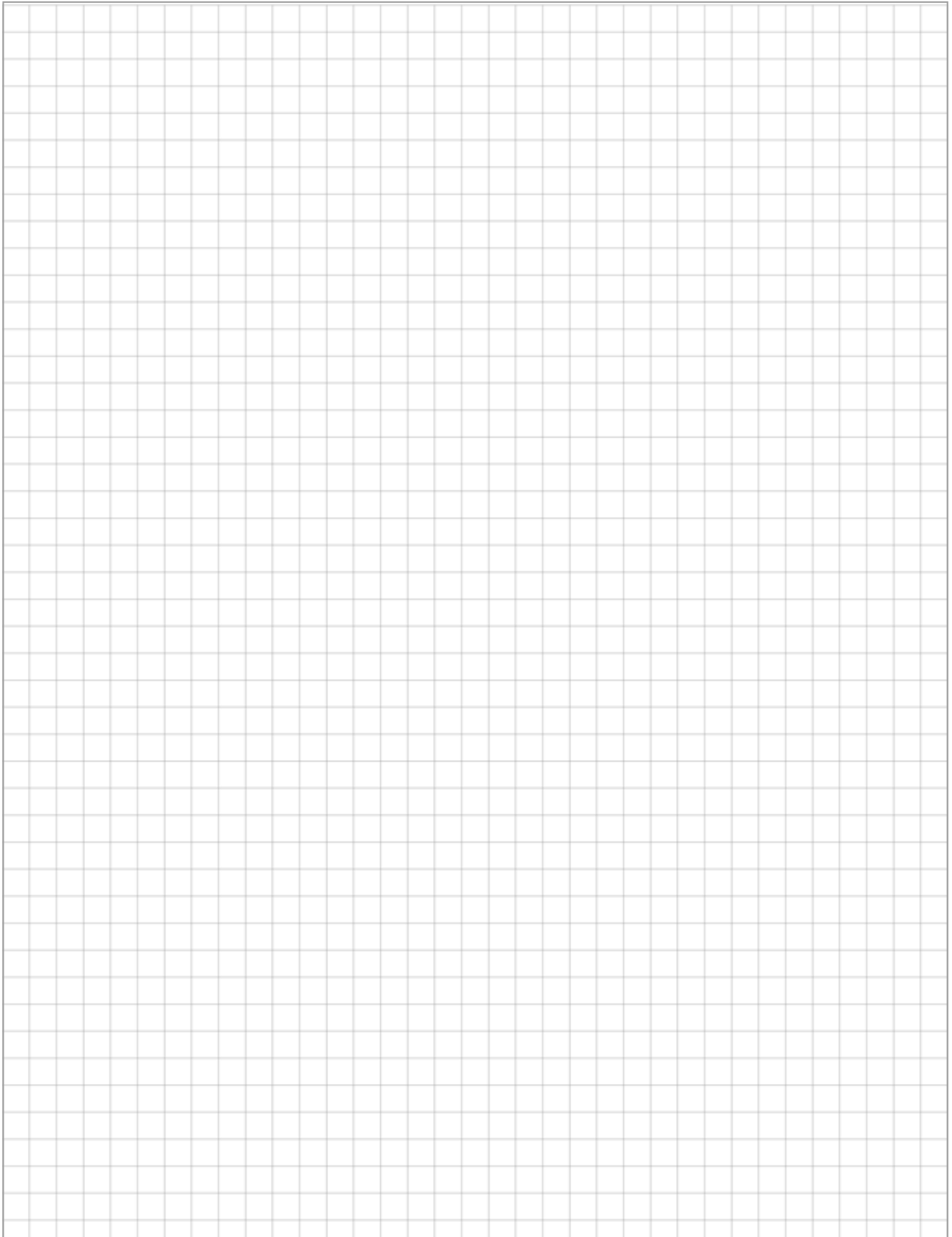
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Vacuum Components
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Vacuum Gripping Systems
Tel. +49 7443 2403-107



Vacuum Handling Systems
Tel. +49 7443 2403-108



Vacuum Clamping Systems
Tel. +49 7443 2403-109

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