

# COVAL

vacuum managers

## GLOBAL CATALOG

vacuum  
**components**



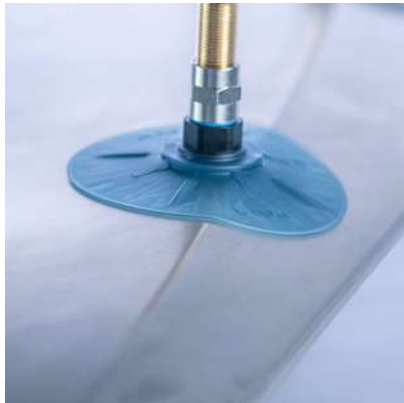
**INTERACTIVE VERSION**

# ADVANCED VACUUM SOLUTIONS

[www.coval.com](http://www.coval.com)

EN5









## VACUUM MANAGERS

### Welcome to the new COVAL catalog!

At COVAL, we set out to provide our clients and users with **vacuum handling** solutions that meet their goals in terms of profitability, productivity, quality, safety, and environmental conservation.

To achieve this, COVAL is rallying its efforts to predict, plan, innovate, and manufacture with one aim in mind: offering the right products and services at the right time.

In practical terms, this is what it takes:

- Impeccable knowledge of various industrial sectors.
- Being attentive and available to our clients' teams and users.
- The ability to adapt quickly to evolving needs.
- A rigorous approach to all of COVAL's efforts and endeavors.

To meet our commitments every day, at COVAL we have been developing an organization and a culture geared towards constant innovation, quality, and service for more than 35 years:

- Teams specialized by industry: food processing, aeronautics, robotics, plastic processing, packaging, and more.
- Strong in-house capacity for research and innovation complemented with external resources through public and private partnerships.
- Strong presence thanks to our sales team, foreign subsidiaries, and authorized dealers.

### COVAL is the Vacuum Manager for each and every one of its clients.

We bring together all the skills and know-how to manage the vacuum handling of their parts, products, or packaging.

This catalog presents our products and services, illustrating COVAL's vision of innovation, with a focus on energy savings, communication, and ease of use, as well as compactness.

It is an introduction to discussions with our sales and technical teams about your projects.

### The COVAL team

COVAL is a member of the **French Fab**, sharing with it the values of innovation, French manufacturing, digital transformation, and international development.



More  
information





## COVAL SERVICES

COVAL combines its products with efficient services to assist in defining your needs, selecting your solution, integrating your products, and optimizing your equipment.

### ► ALL COVAL PRODUCTS ONLINE

Just click to access our entire product range, which is regularly updated, and download any of our catalogs.

### ► 3D ONLINE LIBRARY

You have free access to 3D files of all our products in formats compatible with leading CAD software from our website at [www.coval.com](http://www.coval.com)



**3D  
COVAL Data**

You can use this fast, new, reliable service to make it easier to integrate our components directly into your designs.

### ► TECHNICAL PHONE SUPPORT

COVAL provides you technical support to answer all your questions regarding its products, solutions, and services: find a product or spare part, get advice on recommended use, request technical documentation, ask for technical information (how to avoid pressure losses, reduce noise level, save energy, etc.).

[www.coval.com](http://www.coval.com)

### ► MOBILE APPLICATION

The **COVAL e-catalogue** application gives you access to all our products from anywhere, allowing you to perform the following actions for each product:



- Download 3D models.
- View the latest up-to-date technical data.
- Download and share technical data sheets.

### ► COVAL SOLUTIONS SERVICES

To adapt our products to your specific applications, both the COVAL engineering and design department and its development team are dedicated to providing solutions that meet your specifications.

vacuum  
**management**





## QUALITY AND INNOVATION

COVAL applies an ambitious quality and innovation policy to all its product ranges. Our quality relies on a comprehensive approach, which brings together client focus, staff training, and teamwork.

All these elements foster a favorable environment and culture for each collaborator to contribute to innovation.

This commitment has led to several awards and certifications that reward both the products and their industrial applications.

### ► BROAD INNOVATION NETWORK

At COVAL, we believe that openness to public research centers, universities, and technology clusters is the primary qualification for being able to offer our clients products that make them more competitive. These collaborations complement and strengthen the internal resources of our Research and Innovation Center.

To drive this strategic intent, the Innovation Manager's focus is to develop COVAL interactions with its environment in order to innovate in technical, human, and organizational fields.

### ► ISO 9001 CERTIFICATION: V2015

With this standard, COVAL seeks to achieve the following:

- Satisfy its clients' quality requirements.
- Meet applicable regulatory conditions.
- Improve client satisfaction.
- Constantly optimize performance to achieve these goals.



To do this, COVAL teams focus on clients and rally behind a process of ongoing improvement. Our primary goal is to build a lasting relationship with our clients.

### ► AN EXAMPLE OF INNOVATION: INTELLIGENCE AT THE HEART OF THE VACUUM PUMP

Vacuum pumps are used in a wide variety of automated systems, primarily to generate and control vacuum in suction cups to ensure the gripping of objects. They must be easily integrated into a process and communicate the information necessary to ensure proper production.

To meet the expectations of manufacturers and the demands of automated applications, COVAL offers a complete range of vacuum pumps to meet different needs: vacuum levels, suction rates, control types, communication technologies, and energy savings.

Communication needs vary depending on the industry and application, but more and more, an efficient and real time communication system allows for increased flexibility of the machine.

In addition, the simplification of wiring and configuration is a benefit for integrators, while expanding the possibilities of diagnosis and optimization.





## ENERGY SAVINGS

COVAL is committed to making your vacuum handling system energy-efficient. Our goal is to optimize the overall performance of your equipment by operating on the following three principles:

- Analyzing the system to identify the potential for savings.
- Selecting the most appropriate solution.
- Including COVAL energy-saving technologies, such as ASR and ASC, in our products.

### **AIR Saving Regulator** : AIR SAVING REGULATOR

→ **40%** energy savings on average

The AIR SAVING REGULATOR (ASR) regulates the compressed air pressure to 3.5 bar in all circumstances to obtain a perfect mix of efficiency and consumption.

- No more unnecessary consumption of compressed air.
- No external regulator required, thus eliminating the risk of improper adjustment.

The following products feature this technology:

- LEM
- LEMP
- LEMAX
- LEMAX IO
- LEM+
- LEMAX+
- LEMCOM

### **AIR Saving Control** : AIR SAVING CONTROL

→ **90%** energy savings on average

AIR SAVING CONTROL (ASC) is an intelligent system that stops the consumption of compressed air as soon as the required level of vacuum is reached, thus avoiding any unnecessary consumption and contributing to savings on the equipment's operating costs.

The following products feature this technology:

- LEMAX
- LEMAX IO
- LEMAX+
- LEMCOM
- GVMAX HD

## ENERGY SAVING APP

Measure the savings online that you can make with a COVAL vacuum handling solution.

The **ENERGY SAVING APP** allows you to measure the savings you can generate with COVAL vacuum pumps featuring the **ASC (Air Saving Control)** technology compared with conventional vacuum pumps.

This unique app in the world of vacuum technology is very intuitive to use. Once you've entered the equipment's main characteristics (gripping cycle time, number of cycles, run time, volume to be evacuated), the savings are displayed automatically in euros, air volume, and savings percentage. In most cases, it is quite significant since it peaks at 97% of energy saved, for example with the LEMAX.

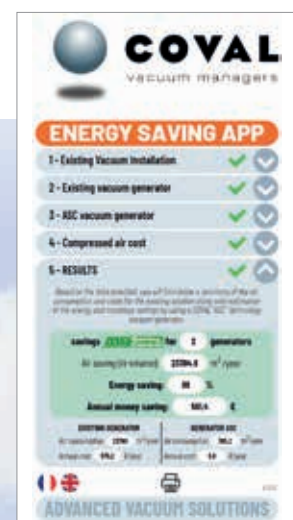
It is, therefore, easy to realize that investing in a COVAL pump featuring ASC pays for itself, on average, after less than a year of use.

This COVAL exclusive strengthens our calling as your company's Vacuum Manager and our desire to contribute to improving the energy and production performance of your equipment.

You can access this software from the COVAL website:

<https://www.coval-international.com/company/our-technologies/>

**Products concerned:** ■ LEMAX ■ LEMAX IO ■ LEMAX+ ■ LEMCOM ■ GVMAX HD.





## MADE IN EXCELLENCE

For more than 35 years, COVAL has been working every day on offering its clients outstanding products and services. This is not merely a goal, it's a daily commitment that drives each of our teams: sales, engineering and design, production, logistics, innovation, and management.

To foster this spirit of excellence, COVAL constantly invests in the following areas:

- ▶ **MODERNIZING ITS INDUSTRIAL EQUIPMENT** to improve quality and productivity.
- ▶ **TRAINING** to enable each and everyone to update their skills, become more versatile, and advance within the company.
- ▶ **OPEN INNOVATION** to let our clients be the first to benefit from the most advanced technology.
- ▶ **RIGOROUS ORGANIZATION** to guarantee our clients obtain the quality, responsiveness, and flexibility they expect.



## MADE IN FRANCE

COVAL is established at the heart of the Auvergne-Rhône-Alpes region, a particularly powerful economic area in terms of research and industrial production.

In its immediate environment, COVAL can rely on the following assets:

- France's leading network of industrial subcontracting.
- 7 business clusters directly linked to its activity: mechatronics, automation, mechanics, food processing, and more.
- 5 universities whose curricula focus on industrial technology.
- Leading network of high-speed trains in Europe.

These favorable conditions all contribute to the development of COVAL's products and services and clearly make **Made in France** an obvious choice.





## YOU DESERVE MUCH MORE THAN JUST VACUUM

Being able to benefit from high-performance products for the vacuum handling of your workpieces, products, and packages is your main requirement, but that's not enough by itself: you want solutions that are comprehensive, performing, and perfectly suited for your industry.

In order to bring you more than just vacuum, we are committed to a comprehensive development approach:

### ► **SOLUTIONS** that take into account all your concerns:

- The constraints of your process.
- The specific features of your products.
- The safety of operators.
- The energy performance of your equipment.

### ► **PRODUCTS** that you can trust:

- Reduced space requirements for better integration.
- Continuously improved performance.
- Reduced energy consumption.
- Easier communication and interaction with the machine.

### ► **KNOW-HOW** that meets your needs:

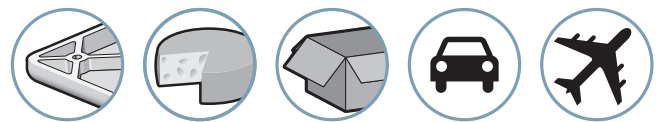
- A thorough analysis.
- Customized advice.
- Capacity for engineering and innovation.
- High-quality manufacturing and service.
- Ongoing follow-up throughout the entire life cycle of our products.

### ► **TEAMS** that specialize in **YOUR INDUSTRY**:

At COVAL, technical and sales teams are dedicated to strategic industry sectors: packaging, food processing, plastics, automotive, aeronautics, and robotics.

The experience they've acquired with major brands and manufacturers allows them to provide quick and efficient answers.

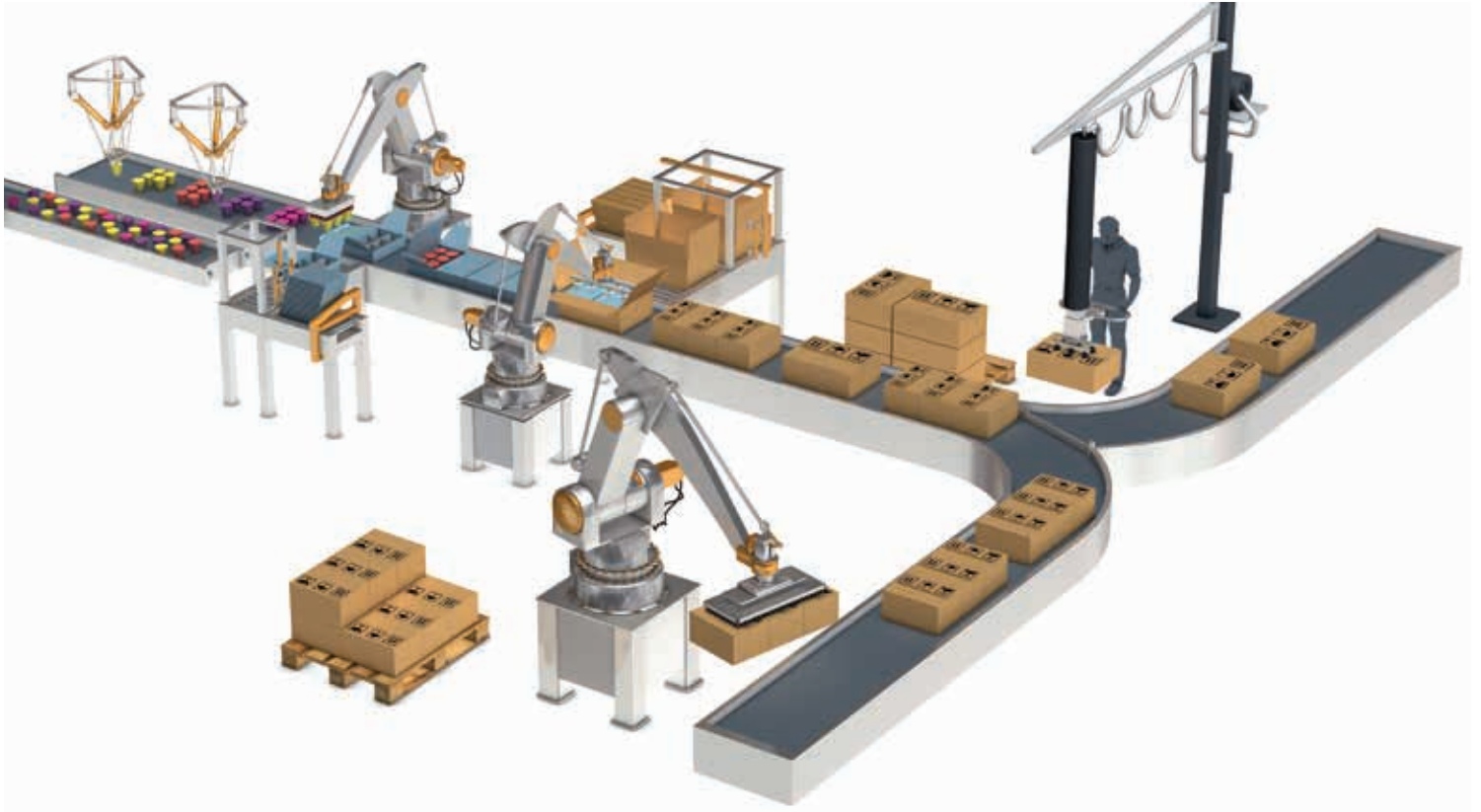
Our goal is to be present wherever vacuum handling and automation is useful for the performance of the business.





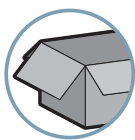


## COVAL ALL ALONG THE LINE



## ADVANCED VACUUM SOLUTIONS





## Industry Solutions: **PACKAGING**



Packaging plays an important role in industrial production. Vacuum applications in this field range from grasping small bags to handling large-sized cardboard boxes.

Their extremely various size, shapes, weights, and materials are a result of the many functions they need to fulfill: hold, transport, and store products, but also inform, promote, and facilitate use, etc.

Regardless of the type of packaging, the handling constraints are always the same:

- Safety of goods and operators.
- Handling throughput.
- Versatility.
- Energy savings.

**More information**



## COVAL All Along the Line

### ► SUCTION CUPS

Suction cups meet a wide variety of specifications thanks to the large choice of shapes, diameters, and materials. COVAL offers a complete line of fastening fittings that are suitable for suction cups and compatible with all types of applications.

- Flat and extra-flat suction cups.
- 1,5, 2,5, 4,5 and 5.5 bellows.
- Oblong suction cups.
- High-performance suction cups.

→ See chapters 2 and 3.



### ► VACUUM PUMPS

COVAL vacuum pumps all have compactness, embedded intelligence, and low energy consumption in common.

- Micro-ejectors.
- Modular vacuum pumps.
- Smart vacuum pumps.

→ See chapters 6 to 9.



### ► VACUUM GRIPPERS

Vacuum grippers are used to grip several products (flow packs, tins, cans, etc.) or packages (palletization) at once.

- **MVG**: fully configurable vacuum grippers.
- **CVGL**: vacuum grippers with many possible combinations.
- **CVGC**: carbon vacuum grippers for collaborative robots

→ See chapter 13.



**IO-Link**  
**NFC**





# Industry Solutions: **FOOD PROCESSING**

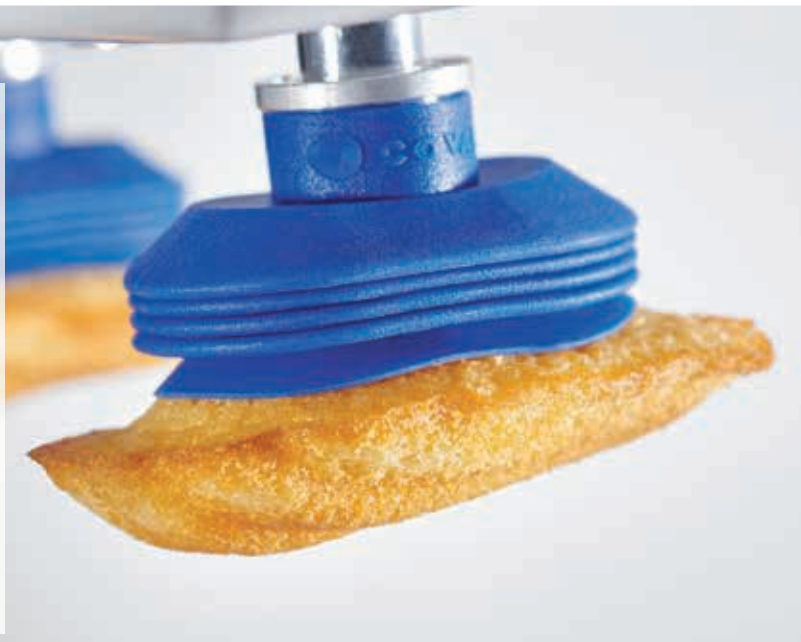
More  
information



Being located in France, the world's second largest exporter of food, COVAL enjoys an exclusive relationship with the food processing industry.

Whether this involves handling raw, prepared, or packaged goods, COVAL has continually developed and adapted its products to the food processing industry needs:

- Making production lines more versatile.
- Producing within a safe food environment.
- Increasing productivity while maintaining a high level of quality.
- Reducing production and maintenance costs.



## Suction Cups with a Firm Grip on Your Products

### ► SILICONE SUCTION CUPS

They are compatible with FDA food standards (FDA 21 CFR 177.2600.) and in conformity with European directives EU 1935/2004 and available in a wide variety of models to adapt perfectly to your products.

- From 1 mm to 88 mm in diameter.
- Round and oblong shapes.
- Flat, 1.5 and 2.5 bellows.
- **Metal-detectable version available upon request.**

→ See chapter 2.



### ► VACUUM PUMPS

COVAL vacuum pumps all have compactness, embedded intelligence, and low energy consumption in common.

- **LEM and LEM+ series** for handling all porous or airtight parts.
- **LEMAX, LEMAX IO and LEMAX+ series** for handling all airtight or slightly porous parts.
- **LEMCOM series:** vacuum pumps with fieldbus communication.
- **CMS HD series:** Heavy Duty Multi-stage Vacuum Pumps.

→ See chapter 8.



### ► SPECIAL SUCTION CUPS

- FlowPack Suction Cups: **FPC series.**
- **MVP Series, Packaging Suction Cup**
- Suction cups for bakery applications: **VSD, VSE, and VSP series.**
- Suction cups for egg-handling: **VSO series.**

→ See chapter 3.



### ► VACUUM GRIPPERS

Vacuum grippers are used to grip several products (flow packs, tins, cans, etc.) or packages (palletization) at once.

- **MVG:** fully configurable vacuum grippers.
- **CVGL:** vacuum grippers with many possible combinations.
- **CVGC:** carbon vacuum grippers for collaborative robots

→ See chapter 13.







## Industry Solutions: **AUTOMOTIVE INDUSTRY**



COVAL has been delivering simple, flexible, modular, compact, and energy-efficient vacuum handling and automation solutions to car manufacturers for more than 35 years:

- High-throughput handling of workpieces on stamping press lines.
- Workpiece transport and clamping for gluing and welding at welding stations.
- Handling of windshields or sheet steel parts for assembly.

## Integration, Performance and Energy Savings

### ► C SERIES AND CTC SERIES HIGH-PERFORMANCE SUCTION CUPS

These suction cups are available in a wide range of sizes and shapes and have been developed to meet the constraints of the automotive industry:

- Optimal placement of oily steel sheets: anti-slip cleats.
- Preservation of workpieces: polyamide fittings.
- Airtight fastening: o-ring.

Versions made of SITON® are available for handling hot workpieces (plastic workpieces, hot stamping).

#### CTC Series bell-type suction cups:

- Excellent adaptation to convex surfaces and angular shapes
- Excellent resistance to wear and oil thanks to thermoplastic polyurethane (TPU)

→ See chapter 2.



### ► HEAVY DUTY COMMUNICATING VACUUM PUMPS, GVMAX HD SERIE

- Optimized robot equipment: ultra-compact and lightweight.
- Reduced gripping times: powerful suction flow rate.
- Up to 90% compressed air savings: ASC technology.
- Maintenance free: non-clogging.
- IO-Link communications interface
- Clear and efficient HMI
- Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile application.

→ See chapter 8.



**AIR** Saving Control



**SMART  
SWAP**

IO-Link  
NFC





## Industry Solutions: **AERONAUTICS**

In a growing industry, the ability to reduce production times while preserving a high level of quality is essential. COVAL has worked on the following specific solutions with major manufacturers:

- Gripping parts on laser-trimming machines.
- Referencing and holding aircraft parts during drilling, sanding, riveting, etc.
- Integrating vacuum components in demonstration tools.
- Gripping aircraft parts made of various materials: steel, stainless steel, aluminum, and composite materials.



More  
information



### Dedicated Solutions for your Industry

#### ► **C SERIES HIGH-PERFORMANCE SUCTION CUPS AND CTC SERIES**

- Gripping thin workpieces without deformation.
- Handling or holding in vertical position.
- Optimal positioning and holding: anti-slip cleats.

→ See chapter 2.



#### ► **LEMAX, LEMAX IO, LEMAX+, LEMCOM AND GVMAX HD SERIES VACUUM PUMPS**

- Optimized robot equipment: ultra-compact and lightweight.
- Reduced gripping times: powerful suction flow rate.
- Up to 90% compressed air savings: ASR technology.
- Maintenance free: non-clogging.
- PROFINET or EtherNet/IP fieldbus for the LEMCOM series.
- IO-Link communications interface for the LEMAX IO and GVMAX HD series.

→ See chapter 8.



#### ► **VPSC MARK-FREE ULTRA-FLAT SUCTION CUPS**

- Gripping raw composite materials.
- No material migration.
- Non-marking on composite parts.

→ See page 3/35.



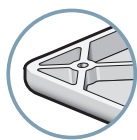
#### ► **CONTROL BOX WITH INTEGRATION FUNCTIONS**

- Integrated pneumatic or electric vacuum pumps.
- Control and monitoring panel allowing you to manually or automatically select the gripping areas on a structure.
- Indicator light for visual alarm.
- Vacuum sequencing to assist with placement of a curved panel.

→ Upon request.





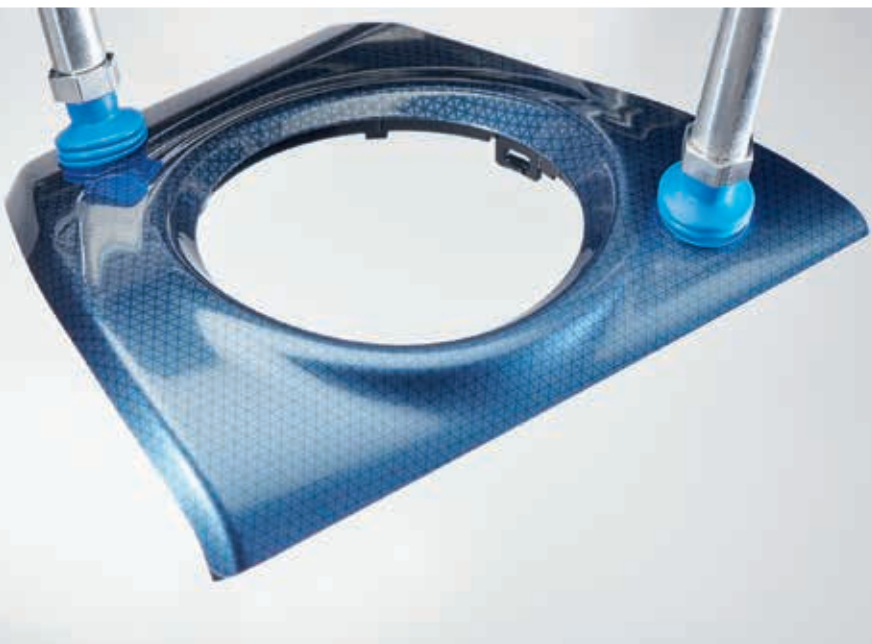


## Industry Solutions: **PLASTICS**

Hidden behind the generic term “plastics”, you will find materials that are very different in their composition, manufacturing, appearance, and applications.

For more than 35 years, COVAL has been developing vacuum handling solutions that are tailored to the constant technological developments of the processes and materials.

Our vacuum pumps and suction cups are able to handle plastics and composites for industries such as aeronautics, cosmetics, electronics/connectors, health, and transportation.



More information



## SITON® material, A COVAL Exclusive

### ► SITON® MATERIAL SUCTION CUPS

SITON®, developed and manufactured exclusively by COVAL, is a non-marking silicone-free material specially designed for handling hot plastic parts from injection molds.

#### Advantages of SITON® material

- Non-marking: clear, silicone-free compound.
- Withstands continuous temperatures of 130°C (266°F) up to 160°C (320°F) at peak.
- Excellent abrasion resistance.

Many suction cup models are available in SITON® 60 Shore A (STN) in this catalog.

For greater flexibility, models in SITON® 50 Shore A (STN5) are available upon request.

→ See chapter 2.



## Intelligent Vacuum Pumps

### ► LEMAX, LEMAX IO, LEMAX+, LEMCOM AND GVMAX HD SERIES

Vacuum pumps with ASC are used for handling all airtight or slightly porous plastic parts.

- Ultra-compact and lightweight.
- More than 90% energy savings thanks to ASC technology.
- Silent operation.
- Auto-adjustment corresponding to the material handled.
- Maintenance free: non-clogging.
- PROFINET or EtherNet/IP fieldbus for the LEMCOM series.
- IO-Link communications interface for the LEMAX IO and GVMAX HD series.

→ See chapter 8.

**AIR** Saving Control



IO-Link NFC )))



## NEW PRODUCTS

Always in touch with the latest market developments, COVAL is driven by constant innovation and regularly introduces new products and solutions that meet specific vacuum handling needs.



IO-Link

- **LEMAX IO Series**  
Mini Vacuum Pumps with  
Communication IO-Link



IO-Link  
NFC

- **CVGL Series**  
Communicating Compact and  
Light Vacuum Grippers



IO-Link NFC

- **GVMAX HD Series**  
Heavy Duty Communicating  
Vacuum Pumps



IO-Link  
NFC

- **MVG Series**  
Communicating Modular  
Vacuum Grippers



IO-Link NFC

- **CMS HD Series**  
Heavy Duty Communicating  
Multi-stage Vacuum Pumps

These new products are already available today. Feel free to ask your COVAL preferred contact for more information.

Discover COVAL's intelligent vacuum pump range on the following pages





# COVAL's Family of Intelligent Vacuum Pumps

Vacuum pumps are used in a wide variety of automated systems, primarily to generate and control vacuum in suction cups to ensure the gripping of objects. They must be easily integrated into a process and communicate the information necessary to ensure proper production.



To meet the expectations of manufacturers and the demands of automated applications, COVAL offers a complete range of vacuum pumps to meet different needs: vacuum levels, suction rates, control types, communication technologies, and energy savings.

Communication needs vary depending on the industry and application, but more and more, an efficient and real time communication system allows for increased flexibility of the machine.

In addition, the simplification of wiring and configuration is a benefit for integrators, while expanding the possibilities of diagnosis and optimization.

## Key points of intelligent vacuum pumps



Functions	Model	LEMP	LEM	LEMAX	LEMAX IO	LEMCOM	LEM+	LEMAX+	GVMAX HD	CMS HD
Recommended for porous products		■	■			■	■			■
Recommended for airtight products				■	■	■		■	■	
Suction flow rate from 29 to 92 NI/min		■	■	■	■	■				
Suction flow rate from 125 to 275 NI/min							■	■	■	
Suction flow rate from 700 to 1600 NI/min										■
Maximum vacuum level: 60%		■	■			■	■			
Maximum vacuum level: 80 or 85%		■	■	■	■	■	■	■	■	■
Vacuum control			■	■	■	■	■	■	■	■
Blow-off control			■	■	■	■	■	■	■	■
Integrated pressure regulator (ASR) 		■	■	■	■	■	■	■		
Powerful blow-off							□	□	□	
Electronic vacuum switch with display		□	□	■			□	■	■	□
Electronic vacuum switch					■	■				
Pressure sensor									■	□
Vacuum check-valve				■	■	■		■	■	
Automatic vacuum regulation (ASC) 				■	■	■		■	■	
M8 connections		□	■	■	■	■				
M12 connections							■	■	■	■
Island Assembly Available		■	■	■	■	■			■	
SMART SWAP Quick-mounting system									■	
Field bus EtherNet/IP™ / PROFINET						■				
IO-Link					■				■	□
NFC									■	□

■: Standard or integrated □: Option

## Energy Savings

COVAL is committed to making your vacuum handling system energy-efficient. Our goal is to optimize the overall performance of your equipment by operating on the following three principles:

- Analyzing the system to identify the potential for savings.
- Selecting the most appropriate solution.
- Including COVAL energy-saving technologies, such as ASR and ASC, in our products.



### ASR (Air Saving Regulator)

A "venturi pressure regulator" that guarantees optimized operation at 3.5 bar.

Ideal for gripping of porous products or rough surfaces.

**Advantage:** Up to 40 % energy savings.



### ASC (Air Saving Control)

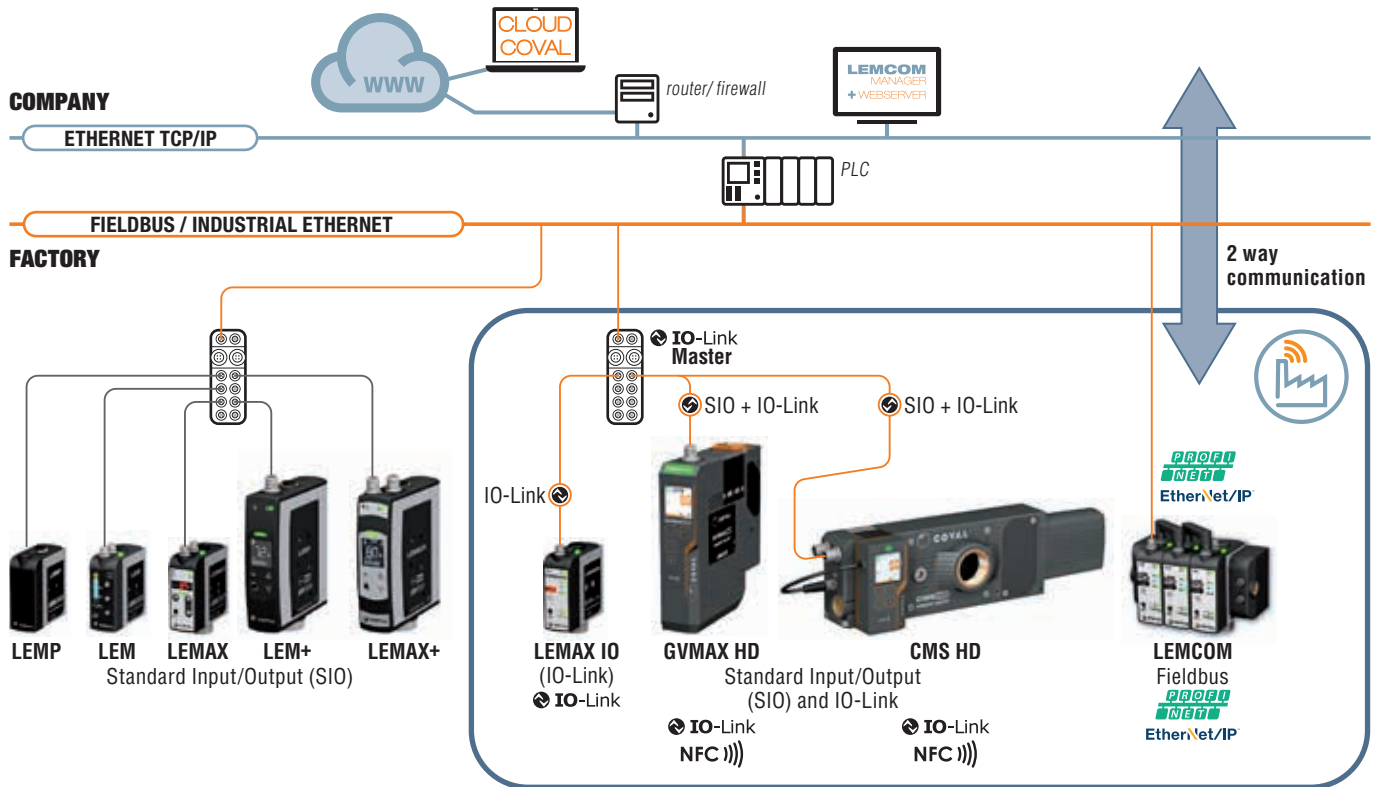
A vacuum regulation system that auto-adjusts to the product being handled.

Ideal for gripping airtight products.

**Advantage:** Up to 90 % energy savings.



**A vast ecosystem of vacuum pumps to meet all needs.**  
From simple control to communication technologies designed for the industry of the future...



## Key points of communication technology



Communication interface with the machine

### Industrial Ethernet

- Supported buses: PROFINET, EtherNet/IP™.
- Direct connection to the machine's ethernet network.
- 2 cables for power and control of 1 to 16 vacuum pumps.



### IO-Link

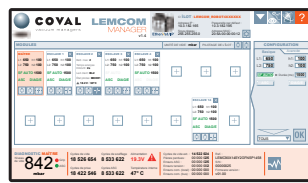
- Compatible with all fieldbus and industrial ethernet networks (via IO-Link master).
- 3-wire connection.
- Easy maintenance thanks to the storage of parameters in the IO-Link master.



User communication interface

### LEMCOM Manager

- PC control software, configuration, and diagnostic software for the LEMCOM series, dedicated to "vacuum applications".



### WEB Server

- Embedded on the master modules of the LEMCOM series.
- Integrated into the commercial IO-Link master for the LEMAX IO/ GVMAX HD.
- Direct access to control, configuration, and diagnostic functions.

### Vacuum Manager App (NFC)

- Available on iOS and Android.
- Configuration and diagnosis of the GVMAX HD and CMS HD series.
- Uploading of operating data to the COVAL cloud.



### High resolution display

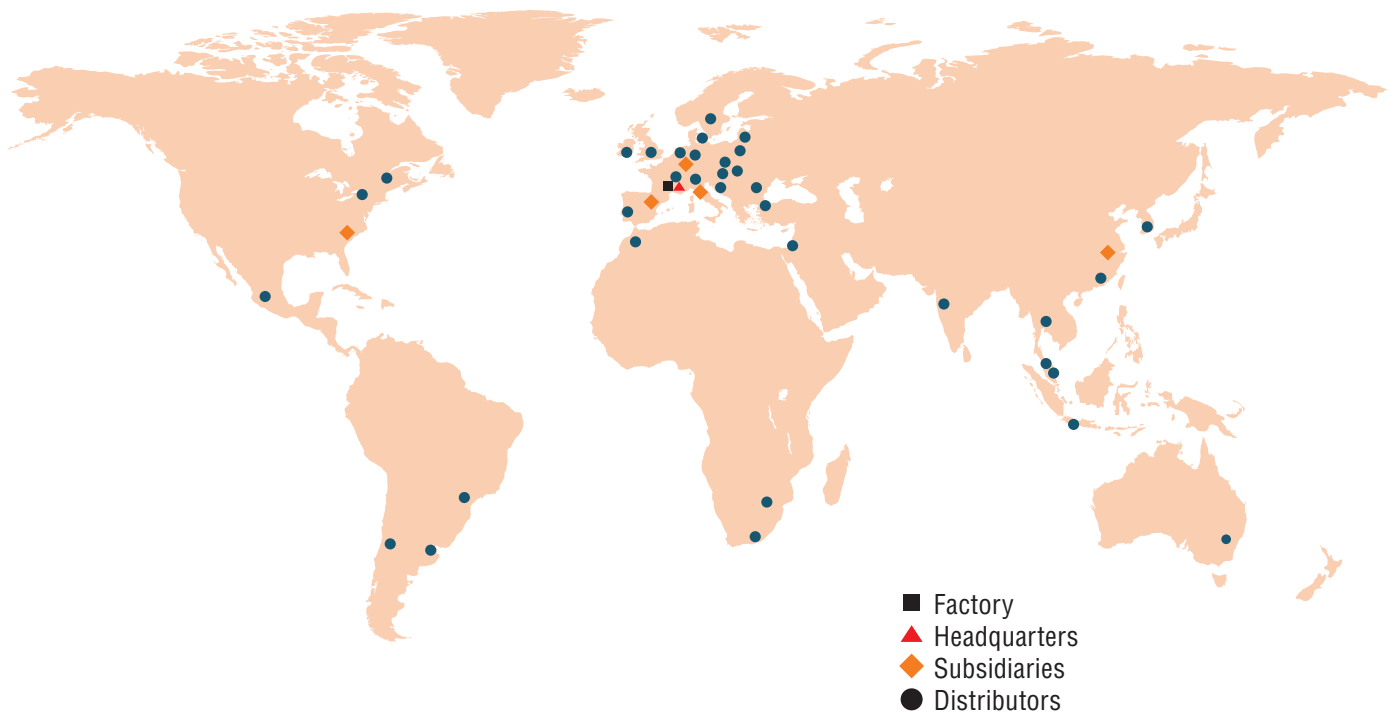
- LCD color display on GVMAX HD and CMS HD series.





## A TECHNOLOGICAL PARTNER ON A GLOBAL SCALE

Every year, we keep developing our network of partners (subsidiaries, distributors and independent agents) to assist our clients in their quest for local and international markets.



### ► **HEADQUARTERS** based in **FRANCE**

Since its creation in 1986, COVAL S.A.S. is established in Montélier in southern France.



### ► **5 SALES SUBSIDIARIES**



COVAL Inc.



COVAL  
Iberica



COVAL  
Germany



COVAL  
Italia



COVAL  
China

### ► A broad network:

- + **25** authorized **DISTRIBUTORS** in **FRANCE**
- + **40** authorized **DISTRIBUTORS** outside **FRANCE**

► Visit the following section on our **WEBSITE**:  
Contact – Sales network,  
to view the latest **UP-TO-DATE LIST**



# ADVANCED VACUUM SOLUTIONS



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## SUCTION CUPS

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## VACUUM PUMPS






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

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Vacuum Filters

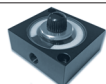
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# Vacuum Handling Guide

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# Vacuum Handling Guide

## Vacuum Applications and Measurements

### VACUUM HANDLING DEVELOPMENT

Industrial vacuum applied to suction cups is an efficient method for handling objects and materials.

This technique was developed to meet automation needs in the industry with applications in parts assembly, finishing, testing, transfer, packaging, etc....

It is designed particularly for the automobile, wood and plastics industries, as well as all object transformation activities: food, electricals, furniture, etc.

Vacuum handling has become a key production technology, and this document will detail the rules, procedures and components involved.

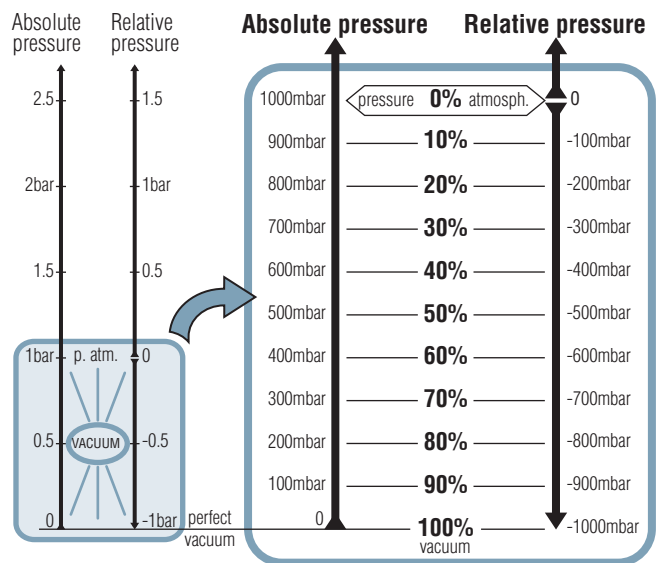
### MEASURING VACUUM LEVEL

Scientists use absolute pressure, with a scale that starts at perfect vacuum, with atmospheric pressure measuring roughly 1 bar.

For industrial applications, relative pressure is preferred because it marks a clear distinction between vacuum (negative pressure) and positive pressure.

In gripping applications, vacuum is only effective by its difference compared with atmospheric pressure. However, atmospheric pressure varies slightly depending on the altitude of the application site. This is why it is more practical to express vacuum level as a percentage of the atmospheric pressure.

The scale shown on the right illustrates the relationship between pressures expressed in bar and mbar and the vacuum level shown as a percentage of the atmospheric pressure. This relationship is accurate for use at an altitude of 100m. This is the measurement that we will use when discussing suction cups, since this is the most common altitude of industrial sites



### VACUUM UNITS CONVERSION

#### Relative vacuum

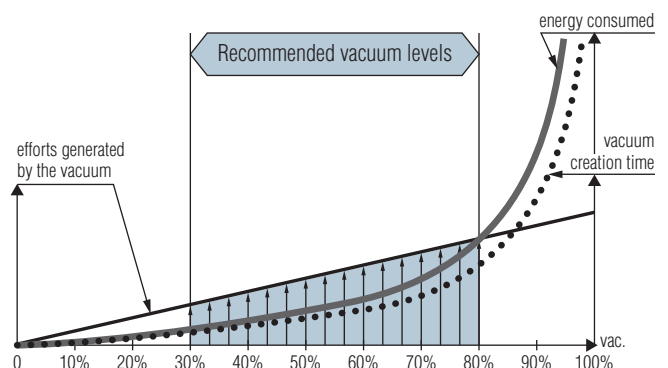
%	bar	mbar	Torr (mmHg)	inHg	kPa
0%	0	0	0	0	0
10%	-0.101	-101	-76	-2.98	-10.1
20%	-0.203	-203	-152	-5.99	-20.3
30%	-0.304	-304	-228	-8.97	-30.4
40%	-0.405	-405	-304	-11.96	-40.5
50%	-0.507	-507	-380	-14.97	-50.7
60%	-0.608	-608	-456	-17.95	-60.8
70%	-0.709	-709	-532	-20.93	-70.9
80%	-0.811	-811	-608	-23.94	-81.1
90%	-0.912	-912	-684	-26.93	-91.2
100%	-1.013	-1013	-760	-29.91	-101.3

### RECOMMENDED VACUUM LEVELS

Gripping provides a level of effort that is proportional to the level of the vacuum that generates it (see curves below). For the most efficient operation, a maximum vacuum level is recommended. However, the curves also show that a high level of vacuum:

- has a high energy cost
- takes a long time to establish

This is why the vacuum levels used should be limited, from 30% when a high flow of vacuum needs to be maintained, to 80% in an airtight circuit (no flow required to maintain the vacuum).

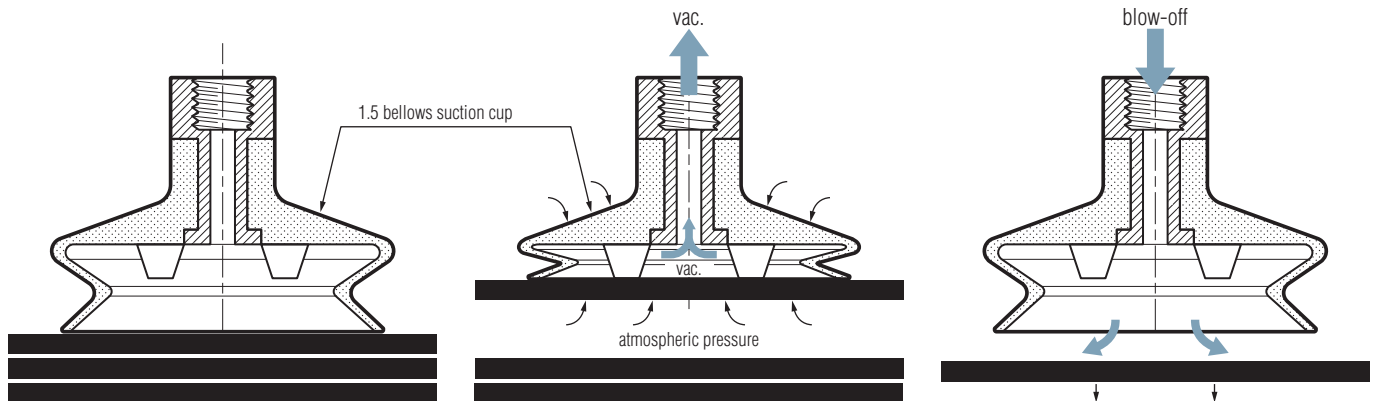




# Vacuum Handling Guide

## Suction Cup Performance

### VACUUM HANDLING PHASES



#### 1- Approach

For shock-free contact with the surface to be gripped, and to conform to its shape, the suction cup in this instance has 1.5 bellows.

Chapter 2 outlines a choice of suction cups and fittings to facilitate this phase.

#### 2- Gripping

Vacuum is then applied to the suction cup, which lifts the object pushed by atmospheric pressure.

The suction cup and object then remain bound together throughout the entire process (transfer, packaging, etc).

#### 3- Release

At the end of the suction process, the vacuum is interrupted to release the object.

Most often, an air blow-off will help this process and avoid sticking. This also helps to quickly move to the next cycle.

### VACUUM LEVELS AND SUCTION CUP SIZING

In practice, the majority of surfaces requiring suction are not airtight. If the material is porous or the surface is rough, it is inevitable that air will escape into the vacuum through the material or under the edges of the suction cup. In this situation, a high flow of vacuum must be maintained to compensate for air leaks and to maintain gripping. This can be done economically and efficiently at a low level of vacuum.

Within the recommended vacuum range of 30% to 80%, two distinct zones must be distinguished, depending on the nature of the object to be gripped..

#### 1. Porous materials

The 30 to 55% vacuum zone is both economical and efficient, given the amount of vacuum flow required. The suction cups should be sized appropriately to obtain the required holding force.

#### 2. Airtight surfaces

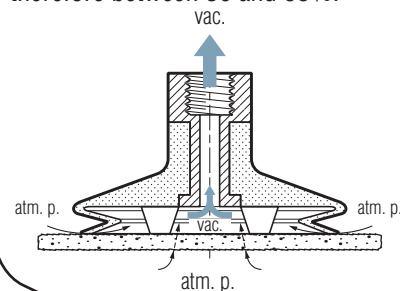
In this case, the 55 to 80% zone gives excellent results. The holding force is greater (curves opposite), so that smaller suction cups may be used.

Chapter 2 outlines a method for sizing the suction cups, particularly in relation to the chosen vacuum level.

#### 1. Porous materials

Greater vacuum flow must compensate for products and processes that cause air leaks such as cardboard, agglomerated materials, rough wood, irregular surfaces, etc.

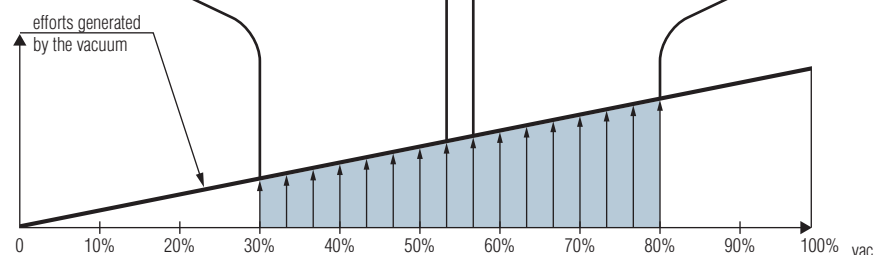
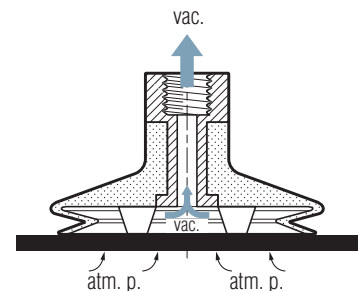
The most economic vacuum level is therefore between 30 and 55%.



#### 2. Airtight surfaces

With metal, plastics, glass and any other smooth, airtight surface, the vacuum flow required remains low, or even zero.

The vacuum level can therefore be higher, between 55 and 85%.





# Vacuum Handling Guide

## Vacuum Generation Technologies

### 1- CONTINUOUS VACUUM, USING ROTARY VACUUM PUMPS

#### Rotary Vacuum Pump Principle

The most commonly used type of rotary pump is the vane pump (illustration).

The blades are spun at high speed by the rotor, and the centrifugal force pushes them against the pump housing. The air is displaced and pushed out, creating a vacuum at the inlet.

For low vacuum levels only, turbines (or regenerative blowers) are also used, which operate in a similar manner to vacuum cleaners: a rotor with blades that do not make contact with the housing, causing air to move at high speed.

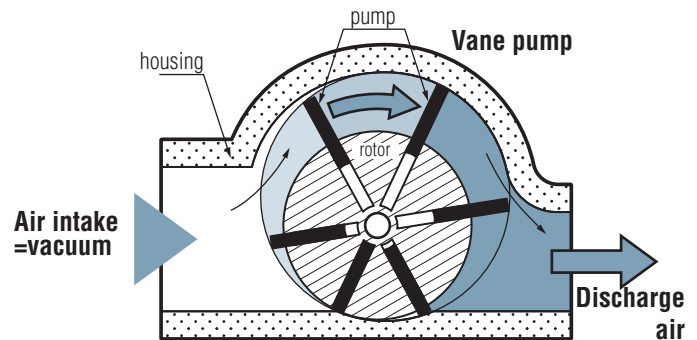
#### Range of Rotary Vacuum Pumps

To maintain optimum output, rotary pumps must remain within average power levels: from 1 to 10 Kw. The suction capacity generated is much higher than the normal requirements of industrial suction cups.

#### Operation Applications and Practice

Rotary pumps are used where a constant, high level of suction flow rate is required. Vacuum packaging machines are a typical example of this.

However, in the vast domain of vacuum gripping, rotary pumps are only used in rare instances, where an object requires a high level of suction flow rate that needs to be maintained for a long time during the cycle.

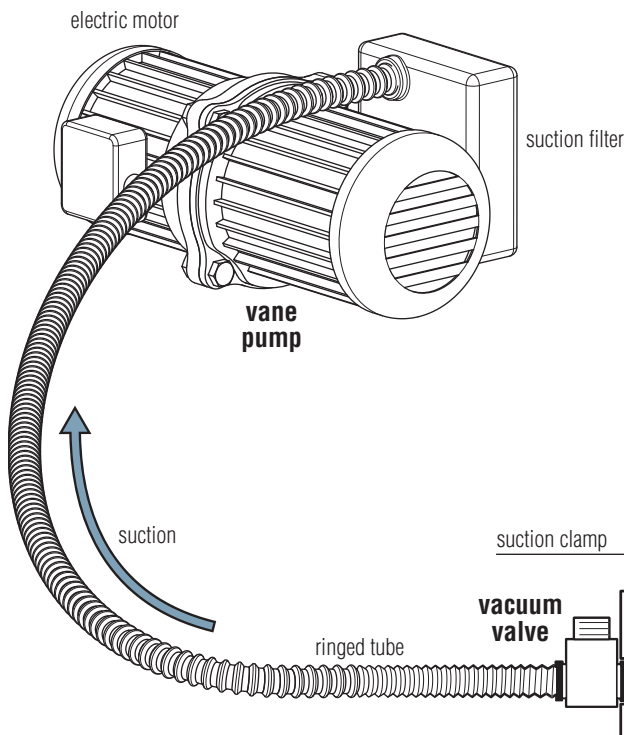


#### Rotary Vacuum Pumps

- Constant consumption, continuous generation of vacuum, even for intermittent requirements: not suitable for intermittent vacuum generation requirements.
- Located far from the suction cups.

#### Applications :

- Vacuum sources for various processes such as vacuum packing, etc.
- Clamping maintained throughout the cycle, with high suction flow rate (porous objects etc.)



#### A Typical Application

The example shown below is a digital control manufacturing robot, which uses suction cups to clamp porous parts. Note that the pump, which is bulky, noisy and causes vibrations, must be installed well away from the operational section of the machine. It is connected via a tube, which must have a large diameter (40 to 80 mm) to reduce the loss of vacuum, which can sometimes be dangerous.



# Vacuum Handling Guide

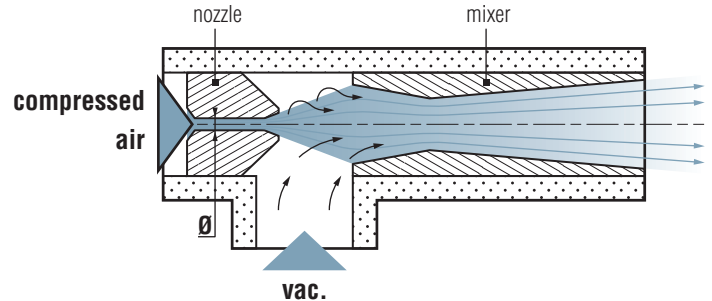
## Vacuum Generation Technologies

### INTERMITTENT VACUUM, USING VENTURI VACUUM PUMPS

#### Venturi Vacuum Pump Principle

Using the "venturi" effect : a nozzle of diameter  $\varnothing$  is supplied with compressed air. The air jet carries along ambient air in its turbulence and then passes through the mixer on its way out. This suction effect of ambient air creates the depression that generates the vacuum.

Unlike rotary vacuum pumps which must turn continuously, venturi vacuum pumps can operate intermittently, only when the suction cups require vacuum.



#### Venturi Vacuum Pumps

- Consumption only when needed, results in low air consumption.
- Installation very close to the suction cups.
- Suction flow rate and vacuum level optimized for each application.

#### Applications :

- All intermittent gripping operations, i.e. which only last for a part of the full cycle of the machine

#### Venturi Vacuum Pump Ranges

The variations in nozzles and mixers offer an optimal range to meet all needs.

##### ■ Nozzle diameter $\varnothing$

The diameter defines the force generated and therefore the suction capacity:  $\varnothing$  0.5mm for micro suction cups, to  $\varnothing$  = 3mm with a suction capacity of 450 NI/min for several large suction cups.

##### ■ Mixer profile

This profile defines the maximum level of vacuum achieved by the venturi.

Two standard levels offered by COVAL:

- 60% for porous material (30 to 55% vacuum)
- 85% for airtight materials (55 to 80% vacuum)

Max. vacuum ► 2 standard levels:

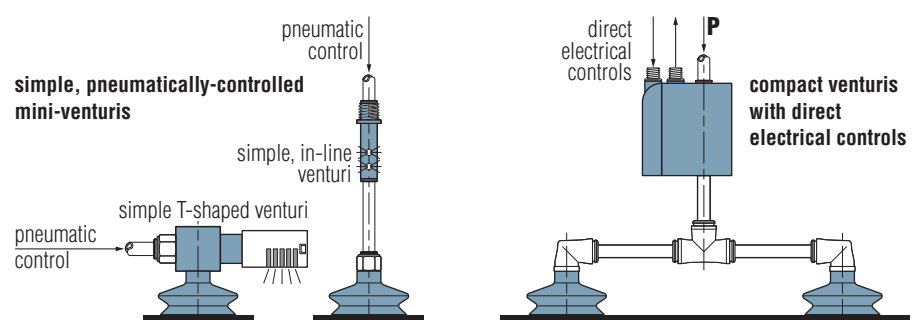
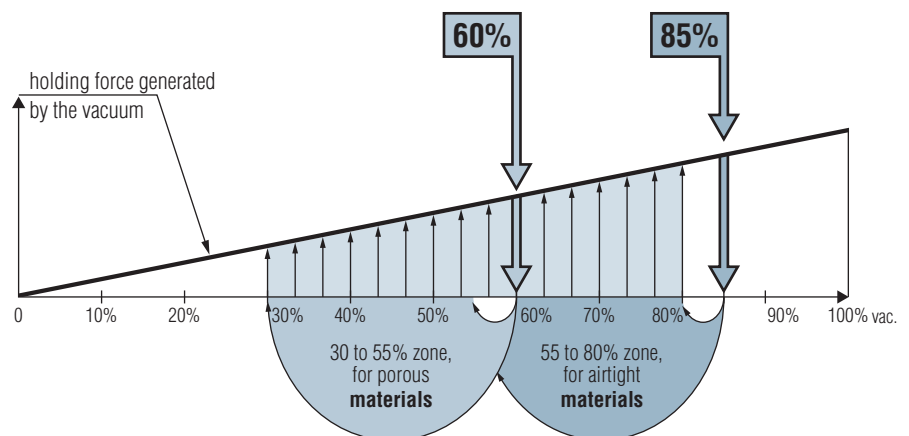
#### Applications and Practice

Venturi vacuum pumps are used for all normal vacuum gripping applications.

Compact and light, venturis are installed as close as possible to the suction cups: little pressure loss and a minimum volume to purge, resulting in short response times and minimum energy consumption.

The following distinguishes between:

- simple, pneumatically-controlled venturi pumps, which are miniaturized for installation on suction cups.
- complete, electrically-controlled venturi pumps, for installation as near as possible to the suction cups.





# Vacuum Handling Guide

## The Process of Defining an Installation

All vacuum handling systems require a three-stage approach:

1. Defining the appropriate suction cups and attachments for the object to be gripped, the movements required, the type of object (airtight or porous), the holding force required, the cycle rate, the environment, etc.
2. Selecting the appropriate vacuum generator for the suction cups, the type of object (airtight or porous), the required response times, etc.
3. Identifying the additional components required to connect, supply and control the installation.

The 3 steps to follow:

### STEP 1: SUCTION CUPS AND THEIR ATTACHMENTS

COVAL offers a wide range of suction cups, in two main groups: standard and special purpose. Tailored solutions can also be developed according to a set of custom requirements.

Chapter 1 provides a detailed guide on how to choose a suction cup for a given application, among the wide range presented in chapters 2 and 4.



### STEP 2: VACUUM GENERATORS AND THEIR MEANS OF CONTROL

Selecting the perfect vacuum source for the suction cups used guarantees optimal productivity.

COVAL has developed a full range of venturi vacuum pumps using the most advanced technologies: optimized flow rates, low energy consumption, reduced weight and bulk, and silent operation. Numerous integrated functions mean they are easier and more economic to install and use.

Chapter 5 provides a guide starts with a guide to choose and configure a venturi among the many possibilities presented in the catalogue, from vacuum pump chapter 6 to 9.



### STEP 3: AUXILIARY COMPONENTS

Peripheral components are an essential addition to the vacuum network and guarantee reliable installation. The risks related to improper use are increased energy consumption and noise and decreased overall efficiency.

Chapters 4 and 14 present a wide variety of auxiliary components





# Suction Cups

## Chapter 1

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# Suction Cups

## Selection Guide

1

A suction cup is a gripper which can be used to handle all sorts of objects of different weights, surfaces, shapes and sizes. For this reason we feel it would be helpful to explain all the parameters to be taken into consideration, in order to choose the right suction cup.



### PARAMETERS TO BE TAKEN INTO CONSIDERATION WHEN CHOOSING A SUCTION CUP

Shape of the load	Flat • Rounded • Cylindrical • Egg-shaped • Spherical, etc.
Type of material of the load	Porous • Porous • Deformable • Rigid • Fragile, etc.
Condition of the surface of the load	Smooth • Granular • Ridged • Abrasive, etc
Appearance of the load	Damp • Oily • Dusty • Viscous • Dry, etc
Weight of the load	Heavy • Light, etc.
Temperature of the load	From -40 to 250°C / -40 to 482°F depending on the materials chosen.
Direction of gripping	Horizontal • Vertical • Over corners • Height differences, etc.
Type of grip	Handling • Lifting • Holding • Unfolding ... objects.
Available surface	Depending on the load
Cycle time	Accelerations

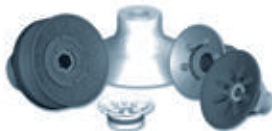
### THE SHAPES

#### Flat Suction Cups

■ Flat suction cups without cleats  
Used for handling flat or slightly rounded, rigid, smooth objects. They withstand lateral forces and can be used for vertical handling.



■ Flat suction cups with cleats  
Used for handling thin, flexible, deformable objects. They increase resistance to lateral forces and horizontal handling.



#### Suction Cups with Bellows

Used to handle spherical, cylindrical or egg-shaped objects. The effect of the technical characteristics increases with the number of bellows.

They can be used for gripping objects with height differences, for a ball-joint effect, to lift and to grip corners or edges.



### SUCTION CUP FORCE CALCULATION

The force of a suction cup is proportional to its surface under vacuum and also depends on its shape, flexibility, material and especially on the level of vacuum attained inside the suction cup.

#### Theoretical force

$$F(\text{DaN}) = S (\text{cm}^2) \times V (\%) \times 0,01013$$

S = Surface of the suction cup (cm<sup>2</sup>)

V = Vacuum level (%)

#### Actual force

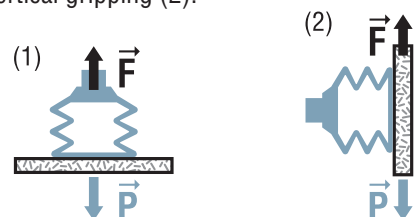
As its name implies, this force represents the actual force of the suction cup when in use. In general this is 50% less than the calculated theoretical force.

This difference is explained by the distortion of the suction cup during handling (which reduces the gripping surface), and by the condition of the surface of the object being handled.

#### The safety factor

All holding forces are listed in the data tables for each range of suction cup. These are **actual values at 65% vacuum**, calculated with a safety factor of:

- 2 for horizontal gripping (1),
- 4 for vertical gripping (2).



For applications involving high acceleration, the safety factor will be calculated accordingly.



# Suction Cups

## Selection Guide

### SUCTION CUP TECHNICAL DATA

#### Diameters

The force of the suction cup and the product's available gripping surface depend on this parameter. COVAL offers standard suction cups of 1 to 600mm in diameter across the product ranges.



#### Minimum bend radius

This indicates the minimum radius of a product to be reliably gripped by the suction cup.



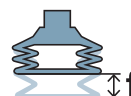
#### Internal volume

This corresponds to the volume which must be evacuated during a vacuum cycle. It must be accounted for in the total volume of the gripping system and thus in the suction time calculation.



#### Stroke

This corresponds to the compression of the suction cup during the vacuum cycle.



### COVAL MATERIALS

To meet the constraints of industrial applications, COVAL has a wide range of both standard and specific materials. COVAL can also study new materials based on specific requirements of your applications.



### Properties of the materials

Materials	Abbreviation	Shore Hardness A (+/- 5 Shore A)	Color	Flexibility	Abrasion resistance	UV & weather resistance	Mineral oil resistance	Continuous temperature resistance		Food compatibility	
								in °C	in °F	FDA CFR 21 177.2600	CE 1935/2004
Nitrile	NBR	60	Black	+	++	+	++	0 to 90	32 to 194		
Silicone	SI	35	Translucent	++++	-	+++	-	-40 to 220	-40 to 428	■	■
	SI3	35	Red	++++	-	+++	-	-40 to 220	-40 to 428	■	■
	SI5	50	Translucent	+++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIB	35	White	++++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIBL3	35	Light blue	++++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIBL5	50	Dark blue	+++	-	+++	-	-40 to 220	-40 to 428	■	■
	SI5BD (detectable)	50	Dark blue	+++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIT3	35	Translucent	++++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIT5	50	Translucent	+++	-	+++	-	-40 to 220	-40 to 428	■	■
	SIT6	60	Translucent	++	-	+++	-	-40 to 220	-40 to 428	■	■
Natural Rubber	NR	50	Grey - Brown	+++	++	-	-	-20 to 70	-4 to 158		
SITON®	STN	60	Blue	+	+++	++	++	-20 to 130 <sup>(*)</sup>	-4 to 266 <sup>(*)</sup>		
	STN5	50	Blue	++	+++	++	++	-20 to 130 <sup>(*)</sup>	-4 to 266 <sup>(*)</sup>		
	STNV6	60	Green	+	+++	++	++	-20 to 130 <sup>(*)</sup>	-4 to 266 <sup>(*)</sup>		
Polyurethane	PU	60	Blue	+	+++	+	+++	-20 to 90	-4 to 194		
	TPU	85	Blue grey	-	+++	+	+++	-20 to 100	-4 to 212		

(\*) Resistance to temperature on a single contact point (< 5 s): 160 °C / 320 °F

- ++++ Excellent
- +++ Very good
- ++ Good
- + Weak
- Not applicable
- Compatible



# Suction Cups

## Selection Guide

1

### ► SITON® MATERIAL SUCTION CUPS

SITON®, developed and manufactured exclusively by COVAL, is a non-marking silicone-free material specially designed for handling hot plastic parts from injection molds.

#### Advantages of SITON® material

- Non-marking: clear, silicone-free compound.
- Withstands continuous temperatures of 130°C (266°F) up to 160°C (320°F) at peak.
- Excellent abrasion resistance.

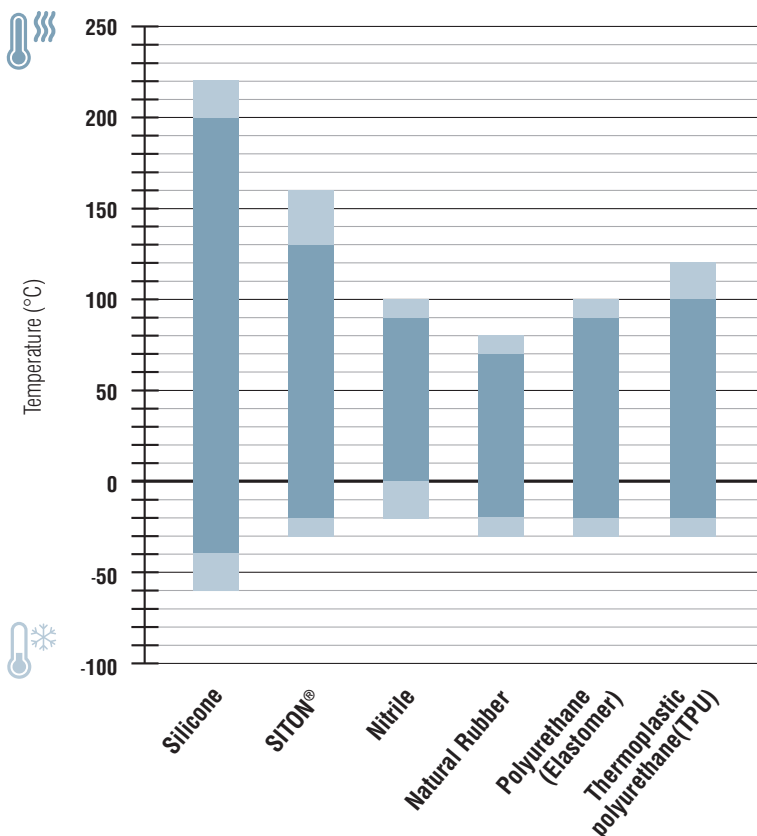
Many suction cup models are available in SITON® 60 Shore A (STN) in this catalog. For greater flexibility, models in SITON® 50 Shore A (STN5) are available upon request.



### Temperature range for COVAL materials

Each material has a specific temperature range of use:

- range for extended use.
- range for occasional use (contact time < 5s).



Use of suction cups outside their temperature range of use, wear, damage (cracking) or permanent change of shape (high temperatures) can appear.



Chemicals may be incompatible with the suction cup material and cause swelling or damage.



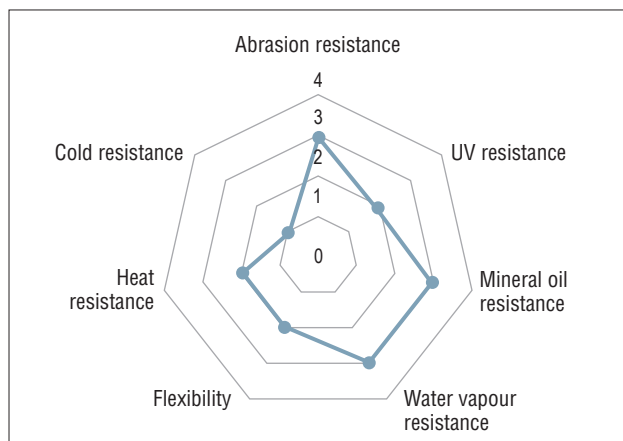
# Suction Cups

## Selection Guide

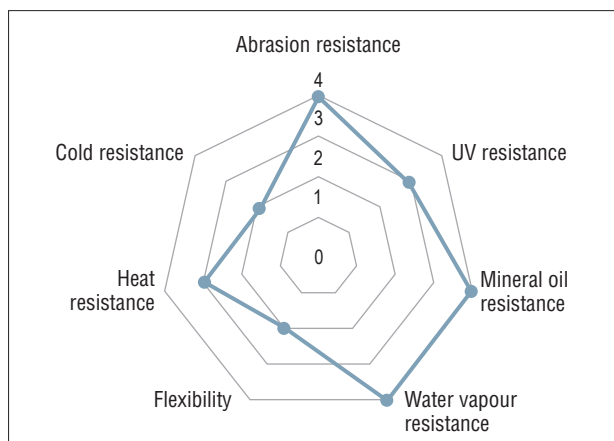
### Characteristics of COVAL materials

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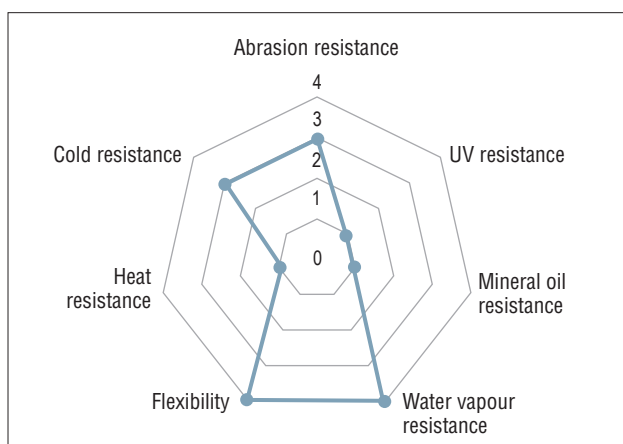
#### NITRILE (NBR)



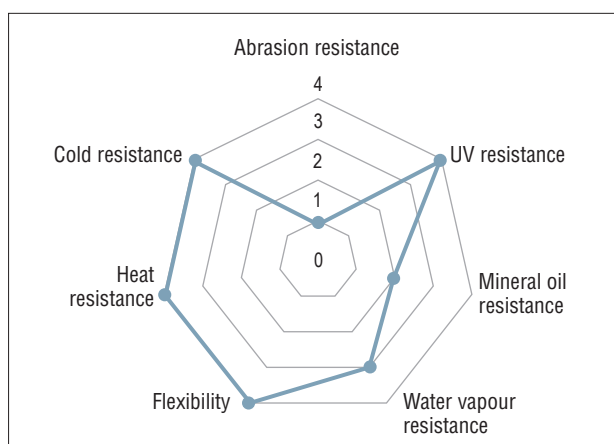
#### SITON® (STN)



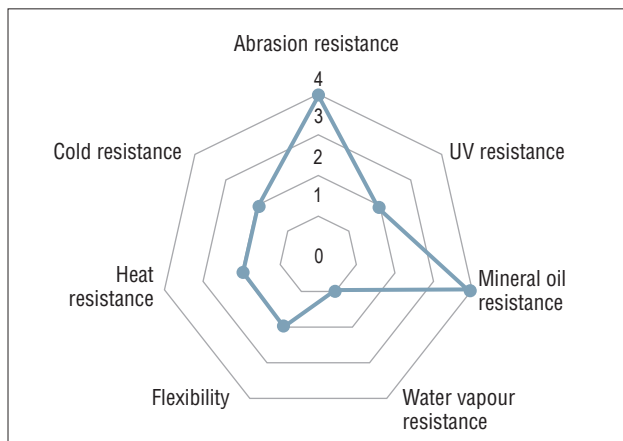
#### NATURAL RUBBER (NR)



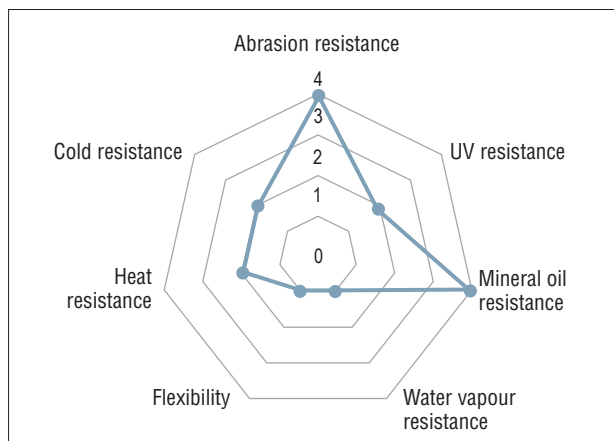
#### SILICONE (SI\_SIT\_SIB\_SIBL)



#### POLYURETHANE (PU)



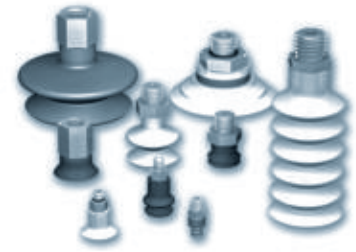
#### THERMOPLASTIC POLYURETHANE (TPU)





# Suction Cups

## Suction Cup Fitting Options

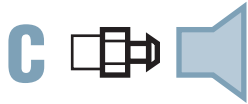


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### Standard Configuration Options

COVAL suction cups offer versatile mounting and fitting options:

**Version C:**  
Barbed fittings.



The suction cup is easily pressed onto the fitting.  
The suction cups and their fittings are delivered unassembled.

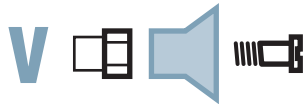
**Types of use:**

- Lightweight products.
- Horizontal handling.
- For suction cups belonging to groups 1 and 2.

**Advantages :**

- Quickest changeout of suction cups without the need for tools, improving efficiency.
- Fitting can be reused, thus reducing replacement costs.

**Version V :**  
2-piece removable fittings  
(hollow screws and adapter)



The V mounting utilizes a hollow screw passing through the suction cup and connecting to an adaptor on the opposite side, fixing the suction cup in place.  
The suction cups and their fittings are delivered unassembled.

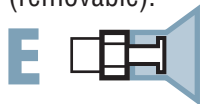
**Types of use :**

- Heavy and lightweight products.
- Horizontal, vertical and rotational handling.
- For suction cups belonging to groups 2 and 3.

**Advantages :**

- Excellent mechanical grip of the suction cup.
- Excellent vacuum sealing of the assembly.
- Fitting can be reused, thus reducing replacement costs.

**Version E :**  
Pressed fitting  
(removable).



The fitting is factory pressed onto the suction cup.

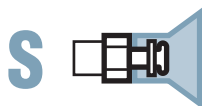
**Types of use :**

- Lightweight and heavy products.
- Horizontal, vertical and rotational handling.
- Recommended for handling of porous products.
- For suction cups belonging to group 2.

**Advantages :**

- Excellent mechanical grip of the suction cup.
- Excellent vacuum sealing of the assembly.
- Greater potential vacuum flow rate when handling porous products.

**Version S :**  
Factory-crimped fitting



The fitting is factory-crimped onto the suction cup, ensuring a one-piece assembly.

**Types of use :**

- Heavy and lightweight products.
- Horizontal handling, vertical and rotational.
- Recommended for handling of porous products (when greater flow is required).
- For suction cups belonging to group 3.

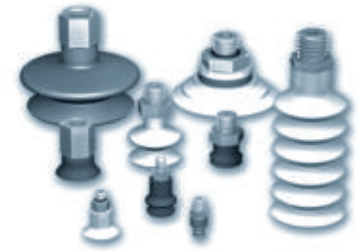
**Advantages :**

- Excellent mechanical grip of the suction cup.
- Excellent vacuum sealing of the assembly.
- Greater potential vacuum flow rate when handling porous products.



# Suction Cups

## Configuration Reference "Suction Cup + Fitting"



1

### Referencing

To simplify selection of fittings for standard suction cups, a male or female fitting option can be found in the example table, "**Choice of fittings**".

To demonstrate assembly options, reference the example below, **Standard configurations** (suction cup + fitting) which indicates full part numbers as well as **non-standard configurations**.

Ex :

### Choice of Fittings

⌀ (mm)	Group	M3-M	M5-M	M6-M	M8-M	M10-M	G1/8"-F	G1/8"-M	10/32-M	G1/4"-F	G1/4"-M	G3/8"-M	G1/2"-M
5	1	■	-	-	-	-	-	-	-	-	-	-	-
11...25	1	-	■	■	-	-	■	■	□	-	-	-	-
26...63	2	-	□	□	□	□	■	■	-	■	■	-	-
78	3	-	-	-	-	□	-	■	-	■	■	□	□



■ Standard configurations (suction cup + fitting)

□ Non-standard mounting configurations

Fitting: M = male F = female

**Standard configurations** (suction cup + fitting) now have a single part number, simplifying your stock management and order fulfillment.

Ex:

Group 3		V 			S 	
⌀ 78 mm	THREAD	G1/8"-M	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F
	VSA78NBR	VSA78NBRIM18V	VSA78NBRIM14V	VSA78NBRIF14V	VSA78NBRIM14	VSA78NBRIF14
	VSA78NR	VSA78NRIM18V	VSA78NRIM14V	VSA78NRIF14V	VSA78NRIM14	VSA78NRIF14
	VSA78SIT5	VSA78SIT5IM18V	VSA78SIT5IM14V	VSA78SIT5IF14V	VSA78SIT5IM14	VSA78SIT5IF14
	VSA78STN	VSA78STNIM18V	VSA78STNIM14V	VSA78STNIF14V	VSA78STNIM14	VSA78STNIF14

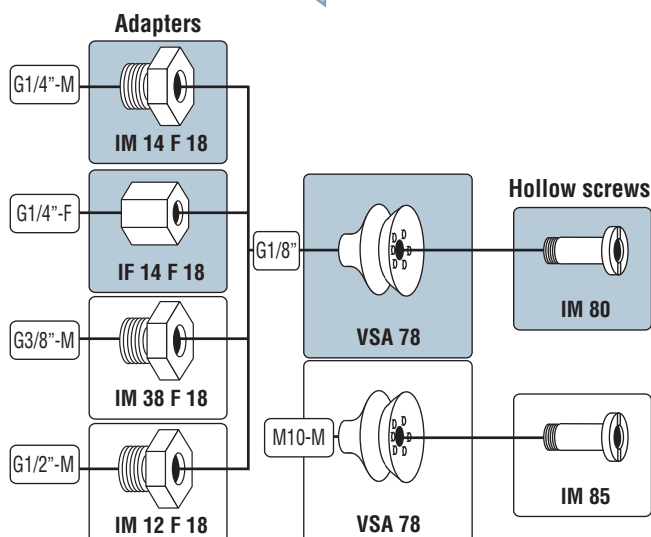
### Note :

For standard configurations (suction cup + fittings), the C and V versions are delivered unassembled.

**Additional mounting configurations** are available. You can find all options on pages "assembly diagrams"

Ex:

Removable fittings V 



■ Standard configurations (suction cup + fitting).

□ Non-standard configurations must be ordered in separate part numbers.



# Suction Cups

## The COVAL Range


















See chapter 2

1

### Standard Suction Cups

Standard suction cups are suitable for all types of applications in various sectors like packaging, plastics, agri-food, sheet-metal working, etc.

These suction cups satisfy very diverse specifications thanks to a wide range of shapes, diameters and materials. COVAL offers a full range of fittings adapted to suction cups and compatible with all types of applications.

Flat Suction Cups		
<b>VP</b>		<ul style="list-style-type: none"> <li>■ Ø 8 to 75 mm</li> <li>■ 4 standard materials</li> <li>■ High tensile force and precise gripping and releasing</li> <li>■ High resistance to lateral forces allowing vertical handling</li> </ul>
<b>VPG</b>		<ul style="list-style-type: none"> <li>■ Extra-flat suction cups</li> <li>■ Ø 2 to 200 mm</li> <li>■ 3 standard materials</li> <li>■ Highly precise gripping and releasing of the load</li> <li>■ High throughput rates</li> </ul>
<b>VPU</b>		<ul style="list-style-type: none"> <li>■ Ø 6 to 50 mm</li> <li>■ 3 standard materials</li> <li>■ Suitable for gripping rigid and flat products</li> </ul>
<b>VPF</b>		<ul style="list-style-type: none"> <li>■ Flat suction cups with cleats</li> <li>■ Ø 15 to 50 mm</li> <li>■ 3 standard materials</li> <li>■ Suitable for gripping rigid and flat products</li> <li>■ Cleats prevent the deformation of the product and provide excellent non-slip properties</li> </ul>
<b>VPO</b>		<ul style="list-style-type: none"> <li>■ Flat oblong suction cups</li> <li>■ From 2x4 mm to 30x90 mm</li> <li>■ 3 standard materials</li> <li>■ Used for handling elongated products such as pens, tubes, bottles, bulbs and flat or cylindrical objects etc.</li> </ul>
Suction Cups with 1.5 Bellows		
<b>VSA</b>		<ul style="list-style-type: none"> <li>■ Ø 5 to 78 mm</li> <li>■ 5 standard materials</li> <li>■ Combines the advantages of flat suction cups with added angle, flexibility and precision</li> <li>■ Used for gripping slightly concave or convex parts</li> </ul>
<b>VSAB</b>		<ul style="list-style-type: none"> <li>■ Ø 5 to 50 mm</li> <li>■ 3 standard materials</li> <li>■ Used for gripping slightly concave or convex parts</li> <li>■ Suitable for gripping products of various heights</li> </ul>
<b>VSAG</b>		<ul style="list-style-type: none"> <li>■ Ø 10 to 150 mm</li> <li>■ 3 standard materials</li> <li>■ Recommended for gripping sensitive products due to the cushioning effect of the bellows</li> <li>■ Used for gripping slightly concave or convex parts</li> </ul>
<b>VSAJ</b>		<ul style="list-style-type: none"> <li>■ Ø 15 to 30 mm</li> <li>■ 2 standard materials</li> <li>■ Used for gripping slightly concave or convex parts</li> <li>■ Suitable for gripping products of various heights</li> </ul>
Suction Cups with 2.5 Bellows		
<b>VS</b>		<ul style="list-style-type: none"> <li>■ Ø 5 to 88 mm</li> <li>■ 4 standard materials</li> <li>■ Recommended for gripping products on different planes (wide deflection) or cylindrical objects gripped at an angle (ball-joint effect).</li> </ul>
<b>VSG</b>		<ul style="list-style-type: none"> <li>■ Ø 5 and 7mm</li> <li>■ 3 standard materials</li> <li>■ Suitable for gripping small products, concave or convex</li> <li>■ Ideal for handling sensitive products</li> </ul>
Long Stroke Suction Cups		
<b>VSD</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 4.5 and 5.5 bellows</li> <li>■ 2 standard materials</li> <li>■ Strongly recommended for handling spherical or cylindrical products requiring a large height adjustment.</li> </ul>
High-performance Suction Cups		
<b>C</b>		<ul style="list-style-type: none"> <li>■ Full range of shapes (flat, bellows, oblongs)</li> <li>■ Ø 35 to 125mm and 25x65mm to 70x140mm</li> <li>■ Integrated fittings</li> <li>■ Structure and internal cleats</li> <li>■ Textured suction cups for gripping thin sheets</li> <li>■ Non-slip cleats ensure optimum positioning of oily sheet metal</li> <li>■ Extreme resistance to slipping,</li> <li>■ Porous integrated fittings</li> <li>■ Ideal for automated applications</li> </ul>
<b>CTC</b>		<ul style="list-style-type: none"> <li>■ High-Performance Bell-type Suction Cups in Thermoplastic Polyurethane (TPU)</li> <li>■ 4 models (Ø40 à 100 mm)</li> <li>■ Integrated fittings</li> <li>■ Structure and internal cleats</li> <li>■ Excellent adaptation to convex surfaces and angular shapes.</li> <li>■ High deflection compared to standard flat suction cups due to the bell shape.</li> <li>■ Anti-slip cleats ensure precise positioning of oily sheets.</li> <li>■ Ideal for automated applications</li> </ul>
Suction Cups with Foam Rings		
<b>VSA-VS BM VSA-VS BM-SIF VSBM</b>		<ul style="list-style-type: none"> <li>■ Foam rings</li> <li>■ Can be adapted to standard suction cups</li> <li>■ 2 standard materials</li> <li>■ Bonded under a suction cup to allow products with an irregular or even-ridged surface to be gripped</li> <li>■ Sawn wood, sheet metal, flat surfaces with bumps or hollows (all types of granular surface)</li> </ul>



# Suction Cups

## The COVAL Range













See chapter 3

1

### Special Purpose Suction Cups

Thanks to a technological mastery and collaboration with its customers in different branches, COVAL supplies solutions for vacuum handling via a wide range of special purpose suction cups.

E.g. handling eggs, flexible bags, raw composite, bottles, paper, cakes, etc.

FlowPack Suction Cups		
<b>FPC FPCX</b>		<ul style="list-style-type: none"> <li>■ Flexible suction cups</li> <li>■ 5 models</li> <li>■ Food-safe materials</li> <li>■ Silicone: FDA and CE standard</li> </ul>
		<ul style="list-style-type: none"> <li>■ Range specially designed for gripping flexible packaging</li> <li>■ Thin and wavy lips mold perfectly to any shape of packaging</li> <li>■ Gripping ability allows for high production rates</li> </ul>
Soft Suction Cups for High Speed Applications		
<b>MVS</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 1.5 and 2.5 bellows</li> <li>■ 9 models</li> <li>■ Silicone: FDA and CE standard</li> </ul>
		<ul style="list-style-type: none"> <li>■ Used to grip delicate objects. Very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.).</li> <li>■ High throughput rate</li> <li>■ Used to grip of flexible products</li> </ul>
Suction Cups with 4.5 Bellows		
<b>MVP</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 4.5 bellows</li> <li>■ 4 diameters available: 20 to 50 mm</li> <li>■ Materials: nitrile and silicone (FDA and CE standards)</li> </ul>
		<ul style="list-style-type: none"> <li>■ The handling of raw food or flexible packaging</li> <li>■ Thin and flexible shaped lip for a perfect handling at high production rates</li> <li>■ The 4.5 bellows give a swivelling effect</li> </ul>
Suction Cups for Cheese		
<b>VSAF</b>		<ul style="list-style-type: none"> <li>■ Suction cup with 1.5 bellows</li> <li>■ Ø 50 mm</li> <li>■ Silicone: FDA and CE standard</li> </ul>
		<ul style="list-style-type: none"> <li>■ Suction cup specially designed for gripping fragile foods such as soft cheese</li> <li>■ Accessory: Stainless steel grill prevents deformation of the food</li> </ul>
<b>VSAOF</b>		<ul style="list-style-type: none"> <li>■ Oval suction cup with 1.5 bellows</li> <li>■ Dim. 65x150 mm</li> <li>■ Silicone: FDA and CE standard</li> </ul>
		<ul style="list-style-type: none"> <li>■ Suction cup specially designed for gripping fragile foods such as soft cheese</li> <li>■ Accessory: Stainless steel grill prevents deformation of the food</li> </ul>
Suction Cups for Bakery Applications		
<b>VSD VSE VSP</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 2.5 to 5.5 bellows</li> <li>■ 11 models</li> <li>■ Silicone: FDA and CE standard</li> </ul>
		<ul style="list-style-type: none"> <li>■ Range specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.)</li> <li>■ Specific shapes and shore A hardness depending on the applications</li> <li>■ Resistance to temperature: - 40 °C to + 220 °C</li> </ul>
Suction Cups for Egg-handling		
<b>VSO</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 2.5 and 3.5 bellows</li> <li>■ 3 models</li> <li>■ Silicone: FDA and CE standard 1935/2004</li> </ul>
		<ul style="list-style-type: none"> <li>■ Range specially designed to meet constraints involved when handling eggs</li> <li>■ Very flexible lip</li> <li>■ Different shapes of suction cup</li> </ul>
Suction Cups for Bottle Handling		
<b>VSBO VSBO+ VSBO LM/BM</b>		<ul style="list-style-type: none"> <li>■ Suction cups with 4.5 bellows</li> <li>■ 8 models</li> <li>■ High tensile force</li> <li>■ Highly flexible and long stroke</li> </ul>
		<ul style="list-style-type: none"> <li>■ Used to grip 750 ml bottles, Magnums bottles and special bottles with textured surfaces</li> <li>■ Bottles gripped from the side, vertical and horizontal handling</li> <li>■ Suction cup with stainless steel reinforcement in the bellows</li> <li>■ Available with integrated sensing valve</li> </ul>
<b>VBO</b>		<ul style="list-style-type: none"> <li>■ Suction cup system comprised of a 62mm cup with 2.5 bellows and a silicone gripping disc (COVAL-Flex).</li> </ul>
		<ul style="list-style-type: none"> <li>■ The VBO suction cup system is designed for gripping bottles by the punt on disgorging stations</li> <li>■ Excellent sealing when gripping different types of bottles</li> </ul>
<b>VPBO</b>		<ul style="list-style-type: none"> <li>■ Coupler Plates for gripping bottles by the punt</li> <li>■ 3 diameters: Ø65, 75 and 95 mm</li> <li>■ Natural rubber</li> </ul>
		<ul style="list-style-type: none"> <li>■ The VPBO Coupler Plates are designed for gripping bottles by the punt on disgorging stations (1/2 bottles, 75cl bottles and Magnum)</li> </ul>





# Suction Cups

## The COVAL Range








### Special Purpose Suction Cups


See chapter 3

1


#### Suction Cups for Paper Applications

<b>VPA</b>		<ul style="list-style-type: none"> <li>■ Flat suction cups</li> <li>■ 9 models</li> <li>■ Very flexible lip</li> <li>■ Natural rubber and silicone (FDA and CE standard)</li> </ul>	<ul style="list-style-type: none"> <li>■ Range of suction cups with very flexible lip used to handle very flexible materials</li> <li>■ Very resistant to abrasion (for paper, cardboard)</li> <li>■ Very flexible gripping lip which molds to the shape of the object to be handled</li> </ul>
<b>VPAL</b>		<ul style="list-style-type: none"> <li>■ Extra-flat shape suction cups</li> <li>■ 3 models</li> <li>■ Material: silicone (food compatibility)</li> </ul>	<ul style="list-style-type: none"> <li>■ The VPAL suction cups are especially adapted for gripping and handling IML labels or flexible materials</li> <li>■ Great lip flexibility</li> </ul>
<b>VSAPL</b>		<ul style="list-style-type: none"> <li>■ Suction cup with 1.5 bellows</li> <li>■ Ø 11 mm</li> <li>■ Silicone: FDA and CE standard</li> </ul>	<ul style="list-style-type: none"> <li>■ The VSAPL suction cup is especially adapted for gripping and handling IML labels or flexible materials</li> <li>■ Great lip flexibility</li> </ul>
<b>VPR</b>		<ul style="list-style-type: none"> <li>■ Flat suction cups</li> <li>■ 4 models</li> <li>■ Natural rubber</li> </ul>	<ul style="list-style-type: none"> <li>■ Range of suction cups designed to meet the requirements of mailing applications.</li> <li>■ Envelope stuffing, film-wrapping, mailing (picking)</li> <li>■ Very resistant to abrasion</li> </ul>
<b>VPAG</b>		<ul style="list-style-type: none"> <li>■ Curved suction cups</li> <li>■ 2 models</li> <li>■ Natural rubber</li> </ul>	<ul style="list-style-type: none"> <li>■ Thanks to very flexible lips and a curved shape, the VPAG range is adapted to gripping flexible materials such as labels or sheets of paper - or textured objects</li> <li>■ Very resistant to abrasion</li> </ul>



#### Ultra-flat, Non-Marking Suction Cups

<b>VPSC</b>		<ul style="list-style-type: none"> <li>■ Ultra-flat suction cups</li> <li>■ Ø 40 and 80 mm</li> <li>■ Materials : Polyurethane and silicone (FDA and CE standards)</li> </ul>	<ul style="list-style-type: none"> <li>■ Suction cups specially designed not to deform the product being handled.</li> <li>■ Vacuum distributed across the entire surface of the suction cup for an optimal gripping force.</li> <li>■ Extra-thin sealing lip designed to contour to the shape of the product being handled</li> </ul>
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#### Radial Ball-joint Suction Cups

<b>VPYR</b>		<ul style="list-style-type: none"> <li>■ Flat suction cups with ball-joint system</li> <li>■ 4 models (Ø 50 to 100mm)</li> <li>■ Materials: nitrile and silicone</li> </ul>	<ul style="list-style-type: none"> <li>■ The range of ball-joint suction cups is recommended for gripping curved or rotating products which requires a lot of force and mechanical resistance</li> </ul>
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#### "Heavy-load" Suction Cups

<b>SPL</b>		<ul style="list-style-type: none"> <li>■ "Heavy load" flat suction cups</li> <li>■ 5 models (Ø 240 to 600mm)</li> <li>■ Materials: nitrile and silicone</li> </ul>	<ul style="list-style-type: none"> <li>■ SPL suction cups are used to handle heavy loads such as sheet metal or glass panels. They have internal cleats allowing them to handle thin metal sheets without distorting them and for vertical handling (non-slip)</li> </ul>
<b>STEEL</b>		<ul style="list-style-type: none"> <li>■ Flat suction cups with a bonded foam seal</li> <li>■ 9 round models (Ø 150 to 580 mm)</li> <li>■ 9 rectangular models (175x115 to 705x385mm)</li> </ul>	<ul style="list-style-type: none"> <li>■ For horizontal handling of heavy loads (thick sheet metal) or objects with an uneven surface such as concrete slabs, wood, etc.</li> <li>■ Wide choice of dimensions</li> </ul>



# Suction Cups

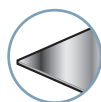
## Index of Symbols and Pictograms



1

You will find the symbols and pictograms described below in the "Suction cups" chapters to help you select the range of suction cups best suited to your application.

### Industry-specific Applications



#### Metal

For handling rigid, smooth, flat objects (e.g. Sheet metal, glass or plastic panels).

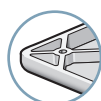
- Heavy loads
- Oily objects
- High throughput
- High acceleration



#### Food-processing

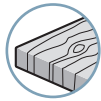
Handling that requires materials which are compatible with food standards, highly flexible lips and suction cup shapes that do not damage fragile products.

- Handling of raw products such as cheese, meat, fish or packaged products.



#### Plastic

For handling plastic objects and requiring resistance to high temperatures, mark-free (e.g. COVAL-developed material, SITON®).



#### Wood

For handling materials with a slightly deformed, rough gripping surface requiring a foam seal to compensate for the unevenness and ensure porosity.



#### Eggs

For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- Gripping eggs



#### Cakes

For handling requiring food compatibility, a very flexible lip and a specific shape of suction cup.

- Gripping buns, biscuits, etc.



#### Bottles

Gripping concave shapes and requiring strong vertical lifting force.

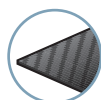
- For handling 750 ml bottles or Magnums



#### Paper/picking

For handling paper, and labels and requiring high resistance to abrasion and a very flexible lip to grip flexible materials.

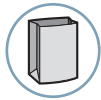
- Envelope filling, film-wrapping



#### Composite materials

Gripping of raw composite materials.

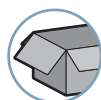
- No material migration
- No marking of the composite product



#### Bags

Gripping very flexible, deformable materials (plastic or paper).

- e.g. blister pack, bagging, etc.



#### Packaging

For handling wrapped products for packaging, cardboard products. Cardboard shaping, palletization, transfer, Pick & Place.

- Precision
- Abrasion

### Types of Use



Flat surfaces,  
all thicknesses



Flat surfaces,  
thin layers



Rounded  
surfaces



Sheet metal  
(unstacking)



Flexible  
materials



Vertical  
handling



Granular  
surfaces

### Tables

Model or reference	Internal volume	Tensile force	Slipping force	Minimum convex curve radius	Minimum concave curve radius	Weight	See page



# Standard Suction Cups

## Chapter 2

2

### COVAL QUALITY

Standard suction cups are suitable for all types of applications in areas of activity such as packaging, plastics, agri-food, sheet-metal working, etc.

These suction cups satisfy very diverse specifications thanks to a wide range of shapes, diameters and materials.

COVAL offers a full range of fittings adapted to suction cups and compatible with all types of applications.

#### VP



#### Flat Suction Cups Ø 8 to 75 mm

4 standard materials

- Nitrile
- Silicone
- Natural rubber
- SITON®

- High tensile force and precise gripping and releasing
- High resistance to lateral forces enabling vertical handling
- A full range of fittings and shut-off valves

P<sub>2/3</sub>

#### VPG



#### Extra-flat Suction Cups Ø 1 to 200 mm

3 standard materials

- Nitrile
- Silicone
- SITON®

- Highly precise gripping and releasing of the load
- High throughput rates

P<sub>2/9</sub>

#### VPU



#### Flat Suction Cups Ø 6 to 50 mm

3 standard materials

- Nitrile
- Silicone
- SITON®

- Suitable for gripping smooth, rigid and flat products

P<sub>2/17</sub>

#### VPF



#### Flat Suction Cups with Cleats Ø 15 to 50 mm

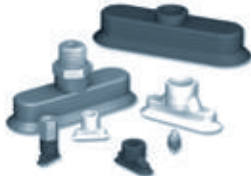
3 standard materials

- Nitrile
- Silicone
- SITON®

- Suitable for gripping smooth, rigid and flat products
- Cleats prevent the deformation of the product

P<sub>2/20</sub>

#### VPO



#### Oblong Flat Suction Cups

3 standard materials

- Nitrile
- Silicone
- SITON®

- Used for handling elongated products such as pens, tubes, bottles, bulbs and flat or cylindrical objects etc.

P<sub>2/23</sub>

#### VSA



#### Suction Cups with 1.5 Bellows Ø 5 to 78 mm

5 standard materials

- Nitrile
- Translucent silicone
- 35 shore A white silicone
- Natural rubber
- SITON®

- VSA series suction cups with bellows combine the advantages of flat suction cups with more deflection, flexibility and precision
- Used for gripping slightly concave or convex parts
- Full range of fittings

P<sub>2/27</sub>

#### VSAB



#### Suction Cups with 1.5 Bellows Ø 5 to 50 mm

3 standard materials

- Nitrile
- Silicone
- SITON®

- Used for gripping slightly concave or convex parts
- Suitable for gripping products of various heights

P<sub>2/33</sub>

#### VSAG



#### Suction Cups with 1.5 Bellows Ø 10 to 150 mm

3 standard materials

- Nitrile
- Silicone
- SITON®

- Recommended for gripping products sensitive to the cushioning effect of the bellows
- Used for gripping slightly concave or convex parts

P<sub>2/37</sub>



# Standard Suction Cups

## Chapter 2

2

### VSAJ



#### Suction Cups with 1.5 Bellows Ø 15 to 30 mm

- 2 standard materials
  - Nitrile
  - Silicone

- Used for gripping slightly concave or convex parts
- Suitable for gripping products of various heights

P 2/43

### VS



#### Suction Cups with 2.5 Bellows Ø 5 to 88 mm

- 4 standard materials
  - Nitrile
  - Natural rubber
  - Translucent silicone
  - SITON®

- VS series suction cups with bellows are recommended for gripping products on different planes (wide deflection) or cylindrical objects gripped at an angle (ball-joint effect).
- Full range of fittings

P 2/47

### VSG



#### Suction Cups with 2.5 Bellows Ø 5 and 7 mm

- 3 standard materials
  - Nitrile
  - Silicone
  - SITON®

- Suitable for gripping small products, concave or convex
- Ideal for handling sensitive products

P 2/53

### VSD



#### Long Stroke Suction Cups

- 2 standard materials
  - Nitrile
  - Silicone

- Strongly recommended for handling spherical or cylindrical products requiring a large height adjustment.

P 2/55

### C



#### High-performance Suction Cups

- Full range of shapes (flat, bellows, oblongs)
- Ø 35 to 125mm and 25x65mm to 70x140mm
- 2 standard materials
  - Nitrile
  - SITON®
- Integrated fittings

- Textured suction cups for gripping thin sheet metal
- Non-slip cleats ensure optimum positioning of oily sheet metal
- Extreme resistance to slipping
- Air-tight integrated fittings
- Ideal for automated applications

P 2/59

### CTC



#### High-performance Suction Cups

- High-Performance Bell-type Suction Cups in Thermoplastic Polyurethane (TPU)
- 4 models (Ø40 à 100 mm)
- Integrated fittings
- Structure and internal cleats

- Excellent adaptation to convex surfaces and angular shapes.
- High deflection compared to standard flat suction cups due to the bell shape.
- Anti-slip cleats ensure precise positioning of oily sheets.
- Ideal for automated applications

P 2/63

### VSA-VS BM

### VSA-VS BM-SIF

### VSBM



#### Suction Cups with Foam Ring Seals

- 2 standard materials
  - Nitrile
  - Silicone

- The foam ring is designed for gripping products with an uneven or ridged surface, e.g.
- Sawn wood, sheet metal, flat surfaces with bumps or hollows.
- All granular surfaces to which suction cups cannot adhere correctly and therefore cannot be airtight.
- Foam rings can be adapted to VSA and VS series.

P 2/65

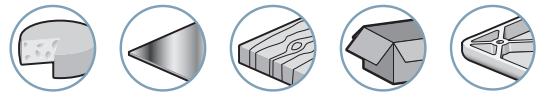




VP series flat suction cups are specially recommended for handling flat, rigid, smooth products.

- High tensile force
- High resistance to lateral forces enabling vertical handling.
- High degree of precision

Industry-specific applications



Types of use








### Materials

**NBR** Nitrile  
**NR** Natural rubber


**SIT5** Translucent silicone  
**STN** SITON®

### Suction Cup Properties

	Ø (mm)	 (cm³)	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	 <sub>min</sub> (mm)	NBR	SIT5	NR	STN
VP 8	7.5	0.04	1.1	0.5	10	VP8NBR	VP8SIT5	-	VP8STN
VP 10	10	0.05	1.6	0.8	13	VP10NBR	VP10SIT5	-	-
VP 15	15	0.18	3.7	1.8	13	VP15NBR	VP15SIT5	-	VP15STN
VP 20	20	0.44	6.1	3.0	20	VP20NBR	VP20SIT5	-	VP20STN
VP 25	25	0.7	9.4	4.7	25	VP25NBR	VP25SIT5	-	VP25STN
VP 26	26	1.5	11.2	5.6	35	VP26NBR	VP26SIT5	-	-
VP 30	30	2.9	15.9	7.9	40	VP30NBR	VP30SIT5	-	VP30STN
VP 35	35	2.7	23.1	11.6	50	VP35NBR	VP35SIT5	-	-
VP 40	40	4	26.7	13.4	50	VP40NBR	VP40SIT5	VP40NR	VP40STN
VP 50	52	7	38.3	19.1	75	VP50NBR	VP50SIT5	-	VP50STN
VP 60	60	7.3	57.8	28.9	100	VP60NBR	VP60SIT5	-	-
VP 75	75	16	101.1	50.6	130	VP75NBR	VP75SIT5	VP75NR	-

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### Choice of Fittings

 (Ø)	Group	M5-M	M6-M	M8-M	M10-M	G1/8"-F	G1/8"-M	10/32-M	G1/4"-F	G1/4"-M	G3/8"-M	G1/2"-M
8...25	1	■	■	-	-	■	■	□	-	-	-	-
26...60	2	□	□	□	□	■	■	-	■	■	-	-
75	3	-	-	-	□	-	■	-	■	■	■	□

■ Standard available configurations (suction cup + fitting)  
refer to page 2/4

□ Additional mounting configurations  
see page 2/7

Fitting: M = male

F = female

### Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations.



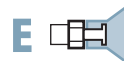
**Version C:** Barbed fitting



**Version S:** Factory-crimped fitting



**Version V:** Removable fitting:  
(adapter and hollow screw)



**Version E:** Pressed fitting



Please specify the part n°. e.g. VP40STNIM14C  
Refer to page 2/4

### Accessories


To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (feelers, nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.








## Flat Suction Cups Ø 8 to 75 mm

References "Suction Cup + Fitting"



Group 1		C 			
Ø 8 - 25 mm	THREAD	M5-M	M6-M	G1/8"-M	G1/8"-F
	VP8NBR	VP8NBRIMM5C	VP8NBRIMM6C	VP8NBRIM18C	VP8NBRIF18C
	VP8SIT5	VP8SIT5IMM5C	VP8SIT5IMM6C	VP8SIT5IM18C	VP8SIT5IF18C
	VP8STN	VP8STNIMM5C	VP8STNIMM6C	VP8STNIM18C	VP8STNIF18C
	VP10NBR	VP10NBRIMM5C	VP10NBRIMM6C	VP10NBRIM18C	VP10NBRIF18C
	VP10SIT5	VP10SIT5IMM5C	VP10SIT5IMM6C	VP10SIT5IM18C	VP10SIT5IF18C
	VP15NBR	VP15NBRIMM5C	VP15NBRIMM6C	VP15NBRIM18C	VP15NBRIF18C
	VP15SIT5	VP15SIT5IMM5C	VP15SIT5IMM6C	VP15SIT5IM18C	VP15SIT5IF18C
	VP15STN	VP15STNIMM5C	VP15STNIMM6C	VP15STNIM18C	VP15STNIF18C
	VP20NBR	VP20NBRIMM5C	VP20NBRIMM6C	VP20NBRIM18C	VP20NBRIF18C
	VP20SIT5	VP20SIT5IMM5C	VP20SIT5IMM6C	VP20SIT5IM18C	VP20SIT5IF18C
	VP20STN	VP20STNIMM5C	VP20STNIMM6C	VP20STNIM18C	VP20STNIF18C
	VP25NBR	VP25NBRIMM5C	VP25NBRIMM6C	VP25NBRIM18C	VP25NBRIF18C
	VP25SIT5	VP25SIT5IMM5C	VP25SIT5IMM6C	VP25SIT5IM18C	VP25SIT5IF18C
	VP25STN	VP25STNIMM5C	VP25STNIMM6C	VP25STNIM18C	VP25STNIF18C

Group 2		C 		E 		V 			
Ø 26 - 60 mm	THREAD	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
	VP26NBR	VP26NBRIM14C	VP26NBRIF14C	VP26NBRIM14	VP26NBRIF14	VP26NBRIM18V	VP26NBRIF18V	VP26NBRIM14V	VP26NBRIF14V
	VP26SIT5	VP26SIT5IM14C	VP26SIT5IF14C	VP26SIT5IM14	VP26SIT5IF14	VP26SIT5IM18V	VP26SIT5IF18V	VP26SIT5IM14V	VP26SIT5IF14V
	VP30NBR	VP30NBRIM14C	VP30NBRIF14C	VP30NBRIM14	VP30NBRIF14	VP30NBRIM18V	VP30NBRIF18V	VP30NBRIM14V	VP30NBRIF14V
	VP30SIT5	VP30SIT5IM14C	VP30SIT5IF14C	VP30SIT5IM14	VP30SIT5IF14	VP30SIT5IM18V	VP30SIT5IF18V	VP30SIT5IM14V	VP30SIT5IF14V
	VP30STN	VP30STNIM14C	VP30STNIF14C	VP30STNIM14	VP30STNIF14	VP30STNIM18V	VP30STNIF18V	VP30STNIM14V	VP30STNIF14V
	VP35NBR	VP35NBRIM14C	VP35NBRIF14C	VP35NBRIM14	VP35NBRIF14	VP35NBRIM18V	VP35NBRIF18V	VP35NBRIM14V	VP35NBRIF14V
	VP35SIT5	VP35SIT5IM14C	VP35SIT5IF14C	VP35SIT5IM14	VP35SIT5IF14	VP35SIT5IM18V	VP35SIT5IF18V	VP35SIT5IM14V	VP35SIT5IF14V
	VP40NBR	VP40NBRIM14C	VP40NBRIF14C	VP40NBRIM14	VP40NBRIF14	VP40NBRIM18V	VP40NBRIF18V	VP40NBRIM14V	VP40NBRIF14V
	VP40NR	VP40NRIM14C	VP40NRIF14C	VP40NRIM14	VP40NRIF14	VP40NRIM18V	VP40NRIF18V	VP40NRIM14V	VP40NRIF14V
	VP40SIT5	VP40SIT5IM14C	VP40SIT5IF14C	VP40SIT5IM14	VP40SIT5IF14	VP40SIT5IM18V	VP40SIT5IF18V	VP40SIT5IM14V	VP40SIT5IF14V
	VP40STN	VP40STNIM14C	VP40STNIF14C	VP40STNIM14	VP40STNIF14	VP40STNIM18V	VP40STNIF18V	VP40STNIM14V	VP40STNIF14V
	VP50NBR	VP50NBRIM14C	VP50NBRIF14C	VP50NBRIM14	VP50NBRIF14	VP50NBRIM18V	VP50NBRIF18V	VP50NBRIM14V	VP50NBRIF14V
	VP50SIT5	VP50SIT5IM14C	VP50SIT5IF14C	VP50SIT5IM14	VP50SIT5IF14	VP50SIT5IM18V	VP50SIT5IF18V	VP50SIT5IM14V	VP50SIT5IF14V
	VP50STN	VP50STNIM14C	VP50STNIF14C	VP50STNIM14	VP50STNIF14	VP50STNIM18V	VP50STNIF18V	VP50STNIM14V	VP50STNIF14V
	VP60NBR	VP60NBRIM14C	VP60NBRIF14C	VP60NBRIM14	VP60NBRIF14	VP60NBRIM18V	VP60NBRIF18V	VP60NBRIM14V	VP60NBRIF14V
	VP60SIT5	VP60SIT5IM14C	VP60SIT5IF14C	VP60SIT5IM14	VP60SIT5IF14	VP60SIT5IM18V	VP60SIT5IF18V	VP60SIT5IM14V	VP60SIT5IF14V

Group 3		V 			S 		
Ø 75 mm	THREAD	G1/8"-M	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G3/8"-M
	VP75NBR	VP75NBRIM18V	VP75NBRIM14V	VP75NBRIF14V	VP75NBRIM14	VP75NBRIF14	VP75NBRIM38
	VP75NR	VP75NRIM18V	VP75NRIM14V	VP75NRIF14V	VP75NRIM14	VP75NRIF14	VP75NRIM38
	VP75SIT5	VP75SIT5IM18V	VP75SIT5IM14V	VP75SIT5IF14V	VP75SIT5IM14	VP75SIT5IF14	VP75SIT5IM38

Additional mounting configurations are available (see page 2/7).

For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.



# VP

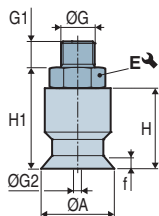
## Flat Suction Cups Ø 8 to 75 mm

Dimensions "Suction Cup + Fitting"

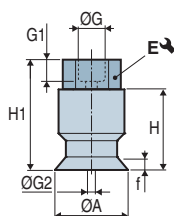


### VP 8 - 10 Group 1

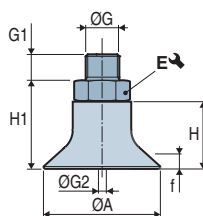
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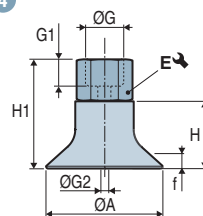
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3

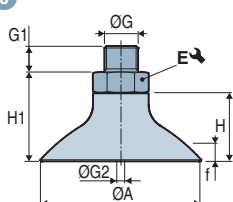


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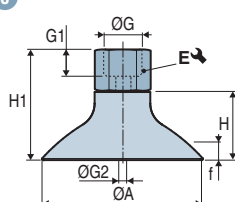


### VP 26 - 60 Group 2

5

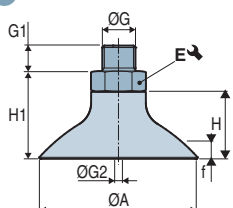


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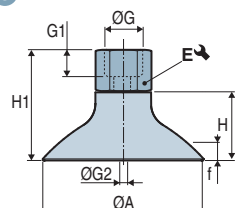


### VP 75 Group 3

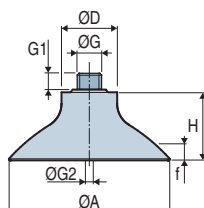
7





8



9



Group 1		Diagram	ØA	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
Ø 8 - 25 mm	VP8---IMM5C	1	7.5	-	1.3	10	15	M5-M	4.5	2.5	7	3.5
	VP8---IMM6C	1	7.5	-	1.3	10	15	M6-M	5	3.5	7	3.1
	VP8---IM18C	1	7.5	-	1.3	10	16	G1/8"-M	7.5	3.5	14	4.5
	VP8---IF18C	2	7.5	-	1.3	10	22	G1/8"-F	8	3.5	14	4.4
	VP10---IMM5C	1	10	-	1.5	10.5	15.5	M5-M	4.5	2.5	7	3.6
	VP10---IMM6C	1	10	-	1.5	10.5	15.5	M6-M	5	3.5	7	3.2
	VP10---IM18C	1	10	-	1.5	10.5	16.5	G1/8"-M	7.5	3.5	14	4.6
	VP10---IF18C	2	10	-	1.5	10.5	22.5	G1/8"-F	8	3.5	14	4.5
	VP15---IMM5C	3	15	-	2.25	11	16	M5-M	4.5	2.5	7	3.8
	VP15---IMM6C	3	15	-	2.25	11	16	M6-M	5	3.5	7	3.4
	VP15---IM18C	3	15	-	2.25	11	17	G1/8"-M	7.5	3.5	14	4.8
	VP15---IF18C	4	15	-	2.25	11	23	G1/8"-F	8	3.5	14	4.7
	VP20---IMM5C	3	20	-	3	11.5	16.5	M5-M	4.5	2.5	7	4.2
	VP20---IMM6C	3	20	-	3	11.5	16.5	M6-M	5	3.5	7	3.8
	VP20---IM18C	3	20	-	3	11.5	17.5	G1/8"-M	7.5	3.5	14	5.2
	VP20---IF18C	4	20	-	3	11.5	23.5	G1/8"-F	8	3.5	14	5.1
	VP25---IMM5C	3	25	-	3	12	17	M5-M	4.5	2.5	7	4.6
	VP25---IMM6C	3	25	-	3	12	17	M6-M	5	3.5	7	4.2
	VP25---IM18C	3	25	-	3	12	18	G1/8"-M	7.5	3.5	14	5.6
	VP25---IF18C	4	25	-	3	12	24	G1/8"-F	8	3.5	14	5.5

Note: All dimensions are in mm



(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.



## Flat Suction Cups Ø 8 to 75 mm

Dimensions "Suction Cup + Fitting"



Group 2		Diagram	ØA	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
Ø 26 - 60 mm	VP26---IM18V	5	26	-	3	19.5	24	G1/8"-M	6	3.5	13	17.9
	VP26---IF18V	6	26	-	3	19.5	32.5	G1/8"-F	7.5	3.5	13	21.2
	VP26---IM14	5	26	-	3	19.5	23.5	G1/4"-M	11	4.4	17	11.6
	VP26---IM14C	5	26	-	3	19.5	27.5	G1/4"-M	10	7	17	12.5
	VP26---IM14V	5	26	-	3	19.5	24.5	G1/4"-M	8	3.5	17	27.2
	VP26---IF14	6	26	-	3	19.5	34.5	G1/4"-F	10	4.4	17	12.2
	VP26---IF14C	6	26	-	3	19.5	34.5	G1/4"-F	12	6.9	17	11.8
	VP26---IF14V	6	26	-	3	19.5	35.5	G1/4"-F	11	3.5	17	31.8
	VP30---IM18V	5	30	-	2.5	19	23.5	G1/8"-M	6	3.5	13	17.3
	VP30---IF18V	6	30	-	2.5	19	32	G1/8"-F	7.5	3.5	13	21.6
	VP30---IM14	5	30	-	2.5	19	23	G1/4"-M	11	4.4	17	12.0
	VP30---IM14C	5	30	-	2.5	19	27	G1/4"-M	10	7	17	12.9
	VP30---IM14V	5	30	-	2.5	19	24	G1/4"-M	8	3.5	17	27.6
	VP30---IF14	6	30	-	2.5	19	34	G1/4"-F	10	4.4	17	12.6
	VP30---IF14C	6	30	-	2.5	19	34	G1/4"-F	12	6.9	17	12.2
	VP30---IF14V	6	30	-	2.5	19	35	G1/4"-F	11	3.5	17	32.2
	VP35---IM18V	5	35	-	3	20	24.5	G1/8"-M	6	3.5	13	20.1
	VP35---IF18V	6	35	-	3	20	33	G1/8"-F	7.5	3.5	13	23.4
	VP35---IM14	5	35	-	3	20	24	G1/4"-M	11	4.4	17	13.8
	VP35---IM14C	5	35	-	3	20	28	G1/4"-M	10	7	17	14.7
	VP35---IM14V	5	35	-	3	20	25	G1/4"-M	8	3.5	17	29.4
	VP35---IF14	6	35	-	3	20	35	G1/4"-F	10	4.4	17	14.4
	VP35---IF14C	6	35	-	3	20	35	G1/4"-F	12	6.9	17	14.0
	VP35---IF14V	6	35	-	3	20	36	G1/4"-F	11	3.5	17	34.0
	VP40---IM18V	5	40	-	3	20	24.5	G1/8"-M	6	3.5	13	20.6
	VP40---IF18V	6	40	-	3	20	33	G1/8"-F	7.5	3.5	13	23.9
	VP40---IM14	5	40	-	3	20	24	G1/4"-M	11	4.4	17	14.3
	VP40---IM14C	5	40	-	3	20	28	G1/4"-M	10	7	17	15.2
	VP40---IM14V	5	40	-	3	20	25	G1/4"-M	8	3.5	17	29.9
	VP40---IF14	6	40	-	3	20	35	G1/4"-F	10	4.4	17	14.9
	VP40---IF14C	6	40	-	3	20	35	G1/4"-F	12	6.9	17	14.5
	VP40---IF14V	6	40	-	3	20	36	G1/4"-F	11	3.5	17	34.5
	VP50---IM18V	5	52	-	4.5	22	26.5	G1/8"-M	6	3.5	13	26.4
	VP50---IF18V	6	52	-	4.5	22	35	G1/8"-F	7.5	3.5	13	29.7
	VP50---IM14	5	52	-	4.5	22	26	G1/4"-M	11	4.4	17	20.1
	VP50---IM14C	5	52	-	4.5	22	30	G1/4"-M	10	7	17	21.0
	VP50---IM14V	5	52	-	4.5	22	27	G1/4"-M	8	3.5	17	35.7
	VP50---IF14	6	52	-	4.5	22	37	G1/4"-F	10	4.4	17	20.7
	VP50---IF14C	6	52	-	4.5	22	37	G1/4"-F	12	6.9	17	20.3
	VP50---IF14V	6	52	-	4.5	22	38	G1/4"-F	11	3.5	17	40.3
	VP60---IM18V	5	60	-	4.5	22	26.5	G1/8"-M	6	3.5	13	30.1
	VP60---IF18V	6	60	-	4.5	22	35	G1/8"-F	7.5	3.5	13	33.4
	VP60---IM14	5	60	-	4.5	22	26	G1/4"-M	11	4.4	17	23.8
	VP60---IM14C	5	60	-	4.5	22	30	G1/4"-M	10	7	17	24.7
	VP60---IM14V	5	60	-	4.5	22	27	G1/4"-M	8	3.5	17	39.4
	VP60---IF14	6	60	-	4.5	22	37	G1/4"-F	10	4.4	17	24.4
	VP60---IF14C	6	60	-	4.5	22	37	G1/4"-F	12	6.9	17	24.0
	VP60---IF14V	6	60	-	4.5	22	38	G1/4"-F	11	3.5	17	44.0

### Group 3

Ø 75 mm	VP75---IM18V	9	75	23	4.5	32	-	G1/8"-M	8	6	-	58.3
	VP75---IM14	7	75	-	4.5	32	38	G1/4"-M	11	8	21	46.4
	VP75---IM14V	7	75	-	4.5	32	37	G1/4"-M	8	6	17	68.9
	VP75---IF14	8	75	-	4.5	32	47	G1/4"-F	10	8	21	50.3
	VP75---IF14V	8	75	-	4.5	32	51	G1/4"-F	9	6	17	78.5
	VP75---IM38	7	75	-	4.5	32	43	G3/8"-M	11	8	21	47

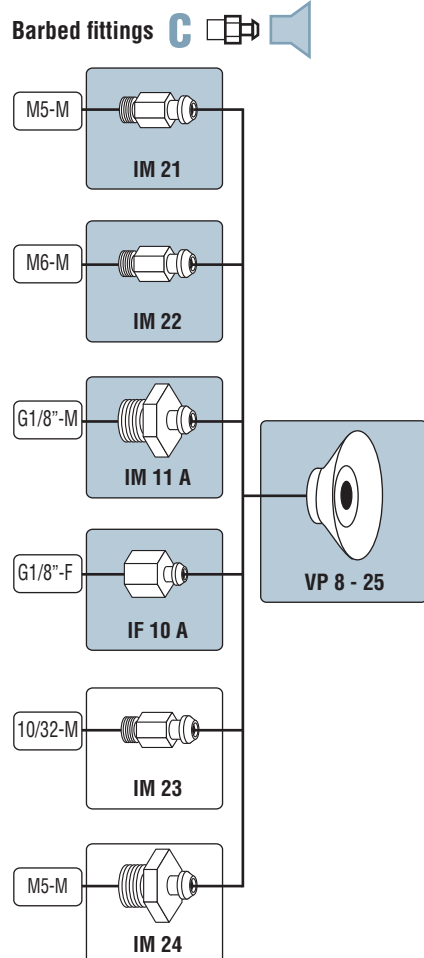
Note: All dimensions are in mm

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

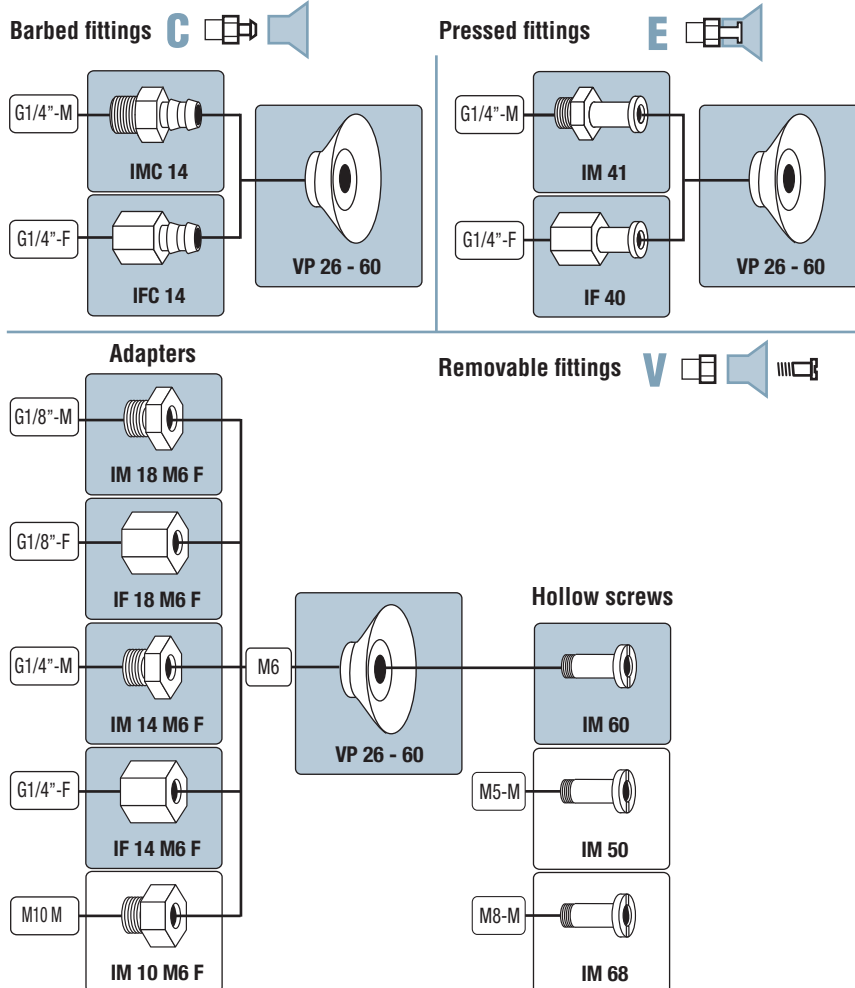




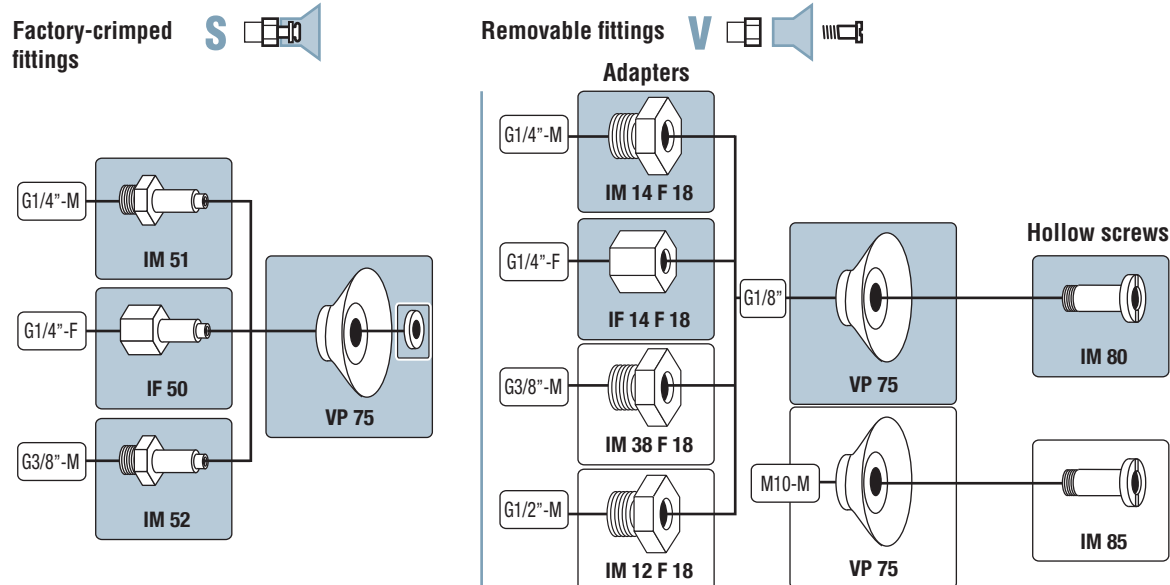
#### VP 8 - 25 Group 1





#### VP 26 - 60 Group 2



#### VP 75 Group 3



-  Configurations (suction cup + fitting) refer to page 2/4
-  Non-standard configurations must be ordered in separate part numbers.

Fittings and suction cups dimensions: see page 2/8.



## Flat Suction Cups Ø 8 to 75 mm

### Dimensions

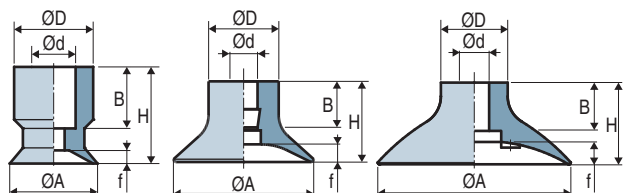


### Suction Cups

VP 8... 10

VP 15... 25

VP 26... 75

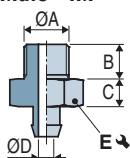


(1) f = Deflection of the suction cup.

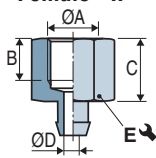
	ØA	H	Ød	ØD	f (1)	B	(g)
VP 8	7.5	10	5	9	1.3	7	0.4
VP 10	10	10.5	4.4	9	1.5	7	0.5
VP 15	15	11	4	9	2.25	7	0.7
VP 20	20	11.5	4	10	3	7	1.2
VP 25	25	12	4	10	3	7	1.4
VP 26	26	19.5	8	16	3	13	3.7
VP 30	30	19	8	16	2.5	13	4
VP 35	35	20	8	16	3	13	5.6
VP 40	40	20	8	16	3	13	9
VP 50	52	22	8	18	4.5	13	14
VP 60	60	22	8	18	4.5	13	16
VP 75	75	32	12	23	4.5	20	33

### Barbed Fittings

Male - IM

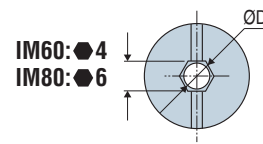
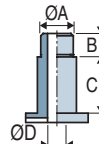


Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM 21 (2)	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 (2)	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated brass	3.2
IF 10 A	G1/8"-F	8	12	3.5	14	Aluminum	4
IFC 14	G1/4"-F	12	15	6.9	17	Aluminum	8

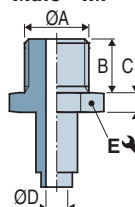
### Hollow Screws



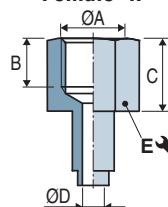
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.7
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

### Factory-crimped Fittings

Male - IM



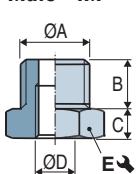
Female - IF



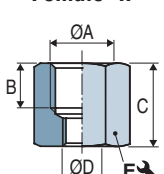
	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	4.4	17	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

### Adapters for Hollow Screws

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 12 F18	G1/2"-M	14	6	G1/8"-F	22	Nickel-plated brass	46.8
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 14 F18	G1/4"-M	8	5	G1/8"-F	17	Nickel-plated brass	10.6
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IM 38 F18	G3/8"-M	9	5	G1/8"-F	19	Nickel-plated brass	18.8
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9
IF 14 F18	G1/4"-F	9	19	G1/8"-F	17	Nickel-plated brass	20.2

The values represent the average characteristics of our products.

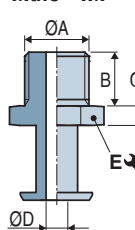
Note: All dimensions are in mm.

(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10).

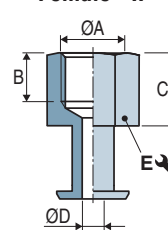
(3) Available in stainless steel.

### Pressed Fitting

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF 40	G1/4"-F	10	15	4.4	17	Aluminum	8.4

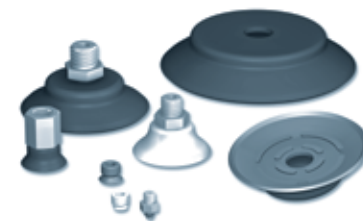


## Extra-flat Suction Cups Ø 2 to 200 mm

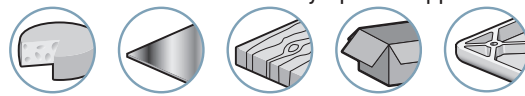
The profile of the VPG series extra-flat suction cups provides for accuracy in load gripping and speeds up throughput rates. These suction cups are used for flat surfaces only.

### Materials

**NBR** Nitrile  
**SI** Silicone  
**STN** SITON®




Industry-specific applications



Types of use




### Suction Cup Properties

	Ø (mm)	cm <sup>3</sup>	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SI	STN
VPG 2	2	0.00073	0.1	0.04	2	VPG2NBR	VPG2SI	-
VPG 3.5	3.5	0.0022	0.2	0.1	8	VPG3.5NBR	VPG3.5SI	-
VPG 5	5	0.005	0.5	0.2	8	VPG5NBR	VPG5SI	VPG5STN
VPG 6	6	0.008	0.7	0.4	8	VPG6NBR	VPG6SI	VPG6STN
VPG 8	8	0.03	1.2	0.6	10	VPG8NBR	VPG8SI	VPG8STN
VPG 10	10	0.07	2.0	1.0	13	VPG10NBR	VPG10SI	VPG10STN
VPG 15	15	0.2	4.7	2.4	13	VPG15NBR	VPG15SI	VPG15STN
VPG 20	20	0.5	8.8	4.4	20	VPG20NBR	VPG20SI	VPG20STN
VPG 25	25	1.1	12.1	6.1	25	VPG25NBR	VPG25SI	VPG25STN
VPG 30	30	1.4	16.4	8.2	40	VPG30NBR	VPG30SI	VPG30STN
VPG 35	35	2.9	23.8	11.9	50	VPG35NBR	VPG35SI	VPG35STN
VPG 40	40	3.8	34.7	17.3	50	VPG40NBR	VPG40SI	VPG40STN
VPG 50	50	5.3	54.2	27.1	75	VPG50NBR	VPG50SI	VPG50STN
VPG 60	60	12	88.8	44.4	100	VPG60NBR	VPG60SI	VPG60STN
VPG 60S	60	12	88.8	44.4	100	VPG60SNBR	VPG60SSI	VPG60SSTN
VPG 80	80	26.9	143.0	71.5	150	VPG80NBR	VPG80SI	VPG80STN
VPG 80S	80	26.9	143.0	71.5	150	VPG80SNBR	VPG80SSI	VPG80SSTN
VPG 95	95	41	202.2	101.1	200	VPG95NBR	VPG95SI	VPG95STN
VPG 95S	95	41	202.2	101.1	200	VPG95SNBR	VPG95SSI	VPG95SSTN
VPG 120	120	141	263.6	131.8	365	VPG120NBR	VPG120SI	VPG120STN
VPG 150	150	230	426.1	213.1	380	VPG150NBR	VPG150SI	VPG150STN
VPG 200	200	384	758.3	379.2	430	VPG200NBR	VPG200SI	VPG200STN

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### Choice of Fittings

	M3-M	M5-M	M5-F	M6-M	M8-M	M10-M	M10x125-F	G1/8"-F	G1/8"-M	G1/4"-F	G1/4"-M	G1/2"-F
2, 3.5	■	■	-	-	-	-	-	-	-	-	-	-
5... 10	-	■	■	-	-	-	-	■	■	-	-	-
15, 20	-	■	-	-	-	-	-	■	■	-	-	-
25... 50	-	-	-	■	□	□	-	■	■	■	■	-
60... 95	-	-	-	-	-	-	■	-	-	■	■	-
60S... 95S	-	-	-	-	-	-	-	-	-	■	-	-
120... 200	-	-	-	-	-	-	-	-	-	-	-	■

■ Standard available configurations (suction cup + fitting)  
see page reference 2/10

□ Additional mounting configurations  
See pages 2/13 - 2/14

Fitting: M = male F = female

### Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations.

**C**  **Version C : Barbed fitting**

**V**  **Version V : Removable fitting:**  
(adapter and hollow screw)

**E**  **Version E : Pressed fitting**

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.

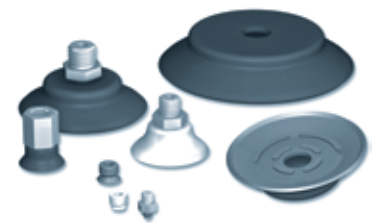


Please specify the part n°. e.g. VPG25STNIF18C  
Refer to page 2/10



## Extra-flat Suction Cups Ø 2 to 200 mm

References "Suction Cup + Fitting"



Ø 2 - 10 mm	THREAD	M3-M	M5-M	M5-F	G1/8"-M	G1/8"-F
	VPG2NBR	VPG2NBRIMM3C	VPG2NBRIMM5C	-	-	-
	VPG2SI	VPG2SIIMM3C	VPG2SIIMM5C	-	-	-
	VPG3.5NBR	VPG3.5NBRIMM3C	VPG3.5NBRIMM5C	-	-	-
	VPG3.5SI	VPG3.5SIIMM3C	VPG3.5SIIMM5C	-	-	-
	VPG5NBR	-	VPG5NBRIMM5C	VPG5NBRIFM5C	VPG5NBRIM18C	VPG5NBRIF18C
	VPG5SI	-	VPG5SIIMM5C	VPG5SIIFM5C	VPG5SIIM18C	VPG5SIIF18C
	VPG5STN	-	VPG5STNIMM5C	VPG5STNIFM5C	VPG5STNIM18C	VPG5STNIF18C
	VPG6NBR	-	VPG6NBRIMM5C	VPG6NBRIFM5C	VPG6NBRIM18C	VPG6NBRIF18C
	VPG6SI	-	VPG6SIIMM5C	VPG6SIIFM5C	VPG6SIIM18C	VPG6SIIF18C
	VPG6STN	-	VPG6STNIMM5C	VPG6STNIFM5C	VPG6STNIM18C	VPG6STNIF18C
	VPG8NBR	-	VPG8NBRIMM5C	VPG8NBRIFM5C	VPG8NBRIM18C	VPG8NBRIF18C
	VPG8SI	-	VPG8SIIMM5C	VPG8SIIFM5C	VPG8SIIM18C	VPG8SIIF18C
	VPG8STN	-	VPG8STNIMM5C	VPG8STNIFM5C	VPG8STNIM18C	VPG8STNIF18C
	VPG10NBR	-	VPG10NBRIMM5C	VPG10NBRIFM5C	VPG10NBRIM18C	VPG10NBRIF18C
	VPG10SI	-	VPG10SIIMM5C	VPG10SIIFM5C	VPG10SIIM18C	VPG10SIIF18C
	VPG10STN	-	VPG10STNIMM5C	VPG10STNIFM5C	VPG10STNIM18C	VPG10STNIF18C

Ø 15 - 20 mm	THREAD	G1/8"-M	G1/8"-F	M5-M	G1/8"-M	G1/8"-F
	VPG15NBR	VPG15NBRIM18C	VPG15NBRIF18C	VPG15NBRIMM5V	VPG15NBRIM18V	VPG15NBRIF18V
	VPG15SI	VPG15SIIM18C	VPG15SIIF18C	VPG15SIIMM5V	VPG15SIIM18V	VPG15SIIF18V
	VPG15STN	VPG15STNIM18C	VPG15STNIF18C	VPG15STNIMM5V	VPG15STNIM18V	VPG15STNIF18V
	VPG20NBR	-	-	VPG20NBRIMM5V	VPG20NBRIM18V	VPG20NBRIF18V
	VPG20SI	-	-	VPG20SIIMM5V	VPG20SIIM18V	VPG20SIIF18V
	VPG20STN	-	-	VPG20STNIMM5V	VPG20STNIM18V	VPG20STNIF18V

Ø 25 - 50 mm	THREAD	G1/8"-M	G1/8"-F	M6-M	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
	VPG25NBR	VPG25NBRIM18	VPG25NBRIF18	VPG25NBRIMM6V	VPG25NBRIM18V	VPG25NBRIF18V	VPG25NBRIM14V	VPG25NBRIF14V
	VPG25SI	VPG25SIIM18	VPG25SIIF18	VPG25SIIMM6V	VPG25SIIM18V	VPG25SIIF18V	VPG25SIIM14V	VPG25SIIF14V
	VPG25STN	VPG25STNIM18	VPG25STNIF18	VPG25STNIMM6V	VPG25STNIM18V	VPG25STNIF18V	VPG25STNIM14V	VPG25STNIF14V
	VPG30NBR	VPG30NBRIM18	VPG30NBRIF18	VPG30NBRIMM6V	VPG30NBRIM18V	VPG30NBRIF18V	VPG30NBRIM14V	VPG30NBRIF14V
	VPG30SI	VPG30SIIM18	VPG30SIIF18	VPG30SIIMM6V	VPG30SIIM18V	VPG30SIIF18V	VPG30SIIM14V	VPG30SIIF14V
	VPG30STN	VPG30STNIM18	VPG30STNIF18	VPG30STNIMM6V	VPG30STNIM18V	VPG30STNIF18V	VPG30STNIM14V	VPG30STNIF14V
	VPG35NBR	VPG35NBRIM18	VPG35NBRIF18	VPG35NBRIMM6V	VPG35NBRIM18V	VPG35NBRIF18V	VPG35NBRIM14V	VPG35NBRIF14V
	VPG35SI	VPG35SIIM18	VPG35SIIF18	VPG35SIIMM6V	VPG35SIIM18V	VPG35SIIF18V	VPG35SIIM14V	VPG35SIIF14V
	VPG35STN	VPG35STNIM18	VPG35STNIF18	VPG35STNIMM6V	VPG35STNIM18V	VPG35STNIF18V	VPG35STNIM14V	VPG35STNIF14V
	VPG40NBR	VPG40NBRIM18	VPG40NBRIF18	VPG40NBRIMM6V	VPG40NBRIM18V	VPG40NBRIF18V	VPG40NBRIM14V	VPG40NBRIF14V
	VPG40SI	VPG40SIIM18	VPG40SIIF18	VPG40SIIMM6V	VPG40SIIM18V	VPG40SIIF18V	VPG40SIIM14V	VPG40SIIF14V
	VPG40STN	VPG40STNIM18	VPG40STNIF18	VPG40STNIMM6V	VPG40STNIM18V	VPG40STNIF18V	VPG40STNIM14V	VPG40STNIF14V
	VPG50NBR	-	-	VPG50NBRIMM6V	VPG50NBRIM18V	VPG50NBRIF18V	VPG50NBRIM14V	VPG50NBRIF14V
	VPG50SI	-	-	VPG50SIIMM6V	VPG50SIIM18V	VPG50SIIF18V	VPG50SIIM14V	VPG50SIIF14V
	VPG50STN	-	-	VPG50STNIMM6V	VPG50STNIM18V	VPG50STNIF18V	VPG50STNIM14V	VPG50STNIF14V

Ø 60 - 95 mm	THREAD	M10x125-F	G1/4"-F	G1/4"-M	G1/4"-F
	VPG60NBR	VPG60NBR	-	VPG60NBRIM14V	VPG60NBRIF14V
	VPG60SNBR	-	VPG60SNBR	-	-
	VPG60SI	VPG60SI	-	VPG60SIIM14V	VPG60SIIF14V
	VPG60SSI	-	VPG60SSI	-	-
	VPG60STN	VPG60STN	-	VPG60STNIM14V	VPG60STNIF14V
	VPG60SSTN	-	VPG60SSTN	-	-
	VPG80NBR	VPG80NBR	-	VPG80NBRIM14V	VPG80NBRIF14V
	VPG80SNBR	-	VPG80SNBR	-	-
	VPG80SI	VPG80SI	-	VPG80SIIM14V	VPG80SIIF14V
	VPG80SSI	-	VPG80SSI	-	-
	VPG80STN	VPG80STN	-	VPG80STNIM14V	VPG80STNIF14V
	VPG80SSTN	-	VPG80SSTN	-	-
	VPG95NBR	VPG95NBR	-	VPG95NBRIM14V	VPG95NBRIF14V
	VPG95SNBR	-	VPG95SNBR	-	-
	VPG95SI	VPG95SI	-	VPG95SIIM14V	VPG95SIIF14V
	VPG95SSI	-	VPG95SSI	-	-
	VPG95STN	VPG95STN	-	VPG95STNIM14V	VPG95STNIF14V
	VPG95SSTN	-	VPG95SSTN	-	-

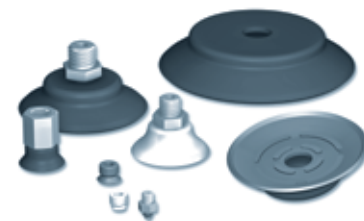
Ø 120 - 200 mm	THREAD	G1/2"-F *	G1/2"-F **
	VPG120NBR	VPG120NBRIF12V	VPG120NBRIF12V
	VPG120SI	VPG120SIIF12V	VPG120SIIF12V
	VPG120STN	VPG120STNIF12V	VPG120STNIF12V
	VPG150NBR	VPG150NBRIF12V	VPG150NBRIF12V
	VPG150SI	VPG150SIIF12V	VPG150SIIF12V
	VPG150STN	VPG150STNIF12V	VPG150STNIF12V
	VPG200NBR	VPG200NBRIF12V	VPG200NBRIF12V
	VPG200SI	VPG200SIIF12V	VPG200SIIF12V
	VPG200STN	VPG200STNIF12V	VPG200STNIF12V

\*Configured using fitting n° IFS12120

\*\* Configured using fitting n° IF12120

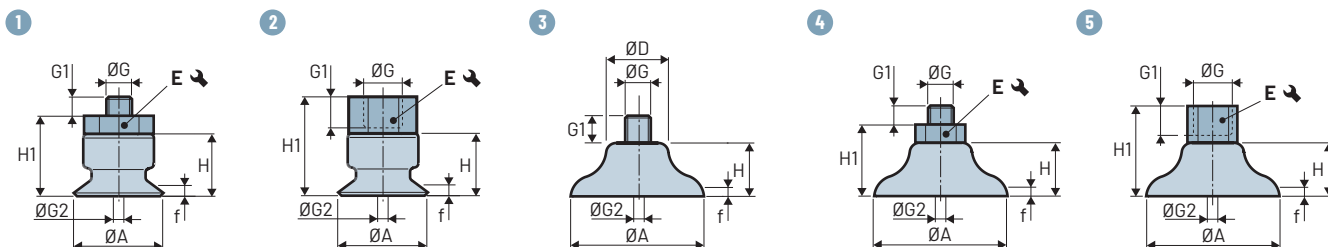
Non-standard configurations are available (see page 2/13 and 2/14). For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.





#### VPG 2 - 10

#### VPG 15 - 50



#### VPG 60 - 95

#### VPG 120 - 200

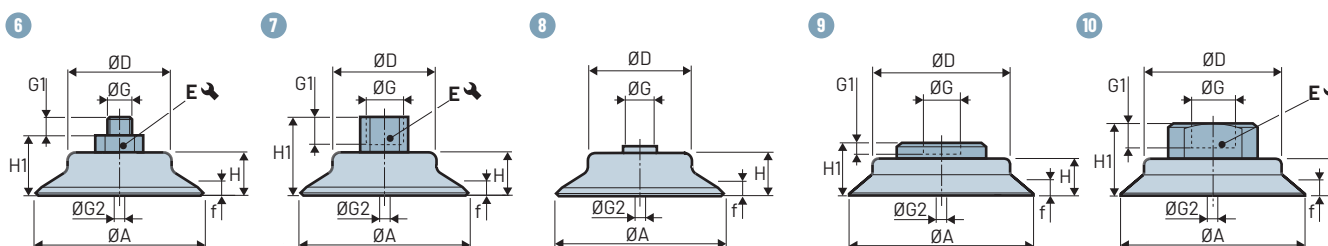


		Diagram	Ø A	Ø D	f <sup>(1)</sup>	H	H1	Ø G	G1	Ø G2 <sup>(2)</sup>	E	⚖ (g)
Ø 2 - 10 mm	VPG2---IMM3C	1	2	-	0.5	4	6	M3-M	3	1	5	0.21
	VPG2---IMM5C	1	2	-	0.5	4	7.5	M5-M	4.5	1	7	0.91
	VPG3.5---IMM3C	1	3.5	-	0.5	4	6	M3-M	3	1	5	0.22
	VPG3.5---IMM5C	1	3.5	-	0.5	4	7.5	M5-M	4.5	1	7	0.65
	VPG5---IMM5C	1	5	-	0.8	6.5	10	M5-M	4.5	2.2	7	0.86
	VPG5---IFM5C	2	5	-	0.8	6.5	15.5	M5-F	6	2.2	8	1.3
	VPG5---IM18C	1	5	-	0.8	6.5	11.5	G1/8"-M	8	2.2	14	4.1
	VPG5---IF18C	2	5	-	0.8	6.5	21.5	G1/8"-F	9	2.2	14	5.3
	VPG6---IMM5C	1	6	-	0.8	6.5	10	M5-M	4.5	2.2	7	0.9
	VPG6---IFM5C	2	6	-	0.8	6.5	15.5	M5-F	6	2.2	8	1.3
	VPG6---IM18C	1	6	-	0.8	6.5	11.5	G1/8"-M	8	2.2	14	4.1
	VPG6---IF18C	2	6	-	0.8	6.5	21.5	G1/8"-F	9	2.2	14	5.3
	VPG8---IMM5C	1	8	-	1.2	7	10.5	M5-M	4.5	2.2	7	0.9
	VPG8---IFM5C	2	8	-	1.2	7	16	M5-F	6	2.2	8	1.4
	VPG8---IM18C	1	8	-	1.2	7	12	G1/8"-M	8	2.2	14	4.1
	VPG8---IF18C	2	8	-	1.2	7	22	G1/8"-F	9	2.2	14	5.33
	VPG10---IMM5C	1	10	-	1.5	7.5	11	M5-M	4.5	2.2	7	1
	VPG10---IFM5C	2	10	-	1.5	7.5	16.5	M5-F	6	2.2	8	1.5
	VPG10---IM18C	1	10	-	1.5	7.5	12.5	G1/8"-M	8	2.2	14	4.2
	VPG10---IF18C	2	10	-	1.5	7.5	21.5	G1/8"-F	9	2.2	14	5.4
Ø 15 - 20 mm	VPG15---IM18C	4	15	-	1.9	8	13	G1/8"-M	8	2.2	14	4.7
	VPG15---IF18C	5	15	-	1.9	8	23	G1/8"-F	9	2.5	14	5.9
	VPG15---IMM5V	3	15	-	1.9	8	-	M5-M	5	2.5	-	2
	VPG15---IM18V	4	15	-	1.9	8	12.5	G1/8"-M	6	2.5	13	9.3
	VPG15---IF18V	5	15	-	1.9	8	21	G1/8"-F	7.5	2.5	13	12.5
	VPG20---IMM5V	3	20	-	2.3	10	-	M5-M	5	2.5	-	3.7
	VPG20---IM18V	4	20	-	2.3	10	14.5	G1/8"-M	6	2.5	13	11
	VPG20---IF18V	5	20	-	2.3	10	23	G1/8"-F	7.5	2.5	13	14.2

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.



## Extra-flat Suction Cups Ø 2 to 200 mm

Dimensions "Suction Cup + Fitting"

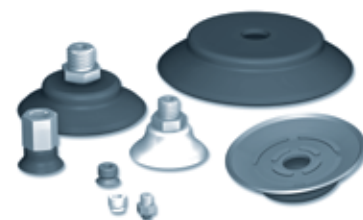
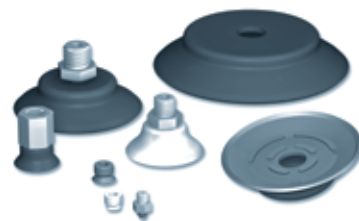


		Diagram	Ø A	Ø D	f <sup>(1)</sup>	H	H1	Ø G	G1	Ø G2 <sup>(2)</sup>	E ↗	⚖ (g)
Ø 25 - 50 mm	VP625---IM18	4	25	-	3	14	19	G1/8"-M	8	4	14	6.9
	VP625---IF18	5	25	-	3	14	29	G1/8"-F	9	4	14	7.9
	VP625---IMM6V	3	25	-	3	14	-	M6-M	6	3.5	-	5.5
	VP625---IM18V	4	25	-	3	14	18.5	G1/8"-M	6	3.5	13	12.1
	VP625---IF18V	5	25	-	3	14	27	G1/8"-F	7.5	3.5	13	15.4
	VP625---IM14V	4	25	-	3	14	19	G1/4"-M	8	3.5	17	21.4
	VP625---IF14V	5	25	-	3	14	30	G1/4"-F	11	3.5	17	26
	VP630---IM18	4	30	-	2	12	17	G1/8"-M	8	4	14	7.4
	VP630---IF18	5	30	-	2	12	27	G1/8"-F	9	4	14	8.4
	VP630---IMM6V	3	30	-	2	12	-	M6-M	6	3.5	-	6
	VP630---IM18V	4	30	-	2	12	16.5	G1/8"-M	6	3.5	13	12.6
	VP630---IF18V	5	30	-	2	12	25	G1/8"-F	7.5	3.5	13	15.9
	VP630---IM14V	4	30	-	2	12	17	G1/4"-M	8	3.5	17	21.9
	VP630---IF14V	5	30	-	2	12	28	G1/4"-F	11	3.5	17	26.5
	VP635---IM18	4	35	-	3	14	19	G1/8"-M	8	4	14	9.9
	VP635---IF18	5	35	-	3	14	29	G1/8"-F	9	4	14	10.9
	VP635---IMM6V	3	35	-	3	14	-	M6-M	6	3.5	-	8.5
	VP635---IM18V	4	35	-	3	14	18.5	G1/8"-M	6	3.5	13	15.1
	VP635---IF18V	5	35	-	3	14	27	G1/8"-F	7.5	3.5	13	18.4
	VP635---IM14V	4	35	-	3	14	19	G1/4"-M	8	3.5	17	24.4
	VP635---IF14V	5	35	-	3	14	30	G1/4"-F	11	3.5	17	29
	VP640---IM18	4	40	-	3.5	14	19	G1/8"-M	8	4	14	11.4
	VP640---IF18	5	40	-	3.5	14	29	G1/8"-F	9	4	14	12.4
	VP640---IMM6V	3	40	-	3.5	14	-	M6-M	6	3.5	-	10
	VP640---IM18V	4	40	-	3.5	14	18.5	G1/8"-M	6	3.5	13	16.6
	VP640---IF18V	5	40	-	3.5	14	27	G1/8"-F	7.5	3.5	13	19.9
	VP640---IM14V	4	40	-	3.5	14	19	G1/4"-M	8	3.5	17	25.9
	VP640---IF14V	5	40	-	3.5	14	30	G1/4"-F	11	3.5	17	30.5
	VP650---IMM6V	3	50	-	4	15	-	M6-M	6	3.5	-	18.6
	VP650---IM18V	4	50	-	4	15	19.5	G1/8"-M	6	3.5	13	25.2
	VP650---IF18V	5	50	-	4	15	28	G1/8"-F	7.5	3.5	13	28.5
	VP650---IM14V	4	50	-	4	15	20	G1/4"-M	8	3.5	17	34.5
	VP650---IF14V	5	50	-	4	15	31	G1/4"-F	11	3.5	17	39.1
Ø 60 - 95 mm	VP660---	8	60	38	5	16	-	M10x125-F	-	-	-	25.4
	VP660---IM14V	6	60	38	5	16	21	G1/4"-M	10	5	17	32.4
	VP660---IF14V	7	60	38	5	16	33	G1/4"-F	10	5	17	33.7
	VP660S---	8	60	38	5	16	-	G1/4"-F	-	-	-	25.4
	VP680---	8	80	53	6	18	-	M10x125-F	-	-	-	53
	VP680---IM14V	6	80	53	6	18	23	G1/4"-M	10	5	17	60
	VP680---IF14V	7	80	53	6	18	35	G1/4"-F	10	5	17	61.3
	VP680S---	8	80	53	6	18	-	G1/4"-F	-	-	-	53
	VP695---	8	95	68	6	19	-	M10x125-F	-	-	-	93.2
	VP695---IM14V	6	95	68	6	19	24	G1/4"-M	10	5	17	100.2
Ø 120 - 200 mm	VP695---IF14V	7	95	68	6	19	36	G1/4"-F	10	5	17	101.5
	VP695S---	8	95	68	6	19	-	G1/4"-F	-	-	-	93.2
	VP6120---IF12V	10	120	89.5	6	24.5	54.5	G1/2"-F	24	19	48	454.8
	VP6120---IFS12V	9	120	89.5	6	24.5	37.5	G1/2"-F	13	-	-	373.5
	VP6150---IF12V	10	150	105	9	30.5	60.5	G1/2"-F	24	19	48	624.8
	VP6150---IFS12V	9	150	105	9	30.5	43.5	G1/2"-F	13	-	-	543.5
Ø 120 - 200 mm	VP6200---IF12V	10	200	143	12.5	35.5	65.5	G1/2"-F	24	19	48	914.8
	VP6200---IFS12V	9	200	143	12.5	35.5	48.5	G1/2"-F	13	-	-	833.5

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.





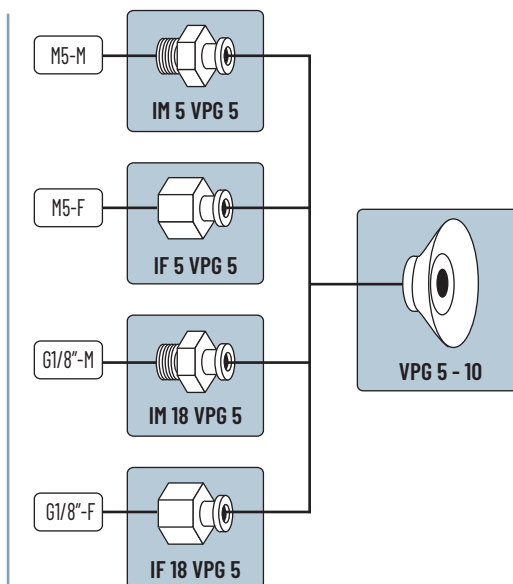
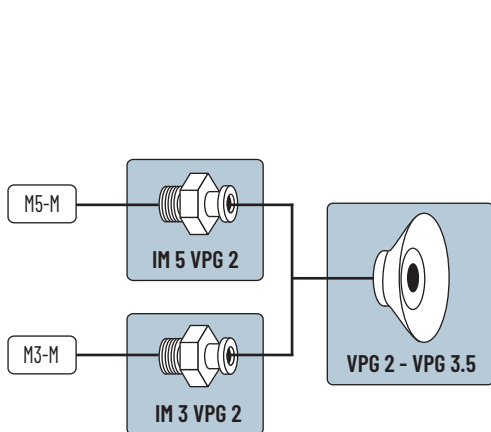
#### VPG 2 - 10

Barbed fittings



2

VPG

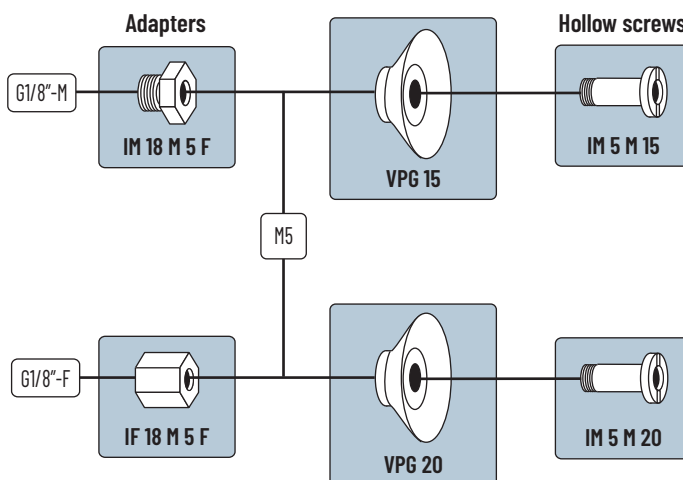
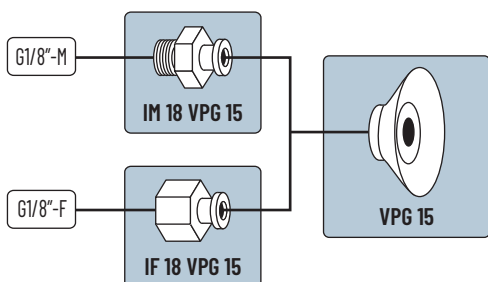


#### VPG 15 - 20

Barbed fittings



Removable fittings



Configurations (suction cup + fitting) refer to page 2/10

Fittings and suction cups dimensions:  
see page 2/15 and 2/16.



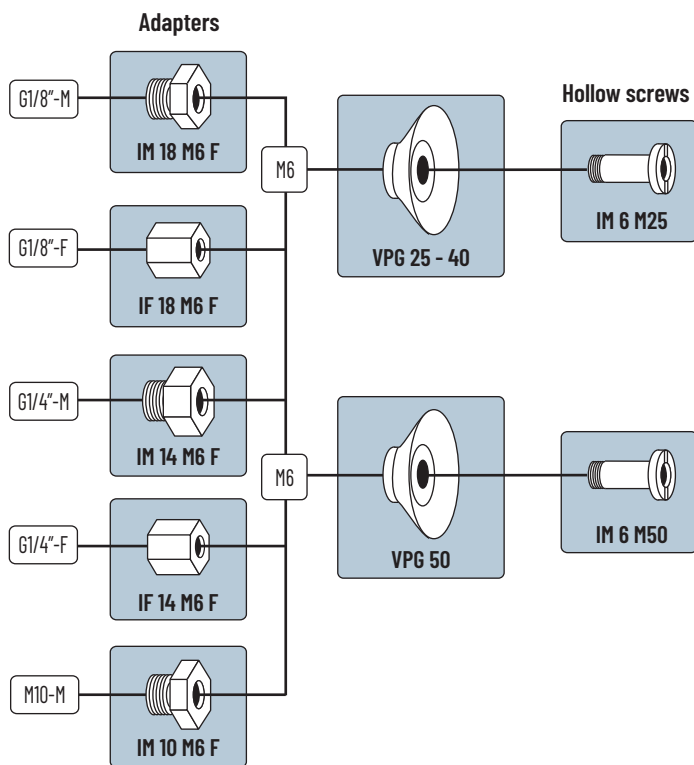
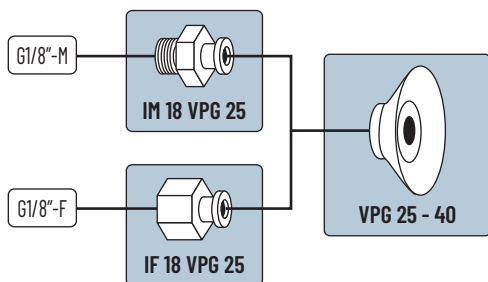


#### VPG 25 - 50

Pressed fittings

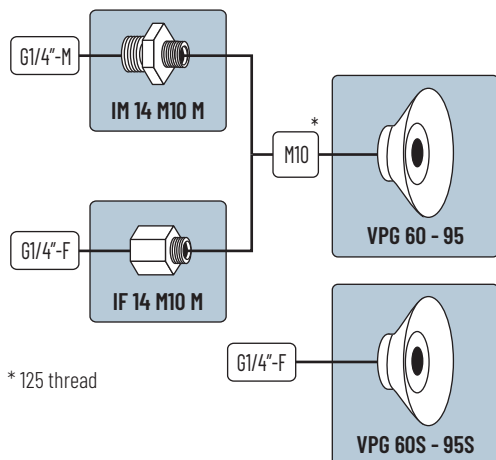


Removable fittings



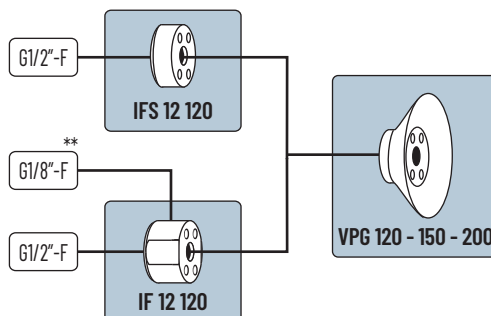
#### VPG 60 - 95

Removable fittings



#### VPG 120 - 200

Removable fittings



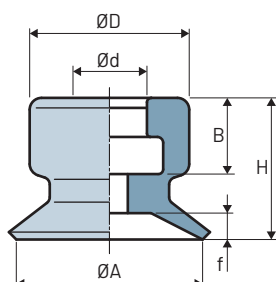
Configurations (suction cup + fitting) refer to page 2/10.

Fittings and suction cups dimensions: see page 2/15 and 2/16.

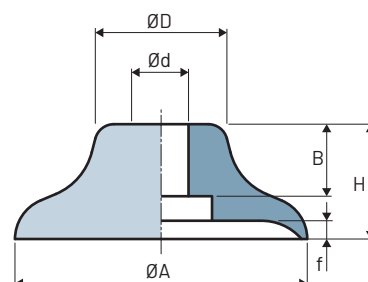




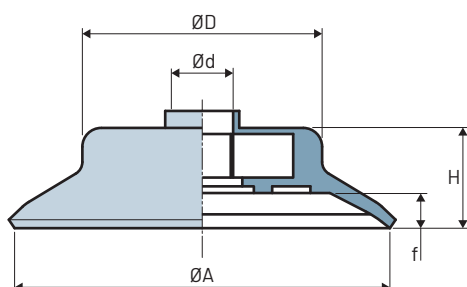
#### VPG 2 - 10



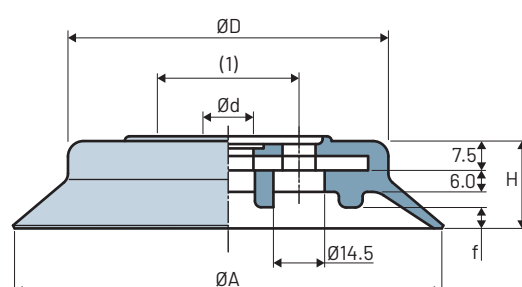
#### VPG 15 - 50





#### VPG 60 - 95



#### VPG 120 - 200



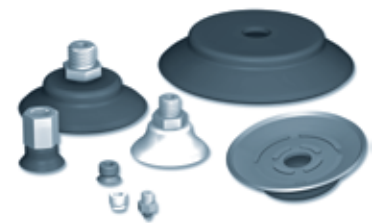
(1) 4 holes Ø 9 on Ø 40

 (Ø)	ØA	H	Ød	ØD	f <sup>(1)</sup>	B	 (g)
VPG 2	2	4	2	4	0.5	2.5	0.03
VPG 3.5	3.5	4	2	4	0.5	2.5	0.04
VPG 5	5	6.5	4	7.5	0.8	4	0.16
VPG 6	6	6.5	4	7.5	0.8	4	0.17
VPG 8	8	7	4	8	1.2	4	0.23
VPG 10	10	7.5	4	8.7	1.5	4	0.3
VPG 15	15	8	4.5	12	1.9	2.5	0.7
VPG 20	20	10	4.5	15	2.3	4.5	1.5
VPG 25	25	14	6	16	3	7	2.8
VPG 30	30	12	6	15	2	7	3.3
VPG 35	35	14	6	20.5	3	7	5.8
VPG 40	40	14	6	23.5	3.5	7	7.3
VPG 50	50	15	8	29	4	7	11.1
VPG 60	60	16	M10x125-F	38	5	-	25.4
VPG 60S	60	16	G1/4"-F	38	5	-	25.4
VPG 80	80	18	M10x125-F	53	6	-	53
VPG 80S	80	18	G1/4"-F	53	6	-	53
VPG 95	95	19	M10x125-F	68	6	-	93.2
VPG 95S	95	19	G1/4"-F	68	6	-	93.2
VPG 120	120	24.5	14.5	89.5	6	-	230
VPG 150	150	30.5	13	105	9	-	400
VPG 200	200	35.5	13	143	12.5	-	690

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.

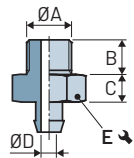
(1) f = Deflection of the suction cup.



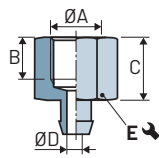


#### Barbed Fittings

Male - IM



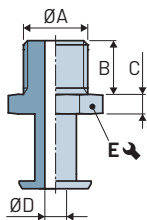
Female - IF



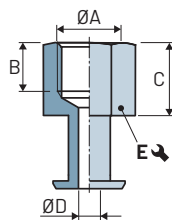
	ØA	B	C	ØD	E	Material	(g)
IM 3 VPG2	M3-M	3	2	1	5	Aluminum	0.18
IM 5 VPG2	M5-M	4.5	3.5	1	7	Aluminum	0.61
IM 5 VPG5	M5-M	4.5	3.5	2.2	7	Aluminum	0.7
IM 18 VPG5	G1/8"-M	8	5	2.2	14	Aluminum	3.9
IM 18 VPG15	G1/8"-M	8	5	2.2	14	Aluminum	4
IF 5 VPG5	M5-F	6	9	2.2	8	Aluminum	1.2
IF 18 VPG5	G1/8"-F	9	15	2.2	14	Aluminum	5.1
IF 18 VPG15	G1/8"-F	9	15	2.5	14	Aluminum	5.2

#### Pressed Fittings

Male - IM

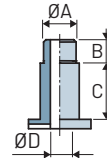


Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.08
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5

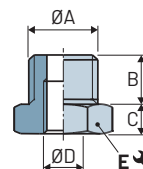
#### Hollow Screws



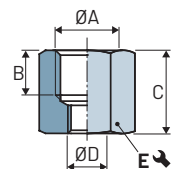
	ØA	B	C	ØD	Material	(g)
IM 5 M15	M5-M	5	2	2.5	Nickel-plated brass	1.3
IM 5 M20	M5-M	5	4	2.5	Nickel-plated brass	2.2
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7
IM 6 M50	M6-M	6	6	3.5	Nickel-plated brass	7.5

#### Adapters for Hollow Screws

Male - IM



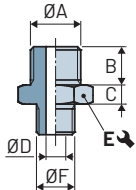
Female - IF



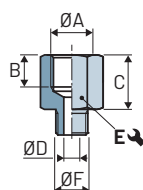
	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M5F	G1/8"-M	6	4.5	M5-F	13	Nickel-plated brass	7.3
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M5F	G1/8"-F	7.5	13	M5-F	13	Nickel-plated brass	10.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9

#### Screwed

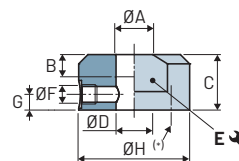
Male - IM



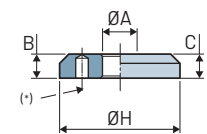
Female - IF



Female - IF 12120



Female - IFS 12120



(\*) 4 M8 holes at 90° on Ø40 (screws provided)

	ØA	B	C	ØD	E	ØF	G	H	Material	(g)
IM 14 M10M	G1/4"-M	10	5	5	17	M10x125-M	-	-	Aluminum	7
IF 14 M10M	G1/4"-F	10	17	5	17	M10x125-M	-	-	Aluminum	8.3
IF 12120	G1/2"-F	24	30	19	48	G1/8"-F	8.7	60	Aluminum	224.8
IFS 12120	G1/2"-F	13	13	-	-	-	-	65	Aluminum	143.5

Note: All dimensions are in mm.



# VPU

## Flat Suction Cups Ø 6 to 50 mm



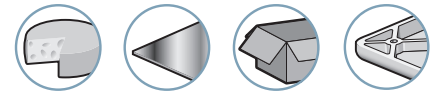
VPU series suction cups are suitable for gripping flat, smooth and rigid products. They benefit from an excellent hold for vertical gripping.

### Materials

**NBR** Nitrile  
**SI** Translucent Silicone

**STN** SITON®

Industry-specific applications



Types of use



### Suction Cup Properties

	Ø (mm)	cm <sup>3</sup>	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SI	STN
VPU 6	7	0.05	0.9	0.4	5	VPU6NBR	VPU6SI	VPU6STN(*)
VPU 8	9	0.1	1.4	0.7	6	VPU8NBR	VPU8SI	VPU8STN(*)
VPU 10	11	0.018	2.5	1.2	8	VPU10NBR	VPU10SI	VPU10STN(*)
VPU 15	16.5	0.5	4.3	2.2	8	VPU15NBR	VPU15SI	VPU15STN(*)
VPU 20	22	1	6.5	3.3	13	VPU20NBR	VPU20SI	VPU20STN(*)
VPU 30	32	2	13.0	6.5	20	VPU30NBR	VPU30SI	VPU30STN(*)
VPU 40	41	5.5	18.8	9.4	30	VPU40NBR	VPU40SI	VPU40STN(*)
VPU 50	51.4	12	33.2	16.6	35	VPU50NBR	VPU50SI	VPU50STN(*)

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

(\*) On request

### Choice of Fittings

Ø	M5-M	G1/8"-M	G1/4"-M	G3/8"-M
6...15	■	-	-	-
20...30	-	■	-	-
40...50	-	-	■	■


■ Standard available configurations (suction cup + fitting) Fittings: M = Male  
See part n° schedule as below


### Type of Assembly


**C** **Version C: Barbed fitting**

**E** **Version E: Pressed fitting**

### References - "Section Cup + Fitting"

ø 6 - 15 mm	THREAD	<b>C</b>  <b>M5-M</b>
	VPU6NBR	VPU6NBRIMM5C
	VPU6SI	VPU6SIIMM5C
	VPU6STN	VPU6STNIMM5C
	VPU8NBR	VPU8NBRIMM5C
	VPU8SI	VPU8SIIMM5C
	VPU8STN	VPU8STNIMM5C
	VPU10NBR	VPU10NBRIMM5C
	VPU10SI	VPU10SIIMM5C
	VPU10STN	VPU10STNIMM5C
	VPU15NBR	VPU15NBRIMM5C
	VPU15SI	VPU15SIIMM5C
VPU15STN	VPU15STNIMM5C	

ø 20 - 30 mm	THREAD	<b>E</b>  <b>G1/8"-M</b>	
		Fitting with filter	Fitting without filter
	VPU20NBR	VPU20NBRIM18MPF	VPU20NBRIM18MP
	VPU20SI	VPU20SIIM18MPF	VPU20SIIM18MP
	VPU20STN(*)	VPU20STNIM18MPF	VPU20STNIM18MP
	VPU30NBR	VPU30NBRIM18MPF	VPU30NBRIM18MP
	VPU30SI	VPU30SIIM18MPF	VPU30SIIM18MP
	VPU30STN(*)	VPU30STNIM18MPF	VPU30STNIM18MP

ø 40 - 50 mm	THREAD	<b>E</b>  <b>G1/4"-M</b>		<b>G3/8"-M</b>	
		Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter
	VPU40NBR	VPU40NBRIM14MPF	VPU40NBRIM14MP	VPU40NBRIM38MPF	VPU40NBRIM38MP
	VPU40SI	VPU40SIIM14MPF	VPU40SIIM14MP	VPU40SIIM38MPF	VPU40SIIM38MP
	VPU40STN(*)	VPU40STNIM14MPF	VPU40STNIM14MP	VPU40STNIM38MPF	VPU40STNIM38MP
	VPU50NBR	VPU50NBRIM14MPF	VPU50NBRIM14MP	VPU50NBRIM38MPF	VPU50NBRIM38MP
	VPU50SI	VPU50SIIM14MPF	VPU50SIIM14MP	VPU50SIIM38MPF	VPU50SIIM38MP
	VPU50STN(*)	VPU50STNIM14MPF	VPU50STNIM14MP	VPU50STNIM38MPF	VPU50STNIM38MP

(\*) On request

### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 4 and 14.



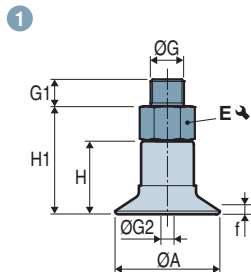
Please specify the part n°. e.g. VPU20NBRIM18MPF  
See part n° table above



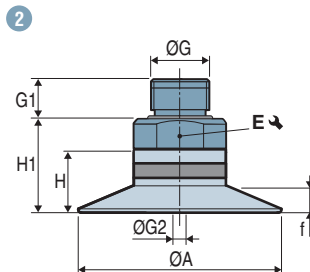


#### Suction Cups + Fittings

VPU 6 - 15



VPU 20 - 30



VPU 40 - 50

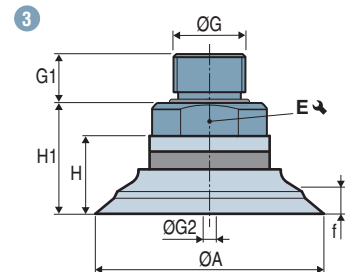
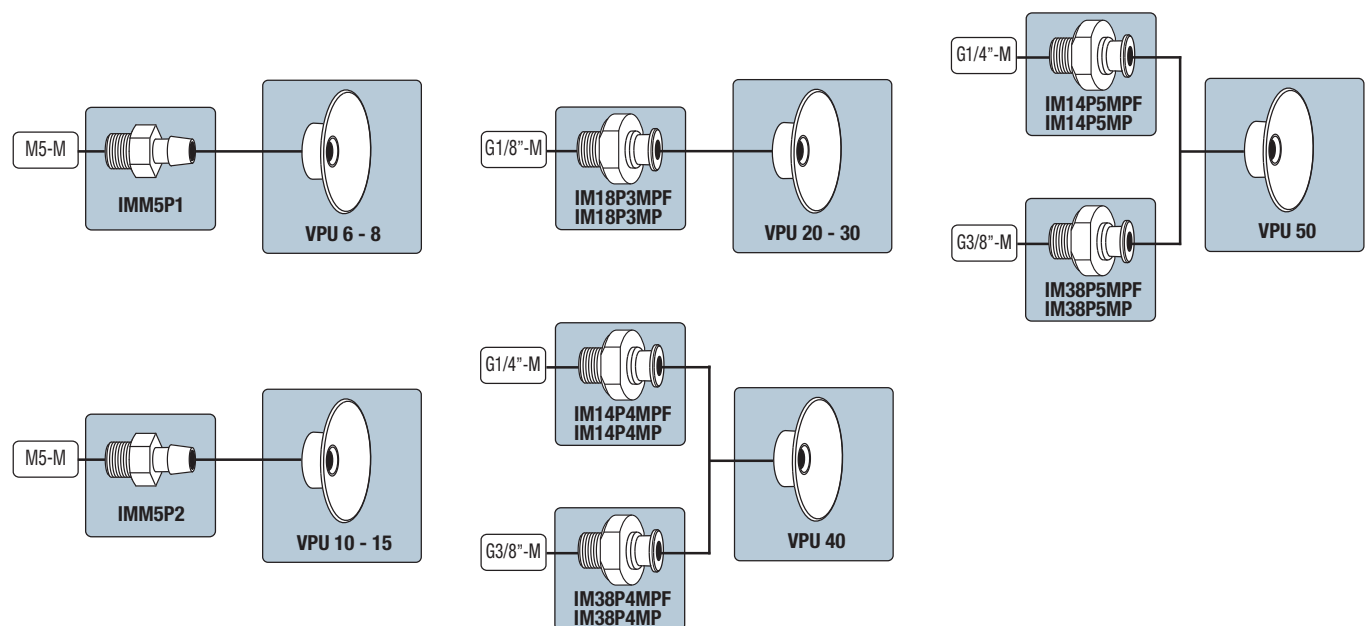


	Diagram	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E ↘	⚖ (g)
VPU6---IMM5C	1	7	0.3	6.5	10	M5-M	4	1.5	7	1.8
VPU8---IMM5C	1	9	0.5	7	10.5	M5-M	4	1.5	7	1.9
VPU10---IMM5C	1	11	0.5	10.5	15	M5-M	4	2.7	7	1.3
VPU15---IMM5C	1	16.5	1.5	11.5	16	M5-M	4	2.7	7	1.6
VPU20---IM18MP-	2	22	2.5	8	13	G1/8"-M	7	4	13	4.4
VPU30---IM18MP-	2	32	3.5	9.5	14.5	G1/8"-M	7	4	13	5.1
VPU40---IM14MP-	3	41	4.5	13	19	G1/4"-M	9	5	19	12
VPU40---IM38MP-	3	41	4.5	13	19	G3/8"-M	10	5	22	16.6
VPU50---IM14MP-	3	51.4	6	17.5	23.5	G1/4"-M	9	5	22	24.1
VPU50---IM38MP-	3	51.4	6	17.5	23.5	G3/8"-M	10	6	23.9	27.1

(1) f = Deflection of the suction cup.

(2) Ø G2 = Ø internal orifice of the fitting.

#### Assembly Diagrams



Note: All dimensions are in mm.



# VPU

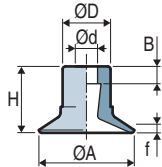
## Flat Suction Cups Ø 6 to 50 mm

### Dimensions

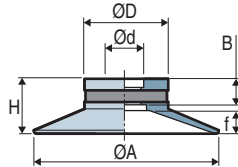


#### Suction Cups

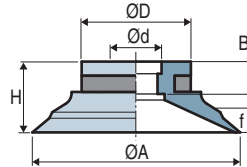
VPU 6 - 15



VPU 20 - 30



VPU 40 - 50

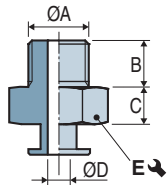


	ØA	H	Ød	ØD	f <sup>(1)</sup>	B	⚖ (g)
VPU 6	7	6.5	2	5	0.3	3.5	0.12
VPU 8	9	7	2	5	0.5	3.5	0.15
VPU 10	11	10.5	3.8	9	0.5	3	0.51
VPU 15	16.5	11.5	3.8	8.3	1.5	3	0.75
VPU 20	22	8	5	14.5	2.5	4.5	1.2
VPU 30	32	9.5	5	14.5	3.5	4.5	1.9
VPU 40	41	13	6.5	20	4.5	6	5
VPU 50	51.4	17.5	10.5	27	6	8	12

(1) f = Deflection of the suction cup.

#### Barbed Fittings

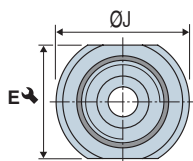
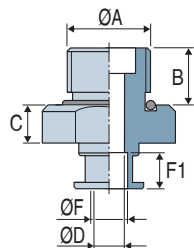
IMM5P1 - IMM5P2



	ØA	B	C	ØD	E	Material	⚖ (g)
IMM5P1	M5-M	4	3.5	1.5	7	Brass	1.7
IMM5P2	M5-M	4	4.5	2.7	7	Aluminum	0.8

#### Pressed fittings

Male fittings



Fitting with stainless steel filter 200 µm	Fitting without filter	ØA	B	C	ØD	E	ØJ	ØF	F1	Materials Fitting*	⚖ (g)
IM18P3MPF	IM18P3MP	G1/8"-M	7	5	4	13	15	5	4.7	Aluminum	3.2
IM14P4MPF	IM14P4MP	G1/4"-M	9	6	5	19	21	6	5.7	Aluminum	7
IM14P5MPF	IM14P5MP	G1/4"-M	9	6	6	22	28	10	8.7	Aluminum	12.1
IM38P4MPF	IM38P4MP	G3/8"-M	10	6	5	22	24	6	5.7	Aluminum	11.6
IM38P5MPF	IM38P5MP	G3/8"-M	10	6	6	23.9	28	10	8.7	Aluminum	15.1

\*Male fittings (IM) equipped with O-ring sealing

Note: All dimensions are in mm.

The values represent the average characteristics of our products.



## Flat Suction Cups with Cleats Ø 15 to 50 mm



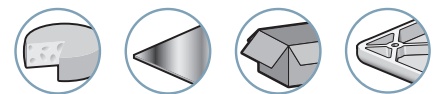
VPF series suction cups are suitable for gripping flat, smooth and rigid products. Cleats prevent the deformation of the product and provide excellent non-slip properties.

### Materials

**NBR** Nitrile  
**SI** Translucent Silicone

**STN** SITON®

Industry-specific applications



Types of use



2

VPF

### Suction Cup Properties

	Ø (mm)	cm³ (cm³)	(N) (1)	(N) (1)	R <sub>min</sub> (mm)	NBR	SI	STN
<b>VPF 15</b>	15.7	0.37	3.6	1.8	13	<b>VPF15NBR</b>	<b>VPF15SI</b>	<b>VPF15STN(*)</b>
<b>VPF 20</b>	22	1.00	7.2	3.6	18	<b>VPF20NBR</b>	<b>VPF20SI</b>	<b>VPF20STN(*)</b>
<b>VPF 25</b>	26.8	1.10	9.4	4.7	22	<b>VPF25NBR</b>	<b>VPF25SI</b>	<b>VPF25STN(*)</b>
<b>VPF 30</b>	32	2.00	11.6	5.8	25	<b>VPF30NBR</b>	<b>VPF30SI</b>	<b>VPF30STN(*)</b>
<b>VPF 40</b>	42.5	1.80	18.1	9.0	52	<b>VPF40NBR</b>	<b>VPF40SI</b>	<b>VPF40STN(*)</b>
<b>VPF 50</b>	53	10.00	34.7	17.3	55	<b>VPF50NBR</b>	<b>VPF50SI</b>	<b>VPF50STN(*)</b>

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

(\*) On request

### Choice of Fittings

Ø	M5-M	G1/8"-M	G1/4"-M	G3/8"-M
<b>15</b>	■	-	-	-
<b>20 - 30</b>	-	■	-	-
<b>40 - 50</b>	-	-	■	■

■ Standard available configurations (suction cup + fitting) Fittings: M = Male  
Refer to n° table above

### Type of Assembly

**C** **Version C: Barbed fitting**

**E** **Version E: Pressed fitting**

### References "Suction Cup + Fitting"

Ø 15 mm	THREAD	M5-M	Ø 20 - 30 mm	THREAD	G1/8"-M	G1/4"-M	G3/8"-M
Ø 15 mm	<b>VPF15NBR</b>	VPF15NBRIMM5C	Ø 20 - 30 mm	Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter
	<b>VPF15SI</b>	VPF15SIIMM5C					
	<b>VPF15STN</b>	VPF15STNIMM5C					
Ø 40 - 50 mm	<b>VPF40NBR</b>	VPF40NBRIM14MPF	Ø 40 - 50 mm	Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter
	<b>VPF40SI</b>	VPF40SIIM14MPF					
	<b>VPF40STN(*)</b>	VPF40STNIM14MPF					
	<b>VPF50NBR</b>	VPF50NBRIM14MPF					
	<b>VPF50SI</b>	VPF50SIIM14MPF					
	<b>VPF50STN(*)</b>	VPF50STNIM14MPF					

(\*) On request

### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 4 and 14.



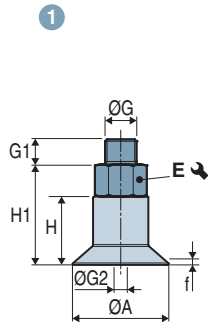
Please specify the part n°. e.g. VPF20NBRIM18MPF  
See part n° table above



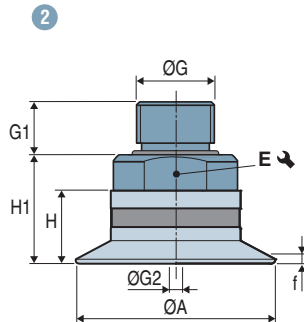


#### Suction Cup + Fitting

VPF 15



VPF 20...30



VPF 40...50

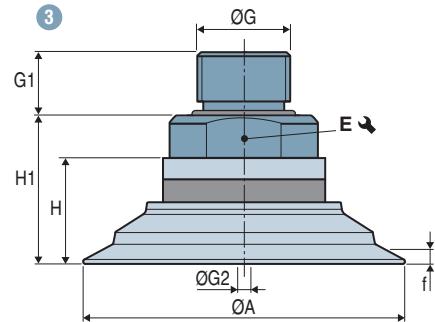
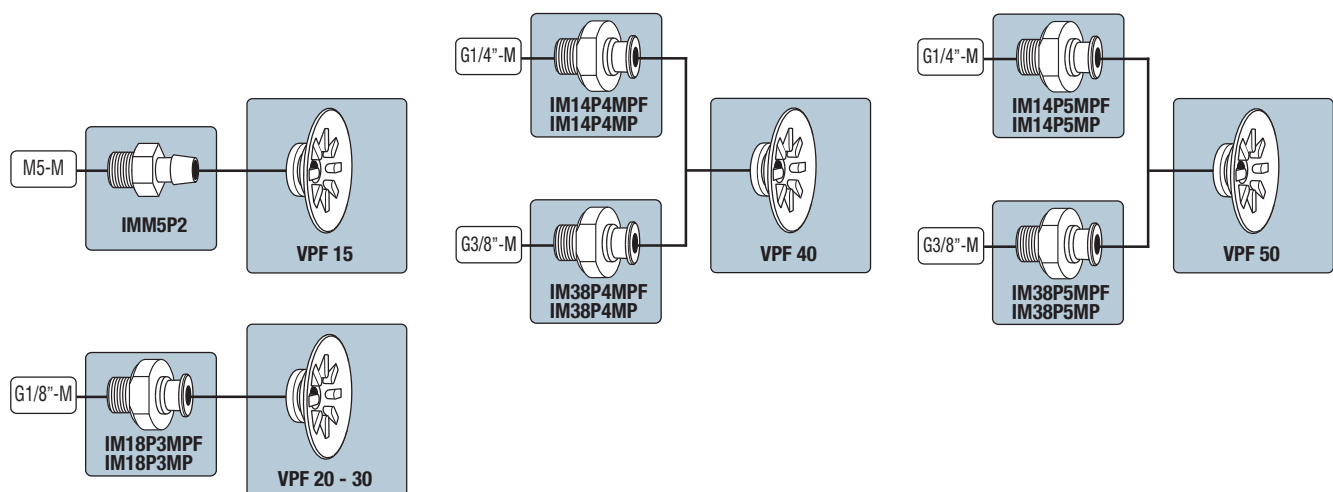


	Diagram	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E	g (g)
VPF15---IMM5C	1	15.7	1	11	15.5	M5-M	4	2.7	7	1.5
VPF20---IM18MP-	2	22	1	8	13	G1/8"-M	7	4	13	4.4
VPF25---IM18MP-	2	26.8	1.3	9	14	G1/8"-M	7	4	13	4.9
VPF30---IM18MP-	2	32	1.8	10	15	G1/8"-M	7	4	13	5.4
VPF40---IM14MP-	3	42.5	1.9	13	19	G1/4"-M	9	5	19	12.6
VPF40---IM38MP-	3	42.5	1.9	13	19	G3/8"-M	10	5	22	17.2
VPF50---IM14MP-	3	53	2.4	17.5	23.5	G1/4"-M	9	6	22	24.8
VPF50---IM38MP-	3	53	2.4	17.5	23.5	G3/8"-M	10	6	23.9	27.8

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

#### Assembly Diagrams



Note: All dimensions are in mm.



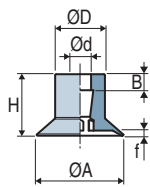
## Flat Suction Cups with Cleats Ø 15 to 50 mm

### Assembly Diagrams

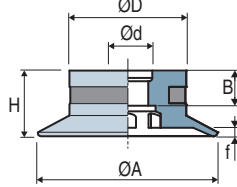


#### Suction Cups

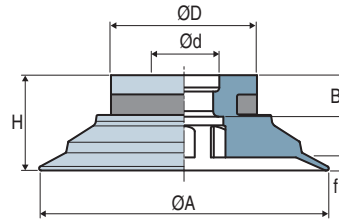
VPF 15



VPF 20...30



VPF 40...50

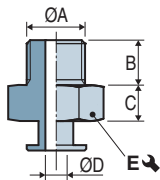


	Ø A	H	Ø d	Ø D	f <sup>(1)</sup>	B	(g)
<b>VPF 15</b>	15.7	11	4	9	1	3	0.7
<b>VPF 20</b>	22	8	5	14.3	1	4.5	1.2
<b>VPF 25</b>	26.8	9	5	14.3	1.3	4.5	1.7
<b>VPF 30</b>	32	10	5	14.3	1.8	4.5	2.2
<b>VPF 40</b>	42.5	13	7	20	1.9	6	5.6
<b>VPF 50</b>	53	17.5	10.5	27	2.4	7.5	12.7

(1) f = Deflection of the suction cup.

#### Barbed Fittings

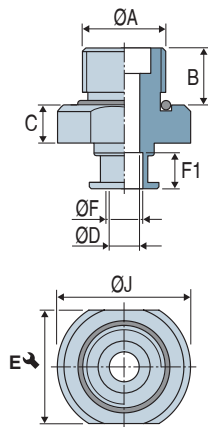
IMM5P2



	ØA	B	C	ØD	E	Material	(g)
<b>IMM5P2</b>	M5-M	4	4.5	2.7	7	Aluminum	0.8

#### Pressed fittings

Male fittings



Fitting with stainless steel filter 200 µm	Fitting without filter	ØA	B	C	ØD	E	ØJ	ØF	F1	Materials Fitting*	(g)
<b>IM18P3MPF</b>	<b>IM18P3MP</b>	G1/8"-M	7	5	4	13	15	5	4.7	Aluminum	3.2
<b>IM14P4MPF</b>	<b>IM14P4MP</b>	G1/4"-M	9	6	5	19	21	6	5.7	Aluminum	7
<b>IM14P5MPF</b>	<b>IM14P5MP</b>	G1/4"-M	9	6	6	22	28	10	8.7	Aluminum	12.1
<b>IM38P4MPF</b>	<b>IM38P4MP</b>	G3/8"-M	10	6	5	22	24	6	5.7	Aluminum	11.6
<b>IM38P5MPF</b>	<b>IM38P5MP</b>	G3/8"-M	10	6	6	23.9	28	10	8.7	Aluminum	15.1

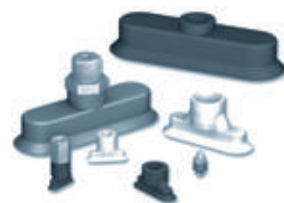
\*Male fittings (IM) equipped with O-ring sealing

Note: All dimensions are in mm.  
The values represent the average characteristics of our products.



# VPO

## Oblong Flat Suction Cups



The VPO series of flat suction cups is used for handling oblong products, such as pens, tubes and bottles, and flat or cylindrical objects.

### Materials

**NBR** Nitrile    **STN** SITON®    **SI** Silicone

Industry-specific applications



Types of use



### Suction Cup Properties

	I x L (mm)	(cm <sup>3</sup> )	(N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SI	STN
VPO 24	2x4	0.004	0.2	1	VPO24NBR	VPO24SI	VPO24STN
VPO 357	3.5x7	0.019	0.5	3	VPO357NBR	VPO357SI	VPO357STN
VPO 515	5x15	0.036	1.7	4	VPO515NBR	VPO515SI	VPO515STN
VPO 618	6x18	0.058	2.4	4	VPO618NBR	VPO618SI	VPO618STN
VPO 824	8x24	0.138	4.3	8	VPO824NBR	VPO824SI	VPO824STN
VPO 1030	10x30	0.28	6.6	8	VPO1030NBR	VPO1030SI	VPO1030STN
VPO 1545	15x45	0.98	15.3	10	VPO1545NBR	VPO1545SI	VPO1545STN
VPO 2060	20x60	2.3	27.1	20	VPO2060NBR	VPO2060SI	VPO2060STN
VPO 2575	25x75	4.7	42.4	30	VPO2575NBR	VPO2575SI	VPO2575STN
VPO 3090	30x90	8.5	61	35	VPO3090NBR	VPO3090SI	VPO3090STN

(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.

### Choice of Fittings

(Ø)	M3-M	M5-M	M5-F	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
24, 357	■	-	-	-	-	-	-
515, 618	-	■	■	-	-	-	-
824, 1030	-	-	-	■	■	-	-
1545... 3090	-	-	-	-	-	■	■

Collar must be used from 8 x 24 upwards to prevent unintentional rotation when in use.

■ Standard available configurations (suction cup + fitting): refer to n° table above

Fitting: M = male

F = female

### Type of Assembly



Version C: Barbed fitting

### References - "Suction Cup + Fitting"

	THREAD	M3-M		THREAD	G1/4"-M	G1/4"-F
2x4, 3.5x7	VPO24NBR	VPO24NBRIMM3C		VPO1545NBR	VPO1545NBRIM14C	VPO1545NBRIF14C
	VPO24SI	VPO24SIIMM3C		VPO1545SI	VPO1545SIIM14C	VPO1545SIIF14C
	VPO24STN	VPO24STNIMM3C		VPO1545STN	VPO1545STNIM14C	VPO1545STNIF14C
	VPO357NBR	VPO357NBRIMM3C		VPO2060NBR	VPO2060NBRIM14C	VPO2060NBRIF14C
	VPO357SI	VPO357SIIMM3C		VPO2060SI	VPO2060SIIM14C	VPO2060SIIF14C
	VPO357STN	VPO357STNIMM3C		VPO2060STN	VPO2060STNIM14C	VPO2060STNIF14C
5x15 - 6x18	THREAD	M5-M	M5-F	VPO2575NBR	VPO2575NBRIM14C	VPO2575NBRIF14C
	VPO515NBR	VPO515NBRIMM5C	VPO515NBRIFM5C	VPO2575SI	VPO2575SIIM14C	VPO2575SIIF14C
	VPO515SI	VPO515SIIMM5C	VPO515SIIFM5C	VPO2575STN	VPO2575STNIM14C	VPO2575STNIF14C
	VPO515STN	VPO515STNIMM5C	VPO515STNIFM5C	VPO3090NBR	VPO3090NBRIM14C	VPO3090NBRIF14C
	VPO618NBR	VPO618NBRIMM5C	VPO618NBRIFM5C	VPO3090SI	VPO3090SIIM14C	VPO3090SIIF14C
	VPO618SI	VPO618SIIMM5C	VPO618SIIFM5C	VPO3090STN	VPO3090STNIM14C	VPO3090STNIF14C
8x24 - 10x30	THREAD	G1/8"-M	G1/8"-F			
	VPO824NBR	VPO824NBRIM18C	VPO824NBRIF18C			
	VPO824SI	VPO824SIIM18C	VPO824SIIF18C			
	VPO824STN	VPO824STNIM18C	VPO824STNIF18C			
	VPO1030NBR	VPO1030NBRIM18C	VPO1030NBRIF18C			
	VPO1030SI	VPO1030SIIM18C	VPO1030SIIF18C			

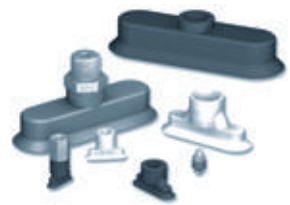
### Accessories

Anti-rotation spring system, see page 4/6



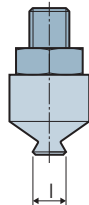
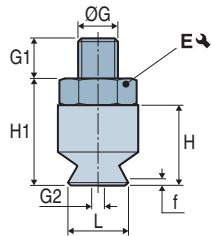
Please specify the part n°. e.g. VPO618NBRIFM5C  
See part n° table above





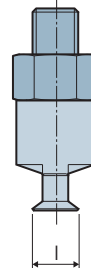
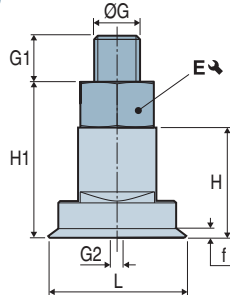
#### VPO 2x4 - 3.5x7

1

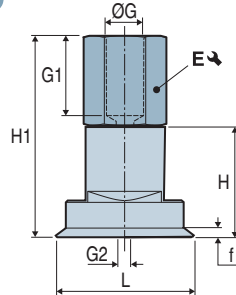


#### VPO 5x15 - 6x18

2

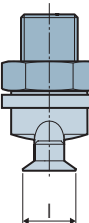
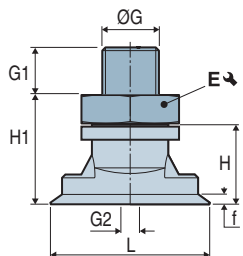


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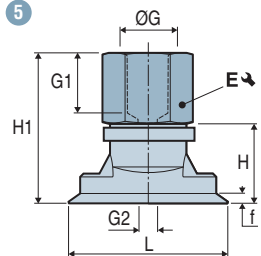


#### VPO 8x24 - 10x30

4

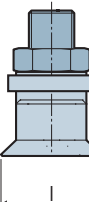
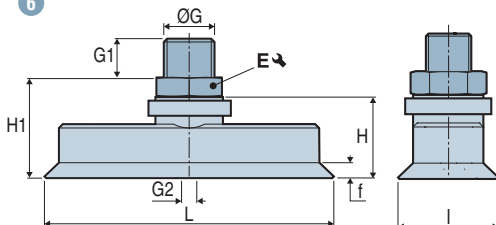


5



#### VPO 15x45 - 20x60 - 25x75 - 30x90

6



7

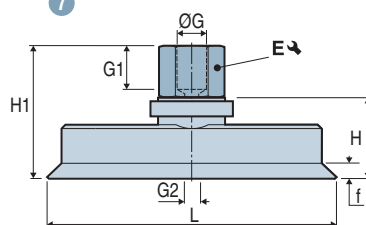


	Diagram	L	I	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E ↘	⚖ (g)
VPO24---IMM3C	1	4	2	0.5	6	8	M3-M	3	1	5	0.4
VPO357---IMM3C	1	7	3.5	0.8	6	8	M3-M	3	1	5	0.3
VPO515---IMM5C	2	15	5	0.7	12	17	M5-M	5	2	8	1.8
VPO515---IFM5C	3	15	5	0.7	12	22	M5-F	8.5	2	8	1.8
VPO618---IMM5C	2	18	6	0.8	12	17	M5-M	5	2	8	1.8
VPO618---IFM5C	3	18	6	0.8	12	22	M5-F	8.5	2	8	1.8
VPO824---IM18C	4	24	8	1	12	17	G1/8"-M	8	3.5	14	6.6
VPO824---IF18C	5	24	8	1	12	25	G1/8"-F	9	3.5	14	7.3
VPO1030---IM18C	4	30	10	1.5	12	17	G1/8"-M	8	3.5	14	6.8
VPO1030---IF18C	5	30	10	1.5	12	25	G1/8"-F	9	3.5	14	7.5
VPO1545---IM14C	6	45	15	2	21	26	G1/4"-M	10	3.5	17	16.5
VPO1545---IF14C	7	45	15	2	21	36	G1/4"-F	12	3.5	17	16.5
VPO2060---IM14C	6	60	20	2.5	21	26	G1/4"-M	10	3.5	17	19.7
VPO2060---IF14C	7	60	20	2.5	21	36	G1/4"-F	12	3.5	17	19.7
VPO2575---IM14C	6	75	25	2.8	21	26	G1/4"-M	10	3.5	17	27.9
VPO2575---IF14C	7	75	25	2.8	21	36	G1/4"-F	12	3.5	17	27.9
VPO3090---IM14C	6	90	30	3.5	21	26	G1/4"-M	10	3.5	17	36.3
VPO3090---IF14C	7	90	30	3.5	21	36	G1/4"-F	12	3.5	17	36.3

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.

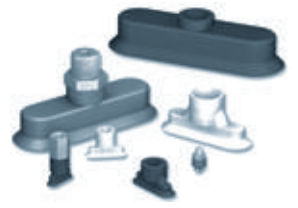
(2) Ø G2 = Ø internal orifice of the fitting.



# VPO

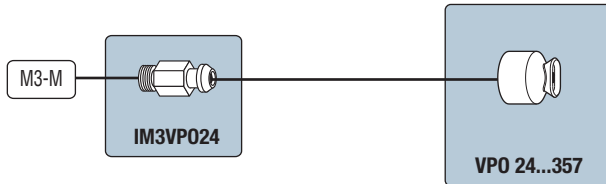
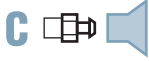
## Oblong Flat Suction Cups

### Assembly Diagrams



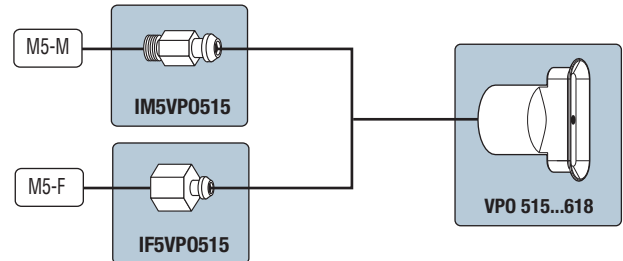
#### VPO 24 - 357

Barbed fittings



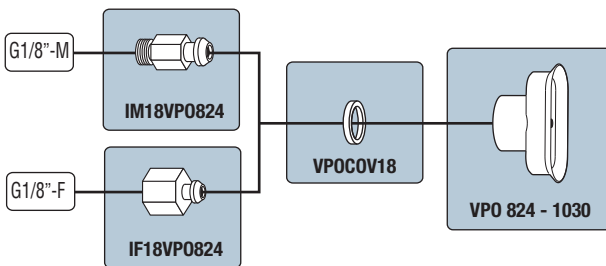
#### VPO 515 - 618

Barbed fittings



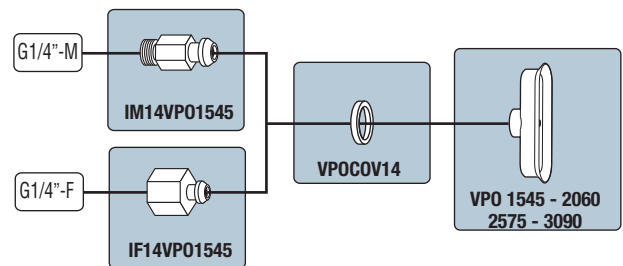
#### VPO 824 - 1030

Barbed fittings

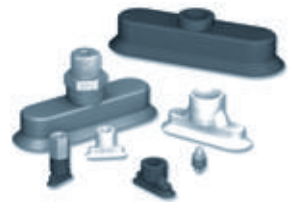


#### VPO 1545 - 2060 - 2575 - 3090

Barbed fittings

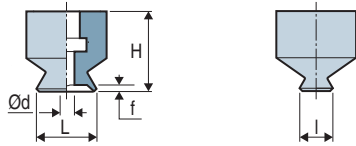




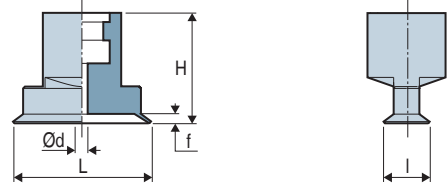


#### Dimensions Suction Cups

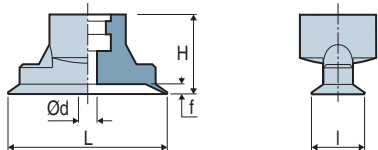
VPO 24 - 357



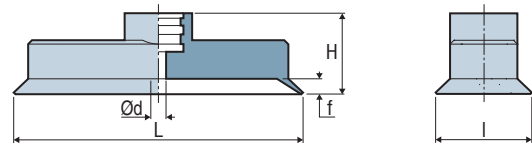
VPO 515 - 618





VPO 824 - 1030



VPO 1545 - 2060 - 2575 - 3090



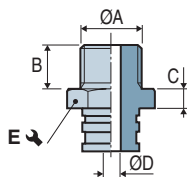
#### Suction Cups

	L	I	Ø d	H	f (1)	 (g)
VP024	4	2	0.7	6	0.5	0.12
VP0357	7	3.5	1	6	0.8	0.15
VP0515	15	5	1.2	12	0.7	0.51
VP0618	18	6	1.5	12	0.8	0.53
VP0824	24	8	1.5	12	1	1.1
VP01030	30	10	2.5	12	1.5	1.3
VP01545	45	15	3	21	2	4.1
VP02060	60	20	4	21	2.5	7.3
VP02575	75	25	4	21	2.8	15.5
VP03090	90	30	4	21	3.5	23.9

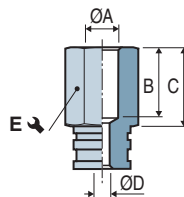
(1) f = Deflection of the suction cup.

#### Barbed Fitting

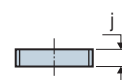
Male - IM





Female - IF



Collar



	ØA	B	C	ØD	E 	j	Material	 (g)
IM3VP024	M3-M	3	2	1	5	-	Aluminum	0.2
IM5VP0515	M5-M	5	5	2	8	-	Aluminum	1.3
IM18VP0824	G1/8"-M	8	5	3.5	14	-	Aluminum	3.9
IM14VP01545	G1/4"-M	10	5	3.5	17	-	Aluminum	9.7
IF5VP0515	M5-F	8.5	10	2	8	-	Aluminum	1.3
IF18VP0824	G1/8"-F	9	13	3.5	14	-	Aluminum	4.6
IF14VP01545	G1/4"-F	12	15	3.5	17	-	Aluminum	9.7
VPO COV18	-	-	-	-	-	4	Aluminum	1.6
VPO COV14	-	-	-	-	-	4	Aluminum	2.7

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.

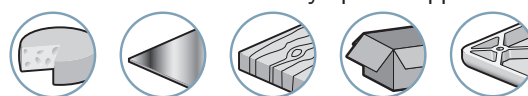
(1) f = Deflection of the suction cup.



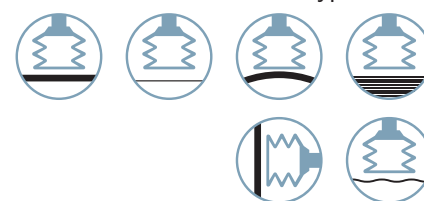


VSA series suction cups with bellows combine the advantages of flat suction cups with increased deflection, flexibility and precision. Used for gripping slightly concave or convex objects.

Industry-specific applications



Types of use



■ Flexibility ■ Precision ■ Deflection  
For delicate gripping requiring a very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.), we recommend using 35 Shore A white silicone, SIB. For larger diameters, see page 3/7, MVS series.

### Materials

<b>NBR</b>	Nitrile	<b>SIT5</b>	Translucent silicone
<b>NR</b>	Natural rubber	<b>SIB</b>	35 shore A white silicone
<b>STN</b>	SITON® 60 ShoreA	<b>STN5</b>	SITON® 50 ShoreA (on request)

### Suction Cup Properties

	Ø (mm)	(cm³)	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SIT5	SIB	NR	STN <sup>(2)</sup>
VSA 5	5.5	0.04	0.5	0.2	10	VSA5NBR	VSA5SIT5	-	-	VSA5STN
VSA 11	11	0.225	1.7	0.9	10	VSA11NBR	VSA11SIT5	-	-	VSA11STN
VSA 14	13	0.42	2.5	1.3	13	VSA14NBR	VSA14SIT5	-	-	VSA14STN
VSA 16	16	0.75	2.7	1.3	20	VSA16NBR	VSA16SIT5	VSA16SIB	VSA16NR	VSA16STN
VSA 18	18	0.76	4.4	2.2	25	VSA18NBR	VSA18SIT5	VSA18SIB	VSA18NR	VSA18STN
VSA 20	19	1.15	5.6	2.8	30	VSA20NBR	VSA20SIT5	VSA20SIB	VSA20NR	VSA20STN
VSA 22	22	1.4	6.1	3.1	25	VSA22NBR	VSA22SIT5	VSA22SIB	VSA22NR	VSA22STN
VSA 25	24	3.15	7.9	4.0	20	VSA25NBR	VSA25SIT5	VSA25SIB	VSA25NR	VSA25STN
VSA 26	25	3.9	10.8	5.4	30	VSA26NBR	VSA26SIT5	-	VSA26NR	VSA26STN
VSA 33	33	4.75	13.9	6.9	40	VSA33NBR	VSA33SIT5	-	VSA33NR	VSA33STN
VSA 43	43	9.25	20.2	10.1	60	VSA43NBR	VSA43SIT5	-	VSA43NR	VSA43STN
VSA 53	53	26.25	42.6	21.3	75	VSA53NBR	VSA53SIT5	-	VSA53NR	VSA53STN
VSA 63	63	39.0	59.2	29.6	75	VSA63NBR	VSA63SIT5	-	VSA63NR	VSA63STN
VSA 78	78	76.0	109.8	54.9	70	VSA78NBR	VSA78SIT5	-	VSA78NR	VSA78STN

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

(2) On request, some models are available in STN5 (SITON® 50 shore A)

### Choice of Fittings

(Ø)	Group	M3-M	M5-M	M6-M	M8-M	M10-M	G1/8"-F	G1/8"-M	10/32-M	G1/4"-F	G1/4"-M	G3/8"-M	G1/2"-M
5	1	■	-	-	-	-	-	-	-	-	-	-	-
11...25	1	-	■	■	-	-	■	■	□	-	-	-	-
26...63	2	-	□	□	□	□	■	■	-	■	■	-	-
78	3	-	-	-	-	□	-	■	-	■	■	■	□

■ Standard available configurations (suction cup + fitting): see page 2/28

□ Additional mounting configurations: see page 2/31 Fitting: M = male F = female

### Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations.

**C** **Version C**  
Barbed fitting

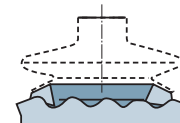
**S** **Version S**  
Factory-primed fitting

**V** **Version V**  
Removable fitting:  
(adapter and hollow screw)

**E** **Version E**  
Pressed fitting

### Textured Surfaces

For handling objects with a granular or textured gripping surface, use VSA suction cups with the VSBM foam strip option (see page 2/65).



### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.






Please specify the part n°. e.g. VSA78NBRIM14C  
Refer to page 2/28





Group 1		C				
Ø 5 - 25 mm	THREAD	M3-M	M5-M	M6-M	G1/8"-M	G1/8"-F
	VSA5NBR	VSA5NBRIMM3C	-	-	-	-
	VSA5SIT5	VSA5SIT5IMM3C	-	-	-	-
	VSA5STN	VSA5STNIMM3C	-	-	-	-
	VSA11NBR	-	VSA11NBRIMM5C	VSA11NBRIMM6C	VSA11NBRIM18C	VSA11NBRIF18C
	VSA11NR	-	VSA11NRIMM5C	VSA11NRIMM6C	VSA11NRIM18C	VSA11NRIF18C
	VSA11SIT5	-	VSA11SIT5IMM5C	VSA11SIT5IMM6C	VSA11SIT5IM18C	VSA11SIT5IF18C
	VSA11STN	-	VSA11STNIMM5C	VSA11STNIMM6C	VSA11STNIM18C	VSA11STNIF18C
	VSA14NBR	-	VSA14NBRIMM5C	VSA14NBRIMM6C	VSA14NBRIM18C	VSA14NBRIF18C
	VSA14NR	-	VSA14NRIMM5C	VSA14NRIMM6C	VSA14NRIM18C	VSA14NRIF18C
	VSA14SIT5	-	VSA14SIT5IMM5C	VSA14SIT5IMM6C	VSA14SIT5IM18C	VSA14SIT5IF18C
	VSA14STN	-	VSA14STNIMM5C	VSA14STNIMM6C	VSA14STNIM18C	VSA14STNIF18C
	VSA16NBR	-	VSA16NBRIMM5C	VSA16NBRIMM6C	VSA16NBRIM18C	VSA16NBRIF18C
	VSA16NR	-	VSA16NRIMM5C	VSA16NRIMM6C	VSA16NRIM18C	VSA16NRIF18C
	VSA16SIB	-	VSA16SIBIMM5C	VSA16SIBIMM6C	VSA16SIBIM18C	VSA16SIBIF18C
	VSA16SIT5	-	VSA16SIT5IMM5C	VSA16SIT5IMM6C	VSA16SIT5IM18C	VSA16SIT5IF18C
	VSA16STN	-	VSA16STNIMM5C	VSA16STNIMM6C	VSA16STNIM18C	VSA16STNIF18C
	VSA18NBR	-	VSA18NBRIMM5C	VSA18NBRIMM6C	VSA18NBRIM18C	VSA18NBRIF18C
	VSA18NR	-	VSA18NRIMM5C	VSA18NRIMM6C	VSA18NRIM18C	VSA18NRIF18C
	VSA18SIB	-	VSA18SIBIMM5C	VSA18SIBIMM6C	VSA18SIBIM18C	VSA18SIBIF18C
	VSA18SIT5	-	VSA18SIT5IMM5C	VSA18SIT5IMM6C	VSA18SIT5IM18C	VSA18SIT5IF18C
	VSA18STN	-	VSA18STNIMM5C	VSA18STNIMM6C	VSA18STNIM18C	VSA18STNIF18C
	VSA20NBR	-	VSA20NBRIMM5C	VSA20NBRIMM6C	VSA20NBRIM18C	VSA20NBRIF18C
	VSA20NR	-	VSA20NRIMM5C	VSA20NRIMM6C	VSA20NRIM18C	VSA20NRIF18C
	VSA20SIB	-	VSA20SIBIMM5C	VSA20SIBIMM6C	VSA20SIBIM18C	VSA20SIBIF18C
	VSA20SIT5	-	VSA20SIT5IMM5C	VSA20SIT5IMM6C	VSA20SIT5IM18C	VSA20SIT5IF18C
	VSA20STN	-	VSA20STNIMM5C	VSA20STNIMM6C	VSA20STNIM18C	VSA20STNIF18C
	VSA22NBR	-	VSA22NBRIMM5C	VSA22NBRIMM6C	VSA22NBRIM18C	VSA22NBRIF18C
	VSA22NR	-	VSA22NRIMM5C	VSA22NRIMM6C	VSA22NRIM18C	VSA22NRIF18C
	VSA22SIB	-	VSA22SIBIMM5C	VSA22SIBIMM6C	VSA22SIBIM18C	VSA22SIBIF18C
	VSA22SIT5	-	VSA22SIT5IMM5C	VSA22SIT5IMM6C	VSA22SIT5IM18C	VSA22SIT5IF18C
	VSA22STN	-	VSA22STNIMM5C	VSA22STNIMM6C	VSA22STNIM18C	VSA22STNIF18C
	VSA25NBR	-	VSA25NBRIMM5C	VSA25NBRIMM6C	VSA25NBRIM18C	VSA25NBRIF18C
	VSA25NR	-	VSA25NRIMM5C	VSA25NRIMM6C	VSA25NRIM18C	VSA25NRIF18C
	VSA25SIB	-	VSA25SIBIMM5C	VSA25SIBIMM6C	VSA25SIBIM18C	VSA25SIBIF18C
	VSA25SIT5	-	VSA25SIT5IMM5C	VSA25SIT5IMM6C	VSA25SIT5IM18C	VSA25SIT5IF18C
	VSA25STN	-	VSA25STNIMM5C	VSA25STNIMM6C	VSA25STNIM18C	VSA25STNIF18C

Additional mounting configurations are available (see page 2/31). For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.

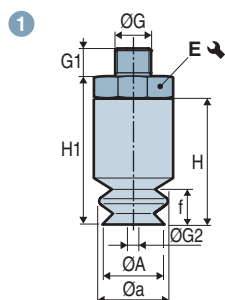
Group 2									
Ø 26 - 63 mm	THREAD	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
	VSA26NBR	VSA26NBRIM14C	VSA26NBRIF14C	VSA26NBRIM14	VSA26NBRIF14	VSA26NBRIM18V	VSA26NBRIF18V	VSA26NBRIM14V	VSA26NBRIF14V
	VSA26NR	VSA26NRIM14C	VSA26NRIF14C	VSA26NRIM14	VSA26NRIF14	VSA26NRIM18V	VSA26NRIF18V	VSA26NRIM14V	VSA26NRIF14V
	VSA26SIT5	VSA26SIT5IM14C	VSA26SIT5IF14C	VSA26SIT5IM14	VSA26SIT5IF14	VSA26SIT5IM18V	VSA26SIT5IF18V	VSA26SIT5IM14V	VSA26SIT5IF14V
	VSA26STN	VSA26STNIM14C	VSA26STNIF14C	VSA26STNIM14	VSA26STNIF14	VSA26STNIM18V	VSA26STNIF18V	VSA26STNIM14V	VSA26STNIF14V
	VSA33NBR	VSA33NBRIM14C	VSA33NBRIF14C	VSA33NBRIM14	VSA33NBRIF14	VSA33NBRIM18V	VSA33NBRIF18V	VSA33NBRIM14V	VSA33NBRIF14V
	VSA33NR	VSA33NRIM14C	VSA33NRIF14C	VSA33NRIM14	VSA33NRIF14	VSA33NRIM18V	VSA33NRIF18V	VSA33NRIM14V	VSA33NRIF14V
	VSA33SIT5	VSA33SIT5IM14C	VSA33SIT5IF14C	VSA33SIT5IM14	VSA33SIT5IF14	VSA33SIT5IM18V	VSA33SIT5IF18V	VSA33SIT5IM14V	VSA33SIT5IF14V
	VSA33STN	VSA33STNIM14C	VSA33STNIF14C	VSA33STNIM14	VSA33STNIF14	VSA33STNIM18V	VSA33STNIF18V	VSA33STNIM14V	VSA33STNIF14V
	VSA43NBR	VSA43NBRIM14C	VSA43NBRIF14C	VSA43NBRIM14	VSA43NBRIF14	VSA43NBRIM18V	VSA43NBRIF18V	VSA43NBRIM14V	VSA43NBRIF14V
	VSA43NR	VSA43NRIM14C	VSA43NRIF14C	VSA43NRIM14	VSA43NRIF14	VSA43NRIM18V	VSA43NRIF18V	VSA43NRIM14V	VSA43NRIF14V
	VSA43SIT5	VSA43SIT5IM14C	VSA43SIT5IF14C	VSA43SIT5IM14	VSA43SIT5IF14	VSA43SIT5IM18V	VSA43SIT5IF18V	VSA43SIT5IM14V	VSA43SIT5IF14V
	VSA43STN	VSA43STNIM14C	VSA43STNIF14C	VSA43STNIM14	VSA43STNIF14	VSA43STNIM18V	VSA43STNIF18V	VSA43STNIM14V	VSA43STNIF14V
	VSA53NBR	VSA53NBRIM14C	VSA53NBRIF14C	VSA53NBRIM14	VSA53NBRIF14	VSA53NBRIM18V	VSA53NBRIF18V	VSA53NBRIM14V	VSA53NBRIF14V
	VSA53NR	VSA53NRIM14C	VSA53NRIF14C	VSA53NRIM14	VSA53NRIF14	VSA53NRIM18V	VSA53NRIF18V	VSA53NRIM14V	VSA53NRIF14V
	VSA53SIT5	VSA53SIT5IM14C	VSA53SIT5IF14C	VSA53SIT5IM14	VSA53SIT5IF14	VSA53SIT5IM18V	VSA53SIT5IF18V	VSA53SIT5IM14V	VSA53SIT5IF14V
	VSA53STN	VSA53STNIM14C	VSA53STNIF14C	VSA53STNIM14	VSA53STNIF14	VSA53STNIM18V	VSA53STNIF18V	VSA53STNIM14V	VSA53STNIF14V
	VSA63NBR	VSA63NBRIM14C	VSA63NBRIF14C	VSA63NBRIM14	VSA63NBRIF14	VSA63NBRIM18V	VSA63NBRIF18V	VSA63NBRIM14V	VSA63NBRIF14V
	VSA63NR	VSA63NRIM14C	VSA63NRIF14C	VSA63NRIM14	VSA63NRIF14	VSA63NRIM18V	VSA63NRIF18V	VSA63NRIM14V	VSA63NRIF14V
	VSA63SIT	VSA63SITIM14C	VSA63SITIF14C	VSA63SITIM14	VSA63SITIF14	VSA63SITIM18V	VSA63SITIF18V	VSA63SITIM14V	VSA63SITIF14V
	VSA63STN	VSA63STNIM14C	VSA63STNIF14C	VSA63STNIM14	VSA63STNIF14	VSA63STNIM18V	VSA63STNIF18V	VSA63STNIM14V	VSA63STNIF14V

Group 3		V			S		
Ø 78 mm	THREAD	G1/8"-M	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G3/8"-M
	VSA78NBR	VSA78NBRIM18V	VSA78NBRIM14V	VSA78NBRIF14V	VSA78NBRIM14	VSA78NBRIF14	VSA78NBRIM38
	VSA78NR	VSA78NRIM18V	VSA78NRIM14V	VSA78NRIF14V	VSA78NRIM14	VSA78NRIF14	VSA78NRIM38
	VSA78SIT5	VSA78SIT5IM18V	VSA78SIT5IM14V	VSA78SIT5IF14V	VSA78SIT5IM14	VSA78SIT5IF14	VSA78SIT5IM38
	VSA78STN	VSA78STNIM18V	VSA78STNIM14V	VSA78STNIF14V	VSA78STNIM14	VSA78STNIF14	VSA78STNIM38

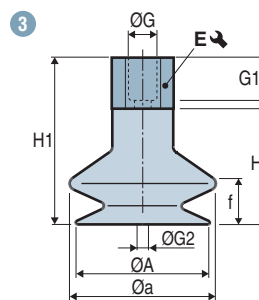
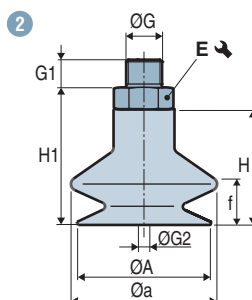




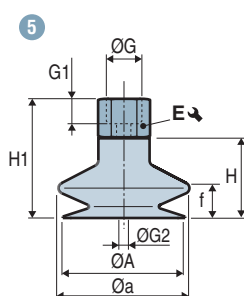
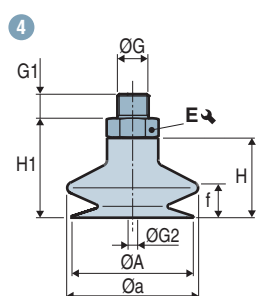
#### VSA 5 Group 1



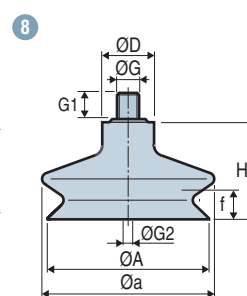
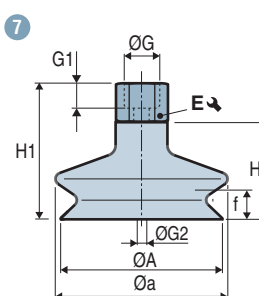
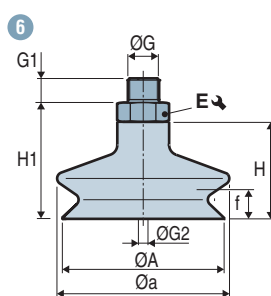
#### VSA 11 - 25 Group 1





#### VSA 26 - 43 Group 2



#### VSA 53 - 63 Group 2 / VSA 78 Group 3





Group 1		Diagram	ØA	Øa	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
Ø 5 - 25 mm	VSA5---IMM3C	1	5.5	6	-	2	11	13	M3-M	3	1.4	5	0.7
	VSA11---IMM5C	2	11	12.2	-	5.5	16	21	M5-M	4.5	2.5	7	4
	VSA11---IMM6C	2	11	12.2	-	5.5	16	21	M6-M	5	3.5	7	3.6
	VSA11---IM18C	2	11	12.2	-	5.5	16	22	G1/8"-M	7.5	3.5	14	5
	VSA11---IF18C	3	11	12.2	-	5.5	16	28	G1/8"-F	8	3.5	14	4.9
	VSA14---IMM5C	2	13	14	-	5	16	21	M5-M	4.5	2.5	7	4.2
	VSA14---IMM6C	2	13	14	-	5	16	21	M6-M	5	3.5	7	3.8
	VSA14---IM18C	2	13	14	-	5	16	22	G1/8"-M	7.5	3.5	14	5.2
	VSA14---IF18C	3	13	14	-	5	16	28	G1/8"-F	8	3.5	14	5.1
	VSA16---IMM5C	2	16	17.3	-	8.5	19	24	M5-M	4.5	2.5	7	4.4
	VSA16---IMM6C	2	16	17.3	-	8.5	19	24	M6-M	5	3.5	7	4
	VSA16---IM18C	2	16	17.3	-	8.5	19	25	G1/8"-M	7.5	3.5	14	5.4
	VSA16---IF18C	3	16	17.3	-	8.5	19	31	G1/8"-F	8	3.5	14	5.3
	VSA18---IMM5C	2	18	18	-	5	16.5	21.5	M5-M	4.5	2.5	7	4.6
	VSA18---IMM6C	2	18	18	-	5	16.5	21.5	M6-M	5	3.5	7	4.2
	VSA18---IM18C	2	18	18	-	5	16.5	22.5	G1/8"-M	7.5	3.5	14	5.6
	VSA18---IF18C	3	18	18	-	5	16.5	28.5	G1/8"-F	8	3.5	14	5.5
	VSA20---IMM5C	2	19	20	-	5	16	21	M5-M	4.5	2.5	7	4.8
	VSA20---IMM6C	2	19	20	-	5	16	21	M6-M	5	3.5	7	5.8
	VSA20---IM18C	2	19	20	-	5	16	22	G1/8"-M	7.5	3.5	14	5.8
	VSA20---IF18C	3	19	20	-	5	16	28	G1/8"-F	8	3.5	14	5.7
	VSA22---IMM5C	2	22	24	-	8	19	24	M5-M	4.5	2.5	7	5.2
	VSA22---IMM6C	2	22	24	-	8	19	24	M6-M	5	3.5	7	4.8
	VSA22---IM18C	2	22	24	-	8	19	25	G1/8"-M	7.5	3.5	14	6.2
	VSA22---IF18C	3	22	24	-	8	19	31	G1/8"-F	8	3.5	14	6.1
	VSA25---IMM5C	2	24	25	-	10	23	28	M5-M	4.5	2.5	7	6
	VSA25---IMM6C	2	24	25	-	10	23	28	M6-M	5	3.5	7	5.8
	VSA25---IM18C	2	24	25	-	10	23	29	G1/8"-M	7.5	3.5	14	7
	VSA25---IF18C	3	24	25	-	10	23	35	G1/8"-F	8	3.5	14	6.9

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.





Group 2		Diagram	ØA	Øa	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
Ø 26 - 63 mm	VSA26---IM18V	4	25	30	-	6	25	29.5	G1/8"-M	6	3.5	13	18.7
	VSA26---IF18V	5	25	30	-	6	25	38	G1/8"-F	7.5	3.5	13	22
	VSA26---IM14	4	25	30	-	6	25	29	G1/4"-M	11	4.4	17	12.4
	VSA26---IM14C	4	25	30	-	6	25	33	G1/4"-M	10	7	17	13.3
	VSA26---IM14V	4	25	30	-	6	25	30	G1/4"-M	8	3.5	17	28
	VSA26---IF14	5	25	30	-	6	25	40	G1/4"-F	10	4.4	17	13
	VSA26---IF14C	5	25	30	-	6	25	40	G1/4"-F	12	6.9	17	12.6
	VSA26---IF14V	5	25	30	-	6	25	41	G1/4"-F	11	3.5	17	32.6
	VSA33---IM18V	4	33	36.2	-	11	27.5	32	G1/8"-M	6	3.5	13	21.1
	VSA33---IF18V	5	33	36.2	-	11	27.5	40.5	G1/8"-F	7.5	3.5	13	24.4
	VSA33---IM14	4	33	36.2	-	11	27.5	31.5	G1/4"-M	11	4.4	17	14.8
	VSA33---IM14C	4	33	36.2	-	11	27.5	35.5	G1/4"-M	10	7	17	15.7
	VSA33---IM14V	4	33	36.2	-	11	27.5	32.5	G1/4"-M	8	3.5	17	30.4
	VSA33---IF14	5	33	36.2	-	11	27.5	42.5	G1/4"-F	10	4.4	17	15.4
	VSA33---IF14C	5	33	36.2	-	11	27.5	42.5	G1/4"-F	12	6.9	17	15
	VSA33---IF14V	5	33	36.2	-	11	27.5	43.5	G1/4"-F	11	3.5	17	35
	VSA43---IM18V	4	43	46	-	12.5	28	32.5	G1/8"-M	6	3.5	13	25.9
	VSA43---IF18V	5	43	46	-	12.5	28	41	G1/8"-F	7.5	3.5	13	29.2
	VSA43---IM14	4	43	46	-	12.5	28	32	G1/4"-M	11	4.4	17	19.6
	VSA43---IM14C	4	43	46	-	12.5	28	36	G1/4"-M	10	7	17	20.5
	VSA43---IM14V	4	43	46	-	12.5	28	33	G1/4"-M	8	3.5	17	35.2
	VSA43---IF14	5	43	46	-	12.5	28	43	G1/4"-F	10	4.4	17	20.2
	VSA43---IF14C	5	43	46	-	12.5	28	43	G1/4"-F	12	6.9	17	19.8
	VSA43---IF14V	5	43	46	-	12.5	28	44	G1/4"-F	11	3.5	17	39.8
	VSA53---IM18V	6	53	59	-	15	34	38.5	G1/8"-M	6	3.5	13	35
	VSA53---IF18V	7	53	59	-	15	34	47	G1/8"-F	7.5	3.5	13	38.3
	VSA53---IM14	6	53	59	-	15	34	38	G1/4"-M	11	4.4	17	28.7
	VSA53---IM14C	6	53	59	-	15	34	42	G1/4"-M	10	7	17	29.6
	VSA53---IM14V	6	53	59	-	15	34	39	G1/4"-M	8	3.5	17	44.3
	VSA53---IF14	7	53	59	-	15	34	49	G1/4"-F	10	4.4	17	29.3
	VSA53---IF14C	7	53	59	-	15	34	49	G1/4"-F	12	6.9	17	28.9
	VSA53---IF14V	7	53	59	-	15	34	50	G1/4"-F	11	3.5	17	48.9
VSA63---IM18V	6	63	67	-	15	34	38.5	G1/8"-M	6	3.5	13	39.1	
VSA63---IF18V	7	63	67	-	15	34	47	G1/8"-F	7.5	3.5	13	42.4	
VSA63---IM14	6	63	67	-	15	34	38	G1/4"-M	11	4.4	17	32.8	
VSA63---IM14C	6	63	67	-	15	34	42	G1/4"-M	10	7	17	33.7	
VSA63---IM14V	6	63	67	-	15	34	39	G1/4"-M	8	3.5	17	48.4	
VSA63---IF14	7	63	67	-	15	34	49	G1/4"-F	10	4.4	17	33.4	
VSA63---IF14C	7	63	67	-	15	34	49	G1/4"-F	12	6.9	17	33	
VSA63---IF14V	7	63	67	-	15	34	50	G1/4"-F	11	3.5	17	53	

#### Group 3

Ø 78 mm	VSA78---IM18V	8	78	83	25	14	46.8	-	G1/8"-M	8	6	-	85.4
	VSA78---IM14	6	78	83	-	14	46.8	52.8	G1/4"-M	11	8	21	70.2
	VSA78---IM14V	6	78	83	-	14	46.8	51.8	G1/4"-M	8	6	17	92.7
	VSA78---IF14	7	78	83	-	14	46.8	61.8	G1/4"-F	10	8	21	74.1
	VSA78---IF14V	7	78	83	-	14	46.8	65.8	G1/4"-F	9	6	17	102.3
	VSA78---IM38	6	78	83	-	14	46.8	52.8	G3/8"-M	11	8	21	72.4

Note: All dimensions are in mm.

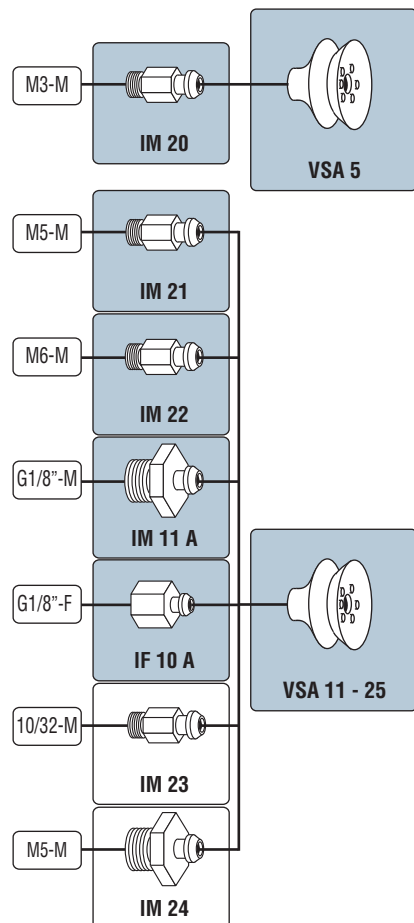
(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.





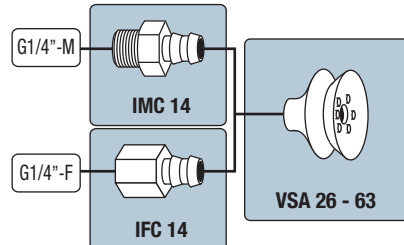
#### VSA 5 - 25 Group 1

Barbed fittings

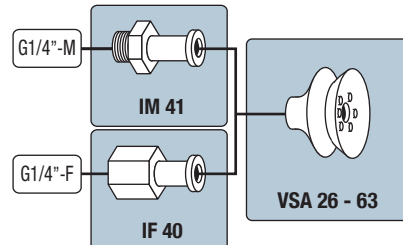


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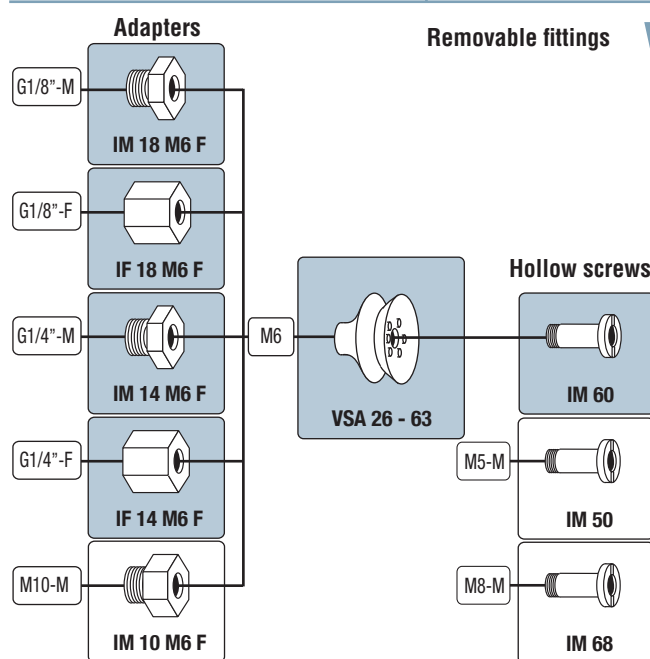
Barbed fittings



Pressed fittings

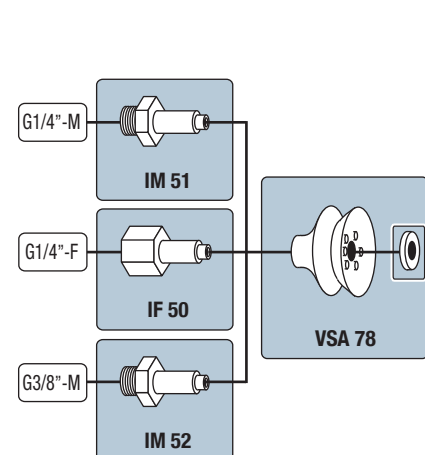


Removable fittings

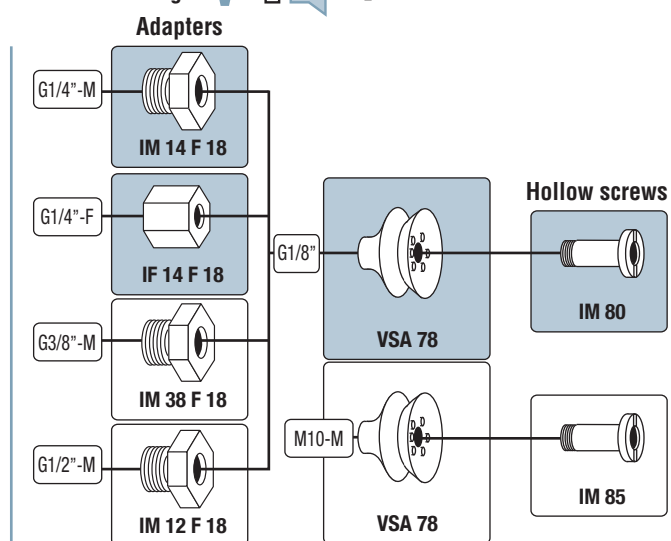


#### VSA 78 Group 3

Factory-criped fittings



Removable fittings



- Configurations (suction cup + fitting) refer to pages 2/28
- Non-standard configurations must be ordered in separate part numbers.

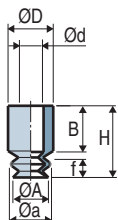
Fittings and suction cups dimensions: see page 2/32.



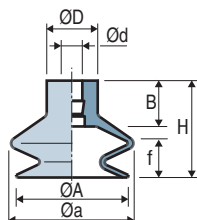


#### Suction Cups

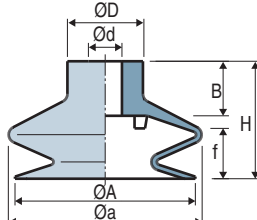
VSA 5



VSA 11 - 25

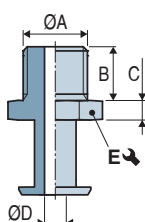


VSA 26 - 78

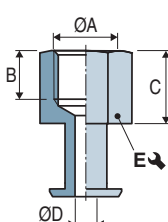


#### Pressed Fittings

Male - IM



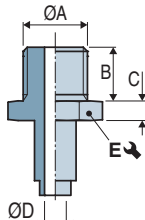
Female - IF



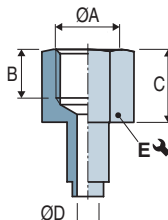
	ØA	B	C	ØD	E	Material	(g)
IM41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF40	G1/4"-F	10	15	4.4	17	Aluminum	8.4

#### Factory-Crimped Fittings

Male - IM

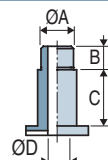


Female - IF

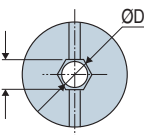


	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	4.4	17	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

#### Hollow Screws



IM60: ●4  
IM80: ●6



	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 (2) (3)	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.7
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

The values represent the average characteristics of our products.

(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10)

(3) Available in stainless steel

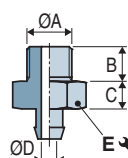


	Ø A	H	Ø a	Ø d	Ø D	f <sup>(1)</sup>	B	(g)
VSA 5	5.5	11	6	4	7	2	7	0.3
VSA 11	11	16	12.2	4	10	5.5	9	0.9
VSA 14	13	16	14	4	10	5	9	1.1
VSA 16	16	19	17.3	4	10	8.5	9	1.3
VSA 18	18	16.5	18	4	10	5	9	1.5
VSA 20	19	16	20	4	10	5	9	1.7
VSA 22	22	19	24	4	10	8	9	2.1
VSA 25	24	23	25	4	10	10	9	2.9
VSA 26	25	25	30	8	16	6	13	4.6
VSA 33	33	27.5	36.2	8	18	11	13	7
VSA 43	43	28	46	8	18	12.5	13	11.8
VSA 53	53	34	59	8	18	15	13	20.9
VSA 63	63	34	67	8	18	15	13	25
VSA 78	78	46.8	83	12	25	14	20	58.4

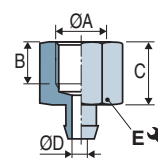
(1) f = Deflection of the suction cup.

#### Barbed Fittings

Male - IM



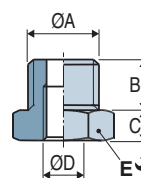
Female - IF



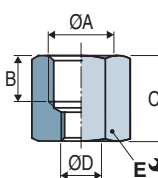
	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM20	M3-M	3	2	1.4	5	Aluminum	0.4
IM 21 (2)	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 (2)	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated brass	3.2
IF 10 A	G1/8"-F	8	12	3.5	14	Aluminum	4
IFC 14	G1/4"-F	12	15	6.9	17	Aluminum	8

#### Adapters for Hollow Screws

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 12 F18	G1/2"-M	14	6	M6-F	22	Nickel-plated brass	46.5
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 14 F18	G1/4"-M	8	5	G1/8"-F	17	Nickel-plated brass	10.6
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IM 38 F18	G3/8"-M	9	5	G1/8"-F	19	Nickel-plated brass	18.8
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9
IF 14 F18	G1/4"-F	9	19	G1/8"-F	17	Nickel-plated brass	20.2

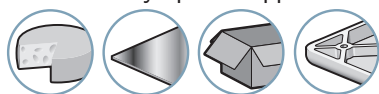
Note: All dimensions are in mm.





The VSAB series 1.5 bellows suction cups are suitable for gripping slightly concave or convex products. And due to their stroke, VSAB cups are capable of gripping products at varying heights.

Industry-specific applications



Types of use



### Materials

**NBR** Nitrile    **STN** SITON®    **SI** Translucent silicone

### Suction Cup Properties

	Ø (mm)	Volume (cm³)	Force (N) (1)	Force (N) (1)	R <sub>min</sub> (mm)	NBR	SI	STN
VSAB 5	5.6	0.05	0.4	0.1	1.5	VSAB5NBR	VSAB5SI	VSAB5STN
VSAB 8	8.8	0.15	0.9	0.4	1.9	VSAB8NBR	VSAB8SI	VSAB8STN
VSAB 10	11	0.48	1.7	0.9	4	VSAB10NBR	VSAB10SI	VSAB10STN
VSAB 15	15.7	1.1	3.0	1.5	5	VSAB15NBR	VSAB15SI	VSAB15STN
VSAB 20	22	2.7	5.1	2.5	10	VSAB20NBR	VSAB20SI	VSAB20STN
VSAB 30	34	10	11.6	5.8	15	VSAB30NBR	VSAB30SI	VSAB30STN
VSAB 40	43	15	18.8	9.4	20	VSAB40NBR	VSAB40SI	VSAB40STN
VSAB 50	53	32	31.8	15.9	30	VSAB50NBR	VSAB50SI	VSAB50STN

(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### Choice of Fittings

(Ø)	M5-M	G1/8"-M	G1/4"-M	G3/8"-M
5...15	■	-	-	-
20	-	■	-	-
30...50	-	-	■	■

■ Standard available configurations (suction cup + fitting) Fitting: M = male  
See part n° table below

### Type of Assembly

**C** **Version C: Barbed fitting**

**E** **Version E: Pressed fitting**

### References - "Suction Cup + Fitting"

Ø 5 - 15 mm	THREAD	<b>C</b>	THREAD	<b>E</b>
Ø 5 - 15 mm	VSAB5NBR	VSAB5NBRIMM5C	Ø 20 mm	G1/8"-M
	VSAB5SI	VSAB5SIIMM5C		
	VSAB5STN	VSAB5STNIMM5C		
	VSAB8NBR	VSAB8NBRIMM5C		
	VSAB8SI	VSAB8SIIMM5C		
	VSAB8STN	VSAB8STNIMM5C		
	VSAB10NBR	VSAB10NBRIMM5C		
	VSAB10SI	VSAB10SIIMM5C		
	VSAB10STN	VSAB10STNIMM5C		
	VSAB15NBR	VSAB15NBRIMM5C		
Ø 30 - 50 mm	VSAB15SI	VSAB15SIIMM5C	Ø 30 - 50 mm	G1/4"-M
	VSAB15STN	VSAB15STNIMM5C		
	VSAB30NBR	VSAB30NBRIM14MPF		
	VSAB30SI	VSAB30SIIM14MPF		
	VSAB30STN	VSAB30STNIM14MPF		
	VSAB40NBR	VSAB40NBRIM14MPF		G3/8"-M
	VSAB40SI	VSAB40SIIM14MPF		
	VSAB40STN	VSAB40STNIM14MPF		
	VSAB50NBR	VSAB50NBRIM14MPF		
	VSAB50SI	VSAB50SIIM14MPF		
	VSAB50STN	VSAB50STNIM14MPF		

### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 4 and 14.



Please specify the part n°. e.g. VSAB30NBRIM14MPF  
See part n° table above





#### Suction Cup + Fitting

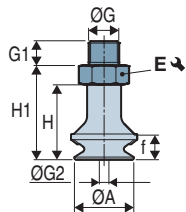
VSAB 5...15

VSAB 20...30

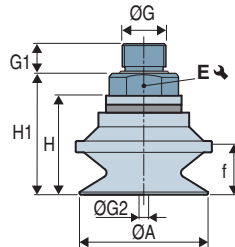
VSAB 40

VSAB 50

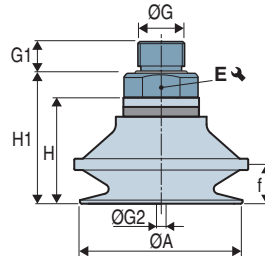
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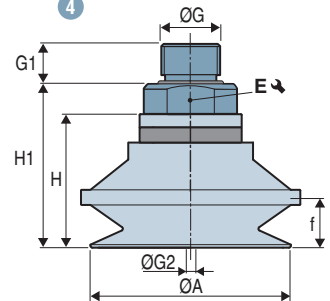
2



3



4

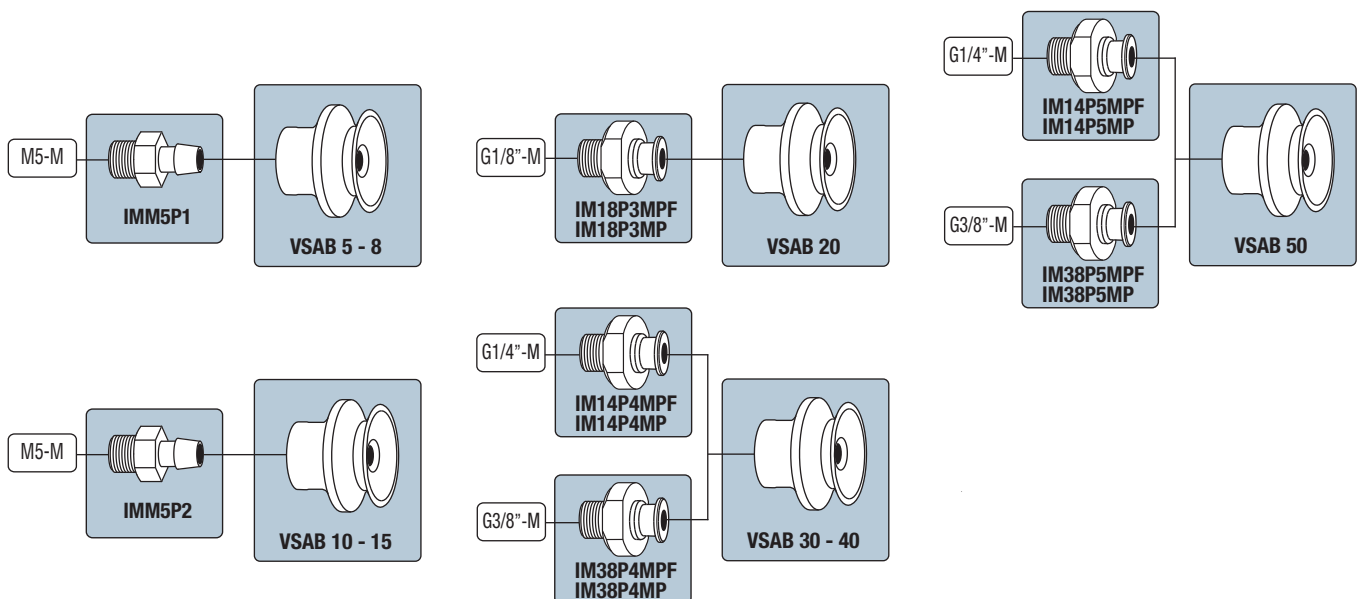


	Diagrams	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E ↘	⚖ (g)
VSAB5---IMM5C	1	5.6	1.5	9.2	12.7	M5-M	4	1.5	7	1.8
VSAB8---IMM5C	1	8.8	3.5	11.9	15.4	M5-M	4	1.5	7	2
VSAB10---IMM5C	1	11	4.5	16.4	20.9	M5-M	4	2.7	7	1.6
VSAB15---IMM5C	1	15.7	6.5	19.8	24.3	M5-M	4	2.7	7	2.1
VSAB20---IM18MP-	2	22	10	19	24	G1/8"-M	7	4	13	5.7
VSAB30---IM14MP-	2	34	15	26.2	32.2	G1/4"-M	9	5	19	13.9
VSAB30---IM38MP-	2	34	15	26.2	32.2	G3/8"-M	10	5	22	18.5
VSAB40---IM14MP-	3	43	15	28	34	G1/4"-M	9	5	19	19.6
VSAB40---IM38MP-	3	43	15	28	34	G3/8"-M	10	5	22	24.2
VSAB50---IM14MP-	4	53	13	35.3	41.3	G1/4"-M	9	6	22	33.8
VSAB50---IM38MP-	4	53	13	35.3	41.3	G3/8"-M	10	6	23.9	36.8

(1) f = Deflection of the suction cup.

(2) Ø G2 = Ø internal orifice of the fitting.

#### Assembly Diagrams



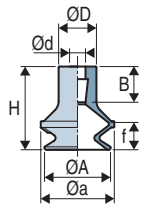
Note: All dimensions are in mm.



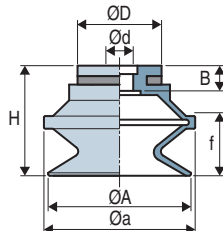


#### Suction Cups

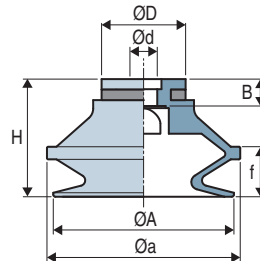
VSAB 5...15



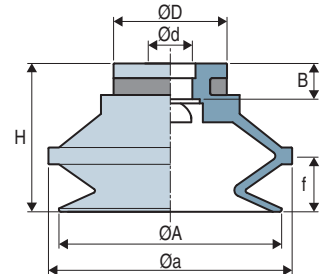
VSAB 20...30



VSAB 40



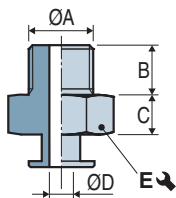
VSAB 50



	ØA	H	Øa	Ød	ØD	f (1)	B	⚖ (g)
<b>VSAB 5</b>	5.6	9.2	6.2	2	4.5	1.5	5.8	0.12
<b>VSAB 8</b>	8.8	11.9	9.6	2	5.5	3.5	5.9	0.27
<b>VSAB 10</b>	11	16.4	12	3.8	9	4.5	8.5	0.8
<b>VSAB 15</b>	15.7	19.8	17.5	3.8	9	6.5	8.5	1.3
<b>VSAB 20</b>	22	19	24	5	14.5	10	4.5	2.5
<b>VSAB 30</b>	34	26.2	36	6.5	20	15	6	6.9
<b>VSAB 40</b>	43	28	46	6.5	20	15	6.4	12.6
<b>VSAB 50</b>	53	35.3	58	10.5	27	13	8.5	21.7

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

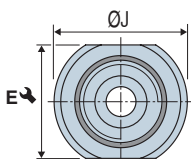
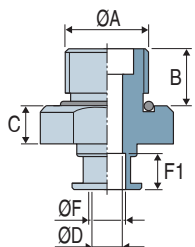
#### Barbed Fittings



	ØA	B	C	ØD	E	Material	⚖ (g)
<b>IMM5P1</b>	M5-M	4	3.5	1.5	7	Brass	1.7
<b>IMM5P2</b>	M5-M	4	4.5	2.7	7	Aluminum	0.8

#### Pressed fittings

Male fittings



Fitting with stainless steel filter 200 µm	Fitting without filter	ØA	B	C	ØD	E	ØJ	ØF	F1	Materials Fitting*	⚖ (g)
<b>IM18P3MPF</b>	<b>IM18P3MP</b>	G1/8"-M	7	5	4	13	15	5	4.7	Aluminum	3.2
<b>IM14P4MPF</b>	<b>IM14P4MP</b>	G1/4"-M	9	6	5	19	21	6	5.7	Aluminum	7
<b>IM14P5MPF</b>	<b>IM14P5MP</b>	G1/4"-M	9	6	6	22	28	10	8.7	Aluminum	12.1
<b>IM38P4MPF</b>	<b>IM38P4MP</b>	G3/8"-M	10	6	5	22	24	6	5.7	Aluminum	11.6
<b>IM38P5MPF</b>	<b>IM38P5MP</b>	G3/8"-M	10	6	6	23.9	28	10	8.7	Aluminum	15.1

\*Male fittings (IM) equipped with O-ring sealing

Note: All dimensions are in mm.  
The values represent the average characteristics of our products.



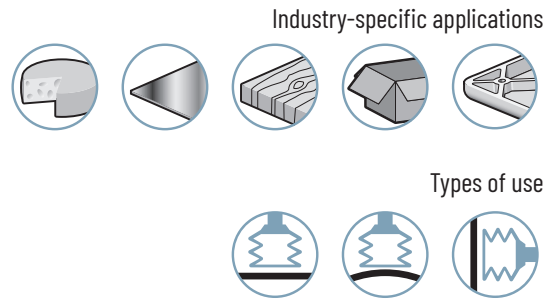




## Suction Cups with 1.5 Bellows Ø 10 to 150 mm



The VSAG series 1.5 bellows suction cups are recommended for gripping concave or convex products as well as sensitive products due to the cushioning effect of the bellows. The bellows also compensate for height variations in product gripping.



2

### Materials

**NBR** Nitrile  
**SI** Translucent silicone  
**STN** SITON®

### Suction Cup Properties

	Ø (mm)	(cm²)	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SI	STN
VSAG 10	10.7	0.2	1.8	0.9	4	VSAG10NBR	VSAG10SI	VSAG10STN
VSAG 15	15	0.7	2.5	1.3	6	VSAG15NBR	VSAG15SI	VSAG15STN
VSAG 20B	20	1	4.8	2.4	8	VSAG20BNBR	VSAG20BSI	VSAG20BSTN
VSAG 30	30	4	15.2	7.6	15	VSAG30NBR	VSAG30SI	-
VSAG 40	40	9	23.1	11.6	30	VSAG40NBR	VSAG40SI	-
VSAG 50	50	26	38.3	18.8	40	VSAG50NBR	VSAG50SI	-
VSAG 75	75	76	90.3	44.8	70	VSAG75NBR	VSAG75SI	VSAG75STN
VSAG 110	110	280	191.4	93.9	100	VSAG110NBR	VSAG110SI	VSAG110STN
VSAG 150	150	640	377.7	187.8	130	VSAG150NBR	VSAG150SI	-

(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### Choice of Fittings

(Ø)	M5-F	M5-M	M6-M	M10-M	M10x125F	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F	G1/2"-F
10...15	■	■	-	-	-	■	■	-	-	-
20...50	-	-	■	□	-	■	■	■	■	-
75	-	-	-	-	■	-	-	■	■	-
110...150	-	-	-	-	-	-	-	-	-	■

■ Standard available configurations (suction cup + fitting)  
 refer to page 2/38

□ Additional mounting configurations  
 see page 2/40

Fitting: M = male

F = female

### Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations:

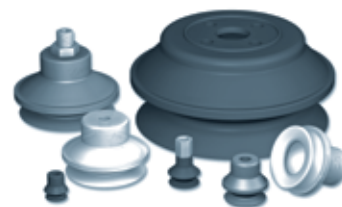
- C** **Version C**  
Barbed fitting
- V** **Version V**  
Removable fitting  
(adapter and hollow screw)
- E** **Version E**  
Pressed fitting


### Accessories



To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring extensions, and feeder systems, etc.) see chapters 4 and 14.


Please specify the part n°. e.g. VSAG10NBRIM18C  
 Refer to page 2/38






Ø 10 - 15 mm	THREAD	C 			
	THREAD	M5-M	M5-F	G1/8"-M	G1/8"-F
	VSAG10NBR	VSAG10NBRIMM5C	VSAG10NBRIFM5C	VSAG10NBRIM18C	VSAG10NBRIF18C
	VSAG10SI	VSAG10SIIMM5C	VSAG10SIIFM5C	VSAG10SIIM18C	VSAG10SIIF18C
	VSAG10STN	VSAG10STNIMM5C	VSAG10STNIFM5C	VSAG10STNIM18C	VSAG10STNIF18C
	VSAG15NBR	VSAG15NBRIMM5C	VSAG15NBRIFM5C	VSAG15NBRIM18C	VSAG15NBRIF18C
	VSAG15SI	VSAG15SIIMM5C	VSAG15SIIFM5C	VSAG15SIIM18C	VSAG15SIIF18C
	VSAG15STN	VSAG15STNIMM5C	VSAG15STNIFM5C	VSAG15STNIM18C	VSAG15STNIF18C

		<b>E</b> 		<b>V</b> 				
Ø 20 - 50 mm	THREAD	G1/8"-M	G1/8"-F	M6-M	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
	VSAG20BNBR	VSAG20BNBRIM18	VSAG20BNBRIF18	VSAG20BNBRIMM6V	VSAG20BNBRIM18V	VSAG20BNBRIF18V	VSAG20BNBRIM14V	VSAG20BNBRIF14V
	VSAG20BSI	VSAG20BSIIM18	VSAG20BSIIF18	VSAG20BSIIMM6V	VSAG20BSIIM18V	VSAG20BSIIF18V	VSAG20BSIIM14V	VSAG20BSIIF14V
	VSAG20BSTN	VSAG20BSTNIM18	VSAG20BSTNIF18	VSAG20BSTNIMM6V	VSAG20BSTNIM18V	VSAG20BSTNIF18V	VSAG20BSTNIM14V	VSAG20BSTNIF14V
	VSAG30NBR	VSAG30NBRIM18	VSAG30NBRIF18	VSAG30NBRIMM6V	VSAG30NBRIM18V	VSAG30NBRIF18V	VSAG30NBRIM14V	VSAG30NBRIF14V
	VSAG30SI	VSAG30SIIM18	VSAG30SIIF18	VSAG30SIIMM6V	VSAG30SIIM18V	VSAG30SIIF18V	VSAG30SIIM14V	VSAG30SIIF14V
	VSAG40NBR	VSAG40NBRIM18	VSAG40NBRIF18	VSAG40NBRIMM6V	VSAG40NBRIM18V	VSAG40NBRIF18V	VSAG40NBRIM14V	VSAG40NBRIF14V
	VSAG40SI	VSAG40SIIM18	VSAG40SIIF18	VSAG40SIIMM6V	VSAG40SIIM18V	VSAG40SIIF18V	VSAG40SIIM14V	VSAG40SIIF14V
	VSAG50NBR	-	-	VSAG50NBRIMM6V	VSAG50NBRIM18V	VSAG50NBRIF18V	VSAG50NBRIM14V	VSAG50NBRIF14V
	VSAG50SI	-	-	VSAG50SIIMM6V	VSAG50SIIM18V	VSAG50SIIF18V	VSAG50SIIM14V	VSAG50SIIF14V

Ø 75 mm	THREAD	V 		
	THREAD	M10x125 F	G1/4"-M	G1/4"-F
	VSAG75NBR	VSAG75NBR	VSAG75NBRIM14V	VSAG75NBRIF14V
	VSAG75SI	VSAG75SI	VSAG75SIIM14V	VSAG75SIIF14V
	VSAG75STN	VSAG75STN	VSAG75STNIM14V	VSAG75STNIF14V

Ø 110 - 150 mm	THREAD	V 	
	THREAD	G1/2"-F *	G1/2"-F **
	VSAG110NBR	VSAG110NBRIFS12V	VSAG110NBRIF12V
	VSAG110SI	VSAG110SIIFS12V	VSAG110SIIF12V
	VSAG110STN	VSAG110STNIFS12V	VSAG110STNIF12V
	VSAG150NBR	VSAG150NBRIFS12V	VSAG150NBRIF12V
	VSAG150SI	VSAG150SIIFS12V	VSAG150SIIF12V

\*Configured using fitting n° IFS12120

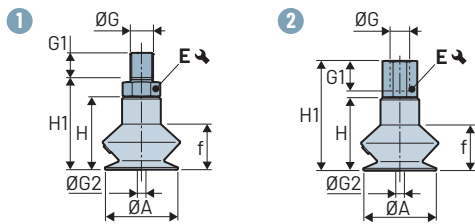
\*\* Configured using fitting n° IF12120

Additional mounting configurations are available (see page 2/40).  
For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.

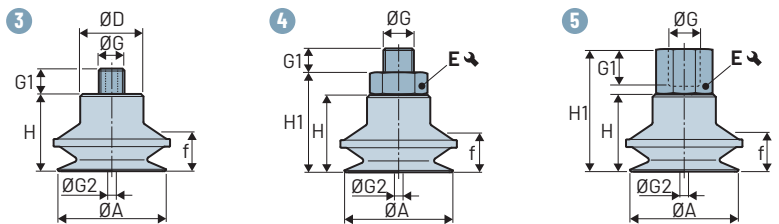




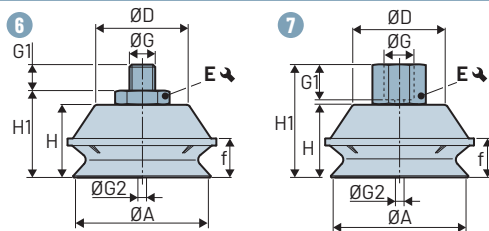
#### VSAG 10 - 15



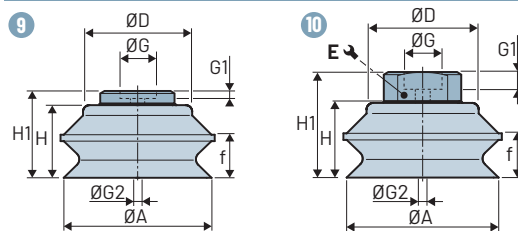
#### VSAG 20B - 50





#### VSAG 75



#### VSAG 110 - 150



		Diagrams	Ø A	Ø D	f <sup>(1)</sup>	H	H1	Ø G	G1	Ø G2 <sup>(2)</sup>	E 	 (g)
Ø 10 - 15 mm	VSAG10---IMM5C	1	10.7	-	5	13.3	16.8	M5-M	4.5	2.2	7	1.3
	VSAG10---IFM5C	2	10.7	-	5	13.3	22.3	M5-F	6	2.2	8	1.8
	VSAG10---IM18C	1	10.7	-	5	13.3	18.3	G1/8"-M	8	2.2	14	4.5
	VSAG10---IF18C	2	10.7	-	5	13.3	28.3	G1/8"-F	9	2.2	14	5.7
	VSAG15---IMM5C	1	15	-	10	16	19.5	M5-M	4.5	2.2	7	1.6
	VSAG15---IFM5C	2	15	-	10	16	25	M5-F	6	2.2	8	2.1
	VSAG15---IM18C	1	15	-	10	16	21	G1/8"-M	8	2.2	14	4.8
VSAG15---IF18C	2	15	-	10	16	31	G1/8"-F	9	2.2	14	6	
Ø 20 - 40 mm	VSAG20B---IM18	4	20	-	12	22	27	G1/8"-M	8	4	14	7.1
	VSAG20B---IF18	5	20	-	12	22	37	G1/8"-F	9	4	14	8.5
	VSAG20B---IMM6V	3	20	15	12	22	-	M6-M	6	3.5	-	5.7
	VSAG20B---IM18V	4	20	-	12	22	26.5	G1/8"-M	6	3.5	13	12.3
	VSAG20B---IF18V	5	20	-	12	22	35	G1/8"-F	7.5	3.5	13	15.6
	VSAG20B---IM14V	4	20	-	12	22	27	G1/4"-M	8	3.5	17	21.6
	VSAG20B---IF14V	5	20	-	12	22	38	G1/4"-F	11	3.5	17	26.2
	VSAG30---IM18	4	30	-	17	30.5	35.5	G1/8"-M	8	4	14	13.2
	VSAG30---IF18	5	30	-	17	30.5	45.5	G1/8"-F	9	4	14	14.6
	VSAG30---IMM6V	3	30	20	17	30.5	-	M6-M	6	3.5	-	11.8
	VSAG30---IM18V	4	30	-	17	30.5	35	G1/8"-M	6	3.5	13	18.4
	VSAG30---IF18V	5	30	-	17	30.5	43.5	G1/8"-F	7.5	3.5	13	21.7
	VSAG30---IM14V	4	30	-	17	30.5	35.5	G1/4"-M	8	3.5	17	27.7
	VSAG30---IF14V	5	30	-	17	30.5	46.5	G1/4"-F	11	3.5	17	32.3
	VSAG40---IM18	4	40	-	15.5	30.5	35.5	G1/8"-M	8	4	14	18.8
	VSAG40---IF18	5	40	-	15.5	30.5	45.5	G1/8"-F	9	4	14	20.2
	VSAG40---IMM6V	3	40	25	15.5	30.5	-	M6-M	6	3.5	-	17.4
	VSAG40---IM18V	4	40	-	15.5	30.5	35	G1/8"-M	6	3.5	13	24
	VSAG40---IF18V	5	40	-	15.5	30.5	43.5	G1/8"-F	7.5	3.5	13	27.3
	VSAG40---IM14V	4	40	-	15.5	30.5	35.5	G1/4"-M	8	3.5	17	33.3
	VSAG40---IF14V	5	40	-	15.5	30.5	46.5	G1/4"-F	11	3.5	17	37.9
Ø 50 mm	VSAG50---IMM6V	3	50	-	20	36.5	-	M6-M	6	3.5	-	30
	VSAG50---IM18V	4	50	-	20	36.5	41	G1/8"-M	6	3.5	13	36.6
	VSAG50---IF18V	5	50	-	20	36.5	49.5	G1/8"-F	7.5	3.5	13	40
	VSAG50---IM14V	4	50	-	20	36.5	41.5	G1/4"-M	8	3.5	17	45.9
	VSAG50---IM14F	5	50	-	20	36.5	52.5	G1/4"-F	11	3.5	17	50.4
Ø 75 - 150 mm	VSAG75---	8	75	50.5	22	43.2	-	M10x125-F	-	-	-	87.6
	VSAG75---IM14V	6	75	50.5	22	43.2	48.2	G1/4"-M	10	5	17	94.6
	VSAG75---IF14V	7	75	50.5	22	43.2	60.2	G1/4"-F	10	5	17	95.9
	VSAG110---IF12V	10	110	85	32.5	55	85	G1/2"-F	24	19	48	488.8
	VSAG110---IFS12V	9	110	85	32.5	55	68	G1/2"-F	13	-	-	407.5
	VSAG150---IF12V	10	150	120	39.5	75.5	105.5	G1/2"-F	24	19	48	911.4
	VSAG150---IFS12V	9	150	120	39.5	75.5	88.5	G1/2"-F	13	-	-	830.1

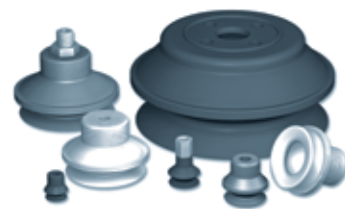
Note: All dimensions are in mm.

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.



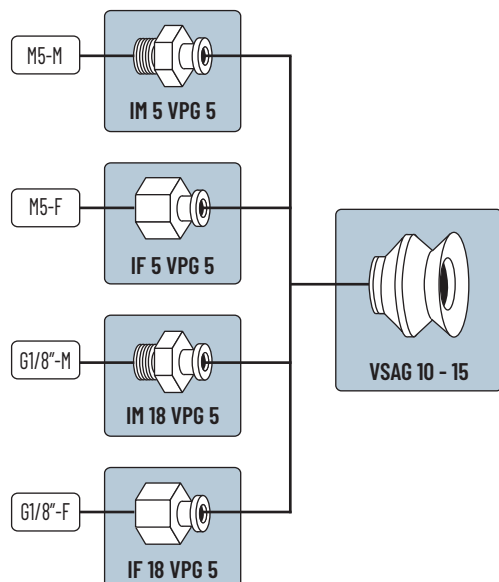
## Suction Cups with 1.5 Bellows Ø 10 to 150 mm

### Assembly Diagrams



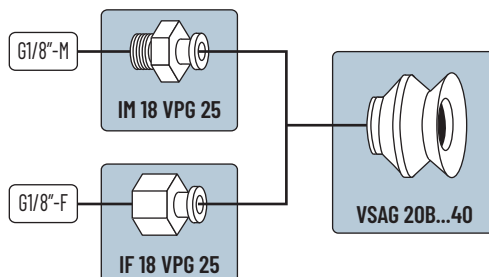
#### VSAG 10 - 15

Barbed fittings



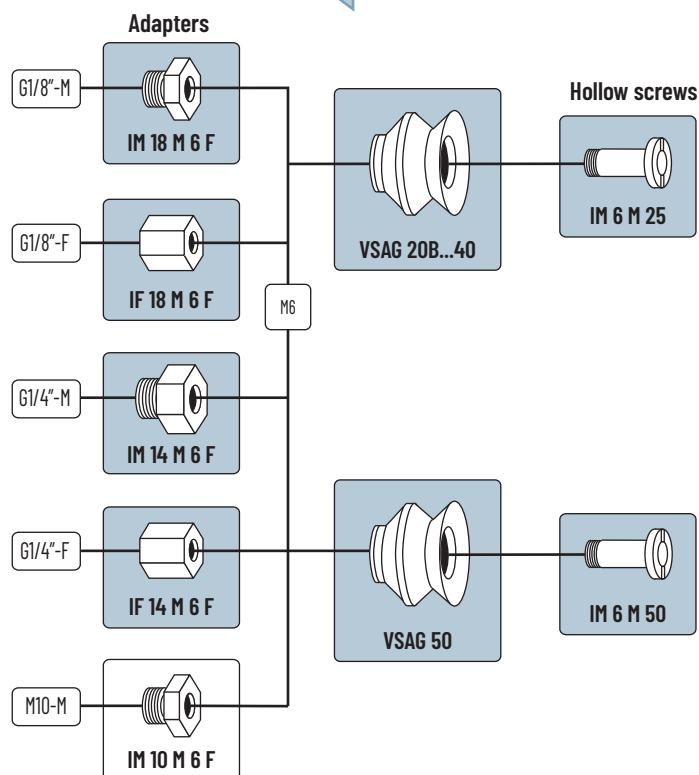
#### VSAG 20B - 40

Pressed fittings



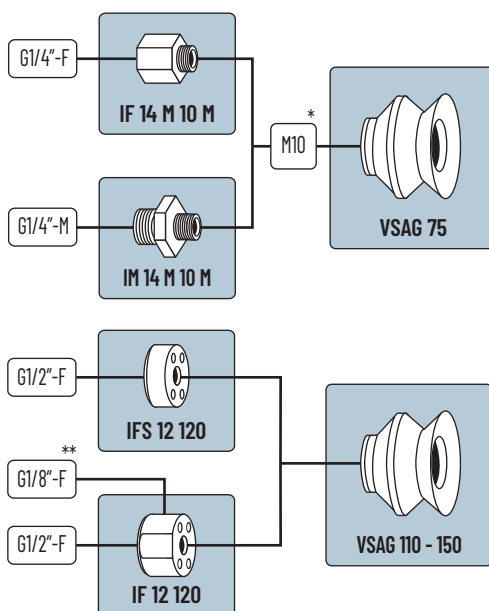
#### VSAG 20B - 50

Removable fittings



#### VSAG 75 - 150

Removable fittings

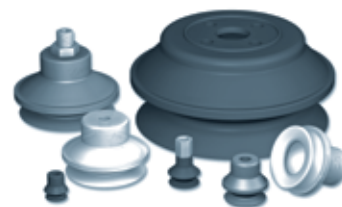


\* 125 thread

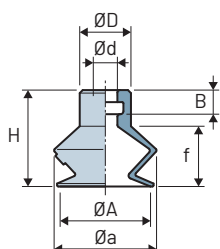
\*\* Female auxiliary radial output

Fittings and suction cups dimensions:  
see pages 2/41 and 2/42.

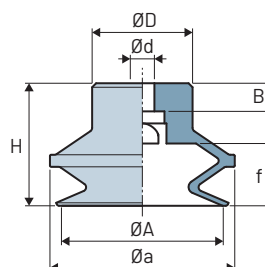




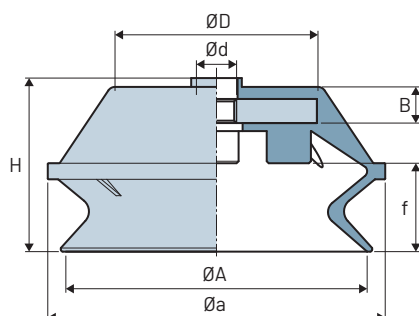
#### VSAG 10 - 15



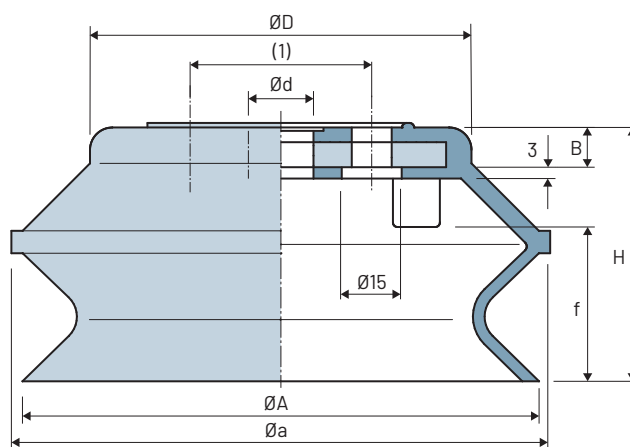
#### VSAG 20 - 50





#### VSAG 75



#### VSAG 110 - 150



(1) 4 holes Ø 9 on Ø 40

 (Ø)	Ø A	H	Ø a	Ø d	Ø D	f <sup>(1)</sup>	B	 (g)
VSAG 10	10.7	13.3	12.5	4	8.5	5	4	0.6
VSAG 15	15	16	17	4	8.5	10	4	0.9
VSAG 20 B	20	22	24	6	15	12	7	3
VSAG 30	30	30.5	36	6	20	17	7	9.1
VSAG 40	40	30.5	46	6	25	15.5	7	14.7
VSAG 50	50	36.5	59.5	7.8	28.5	20	7	22.5
VSAG 75	75	43.2	84	M10 x 125 - F	50.5	22	9	87.6
VSAG 110	110	55	121.5	14	85	32.5	9	264
VSAG 150	150	75.5	166	13	120	39.5	11	686.6

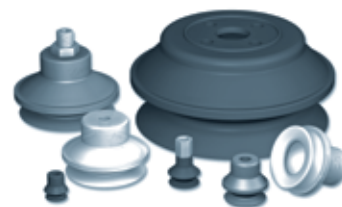
The values represent the average characteristics of our products.  
Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.



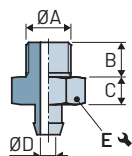
## Suction Cups with 1.5 Bellows Ø 10 to 150 mm

### Dimensions - Fittings

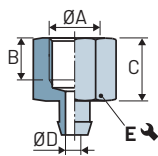


#### Barbed fittings

Male - IM



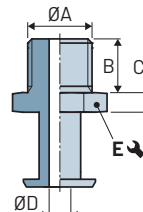
Female - IF



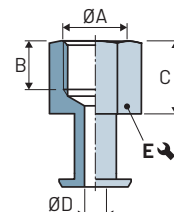
	ØA	B	C	ØD	E	Material	⚖ (g)
IM 5 VPG5	M5-M	4.5	3.5	2.2	7	Aluminum	0.7
IM 18 VPG5	G1/8"-M	8	5	2.2	14	Aluminum	3.9
IF 5 VPG5	M5-F	6	9	2.2	8	Aluminum	1.2
IF 18 VPG5	G1/8"-F	9	15	2.2	14	Aluminum	5.1

#### Pressed Fittings

Male - IM

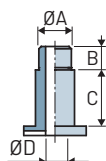


Female - IF



	ØA	B	C	ØD	E	Material	⚖ (g)
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.08
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5

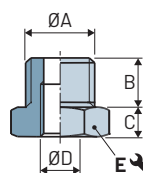
#### Hollow Screws



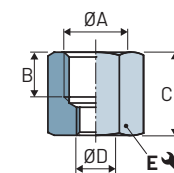
	ØA	B	C	ØD	Material	⚖ (g)
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7
IM 6 M50	M6-M	6	6	3.5	Nickel-plated brass	7.5

#### Adapters for Hollow Screws

Male - IM



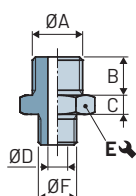
Female - IF



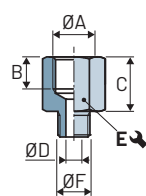
	ØA	B	C	ØD	E	Material	⚖ (g)
IM 10 M6F	M10-M	7	3.5	M6	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9

#### Removable Fittings

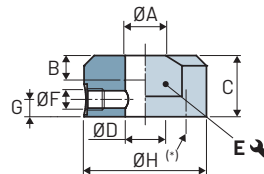
Male - IM



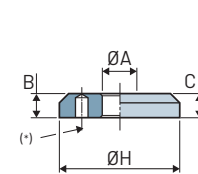
Female - IF



Female - IF 12120



Female - IFS 12120



(1) 4 holes Ø 9 on Ø 40

	ØA	B	C	ØD	E	ØF	G	H	Material	⚖ (g)
IM 14 M10M	G1/4"-M	10	5	5	17	M10x125-M	-	-	Aluminum	7
IF 14 M10M	G1/4"-F	10	17	5	17	M10x125-M	-	-	Aluminum	8.3
IF 12120	G1/2"-F	24	30	19	48	G1/8"-F	8.7	60	Aluminum	224.8
IFS 12120	G1/2"-F	13	13	-	-	-	-	65	Aluminum	143.5

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.



## Suction Cups with 1.5 Bellows Ø 15 to 30 mm

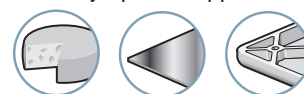
The VSAJ series 1.5 bellows suction cups are recommended to grip slightly convex or concave products. They are also able to compensate for height variations in products being gripped.

### Materials

**NBR** Nitrile  
**SI** Translucent silicone




Industry-specific applications



Types of use




### Suction Cup Properties

	Ø (mm)	Volume (cm³)	Force (N) (1)	Force (N) (1)	R <sub>min</sub> (mm)	NBR	SI
VSAJ 15	15	0.5	3.6	1.8	10	VSAJ15NBR	VSAJ15SI
VSAJ 20	20	1.2	6.9	3.4	13	VSAJ20NBR	VSAJ20SI
VSAJ 30	30	3	13.4	6.6	26	VSAJ30NBR	VSAJ30SI

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

### Choice of Fittings

 (Ø)	M5-M	M6-M	M10-M	G1/8"-F	G1/8"-M	G1/4"-F	G1/4"-M
15...20	■	-	-	■	■	-	-
30	-	■	□	■	■	■	■

■ Standard available configurations (suction cup + fitting) □ Additional mounting configurations  
refer to page 2/44 see page 2/45

Fitting: M = male F = female

### Types of Assembly

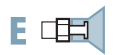
COVAL suction cups can be assembled in a wide variety of configurations:



**Version C**  
Barbed fitting



**Version V**  
Removable fitting  
(adapter and hollow screw)



**Version E**  
Pressed fitting



Please specify the part n°. e.g. VSAJ20NBRIM18C  
Refer to page 2/44

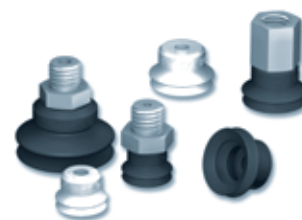
### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (spring systems, extensions, feeder systems, etc.) see chapters 4 and 14.



## Suction cups with 1.5 bellows Ø 15 to 30 mm

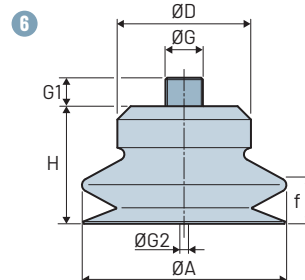
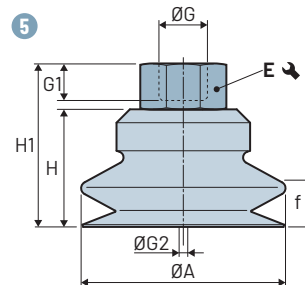
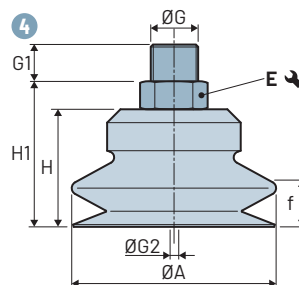
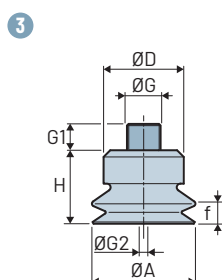
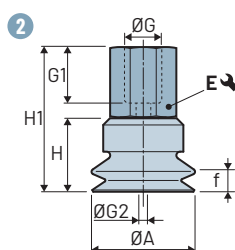
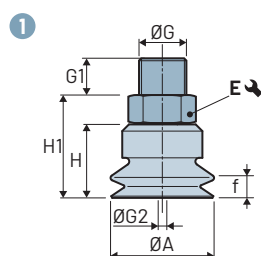
References and Dimensions - "Suction Cup + Fitting"





## References - "Suction Cup + Fitting"

Ø 15 - 20 mm	THREAD	<b>G1/8"-M</b>	<b>G1/8"-F</b>	<b>M5-M</b>	<b>G1/8"-M</b>	<b>G1/8"-F</b>
	<b>VSAJ15NBR</b>	VSAJ15NBRIM18C	VSAJ15NBRIF18C	VSAJ15NBRIMM5V	VSAJ15NBRIM18V	VSAJ15NBRIF18V
	<b>VSAJ15SI</b>	VSAJ15SIIM18C	VSAJ15SIIF18C	VSAJ15SIIMM5V	VSAJ15SIIM18V	VSAJ15SIIF18V
	<b>VSAJ20NBR</b>	-	-	VSAJ20NBRIMM5V	VSAJ20NBRIM18V	VSAJ20NBRIF18V
	<b>VSAJ20SI</b>	-	-	VSAJ20SIIMM5V	VSAJ20SIIM18V	VSAJ20SIIF18V
Ø 30 mm	THREAD	<b>G1/8"-M</b>	<b>G1/8"-F</b>	<b>M5-M</b>	<b>G1/8"-M</b>	<b>G1/8"-F</b>
	<b>VSAJ30NBR</b>	VSAJ30NBRIM18	VSAJ30NBRIF18	VSAJ30NBRIMM6V	VSAJ30NBRIM18V	VSAJ30NBRIF18V
	<b>VSAJ30SI</b>	VSAJ30SIIM18	VSAJ30SIIF18	VSAJ30SIIMM6V	VSAJ30SIIM18V	VSAJ30SIIF18V

## VSAJ 15 -20



		Diagrams	Ø A	Ø D	f <sup>(1)</sup>	H	H1	Ø G	G1	Ø G2 <sup>(2)</sup>	E 	 (g)
Ø 15 - 20 mm	VSAJ15---IM18C	1	15	-	3.3	11	16	G1/8"-M	8	2.2	14	4.8
	VSAJ15---IF18C	2	15	-	3.3	11	26	G1/8"-F	9	2.5	14	6
	VSAJ15---IMM5V	3	15	12	3.3	11	-	M5-M	5	2.5	-	3
	VSAJ15---IM18V	1	15	-	3.3	11	15.5	G1/8"-M	6	2.5	13	9.4
	VSAJ15---IF18V	2	15	-	3.3	11	24	G1/8"-F	7.5	2.5	13	12.6
	VSAJ20---IMM5V	3	20	15	5.5	13	-	M5-M	5	2.5	-	3.8
	VSAJ20---IM18V	1	20	-	5.5	13	17.5	G1/8"-M	6	2.5	13	10.1
	VSAJ20---IF18V	2	20	-	5.5	13	26	G1/8"-F	7.5	2.5	13	14.6
Ø 30 mm	VSAJ30---IM18	4	30	-	7	17	42	G1/8"-M	8	4	14	9
	VSAJ30---IF18	5	30	-	7	17	32	G1/8"-F	9	4	14	8.4
	VSAJ30---IMM6V	6	30	20	7	17	-	M6-M	6	3.5	-	7.6
	VSAJ30---IM18V	4	30	-	7	17	21.5	G1/8"-M	6	3.5	13	14.2
	VSAJ30---IF18V	5	30	-	7	17	30	G1/8"-F	7.5	3.5	13	17.5
	VSAJ30---IM14V	4	30	-	7	17	21.5	G1/4"-M	8	3.5	17	20.8
	VSAJ30---IF14V	5	30	-	7	17	33	G1/4"-F	11	3.5	17	28.1

Note: All dimensions are in mm.

(1)  $f$  = Deflection of the suction cup.

(2)  $\emptyset G2 = \emptyset$  internal orifice of the fitting.

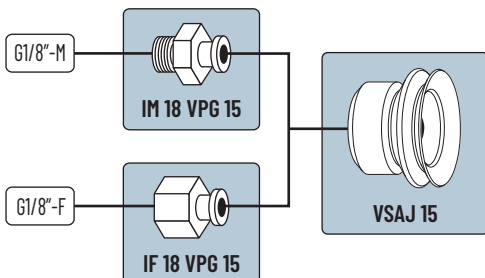
Additional mounting configurations are available (see page 2/45). For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.



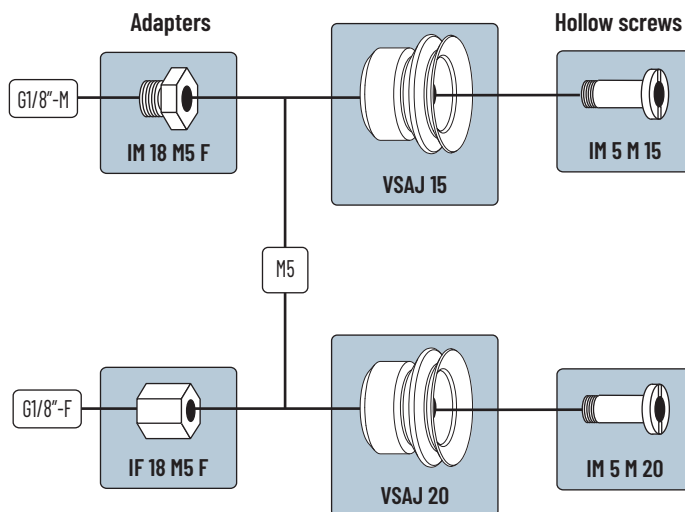


#### VSAJ 15 - 20

Barbed fittings

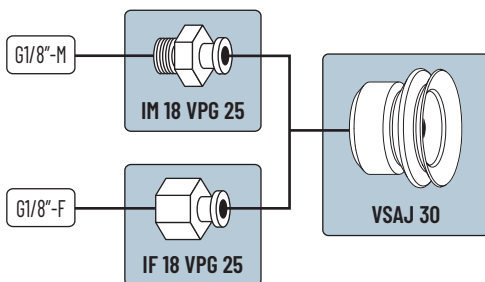


Removable fittings

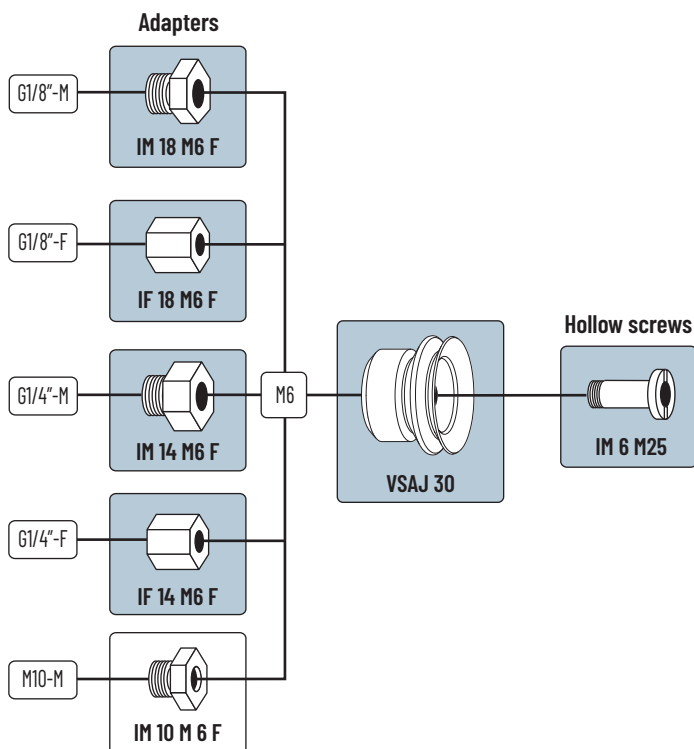


#### VSAJ 30

Pressed fittings



Removable fittings



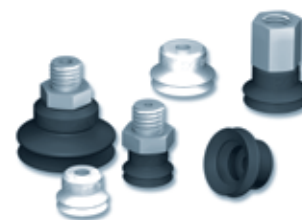
Configurations (suction cup + fitting) refer to page 2/44

Non-standard configurations must be ordered in separate part numbers.



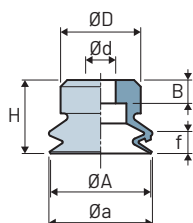
## Suction Cups with 1.5 Bellows Ø 15 to 30 mm

### Dimensions

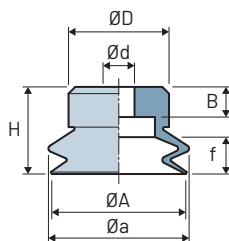


### Suction Cups

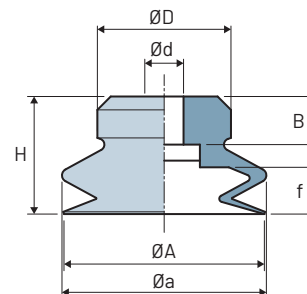
VSAJ 15



VSAJ 20



VSAJ 30

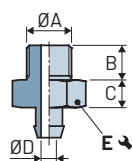


	Ø A	H	Ø a	Ø d	Ø D	f (1)	B	⚖ (g)
VSAJ 15	15	11	15.5	4.5	12	3.3	3.5	9
VSAJ 20	20	13	21	4.7	15	5.5	4.5	8.4
VSAJ 30	30	17	30.6	5.8	20	7	7.2	7.6

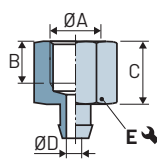
(1) f = Deflection of the suction cup.

### Barbed Fittings

Male - IM



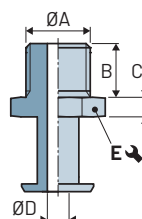
Female - IF



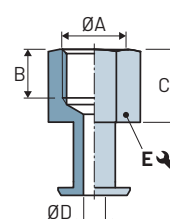
	Ø A	B	C	Ø D	E	Material	⚖ (g)
IM 18 VPG15	G1/8"-M	8	5	2.2	14	Aluminum	4
IF 18 VPG15	G1/8"-F	9	15	2.5	14	Aluminum	5.2

### Pressed Fittings

Male - IM

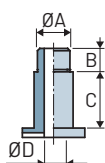


Female - IF



	Ø A	B	C	Ø D	E	Material	⚖ (g)
IM 18 VPG25	G1/8"-M	8	5	4	14	Aluminum	4.08
IF 18 VPG25	G1/8"-F	9	15	4	14	Aluminum	5.5

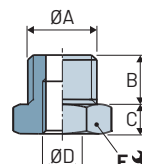
### Hollow Screws



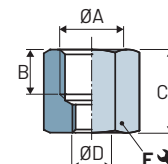
	Ø A	B	C	Ø D	Material	⚖ (g)
IM 5 M15	M5-M	5	2	2.5	Nickel-plated brass	1.3
IM 5 M20	M5-M	5	4	2.5	Nickel-plated brass	2.2
IM 6 M25	M6-M	6	6	3.5	Nickel-plated brass	2.7

### Adapters for Hollow Screws

Male - IM



Female - IF



	Ø A	B	C	Ø D	E	Material	⚖ (g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M5F	G1/8"-M	6	4.5	M5-F	13	Nickel-plated brass	7.3
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M5F	G1/8"-F	7.5	13	M5-F	13	Nickel-plated brass	10.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.



## Suction Cups with 2.5 Bellows Ø 5 to 88 mm



VS series suction cups with bellows are recommended for gripping products on different planes (wide deflection) where they can replace spring systems, and for gripping spherical or cylindrical objects gripped at an angle (ball-joint effect).

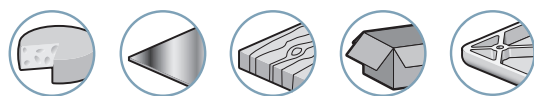
- Large deflection (stroke)
- Flexibility

## Materials

**NBR** Nitrile  
**NR** Natural rubber

**SIT5** Translucent silicone  
**STN** SITON® 60 ShoreA  
**STN5** SITON® 50 ShoreA  
(on request)





Industry-specific applications



Types of use




## Suction Cup Properties

	Ø (mm)	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 R <sub>min</sub> (mm)	NBR	SIT5	NR	STN <sup>(2)</sup>
VS 5	5	0.04	0.5	8	VS5NBR	VS5SIT5	-	VS5STN
VS 6	6	0.04	0.5	8	VS6NBR	VS6SIT5	-	-
VS 7	7	0.0425	0.9	8	VS7NBR	VS7SIT5	-	VS7STN
VS 9	9	0.15	1.1	10	VS9NBR	VS9SIT5	VS9NR	VS9STN
VS 12	12	0.54	2.8	13	VS12NBR	VS12SIT5	VS12NR	VS12STN
VS 14	14	0.975	3.0	15	VS14NBR	VS14SIT5	VS14NR	VS14STN
VS 18	17.5	1.35	4.4	20	VS18NBR	VS18SIT5	VS18NR	VS18STN
VS 20	20	2	4.6	30	VS20NBR	VS20SIT5	VS20NR	VS20STN
VS 25	25	5.4	6.5	30	VS25NBR	VS25SIT5	VS25NR	VS25STN
VS 26	25	6.1	10.8	30	VS26NBR	VS26SIT5	VS26NR	VS26STN
VS 32	32	10	12.1	35	VS32NBR	VS32SIT5	VS32NR	VS32STN
VS 42	42	19.5	20.9	75	VS42NBR	VS42SIT5	VS42NR	VS42STN
VS 52	52	36	28.9	75	VS52NBR	VS52SIT5	VS52NR	VS52STN
VS 62	62	72.5	41.2	75	VS62NBR	VS62SIT5	VS62NR	VS62STN
VS 88	88	165	132.9	100	VS88NBR	VS88SIT5	VS88NR	-

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling.

(2) On request, some models are available in STN5 (SITON® 50 ShoreA)

## Choice of Fittings

 (Ø)	Group	M3-M	M5-M	M6-M	M8-M	M10-M	G1/8"-F	G1/8"-M	10/32-M	G1/4"-F	G1/4"-M	G3/8"-M	G1/2"-M
5 - 6	1	■	-	-	-	-	-	-	-	-	-	-	-
7 - 25	1	-	■	■	-	-	■	■	□	-	-	-	-
26 - 62	2	-	□	□	□	□	■	■	-	■	■	-	-
88	3	-	-	-	-	□	-	■	-	■	■	■	□

■ Standard available configurations (suction cup + fitting) refer to page 2/48  
□ Additional mounting configurations see page 2/51

Fitting: M = male F = female

## Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations.



**Version C**  
Barbed fitting



**Version S**  
Factory-crimped fitting



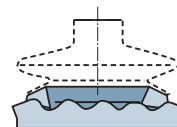
**Version V**  
Removable fitting:  
(adapter and hollow screw)



**Version E**  
Pressed fitting

## Textured Surfaces

For handling objects with a granular or textured gripping surface, use VS suction cups with the VSBM foam strip option (see page 2/65).



## Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.



Please specify the part n°. e.g. VS32SIT5IF14  
Refer to page 2/48



## Suction Cups with 2.5 Bellows Ø 5 to 88 mm

References - "Suction Cup + Fitting"



## Group 1



THREAD	M3M	M5M	M6M	G1/8"-M	G1/8"-F
<b>VS5NBR</b>	VS5NBRIMM3C	-	-	-	-
<b>VS5SIT5</b>	VS5SIT5IMM3C	-	-	-	-
<b>VS5STN</b>	VS5STNIMM3C	-	-	-	-
<b>VS6NBR</b>	VS6NBRIMM3C	-	-	-	-
<b>VS6SIT5</b>	VS6SIT5IMM3C	-	-	-	-
<b>VS7NBR</b>	-	VS7NBRIMM5C	VS7NBRIMM6C	VS7NBRIM18C	VS7NBRIF18C
<b>VS7SIT5</b>	-	VS7SIT5IMM5C	VS7SIT5IMM6C	VS7SIT5IM18C	VS7SIT5IF18C
<b>VS7STN</b>	-	VS7STNIMM5C	VS7STNIMM6C	VS7STNIM18C	VS7STNIF18C
<b>VS9NBR</b>	-	VS9NBRIMM5C	VS9NBRIMM6C	VS9NBRIM18C	VS9NBRIF18C
<b>VS9SIT5</b>	-	VS9SIT5IMM5C	VS9SIT5IMM6C	VS9SIT5IM18C	VS9SIT5IF18C
<b>VS9NR</b>	-	VS9NRIMM5C	VS9NRIMM6C	VS9NRIM18C	VS9NRIF18C
<b>VS9STN</b>	-	VS9STNIMM5C	VS9STNIMM6C	VS9STNIM18C	VS9STNIF18C
<b>VS12NBR</b>	-	VS12NBRIMM5C	VS12NBRIMM6C	VS12NBRIM18C	VS12NBRIF18C
<b>VS12SIT5</b>	-	VS12SIT5IMM5C	VS12SIT5IMM6C	VS12SIT5IM18C	VS12SIT5IF18C
<b>VS12NR</b>	-	VS12NRIMM5C	VS12NRIMM6C	VS12NRIM18C	VS12NRIF18C
<b>VS12STN</b>	-	VS12STNIMM5C	VS12STNIMM6C	VS12STNIM18C	VS12STNIF18C
<b>VS14NBR</b>	-	VS14NBRIMM5C	VS14NBRIMM6C	VS14NBRIM18C	VS14NBRIF18C
<b>VS14SIT5</b>	-	VS14SIT5IMM5C	VS14SIT5IMM6C	VS14SIT5IM18C	VS14SIT5IF18C
<b>VS14NR</b>	-	VS14NRIMM5C	VS14NRIMM6C	VS14NRIM18C	VS14NRIF18C
<b>VS14STN</b>	-	VS14STNIMM5C	VS14STNIMM6C	VS14STNIM18C	VS14STNIF18C
<b>VS18NBR</b>	-	VS18NBRIMM5C	VS18NBRIMM6C	VS18NBRIM18C	VS18NBRIF18C
<b>VS18SIT5</b>	-	VS18SIT5IMM5C	VS18SIT5IMM6C	VS18SIT5IM18C	VS18SIT5IF18C
<b>VS18NR</b>	-	VS18NRIMM5C	VS18NRIMM6C	VS18NRIM18C	VS18NRIF18C
<b>VS18STN</b>	-	VS18STNIMM5C	VS18STNIMM6C	VS18STNIM18C	VS18STNIF18C
<b>VS20NBR</b>	-	VS20NBRIMM5C	VS20NBRIMM6C	VS20NBRIM18C	VS20NBRIF18C
<b>VS20SIT5</b>	-	VS20SIT5IMM5C	VS20SIT5IMM6C	VS20SIT5IM18C	VS20SIT5IF18C
<b>VS20NR</b>	-	VS20NRIMM5C	VS20NRIMM6C	VS20NRIM18C	VS20NRIF18C
<b>VS20STN</b>	-	VS20STNIMM5C	VS20STNIMM6C	VS20STNIM18C	VS20STNIF18C
<b>VS25NBR</b>	-	VS25NBRIMM5C	VS25NBRIMM6C	VS25NBRIM18C	VS25NBRIF18C
<b>VS25SIT5</b>	-	VS25SIT5IMM5C	VS25SIT5IMM6C	VS25SIT5IM18C	VS25SIT5IF18C
<b>VS25NR</b>	-	VS25NRIMM5C	VS25NRIMM6C	VS25NRIM18C	VS25NRIF18C
<b>VS25STN</b>	-	VS25STNIMM5C	VS25STNIMM6C	VS25STNIM18C	VS25STNIF18C

Additional mounting configurations are available (see page 2/51).  
For standard configurations (suction cup+fitting), the C and V versions are delivered unassembled.

## Group 2



THREAD	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F	G1/4"-M	G1/4"-F
<b>VS26NBR</b>	VS26NBRIM14C	VS26NBRIF14C	VS26NBRIM14	VS26NBRIF14	VS26NBRIM18V	VS26NBRIF18V	VS26NBRIM14V	VS26NBRIF14V
<b>VS26SIT5</b>	VS26SIT5IM14C	VS26SIT5IF14C	VS26SIT5IM14	VS26SIT5IF14	VS26SIT5IM18V	VS26SIT5IF18V	VS26SIT5IM14V	VS26SIT5IF14V
<b>VS26NR</b>	VS26NRIM14C	VS26NRIF14C	VS26NRIM14	VS26NRIF14	VS26NRIM18V	VS26NRIF18V	VS26NRIM14V	VS26NRIF14V
<b>VS26STN</b>	VS26STNIM14C	VS26STNIF14C	VS26STNIM14	VS26STNIF14	VS26STNIM18V	VS26STNIF18V	VS26STNIM14V	VS26STNIF14V
<b>VS32NBR</b>	VS32NBRIM14C	VS32NBRIF14C	VS32NBRIM14	VS32NBRIF14	VS32NBRIM18V	VS32NBRIF18V	VS32NBRIM14V	VS32NBRIF14V
<b>VS32SIT5</b>	VS32SIT5IM14C	VS32SIT5IF14C	VS32SIT5IM14	VS32SIT5IF14	VS32SIT5IM18V	VS32SIT5IF18V	VS32SIT5IM14V	VS32SIT5IF14V
<b>VS32NR</b>	VS32NRIM14C	VS32NRIF14C	VS32NRIM14	VS32NRIF14	VS32NRIM18V	VS32NRIF18V	VS32NRIM14V	VS32NRIF14V
<b>VS32STN</b>	VS32STNIM14C	VS32STNIF14C	VS32STNIM14	VS32STNIF14	VS32STNIM18V	VS32STNIF18V	VS32STNIM14V	VS32STNIF14V
<b>VS42NBR</b>	VS42NBRIM14C	VS42NBRIF14C	VS42NBRIM14	VS42NBRIF14	VS42NBRIM18V	VS42NBRIF18V	VS42NBRIM14V	VS42NBRIF14V
<b>VS42SIT5</b>	VS42SIT5IM14C	VS42SIT5IF14C	VS42SIT5IM14	VS42SIT5IF14	VS42SIT5IM18V	VS42SIT5IF18V	VS42SIT5IM14V	VS42SIT5IF14V
<b>VS42NR</b>	VS42NRIM14C	VS42NRIF14C	VS42NRIM14	VS42NRIF14	VS42NRIM18V	VS42NRIF18V	VS42NRIM14V	VS42NRIF14V
<b>VS42STN</b>	VS42STNIM14C	VS42STNIF14C	VS42STNIM14	VS42STNIF14	VS42STNIM18V	VS42STNIF18V	VS42STNIM14V	VS42STNIF14V
<b>VS52NBR</b>	VS52NBRIM14C	VS52NBRIF14C	VS52NBRIM14	VS52NBRIF14	VS52NBRIM18V	VS52NBRIF18V	VS52NBRIM14V	VS52NBRIF14V
<b>VS52SIT5</b>	VS52SIT5IM14C	VS52SIT5IF14C	VS52SIT5IM14	VS52SIT5IF14	VS52SIT5IM18V	VS52SIT5IF18V	VS52SIT5IM14V	VS52SIT5IF14V
<b>VS52NR</b>	VS52NRIM14C	VS52NRIF14C	VS52NRIM14	VS52NRIF14	VS52NRIM18V	VS52NRIF18V	VS52NRIM14V	VS52NRIF14V
<b>VS52STN</b>	VS52STNIM14C	VS52STNIF14C	VS52STNIM14	VS52STNIF14	VS52STNIM18V	VS52STNIF18V	VS52STNIM14V	VS52STNIF14V
<b>VS62NBR</b>	VS62NBRIM14C	VS62NBRIF14C	VS62NBRIM14	VS62NBRIF14	VS62NBRIM18V	VS62NBRIF18V	VS62NBRIM14V	VS62NBRIF14V
<b>VS62SIT5</b>	VS62SIT5IM14C	VS62SIT5IF14C	VS62SIT5IM14	VS62SIT5IF14	VS62SIT5IM18V	VS62SIT5IF18V	VS62SIT5IM14V	VS62SIT5IF14V
<b>VS62NR</b>	VS62NRIM14C	VS62NRIF14C	VS62NRIM14	VS62NRIF14	VS62NRIM18V	VS62NRIF18V	VS62NRIM14V	VS62NRIF14V
<b>VS62STN</b>	VS62STNIM14C	VS62STNIF14C	VS62STNIM14	VS62STNIF14	VS62STNIM18V	VS62STNIF18V	VS62STNIM14V	VS62STNIF14V

## Group 3



THREAD	G1/8"-M	G1/4"-M	G1/4"-F	G1/4"-M	G1/4"-F	G3/8"-M
<b>VS88NBR</b>	VS88NBRIM18V	VS88NBRIM14V	VS88NBRIF14V	VS88NBRIM14	VS88NBRIF14	VS88NBRIM38
<b>VS88SIT5</b>	VS88SIT5IM18V	VS88SIT5IM14V	VS88SIT5IF14V	VS88SIT5IM14	VS88SIT5IF14	VS88SIT5IM38
<b>VS88NR</b>	VS88NRIM18V	VS88NRIM14V	VS88NRIF14V	VS88NRIM14	VS88NRIF14	VS88NRIM38



# VS

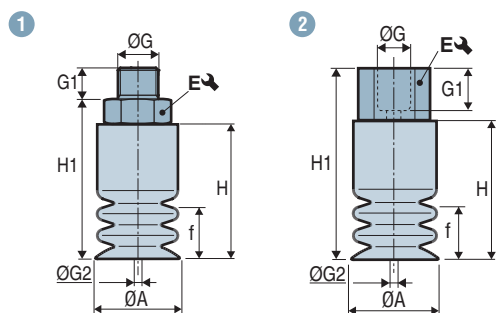
## Suction Cups with 2.5 Bellows Ø 5 to 88 mm

Dimensions - "Suction Cup + Fitting"

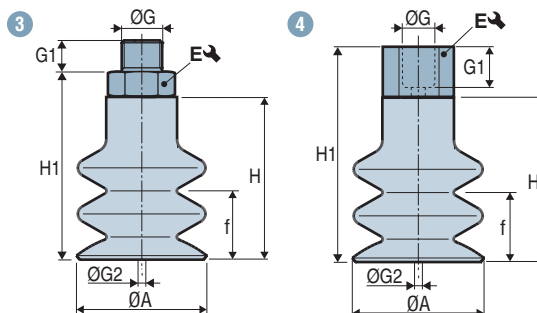


2  
VS

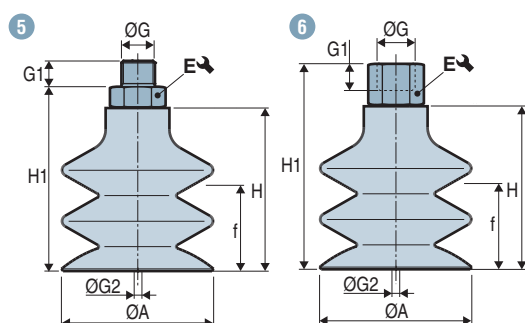
### VS 5 - 9 Group 1



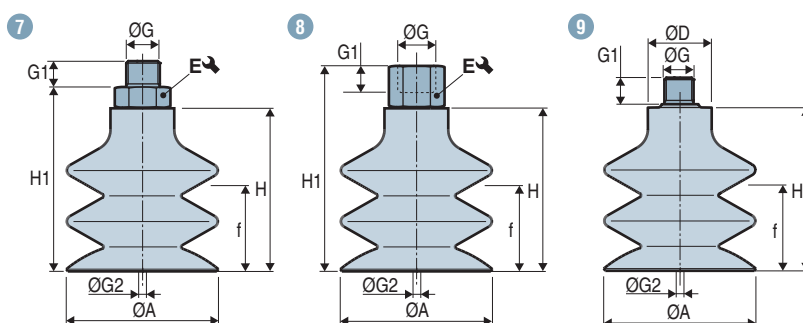
### VS 12 - 25 Group 1





### VS 26 - 62 Group 2



### VS 88 Group 3



Group 1		Diagram	ØA	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
Ø 5 - 25 mm	VS5---IMM3C	1	5	-	3	13.5	15.5	M3-M	3	1.4	5	0.7
	VS6---IMM3C	1	6	-	3	13.2	15.2	M3-M	3	1.4	5	0.7
	VS7---IMM5C	1	7	-	3	13.5	18.5	M5-M	4.5	2.5	7	3.5
	VS7---IMM6C	1	7	-	3	13.5	18.5	M6-M	5	3.5	7	3.1
	VS7---IM18C	1	7	-	3	13.5	19.5	G1/8"-M	7.5	3.5	14	4.5
	VS7---IF18C	2	7	-	3	13.5	25.5	G1/8"-F	8	3.5	14	4.4
	VS9---IMM5C	1	9	-	3	15	20	M5-M	4.5	2.5	7	3.7
	VS9---IMM6C	1	9	-	3	15	20	M6-M	5	3.5	7	3.3
	VS9---IM18C	1	9	-	3	15	21	G1/8"-M	7.5	3.5	14	4.8
	VS9---IF18C	2	9	-	3	15	27	G1/8"-F	8	3.5	14	4.6
	VS12---IMM5C	3	12	-	7	21	26	M5-M	4.5	2.5	7	3.2
	VS12---IMM6C	3	12	-	7	21	26	M6-M	5	3.5	7	3.8
	VS12---IM18C	3	12	-	7	21	27	G1/8"-M	7.5	3.5	14	5.2
	VS12---IF18C	4	12	-	7	21	33	G1/8"-F	8	3.5	14	5.1
	VS14---IMM5C	3	14	-	10	23	28	M5-M	4.5	2.5	7	4.6
	VS14---IMM6C	3	14	-	10	23	28	M6-M	5	3.5	7	4.2
	VS14---IM18C	3	14	-	10	23	29	G1/8"-M	7.5	3.5	14	5.6
	VS14---IF18C	4	14	-	10	23	35	G1/8"-F	8	3.5	14	5.5
	VS18---IMM5C	3	17.5	-	10	23	28	M5-M	4.5	2.5	7	5.1
	VS18---IMM6C	3	17.5	-	10	23	28	M6-M	5	3.5	7	4.7
	VS18---IM18C	3	17.5	-	10	23	29	G1/8"-M	7.5	3.5	14	6.1
	VS18---IF18C	4	17.5	-	10	23	35	G1/8"-F	8	3.5	14	6
	VS20---IMM5C	3	20	-	10	23	28	M5-M	4.5	2.5	7	5.5
	VS20---IMM6C	3	20	-	10	23	28	M6-M	5	3.5	7	5.1
	VS20---IM18C	3	20	-	10	23	29	G1/8"-M	7.5	3.5	14	6.5
	VS20---IF18C	4	20	-	10	23	35	G1/8"-F	8	3.5	14	6.4
	VS25---IMM5C	3	25	-	20	34	39	M5-M	4.5	2.5	7	7.4
	VS25---IMM6C	3	25	-	20	34	39	M6-M	5	3.5	7	7
	VS25---IM18C	3	25	-	20	34	40	G1/8"-M	7.5	3.5	14	8.4
	VS25---IF18C	4	25	-	20	34	46	G1/8"-F	8	3.5	14	8.3

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.





VS

## Suction Cups with 2.5 Bellows Ø 5 to 88 mm

Dimensions - "Suction Cup + Fitting"



Group 2		Diagram	ØA	ØD	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E 	 (g)
<div>Ø 26 - 62 mm</div>	VS26---IM18V	5	25	-	11	31	35.5	G1/8"-M	6	3.5	13	20.2
	VS26---IF18V	6	25	-	11	31	44	G1/8"-F	7.5	3.5	13	23.5
	VS26---IM14	5	25	-	11	31	35	G1/4"-M	11	4.4	17	14.1
	VS26---IM14C	5	25	-	11	31	39	G1/4"-M	10	7	17	15
	VS26---IM14V	5	25	-	11	31	36	G1/4"-M	8	3.5	17	29.5
	VS26---IF14	6	25	-	11	31	46	G1/4"-F	10	4.4	17	14.7
	VS26---IF14C	6	25	-	11	31	46	G1/4"-F	12	6.9	17	14.3
	VS26---IF14V	6	25	-	11	31	47	G1/4"-F	11	3.5	17	34.1
	VS32---IM18V	5	32	-	14.5	37.5	42	G1/8"-M	6	3.5	13	22.9
	VS32---IF18V	6	32	-	14.5	37.5	50.5	G1/8"-F	7.5	3.5	13	26.2
	VS32---IM14	5	32	-	14.5	37.5	41.5	G1/4"-M	11	4.4	17	16.8
	VS32---IM14C	5	32	-	14.5	37.5	45.5	G1/4"-M	10	7	17	17.7
	VS32---IM14V	5	32	-	14.5	37.5	42.5	G1/4"-M	8	3.5	17	32.2
	VS32---IF14	6	32	-	14.5	37.5	52.5	G1/4"-F	10	4.4	17	17.4
	VS32---IF14C	6	32	-	14.5	37.5	52.5	G1/4"-F	12	6.9	17	17
	VS32---IF14V	6	32	-	14.5	37.5	53.5	G1/4"-F	11	3.5	17	36.8
	VS42---IM18V	5	42	-	22	46	50.5	G1/8"-M	6	3.5	13	32.1
	VS42---IF18V	6	42	-	22	46	59	G1/8"-F	7.5	3.5	13	35.4
	VS42---IM14	5	42	-	22	46	50	G1/4"-M	11	4.4	17	26
	VS42---IM14C	5	42	-	22	46	54	G1/4"-M	10	7	17	26.2
	VS42---IM14V	5	42	-	22	46	51	G1/4"-M	8	3.5	17	41.4
	VS42---IF14	6	42	-	22	46	61	G1/4"-F	10	4.4	17	26.6
	VS42---IF14C	6	42	-	22	46	61	G1/4"-F	12	6.9	17	26.2
	VS42---IF14V	6	42	-	22	46	62	G1/4"-F	11	3.5	17	46
	VS52---IM18V	5	52	-	27	49	53.5	G1/8"-M	6	3.5	13	38.1
	VS52---IF18V	6	52	-	27	49	62	G1/8"-F	7.5	3.5	13	41.4
	VS52---IM14	5	52	-	27	49	53	G1/4"-M	11	4.4	17	32
	VS52---IM14C	5	52	-	27	49	57	G1/4"-M	10	7	17	32.9
	VS52---IM14V	5	52	-	27	49	54	G1/4"-M	8	3.5	17	47.4
	VS52---IF14	6	52	-	27	49	64	G1/4"-F	10	4.4	17	32.6
	VS52---IF14C	6	52	-	27	49	64	G1/4"-F	12	6.9	17	32.2
	VS52---IF14V	6	52	-	27	49	65	G1/4"-F	11	3.5	17	52
	VS62---IM18V	5	62	-	31	55	59.5	G1/8"-M	6	3.5	13	51
	VS62---IF18V	6	62	-	31	55	68	G1/8"-F	7.5	3.5	13	54.3
	VS62---IM14	5	62	-	31	55	59	G1/4"-M	11	4.4	17	44.9
	VS62---IM14C	5	62	-	31	55	63	G1/4"-M	10	7	17	45.8
	VS62---IM14V	5	62	-	31	55	60	G1/4"-M	8	3.5	17	60.3
	VS62---IF14	6	62	-	31	55	70	G1/4"-F	10	4.4	17	45.5
	VS62---IF14C	6	62	-	31	55	70	G1/4"-F	12	6.9	17	45.1
	VS62---IF14V	6	62	-	31	55	71	G1/4"-F	11	3.5	17	65

## Group 3

Ø 88 mm	VS88---IM18V	9	88	25	48.5	87.5	-	G1/8"-M	8	6	-	142.8
	VS88---IM14	7	88	-	48.5	87.5	93.5	G1/4"-M	11	8	21	153.4
	VS88---IM14V	7	88	-	48.5	87.5	92.5	G1/4"-M	8	6	17	163
	VS88---IF14	8	88	-	48.5	87.5	102.5	G1/4"-F	10	8	21	130.8
	VS88---IF14V	8	88	-	48.5	87.5	106.5	G1/4"-F	9	6	17	134.7
	VS88---IM38	7	88	-	48.5	87.5	93.5	G3/8"-M	11	8	21	133

Note: All dimensions are in mm.

(1) f = Deflection of the suction cup.

(2) Ø G2 = Ø internal orifice of the fitting.



# VS

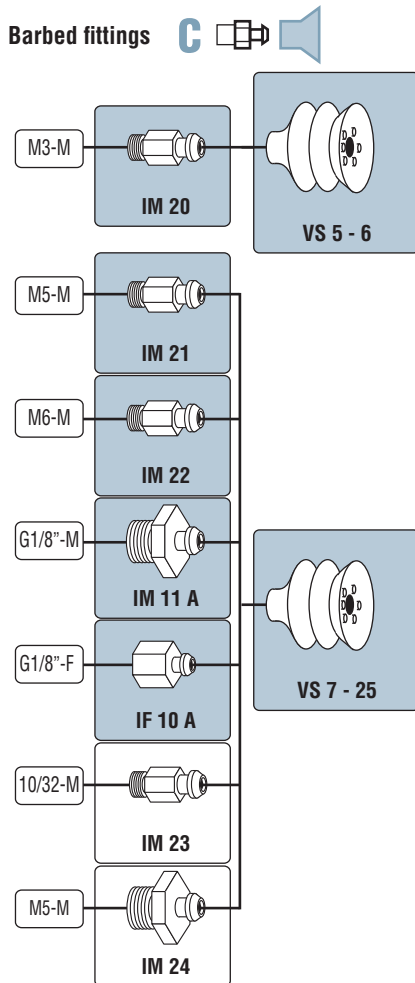
## Suction Cups with 2.5 Bellows Ø 5 to 88 mm

### Assembly Diagrams

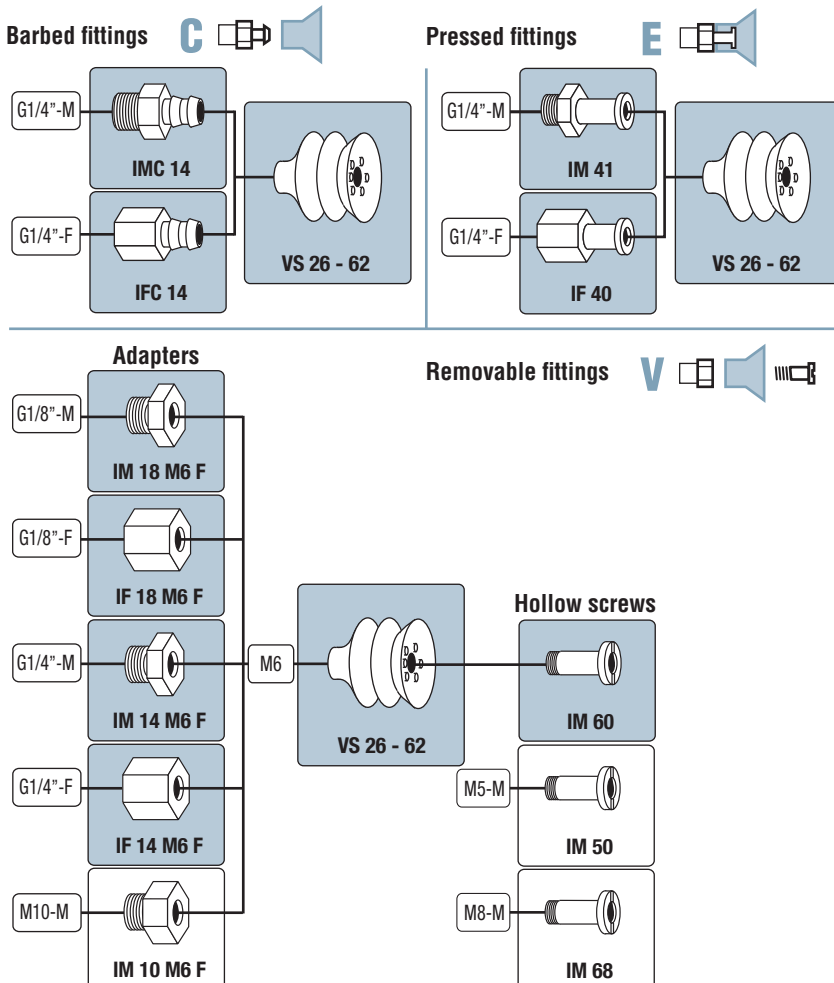


2  
VS

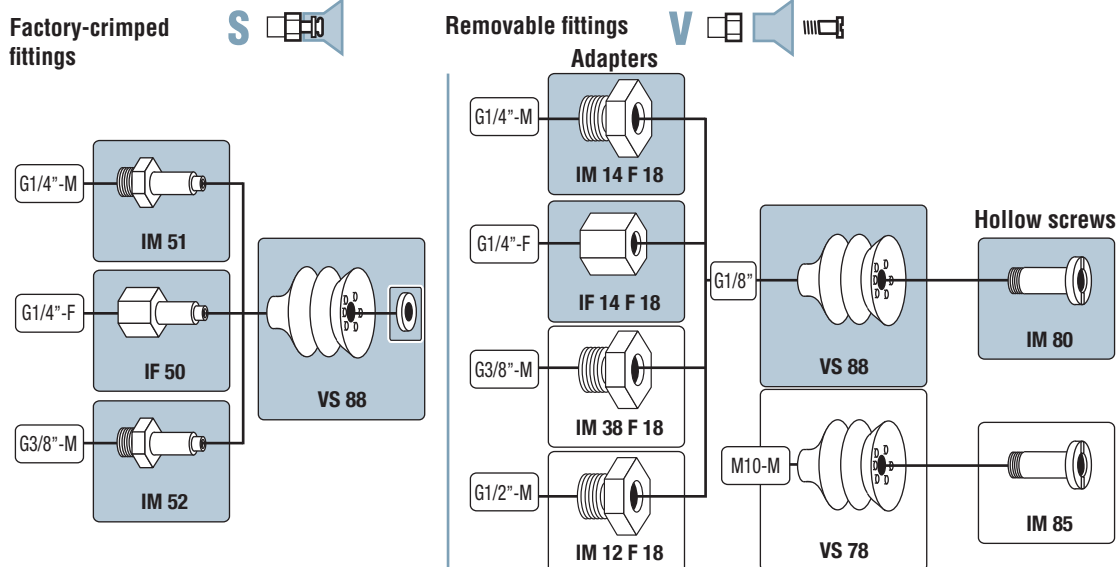
#### VS 5 - 25 Group 1





#### VS 26 - 62 Group 2



#### VS 88 Group 3



-  Configurations (suction cup + fitting) refer to page 2/48
-  Non-standard configurations must be ordered in separate part numbers.

Fittings and suction cups dimension: see page 2/52.



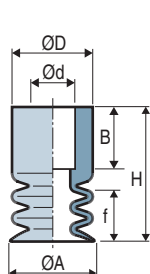
# Suction Cups with 2.5 Bellows Ø 5 to 88 mm

## Dimensions

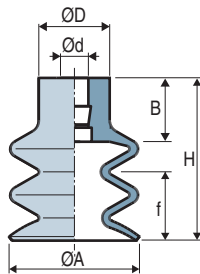


### Suction Cups

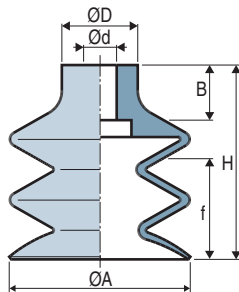
VS 5 - 25



VS 26 - 62

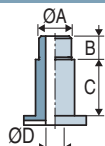


VS 88

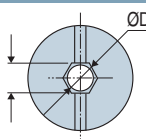


(1) f = Deflection of the suction cup.

### Hollow Screws



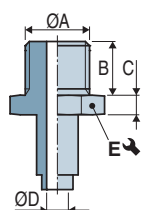
IM60: 4  
IM80: 6



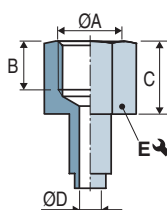
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 <sup>(2)(3)</sup>	M6-M	7	11	3.5	Nickel-plated brass	7.3
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.5
IM 80	G1/8"-M	8	18	6	Nickel-plated brass	23.8
IM 85	M10x150-M	8	18	6	Nickel-plated brass	23.5

### Factory-Crimped Fittings

Male - IM



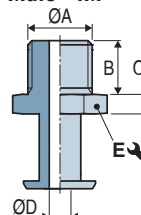
Female - IF



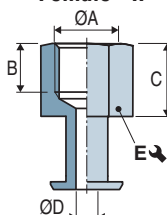
	ØA	B	C	ØD	E	Material	(g)
IM 51	G1/4"-M	11	6	8	21	Aluminum	11.8
IF 50	G1/4"-F	10	15	8	21	Aluminum	15.7
IM 52	G3/8"-M	11	6	8	21	Aluminum	14

### Pressed Fittings

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF 40	G1/4"-F	10	15	4.4	17	Aluminum	8.4

The values represent the average characteristics of our products.

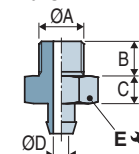
(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10)

(3) Available in stainless steel

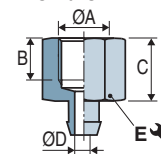
	ØA	H	Ød	ØD	f <sup>(1)</sup>	B	(g)
VS 5	5	13.5	4	7	3	8	0.3
VS 6	6	13.2	4	7	3	7	0.31
VS 7	7	13.5	4.7	9	3	6	0.42
VS 9	9	15	4.4	9	3	7	0.64
VS 12	12	21	4	10	7	9	1.1
VS 14	14	23	4	10	10	9	1.5
VS 18	17.5	23	4	10	10	9	2
VS 20	20	23	4	10	10	9	2.4
VS 25	25	34	4	10	20	9	4.3
VS 26	25	31	8	16	11	13	6.3
VS 32	32	37.5	8	18	14.5	13	9
VS 42	42	46	8	18	22	13	18.2
VS 52	52	49	8	18	27	13	24.2
VS 62	62	55	8	21	31	13	37.1
VS 88	88	87.5	12	25	48.5	20	119

### Barbed Fittings

Male - IM



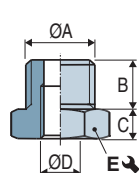
Female - IF



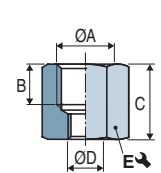
	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM 20	M3-M	3	2	1.4	5	Aluminum	0.4
IM 21 <sup>(2)</sup>	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 <sup>(2)</sup>	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated brass	3.2
IF 10 A	G1/8"-F	8	12	3.5	14	Aluminum	4
IFC 14	G1/4"-F	12	15	6.9	17	Aluminum	8

### Adapters for Hollow Screws

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 12 F18	G1/2"-M	14	6	G1/8"-F	22	Nickel-plated brass	46.8
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 14 F18	G1/4"-M	8	5	G1/8"-F	17	Nickel-plated brass	10.6
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IM 38 F18	G3/8"-M	9	5	G1/8"-F	19	Nickel-plated brass	18.8
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9
IF 14 F18	G1/4"-F	9	19	G1/8"-F	17	Nickel-plated brass	20.2

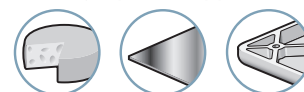
Note: All dimensions are in mm.



## Suction Cups with 2.5 Bellows Ø 5 and 7mm



Industry-specific applications



Types of use







The VSG series 2.5 bellows suction cups benefit from very flexible lips allowing the gripping of small concave or convex products. They are ideal for the gripping of sensitive products which require a soft lip.

### Materials

**NBR** Nitrile  
**SI** Silicone  
**STN** SITON®

### Suction Cup Properties

	Ø (mm)	 (cm³)	 (N) <sup>(1)</sup>	 $R_{min}$ (mm)	NBR	SI	STN
<b>VSG 5</b>	5	0.03	0.4	3.5	<b>VSG5NBR</b>	<b>VSG5SI</b>	<b>VSG5STN</b>
<b>VSG 7</b>	7	0.04	1.0	4	<b>VSG7NBR</b>	<b>VSG7SI</b>	<b>VSG7STN</b>

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling.

### Choice of Fittings

 (Ø)	M5-M	M5-F	G1/8"-M	G1/8"-F
5 - 7	■	■	■	■

■ Standard available configurations (suction cup + fitting) Fitting: M = male  
See part n° table below F = female

### Type of Assembly

**C**  **Version C**  
Barbed fitting

### References - "Suction Cup + Fitting"

	THREAD	M5-M	M5-F	G1/8"-M	G1/8"-F
<b>Ø 5 - 7 mm</b>	<b>VSG5NBR</b>	VSG5NBRIMM5C	VSG5NBRIFM5C	VSG5NBRIM18C	VSG5NBRIF18C
	<b>VSG5SI</b>	VSG5SIIMM5C	VSG5SIIFM5C	VSG5SIIM18C	VSG5SIIF18C
	<b>VSG5STN</b>	VSG5STNIMM5C	VSG5STNIFM5C	VSG5STNIM18C	VSG5STNIF18C
	<b>VSG7NBR</b>	VSG7NBRIMM5C	VSG7NBRIFM5C	VSG7NBRIM18C	VSG7NBRIF18C
	<b>VSG7SI</b>	VSG7SIIMM5C	VSG7SIIFM5C	VSG7SIIM18C	VSG7SIIF18C
	<b>VSG7STN</b>	VSG7STNIMM5C	VSG7STNIFM5C	VSG7STNIM18C	VSG7STNIF18C



Please specify the part n°. e.g. **VSG5NBR**  
See part n° table above

### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring systems, extensions, feeder systems, etc.) see chapters 4 and 14.



## Suction Cups with 2.5 Bellows Ø 5 and 7mm Dimensions



### Suction Cups + Fittings

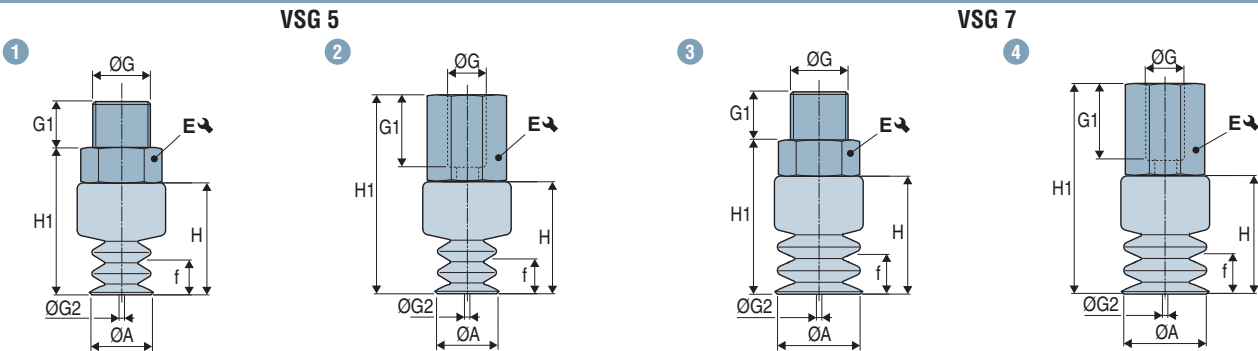
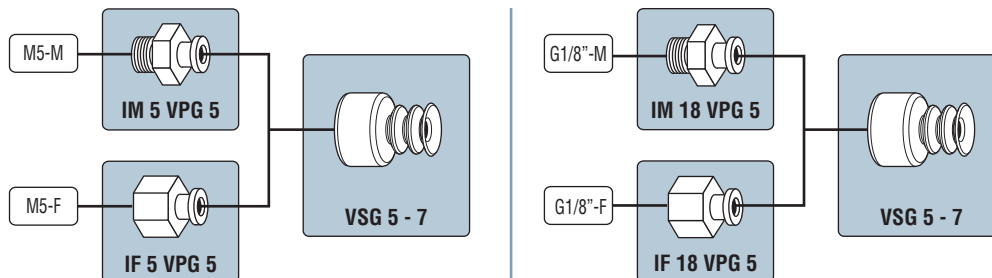


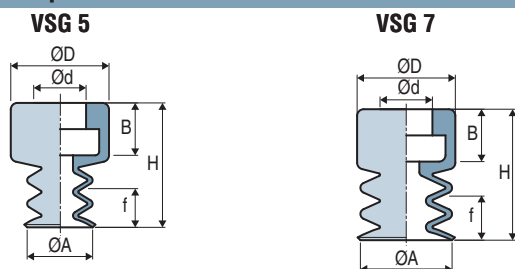
	Diagram	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E ↗	⚖ (g)
VSG5-IMM5C	1	5	3	9.5	13	M5-M	4.5	2.2	7	2.6
VSG5-IFM5C	2	5	3	9.5	18.5	M5-F	6	2.2	8	3.1
VSG5-IM18C	1	5	3	9.5	14.5	G1/8"-M	8	2.2	14	5.8
VSG5-IF18C	2	5	3	9.5	24.5	G1/8"-F	9	2.2	14	7
VSG7-IMM5C	3	7	3	10	13.5	M5-M	4.5	2.2	7	0.9
VSG7-IFM5C	4	7	3	10	19	M5-F	6	2.2	8	1.4
VSG7-IM18C	3	7	3	10	15	G1/8"-M	8	2.2	14	4.1
VSG7-IF18C	4	7	3	10	25	G1/8"-F	9	2.2	14	5.3

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

### Assembly Diagrams



### Suction Cups

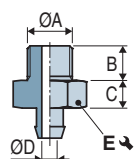


	ØA	H	Ød	ØD	f <sup>(1)</sup>	B	⚖ (g)
VSG 5	5	9.5	4	7.5	3	4	1.9
VSG 7	7	10	4	7.5	3	4	0.24

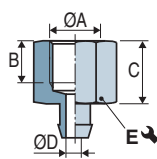
(1) f = Deflection of the suction cup

### Barbed Fittings

Male - IM



Female - IF



	ØA	B	C	ØD	E ↗	Material	⚖ (g)
IM 5 VPG 5	M5-M	4.5	3.5	2.2	7	Aluminum	0.7
IF 5 VPG 5	M5-F	6	9	2.2	8	Aluminum	1.2
IM 18 VPG 5	G1/8"-M	8	5	2.2	14	Aluminum	3.9
IF 18 VPG 5	G1/8"-F	9	15	2.2	14	Aluminum	5.1

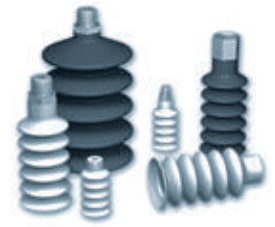
The values represent the average characteristics of our products.

Note: All dimensions are in mm.



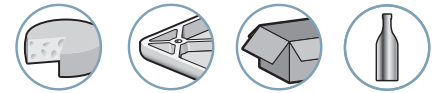
# VSD

## Long Stroke Suction Cups



Long stroke suction cups (4.5 and 5.5 bellows) are specially recommended for handling spherical or cylindrical objects or which require compensation for varying heights.

Industry-specific applications



Types of use



### Materials

<b>NBR</b>	Nitrile
<b>SIT3</b>	30 Shore A translucent
<b>SIT5</b>	50 Shore A translucent silicone

### Suction Cup Properties

	Ø (mm)	Volume (cm³)	Force (N) <sup>(1)</sup>	R <sub>min</sub> (mm)	NBR	SIT3	SIT5
<b>VSD 18</b>	17.5	2.5	4.5	20	-	-	<b>VSD18SIT5</b>
<b>VSD 32</b>	32	21.7	10.5	35	<b>VSD32NBR</b>	<b>VSD32SIT3</b>	-
<b>VSD 62</b>	62	111	50	75	<b>VSD62NBR</b>	-	-

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling.

### Choice of Fittings

	Group	M5-M	M6-M	M8-M	M10-M	G1/8"-F	G1/8"-M	10/32-M	G1/4"-F	G1/4"-M
<b>VSD 18</b>	<b>1</b>	■	■	-	-	■	■	□	-	-
<b>VSD 32-62</b>	<b>2</b>	□	□	□	□	■	■	-	■	■

■ Standard available configurations (suction cup + fitting) □ Additional mounting configurations  
See part n° below see page 2/57

Fitting: M = male F = female

### Types of Assembly

COVAL suction cups can be assembled in a wide variety of configurations.



**Version C:** Factory-crimped fitting



**Version E:** Pressed fitting



**Version V:** Removable fitting:  
(adapter and hollow screw)

### References - "Suction Cup + Fitting"

Group 1	
<b>Ø 18</b>	<b>THREAD</b>
<b>VSD18SIT5</b>	<b>M5-M</b> VSD18SIT5IMM5C <b>M6-M</b> VSD18SIT5IMM6C <b>G1/8"-M</b> VSD18SIT5IM18C <b>G1/8"-F</b> VSD18SIT5IF18C

Group 2			
<b>Ø 32-62</b>	<b>THREAD</b>	<b>G1/4"-M</b> <b>G1/4"-F</b>	<b>G1/4"-M</b> <b>G1/4"-F</b>
<b>VSD32NBR</b>	VSD32NBRIM14C VSD32NBRIF14C	VSD32NBRIM14 VSD32NBRIF14	VSD32NBRIM18V VSD32NBRIF18V
<b>VSD32SIT3</b>	VSD32SIT3IM14C VSD32SIT3IF14C	VSD32SIT3IM14 VSD32SIT3IF14	VSD32SIT3IM18V VSD32SIT3IF18V
<b>VSD62NBR</b>	VSD62NBRIM14C VSD62NBRIF14C	VSD62NBRIM14 VSD62NBRIF14	VSD62NBRIM18V VSD62NBRIF18V



Please specify the part n°. e.g. **VSD18SIT5IMM5C**  
See part n° table above

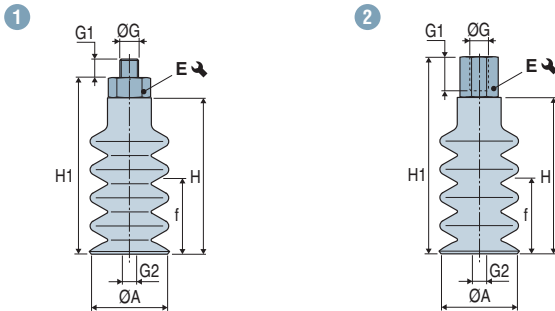
### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (sensors, spring systems, extensions, feeder systems, etc.) see chapters 4 and 14.

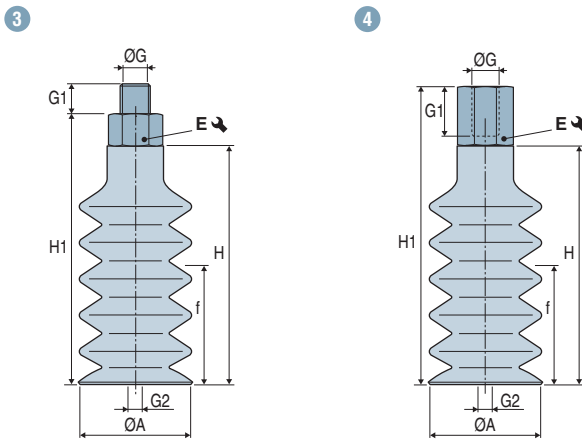




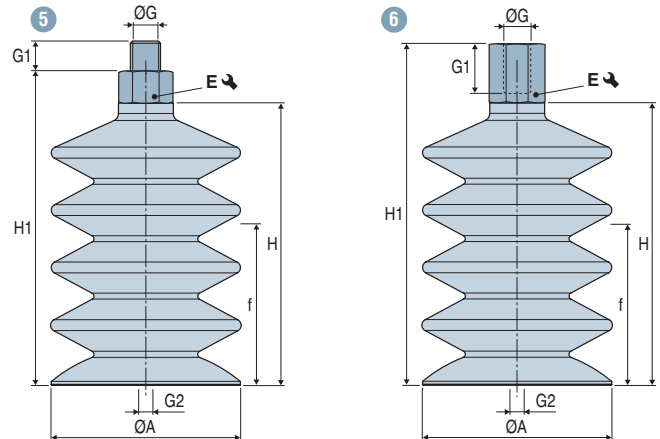
#### VSD 18 Group 1



#### VSD 32 Group 2



#### VSD 62 Group 2



Group 1	Diagram	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E	(g)
Ø 18 mm	VSD18-IMM5C	1	17.5	18	36	41	M5-M	4.5	2.5	6.2
	VSD18-IMM6C	1	17.5	18	36	41	M6-M	5	3.5	5.8
	VSD18-IM18C	1	17.5	18	36	42	G1/8"-M	7.5	3.5	7.2
	VSD18-IF18C	2	17.5	18	36	48	G1/8"-F	8	3.5	7.1

Group 2	Diagram	ØA	f <sup>(1)</sup>	H	H1	G	G1	ØG2 <sup>(2)</sup>	E	(g)
Ø 32 - 62 mm	VSD32-IM18V	3	32	34	65	69.5	G1/8"-M	6	3.5	29.2
	VSD32-IF18V	4	32	34	65	78	G1/8"-F	7.5	3.5	32.5
	VSD32-IM14	3	32	34	65	69	G1/4"-M	11	4.4	22.9
	VSD32-IM14C	3	32	34	65	73	G1/4"-M	10	7	23.8
	VSD32-IM14V	3	32	34	65	70	G1/4"-M	8	3.5	38.5
	VSD32-IF14	4	32	34	65	80	G1/4"-F	10	4.4	23.7
	VSD32-IF14C	4	32	34	65	80	G1/4"-F	12	6.9	23.1
	VSD32-IF14V	4	32	34	65	81	G1/4"-F	11	3.5	43.5
	VSD62-IM18V	5	62	55	92.5	97	G1/8"-M	6	3.5	76.7
	VSD62-IF18V	6	62	55	92.5	105.5	G1/8"-F	7.5	3.5	80
	VSD62-IM14	5	62	55	92.5	96.5	G1/4"-M	11	4.4	70.4
	VSD62-IM14C	5	62	55	92.5	100.5	G1/4"-M	10	7	71.3
	VSD62-IM14V	5	62	55	92.5	97.5	G1/4"-M	8	3.5	86
	VSD62-IF14	6	62	55	92.5	107.5	G1/4"-F	10	4.4	71.2
	VSD62-IF14C	6	62	55	92.5	107.5	G1/4"-F	12	6.9	70.6
	VSD62-IF14V	6	62	55	92.5	108.5	G1/4"-F	11	3.5	90.6

(1) f = Deflection of the suction cup. (2) Ø G2 = Ø internal orifice of the fitting.

Note: All dimensions are in mm.

Assembly diagrams  
See page 2/57.

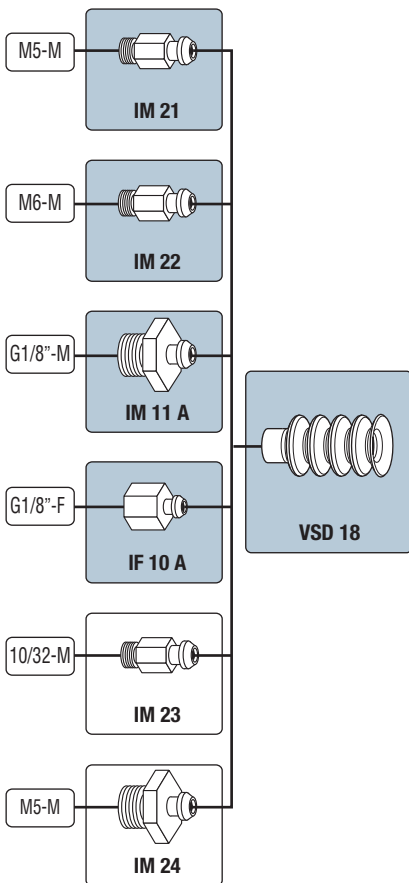




#### VSD 18

#### Group 1

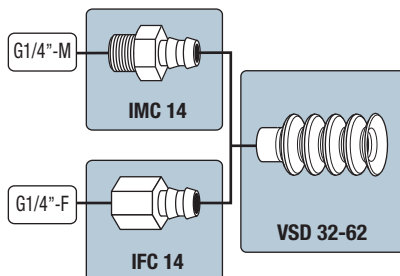
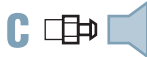
Barbed fittings



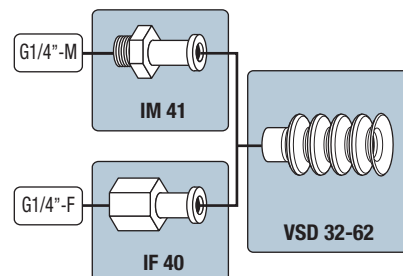
#### VSD 32-62

#### Group 2

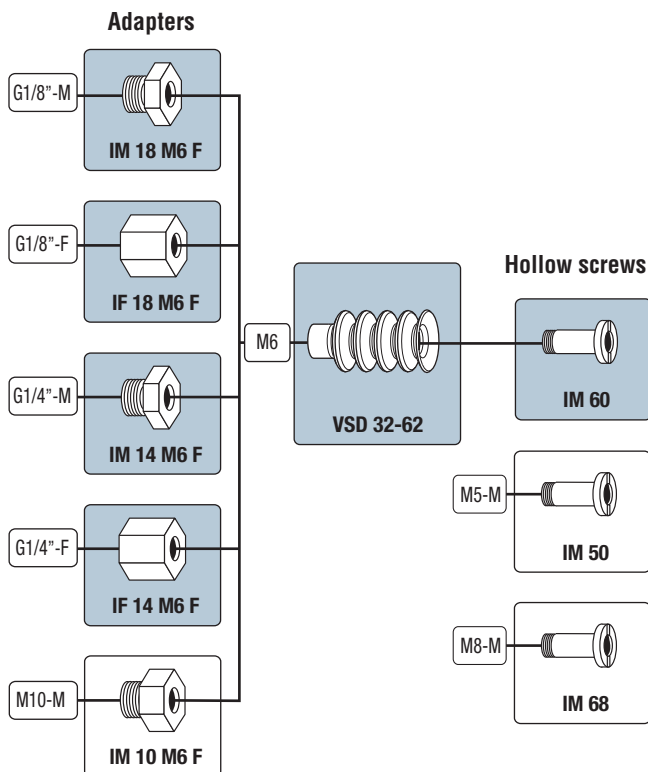
Barbed fittings



Pressed fittings



Removable fittings



Configurations (suction cup + fitting) refer to page 2/55

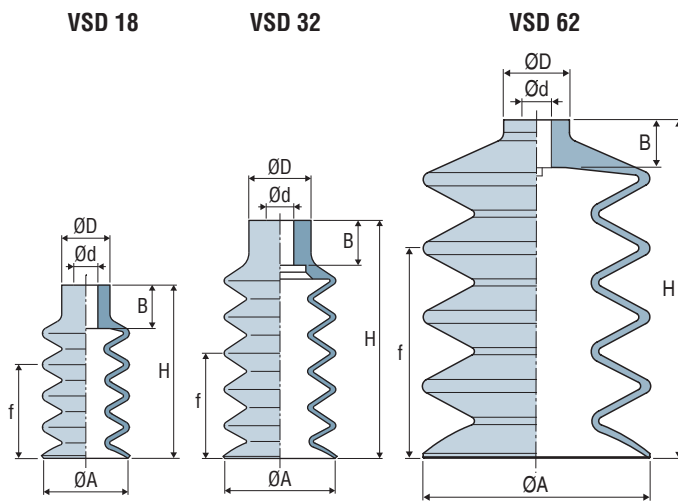


Non-standard configurations must be ordered in separate part numbers.





#### Suction Cups

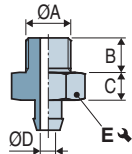


	ØA	f <sup>(1)</sup>	H	Ød	ØD	B	(g)
VSD 18	17.5	18	36	4	10	9	3.1
VSD 32	32	34	65	8	18	13	15.1
VSD 62	62	55	92.5	8	18	13	62.6

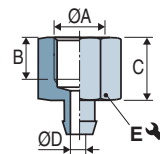
(1) f = Deflection of the suction cup.

#### Barbed Fittings

Male - IM

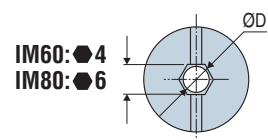
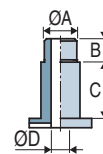


Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IMC 14	G1/4"-M	10	8	7	17	Aluminum	8.7
IM 21 <sup>(2)</sup>	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 <sup>(2)</sup>	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 23	10/32-M	4.5	5	2.5	7	Brass	3.0
IM 24	M5-M	4.5	2.5	2.5	10	Nickel-plated brass	3.2
IF 10 A	G1/8"-F	8	12	3.5	14	Aluminum	4.0
IFC 14	G1/4"-F	12	15	6.9	17	Aluminum	8.0

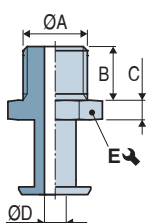
#### Hollow Screws



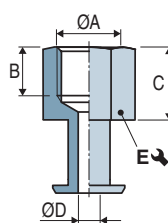
	ØA	B	C	ØD	Material	(g)
IM 50	M5-M	5	11	2.8	Brass	7.4
IM 60 <sup>(2) (3)</sup>	M6-M	7	11	3.5	Nickel-plated brass	7.5
IM 68	M8-M	8	11	5.2	Nickel-plated brass	6.4

#### Pressed Fittings

Male - IM



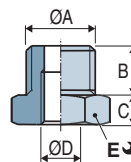
Female - IF



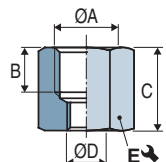
	ØA	B	C	ØD	E	Material	(g)
IM 41	G1/4"-M	11	4	4.4	17	Aluminum	7.8
IF 40	G1/4"-F	10	15	4.4	17	Aluminum	8.6

#### Adapters for Hollow Screws

Male - IM



Female - IF



	ØA	B	C	ØD	E	Material	(g)
IM 10 M6F	M10-M	7	3.5	M6-F	13	Brass	5.9
IM 14 M6F	G1/4"-M	8	5	M6-F	17	Nickel-plated brass	15.9
IM 18 M6F	G1/8"-M	6	4.5	M6-F	13	Nickel-plated brass	6.6
IF 14 M6F	G1/4"-F	11	16	M6-F	17	Nickel-plated brass	20.5
IF 18 M6F	G1/8"-F	7.5	13	M6-F	13	Nickel-plated brass	9.9

The values represent the average characteristics of our products.

Note: All dimensions are in mm.

(2) Flow restrictor version available: orifice calibrated to reduce leaks when used with a multi-cup gripper (see page 4/10).

(3) Available in stainless steel.

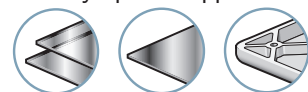


# C

## High-performance Suction Cups



Industry-specific applications



Types of use



2



### Characteristics

- Extreme resistance to slipping and acceleration.
- 2 suction cup materials available depending on the model (Nitrile or SITON®).
- Ideal for automated applications.
- Rigid central stopper with integrated cleats allows gripping of thin sheet metal without any deformation.
- Lightweight polyamide fittings allow for better integration on end-of-arm tooling.
- Airtight sealing lips.
- Airtight fittings using:
  - O-rings on G3/8" male cylindrical suction cups and 32 square suction cups
  - Sealing ring on all oblong 3/8" male suction cups.
- Visual wear indicator.
- Double tightening: external with 22 mm wrench or internal with 6 or 8 mm hex key.

### Materials

#### Suction cups

##### ■ NBR nitrile 55 Shore A

- High resistance to oils and supports peak temperatures up to 100°C (212°F).
- Colors: gray for suction cups with polyamide fittings, and blue-green for suction cups with aluminum fittings.

##### ■ STNV6 SITON® 60 Shore A

- High resistance to oils, supports peak temperatures up to 160°C (320°F) and features excellent abrasion resistance.
- Color: green.

#### Fittings

##### ■ PA

- Polyamide filled with fiberglass (PA 6.6 30% FG), ensures weight savings, avoids risk of deterioration of expensive tools, and facilitates suction cup recycling. (fitting M38G/F38G).

##### ■ AL

- Aluminum (M38GA/F38GA/C32 Fitting).
- O-ring: NBR Nitrile Blue.

### Range

The COVAL **C Series** high performance vacuum cups are available in a complete range of shapes, sizes, materials, and connection types in order to meet all your needs in the most appropriate way.

#### Models

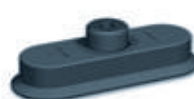
**CFC** flat suction cup



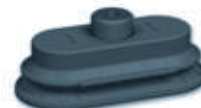
**CBC** 1.5 bellows suction cup



**COFC** flat oblong suction cup



**COBC** oblong suction cup with 1.5 bellows



#### Fittings

**M38G** male fitting G3/8" (polyamide fitting)



**F38G** female fitting G3/8" (polyamide fitting)



**C32** square coupling 32 mm (polyamide fitting and 32mm square in aluminum)



**M38GA** male fitting G3/8" (aluminum fitting)



**F38GA** female fitting G3/8" (aluminum fitting)



Other fittings available on request.



Please specify the part n°. e.g. **CBC85M38G**  
Refer to page 2/60

#### Accessories

To optimize use of your suction cups, Coval offers a comprehensive range of accessories (3/8G extensions, feeders and special couplings for 100% air-tight vacuum networks,) see chapters 4 and 14.



## C

## High-performance Suction Cups

## References - Suction Cups



## CFC Flat Suction Cup

References for nitrile (NBR) suction cups  
according to the type of fitting

	M38G	F38G	M38GA	F38GA	C32	M38G	F38G
<b>CFC35</b>	CFC35M38G	CFC35F38G	CFC35M38GA	CFC35F38GA	CFC35C32	on request	on request
<b>CFC50</b>	CFC50M38G	CFC50F38G	CFC50M38GA	CFC50F38GA	CFC50C32	on request	on request
<b>CFC75</b>	CFC75M38G	CFC75F38G	CFC75M38GA	CFC75F38GA	CFC75C32	CFC75STNV6M38G	CFC75STNV6F38G
<b>CFC100</b>	CFC100M38G	CFC100F38G	CFC100M38GA	CFC100F38GA	CFC100C32	CFC100STNV6M38G	CFC100STNV6F38G
<b>CFC125</b>	CFC125M38G	CFC125F38G	CFC125M38GA	CFC125F38GA	CFC125C32	on request	on request

Part No. for SITON® (STNV6) suction cups  
according to the type of fitting

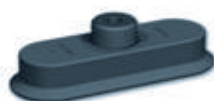
## CBC Suction Cup with 1.5 Bellows

References for nitrile (NBR) suction cups  
according to the type of fitting

	M38G	F38G	M38GA	F38GA	C32	M38G	F38G
<b>CBC22</b>	CBC22M38G	CBC22F38G	CBC22M38GA	CBC22F38GA	CBC22C32	on request	on request
<b>CBC30</b>	CBC30M38G	CBC30F38G	CBC30M38GA	CBC30F38GA	CBC30C32	on request	on request
<b>CBC45</b>	CBC45M38G	CBC45F38G	CBC45M38GA	CBC45F38GA	CBC45C32	CBC45STNV6M38G	CBC45STNV6F38G
<b>CBC60</b>	CBC60M38G	CBC60F38G	CBC60M38GA	CBC60F38GA	CBC60C32	CBC60STNV6M38G	CBC60STNV6F38G
<b>CBC85</b>	CBC85M38G	CBC85F38G	CBC85M38GA	CBC85F38GA	CBC85C32	CBC85STNV6M38G	CBC85STNV6F38G
<b>CBC115</b>	CBC115M38G	CBC115F38G	CBC115M38GA	CBC115F38GA	CBC115C32	CBC115STNV6M38G	CBC115STNV6F38G
<b>CBC125</b>	CBC125M38G	CBC125F38G	on request	on request	CBC125C32	on request	on request

Part No. for SITON® (STNV6) suction cups  
according to the type of fitting

## COFC Flat Oblong Suction Cup

References for nitrile (NBR) suction cups  
according to the type of fitting

	M38G	F38G	M38GA	F38GA	C32	M38G	F38G
<b>COFC2565</b>	COFC2565M38G	COFC2565F38G	COFC2565M38GA	COFC2565F38GA	COFC2565C32	on request	on request
<b>COFC3080</b>	COFC3080M38G	COFC3080F38G	COFC3080M38GA	COFC3080F38GA	COFC3080C32	on request	on request
<b>COFC4080</b>	COFC4080M38G	COFC4080F38G	COFC4080M38GA	COFC4080F38GA	COFC4080C32	on request	on request
<b>COFC50100</b>	COFC50100M38G	COFC50100F38G	COFC50100M38GA	COFC50100F38GA	COFC50100C32	on request	on request

Part No. for SITON® (STNV6) suction cups  
according to the type of fitting

## COBC Oblong Suction Cup with 1.5 Bellows

References for nitrile (NBR) suction cups  
according to the type of fitting

	M38G	F38G	M38GA	F38GA	C32	M38G	F38G
<b>COBC3065</b>	COBC3065M38G	COBC3065F38G	COBC3065M38GA	COBC3065F38GA	COBC3065C32	COBC3065STNV6M38G	COBC3065STNV6F38G
<b>COBC4080</b>	COBC4080M38G	COBC4080F38G	COBC4080M38GA	COBC4080F38GA	COBC4080C32	COBC4080STNV6M38G	COBC4080STNV6F38G
<b>COBC55110</b>	COBC55110M38G	COBC55110F38G	COBC55110M38GA	COBC55110F38GA	COBC55110C32	COBC55110STNV6M38G	COBC55110STNV6F38G
<b>COBC70140</b>	COBC70140M38G	COBC70140F38G	COBC70140M38GA	COBC70140F38GA	COBC70140C32	on request	on request

Part No. for SITON® (STNV6) suction cups  
according to the type of fitting



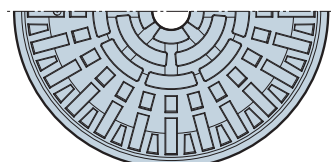
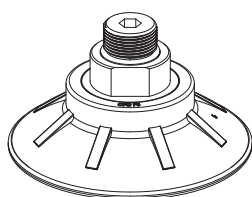
# C

## High-performance Suction Cups

### Suction Cup Properties

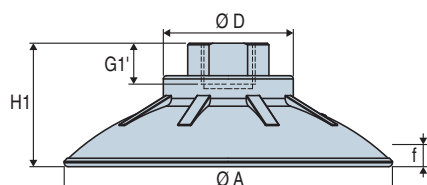


#### CFC Flat Suction Cup

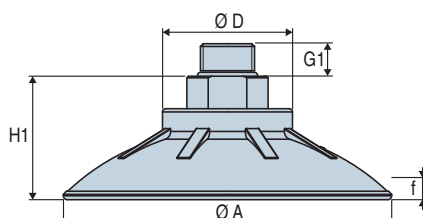


		ØA at rest	ØA gripping				$R_{min}$	$R_{min}$	Ø bore	tightening
				(cm <sup>3</sup> )	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>				
CFC 35		37	38.5	2.46	60	56	58	50	6.3	w 22 + hk 6
CFC 50		51	54	8.37	107	110	66	52	6.3	w 22 + hk 6
CFC 75		76	80	25.03	210	225	100	58	6.3	w 22 + hk 6
CFC 100		101	105.7	57.61	350	470	120	90	6.3	w 22 + hk 6
CFC 125		127	132	119.7	600	600	160	115	6.3	w 22 + hk 8

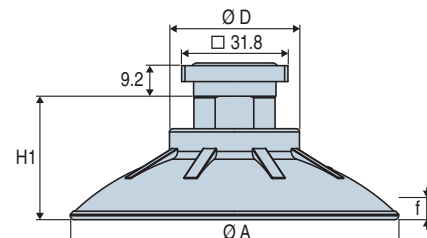
		H1	f(*)	G1	G1'	ØD	⚖️ (g)				
							F38G	F38GA	M38G	M38GA	C32
CFC 35		25	3	10	12.6	37	14	25.7	18	33.7	36.2
CFC 50		30	5	10	12.6	38	25	34.9	29	42.9	47.2
CFC 75		33	8	10	12.6	41	40	48.9	45	56.9	62.2
CFC 100		38	10	10	12.6	41	67	75.3	72	83.3	89.2
CFC 125		44	14	10	12.6	55	119	146	124	154	141.2



F38G/F38GA Female fitting G3/8"

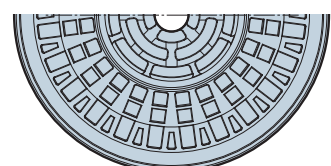
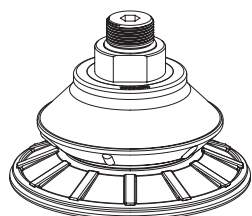









M38G/M38GA Male fitting G3/8"



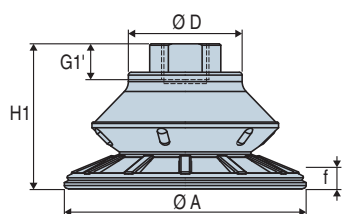
C32 Square coupling 32

#### CBC Suction Cup with 1.5 Bellows

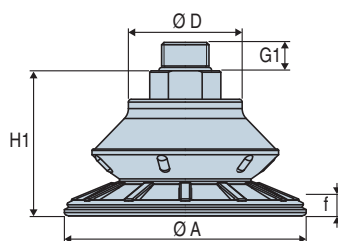


	ØA at rest	ØA gripping	 (cm³)	 (N) <sup>(1)(2)</sup>	 (N) <sup>(1)(3)</sup>	 (N) <sup>(1)</sup>	 R <sub>min</sub>	 R <sub>min</sub>	Ø bore	tightening
CBC 22	21.5	22	1.6	18	20	17	25	30	6.3	w 22 + hk 6
CBC 30	32	34	5	35	40	33	30	32	6.3	w 22 + hk 6
CBC 45	47	48.7	11.47	39	77	85	36	45	6.3	w 22 + hk 6
CBC 60	62	64.5	25.31	60	135	155	44	62	6.3	w 22 + hk 6
CBC 85	85	88	66.54	125	250	220	65	115	6.3	w 22 + hk 6
CBC 115	115	119	141.47	214	430	430	84	140	6.3	w 22 + hk 8
CBC 125	125	132	200.1	223	475	560	93	155	6.3	w 22 + hk 8

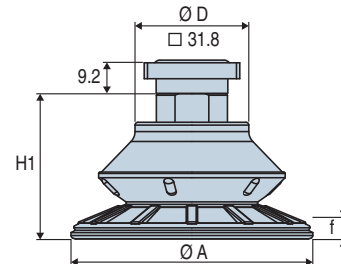
		H1	f(*)	G1	G1'	ØD	⚖️ (g)				
							F38G	F38GA	M38G	M38GA	C32
CBC 22		32	6	10	12.6	37	10	23	14	31	32.2
CBC 30		31	8	10	12.6	37	14	26.3	19	34.3	36.2
CBC 45		36	11	10	12.6	37	22	31.5	26	39.5	44.2
CBC 60		41	14	10	12.6	39	32	42	37	50	54.2
CBC 85		51	21	10	12.6	41	64	71.2	69	79.2	86.2
CBC 115		53	23	10	12.6	55	103	131.1	107	139.1	125.2
CBC 125		51	24	10	12.6	55	159	/	163	/	181.2



F38G/F38GA Female fitting G3/8"



M38G/M38GA Male fitting G3/8"



C32 Square coupling 32

(1) Force measured at 65% on dry, smooth, flat sheet metal, without safety factor. The values may change according to the characteristics and the surface of the part.

(2) Suction force. (3) Pull-off force. (\*) f: deflection of the suction cup. Note: All dimensions are in mm.



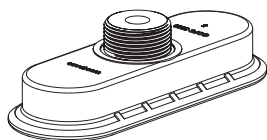
# C







## High-performance Suction Cups

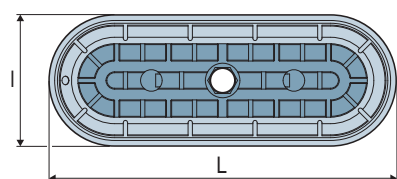
### Suction Cup Properties





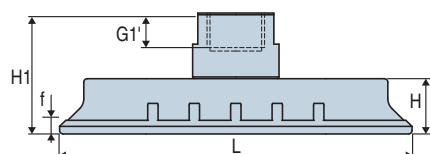
#### COFC Flat Oblong Suction Cup



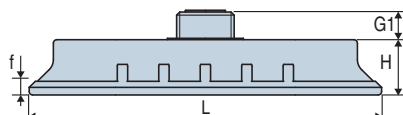
		I x L at rest	I x L gripping	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	 R <sub>min</sub>	 R <sub>min</sub>	Ø bore	tightening
COFC 2565		25x65	26.8x67	3.78	82	57	25	25	6	hk 6
COFC 3080		30x80	31.5x82	6.08	125	91	40	32	6	hk 6
COFC 4080		40x80	42x82	11.03	145	133	60	40	6	hk 6
COFC 50100		50x100	52.5x102.5	22.25	240	218	70	50	6	hk 6



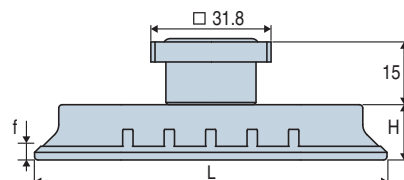
		H1	H	G1	G1'	f(*)	 (g)				
							F38G	F38GA	M38G	M38GA	C32
COFC 2565		31.5	12.5	8	10	3	24	37.8	17	26.3	35
COFC 3080		32	13	8	10	3	29	42.7	22	31.2	40
COFC 4080		34	15	8	10	4.5	30	45.5	23	34	41
COFC 50100		35	16	8	10	6	43	72.3	36	60.8	54



F38G/F38GA Female fitting G3/8"

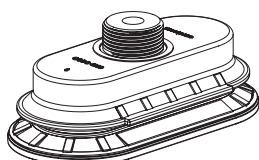









M38G/M38GA Male fitting G3/8"

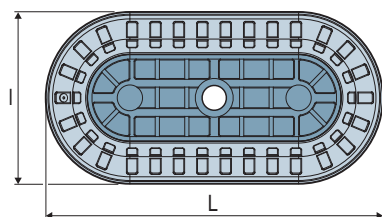




C32 Square coupling 32

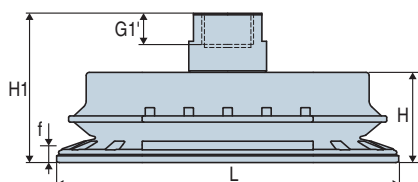
#### COBC Oblong Suction Cup with 1.5 Bellows



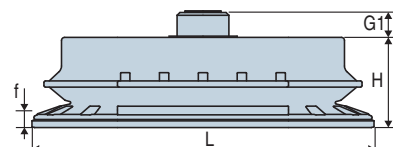
		I x L at rest	I x L gripping	 (cm <sup>3</sup> )	 (N) <sup>(1)(2)</sup>	 (N) <sup>(1)(3)</sup>	 (N) <sup>(1)</sup>	 R <sub>min</sub>	 R <sub>min</sub>	Ø bore	tightening
COBC 3065		31x65	32.3x67	9.98	50	75	87	25	30	6	hk 6
COBC 4080		40x80	41.5x82	19.44	116	130	155	38	37	6	hk 6
COBC 55110		55x110	57x112.5	49.25	170	210	265	58	57	6	hk 6
COBC 70140		70x140	72x143	93.57	270	350	410	72	68	6	hk 6



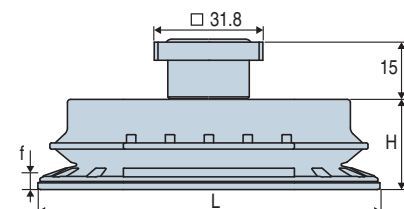
		H1	H	G1	G1'	f(*)	 (g)				
							F38G	F38GA	M38G	M38GA	C32
COBC 3065		39	20	8	10	7	31	45.5	25	34	43
COBC 4080		41	22	8	10	9.5	37	52.1	31	40.6	49
COBC 55110		48	29	8	10	11.5	68	94.3	62	82.8	80
COBC 70140		49	30	8	10	14.5	103	120.9	97	109.4	115



F38G/F38GA Female fitting G3/8"



M38G/M38GA Male fitting G3/8"



C32 Square coupling 32

The values represent the average characteristics of our products.

(1) Force measured at 65% on dry, smooth, flat sheet metal, without safety factor. The values may change according to the characteristics and the surface of the part.

(2) Suction force. (3) Pull-off force. (\*) f = deflection of the suction cup. Note: All dimensions are in mm.





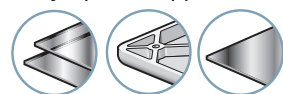


The **CTC Series** high-performance bell-type suction cups have been specifically developed to meet the production requirements of applications in the automotive sector.

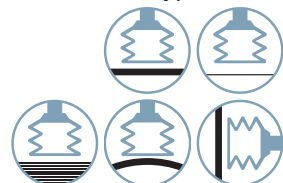
The bell shape of the **CTC Series** suction cups gives them significant deflection compared to traditional flat suction cups and guarantees better adaptability to the profiles of parts with long lines. The internal stops ensure excellent sliding resistance and allow the gripping of parts without deformation.

The characteristics of the **CTC Series** suction cups optimize production in all areas of operation.

Industry-specific applications

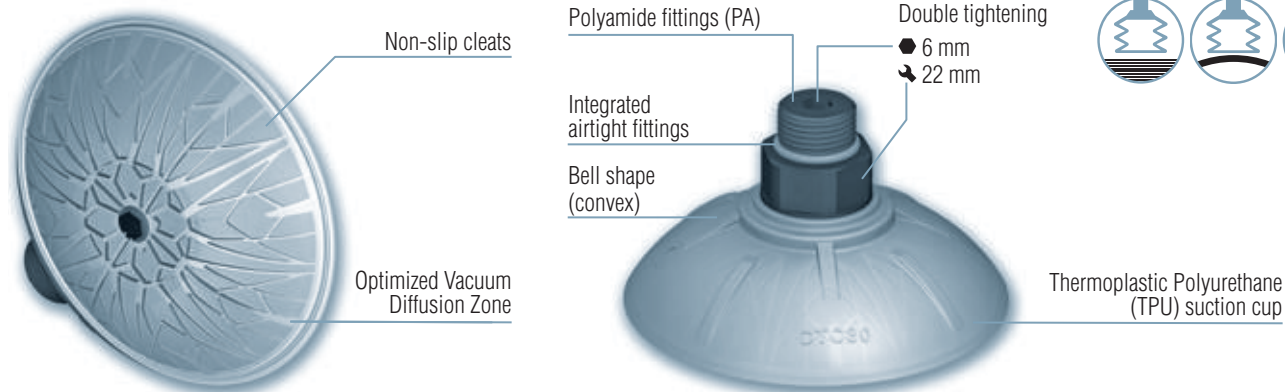


Types of use



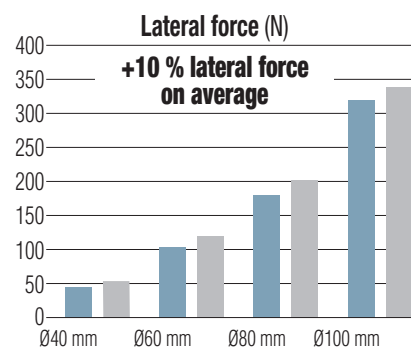
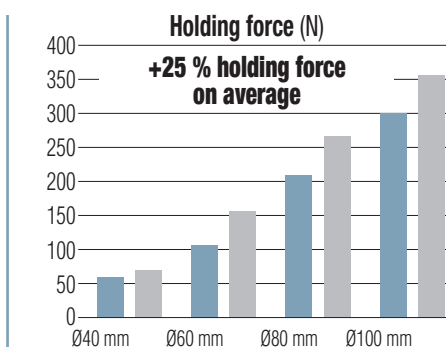
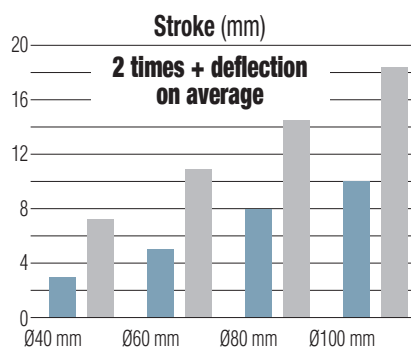
2

CTC



### Advantages

- Extreme resistance to slippage and acceleration.
- Excellent adaptation to convex surfaces and angular shapes.
- High deflection compared to standard flat suction cups due to the bell shape.
- Anti-slip cleats ensure precise positioning of oily sheets.
- Particularly suitable for use on high-speed presses, for high speeds and handling of large parts (e.g. body side, roof, doors).
- Deformation-free gripping of thin sheets thanks to central stops.
- 4 diameters for optimal adaptation to each application.
- Excellent resistance to wear and oil thanks to thermoplastic polyurethane (TPU).
- Low weight due to polyamide insert.
- Sealing lips.
- Integrated O-ring seal (male cylindrical G3/8" and square 32 versions).
- Double tightening: 2 flat 22 mm and one hollow hexagonal 6 mm.



■ Standard suction cups

■ CTC Series

### Application Fields

The extreme resistance to slippage and acceleration of the COVAL **CTC Series**, as well as their very low weight, make them particularly well suited for high-speed applications on robots.

The **CTC Series** are dedicated to the handling of sheet metal, glass, and plastics in industries such as stamping, metal forming, mirror manufacturing, and assembly.







### Fittings

#### M38G

Male fitting G3/8"  
(polyamide insert)



#### F38G

Female fitting G3/8"  
(polyamide insert)



#### C32

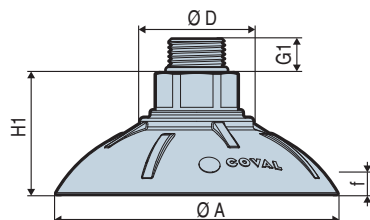
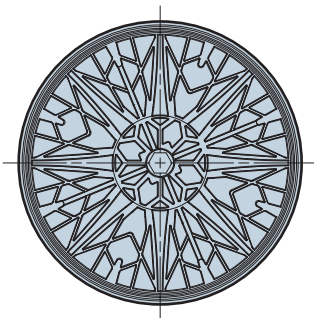
Square coupling 32 mm  
(polyamide fitting and 32mm square in aluminum)



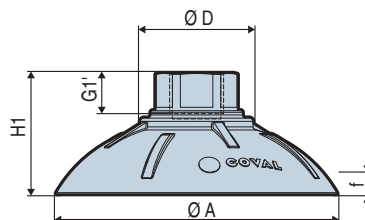
Other fittings available upon request

### Characteristics

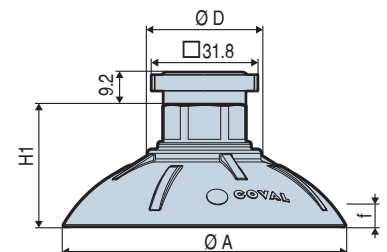
(1) Force measured at 65% on dry, smooth, and flat sheet metal, without safety coefficient. (2)  $f$  = deflection of the suction cup  
Note: all dimensions are given in mm.



M38G Male fitting G3/8"



F38G Female fitting G3/8"



C32 Square coupling 32

	ØA At rest	ØA gripping	Volume (cm <sup>3</sup> )	Force (N) <sup>(1)</sup>	Force (N) <sup>(1)</sup>	R <sub>min</sub>	Ø bore	tightening
CTC 40	43.5	47.6	8.1	70	53	18	6.3	w 22 + hk 6
CTC 60	64.7	71.7	26.1	156	120	24	6.3	w 22 + hk 6
CTC 80	84.1	92.7	72.1	266	202	36	6.3	w 22 + hk 6
CTC 100	106	115.6	103.4	356	338	40	6.3	w 22 + hk 6

	H1	f <sup>(2)</sup>	G1	G1'	ØD	Weight (g)		
						F38G	M38G	C32
CTC 40	30	7.2	10.5	10.7	32.8	12.9	17.9	35.1
CTC 60	33.9	10.9	10.5	10.7	32.7	18.3	23.3	40.5
CTC 80	36.5	14.5	10.5	10.7	33.3	26.9	31.9	49.1
CTC 100	39.1	18.4	10.5	10.7	40.3	36.1	41.1	58.3

### Materials

#### SUCTION CUPS

- **TPU: Thermoplastic polyurethane, 85 shore A**
  - High resistance to oils and abrasion.
  - Operating temperature from -20° to 100°C (up to 120°C peak).

#### FITTINGS

- **PA:** Polyamide filled with fiberglass (PA 6.6 30% FG), (fitting M38G/F38G).
- **AL:** Aluminum (M38GA/F38GA/C32 Fitting).
- **O-ring** (for M38G and C32 fittings): NBR Nitrile Blue.

**CTC 80 TPU M38G**

DIAMETER			FITTING
Ø 40 mm	<b>40</b>	<b>M38G</b>	G3/8"-M
Ø 60 mm	<b>60</b>	<b>F38G</b>	G3/8"-F
Ø 80 mm	<b>80</b>	<b>C32</b>	C32
Ø 100 mm	<b>100</b>		

Example:  
**CTC80TPUM38G**





# VSA-VS BM

## Suction Cups with Foam Ring Seals

The VSA and VS series suction cups equipped with VSBM foam rings are suitable for gripping products with rough surfaces. For example...

For applications requiring FDA food grade compatibility, see the suction cups with a silicone band, series VSA-VS BM-SIF.

- Sawn wood, sheet metal, flat surfaces with bumps or hollows.
- Any rough surfaces for which the suction cups' lips do not seal properly.

### Materials

**NBR** Nitrile      **SIT5** Translucent silicone      **SI** Silicone

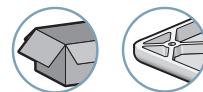
### Specifications

Some suction cup models are available with a foam ring:

- **VSA series:** Standard 1.5 bellows suction cups, Ø 20 to 78 mm in nitrile (NBR) or in transparent silicone (SIT5).
- **VS series:** Standard 2.5 bellows suction cups, Ø 20 to 88 mm in nitrile (NBR) or in transparent silicone (SIT5).
- Foam ring in nitrile for nitrile suction cups (good resistance to oil).
- Foam ring in silicone (SI) for transparent suction cups (SIT5) and silicone glue. (Resistant up to 200°C and leaves no marks on gripped products. Do not use for gripping of products before painting or lacquering.)
- Assembling: foam rings are factory-bonded onto suction cup lips.



Industry-specific applications



Types of use



### Suction Cups with 1.5 Bellows with Foam Ring Seals, VSA-BM series

	Ø (mm)	NBR			SIT5 / SI		
		Volume (cm³)	Force (N) <sup>(1)</sup>	Part Nr.	Volume (cm³)	Force (N) <sup>(1)</sup>	Part Nr.
VSA 20---BM	20	1.3	7	VSA20NBRBM	1.3	4	VSA20SIT5BM
VSA 25---BM	25	3.3	10	VSA25NBRBM	3.2	8	VSA25SIT5BM
VSA 26---BM	26	4.2	10	VSA26NBRBM	4.1	8	VSA26SIT5BM
VSA 33---BM	33	6.7	14	VSA33NBRBM	5.3	15	VSA33SIT5BM
VSA 43---BM	43	12.3	25	VSA43NBRBM	10.8	26	VSA43SIT5BM
VSA 53---BM	53	34.8	20	VSA53NBRBM	30.5	35	VSA53SIT5BM
VSA 63---BM	63	52.9	40	VSA63NBRBM	45.9	50	VSA63SIT5BM
VSA 78---BM	78	102.4	67	VSA78NBRBM	87.5	76	VSA78SIT5BM

Suction Cups with 1.5 Bellows



Foam Ring Seals

### Suction Cups with 2.5 Bellows with Foam Ring Seals, VS-BM series

	Ø (mm)	NBR			SIT5 / SI		
		Volume (cm³)	Force (N) <sup>(1)</sup>	Part Nr.	Volume (cm³)	Force (N) <sup>(1)</sup>	Part Nr.
VS 20---BM	20	2.4	5	VS20NBRBM	2.4	4.1	VS20SIT5BM
VS 25---BM	25	5.7	9	VS25NBRBM	5.6	8	VS25SIT5BM
VS 26---BM	26	6.5	9	VS26NBRBM	6.4	8	VS26SIT5BM
VS 32---BM	32	11.9	11.2	VS32NBRBM	10.6	12.6	VS32SIT5BM
VS 42---BM	42	22.6	23.4	VS42NBRBM	21.1	29	VS42SIT5BM
VS 52---BM	52	44.6	32	VS52NBRBM	40.3	31.6	VS52SIT5BM
VS 62---BM	62	86.4	37.5	VS62NBRBM	79.4	41	VS62SIT5BM
VS 88---BM	88	201.3	93	VS88NBRBM	181.1	98.5	VS88SIT5BM

Suction Cups with 2.5 Bellows



Foam Ring Seals

(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling.



# VSA-VS BM

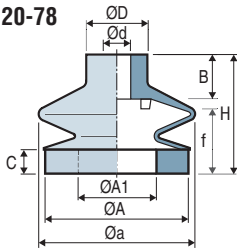
## Suction Cups with Foam Ring Seals

### Dimensions



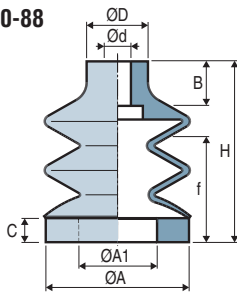
#### Dimensions

##### VSA-BM 20-78



							NBR					SIT5 / SI				
	ØA	Øa	Ød	ØD	B		ØA1	C	H	f <sup>(2)</sup>	(g)	ØA1	C	H	f <sup>(2)</sup>	(g)
VSA20 ... BM	20	20	4	10	9		10	2	18.2	6	1.8	10	2	18.2	6	1.8
VSA25 ... BM	25	25	4	10	9		16	2	25.3	11.3	3.4	13	2	25.3	10.2	3.4
VSA 26 ... BM	25	30	8	16	13		16	2	26.5	6.8	4.7	13	2	26.5	7.1	4.7
VSA 33 ... BM	32	36.2	8	18	13		22	5	32.5	13.5	7.3	19	2	29.5	12.0	7.5
VSA 43 ... BM	42	46	8	18	13		28	5	33	15.0	12.5	20	5	33	15.0	14
VSA 53 ... BM	53	59	8	18	13		33	10	44	20.0	23.6	33	5	39	17.5	23.7
VSA 63 ... BM	62	67	8	18	13		42	10	44	20.0	27.8	42	5	39	17.5	28.4
VSA 78 ... BM	78	83	12	25	20		58	10	56.8	19.0	62.1	54	5	51.8	16.5	63.6

##### VS-BM 20-88



VS 20 ... BM	20	-	4	10	9		10	2	25	9.6	2.5	10	2	25	10	2.6
VS 25 ... BM	25	-	4	10	9		16	2	36.7	19.6	4.4	13	2	36.7	17.3	4.5
VS 26 ... BM	25	-	8	16	13		16	2	35	12.3	6.6	13	2	35	11.6	6.8
VS 32 ... BM	32	-	8	18	13		22	5	42.5	17.0	9.3	19	2	39.5	15.5	9.5
VS 42 ... BM	42	-	8	18	13		28	5	51	24.5	18.9	20	5	51	24.5	20.4
VS 52 ... BM	53	-	8	18	13		33	10	59	32.0	26.9	33	5	54	29.5	27
VS 62 ... BM	62	-	8	21	13		42	10	65	36.0	37.1	42	5	60	33.5	40.5
VS 88 ... BM	88	-	12	25	20		68	10	97.5	53.5	123.6	64	5	92.5	51.0	125.4

(2) f = Deflection of the suction cup.

Note: All dimensions are in mm.

The values represent the average characteristics of our products.



Please specify the part n°. e.g. VS42NBRBM  
See part n° table above

**Selection of fittings:** please refer to fittings which are available in the suction cup series. **VSA** series: page 2/27, **VS** series: page 2/47.



# VSA-VS BM-SIF

## Suction Cups with Foam Ring Seals (Food-grade silicone FDA Standard)



The standard VSA and VS suction cups series, equipped with the VSBM-SIF, are suitable for gripping products with an irregular or ridged surface, and are FDA-compliant.

- Flat surfaces with bumps or hollows.
- Any rough surfaces for which the suction cups' lips do not seal properly.

Industry-specific application



Types of use



### Materials

**SIT5** 50 Shore A translucent silicon

**SIF** Food-grade silicone FDA Standard







VSA-VS BM-SIF suction cups are compatible with FDA food standards (FDA 21 CFR 177.2600.).

### Specifications

Some suction cup models are available with a foam ring:

- **VSA series:** Standard 1.5 bellows suction cups, Ø 20 to 78 mm in transparent silicone (SIT5).
- **VS series:** Standard 2.5 bellows suction cups, Ø 20 to 88 mm in transparent silicone (SIT5).
- Foam ring in silicone (SIF) for transparent suction cups (SIT5) and silicone glue. (Resistant up to 200°C and leaves no marks on gripped products. Do not use for gripping of products before painting or lacquering.)
- Assembling: foam rings are factory-bonded onto suction cup lips.

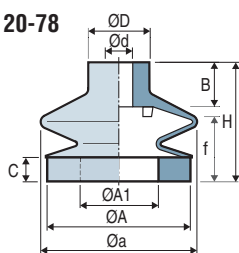
### Suction Cup Properties

VSA Suction Cups with 1.5 Bellows					VS Suction Cups with 2.5 Bellows				
	Ø (mm)	 (cm³)	 (N) <sup>(1)</sup>	SIT5 / SIF		Ø (mm)	 (cm³)	 (N) <sup>(1)</sup>	SIT5 / SIF
VSA 20	20	1.3	4	VSA20SIT5BMSIF	VS 20	20	2.4	4.1	VS20SIT5BMSIF
VSA 25	25	3.2	8	VSA25SIT5BMSIF	VS 25	25	5.6	8	VS25SIT5BMSIF
VSA 26	26	4.1	6.7	VSA26SIT5BMSIF	VS 26	26	6.4	8	VS26SIT5BMSIF
VSA 33	33	5.3	15	VSA33SIT5BMSIF	VS 32	32	10.6	12.6	VS32SIT5BMSIF
VSA 43	43	10.8	26	VSA43SIT5BMSIF	VS 42	42	21.1	29	VS42SIT5BMSIF
VSA 53	53	30.5	35	VSA53SIT5BMSIF	VS 52	52	40.3	31.6	VS52SIT5BMSIF
VSA 63	63	45.9	50	VSA63SIT5BMSIF	VS 62	62	79.4	41	VS62SIT5BMSIF
VSA 78	78	87.5	76	VSA78SIT5BMSIF	VS 88	88	181.1	98.5	VS88SIT5BMSIF

(1) Actual force of the suction cup in use with a 65% vacuum and including a safety factor of 2 for horizontal handling.

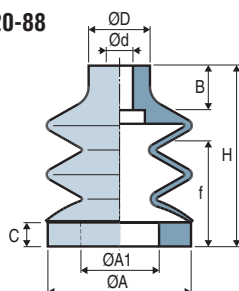
### Dimensions

#### VSA-BM 20-78



	ØA	Øa	Ød	ØD	B	ØA1	C	H	f <sup>(2)</sup>	(g)
VSA20SIT5BMSIF	20	20	4	10	9	10	2	18	6.0	1.9
VSA25SIT5BMSIF	25	25	4	10	9	13	2	25	13.0	3.3
VSA26SIT5BMSIF	25	30	8	16	13	13	2	27	7.0	5
VSA33SIT5BMSIF	32	36.2	8	18	13	19	2	29.5	12.0	7.5
VSA43SIT5BMSIF	42	46	8	18	13	20	5	33	15.0	14
VSA53SIT5BMSIF	53	59	8	18	13	33	5	39	17.5	23.7
VSA63SIT5BMSIF	62	67	8	18	13	42	5	39	17.5	28.4
VSA78SIT5BMSIF	78	83	12	25	20	54	5	51.8	16.5	63.6

#### VS-BM 20-88



	ØA	Øa	Ød	ØD	B	ØA1	C	H	f <sup>(2)</sup>	(g)
VS20SIT5BMSIF	20	-	4	10	9	10	2	25	11.0	2.6
VS25SIT5BMSIF	25	-	4	10	9	13	2	36	21.0	4.6
VS26SIT5BMSIF	25	-	8	16	13	13	2	33	12.0	6.6
VS32SIT5BMSIF	32	-	8	18	13	19	2	39.5	15.5	9.5
VS42SIT5BMSIF	42	-	8	18	13	20	5	51	24.5	20.4
VS52SIT5BMSIF	53	-	8	18	13	33	5	54	29.5	27
VS62SIT5BMSIF	62	-	8	21	13	42	5	60	33.5	40.5
VS88SIT5BMSIF	88	-	12	25	20	64	5	92.5	51.0	125.4

(2) f = Deflection of the suction cup.

Note: All dimensions are in mm.

The values represent the average characteristics of our products.



Please specify the part n°. e.g. VS42SIT5BMSIF  
See part n° table above

**Selection of fittings:** please refer to fittings which are available in the suction cup series. **VSA series:** page 2/27, **VS series:** page 2/47.



# VSBM

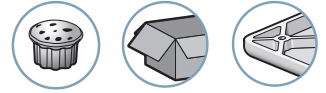
## Foam Rings



The foam ring is designed for gripping products with an uneven or ridged surface, e.g.

- Sawn wood, sheet metal, flat surfaces with bumps or hollows.
- All granular surfaces to which suction cups cannot adhere correctly and therefore cannot be airtight.

Industry-specific applications



Types of use



### Materials

**NBR** Nitrile

**SI** Non Food-grade silicone

**SIF** Food-grade silicone FDA Standard

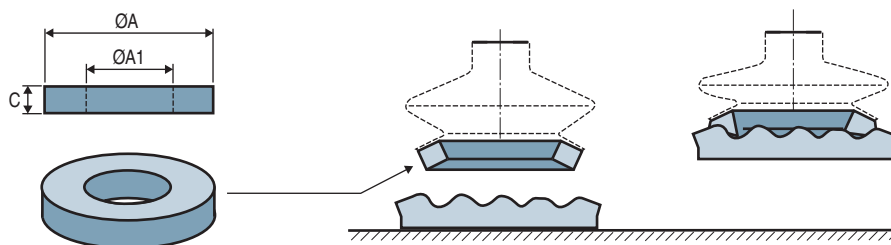
### Operating Characteristics of the Materials

- Nitrile (NBR - Black)  
5 or 10mm thick, depending on the diameters of the suction cups.  
Good resistance to oil.  
The nitrile foam strip can only be bonded to nitrile suction cups.
- Silicone (SI - White non Food-grade silicone, SIF - White Food-grade silicone FDA Standard)  
2 or 5 mm thick, depending on the diameters of the suction cups.  
Heat-resistant up to 200°C, does not leave marks on products handled.  
Do not use the silicone foam strip for gripping products before painting or lacquering.  
The silicone foam strip can only be bonded onto silicone suction cups (bonding is guaranteed if it is carried out in the factory).
- Mounting  
The foam rings are mounted by bonding. In all cases, this should be performed in our factory as we have the adhesives adapted to the materials. It is essential that bonding of silicone be carried out in the COVAL factory.

### Foam Ring Characteristics

NBR						SI / SIF					
Part Nr.	ØA	ØA1	C	f <sup>(1)</sup>	⚖ (g)	Part Nr.	ØA	ØA1	C	f <sup>(1)</sup>	⚖ (g)
VSBM32	32	22	5	2.5	0.3	VSBM20SI / SIF	20	10	2	1.0	0.2
VSBM42	42	28	5	2.5	0.7	VSBM25SI / SIF	25	13	2	1.0	0.4
VSBM53	53	33	10	5.0	2.7	VSBM32SI / SIF	32	19	2	1.0	0.5
VSBM62	62	42	10	5.0	2.8	VSBM42SI / SIF	42	20	5	2.5	2.2
VSBM78	78	58	10	5.0	3.7	VSBM53SI / SIF	53	33	5	2.5	2.8
VSBM88	88	68	10	5.0	4.6	VSBM62SI / SIF	62	42	5	2.5	3.4
						VSBM78SI / SIF	78	54	5	2.5	5.2
						VSBM88SI / SIF	88	64	5	2.5	6.4

Note: Suction cups with bellows are preferable when foam rings are required, as the slope of the lips is better suited to this type of grip. Please consult us for other models based on quantities.



Please specify the part n°. e.g. VSBM32SI  
See part n° table above

The values represent the average characteristics of our products.

(1) f = Deflection of the suction cup.

Note: All dimensions are in mm.



# Special Purpose Suction Cups

## Chapter 3

### Special Purpose Suction Cups

Thanks to its technological strength and collaboration with its customers in different industries, COVAL supplies a varied range of special purpose suction cups. E.g. handling eggs, CDs, bottles, paper, cakes, sheet metal at high speed, etc.

#### FPC FPCX



#### FlowPack Suction Cups

- Flexible suction cups
- 5 models
- Food-safe materials
- Silicone: FDA and CE standard
- Range specially designed for gripping flexible packaging
- Thin and wavy lips mold perfectly to any shape of packaging
- Gripping ability allows for high production rates

P 3/4

#### MVS



#### Soft Suction Cups for High Speed Applications

- Suction cups with 1.5 and 2.5 bellows
- 9 models
- Silicone: FDA and CE standard
- Used to grip delicate objects. Very flexible lip (opening bags, gripping tins and flexible aluminum or plastic bottles, etc.).
- High throughput rate
- Used to grip of flexible products

P 3/7

#### MVP



#### Suction Cups with 4.5 Bellows

- Suction cups with 4.5 bellows
- 4 diameters available: 20 to 50 mm
- Materials: nitrile and silicone (FDA and CE standards)
- The handling of raw food or flexible packaging
- Thin and flexible shaped lip for a perfect handling at high production rates
- The 4.5 bellows give a swivelling effect

P 3/10

#### VSAF



#### Suction Cup for Cheese

- Suction cup with 1.5 bellows
- Ø 50 mm
- Silicone: FDA and CE standard
- Suction cup specially designed for gripping fragile foods such as soft cheese
- Accessory: Stainless steel grid prevents deformation of the food

P 3/13

#### VSAOF



#### Oblong Suction Cup for Cheese

- Oval suction cup with 1.5 bellows
- Dim. 65x150 mm
- Silicone: FDA and CE standard
- Suction cup specially designed for gripping fragile foods such as soft cheese
- Accessory: Stainless steel grid prevents deformation of the food

P 3/14

#### VSD VSE VSP



#### Suction Cups For Bakery Applications

- Suction cups with 2.5 to 5.5 bellows
- 11 models
- Silicone: FDA and CE standard
- Range specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.)
- Specific shapes and shore A hardness depending on the applications
- Resistance to temperature: - 40 °C to + 220 °C

P 3/15



# Special Purpose Suction Cups

## Chapter 3

### VSO



#### Suction Cups for Egg-Handling

- Suction cups with 2.5 and 3.5 bellows
- 3 models
- Silicone: FDA and CE standard 1935/2004
- Range specially designed to meet constraints involved when handling eggs.
- Very flexible lip
- Different shapes of suction cup

P 3/17

3

### VSBO VSBO+ VSBO LM/BM



#### Suction Cups for Bottle Handling

- Suction cups with 4.5 bellows
- 8 models
- High tensile force
- Highly flexible and long stroke
- Used to grip 750 ml bottles, Magnums bottles and special bottles with textured surfaces
- Bottles gripped from the side, vertical and horizontal handling
- Suction cup with stainless steel reinforcement in the bellows
- Available with integrated sensing valve

P 3/18

### VBO



#### Suction Cup for Bottle Handling via the Punt

- Suction cup system comprised of a 62mm cup with 2.5 bellows and a silicone gripping disc (COVAL-Flex).
- The VBO suction cup system is designed for gripping bottles by the punt on disgorging stations.
- Excellent sealing when gripping different types of bottles.

P 3/27

### VPBO



#### Coupler Plates for gripping bottles by the Punt

- Coupler Plates for gripping bottles by the punt
- 3 diameters: Ø65, 75 and 95 mm
- Natural rubber
- The VPBO Coupler Plates are designed for gripping bottles by the punt on disgorging stations (1/2 bottles, 75cl bottles and Magnum)

P 3/28

### VPA

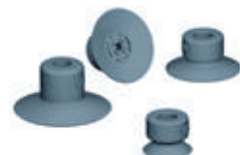


#### Suction Cups for Paper Applications

- Flat suction cups
- 9 models
- Very flexible lip
- Materials: natural rubber and silicone (food compatibility)
- Range of suction cups with very flexible lip used to handle very flexible materials
- Very resistant to abrasion (for paper, cardboard)
- Very flexible gripping lip which molds to the shape of the object to be handled

P 3/29

### VPAL



#### Suction Cups for Labels

- Extra-flat shape suction cups
- 3 models
- Material: silicone (food compatibility)
- The VPAL suction cups are especially adapted for gripping and handling IML labels or flexible materials
- Great lip flexibility

P 3/31

### VSAPL



#### Suction Cups with 1.5 Bellows for Labels

- Suction cup with 1.5 bellows
- Ø 11 mm
- Silicone: FDA and CE standard
- The VSAPL suction cup is especially adapted for gripping and handling IML labels or flexible materials
- Great lip flexibility

P 3/32



# Special Purpose Suction Cups

## Chapter 3

3

### VPR



#### Suction Cups for Mailing Applications

- Flat suction cups
- 4 models
- Material: natural rubber
- Range of suction cups designed to meet the requirements of mailing applications
- Envelope stuffing, film-wrapping, mailing (picking)
- Very resistant to abrasion

P 3/33

### VPAG



#### Curved Suction Cups

- Curved suction cups
- 2 models
- Material: natural rubber
- Thanks to very flexible lips and a curved shape, the VPAG range is adapted to gripping flexible materials such as labels or sheets of paper - or textured objects
- Very resistant to abrasion

P 3/34

### VPSC



#### Ultra-flat, Non-Marking Suction Cups

- Ultra flat suction cups
- Ø 40 and 80 mm
- Materials : Polyurethane and silicone (FDA and CE standards)
- Suction cup specially designed not to deform the gripped product.
- Vacuum distributed across the entire surface of the suction cup for optimal gripping force.
- Extra-thin sealing lip designed to contour to the shape of the product being handled

P 3/35

### VPYR



#### Radial Ball-joint Suction Cups

- Flat suction cups with radial ball-joint system
- 4 models (Ø50 to 100mm)
- Materials: nitrile and silicone
- The range of ball-joint suction cups is recommended for gripping curved or rotating products which requires a lot of force and mechanical resistance

P 3/36

### SPL



#### Heavy Load Suction Cups

- "Heavy load" flat suction cups
- 5 models (Ø240 to 600mm)
- Materials: nitrile and silicone
- SPL suction cups are used to handle heavy loads such as sheet metal or glass panels. They have internal cleats allowing them to handle thin metal sheets without distorting them and for vertical handling (non-slip)

P 3/37

### STEEL



#### Steel Suction Cups

- Flat suction cups with a bonded foam seal
- 9 round models (Ø 150 to 580 mm)
- 9 rectangular models (175x115 to 705x385mm)
- For horizontal handling of heavy loads (thick sheet metal) or objects with an uneven surface such as concrete slabs, wood, etc.
- Wide choice of dimensions

P 3/38





Combining great flexibility and food compatibility, the new FPC and FPCX Series suction cups have been specially designed to optimize the handling of packed bags from 100 g to 5 kg. E.g. - FlowPack, DoyPack, etc.

- Its gripping ability allows for high production rates.
- No interruption in the packaging line due to faulty gripping.
- Suction cup made of silicone, a material that is recommended for its temperature resistance and food safety (FDA and CE 1935/2004).
- Energy Savings: the airtightness of FPC and FPCX Series suction cups avoids the need for an oversized vacuum generator.

Different forms and dimensions for a suitable solution.

- Round Ø 35 1.5 bellows, Round Ø 45 and Ø 60 mm or elliptical 120 x 100 mm.

### Applications

The FPC and FPCX series suction cups are dedicated to the handling of flexible packaging such as FlowPack, Doypack, etc. :

- FlowPack < 0.5 kg: suction cup Ø 35 mm, FPC351.5.
- FlowPack < 1 kg: suction cup Ø 45 mm, FPC45.
- FlowPack < 1.5kg: suction cup Ø 60 mm, FPC60/ FPCX60.
- FlowPack ≤ 5 kg: elliptical suction cup 120x100 mm, FPC120100.

Industry-specific application



Types of use



### Materials

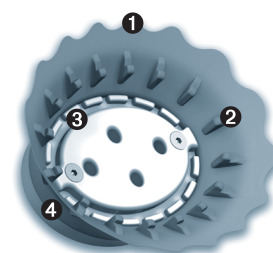
Suction cups:	<b>SIBL3</b> Blue silicone 35 Shore A
	<b>SIBL5</b> Blue silicone 50 Shore A
Fittings:	Plastic POM-C and PETP
Flat seal:	Silicone
Screw:	Stainless steel

FPC and FPCX suction cups are compatible with FDA food standards (FDA 21 CFR 177.2600.) and meet the European regulation (EC) 1935/2004.

### Innovations




The shape of the lip has been designed to match the deformation of flexible packaging and ensure the best possible seal during positioning; which, as an additional advantage, allows for a reduction in power of the vacuum generator. The FPC/FPCX suction cups are also equipped with cleats that stiffen the lip and reinforce the clamping effect.

- ① Thin and wavy flapper-shaped lips that perfectly mold to the packaging, whatever the shape.
- ② Internal cleats that allow for optimized vacuum while preventing any crushing and also strengthen the hold on the product being handled.
- ③ Fittings featuring a lateral vacuum distributor that prevent any loss in efficiency when the product is held.
- ④ Materials: Food-grade silicone and plastic insert meets FDA and CE standards.



**FPCX60SIBL5:** A variant of the FPC60SIBL5 suction cup is available with a slightly thicker lip, providing it with greater durability over time

### Suction Cup characteristics

	Dim. (mm)	 (cm³)	 (N) <sup>(1)</sup>	SIBL3	SIBL5
				Part number suction cup + fitting	Part number suction cup + fitting
FPC351.5...IF14PC	Ø 35	7.2	5	FPC351.5SIBL3IF14PC	FPC351.5SIBL5IF14PC
FPC45...IF38PC	Ø 45	13	10	FPC45SIBL3IF38PC	FPC45SIBL5IF38PC
FPC60...IF38PC	Ø 60	24.5	15	FPC60SIBL3IF38PC	FPC60SIBL5IF38PC
FPCX60...IF38PC	Ø 60	24.5	15	-	FPCX60SIBL5IF38PC
FPC120100...IF38P1V	120x100	167	50	FPC120100SIBL3IF38P1V	FPC120100SIBL5IF38P1V

(1) Force measured at 65% vacuum, without safety factor.

### Range

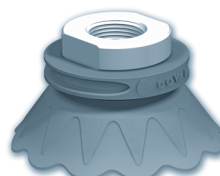
**FPC351.5...IF14PC**  
Round Ø 35 mm  
1.5 bellows

**FPC45...IF38PC**  
Round Ø 45 mm

**FPC60...IF38PC**  
Round Ø 60 mm

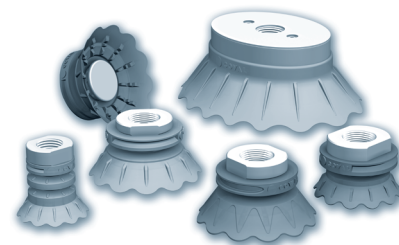
**FPCX60...IF38PC**  
Round Ø 60 mm

**FPC120100...IF38P1V**  
Elliptical 120 x 100 mm



Specify the part number e.g.: FPC60SIBL3IF38PC  
Please refer to the characteristics table above

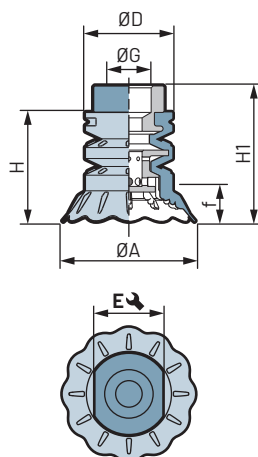




#### Suction Cup + fittin

**FPC351.5---IF14PC**

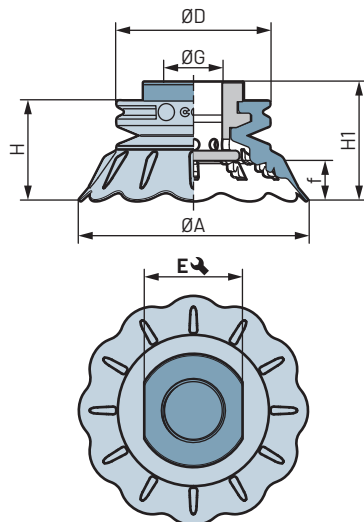
Round, Ø 35 mm, 1.5 bellows



**FPC45---IF38PC**

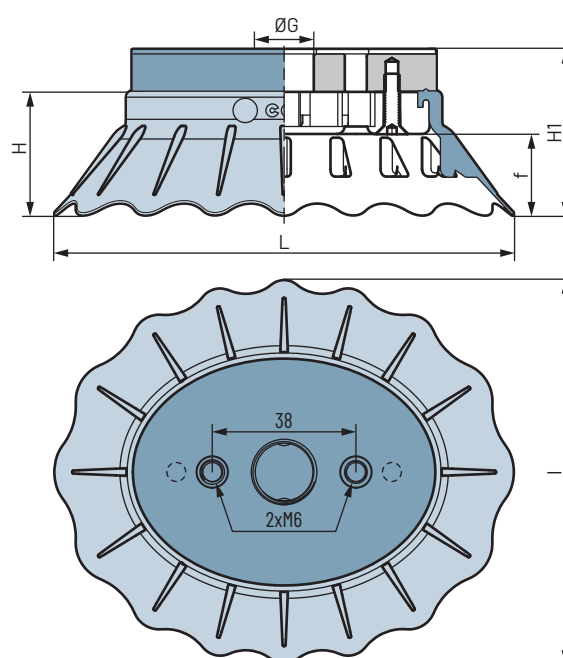
**FPC60/FPCX60---IF38PC**


Round, Ø 45 and 60 mm



**FPC120100---IF38P1V**

Elliptical, 120 x 100 mm



	Ø A	Ø D	L	I	f (1)	H	H1	Ø G	E	⚖ (g)
 FPC351.5---IF14PC	35	23	-	-	10	29	36	G1/4"-F	19	9.9
FPC45---IF38PC	45	39	-	-	7	23	30	G3/8"-F	26	20
FPC60---IF38PC	60	40	-	-	10	26	33	G3/8"-F	26	21.5
FPCX60---IF38PC	60	40	-	-	10	26	33	G3/8"-F	26	21.5
FPC120100---IF38P1V	-	-	120	100	15	32.5	42.5	G3/8"-F	-	92.1

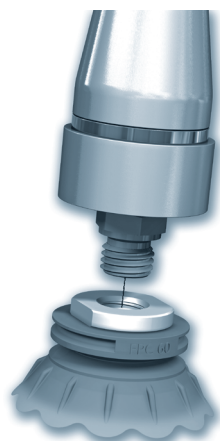
(1) f = Deflection of the suction cup

#### Mounting Configurations

**FPC351.5/FPC45/FPC60/FPCX60**

Via connection:

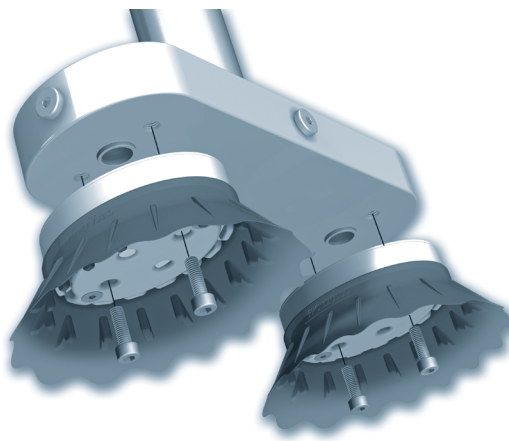
- FPC351.5: G1/4"-F
- FPC45/FPC60/FPCX60: G3/8"-F



**FPC120100**

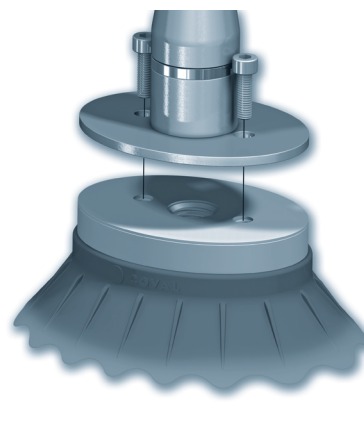
From below:

2 M5x20 screws (not included)



From above:

2 M6x16 screws (not included)

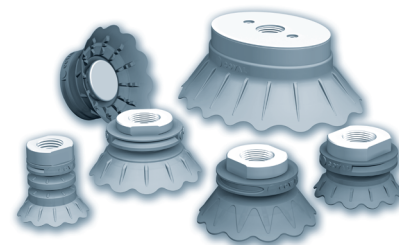


The values represent the average characteristics of our products.  
Note: All dimensions are in mm



# FPC/FPCX

## FlowPack Suction Cups Part Configurations



### FPC351.5

Round, Ø 35 mm, 1.5 bellows

#### COMPLETE PART CONFIGURATION

SUCTION CUP  
+  
UPPER G1/4"-F FITTING  
+  
LOWER PLATE

■ Hardness 35 Shore  
**FPC351.5SIBL3IF14PC**

■ Hardness 50 Shore  
**FPC351.5SIBL5IF14PC**



#### INDIVIDUAL PART REFERENCE

UPPER G1/4"-F FITTING ONLY:  
**IF14PFPC35**

SUCTION CUP ONLY:  
■ Hardness 35 Shore  
**FPC351.5SIBL3**  
■ Hardness 50 Shore  
**FPC351.5SIBL5**

LOWER PLATE ONLY:  
**IL1PFPC35**

### FPC45/FPC60/FPCX60

Round, Ø 45 and 60 mm

#### COMPLETE PART CONFIGURATION

SUCTION CUP  
+  
G3/8"-F FITTING:

#### FPC45

■ Hardness 35 Shore  
**FPC45SIBL3IF38PC**

■ Hardness 50 Shore  
**FPC45SIBL5IF38PC**

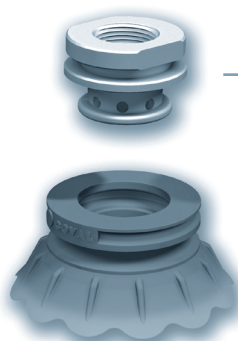
#### FPC60

■ Hardness 35 Shore  
**FPC60SIBL3IF38PC**

■ Hardness 50 Shore  
**FPC60SIBL5IF38PC**

#### FPCX60

■ Hardness 35 Shore  
**FPCX60SIBL5IF38PC**



#### INDIVIDUAL PART REFERENCE

UPPER G3/8"-F ONLY:  
**IF38PFPC60**

#### FPC45

SUCTION CUP ONLY:  
■ Hardness 35 Shore  
**FPC45SIBL3**  
■ Hardness 50 Shore  
**FPC45SIBL5**

#### FPC60

SUCTION CUP ONLY:  
■ Hardness 35 Shore  
**FPC60SIBL3**  
■ Hardness 50 Shore  
**FPC60SIBL5**

#### FPCX60

■ Hardness 50 Shore  
**FPCX60SIBL5**

### FPC120100

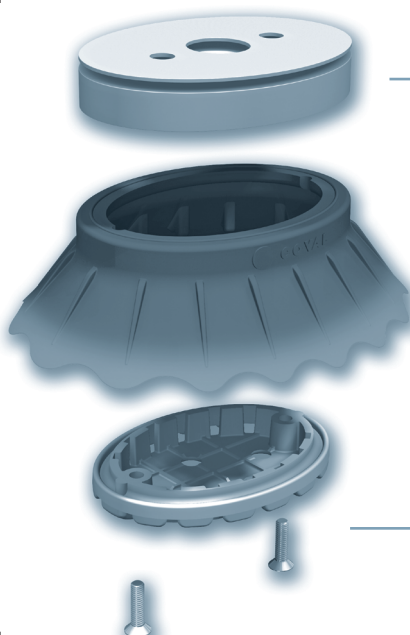
Elliptical, 120 x 100 mm

#### RÉFÉRENCE DES VENTOUSES COMPLÈTES

SUCTION CUP  
+  
LOWER PLATE  
+  
UPPER PLATE G3/8"-F  
+  
FLAT SEAL:

■ Hardness 35 Shore  
**FPC120100SIBL3IF38P1V**

■ Hardness 50 Shore  
**FPC120100SIBL5IF38P1V**



#### INDIVIDUAL PART REFERENCE

UPPER PLATE G3/8"-F + FLAT SEAL:  
**IF38PFPC120**

SUCTION CUP ONLY:  
■ Hardness 35 Shore  
**FPC120100SIBL3**  
■ Hardness 50 Shore  
**FPC120100SIBL5**

LOWER PLATE + 2 STAINLESS SCREWS M4x16:  
**IL1PFPC120**

Standard configurations (suction cup + fitting) are delivered unassembled.



COVAL has designed a range of high performance cups in order to meet demanding industry requirements for gripping soft or flexible products at high speeds.

- Soft, thin sealing lip and optional cleats provide a perfect grip during high work rates for all types of flexible shapes and materials.
- Food-grade silicone meets FDA and CE 1935/2004 standards.
- Available in 1.5, 2.5 and 3.5 bellows.
- Available in Ø 20-40 mm.

### Applications

This flexibility allows for high speed gripping of all types of materials and foods: FlowPack, DoyPack, thermoformed food trays, raw materials (sausage, fresh fish, cookies, chocolates)...Speeds of 120 or more grip and release cycles per minute.

### Materials

**SIB** 35 Shore A white silicone

**SIT5** 50 Shore A Translucent silicone






Industry-specific applications



Types of use



### Suction Cup Characteristics

	Ø (mm)	 (cm³)	 (N) <sup>(1)</sup>	SIB	SIT5	Fittings		
				Reference	Reference	G1/8"-M	G1/4"-M	G1/4"-F
MVS202.5...G	20	4	3.1	MVS202.5SIBG	MVS202.5SIT5G	IM18SP1251	-	-
MVS202.5...C	20	4	3.3	MVS202.5SIBC	MVS202.5SIT5C	IM18SP1251	-	-
MVS301.5...G	30	7	7.8	MVS301.5SIBG	MVS301.5SIT5G	-	IM51SP143	IF50SP143
MVS301.5...C	30	7	10.1	MVS301.5SIBC	MVS301.5SIT5C	-	IM51SP143	IF50SP143
MVS302.5...G	30	11.2	7.6	MVS302.5SIBG	MVS302.5SIT5G	-	IM51SP143	IF50SP143
MVS302.5...C	30	11.2	8.5	MVS302.5SIBC	MVS302.5SIT5C	-	IM51SP143	IF50SP143
MVS303.5...C	30	11.6	8.4	MVS303.5SIBC	-	-	IM51SP143	IF50SP143
MVS401.5...C	40	7.3	12.7	MVS401.5SIBC	MVS401.5SIT5C	-	IM51SP143	IF50SP143
MVS402.5...C	40	13	8.2	MVS402.5SIBC	MVS402.5SIT5C	-	IM51SP143	IF50SP143

(1) Actual holding force of the suction cup at a vacuum of 65% on flat and smooth surface and safety factor of 2 included.

MVS...G



MVS...C



For applications requiring suction cups with a smaller diameter, we recommend the VSA series in the SIB version, see page 2/27.

Note: Nozzle fitting IM5MVS see page 4/10.

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.



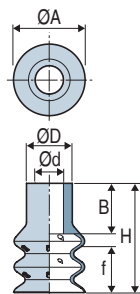
Specify the part number e.g.: MVS302.5SIBC  
Please refer to the characteristics table above



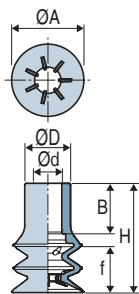


#### Suction Cups

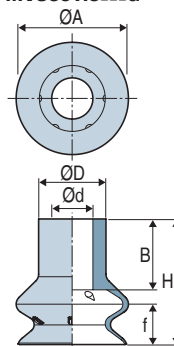
MVS202.5...G



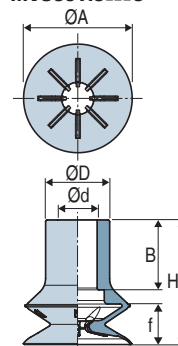
MVS202.5...C



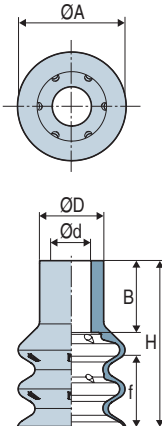
MVS301.5...G



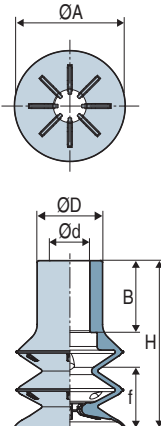
MVS301.5...C



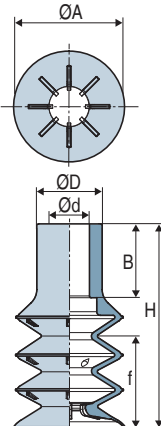
MVS302.5...G



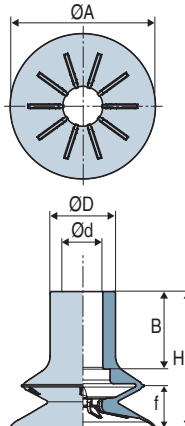
MVS302.5...C



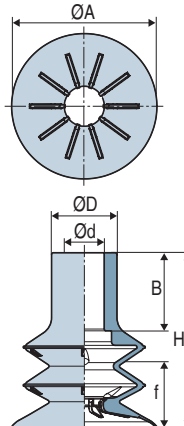
MVS303.5...C



MVS401.5...C



MVS402.5...C

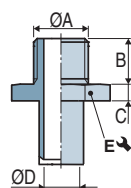


	Ø A	H	Ø d	Ø D	f (2)	B	(g)
MVS202.5...G	20	31	8	13	10	13	2.3
MVS202.5...C	20	31	8	13	10	13	3
MVS301.5...G	30	35	11	18	10	19.5	5.9
MVS301.5...C	30	35	11	18	9	19.5	6.5
MVS302.5...G	30	46	11	18	17.5	19.5	6.8
MVS302.5...C	30	46	11	18	15.5	19.5	8.2
MVS303.5...C	30	56	11	18	22.5	20.6	9.4
MVS401.5...C	40	37.5	11	18	7	21.5	8.7
MVS402.5...C	40	48	11	18	15.5	21.5	10.5

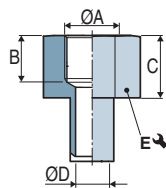
(2) f = Deflection of the suction cup.

#### Barbed Fittings

Male fittings



Female fittings



	ØA	B	C	ØD	E	Materials	(g)
IM 18 SP1251	G1/8"-M	8	5	4.8	14	POM-C	2.5
IM 51 SP143	G1/4"-M	11	6	8	21	Aluminum	10.5
IF 50 SP143	G1/4"-F	10	15	8	21	Aluminum	14.4

The values represent the average characteristics of our products.  
Note: All dimensions are in mm







## Suction Cups with 4.5 Bellows



The MVP series suction cups are designed to the handling of raw food or flexible packaging at high speeds. The thin gripping lip allows to fit with the product to be handled and the 4.5 bellows give a swivelling effect to ensure the positioning of the suction cup when the product is held. Furthermore, once in grip, the rigidity of the compressed bellows ensures a very good prehension of the object and avoids the swing effect.

- Thin and flexible shaped lip for a perfect handling at high production rates
- 4.5 bellows
- Ø 20-30-40-50 mm
- Available in 3 materials:
  - Blue Silicone (SIBL5) to meet FDA and CE 1935/2004 standards.
  - Detectable Blue Silicone (SI5BD), load with 30% of detectable particles and meets the CE 1935/2004 standards.
  - Nitrile (NBR)
- Fittings available with or without inner filtering grid.
- Male fittings (IM) equipped with O-ring sealing

### Applications

The high flexibility of the MVP suction cups lips allows to handle at great speed all kind of materials or foodstuff: Flowpack, Doypack, pouch bags, thermoformed trays, raw products (sausage, fresh fish, biscuits, chocolates)...

Industry-specific applications



Types of use




### Materials

**NBR** Nitrile

**SIBL5** Blue silicone 50 shore A

**SI5BD** Blue silicone 50 shore A detectable


### Suction Cup Characteristics

	Ø (mm)	Volume (cm³)	Force (N) <sup>(1)</sup>	NBR	SIBL5	SI5BD
MVP204.5	20	3.2	4.3	MVP204.5NBR	MVP204.5SIBL5	MVP204.5SI5BD(*)
MVP304.5	30	11.6	12.5	MVP304.5NBR	MVP304.5SIBL5	MVP304.5SI5BD(*)
MVP404.5	40	25.3	16.5	MVP404.5NBR	MVP404.5SIBL5	MVP404.5SI5BD(*)
MVP504.5	50	50.4	27.8	MVP504.5NBR	MVP504.5SIBL5	MVP504.5SI5BD(*)

(1) Actual holding force of the suction cup at a vacuum of 65% on flat and smooth surface and safety factor of 2 included.

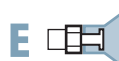
(\*) On request

### Choice of Fittings

 (Ø)	G1/8"-M	G1/8"-F	G1/4"-M	G3/8"-M
20	■	-	-	-
30	-	■	■	■
40	-	■	■	■
50	-	-	■	■

■ Standard available configurations (suction cup + fitting) Fitting: M = male F = female  
refer to page 3/11

### Type of Assembly



Version E: Pressed fitting





Specify the part number e.g.: MVP304.5SIBL5  
Please refer to the characteristics table above






#### References - "Suction Cup + Fitting"

ø 20 mm		G1/8"-M	
		Fitting with filter	Fitting without filter
		MVP204.5NBR	MVP204.5NBRIM18F MVP204.5NBRIM18
		MVP204.5SIBL5	MVP204.5SIBL5IM18F MVP204.5SIBL5IM18
		MVP204.5SI5BD	on request on request

ø 30 - 40 mm		G1/8"-F		G1/4"-M		G3/8"-M	
		Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter
		MVP304.5NBR	MVP304.5NBRIF18F MVP304.5NBRIF18	MVP304.5NBRIM14F MVP304.5NBRIM14	MVP304.5NBRIM38F MVP304.5NBRIM38		
		MVP304.5SIBL5	MVP304.5SIBL5IF18F MVP304.5SIBL5IF18	MVP304.5SIBL5IM14F MVP304.5SIBL5IM14	MVP304.5SIBL5IM38F MVP304.5SIBL5IM38		
		MVP304.5SI5BD	on request on request	on request on request	on request on request		
		MVP404.5NBR	MVP404.5NBRIF18F MVP404.5NBRIF18	MVP404.5NBRIM14F MVP404.5NBRIM14	MVP404.5NBRIM38F MVP404.5NBRIM38		
		MVP404.5SIBL5	MVP404.5SIBL5IF18F MVP404.5SIBL5IF18	MVP404.5SIBL5IM14F MVP404.5SIBL5IM14	MVP404.5SIBL5IM38F MVP404.5SIBL5IM38		
		MVP404.5SI5BD	on request on request	on request on request	on request on request		

ø 50 mm		G1/4"-M		G3/8"-M	
		Fitting with filter	Fitting without filter	Fitting with filter	Fitting without filter
		MVP504.5NBR	MVP504.5NBRIM14F MVP504.5NBRIM14	MVP504.5NBRIM38F MVP504.5NBRIM38	
		MVP504.5SIBL5	MVP504.5SIBL5IM14F MVP504.5SIBL5IM14	MVP504.5SIBL5IM38F MVP504.5SIBL5IM38	
		MVP504.5SI5BD	on request on request	on request on request	

#### Dimensions «Suction Cup + Fitting»

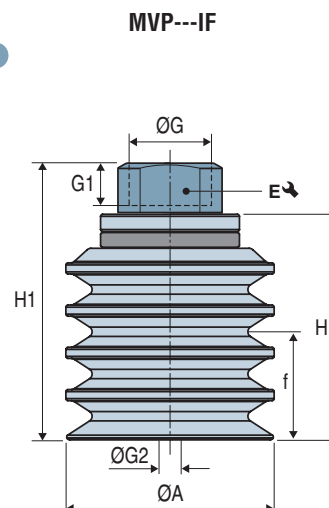
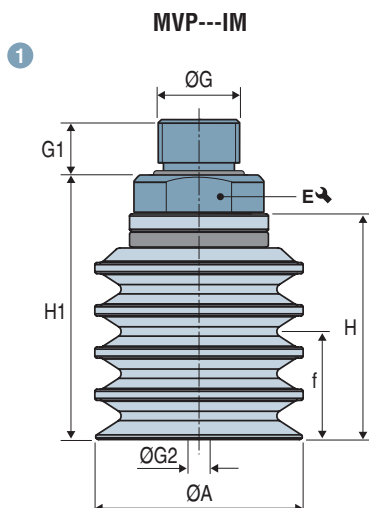


	Diagram	ØA	f <sup>(1)</sup>	H	H1	ØG	G1	ØG2 <sup>(2)</sup>	E	(g)
MVP204.5...IM18-	1	20	13.2	22.3	27.3	G1/8"-M	7	4	13	5.3
MVP304.5...IF18-	2	30	20.2	32.5	40.5	G1/8"-F	6.6	5	17	11.5
MVP304.5...IM14-	1	30	20.2	32.5	38.5	G1/4"-M	9	5	19	12.4
MVP304.5...IM38-	1	30	20.2	32.5	38.5	G3/8"-M	10	5	22	17
MVP404.5...IF18-	2	40	27	41.2	49.2	G1/8"-F	6.6	5	17	18.8
MVP404.5...IM14-	1	40	27	41.2	47.2	G1/4"-M	9	5	19	19.7
MVP404.5...IM38-	1	40	27	41.2	47.2	G3/8"-M	10	5	22	24.3
MVP504.5...IM14-	1	50	32.8	52.1	58.1	G1/4"-M	9	6	22	35.6
MVP504.5...IM38-	1	50	32.8	52.1	58.1	G3/8"-M	10	6	23.9	38.6

Note: All dimensions are in mm.

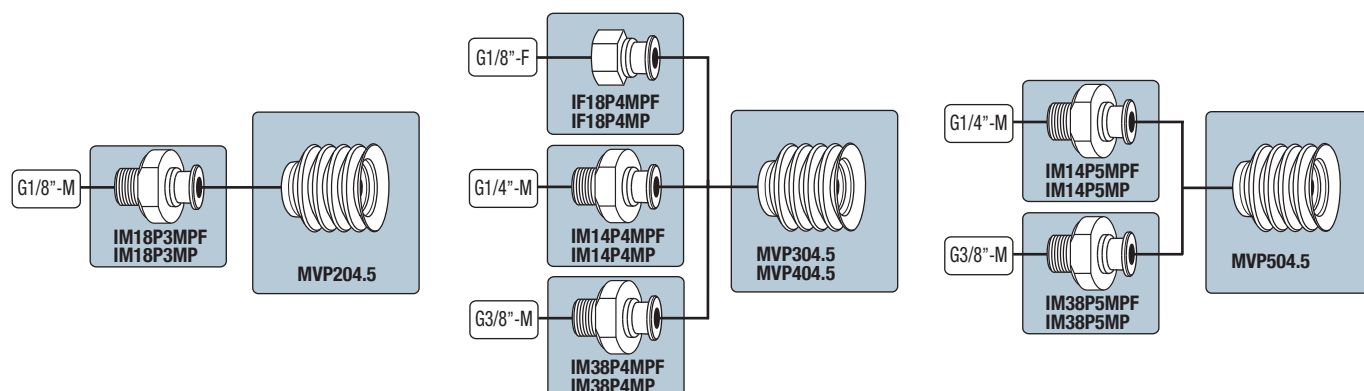
(1) f = Deflection of the suction cup.

(2) Ø G2 = Ø internal orifice of the fitting.

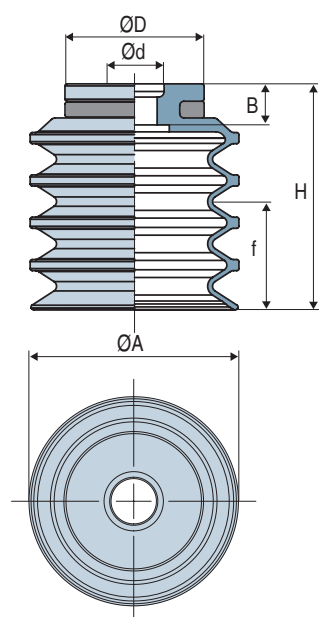




#### Assembly Diagrams



#### Dimensions Suction Cups

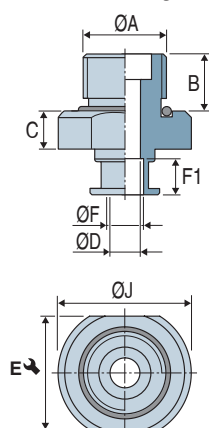


	ØA	H	Ød	ØD	f <sup>(2)</sup>	B	(g)
MVP204.5	20	22.3	6	14	13.2	4.8	2.1
MVP304.5	30	32.5	6.5	20	20.2	6.9	5.4
MVP404.5	40	41.2	6.5	19.5	27	6.9	12.7
MVP504.5	50	52.1	6.5	27	32.8	9.9	23.5

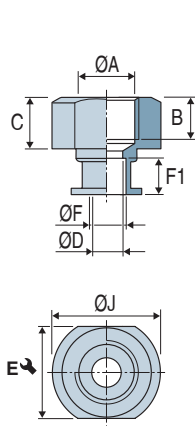
(2) f = Deflection of the suction cup.

#### Dimensions Fittings

##### Male fittings



##### Female fittings



Fitting with stainless steel filter 200 µm	Fitting without filter	ØA	B	C	ØD	E	ØJ	ØF	F1	Materials Fitting*	(g)
IM18P3MPF	IM18P3MP	G1/8"-M	7	5	4	13	15	5	4.7	Aluminum	3.2
IF18P4MPF	IF18P4MP	G1/8"-F	6.6	8	5	17	20	6	5.7	Aluminum	6.1
IM14P4MPF	IM14P4MP	G1/4"-M	9	6	5	19	21	6	5.7	Aluminum	7
IM14P5MPF	IM14P5MP	G1/4"-M	9	6	6	22	28	10	8.7	Aluminum	12.1
IM38P4MPF	IM38P4MP	G3/8"-M	10	6	5	22	24	6	5.7	Aluminum	11.6
IM38P5MPF	IM38P5MP	G3/8"-M	10	6	6	23.9	28	10	8.7	Aluminum	15.1

\*Male fittings (IM) equipped with O-ring sealing

The values represent the average characteristics of our products.  
Note: All dimensions are in mm



## Suction cup with 1.5 bellow Specifically designed for cheese

To meet the requirements of applications for handling soft and fragile food products such as soft cheese, COVAL has developed a 1.5 bellow suction cup made of food-grade silicone that can be fitted with a stainless steel grid, which prevents deforming the food product.

- Suction cup made of 50 Shore A blue silicone that complies with food standards (FDA and CE 1935/2004).
- 1.5 bellow
- Ø 50 mm

### Materials

**SIBL5** 50 Shore A blue silicone



Industry-specific applications






Types of use



3

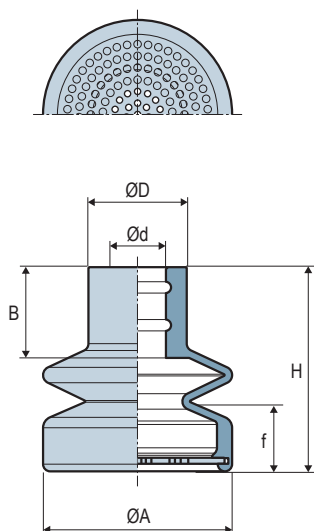
VSAF

### Suction Cup Characteristics

	Ø (mm)	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>
<b>VSAF50SIBL5</b>	50	24.1	19

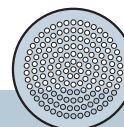
(1) Actual force of suction cup in use with 20% vacuum and including a safety factor of 2.



### Dimensions



### Accessory

Stainless steel grid 50 mm  
in diameter for suction cup VSAF50:  
Part no.: 80002171  
Weight: 18 g



	Ø A	H	Ø d	Ø D	B	f <sup>(2)</sup>	 (g)
<b>VSAF50SIBL5</b>	50	54	15	26	24	11	28

(2) f = Deflection of suction cup.



**Specify the part number: VSAF50SIBL5  
+ stainless steel grid Part no. 80002171**

The values represent the average characteristics of our products.  
Note: All dimensions are in mm



## Oblong suction cup with 1.5 bellow Specifically designed for cheese

To meet the requirements of applications for handling soft and fragile food products such as soft cheese, COVAL has developed a 1.5 bellow oblong suction cup made of food-grade silicone that can be fitted with a stainless steel grid, which prevents deforming the food product.

- Suction cup made of 50 Shore A blue silicone that complies with food standards (FDA and CE 1935/2004).
- 1.5 bellow
- Dimensions: 65 x 150 mm

### Materials

**SIBL5** 50 Shore A blue silicone



Industry-specific applications






Types of use



3

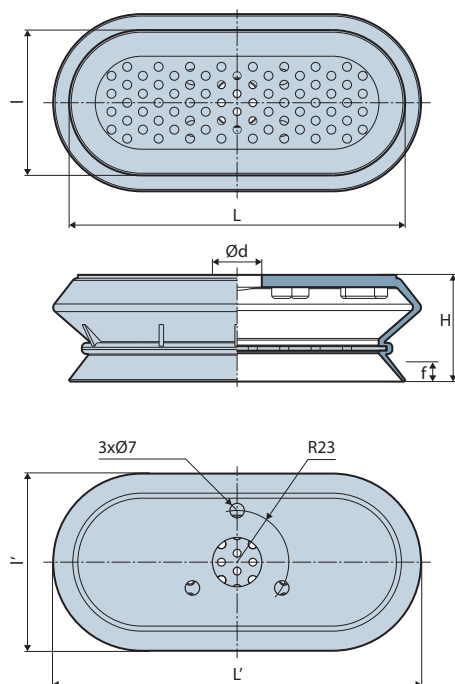
VSAOF

### Suction Cup Characteristics

	Dim. (mm)	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>
<b>VSAOF65150SIBL5</b>	65x150	298	51.5

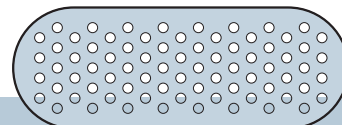
(1) Actual force of suction cup in use with 20% vacuum and including a safety factor of 2.



### Dimensions



### Accessory

Stainless steel grid for suction cup  
VSAOF65150:  
Part no.: 80002470  
Weight: 80 g



	L	I	L'	I'	Ø d	f <sup>(2)</sup>	 (g)
<b>VSAOF65150SIBL5</b>	149.8	64.8	164	79	22	26	124

(2) f = Deflection of suction cup.



**Specify the part number: VSAOF65150SIBL5  
+ stainless steel grid Part no. 80002470**

The values represent the average characteristics of our products.  
Note: All dimensions are in mm



# VSD, VSE, VSP

## Suction Cups for Bakery Applications



Suction cups specially developed for gripping delicate objects such as cakes (buns, biscuits, etc.). Specific shape and shore hardness options are available depending on the application. Food-grade silicone (FDA and CE 1935/2004) allows the suction cups to be used at temperatures between - 40 °C to + 220 °C (-40 °F to 428 °F).

Industry-specific applications



Types of use



### Materials

**Si** Silicone

**Si3** 35 Shore A silicone



**Si5** 50 Shore A silicone

**SIT3** 35 Shore A translucent silicone

**SIT5** 50 Shore A translucent silicone

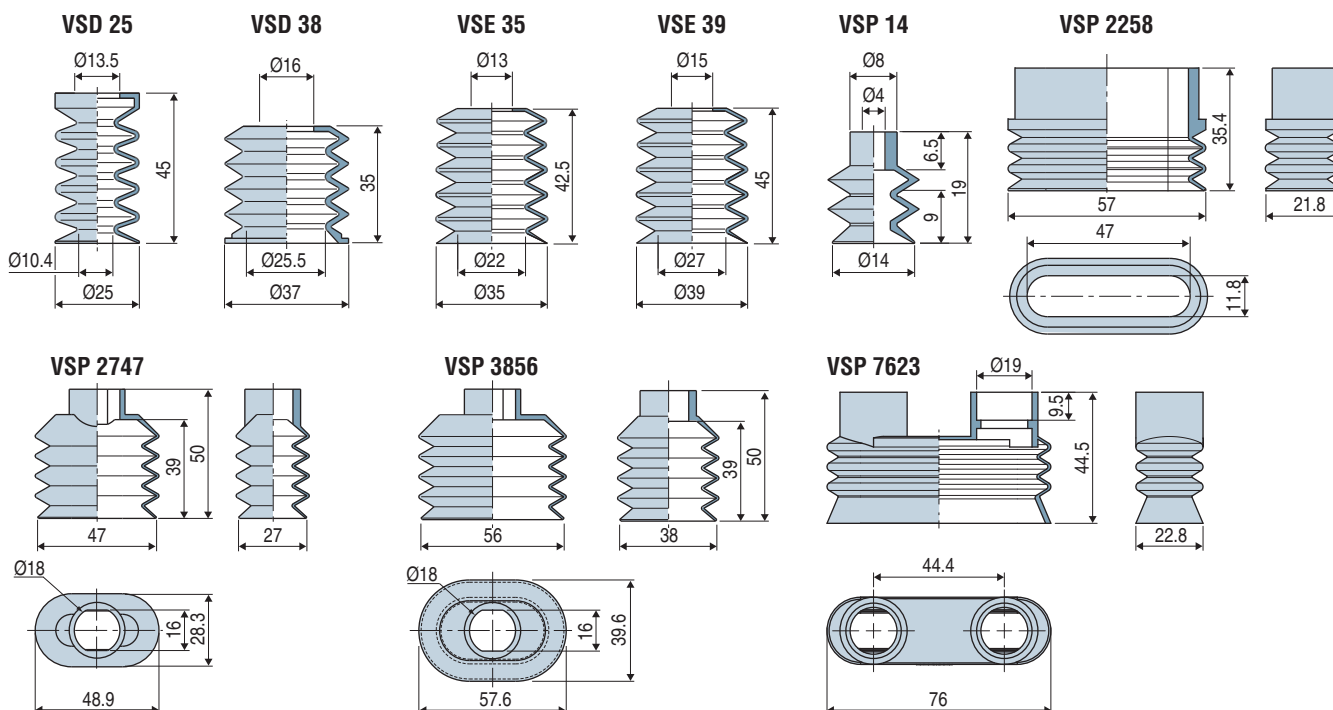
**SIT6** 60 Shore A translucent silicone

### Suction Cup Characteristics

	dim. (mm)	f <sup>(1)</sup>	maximum vacuum (%)	shore hardness	 (g)	Fittings	
						M5-M	G1/8"-M
<b>VSD 25 SI</b>	Ø 25	24	90	30	6.5	-	-
<b>VSD 38 SI5</b>	Ø 37	21	20	50	6.3	-	-
<b>VSE 35 SI3</b>	Ø 35	26	20	30	8.8	-	-
<b>VSE 35 SI</b>	Ø 35	26	30	50	8.8	-	-
<b>VSE 39 SI</b>	Ø 39	28	30	50	11.5	-	-
<b>VSP 14 SI3</b>	Ø 14	9	70	35 <sup>(2)</sup>	0.9	IM21SP139	IM11ASP139
<b>VSP 14 SIT6</b>	Ø 14	9	90	60	0.9	IM21SP139	IM11ASP139
<b>VSP 2258 SIT5</b>	22 x 58	8	20	50	12.5	-	-
<b>VSP 2747 SIT3</b>	27 x 47	26	15	30	9.8	-	-
<b>VSP 3856 SIT5</b>	38 x 56	28	15	50	11.8	-	-
<b>VSP 7623 SIT5</b>	23 x 76	14	15	50	13.5	-	-

(1) f = Deflection of the suction cup. (2) Non-toxic red silicone

### Suction Cup Dimensions



The values represent the average characteristics of our products.  
Note: All dimensions are in mm

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.



**Specify the part number e.g.: VSP14SIT6**  
**Please refer to the characteristics table above**



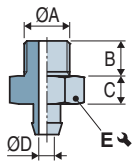
# VSD, VSE, VSP

## Suction Cups for Bakery Applications



### Barbed Fittings

Male - IM



	ØA	B	C	ØD	E ↙	Material	⚖️ (g)
IM 11 ASP 139	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IM 21 SP 139	M5-M	4.5	5	2.5	7	Brass	2.8





Industry-specific applications



Types of use



The VSO range of suction cups has been specially designed to meet the constraints involved when handling eggs.

- Very flexible lip
- Different shapes of suction cup
- Food-grade silicone meets FDA and CE 1935/2004 standards.


### Materials

**SI** 35 Shore A red silicone

**SIT3** 35 Shore A translucent silicone

**SIT5** 50 Shore A translucent silicone

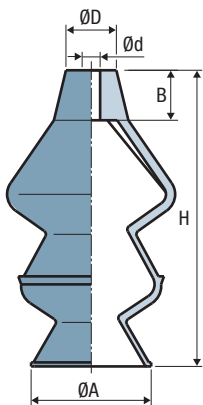
### Suction Cup Characteristics

	Ø (mm)	cm <sup>3</sup>	(N) <sup>(1)</sup>	SI	SIT3	SIT5
<b>VSO 30</b>	30	40	1.1	<b>VS030SI</b>	-	-
<b>VSO 33</b>	33	13	1.1	-	-	<b>VS033SIT5</b>
<b>VSO 36</b>	36	34	1.1	-	<b>VS036SIT3</b>	-

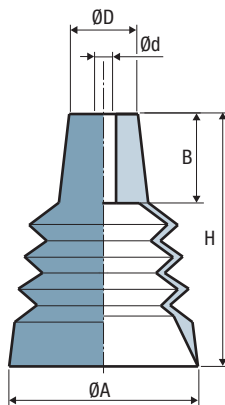
(1) at 30% vacuum with a safety factor of 2 included.

### Suction Cup Dimensions

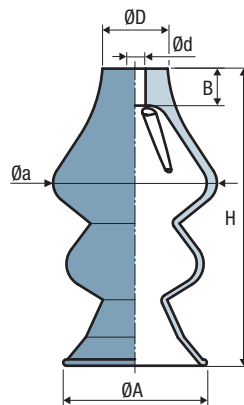
VSO 30 SI




VSO 33 SIT5



VSO 36 SIT3



	Ø A	H	Ø a	Ø d	Ø D	B	(g)
<b>VSO 30</b>	30	74	-	4.5	12.6	12.5	17
<b>VSO 33</b>	33	46	-	4.5	12.5	14	7.3
<b>VSO 36</b>	36	75	41	5.3	16.4	9.2	16.36



Specify the part number e.g.: **VSO 30 SI**  
Please refer to the characteristics table above

The values represent the average characteristics of our products.  
Note: All dimensions are in mm



# VSBO, VSBO+, VSBO LM/BM

## Bottle Suction Cups - Product Selection Guide



### 40 x 95 mm Bottle Suction Cups

p. 3/19

VSBO 4095	C	NBR	D5	X	30
TYPE		MATERIAL	REINFORCEMENTS		MOUNTING DISTANCE
Version VSBO	-	NBR Nitrile	D5 <ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: stainless steel</li> </ul>		30 30 mm
Version VSBO+	C	NR Natural rubber	D6 <ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: stainless steel</li> </ul>		45 45 mm
			D5P <ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: polypropylene</li> </ul>		- 30 and 45 mm (only available for VSBO+, cutout to be made on suction cup)
			D6P <ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: polypropylene</li> </ul>		

Note: 40 mm mounting hole distance available upon request

### 40 x 95 mm Bottle Suction Cups with Sensing Valve

p. 3/21

VSBO 4095	C	NBR	D5	CH4	30
TYPE		MATERIAL	REINFORCEMENTS	VALVE TECHNOLOGY	MOUNTING DISTANCE
Version VSBO	-	Nitrile	D5P <ul style="list-style-type: none"> <li>1 upper insert</li> <li>3 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: polypropylene</li> </ul>	CH2 V2 mechanical sensing valve (only with D6P reinforcements)	30 30 mm
Version VSBO+	C	Natural rubber	D6P <ul style="list-style-type: none"> <li>1 upper insert</li> <li>3 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: polypropylene</li> </ul>	CH4 V4 mechanical sensing valve	45 45 mm

Note: Version CHV\_, including valve with calibrated leakage, available upon request.

Note: 40 mm mounting hole distance available upon request

### Bottle Suction Cups with Gripping Interface

p. 3/24

VSBO 50105	NBR	D5	X	45	BM10N
REINFORCEMENTS		INTERFACE			
<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: stainless steel</li> </ul>	D5	BM10N POM support with 10 mm thick EPDM foam strip			
<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: stainless steel</li> </ul>	D6	LMNBR Nitrile Magnum lip 50 x 105 mm			



# VSBO, VSBO+

## 40 x 95 mm Bottle Suction Cups

COVAL has designed a complete range of 4.5 bellows suction cups, including internal reinforcements and a 40 x 95 mm gripping lip, to meet application requirements for handling 75 cl bottles from the side during vertical or horizontal gripping. To increase the lifting force while maintaining a long travel distance and great flexibility, **VSBO** and **VSBO+** suction cups include a stainless steel upper insert, four stainless steel reinforcements inside the bellows, and a lower reinforcement, available either in stainless steel or polypropylene.

**VSBO+** suction cups feature anti-slip cleats on the lip to ensure that 75 cl bottles can be handled at high rates and in humid environments.

■ **Dual mounting option:** To provide users with more options, the bottle suction cups feature M6 threads, so that they can be mounted from the inside using with two M5 screws or from the top using two M6 screws.

Note: To handle magnum bottles or textured bottles, COVAL has designed a range of suction cups with various gripping interfaces (see VSBO LM/BM).

### Materials

#### Suction cups

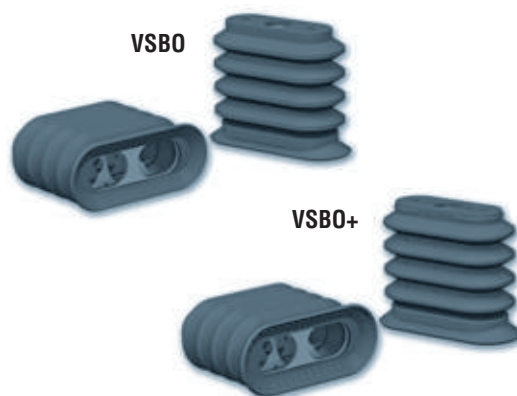
**NBR** Nitrile  
**NR** Natural rubber








Industry-specific applications



Types of use



### Suction Cup Characteristics

	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	f <sup>(2)</sup> (mm)	 (g)
VSBO 4095 (VSBO)	112.5	158	83	34	120
VSBO 4095C (VSBO+)	112.5	158	83	35.5	120

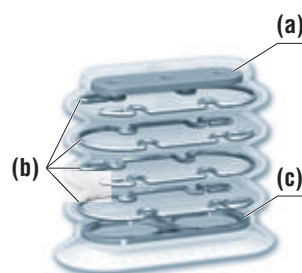
(1) Force measured at 65% on dry and smooth bottles without safety factor.

(2) f = Suction cup deflection.

### Insert and Reinforcements

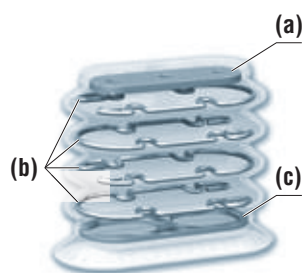
#### Version D5

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel wire
- (c) 1 lower reinforcement: stainless steel



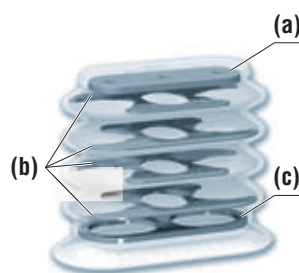
#### Version D5P

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel wire
- (c) 1 lower reinforcement: polypropylene



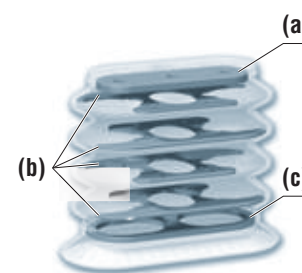
#### Version D6

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel plate
- (c) 1 lower reinforcement: stainless steel



#### Version D6P

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel plate
- (c) 1 lower reinforcement: polypropylene



### Mounting Hole Distance

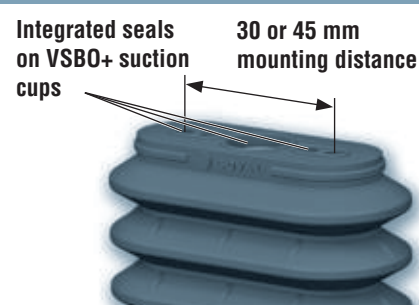
VSBO and VSBO+ suction cups offer a choice of two mounting hole distances: 30 or 45 mm.

VSBO+ suction cups come in a version where the mounting holes have not been perforated, allowing users to choose during installation either a 30 mm or a 45 mm distance between mounting holes.

VSBO+ suction cups include integrated seals for easier mounting.

#### Available upon request: Vacuum switch connector

The VSBO and VSBO+ suction cups have a Ø 5 mm connector for a vacuum switch or blow-off valve. This option is only available for suction cups with a distance of 45 mm between mounting holes.





# VSBO, VSBO+

## 40 x 95 mm Bottle Suction Cups



### How To Order



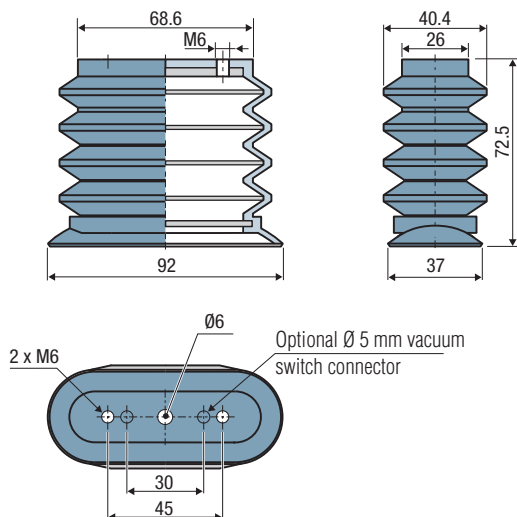
**VSBO 4095 C NBR D5 X 30**

TYPE	MATERIAL	REINFORCEMENTS	MOUNTING DISTANCE
Version <b>VSBO</b>	<b>NBR</b> Nitrile	<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: stainless steel</li> </ul>	<b>30</b> 30 mm
Version <b>VSBO+</b>	<b>NR</b> Natural rubber	<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: stainless steel</li> </ul>	<b>45</b> 45 mm
		<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel wire</li> <li>1 lower reinforcement: polypropylene</li> </ul>	- 30 and 45 mm (only available for VSBO+, cutout to be made on suction cup)
		<ul style="list-style-type: none"> <li>1 upper insert: stainless steel</li> <li>4 reinforcements: stainless steel plates</li> <li>1 lower reinforcement: polypropylene</li> </ul>	

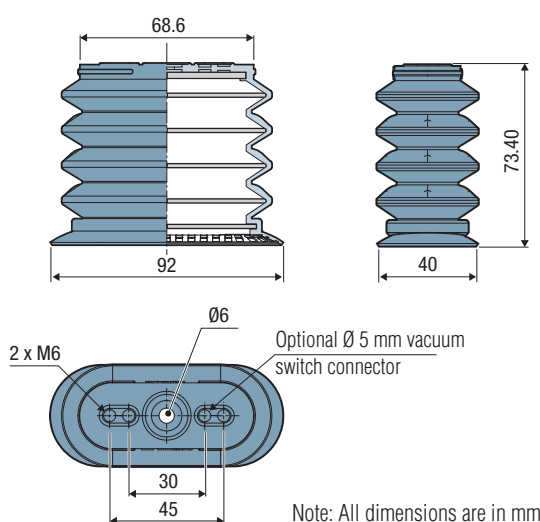
Note: 40 mm mounting hole distance available upon request

### Suction Cup Dimensions

VSBO (VSBO4095)



VSBO+ (VSBO4095C)



Note: All dimensions are in mm.

### Replacement suction cups without insert or reinforcement



**VSBO R 4095 C NBR N6 X 30**

TYPE	MATERIAL	MOUNTING DISTANCE
Version <b>VSBO</b>	<b>NBR</b> Nitrile	<b>30</b> 30 mm
Version <b>VSBO+</b>	<b>NR</b> Natural rubber	<b>45</b> 45 mm
		- 30 and 45 mm (only available for VSBO+, cutout to be made on suction cup)



# VSBO, VSBO+

## 40 x 95 mm Bottle Suction Cups with Sensing Valve

COVAL has designed a complete range of 4.5 bellows suction cups, featuring a sensing valve, internal reinforcements, a 40 x 95 mm gripping lip to handle 750 ml bottles, as well as the ability to limit vacuum leakage from the network should a bottle be missing.

**VSBO** and **VSBO+** suction cups are made for handling bottles from the side during vertical or horizontal gripping.

VSBO+ suction cups feature anti-slip cleats on the lip to ensure that 750 ml bottles can be handled at high rates and in humid environments.

VSBO and VSBO+ suction cup technology features two different mechanical sensing valves that isolate the suction cups should a bottle be missing.






To increase the lifting force while maintaining a long travel distance and great flexibility for packing/unpacking applications, VSBO and VSBO+ suction cups feature an upper insert, three reinforcements inside the bellows, and a lower reinforcement or a trigger plate.

### Materials

#### Suction cups

<b>NBR</b>	Nitrile
<b>NR</b>	Natural rubber

### Suction Cup Characteristics

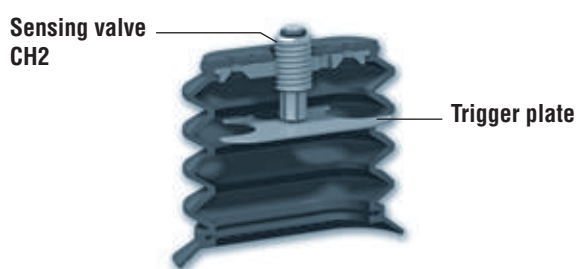
	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	 f <sup>(2)</sup> (mm)	 (g)
<b>VSBO / VSBO+ _CH2</b>	112.5	158	83	34	125
<b>VSBO / VSBO+ _CH4</b>	112.5	158	83	22	125

### Sensing Valve Technologies

#### CH2 mechanical sensing valve

The **CH2 sensing valve** opens as pressure is exerted on the suction cup by an **internal** reinforcement, called a “**trigger plate**”.

The CH2 sensing valve is only compatible with stainless steel reinforcement plates (version D6P).



#### Advantages:

- Suction cup travel is not lost when suction cup is evacuated
- Adjustable valve
- Robust mechanical design

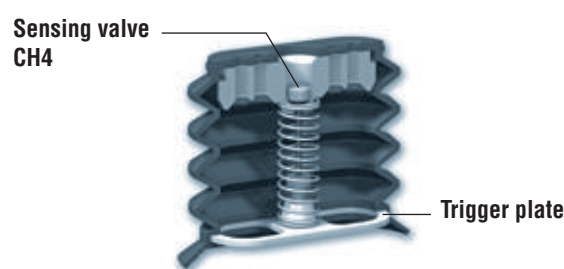
#### Materials:

- Upper insert: aluminum
- Valve body: aluminum
- O-ring: nitrile
- Spring: stainless steel
- Trigger plate: stainless steel

#### CH4 mechanical sensing valve

The CH4 sensing valve opens as soon as pressure is exerted on the suction cup by a **lower** reinforcement called “**trigger plate**”.

The CH4 sensing valve is compatible with stainless steel reinforcement wire or plates (versions D5P and D6P).



#### Advantages:

- Valve is adjusted from underneath the suction cup
- Suction cup is evacuated immediately as soon as pressure is applied

#### Materials:

- Upper insert: POM
- Pin: nylon
- Cone: aluminum
- O-ring: nitrile
- Spring: stainless steel
- Trigger plate: HDPE

### Sensing valve with calibrated leakage (CHV\_)

COVAL has designed sensing valve solutions with calibrated leakage. Leakage calibration depends on the application and requires an engineering study (available upon request).



Industry-specific applications



Types of use



VSBO\_CH2\_



VSBO\_CH4\_

(1) Force measured at 65% on dry and smooth bottles without safety factor.

(2) f = Suction cup deflection.



# VSBO, VSBO+

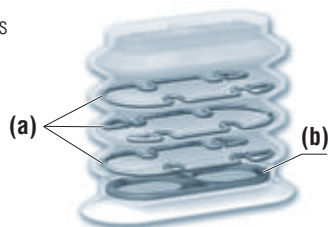
## 40 x 95 mm Bottle Suction Cups with Sensing Valve



### Insert and Reinforcements

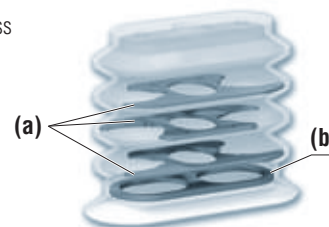
#### Version D5P

- (a) 3 reinforcements: stainless steel wire
- (b) 1 lower reinforcement: polypropylene



#### Version D6P

- (a) 3 reinforcements: stainless steel plate
- (b) 1 lower reinforcement: polypropylene



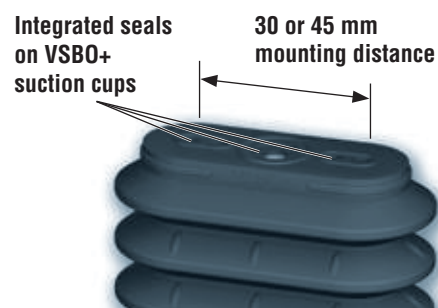
### Mounting Hole Distance

VSBO and VSBO+ suction cups offer a choice of two mounting hole distances: 30 or 45 mm.

VSBO+ suction cups include integrated seals for easier mounting.

#### Available upon request: Vacuum switch connector

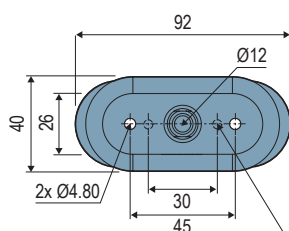
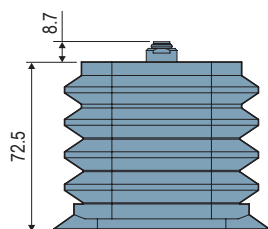
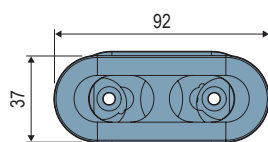
The VSBO and VSBO+ suction cups with sensing valve have a  $\varnothing 5$  mm connector for a vacuum switch or blow-off valve. This option is only compatible with suction cups with a 45 mm distance between mounting holes.



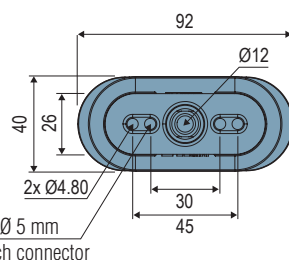
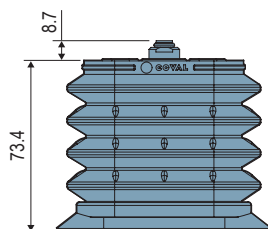
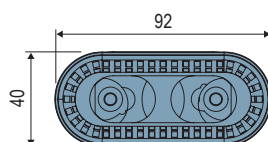
### Suction Cup Dimensions

#### CH2 sensing valve

##### VSBO (VSBO4095\_D6PCH2\_)

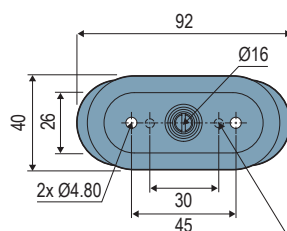
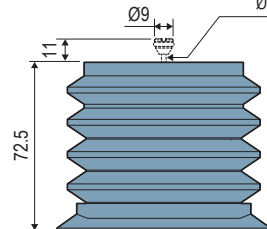
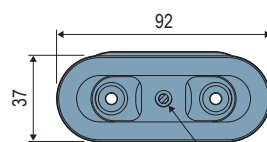


##### VSBO+ (VSBO4095C\_D6PCH2\_)

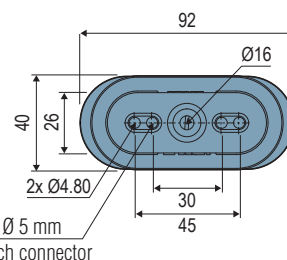
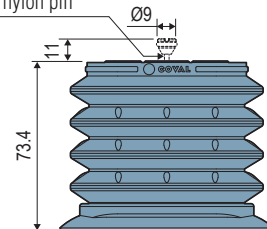
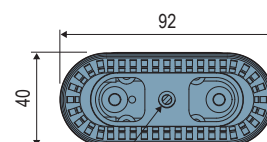


#### CH4 sensing valve

##### VSBO (VSBO4095\_D\_PCH4\_)



##### VSBO+ (VSBO4095C\_D\_PCH4\_)





# VSBO, VSBO+

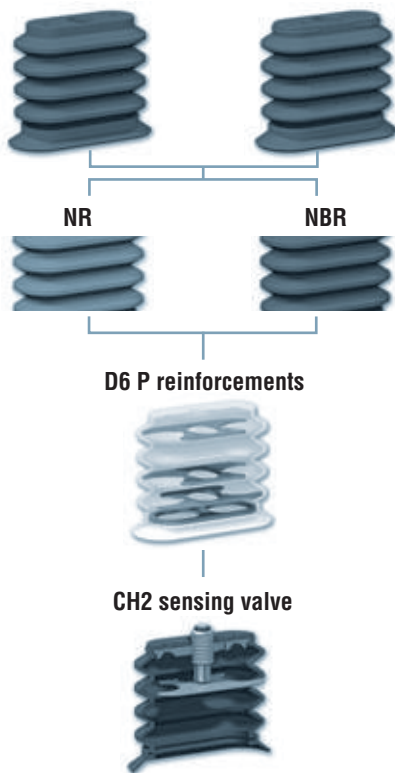
## 40 x 95 mm Bottle Suction Cups with Sensing Valve



### Modular Bottle Suction Cups

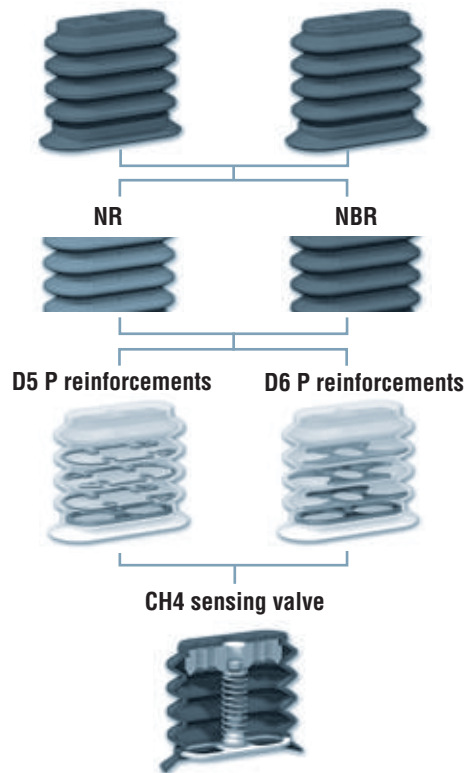
VSBO\_\_CH2

VSBO series suction cup VSBO+ series suction cups




VSBO\_\_CH4

VSBO series suction cup VSBO+ series suction cups



### How To Order



VSBO

4095

C

NBR

D5

CH4

30

TYPE

Version VSBO

-

Version VSBO+

C

MATERIAL

Nitrile

NBR

Natural rubber

NR

REINFORCEMENTS

D5P

- 1 upper insert
- 3 reinforcements: stainless steel wire
- 1 lower reinforcement: polypropylene

D6P

- 1 upper insert
- 3 reinforcements: stainless steel plates
- 1 lower reinforcement: polypropylene

VALVE TECHNOLOGY

CH2

V2 mechanical sensing valve (only with D6P reinforcements)

CH4

V4 mechanical sensing valve

Note: Version CHV<sub>...</sub>, including valve with calibrated leakage, available upon request.

MOUNTING DISTANCE

30

30 mm

45

45 mm

Note: 40 mm mounting hole distance available upon request

### Replacement suction cups without insert or reinforcement

VSBO R 4095 C NBR N16 X 30									
TYPE		MATERIAL		Ø OF VACUUM FLOW		MOUNTING DISTANCE			
Version VSBO	-	NBR	Nitrile	N12	12mm Ø of vacuum flow for mounting with mechanical sensing valve V2 (CH2)	30	30 mm		
Version VSBO+	C	NR	Natural rubber	N16	16mm Ø of vacuum flow for mounting with mechanical sensing valve V4 (CH4)	45	45 mm		



# VSBO LM/BM

## Bottle Suction Cups with Gripping Interface

To meet the requirements for handling magnum bottles and textured bottles, COVAL has designed a range of 4.5 bellows suction cups, including internal reinforcements and a choice of two gripping interfaces.

- A magnum bottle interface featuring a lip shape and surface suited for the weight and diameter of magnum bottles
- A foam strip interface featuring a support shape and foam strip that compensates for any irregular surfaces on specific types of bottles (e.g. textured or faceted surface, coat of arms, etc.)

To increase the lifting force while maintaining a long travel distance and great flexibility for packing/unpacking applications, VSBO LM/BM suction cups are feature an upper insert, three reinforcements inside the bellows, and a lower reinforcement to fit the desired interface.

The **VSBO LM/BM** series suction cups are designed for handling bottles from the side.







- Version VSBO LM: vertical or horizontal gripping
- Version VSBO BM: horizontal gripping

### Materials

#### Suction cups

**NBR** Nitrile

#### Suction Cup Characteristics

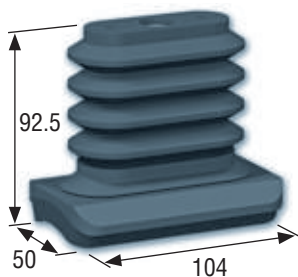
	 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	 f <sup>(2)</sup> (mm)	 (g)
<b>VSBO50105NBR_BM10N</b>	150	230	70	7 + 34	205
<b>VSBO50105NBR_LMNBR</b>	142.5	245	83	2.5 + 34	205

- (1) Force measured at 65% on dry and smooth bottles without safety factor.  
(2) f = Suction cup deflection.

## Bottle Suction Cups with Gripping Interface

### For textured bottles

Part no.: **VSBO50105NBR\_BM10N**



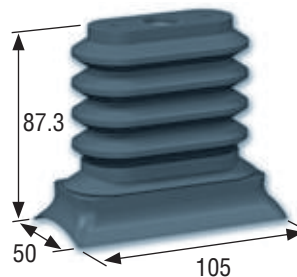
The **VSBO50105\_BM10N** suction cup is designed for handling textured bottles. It features a curved gripping interface that fits the shape of the bottle and includes an EPDM foam seal that compensates for any irregular surfaces and guarantees an airtight seal.

The suction cup includes the following:

- One stainless steel upper insert
- One nitrile suction cup with 4 bellows, VSBO4095NBR
- Four stainless steel internal reinforcements
- One stainless steel lower reinforcement
- One gripping interface with 10 mm EPDM foam seal

### For Magnum bottles

Part no.: **VSBO50105NBR\_LMNBR**



The **VSBO50105\_LMNBR** suction cup is designed for handling magnum bottles. It features a lip shape and surface suited for the weight and diameter of magnum bottles.

The suction cup includes the following:

- One stainless steel upper insert
- One nitrile suction cup with 4 bellows, VSBO4095NBR
- Four stainless steel internal reinforcements
- One stainless steel lower reinforcement
- One 50 x 105 mm Magnum nitrile lip



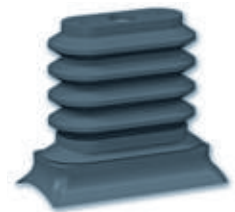
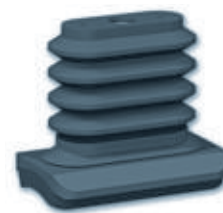
Industry-specific applications



Types of use



**VSBO50105NBR\_BM10N**

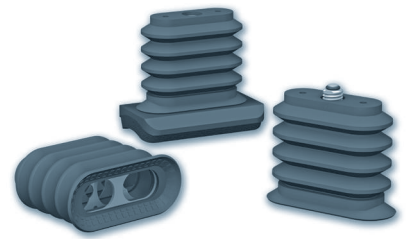


**VSBO50105NBR\_LMNBR**



# VSBO LM/BM

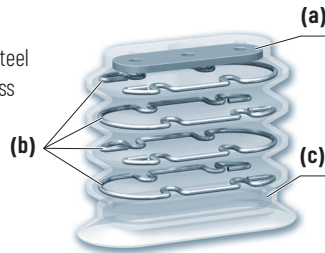
## Bottle Suction Cups with Gripping Interface



### Reinforcements

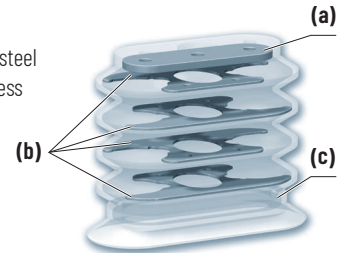
#### Version D5

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel wire
- (c) 1 lower reinforcement: stainless steel



#### Version D6

- (a) 1 upper insert: stainless steel
- (b) 4 reinforcements: stainless steel plate
- (c) 1 lower reinforcement: stainless steel



### Bottle Suction Cups with Modular Gripping Interfaces

#### PART NUMBER FOR COMPLETE SUCTION CUPS

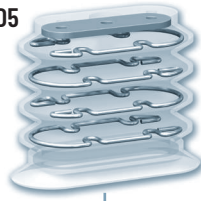
including gripping interface with foam seal:

- With stainless steel reinforcement wire (version D5):  
Part no.: **VSBO50105NBRD5X45BM10N**
- With stainless steel reinforcement plate (version D6):  
Part no.: **VSBO50105NBRD6X45BM10N**

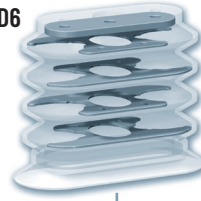
Bottle suction cup  
**VSBO4095NBR**



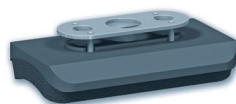
4 reinforcements:  
stainless steel wire  
**D5**



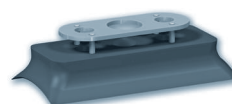
4 reinforcements:  
stainless steel plate  
**D6**



Gripping interface kit with  
memory foam seal,  
**VSBOKIT50105BM10N**



Magnum lip kit,  
**VSBOKIT50105LMNBR**



#### PART NUMBER FOR COMPLETE SUCTION CUPS

including gripping interface with  
50 x 105 mm nitrile lip seal:

- With stainless steel reinforcement wire (version D5):  
Part no.: **VSBO50105NBRD5X45LMNBR**
- With stainless steel reinforcement plate (version D6):  
Part no.: **VSBO50105NBRD6X45LMNBR**

### How To Order



**VSBO 50105 NBR D5 X 45 BM10N**

#### REINFORCEMENTS

- 1 upper insert: stainless steel
- 4 reinforcements: stainless steel wire
- 1 lower reinforcement: stainless steel

**D5**

- 1 upper insert: stainless steel
- 4 reinforcements: stainless steel plates
- 1 lower reinforcement: stainless steel

**D6**

#### INTERFACE

**BM10N**

POM support with 10 mm thick EPDM foam strip

**LMNBR**

Nitrile Magnum lip  
50 x 105 mm

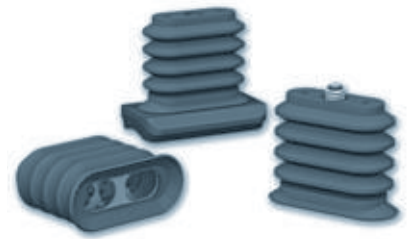
#### Available upon request: Vacuum switch connector

VSBO LM/BM suction cups feature an optional Ø 5 mm connector for a vacuum switch or blow-off valve.



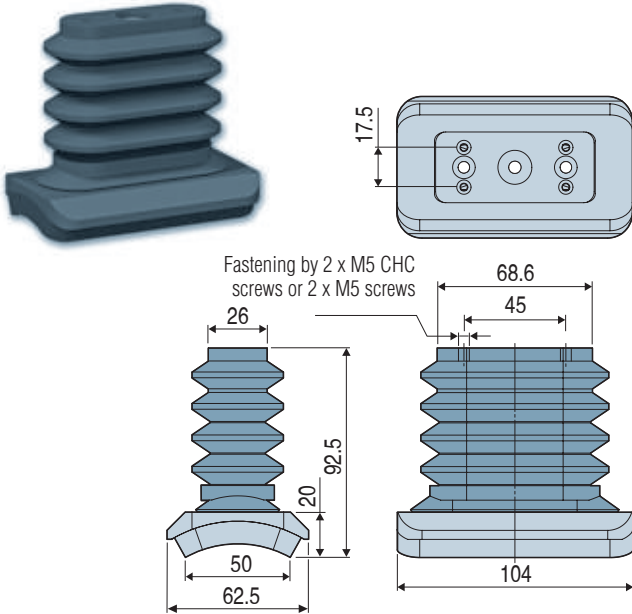
# VSBO LM/BM

## Bottle Suction Cups with Gripping Interface

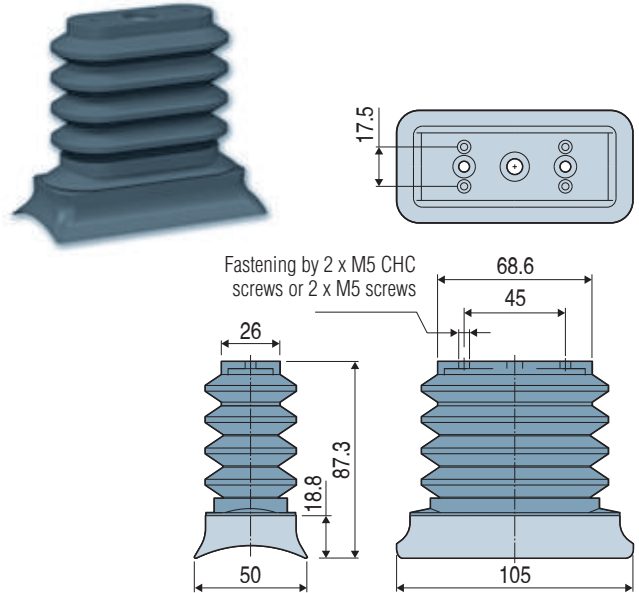


### Suction Cup Dimensions

VSBO50105NBR\_X45BM10N



VSBO50105NBR\_X45LMNBR

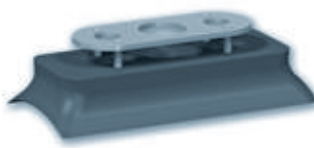
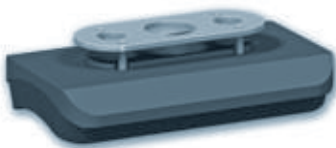


### Gripping Interface Kits

Gripping interface kits are used to turn 40 x 95 mm bottle suction cups (part no. VSBO4095NBR) into magnum bottle suction cups or suction cups with a foam gripping interface.

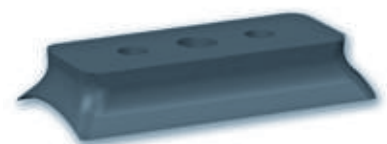
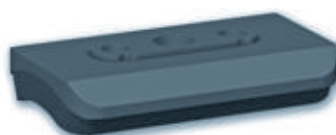
The kits include the reinforcement to fit the interface under the suction cup.

- Gripping interface kit with memory foam seal, 10 mm thick:  
Part no.: **VSBOKIT50105BM10N**
- Nitrile Magnum lip kit  
50 x 105 mm  
Part no.: **VSBOKIT50105LMNBR**



### Part Numbers for Spare Parts

- Nitrile suction cup with 4.5 bellows (without insert or reinforcement):  
Part no.: **VSBO4095NBRN6X45**
- POM curved gripping interface with memory foam seal, 10 mm th.  
Part no.: **VSBO4095BM10N**
- 50 x 105 mm nitrile lip:  
Part no.: **VSBO4095LMNBR**





## Suction Cup for Bottle Handling via the Punt

Developed in partnership with manufacturers in the wine sector, the VBO suction cup system is designed for gripping bottles by the punt on disgorging stations.

Its modular design allows for a high degree of flexibility in positioning the whole assembly when gripping the base, as well as excellent sealing when gripping different types of bottles

The VBO suction cup system consists of:

- A 2.5 bellows suction cup, Ø62 mm in Nitrile with 31mm stroke, ensuring a high degree of flexibility in positioning on the bottle base (swivel effect, deflection).
- An aluminium fitting threaded G1/4" -Male allowing the assembly to be mounted on the tool.
- Aluminium top and bottom coupler plates for joining the suction cup to the gripping disc.
- A silicone gripping disc (COVAL-Flex) ensures the tightness of the grip on various punts.

### Materials

**Suction Cup:** NBR - Nitrile

**Fitting and Couplers:** Aluminum

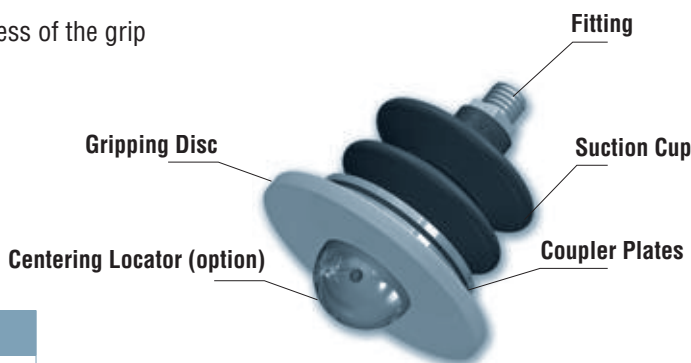
**Gripping Disc:** SI - Silicone




Industry-specific application



Types of use

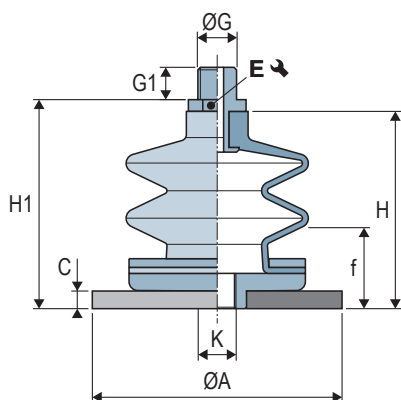



### Suction Cup Characteristics

	Ø (mm)	Volume (cm³)	Force (N) <sup>(1)</sup>
VBO60D85A2.5X62NBRM14C0	85	72.5	-

Force to be determined depending on application

### Suction Cup Dimensions



	Ø A	C	f <sup>(2)</sup>	H	H1	Ø G	G1	E	K	(g)
VBO60D85A2.5X62NBRM14C0	85	6	31	65	69	G1/4"-M	11	Hexa 17	M14-F	130

(2) f = Deflection of the suction cup.



Please specify part n°  
**VBO60D85A2.5X62NBRM14C0**  
See table of properties above.

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.





The VPBO Coupler Plates are designed for gripping bottles by the Punt on disgorging stations.

3 diameters available:

- Ø 65 mm for 1/2 bottles
- Ø 75 mm for 75 cl bottles
- Ø 95 mm for Magnum

### Materials

NR Natural rubber 45 Shore A

Industry-specific applications



Types of use



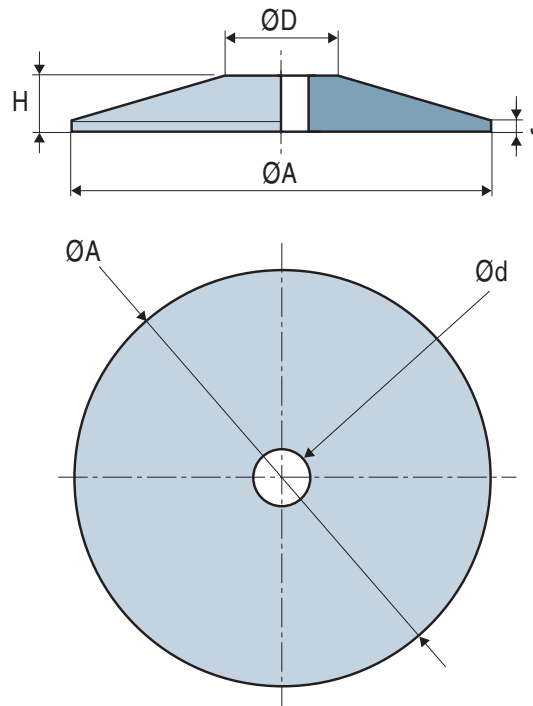
### Characteristics



Ø (mm)

VPB065NR	65
VPB075NR	75
VPB095NR	95

### Dimensions



	Ø A	H	Ø d	Ø D	J	(g)
VPB065NR	65	10	10	23	2	19
VPB075NR	75	10	10	20	2	24
VPB095NR	95	10	10	49	2	47



Specify the part number e.g.: VPB095NR  
Please refer to the characteristics table above

The values represent the average characteristics of our products.  
Note: All dimensions are in mm.



## Suction Cups for Paper Applications

The VPA series is a range of suction cups with a very flexible lip used to handle highly flexible materials. These suction cups are specially designed for gripping in applications such as label placement, plastic films and printing. They are mainly produced in natural rubber (NR) to provide resistance to abrasion caused by paper and cardboard or in silicone (SIT5) for food compatibility (FDA and CE 1935/2004).

### Materials

<b>NBR</b>	Nitrile	<b>NR</b>	Natural rubber
<b>SIT5</b>	Translucent silicone	<b>STN</b>	SITON®



### Industry-specific applications



### Types of use

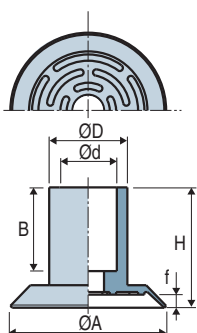


### Suction Cup Characteristics

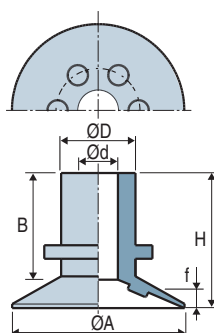
	Ø (mm)	(N) <sup>(1)</sup>	NBR	SIT5	NR	STN
<b>VPA 15</b>	15	2.9	-	<b>VPA15SIT5</b>	<b>VPA15NR</b>	-
<b>VPA 20</b>	20	4.3	-	<b>VPA20SIT5</b>	<b>VPA20NR</b>	-
<b>VPA 25</b>	25	6.5	-	<b>VPA25SIT5</b>	<b>VPA25NR</b>	-
<b>VPA 26</b>	26	6.5	-	-	<b>VPA26NR</b>	<b>VPA26STN</b>
<b>VPA 30</b>	30	9.4	<b>VPA30NBR</b>	<b>VPA30SIT5</b>	<b>VPA30NR</b>	<b>VPA30STN</b>
<b>VPA 35 A</b>	35	12.3	-	-	<b>VPA35ANR</b>	-
<b>VPA 40</b>	40	20.9	-	<b>VPA40SIT5</b>	<b>VPA40NR</b>	-
<b>VPA 25000</b>	25.5	7.2	-	<b>VPA25000SIT5</b>	<b>VPA25000NR</b>	-
<b>VPA 25001</b>	25.5	7.2	-	<b>VPA25001SIT5</b>	<b>VPA25001NR</b>	-

(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.

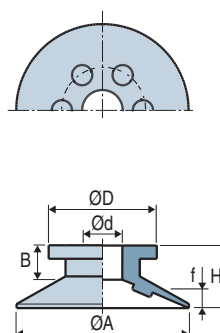
VPA 15...40



VPA 25000



VPA 25001



### Suction Cup Dimensions

	ØA	H	Ød	ØD	f <sup>(2)</sup>	B
<b>VPA 15</b>	15	9.8	5	9	0.8	7
<b>VPA 20</b>	20	10.3	5	10	1.3	7
<b>VPA 25</b>	25	10.8	5	10	1.8	7
<b>VPA 26</b>	26	21.5	6	14	1.9	13.5
<b>VPA 30</b>	30	23	11	15	2.5	16
<b>VPA 35 A</b>	35	23	11	15	2.5	16
<b>VPA 40</b>	40	20	8	16	2	15
<b>VPA 25000</b>	25.5	20	5.8	11	3	15.8
<b>VPA 25001</b>	25.5	9.5	5.8	16	3	5.1

(2) f = Deflection of the suction cup.

The values represent the average characteristics of our products.  
Note: All dimensions are in mm

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.




**Specify the part number e.g.: VPA20NR**  
**Please refer to the characteristics table above**

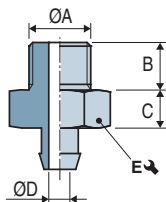




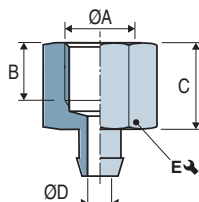
### Choice of Fittings

	Male fittings				Female fittings	
	G1/8"-M	G1/4"-M	M5-M	M6-M	G1/8"-F	G1/4"-F
VPA 15	IM11A	-	IM21	IM22	IF10A	-
VPA 20	IM11A	-	IM21	IM22	IF10A	-
VPA 25	IM11A	-	IM21	IM22	IF10A	-
VPA 26	-	-	-	-	-	-
VPA 30	-	IM51SP143	IM5VPA30	-	-	IF50SP143
VPA 35 A	-	IM51SP143	IM5VPA30	-	-	IF50SP143
VPA 40	-	IM41SP477	-	-	-	IF40SP477
VPA 25000	-	-	-	-	-	-
VPA 25001	IM11ASP082	-	-	-	IF10ASP082	-

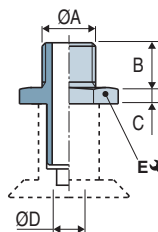
Male fittings  
VPA 15...25



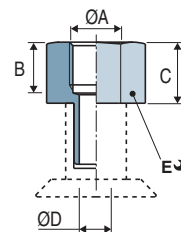
Female fittings  
VPA 15...25





Male fittings  
VPA 30...40



Female fittings  
VPA 30...40



### Barbed Fittings

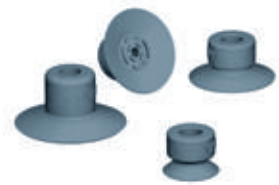
Model	ØA	B	C	ØD	E 	Materials	 (g)
IM 11 A	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IM 11 A SP082	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IM 21 <sup>(1)</sup>	M5-M	4.5	5	2.5	7	Nickel-plated brass	3.1
IM 22 <sup>(1)</sup>	M6-M	5	5	3.5	7	Nickel-plated brass	2.7
IM 41 SP477	G1/4"-M	11	4	4.4	17	Aluminum	7.5
IM 51 SP143	G1/4"-M	11	6	8	21	Aluminum	10.5
IM 5 VPA30	M5-M	5	3	2.5	13	Aluminum	5.7
IF 10 A	G1/8"-F	8	12	3.5	14	Aluminum	4
IF 10 A SP082	G1/8"-F	8	12	3.5	14	Aluminum	4
IF 50 SP143	G1/4"-F	10	15	8	21	Aluminum	14.4
IF 40 SP477	G1/4"-F	10	15	4.4	17	Aluminum	8

(1) Flow control nozzle available: orifice calibrated to reduce the leakage in case of use of a multi-cup gripper (refer to page 4/10)



# VPAL

## Suction Cups for Labels



Thanks to their extra-flat shape and great lip flexibility, the VPAL suction cups are especially adapted for gripping and handling IML labels or flexible materials. They are made of silicone to meet food compatibility standards (FDA and CE 1935/2004).

### Materials

**SIBL5** Blue Silicone 50 Shore



Industry-specific applications



Types of use




### Suction Cup Characteristics

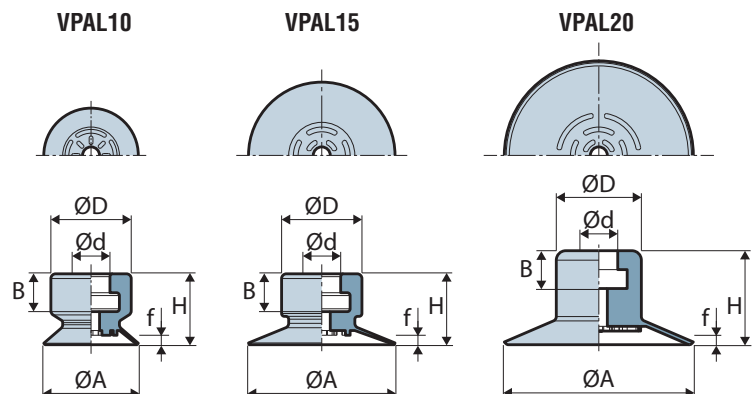
	Ø (mm)	 (N) <sup>(1)</sup>	SIBL5
<b>VPAL 10</b>	10	1.5	<b>VPAL10SIBL5</b>
<b>VPAL 15</b>	15.5	2.1	<b>VPAL15SIBL5</b>
<b>VPAL 20</b>	20	4.4	<b>VPAL20SIBL5</b>

(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.


### Suction Cup Dimensions

	ØA	H	Ød	ØD	f <sup>(2)</sup>	B
<b>VPAL 10</b>	10	7.5	4	8.5	1.5	4
<b>VPAL 15</b>	15.5	7.5	4	8.5	1.5	4
<b>VPAL 20</b>	20	9.9	4	9	1.4	4

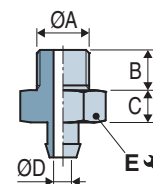
(2) f = Deflection of the suction cup.



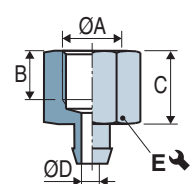
### Choice of Fittings

	Male fittings		Female fittings	
	G1/8"-M	M5-M	G1/8"-F	M5-F
<b>VPAL 10</b>	IM18VPG5	IM5VPG5	IF18VPG5	IF5VPG5
<b>VPAL 15</b>	IM18VPG5	IM5VPG5	IF18VPG5	IF5VPG5
<b>VPAL 20</b>	IM18VPG5	IM5VPG5	IF18VPG5	IF5VPG5



Male fittings  
VPAL 10...20



Female fittings  
VPAL 10...20



### Barbed Fittings

Model	ØA	B	C	ØD	E 	Materials	 (g)
<b>IM 5 VPG 5</b>	M5-M	4.5	3.5	2.2	7	Aluminum	0.7
<b>IM 18 VPG 5</b>	G1/8"-M	8	5	2.2	14	Aluminum	3.9
<b>IF 5 VPG 5</b>	M5-F	6	9	2.2	8	Aluminum	1.2
<b>IF 18 VPG 5</b>	G1/8"-M	9	15	2.2	14	Aluminum	5.1

The values represent the average characteristics of our products.  
Note: All dimensions are in mm

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.



Specify the part number e.g.: **VPAL15SIBL5**  
Please refer to the characteristics table above





The 1.5 bellows VSAPL suction cup is especially adapted for gripping and handling IML labels or flexible materials.

They are made of silicone to meet food compatibility standards (FDA and CE 1935/2004).

### Materials

**SIBL5** Blue Silicone 50 Shore A




Industry-specific applications



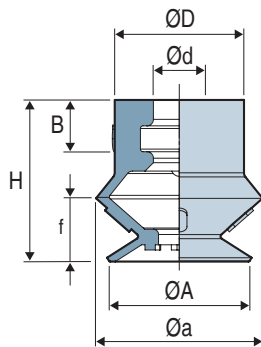
Types of use




### Suction Cup Characteristics

	Ø (mm)	 (N) <sup>(1)</sup>	 (g)	Fitting M5-M
<b>VSAPL11SIBL5</b>	11	1.5	0.7	IM5VPG5

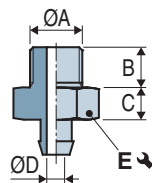
(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.





### Suction Cup Dimensions

	ØA	H	Øa	Ød	ØD	f <sup>(2)</sup>	B
<b>VSAPL11SIBL5</b>	11.2	12.5	12.9	4	10	5	4

(2) f = Deflection of the suction cup.



### Barbed Fittings

Model	ØA	B	C	ØD	E 	Materials	 (g)
<b>IM 5 VPG 5</b>	M5-M	4.5	3.5	2.2	7	Aluminum	0.7



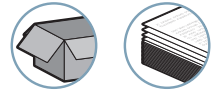
Specify the part number e.g.: VSAPL11SIBL5  
Please refer to the characteristics table above

The values represent the average characteristics of our products.  
Note: All dimensions are in mm





Industry-specific applications



Types of use



The COVAL range of mailing application suction cups is designed to meet the requirements of the mailing industry. The improved characteristics mean you can optimize production equipment in your branch, such as:

- Envelope stuffing
- Film wrapping
- Envelope insertion
- Mailing (picking).


### Material

NR Natural rubber

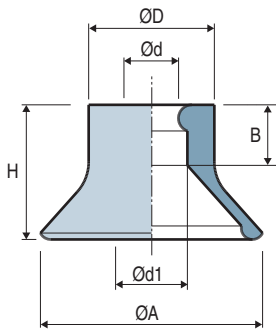
### Advantages

- Longer life expectancy
- Optimized for high throughput rates
- Excellent resistance to abrasion and slipping
- 100% compatible with machines currently on the market

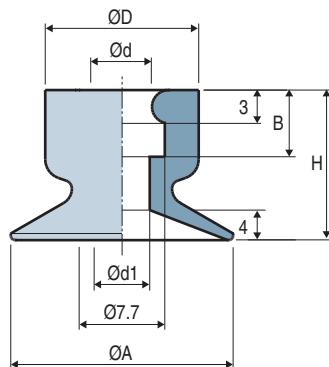
### Suction Cup Characteristics

	ØA	H	Ød	Ød1	ØD	B	Color	NR
VPR 001	24.4	15	5.9	7.8	13.8	8	green	VPR001NR
VPR 002	25.7	14.5	5.9	7.8	14	9	brown	VPR002NR
VPR 003	20	14.2	5.7	4	13.8	6	red	VPR003NR
VPR 004	20	14.2	5.7	5	14.8	6	black	VPR004NR

VPR 001 - 002



VPR 003 - 004



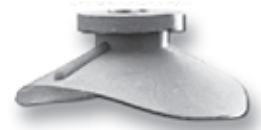
The values represent the average characteristics of our products.  
Note: All dimensions are in mm



Specify the part number e.g.: VPR003NR  
Please refer to the characteristics table above



## Rounded Suction Cups

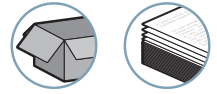


Thanks to very flexible lips, the VPAG range is suitable for gripping flexible materials such as labels or sheets of paper as well as textured objects. Their shape allows them to be used for unstacking.

### Materials

NR Natural rubber

Industry-specific applications



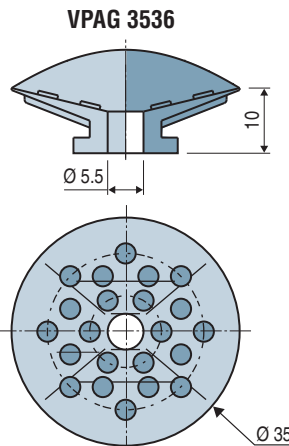
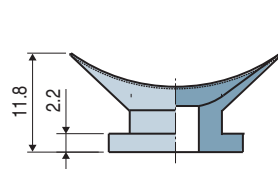
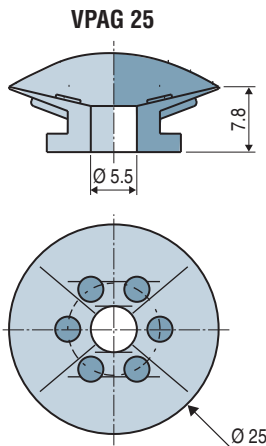
Types of use



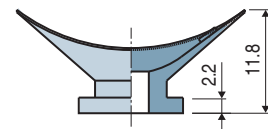
### Suction Cup Characteristics

	NR	Fittings	
		G1/8"-M	G1/8"-F
VPAG 25	VPAG25NR	IM11ASP082	IF10ASP082
VPAG 3536	VPAG3536NR	-	-

### Suction Cup Dimensions

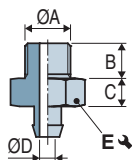


VPAG 3536

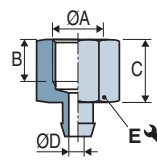


### Barbed Fittings

#### Male - IM



#### Female - IF



	ØA	B	C	ØD	E	Materials	(g)
IM 11 A SP082	G1/8"-M	7.5	6	3.5	14	Aluminum	4.1
IF 10 A SP082	G1/8"-F	8	12	3.5	14	Aluminum	4.0

The values represent the average characteristics of our products.  
Note: All dimensions are in mm

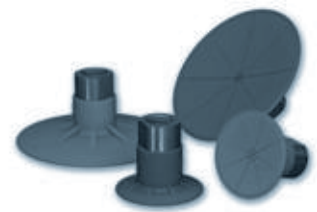


Specify the part number e.g.: VPAG3536NR  
Please refer to the characteristics table above.

### Accessories

To optimize the use of your suction cups, Coval offers a comprehensive range of accessories (nozzle fittings, spring extensions, and feeder systems, etc.), see chapters 4 and 14.





Developed through partnerships with the composite material industry, the VPSC suction cups are dedicated to the handling of raw composite. Their ultra-flat profile and innovative system of vacuum distribution across the surface of the cups provide optimized gripping with no mark and no deformation. The extra thin sealing lip contours to the product shape without restriction.

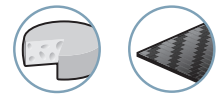
The specific characteristics of these suction cups enable its use in other fields such as cheese handling or other fragile, easily deformed products.

The VPSC cups are available in two materials to meet all the applications:

- Polyurethane (PU), high resistance to hydrocarbons and high durability.
- Silicone (SIBL5), food compliance. FDA and CE 1935/2004 standards.

The VPSC suction cups are equipped with a G1/4" female pressed aluminum fitting.

Industry-specific applications



Types of use



3

VPSC

### Materials

**PU** Polyurethane 60 Shore A

**SIBL5** Blue Silicone 50 Shore A

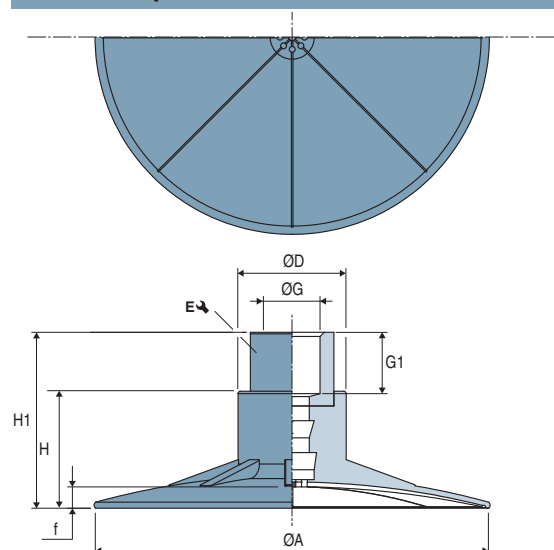
### Suction Cup Characteristics

	Ø (mm)	cm <sup>3</sup>	(N) <sup>(1)</sup>	(N) <sup>(1)</sup>	PU	SIBL5
<b>VPSC 40</b>	40	5.6	27	15	<b>VPSC40PUIF14</b>	<b>VPSC40SIBL5IF14</b>
<b>VPSC 80</b>	80	11.2	92.6	46.3	<b>VPSC80PUIF14</b>	<b>VPSC80SIBL5IF14</b>

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

When used on deformable materials, the indicated forces may require more consideration. Please contact us, particularly for composite applications.

### Suction Cup Dimensions



	Ø A	Ø D	f <sup>(2)</sup>	H	H1	Ø G	E	(g)
<b>VPSC 40</b>	40	21	1.5	21.8	33.8	G1/4"-F	17	16
<b>VPSC 80</b>	80	22	4	23.8	35.8	G1/4"-F	17	26

(2) f = Deflection of the suction cup.



Specify the part number e.g.: VPSC80PUIF14  
Please refer to the characteristics table above

The values represent the average characteristics of our products.  
Note: All dimensions are in mm





VPYR series ball-joints are recommended for gripping rounded or rotating products. They are also recommended for gripping requiring high mechanical resistance and force.

Industry-specific applications

### Materials

#### Suction cups

**NBR** Nitrile  
**SI** Silicone

#### Ball-joint

Nickel-plated brass and zinc-plated steel



Types of use

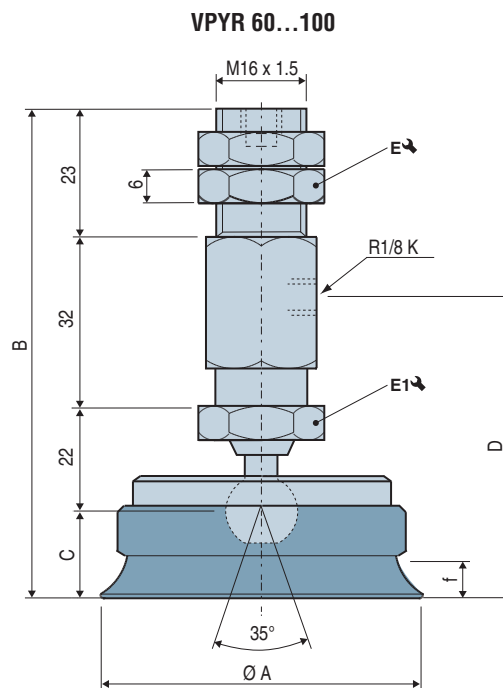
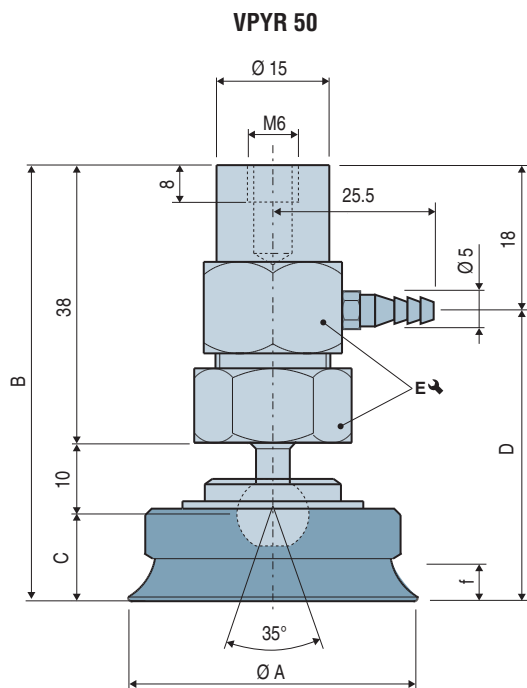


### Suction Cup Characteristics

	(N) <sup>(1)</sup>	$R_{min}$	$\varnothing A$	B	C	D	E	E1	f <sup>(2)</sup>	NBR	SI	(g)
<b>VPYR 50</b>	65	41	50	60	12	42	19	-	4	<b>VPYR50NBR</b>	<b>VPYR50SI</b>	117
<b>VPYR 60</b>	93.7	70	60	93	16	58	21	19	5	<b>VPYR60NBR</b>	<b>VPYR60SI</b>	352
<b>VPYR 80</b>	166.1	100	80	95	18	60	21	19	6	<b>VPYR80NBR</b>	<b>VPYR80SI</b>	444
<b>VPYR 100</b>	260	150	100	95	18	60	21	19	6	<b>VPYR100NBR</b>	<b>VPYR100SI</b>	568

(1) Actual force of the suction cup with 65% vacuum and a safety factor of 2 included.

(2) f = Deflection of the suction cup.



### Replacement suction cup

If the suction cup becomes worn, the VPR suction cup can be ordered alone, specifying the diameter ( $\varnothing A$ ) and material of the suction cup.  
Example VPR 50 NBR.

The values represent the average characteristics of our products.  
Note: All dimensions are in mm

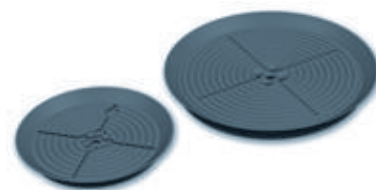


**Specify the part number e.g.: VPYR50NBR**  
**Please refer to the characteristics table above.**

### Accessories

Possibility of telescopic spring-mounting on request.





SPL suction cups are used to handle heavy loads such as sheet metal or glass panels. They have internal cleats allowing them to handle thin sheet metal without distorting them and for vertical handling (non-slip).

SPL suction cups are delivered without holes for fittings or you can choose from our range of standard models or specific models on request.

Industry-specific applications








Types of use



### Materials

**NBR** Nitrile  
**SI** Silicone

### Suction Cup Characteristics

		 (cm <sup>3</sup> )	 (N) <sup>(1)</sup>	 (N) <sup>(1)</sup>	Ø A	H	Ø D	f <sup>(2)</sup>	NBR	SI	Fittings <sup>(3)</sup>	 (kg)
<b>SPL 240</b>		510	1300	650	240	28	200	14	<b>SPL240NBR</b>	<b>SPL240SI</b>	Steel	2.2
<b>SPL 340</b>		720	2744	1372	340	32	300	15	<b>SPL340NBR</b>	<b>SPL340SI</b>	Steel	5.5
<b>SPL 400</b>		850	3611	1806	400	46	300	25	<b>SPL400NBR</b>	<b>SPL400SI</b>	Steel	7.6
<b>SPL 500</b>		1050	5778	2889	500	46	400	25	<b>SPL500NBR</b>	-	Steel	12
<b>SPL 600</b>		1300	7944	3972	600	46	500	25	<b>SPL600NBR</b>	-	Steel	18

(1) Actual force of the suction cup in use with 65% vacuum and including a safety factor of 2 for horizontal handling and a factor of 4 for vertical handling.

(2) f = Deflection of the suction cup.

(3) Thickness of the steel fitting: 8 mm


### Standard internal threads

The threads given below are for mounting on the COVAL spring systems (not supplied with the suction cup).

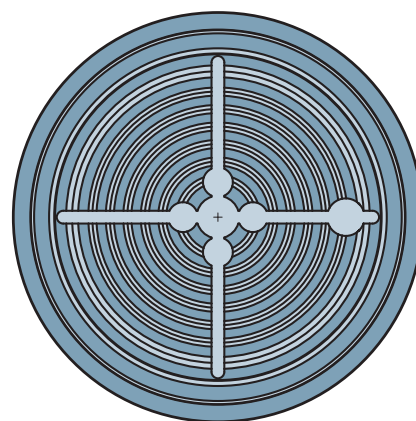
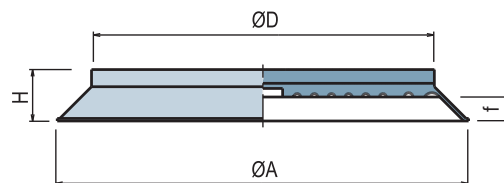
RSC1: specify **G38 RS1** in the order number

RSC2: specify **G38 RS2** in the order number

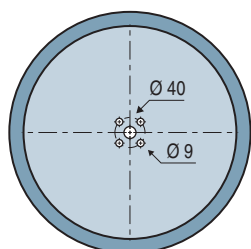
### Internal Thread

	<b>TS5 + IFA 12120</b>	<b>RSC1 <sup>(1)</sup></b>	<b>RSC2 <sup>(1)</sup></b>
<b>SPL 240</b>	■	■	-
<b>SPL 340</b>	■	■	■
<b>SPL 400</b>	-	-	■

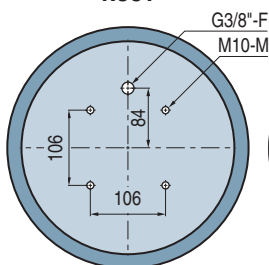
(1) A G3/8" internal thread is available for connection to the vacuum system.



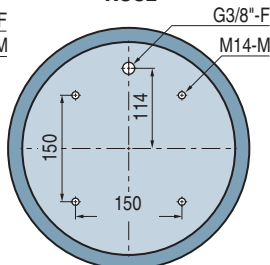
**TS5**



**RSC1**



**RSC2**



The values represent the average characteristics of our products.  
Note: All dimensions are in mm

### Accessories

Suction cups from the SPL series can be mounted on RSC series spring systems. SPL 240 suction cups can be mounted on the IFA 12120 fitting and the TS560 spring system. See page 4/5.



**For all orders, please specify the part number from characteristics table and any required threadings**  
**E.g.: SPL240NBRG38RS1**



# STEEL

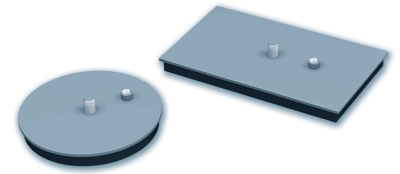
## Steel Suction Cups with Bonded Seal With Bonded Seal

For horizontal handling of heavy loads (very thick sheet metal) or objects with an uneven surface such as concrete slabs or wood, etc.

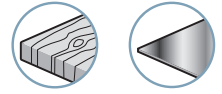
Advantage: wide selection of shapes and sizes.

### Materials

Body Painted steel  
Foam seal Nitrile







Industry-specific application



Types of use

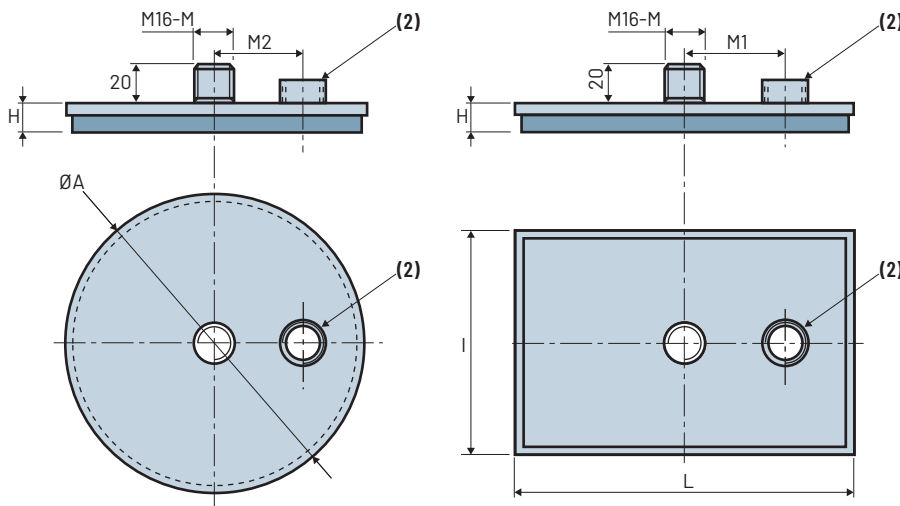


### Suction Cup Characteristics

Round suction cups				Rectangular suction cups							
	Ø A	H	 (N) <sup>(1)</sup>		L	I	H	M1/M2	Rac. <sup>(2)</sup>	 (N) <sup>(1)</sup>	Type of seal
5020	150	25	311	6020	175	115	25	40	G1/4"-F	332	BM 2020 SPTR
5028	170	25	433	6028	215	115	25	45	G1/4"-F	426	BM 2020 SPTR
5035	190	25	571	6035	225	125	25	50	G1/4"-F	513	BM 2020 SPTR
5050	210	25	737	6050	250	150	25	60	G1/4"-F	751	BM 2020 SPTR
5085	260	25	1235	6085	305	180	25	70	G1/4"-F	1206	BM 2020 SPTR
5150	350	35	2145	6150	410	250	35	80	G3/8"-F	2159	BM 3030 SPTR
5240	420	35	3308	6240	480	310	35	100	G3/8"-F	3416	BM 3030 SPTR
5330	500	35	4940	6330	575	330	35	120	G3/8"-F	4521	BM 3030 SPTR
5500	580	35	6897	6500	705	385	35	140	G3/8"-F	6811	BM 3030 SPTR

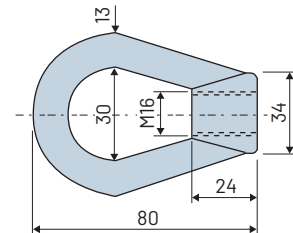
(1) Force measured at 65% vacuum including a factor of 2.

### Dimensions



### Accessory

- Ring fitting  
E.g.: 5000AN



The values represent the average characteristics of our products.  
Note: All dimensions are in mm



Specify the part number e.g.: 5020  
Please refer to the characteristics table above.

### Option

Spring system mounting, see page 4/5.



# Suction Cup Accessories

## Chapter 4

4

### TS11



#### Level Compensators

- Stroke available from 7 to 40 mm
- Protected internal spring
- The TS 11 series spring systems are recommended for horizontal handling of objects located on different levels. The spring function also ensures the gripping points are applied on the same plane when gripping using multiple suction cups.

P<sub>4/3</sub>

### TS



#### Level Compensators TS1 – TS2 – TS3

- 4 models
- 5 to 70 mm stroke available
- TS Series spring systems are recommended for horizontal handling of parts at different levels. The spring function also ensures the gripping points are applied on the same plane when gripping using multiple suction cups.

P<sub>4/4</sub>

### TS



#### Level Compensators TS4 - TS5

- 3 models available
- Stroke 40 mm and 60 mm
- Available connections to suction cups: G3/8"-M and G1/2"-M
- TS Series spring systems are recommended for horizontal handling of parts at different levels. The spring function also ensures the gripping points are applied on the same plane when gripping using multiple suction cups.

P<sub>4/5</sub>

### RSC



#### Multi-Compensator Systems

- 2 models
- 30 mm stroke + 10° ball-joint effect
- Possibility of mounting on square tube with fitting system
- The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction cups. The springs compensate for different levels between the suction cups (ball-joint effect).

P<sub>4/5</sub>

### TSOP



#### Anti-Rotation Level Compensators

- 4 models
- Anti-rotation
- 7 to 40 mm stroke available
- Protected spring
- The TSOP series anti-rotation spring systems are used for horizontal handling of objects at different levels. The anti-rotation function ensures that objects are always gripped in the same position.

P<sub>4/6</sub>

### TSOG



#### Anti-Rotation Level Compensators

- 8 models
- Anti-rotation
- 10 to 80 mm stroke available
- Protected spring
- The TSOG series anti-rotation spring systems are used for horizontal handling of objects at different levels. The anti-rotation function ensures that objects are always gripped in the same position.

P<sub>4/7</sub>



# Suction Cup Accessories

## Chapter 4

### L



#### Mounting Extensions

- 4 ranges (G1/4"-M, G1/8"-M, G3/8"-M and G3/8"-F)
- 3 possible strokes

- The L series extensions are used for gripping on various levels using the same installation plate. These extensions are adjustable to different heights.

P<sub>4/8</sub>

### Flow Control Fittings



#### Groups 1 and 2

- 13 models
- (Hollow screw or hollow shaft fitting)

- These fittings are designed for installations requiring a large number of suction cups connected to the same vacuum source, particularly for situations where parts may be missing in the layer to be handled. Using flow-controlled fittings reduces the loss of flow and therefore optimizes the size of the vacuum generator.

P<sub>4/10</sub>

### PMG2



#### Mechanical Feelers

- Mechanical feelers
- 5 models
- For VP series Ø30 to 60 mm suction cups

- The PMG2 series mechanical feelers are mounted on VP series diameter 30 to 60 mm flat suction cups in all types of material. The feeler is activated by the object to be handled, causing it to open and free the route for the vacuum.

P<sub>4/11</sub>

### IMU



#### Axial Ball-Joints

- Ball-joint fitting
- 4 models

- IMU series ball-joints are recommended for gripping rounded products.
- When installed on a flat suction cup, they provide greater force than a bellows suction cup.

P<sub>4/12</sub>

### CSP



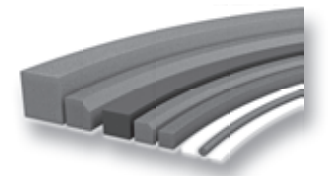
#### Piloted Safety Valves

- Vacuum check-valve
- Directly mounted on the suction cup
- Release by blow-off

- The piloted safety valve CSP series mounts directly on the suction cup and allows to maintain the vacuum in it, in case of emergency stop or malfunctioning of the vacuum generator. The controlled dropping is done by connecting the fitting attached to the compressed air.

P<sub>4/13</sub>

### BM



#### Foam Seals

- Foam strip (airtight cells)
- 9 models
- 2 types of material (Nitrile and Natural rubber)

- The foam strip is designed for gripping products with an uneven or ridged surface: sawn wood, metal sheets, flat surfaces with bumps or hollows.
- All granular surfaces to which suction cups cannot adhere correctly and therefore cannot be airtight.

P<sub>4/14</sub>



# TS 11

## Level Compensators



The TS 11 series compensated spring systems are recommended for horizontal handling of objects at different levels. The spring function also ensures that the gripping points are applied on the same plane when gripping with multiple suction cups.

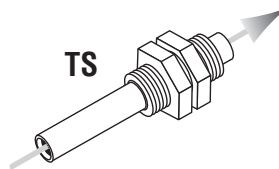
■ Protected spring.

### Materials

**Spring** Stainless steel

**Tubing** Zinc-plated steel

**Slider** Brass



### Characteristics

References	A	F1	F2	C	D	L	1	2	k (N/mm)	Frep (N)	(g)
TS11 7	M5-F	M5-F	G1/8"-M	7	19	43	7	14	0.68	1.3	20
TS11 10	M5-F	M5-F	G1/8"-M	10	22	49	7	14	0.45	1.8	22
TS11 20	M5-F	M5-F	G1/8"-M	20	39	76	7	14	0.24	1.7	33
TS11 40	M5-F	M5-F	G1/8"-M	40	64	121	7	14	0.13	1.6	50

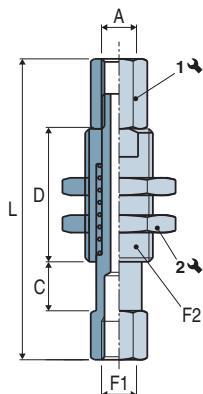
Note: All dimensions are in mm

C = Stroke

k = Spring stiffness

Frep = Force at rest

### TS11



Please specify the part n° e.g.: TS1140  
See part n° table above.

### Suction cup mounting

The TS 11 series spring system can be fitted on all suction cups in group 1 (VP, VSA, VS Ø 5 to 25 mm) for IM21 and on suction cups in series VPG 5 to 20.



# TS

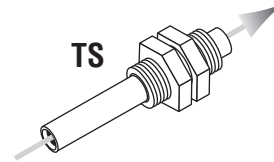
## Level Compensators



TS series compensated spring systems are recommended for horizontal handling of parts at different levels. The spring function also ensures that the gripping points are applied on the same plane when gripping with multiple suction cups.

### Materials

**Spring** Stainless steel  
**Tubing** Zinc-plated steel  
**Slider** Brass



### Characteristics

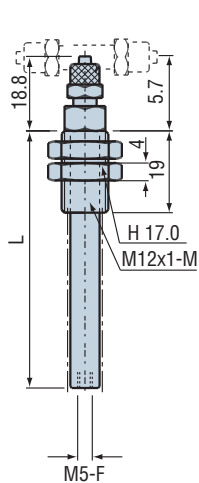
Models	TS1				TS2				TS3				TS1.20 LG
Stroke	05	10	20	30	10	30	50	70	10	30	50	70	20
L	29	39	59	79	48	88	128	168	48	88	128	168	59
k (N/mm)	0.36	0.15	0.07	0.045	0.9	0.2	0.115	0.08	0.9	0.2	0.115	0.08	0.07
Frep (N)	1.00	1.70	1.45	2	8.1	4.2	4.5	4.5	5.1	4.2	4.5	4.5	1.45

Note: All dimensions are in mm

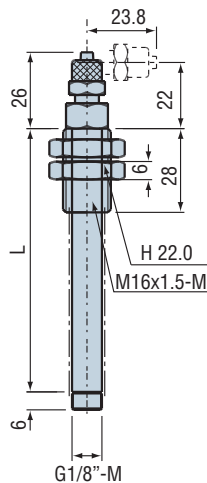
k = Spring stiffness

Frep = Force at rest

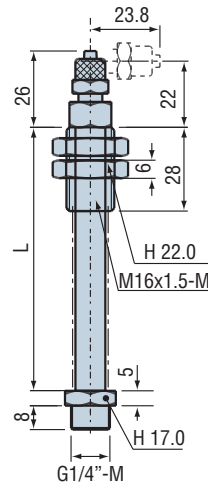
### TS1



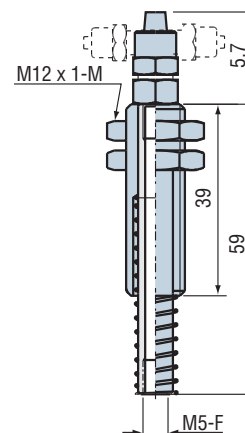
### TS2



### TS3



### TS1.20 LG



Please specify the part n° e.g.:  
**Model + Spring stroke + Fitting**  
 e.g.: TS350C46

1: Model	2: Spring stroke	3: Fittings (for TS series)
TS1	05 - 10 - 20 - 30 (TS1)	D46 (Straight 4 x 6 - TS1, TS2, TS3)
TS2	10 - 30 - 50 - 70 (TS2, TS3)	D68 (Straight 6 x 8 - TS2, TS3)
TS3		C46 (Elbow 4 x 6 - TS1, TS2, TS3)
		C68 (Elbow 6 x 8 - TS2, TS3)
		T46 <sup>1</sup> (T-shape 4 x 6 - TS1)
		N <sup>2</sup> (Without fitting)

(1) versions T46 and T68 on request for TS2 and TS3.

(2) For TS1 model, vacuum connection M5-F and for models TS2 and TS3 vacuum connection G1/8"-M.

### Advantage of the TS120LG

The adjustment height is twice that of the standard TS1 spring system and its spring is protected.



# TS

## Level Compensators



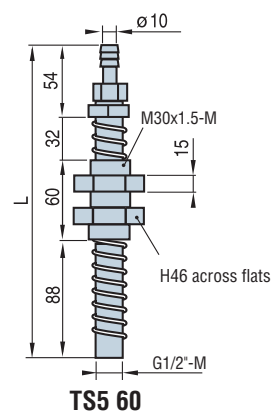
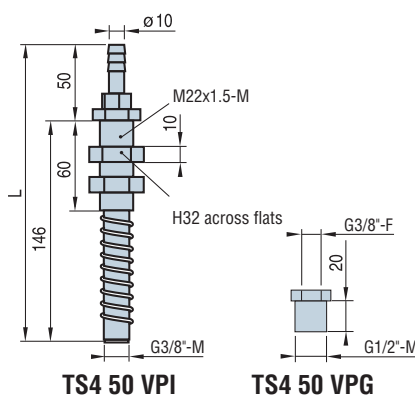
### Characteristics

Models	TS4 50	TS5 60
Stroke	45	60
L	196	234
k (N/mm)	0.47	1.23
Force at rest (N)	4	0

k = Spring stiffness

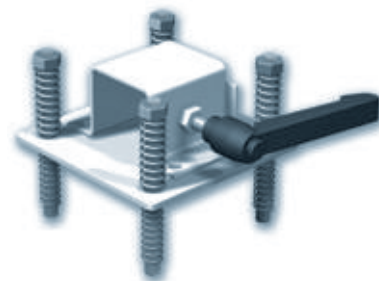
### Materials

**Spring** Stainless steel  
**Tubing** Zinc-plated steel  
**Slider** Zinc-plated steel



Note: All dimensions are in mm

## 4 RSC Multi-Compensator Systems



### Use

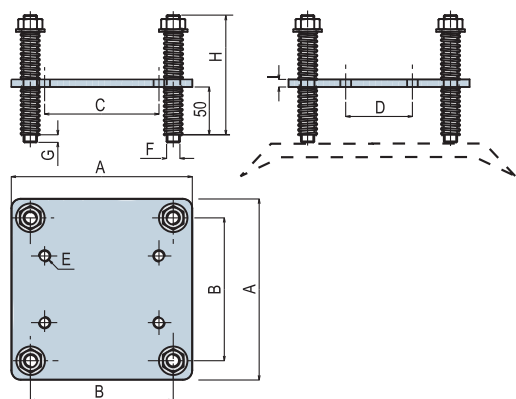
The system of 4 compensated springs is particularly recommended for horizontal handling requiring large diameter suction cups. The upper stainless steel springs act as dampers for all vertical movements. They compensate for different levels between the suction cups. The system of 4 compensated springs mounted in a square gives the assembly a ball-joint effect.

### Materials

**Spring** Stainless steel  
**Damper** Stainless steel  
**Studs** A 60  
**Colour** Yellow RAL 1023

### Characteristics

Models	Max. load (N)	Stroke under traction	Vertical force (N)	Maxi. weight (kg)	Ball-joint angle	Tube mounted	A	B	C	D	E	F	G	H	I	J	K	L
RSC1	2000	30	160	1	10 °	50	140	106	88	50	M8-F	M10-M	8	120	5	52	52	9
RSC2	4000	30	340	2.7	10 °	80	190	150	120	70	M12-F	M14-M	8	130	8	83	83	13



### RSC option...VAC

**Square tube mounting options** (Tightening by indexable lever).

- RSC1 VAC on 50 mm square tube.
- RSC2 VAC on 80 mm square tube.

Note: All dimensions are in mm

### Note:

- RSC1: for SPL 240 suction cups, 5085 steel suction cups.
- RSC2: for SPL 340 suction cups, 5150 steel suction cups.



Please specify the part:  
**Model + Type + Tube mounting option**  
 e.g.: RSC2VAC

1: Model	2: Type	3: Tube-mounting option
RSC	1 max. 2000 N 2 max. 4000 N	VAC with tube-mounting option



# TSOP

## Anti-Rotation Level Compensators



The TSOP and TSOG series spring systems are anti-rotation spring systems. They are used for horizontal handling of parts at different levels. The anti-rotation function ensures that objects are always gripped in the same position. The TSOP range is designed for applications requiring very precise handling.

- The hexagonal rod prevents the suction cup from rotating.
- Protected spring.

### Characteristics - TSOP

References	A	F1	F2	C	D	L	1	2	k (N/mm)	Frep (N)	(g)
TSOP 107	M5-F	M5-F	G1/8"-M	7	18	42	7	14	0.68	1.3	20
TSOP 110	M5-F	M5-F	G1/8"-M	10	22	49	7	14	0.45	1.8	22
TSOP 120	M5-F	M5-F	G1/8"-M	20	39	73.5	7	14	0.24	1.7	33
TSOP 140	M5-F	M5-F	G1/8"-M	40	64	118.5	7	14	0.13	1.6	50

Note: All dimensions are in mm

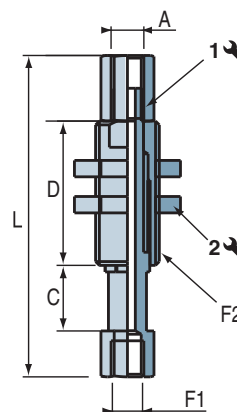
C = Stroke

k = Spring stiffness

Frep = Force at rest

### Materials

- Spring** Stainless steel  
**Tubing** Anodized aluminum  
**Slider** Nickel-plated steel



4  
TSOP



Please specify the part e.g.: TSOP140  
See part n° table above.



# TSOG

## Anti-Rotation Level Compensators

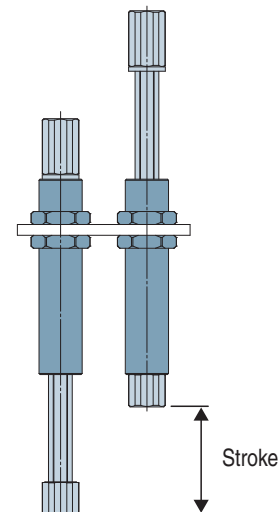


The anti-rotation spring system TSOG serie allows to compensate for differences in height and to handle parts at different levels with ensuring precise positioning of the suction cup.

They are perfect to equip end of arm tooling in plastics processing and packaging.

The TSOG range is designed for applications requiring very precise handling.

- Lightness thanks to the aluminium design
- Protected spring
- Accurate anti-rotation system
- Wide range of stroke and connections



### Characteristics - TSOG

References	A	F1	F2	C	B	D	E	G	L	↺ 1	↺ 2	↺ 3	k (N/mm)	Frep (N)	Fcomp (N)	⚖ (g)
TSOG110FM12	M5-F	M5-F	M12x1-M	10	17	25	5.5	5.5	60	10	15	10	0.21	1.9	4.1	17
TSOG125FM12	M5-F	M5-F	M12x1-M	25	17	44	5.5	5.5	94	10	15	10	0.12	2	5	23
TSOG220FM16	G1/8"-F	G1/8"-F	M16x1-M	20	20	38.5	9	7	100	12	19	12	0.27	3.6	9	36
TSOG235FM16	G1/8"-F	G1/8"-F	M16x1-M	35	20	58.5	9	7	131.5	12	19	12	0.15	4.3	9.5	46
TSOG325FM20	G1/4"-F	G1/4"-F	M20x1.5-M	25	23	50	10	10	113	16	24	16	0.27	4.1	11	64
TSOG350FM20	G1/4"-F	G1/4"-F	M20x1.5-M	50	23	82.5	10	10	170.5	16	24	16	0.14	4.3	11.4	90
TSOG440FM25	G3/8"-F	G3/8"-F	M25x1.5-M	40	33	71	11	11	159	22	32	22	0.27	5.6	16.5	164
TSOG480FM25	G3/8"-F	G3/8"-F	M25x1.5-M	80	33	121	11	11	249	22	32	22	0.14	6	17	231

Note: All dimensions are in mm

C = Stroke

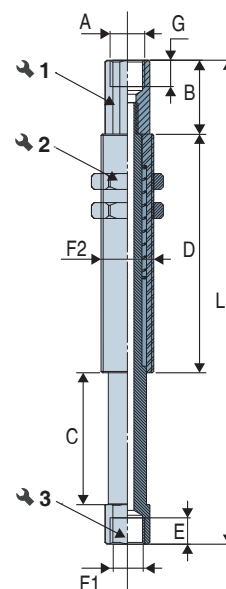
k = Spring stiffness

Frep = Spring force

Fcomp = Force at rest

### Materials

- Spring** Stainless steel
- Tubing** Anodized aluminum
- Slider** Anodized aluminum
- Nuts** Anodized aluminum

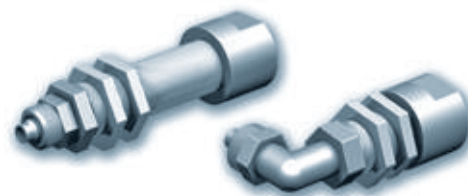


Please specify the part e.g.: TSOG350FM20  
See part n° table above.





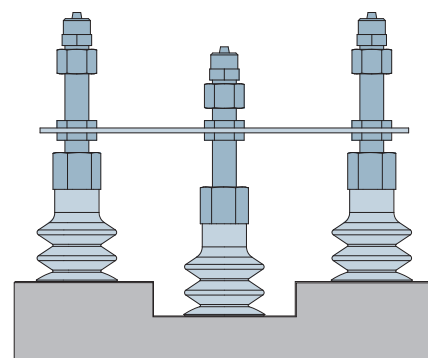
## Mounting Extensions



The L series extensions are used for gripping on various levels using the same installation plate. These extensions are adjustable to different heights.

This system is especially useful for 2.5 bellows type suction cups, as height adjustment is made easier by the deflection of the suction cup.

Spring systems should be chosen, instead, for flat suction cups with low deflection.



### Materials

**Threaded rod and nut**

Brass

**Screwed vacuum fitting**

Nickel-plated brass

### Characteristics

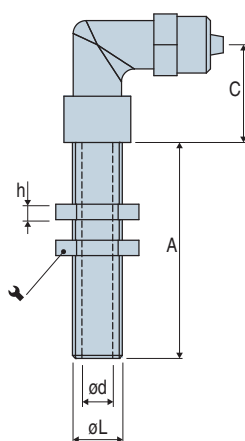
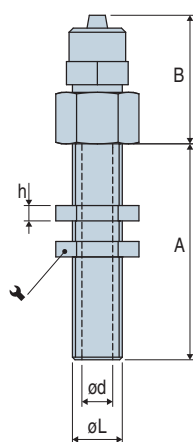
Models	A <sup>(1)</sup>			B	C	h		Ød	ØL	D	P
G1/8"-M	22	42	52	25	19	3	14	6	G1/8"-M	-	-
G1/4"-M	19	49	69	29	24	4	19	9	G1/4"-M	-	-
G3/8"-F	19	49	69	20.5	19.5	4	23	-	G3/8"-F	19	22
G3/8"-M	19	49	69	20.5	19.5	4	23	10	G3/8"-M	-	-

(1) Other lengths available on request for a minimum quantity of 10 pieces.

### G1/4"-M - G1/8"-M

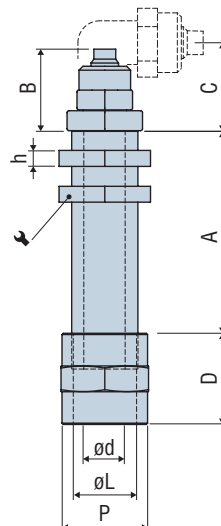
Straight

Elbow



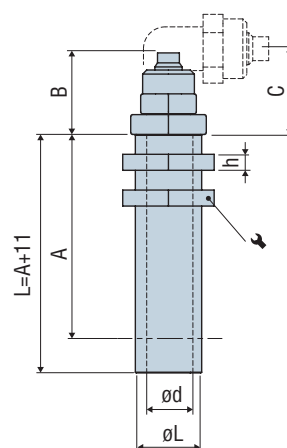
### G3/8"-F

Straight or elbow 6x8 or 8x10



### G3/8"-M

Straight or elbow 6x8 or 8x10



Please specify the part:

**Model + Thread + Adjustable stroke + Fitting + Suction cup fitting**  
e.g.: L1449C68F

1: Model	2: Thread	3: Adjustable stroke	4: Fittings	5: Suction cup fitting G3/8" version	
L	18 G1/8"	22 - 42 - 52	G1/8"	D46 Straight 4 x 6	F Female
	14 G1/4"	19 - 49 - 69	G1/4"	D68 Straight 6 x 8	M Male
	38 G3/8"		G3/8"	C46 Elbow 4 x 6	
				C68 Elbow 6 x 8	
				N Without fitting	
				D810 Straight 8 x 10	
			C810 Elbow 8 x 10		

Note: All dimensions are in mm

G3/8" extensions are compatible with C Series high performance suction pads (see page 2/59) and CTC Series (see page 2/63).



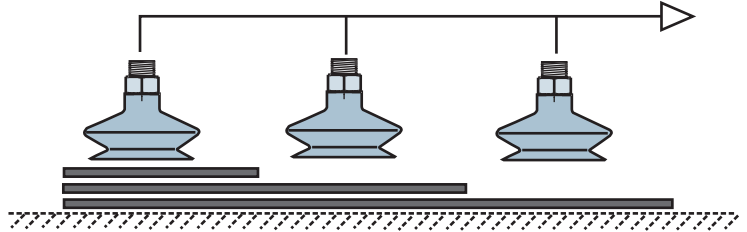
# Miscellaneous Gripping

## Principle

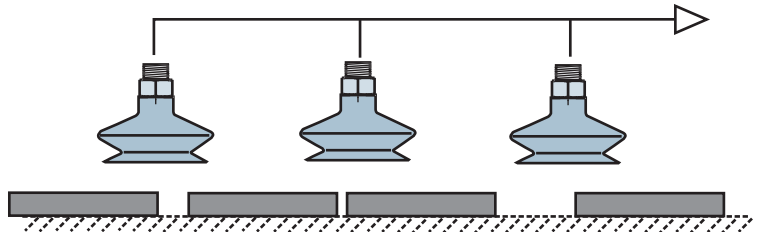
In many cases when using a multi-suction cup installation, some of the cups will not be covered by the product(s) to be handled. This leads to a high risk of reduced grip from the covered suction cups, or may even prevent them gripping at all.

## Examples

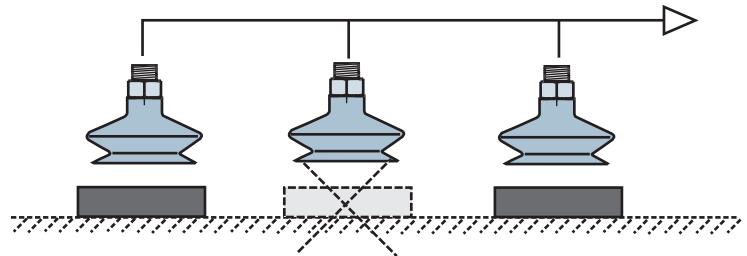
- Gripping of panels, sheet metal, etc. in a wide variety of sizes by a vacuum lifter equipped with suction cups.



- Uncertain position of the object(s).



- Gripping several objects at one time, some of which may be missing.



## Solutions

- Independent ejector

Mounting an ejector for each suction cup guarantees the installation will operate perfectly even if one or more suction cups are not covered.

The COVAL solutions are the VR, GVR, CVP and CVPC series micro-ejectors.

For further information, see chapter 6.

- Flow control fittings

Flow control fittings are incorporated as part of the suction cup mounting, thus reducing leakage in that cup with no part present during the vacuum cycle.

This technical solution is particularly suitable for vacuum grippers with a large number of suction cups.

To determine the diameter of the nozzle, COVAL has developed a specific CAD.

- Mechanical feelers

See following pages. COVAL offers four solutions depending on the application, with their advantages and drawbacks.



# Flow Control Fittings

## Groups 1 and 2

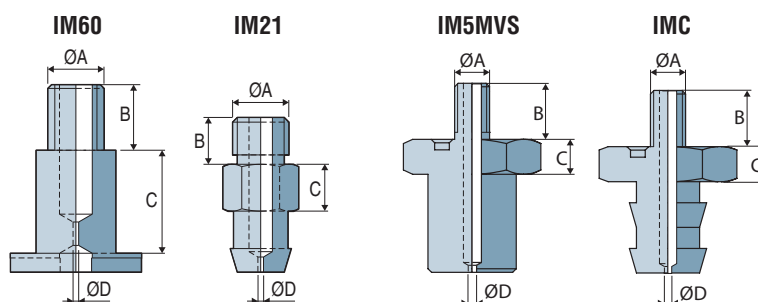


These fittings are designed for installations with a large number of suction cups connected to the same vacuum generator (vacuum gripper technology), particularly in cases where there may be objects missing from the layer of objects to be handled. Using flow-controlled fittings reduces the loss of flow and therefore optimizes the size of the vacuum generator.

**Caution, do not use this type of fitting for applications in a dusty environment.**

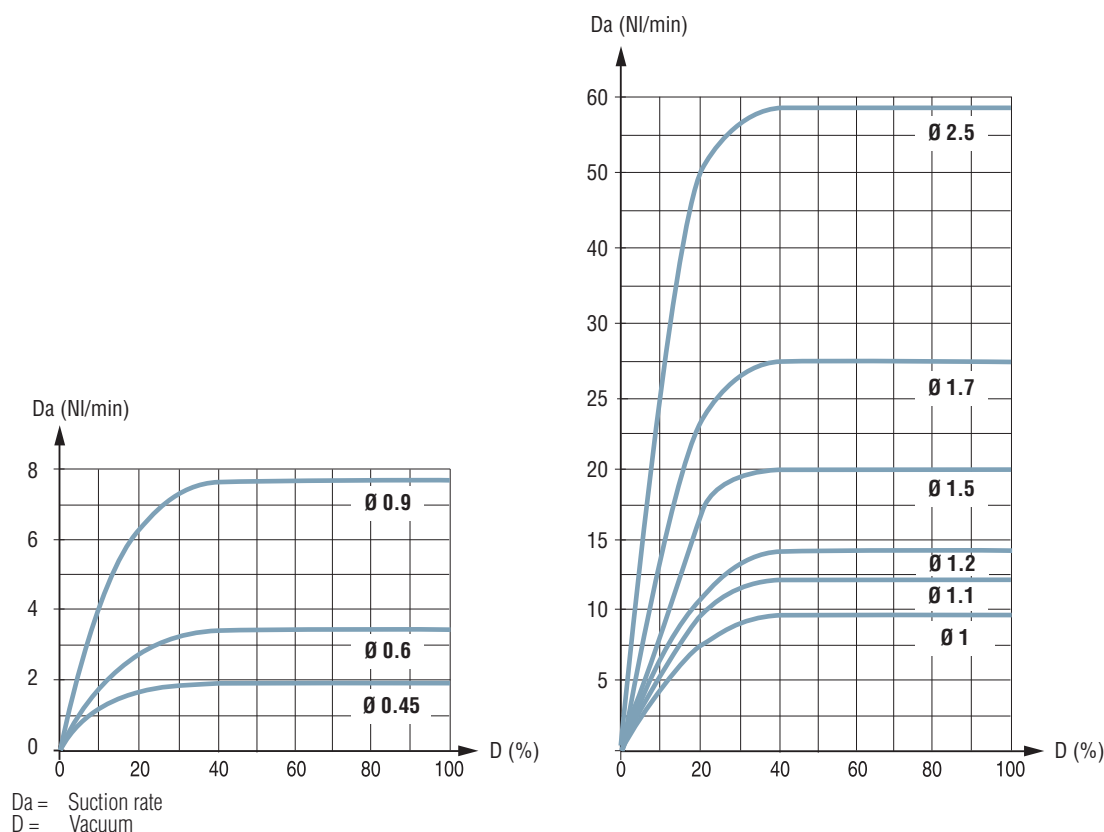
### Characteristics

References	ØA	ØD	B	C
IM5 MVSD1.1	M5-M	1.1	8	5
IM21 SP058	M5-M	0.45	4.5	5
IM21 SP094	M5-M	0.6	4.5	5
IM60 SP335	M6-M	0.6	7	11
IM60 SP387	M6-M	1.2	7	11
IM60 SP461	M6-M	0.9	7	11
IM60 SP483	M6-M	1	7	11
IM60 SP510	M6-M	1.7	7	11
IM60 SP511	M6-M	2.5	7	11
IMCM5 D0.6	M5-M	0.6	8	5
IMCM5 SP691	M5-M	1.1	8	5
IMCM5 SP701	M5-M	1.5	8	5



4

### Maximum suction per nozzle diameter



Please specify the part e.g.: IM60SP387  
See part n° table above.

Note: All dimensions are in mm



# PMG2

## Mechanical Feelers



The PMG2 series mechanical feelers are mounted on VP series diameter 30 to 60 mm flat suction cups in all types of material (group 2 suction cups).

The mechanical feeler blocks the path from the vacuum source to the suction cup.

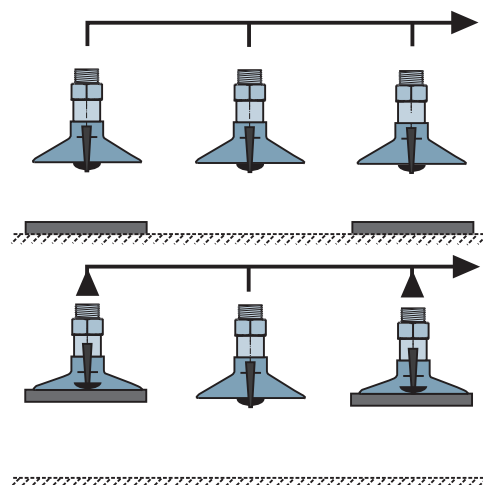
The feeler is actuated by the object, causing it to open and free the path for the vacuum.

### Materials

**Body** Nickel-plated brass

**Spring** Stainless steel

**Feeler** Delrin and brass



4

PMG2


### Advantages

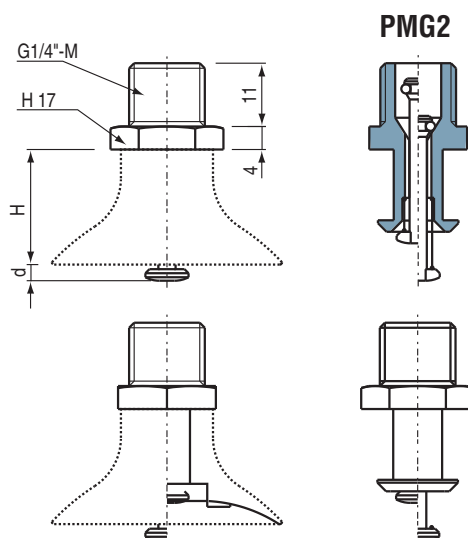
- Simple to install and operate.
- Very efficient air-tightness for non-covered suction cups.
- Little risk of marking delicate objects, as the feeler has a rounded surface.

### Mounting

The feelers are mounted by press fitting. It is preferable to allow us to assemble the feeler onto the suction cup.

### Characteristics

	VP 30	VP 35	VP 40	VP 50	VP 60
 d (mm)	3.9	2.9	2.9	0.9	0.9
H (mm)	19	20	20	22	22



### Leakage rate

No leakage if all the suction cups are correctly placed. This represents substantial savings in power with regard to the vacuum source: pneumatic ejector or electric vacuum pumps.



Please specify the part: PMG2

### Accessories

Mounting on spring or ball-joint systems (see chapter 4).



## Axial Ball-Joints



IMU series ball-joints are recommended for gripping rounded or rotating products.

When installed on a flat suction cup, they provide greater force than a bellows suction cup.

The vacuum connection is axial and sealing is ensured by a special seal always in contact with the spherical articulation.

The suction pad installed over the axial ball joint is free to rotate on its axis around 360° and can incline up to 15°

The ball joints are manufactured entirely in copper except the spherical joint made in stainless steel.

### Materials

#### Ball-joint

Zinc-plated steel and brass

#### Seal

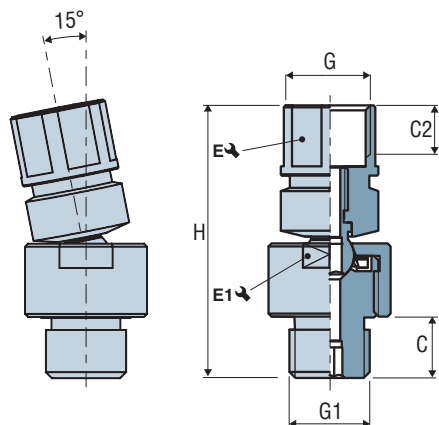
Nitrile (NBR)

4

IMU

### Characteristics

References	G	G1	C2	C	E	E1	H	(g)
IMU 18	G1/8"-F	G1/8"-M	8	8.5	11	18	43	40
IMU 14	G1/4"-F	G1/4"-M	8	10	15	18	44.6	56
IMU 38	G3/8"-F	G3/8"-M	13	13	26	28	63.3	206
IMU 12	G1/2"-F	G1/2"-M	15	17	26	28	72.3	232



Please specify the part e.g.: IMU14  
See part n° table above.

Note: All dimensions are in mm







The piloted vacuum valve CSP series mounts directly on the suction cup and allows to maintain the vacuum in it, in case of emergency stop or malfunctioning of the vacuum generator.

The controlled dropping is done by connecting the fitting attached to the compressed air.

Note: The empty valve is not a positive safety feature. Regular maintenance is needed to ensure the proper functioning of the valve.

### Materials

**Valve** Nitrile (NBR)


**Body** Anodized aluminum

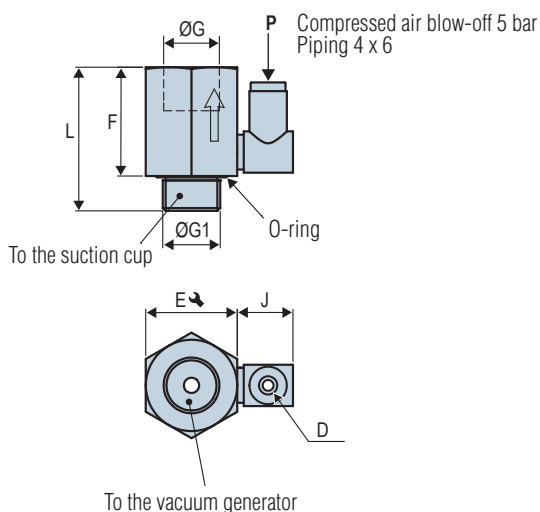
**Filter** Stainless steel screen 200  $\mu$

4

CSP

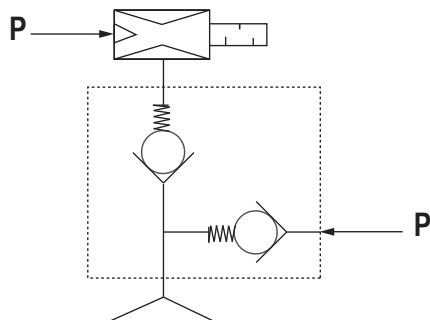
### Characteristics

Reference	$\varnothing G$	$\varnothing G1$	D	F	L	J	E 
CSP 14	G1/4"-F	G1/4"-M	4x6	25	33	12.8	21



### Mounting

- One piloted vacuum valve by suction cup.
- Blow-off pressure, minimum 5 bar.



Please specify the part e.g.: CSP14  
See part n° table above.

Note: All dimensions are in mm



# BM

## Foam Strips



Industry-specific applications



### Nitrile foam strip: 10m roll

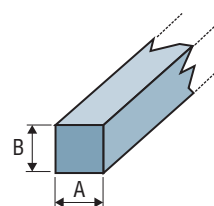
#### Mounting

Mounting with contact adhesive or flush-mounted at a depth adapted to the height and potential flush-mounting of the seal subject to the vacuum: 50% to 70% of the new height.

References	A	B
BM 1510	15	10
BM 1010	10	10
BM 1515	15	15
BM 2020	20	20
BM 3030	30	30

#### Support

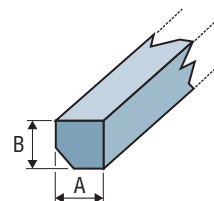
- All supports, particularly steel, aluminum, etc.
- Closed cells.
- Tube of neoprene adhesive (120 ml):  
Part No. 095.99.006.



### Nitrile beveled foam strip: 10m roll

- The beveling facilitates gripping of products with uneven surfaces.
- Closed cells.
- Contact adhesive reference: BOSTIK 1400 (Neoprene adhesive).

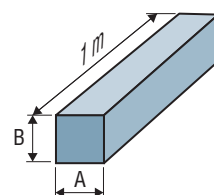
References	A	B
BM 2020 SPTR	20	20
BM 3020 SPTR	20	30
BM 3030 SPTR	30	30



### Natural rubber foam strips: Length 1m

- Flush-mounting.
- Use with turbine (strong suction) for gripping products with very uneven surfaces, such as slabs of washed gravel.
- Open cells.
- Contact adhesive reference: BOSTIK 1400 (Neoprene adhesive)

Reference	A	B
BMS 3025	30	25



Please specify the part e.g.: BM1510  
See part n° table above.

Note: All dimensions are in mm







# Vacuum Pumps Overview

## Chapter 5

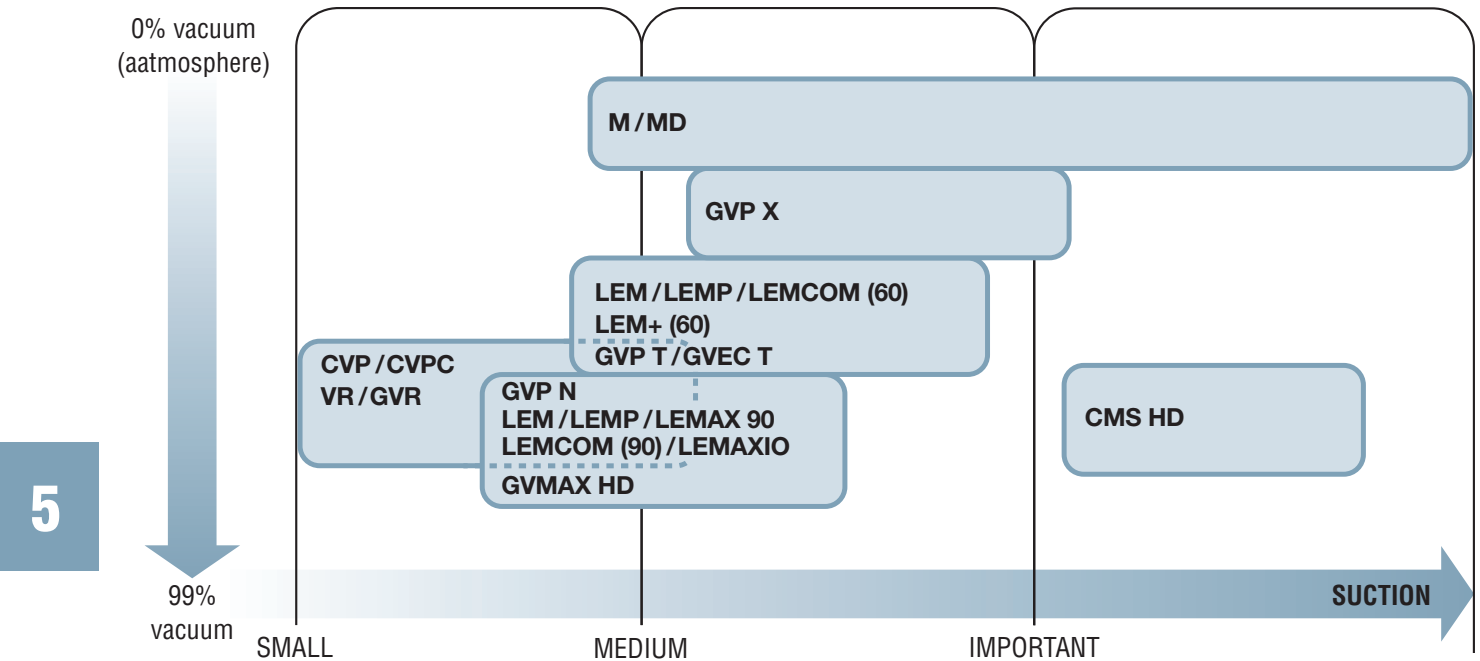
<b>General Points</b>	<b>p. 5/2</b>
<b>Choosing a Vacuum Pump</b>	<b>p. 5/3</b>
<b>Comparison of Vacuum Pumps and Air Amplifiers</b>	<b>p. 5/4</b>
<b>COVAL's Family of Intelligent Vacuum Pumps</b>	<b>p. 5/6</b>
<b>Vacuum Pump Range</b>	<b>p. 5/8</b>
<b>Evacuation Time and Weight of Vacuum Pumps</b>	<b>p. 5/11</b>



# Vacuum Pumps Overview

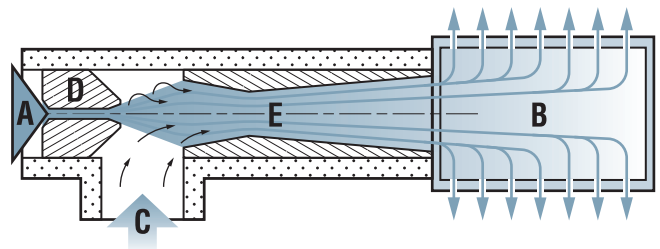
## General Points

### What is vacuum?



### HOW A VENTURI WORKS

The COVAL vacuum pump works on the Venturi principle. The filtered, non-lubricated compressed air in **A** is blown through nozzle **D** and speeds up. It then goes into mixer **E** and finally escapes through silencer **B**. The vacuum is caused by the pressure drop in the chamber around nozzle **D**. The air sucked in **C** follows the same route to end up in silencer **B**.



### PRESSURE UNIT CONVERSION

Units	Bar 10 N/cm <sup>2</sup> = 100 kPa	Atm kp/cm <sup>2</sup>	Torr mm of Hg
Bar = 10 N/cm <sup>2</sup> = 100 kPa	1	0.986923	750.0617
Atm = kp/cm <sup>2</sup>	1.01325	1	760
Torr = mm of Hg	0.0013332	0.001316	1

### CONVERSION ACCORDING TO THE PERCENTAGE OF VACUUM

%	Bar (10 N/cm <sup>2</sup> = 100 kPa)	Atm (kp/cm <sup>2</sup> )	mm of water column
10%	-0.101	-0.103	1000
20%	-0.203	-0.207	2000
30%	-0.304	-0.310	3000
40%	-0.405	-0.413	4000
50%	-0.507	-0.517	5000
60%	-0.608	-0.620	6000
70%	-0.709	-0.723	7000
80%	-0.811	-0.827	8000
90%	-0.912	-0.930	9000

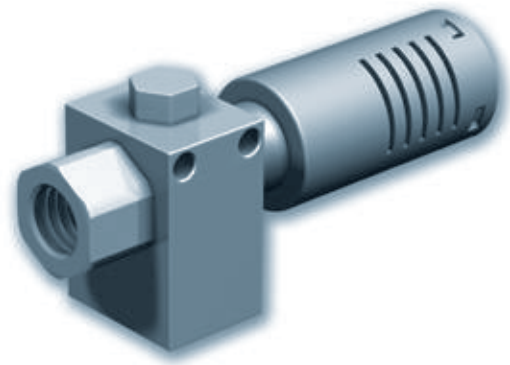


# Vacuum Pumps Overview

## Choosing a Vacuum Pump

The role of the vacuum pump is to generate a vacuum relative to a specific capacity. For vacuum handling, this capacity generally consists of:

- the internal volume of the suction cups to be evacuated,
- the volume of the network (piping).



### GRIPPING AIRTIGHT AND POROUS OBJECTS

#### Airtight objects

Only the volume of the cups and vacuum network needs to be considered. The choice of vacuum pump will correspond directly to the evacuation time required by the application. By nature of the product, it is ideal and more efficient to select pumps with a maximum vacuum level of 85% or more.

#### Porous objects

In this case, it is not possible to fully evacuate the vacuum system. The leakage rate from the suction cup network must be considered as well as the volume. A vacuum pump equipped to handle this application will be one whose flow is significantly greater than that of the leakage in the system, thus allowing vacuum pressure to build. For these products, it is preferable to choose a pump with high flow rates and a reduced maximum vacuum level of 50-60%.

5

### CALCULATING THE LEAKAGE RATE

First, choose a suction cup with a diameter compatible with the object to be gripped.

Second, equip a vacuum pump (with known characteristics) with a pressure gauge and a vacuum gauge. Then supply the pump with optimal pressure (e.g. 5 bar).

Finally, apply the suction cup to the surface to be tested.

#### Three possible cases may arise:

- The vacuum gauge indicates the maximum vacuum achieved for this type of pump: the object is airtight.
- The vacuum gauge does not measure any vacuum: choose a more efficient vacuum pump as the leakage rate is higher than the maximum vacuum pump flow.
- The vacuum gauge displays a vacuum value, e.g. -300 mb (30% vacuum), refer to the vacuum pump curve. Read the flow corresponding to -300 mb (e.g. 75 NL/minute).

For example, the leakage rate at -300mb is measured at 75 NL/min for the suction cup used.

Using this data, calculate the forces to be applied to handle the object:

At -300mb the theoretical force of the suction cup is:

**F = S x 0.3** with:

**S** = surface of the suction cup in cm<sup>2</sup>, **F** in daN.

(-300 mbar = -0.3 bar, for calculation use 0.3).

To grip the object safely, (factor of 2 for horizontal gripping and 4 for vertical gripping), one must account for the varying characteristics of the vacuum pumps.

### THINGS TO REMEMBER

"An installation must breathe properly".

The throughput for a machine includes:

- gripping time,
- transfer time,
- release time.

Efficient vacuum handling will ensure a proper release of the object in addition to the grip, as the release is often a difficult point to resolve. Some steps to consider.

- Install vacuum pump as close as possible to the suction cups,
- Choose suction cups with the smallest possible internal volume,
- Identify suitable sizes of piping and fittings to limit pressure losses.



# Vacuum Pumps Overview

## Comparison of Vacuum Pumps and Air Amplifiers

### AIR AMPLIFIER

Optimal usage zone: 0 to 12% vacuum.

Maximum usage range: 0 to 15% vacuum.

#### ■ Applications:

##### **TRANSPORT - DRYING - DEGASSING**

Handling very porous, lightweight products: carpet, textiles, foam, etc...

Transporting small objects: granules, grains of coffee, rice, paperclips, etc...

Smoke extraction, degassing.



## 5

### TYPES OF VACUUM PUMPS

#### ■ Version 60% vacuum

Optimal usage zone: 30 to 55% vacuum.

Use of vacuum pumps optimized at 60% maximum vacuum implies high suction flow to account for the drop in vacuum pressure.

#### ■ Version 85 % vacuum

Optimal usage zone: 55 to 80% vacuum.

The importance of a vacuum pump which can create an 85% vacuum is to generate high vacuum and therefore a high force/surface ratio.

#### ■ Applications:

##### **HANDLING - SUCTION - EMPTYING - DOSING**

Handling porous, semi-porous and airtight products.

High-speed pick and place.

Air and/or liquid dosing.



### COMMENTS

The optimal use zones recommended as follows are the most adapted to the different types of technology. However they are in no way restrictive or limiting.

The notes are valid for both COVAL product groups: air amplifiers and vacuum pumps and also apply to all products using the same technology.

### NOTE

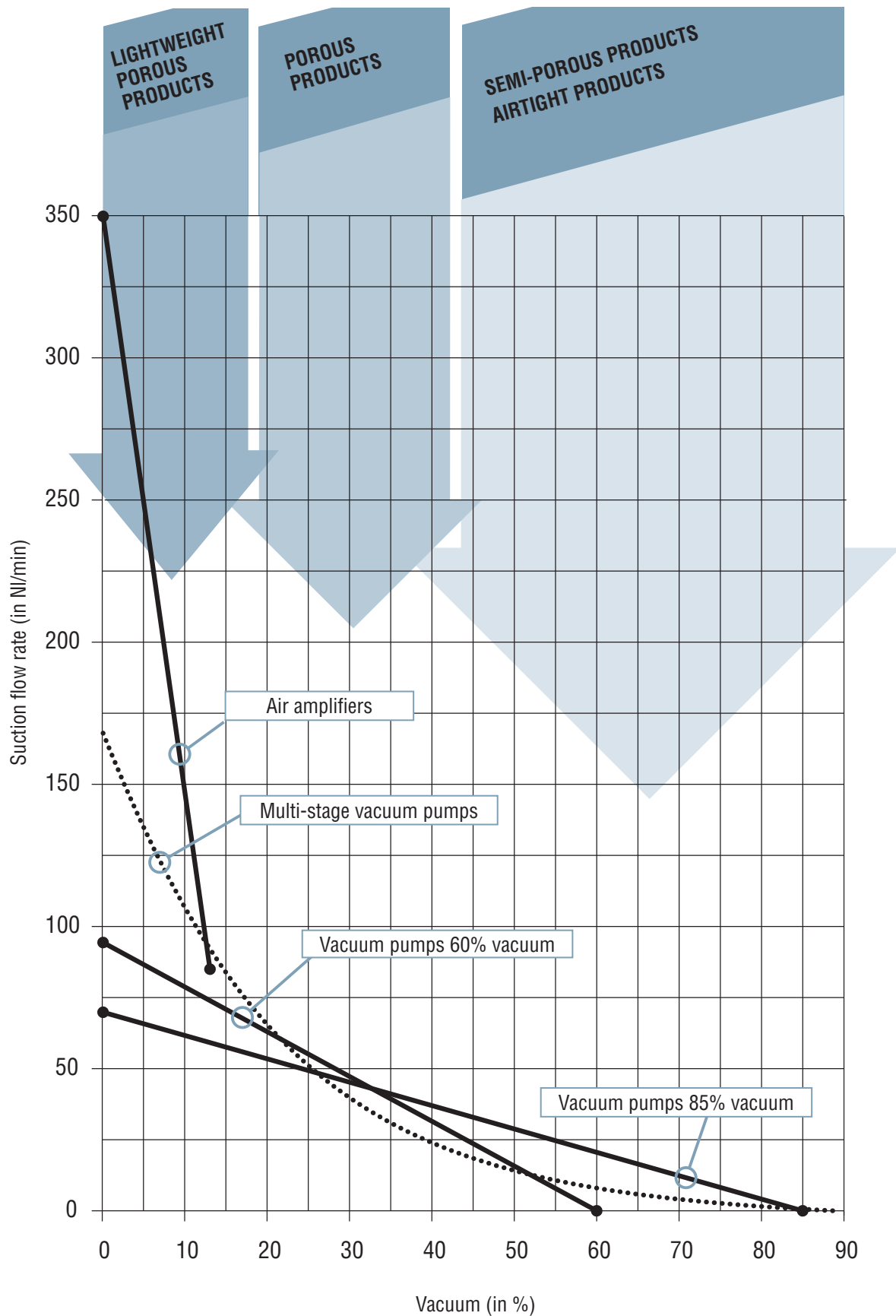
The following curves have been established using COVAL equipment: M 10 C air amplifier, LEM60X14 and LEM90X14 vacuum pumps.

The values given are values for identical compressed air consumption and optimal characteristics of each of the vacuum generation procedures.



# Vacuum Pumps Overview

## Comparison of Vacuum Pumps and Air Amplifiers





# COVAL's Family of Intelligent Vacuum Pumps

Vacuum pumps are used in a wide variety of automated systems, primarily to generate and control vacuum in suction cups to ensure the gripping of objects. They must be easily integrated into a process and communicate the information necessary to ensure proper production.

To meet the expectations of manufacturers and the demands of automated applications, COVAL offers a complete range of vacuum pumps to meet different needs: vacuum levels, suction rates, control types, communication technologies, and energy savings.



Communication needs vary depending on the industry and application, but more and more, an efficient and real time communication system allows for increased flexibility of the machine.

In addition, the simplification of wiring and configuration is a benefit for integrators, while expanding the possibilities of diagnosis and optimization.

## Key points of intelligent vacuum pumps



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Functions	Model	LEMP	LEM	LEMAX	LEMAX IO	LEMCOM	LEM+	LEMAX+	GVMAX HD	CMS HD
Recommended for porous products		■	■			■	■			■
Recommended for airtight products				■	■	■		■	■	
Suction flow rate from 29 to 92 NI/min		■	■	■	■	■				
Suction flow rate from 125 to 275 NI/min							■	■	■	
Suction flow rate from 700 to 1600 NI/min										■
Maximum vacuum level: 60%		■	■			■	■			
Maximum vacuum level: 80 or 85%		■	■	■	■	■	■	■	■	■
Vacuum control			■	■	■	■	■	■	■	■
Blow-off control			■	■	■	■	■	■	■	■
Integrated pressure regulator (ASR) 		■	■	■	■	■	■	■		
Powerful blow-off							□	□	□	
Electronic vacuum switch with display		□	□	■			□	■	■	□
Electronic vacuum switch					■	■				
Pressure sensor									■	□
Vacuum check-valve				■	■	■		■	■	
Automatic vacuum regulation (ASC) 				■	■	■		■	■	
M8 connections		□	■	■	■	■				
M12 connections							■	■	■	■
Island Assembly Available		■	■	■	■	■			■	
SMART SWAP Quick-mounting system									■	
Field bus EtherNet/IP™ / PROFINET						■				
IO-Link					■				■	□
NFC									■	□

■: Standard or integrated □: Option

## Energy Savings

COVAL is committed to making your vacuum handling system energy-efficient.

Our goal is to optimize the overall performance of your equipment by operating on the following three principles:

- Analyzing the system to identify the potential for savings.
- Selecting the most appropriate solution.
- Including COVAL energy-saving technologies, such as ASR and ASC, in our products.



### ASR (Air Saving Regulator)

A "venturi pressure regulator" that guarantees optimized operation at 3.5 bar.

Ideal for gripping of porous products or rough surfaces.

**Advantage:** Up to 40 % energy savings.



### ASC (Air Saving Control)

A vacuum regulation system that auto-adjusts to the product being handled.

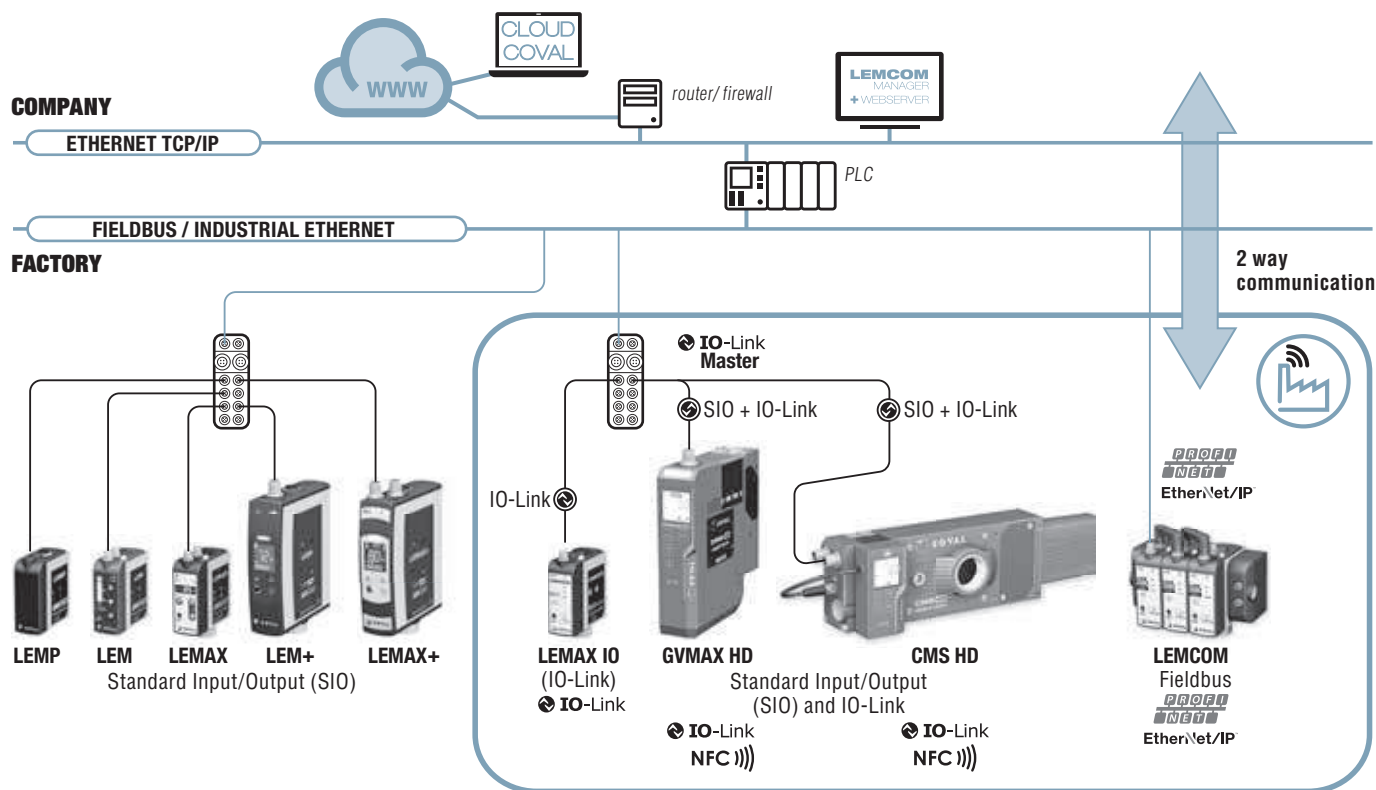
Ideal for gripping airtight products.

**Advantage:** Up to 90 % energy savings.



# COVAL's Family of Intelligent Vacuum Pumps

A vast **ecosystem of vacuum pumps** to meet all needs.  
From simple control to communication technologies designed for the industry of the future...



5

## Key points of communication technology



Communication interface with the machine

### Industrial Ethernet

- Supported buses: PROFINET, EtherNet/IP™.
- Direct connection to the machine's ethernet network.
- 2 cables for power and control of 1 to 16 vacuum pumps.



### IO-Link

- Compatible with all fieldbus and industrial ethernet networks (via IO-Link master).
- 3-wire connection.
- Easy maintenance thanks to the storage of parameters in the IO-Link master.



User communication interface

### LEMCOM Manager

- PC control software, configuration, and diagnostic software for the LEMCOM series, dedicated to "vacuum applications".



### WEB Server

- Embedded on the master modules of the LEMCOM series.
- Integrated into the commercial IO-Link master for the LEMAX IO/ GVMAX HD.
- Direct access to control, configuration, and diagnostic functions.

### Vacuum Manager App (NFC)

- Available on iOS and Android.
- Configuration and diagnosis of the GVMAX HD and CMS HD series.
- Uploading of operating data to the COVAL cloud.



### High resolution display

- LCD color display on GVMAX HD and CMS HD series.



# Vacuum Pumps Overview

## Vacuum Pump Range

5

### Micro Ejectors / Vacuum Cartridges

#### VR



- 5 models
- Nozzle Ø: 0.5 ; 0.7 ; 0.9 ; 1 ; 1.2 ; 1.4mm
- Suction flow rate: 7 to 64 NI/min
- Optimum supply pressure: 5 bar
- Weight between 20 and 45 g
- Silencer option

- Wide range
- Very compact
- Installed directly on the suction cups
- Excellent mechanical resistance
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

#### GVR



- 2 models
- Nozzle Ø: 0.9 ; 1 ; 1.2 ; 1.4 mm
- Suction flow rate: 21 to 64 NI/min
- Optimum supply pressure: 5 bar
- Weight 45 g
- Integrated silencer

- Very compact
- Installed directly on the suction cups
- Excellent mechanical resistance
- No clogging
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

#### CVP



- 2 sizes
- Nozzle Ø: 1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm
- Suction flow rate: 41 to 215 NI/min
- Optimum supply pressure: 5 to 5.5 bar
- Weight between 6 and 23 g

- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.
- Adaptable to all industries

#### CVPC



- 2 sizes
- Nozzle Ø: 1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm
- Suction flow rate: 41 to 215 NI/min
- Optimum supply pressure: 5 to 5.5 bar
- Weight: 22 g
- Control indicator light
- M8 connector

- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Integrated pilot control solenoid valve that controls the compressed air in order to regulate vacuum, ensuring high reactivity and thus a quick response time, meeting the requirements of ultra-fast pick & place applications.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.
- Adaptable to all industries

#### CBP



- Pilot solenoid valve 2/2-way
- Nominal flow rate at 6 bar: 355 NI/min
- Nominal diameter: 3 mm
- Control indicator light
- M8 connector

- Ultra-light and compact cartridge design allows for great flexibility and easy integration
- Electro-pneumatic control valve 2/2-way
- Blow-off control valve
- Single and multi-cartridge control valve.

### Vacuum Pumps without control

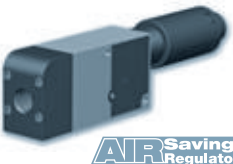
#### GVP



- Simple vacuum pumps
- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- Suction flow rate: 45 to 450 NI/min
- Optimum supply pressure: 4 bar
- Integrated silencer

- Modular design with interchangeable options
- Compact
- Optimized performance for handling all types of objects
- Silent operation
- No clogging
- Adaptable to all industries

#### GEMP



- Simple energy-saving vacuum pumps
- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate: 72 to 385 NI/min
- Integrated supply pressure regulator (ASR)
- Integrated silencer

- Very compact and light-weight
- Exceptional energy savings thanks to automatic pressure regulation at 4 bar
- Optimized performance for handling all types of objects
- Silent operation
- No clogging

#### GVEC

















- "Easy Clean" Vacuum Pumps
- Nozzle Ø: 1.5 ; 2.5 ; 3 mm
- Suction flow rate: 95 to 330 NI/min
- Optimum supply pressure: 4 bar
- Materials resistant to corrosion and compatible with food-processing sector

- Very compact and light-weight
- Ideal for applications needs frequent cleaning
- Use in washing or splashing zones
- No clogging



# Vacuum Pumps Overview

## Vacuum Pump Range

Intelligent Vacuum Pumps		
<b>LEMP</b>  	<ul style="list-style-type: none"> <li>■ Mini Vacuum Pumps without control with ASR (Air Saving Regulator)</li> <li>■ Nozzle Ø: 1; 1.2; 1.4 mm</li> <li>■ 2 vacuum levels: 60% and 85%</li> <li>■ Suction flow rate up to 92 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ With or without vacuum switch</li> <li>■ M8 connections</li> <li>■ Stand-alone or island module</li> </ul>	<ul style="list-style-type: none"> <li>■ For airtight and porous objects</li> <li>■ Ultra compact and lightweight</li> <li>■ Control panel for monitoring and adjustment</li> <li>■ Energy savings in all networks &gt; 4 bar</li> <li>■ Reduced wiring</li> <li>■ Reduced installation time</li> <li>■ Adaptable to all industries</li> </ul>
<b>LEM</b>  	<ul style="list-style-type: none"> <li>■ Integrated Mini Vacuum Pumps with ASR (Air Saving regulator)</li> <li>■ Nozzle Ø: 1; 1.2; 1.4 mm</li> <li>■ 2 vacuum levels: 60% and 85%</li> <li>■ Suction flow rate up to 92 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ All required functions integrated internally</li> <li>■ M8 connections</li> <li>■ Stand-alone or island module</li> </ul>	<ul style="list-style-type: none"> <li>■ For airtight and porous objects</li> <li>■ Ultra compact and lightweight</li> <li>■ Control panel for monitoring and adjustment</li> <li>■ Energy savings in all networks &gt; 4 bar</li> <li>■ Reduced wiring</li> <li>■ Reduced installation time</li> <li>■ Adaptable to all industries</li> </ul>
<b>LEMAX</b>  	<ul style="list-style-type: none"> <li>■ Integrated Mini Vacuum Pumps with ASC (Air Saving Control)</li> <li>■ Nozzle Ø: 1; 1.2; 1.4 mm</li> <li>■ Vacuum level: 85%</li> <li>■ Suction flow rate up to 70 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ Integrated vacuum regulation (ASC)</li> <li>■ All required functions integrated internally</li> <li>■ M8 connections</li> <li>■ Stand-alone or island module</li> </ul>	<ul style="list-style-type: none"> <li>■ For sealed or slightly porous parts</li> <li>■ Ultra compact and lightweight</li> <li>■ Control panel for monitoring and adjustment</li> <li>■ ASC = 75% to 90% energy savings</li> <li>■ Reduced wiring</li> <li>■ Reduced installation time</li> <li>■ Adaptable to all industries</li> </ul>
<b>LEMAX IO</b>   	<ul style="list-style-type: none"> <li>■ Mini Vacuum Pumps Communicating via Industrial Field Bus</li> <li>■ Nozzle Ø: 1; 1.2; 1.4 mm</li> <li>■ Vacuum level: 85%</li> <li>■ Suction flow rate up to 70 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ Integrated vacuum regulation (ASC)</li> <li>■ IO-Link</li> <li>■ M8 connections</li> <li>■ Stand-alone or island module</li> </ul>	<ul style="list-style-type: none"> <li>■ For sealed or slightly porous parts</li> <li>■ Ultra compact and lightweight</li> <li>■ Settings and diagnosis by remote monitoring.</li> <li>■ ASC = 75% to 90% energy savings</li> <li>■ Easy installation and operation thanks to the IO-Link communication interface</li> <li>■ Adaptable to all industries</li> </ul>
<b>LEMCOM</b>    EtherNet/IP™	<ul style="list-style-type: none"> <li>■ Mini Vacuum Pumps Communicating via Industrial Field Bus</li> <li>■ Nozzle Ø: 1; 1.2; 1.4 mm</li> <li>■ 2 vacuum levels: 60% and 85%</li> <li>■ Suction flow rate up to 92 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ Integrated vacuum regulation (ASC)</li> <li>■ Field bus: PROFINET, EtherNet/IP™</li> <li>■ M8 connections</li> <li>■ Stand-alone or island module</li> </ul>	<ul style="list-style-type: none"> <li>■ For sealed or slightly porous parts</li> <li>■ Ultra compact and lightweight</li> <li>■ Settings and diagnosis by remote monitoring.</li> <li>■ ASC = 75% to 90% energy savings</li> <li>■ Reduced wiring</li> <li>■ Reduced installation time</li> <li>■ Adaptable to all industries</li> </ul>
<b>LEM+</b>  	<ul style="list-style-type: none"> <li>■ Compact High Flow Vacuum Pumps with ASR (Air Saving Regulator)</li> <li>■ Nozzle Ø: 2; 2.5 mm</li> <li>■ 2 vacuum levels: 60% and 85%</li> <li>■ Suction flow rate up to 275 NI/min</li> <li>■ Integrated pressure regulator (ASR)</li> <li>■ All required functions integrated internally</li> <li>■ M12 connections</li> </ul>	<ul style="list-style-type: none"> <li>■ For airtight and porous objects</li> <li>■ Compact and lightweight</li> <li>■ Control panel for monitoring and adjustment</li> <li>■ Energy savings in all networks &gt; 4 bars</li> <li>■ Reduced wiring</li> <li>■ Reduced installation time</li> <li>■ Adaptable to all industries</li> </ul>



# Vacuum Pumps Overview

## Vacuum Pump Range

5

### Intelligent Vacuum Pumps

#### LEMAX+



AIR Saving Control

- Compact High Flow Vacuum Pumps with ASC (Air Saving Control)
- Nozzle Ø: 2 ; 2.5 mm
- Vacuum level: 85%
- Suction flow rate up to 200 NI/min
- Integrated pressure regulator (ASR)
- Integrated vacuum regulation (ASC)
- All required functions integrated internally
- M12 connections

- For sealed or slightly porous parts
- Compact and lightweight
- Control panel for monitoring and adjustment
- ASC = 75% to 90% energy savings
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

#### GVMAX HD



AIR Saving Control

NFC )))

IO-Link

- Heavy Duty Communicating Vacuum Pumps
- Nozzle Ø: 2.5 ; 3 mm
- Vacuum level: 85%
- Suction flow rate up to 230 NI/min
- Integrated vacuum regulation (ASC)
- Standard In/Out (SIO) and IO-Link
- NFC
- M12 connections
- Standalone vacuum pumps or in island assemblies

- For sealed or slightly porous parts
- High visibility color display with clear multi-lingual messages and straightforward settings menu
- ASC = 75% to 90% energy savings
- Easy installation and operation thanks to the IO-Link communication interface
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application
- Adaptable to all industries

#### CMS HD



NFC ))) IO-Link

- Heavy Duty Communicating Vacuum Pumps
- 3 powerful suction flow rates from 700 NI/min to 1600 NI/min
- Vacuum level: 80%
- With or without vacuum and blow-off control
- M12 connections
- Digital inputs/outputs mode (SIO)/ IO-Link
- NFC
- 3 exhaust configurations

- For airtight and porous objects
- High visibility color display with clear multi-lingual messages and straightforward settings menu
- Easy installation and operation thanks to the IO-Link communication interface
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application
- Adaptable to all industries

### Air Amplifiers

#### M--C



- Operating principle based on the COANDA effect
- Bore diameter (Ø): 6, 10, 20, 30, 40 mm
- Flow rate: between 200 and 5000 NI/min depending on the supply pressure (between 1.5 and 6 bar)
- Body material: aluminum

- Recommended for gripping light-weight, porous products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, light-weight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers

#### MD



- Operating principle based on the COANDA effect
- Bore diameter (Ø): 26,6 and 38,1 mm
- Flow rate: between 2015 and 4370 NI/min depending on the supply pressure (between 3 and 5 bar)
- Body material: aluminum

- Recommended for gripping lightweight, porous products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers

#### TVM



- Pipes for Air Amplifiers
- Flexible polyurethane hose with steel spiral reinforcement.
- 4 sizes available: Ø 25, 40, 50 and 60 mm
- Anti-static properties according to DIN 53486

- Commonly used with COVAL air amplifiers (M--C series)
- High resistance to abrasion, cutting lubricant and UV rays



# Vacuum Pumps Overview

## Evacuation Time

### Evacuation time in seconds per liter

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	85 %
VR05	0.92	1.96	3.18	4.63	6.38	8.79	12.17	18.96	27.39
VR07	0.46	0.98	1.58	2.28	3.13	4.27	5.8	8.55	11.01
VR09	0.31	0.65	1.05	1.52	2.09	2.85	3.87	5.7	7.34
VR10	0.24	0.51	0.82	1.18	1.62	2.21	3.01	4.43	5.71
GVR09S	0.31	0.65	1.05	1.52	2.09	2.85	3.88	5.7	7.34
GVR10	0.24	0.51	0.82	1.18	1.62	2.21	3.01	4.43	5.71
VR12	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
GVR12	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
VR14	0.1	0.21	0.34	0.5	0.68	0.93	1.27	1.85	2.44
GVR14	0.1	0.21	0.34	0.5	0.68	0.93	1.27	1.85	2.44
GVP12N	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
GVP15N	0.09	0.20	0.32	0.46	0.63	0.85	1.16	1.71	2.20
GVP20N	0.06	0.12	0.19	0.28	0.38	0.52	0.71	1.04	2.13
GVP25N	0.03	0.07	0.11	0.16	0.22	0.30	0.41	0.60	0.77
GVP30N	0.02	0.05	0.08	0.12	0.17	0.23	0.31	0.45	0.58

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %
GVP12T	0.1	0.22	0.37	0.55	0.78	1.16	1.92
GVP15T, GVEC15T	0.07	0.15	0.24	0.36	0.52	0.77	1.27
GVP20T	0.04	0.09	0.14	0.22	0.31	0.46	0.76
GVP25T, GVEC25T	0.03	0.06	0.1	0.14	0.21	0.3	0.5
GVP30T, GVEC30T	0.02	0.04	0.07	0.1	0.15	0.22	0.37

% vacuum	10 %	20 %	30 %	35 %	40 %	45 %
GVP12X	0.05	0.11	0.22	0.33	0.62	0.62
GVP15X	0.04	0.09	0.15	0.2	0.27	0.39
GVP20X	0.03	0.06	0.11	0.15	0.19	0.28
GVP25X	0.02	0.04	0.08	0.1	0.14	0.19
GVP30X	0.01	0.03	0.06	0.08	0.11	0.15

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	85 %
GEMP60x12	0.09	0.2	0.35	0.55	0.9	-	-	-	-
GEMP60x15	0.06	0.14	0.23	0.36	0.59	-	-	-	-
GEMP60x20	0.04	0.08	0.13	0.21	0.34	-	-	-	-
GEMP60x25	0.03	0.05	0.09	0.14	0.24	-	-	-	-
GEMP60x30	0.01	0.04	0.07	0.10	0.17	-	-	-	-
GEMP90x12	0.13	0.27	0.44	0.64	0.88	1.19	1.62	2.37	3.12
GEMP90x15	0.09	0.18	0.29	0.42	0.58	0.79	1.08	1.59	2.08
GEMP90x20	0.05	0.11	0.18	0.25	0.35	0.46	0.65	0.95	1.25
GEMP90x25	0.03	0.07	0.11	0.16	0.22	0.3	0.41	0.59	0.78
GEMP90x30	0.03	0.06	0.09	0.13	0.18	0.24	0.33	0.48	0.64

% vacuum	30 %	35 %	40 %	45 %	50 %	55 %
LEM/LEMP 60X10	0.66	0.83	1.04	1.31	1.70	2.35
LEM/LEMP 60X12	0.41	0.52	0.66	0.83	1.07	1.49
LEM/LEMP 60X14	0.27	0.34	0.43	0.54	0.70	0.97
LEM60X20	-	0.16	-	0.27	-	0.42
LEM60X25	-	0.11	-	0.18	-	0.31



# Vacuum Pumps Overview

## Evacuation Time and Weight of Vacuum Pumps

### Evacuation time in seconds per liter (cont.)

% vacuum	55 %	60 %	65 %	70 %	75 %	80 %
LEM/LEMP/LEMAX/LEMAXIO 90X10	1.76	2.04	2.38	2.80	3.33	4.09
LEM/LEMP/LEMAX/LEMAXIO 90X12	1.13	1.31	1.53	1.80	2.15	2.64
LEM/LEMP/LEMAX/LEMAXIO 90X14	0.73	0.85	0.99	1.16	1.38	1.70
LEM/LEMAX 90X20	0.38	-	0.55	-	0.80	-
LEM/LEMAX 90X25	0.26	-	0.35	-	0.50	-

% vacuum	45 %	55 %	65 %	75 %
GVMAXHD90X25	0.17	0.24	0.35	0.52
GVMAXHD90X30	0.15	0.20	0.27	0.42

% vacuum	45 %	55 %	65 %	75 %
CMSHD90X50	0.10	0.18	0.30	0.60
CMSHD90X100	0.07	0.10	0.16	0.30
CMSHD90X150	0.05	0.08	0.13	0.24

5

### Weight of micro/mini-ejectors in grams

Model	Nozzle size (mm)							
	0.5	0.7	0.9	1.0	1.2	1.4	1.5	2.0
VR	20.7	20.5	20.2	45.4	45.4	45.4	-	-
GVR	20.7	20.5	20.2	45.4	45.4	45.4	-	-

### Weight of vacuum pumps in grams

Model	Nozzle size (mm)				
	1.2	1.5	2.0	2.5	3.0
GVEC	-	33	-	139	159
GVP	100	110	160	180	265
GEMP	maximum weight 265				

Model	Nozzle size (mm)				
	1.0	1.2	1.4	2.0	2.5
LEMP	90 to 110 g, depending on the model.			-	-
LEM	90 to 120 g, depending on the model.			-	-
LEM+	-	-	-	410 to 460 g, depending on the model.	
LEMAX	100 to 130 g, depending on the model.			-	-
LEMAXIO	130 g			-	-
LEMAX+	-	-	-	410 to 460 g, depending on the model.	
LEMCOM	150 g			-	-

Model	Nozzle size (mm)				
	1.2	1.5	2.0	2.5	3.0
GVMAX HD	-	-	-	870 g	

Model	Without control	With control
CMSHD--50/100	645 g	890 g
CMSHD--150	1330 g	1575 g



# Micro Ejectors / Vacuum Cartridges

## Chapter 6

### VR



#### Heavy-duty in-Line Ejectors

- 5 models
- Nozzle Ø:  
0.5 ; 0.7 ; 0.9 ; 1 ; 1.2 ; 1.4 mm
- Suction flow rate: 7 to 64 NI/min
- Optimum supply pressure: 5 bar
- Weight between 20 and 45 g
- Silencer option
- Wide range
- Very compact
- Direct installation on suction cups
- Excellent mechanical resistance
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

**P** 6/2

### GVR



#### Heavy-duty in-Line Ejectors

- 2 models
- Nozzle Ø:  
0.9 ; 1 ; 1.2 ; 1.4 mm
- Suction flow rate:  
21 to 64 NI/min
- Optimum supply pressure: 5 bar
- Weight: 45 g
- Integrated silencer
- Very compact
- Direct installation on suction cups
- Excellent mechanical resistance
- No clogging
- Reduced gripping time
- Blow-off option
- Extended suction flow rate range
- Silent operation
- Adaptable to all industries

**P** 6/6

### CVP



#### Vacuum Cartridges

- 2 sizes
- Nozzle Ø:  
1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm
- Suction flow rate:  
41 to 215 NI/min
- Optimum supply pressure:  
5 to 5.5 bar
- Weight between 6 and 23 g
- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.
- Adaptable to all industries

**P** 6/8

### CVPC



#### Controlled Vacuum Cartridges

- 2 sizes
- Nozzle Ø:  
1.2 ; 1.4 ; 1.6 ; 2.2 ; 2.7 mm
- Suction flow rate:  
41 to 215 NI/min
- Optimum supply pressure:  
5 to 5.5 bar
- Weight: 22 g
- Control indicator light
- M8 connector
- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Integrated pilot control solenoid valve that controls the compressed air in order to regulate vacuum, ensuring high reactivity and thus a quick response time, meeting the requirements of ultra-fast pick & place applications.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.
- Adaptable to all industries

**P** 6/12

### CBP



#### Pilot Control Cartridge

- Pilot solenoid valve 2/2-way
- Nominal flow rate at 6 bar:  
355 NI/min
- Nominal diameter: 3 mm
- Control indicator light
- M8 connector
- Ultra-light and compact cartridge design allows for great flexibility and easy integration
- Electro-pneumatic control valve 2/2-way.
- Blow-off control valve
- Single and multi-cartridge control valve.

**P** 6/16



# VR 05, 07, 09

## Heavy-duty In-line Ejectors

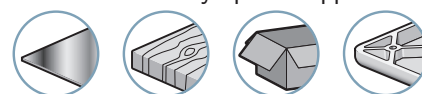
The main advantage of the VR series in-line ejectors is that they can be mounted directly on the suction cup, which simplifies plumbing.

By integrating the ejector on the suction cup, we obtain a localized vacuum and, therefore, the possibility of obtaining multiple independent grips, even in the absence of objects.

It is also possible to supply vacuum to two or more suction cups using a G1/8" or G1/4" T-shaped fitting.



Industry-specific applications



### Advantages

- Wide range
- Adaptable to all industries
- Lightweight and compact
- Reduced gripping time
- Direct installation on suction cups
- Excellent mechanical resistance
- Blow-off option
- Extended range of suction flow rates
- No clogging
- Silent operation

### Characteristics

Model	Ø Nozzle	Air consumed (NI/min)	Maximum vacuum (%)	Air drawn in (NI/min)	At air pressure (bar)
VR 05	0.5	12	87	7	5
VR 07	0.7	21	90	14	5
VR 09	0.9	36	90	21	5

Note: All dimensions are in mm

### Evacuation Time in Seconds per Liter

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	85 %
VR05	0.92	1.96	3.18	4.63	6.38	8.79	12.17	18.96	27.39
VR07	0.46	0.98	1.58	2.28	3.13	4.27	5.8	8.55	11.01
VR09	0.31	0.65	1.05	1.52	2.09	2.85	3.87	5.7	7.34

### Specifications

Supply	Non-lubricated filtered air, pressure 2 to 6 bar
Optimum operating pressure	5 bar
Weight	20 g
Material	2017A - Cu Zn
Temperature	0 to 80 °C.



**When ordering, please specify:**  
**Model + Nozzle diameter + Vacuum outlet**  
e.g.: VR07M6

1: Model	2: Ø Nozzle	3: Vacuum outlet
VR	05 Ø 0.5 mm	M6 M6 Female
	07 Ø 0.7 mm	M18 G1/8" Male
	09 Ø 0.9 mm	M14 G1/4" Male
		F18 G1/8" Female
		F14 G1/4" Female

### Additional Information

#### Mounting on spring systems

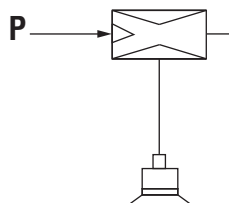
- Spring system, series TS3, available strokes: 10, 30, 50, 70mm, page 4/4.
- TSOP-TSOG series anti-rotation spring system, pages 4/6 and 4/7.
- Ball-joint systems, IMU series, page 4/12.

#### Customized on request

- Alternate material option: stainless steel or plastic, based on specifications.
- Special characteristics such as suction flow rate or vacuum level.
- On request for the F18 model, M5 ancillary vacuum fitting for connection of a vacuum switch.

#### New function

- Silencer option: (ref. SILGV10M5F)
- Vacuum or blow-off switch, on request.





# VR 05, 07, 09

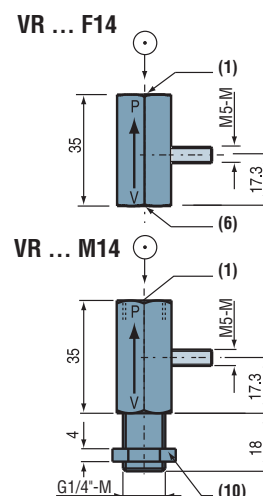
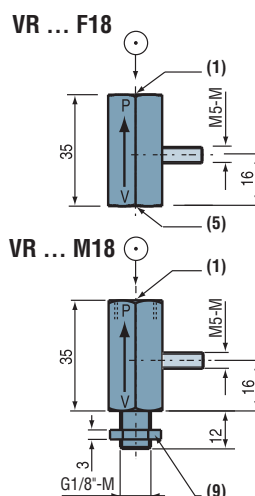
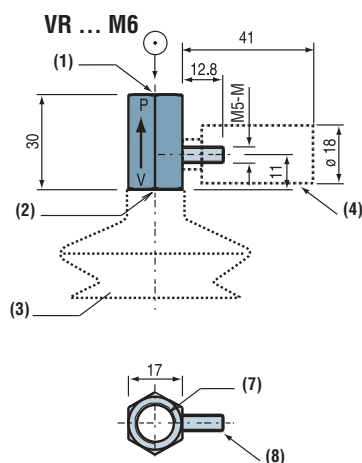
## Heavy-duty In-line Ejectors

### Dimensions and Data Curves



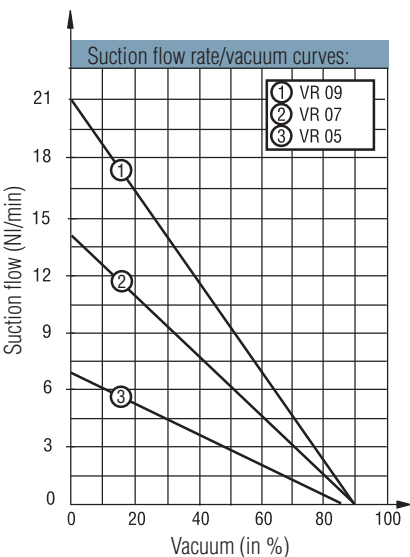
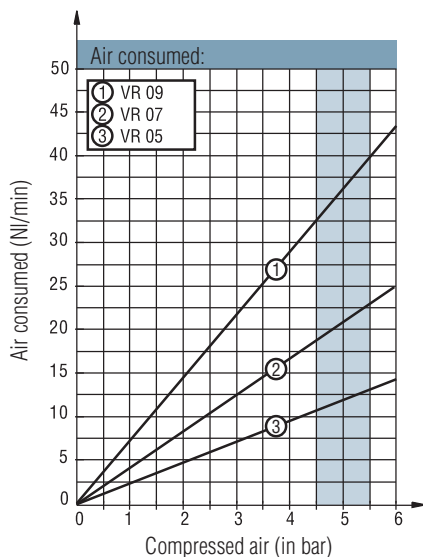
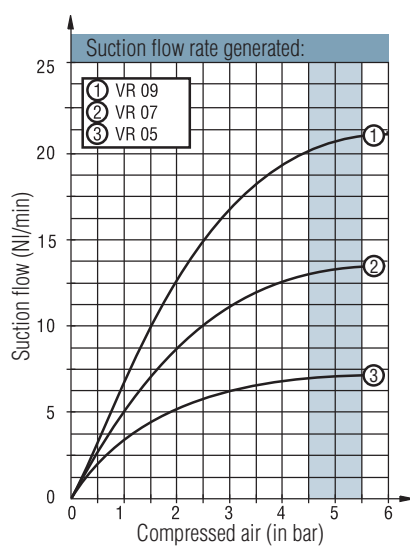
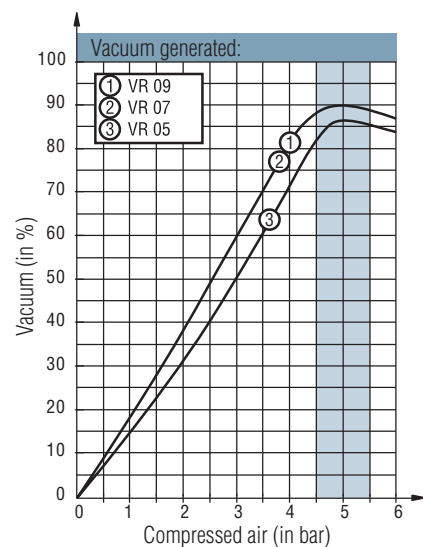
#### Dimensions

- (1) G1/4"-F C.A. inlet, depth 10 mm
- (2) M6-F vacuum outlet, depth 6 mm
- (3) Example of suction cup
- (4) Silencer
- (5) G1/8"-F vacuum outlet, depth 7.5 mm
- (6) G1/4"-F vacuum outlet, depth 10 mm
- (7) Compressed air
- (8) Exhaust
- (9) Hexagonal nut, 14 across flats
- (10) Hexagonal nut, 19 across flats



Note: All dimensions are in mm

#### Data Curves





# VR 10, 12, 14

## Ejector Fittings

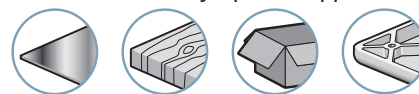


Based on the same principle as the VR 05, 07, 09, the main advantage of the VR 10, 12, 14 series is that they can be mounted directly on larger suction cups due their optimum technical characteristics.

The aluminum design guarantees:

- Excellent mechanical resistance
- Lightweight
- Ideal for miscellaneous gripping.

Industry-specific applications



### Advantages

- Wide range
- Adaptable to all industries
- Lightweight and compact
- Reduced gripping time
- Direct installation on suction cups
- Excellent mechanical resistance
- Blow-off option
- Extended range of suction flow rates
- No clogging
- Silent operation

### Characteristics

Model	Ø nozzle	Air consumed (Nl/min)	Maximum vacuum (%)	Air drawn in (Nl/min)	At air pressure (bar)
VR 10	1	44	90	27	5
VR 12	1.2	67	90	45	5
VR 14	1.4	108	90	64	5

Note: All dimensions are in mm

### Evacuation Time in Seconds per Liter

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	85 %
VR 10	0.24	0.51	0.82	1.18	1.62	2.21	3.01	4.43	5.71
VR 12	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
VR 14	0.1	0.21	0.34	0.5	0.68	0.93	1.27	1.85	2.44

### Specifications

Supply	Non-lubricated filtered air, pressure 2 to 6 bar
Optimum operating pressure	5 bar
Weight	50 g
Material	2017A - Cu Zn
Temperature	0 to 80 °C.



When ordering, please specify:

Model + Nozzle diameter + Vacuum outlet + Silencer  
e.g.: VR12M14S

1: Model	2: Ø Nozzle	3: Vacuum outlet	4: Silencer
VR	10 Ø 1 mm 12 Ø 1.2 mm 14 Ø 1.4 mm	M14 G1/4" Male	S SILGV 10 K SILK 18 C <sup>(1)</sup>

(1) SILK 18 C through-type silencer dimensions, see page 11/11.

### Additional Information

#### As standard

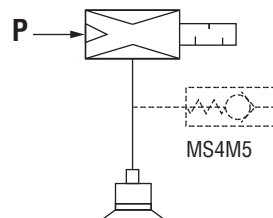
- New functions: vacuum switch or blow-off switch with or without silencer (SILGV 10).

#### Optional

- MS2M5 or MS4M5 blow-off valves with no-return valve on vacuum (see page 11/4).

#### Special

- Coval offers the product best adapted to your needs based on your specifications, and advises you according to your applications (material, shape, special technical characteristics).





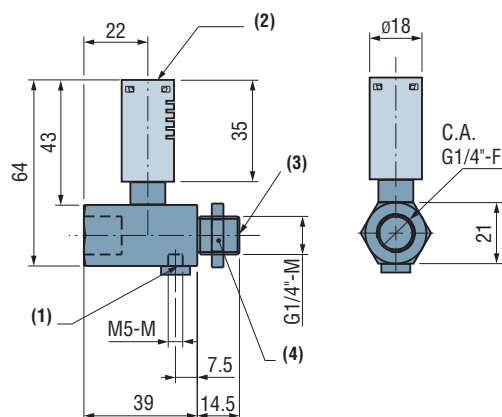
# VR 10, 12, 14

## Ejector Fittings

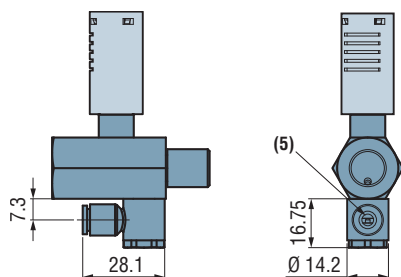
### Dimensions and Data Curves



#### Dimensions

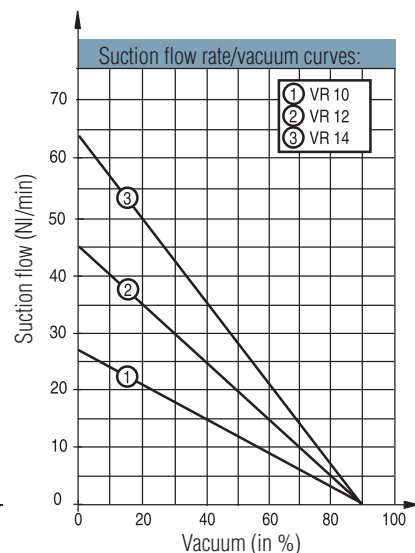
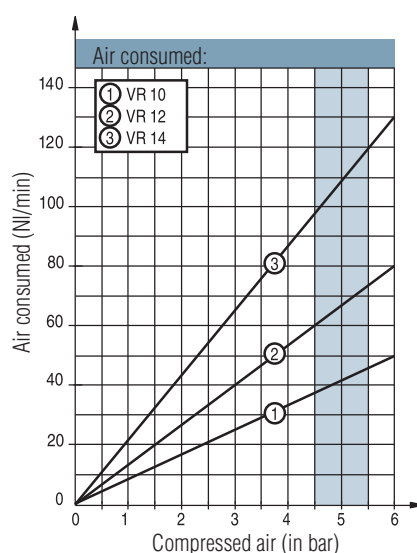
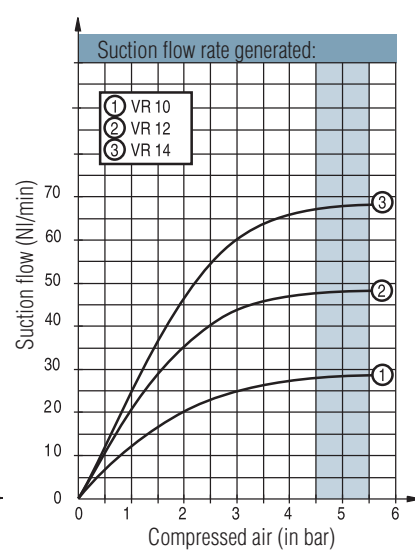
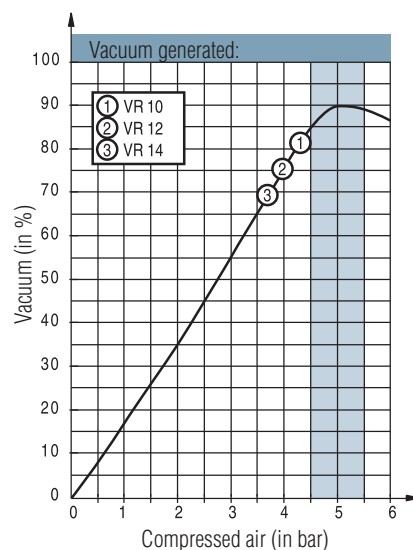


#### VR + MS4M5 version



- (1) Blow-off or vacuum switch
- (2) Silencer
- (3) Vacuum
- (4) Hexagonal nut, 19 across flats
- (5) Push fitting, external Ø 6

#### Data Curves



Note: All dimensions are in mm



# GVR 09, 10, 12, 14

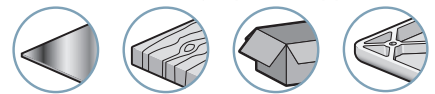
## Micro Ejectors



The GVR range is designed for an industrial environment:

- Compact
- Lightweight
- Optimized technical characteristics
- Pollution-resistant with its through-type silencer (SILK 18C)
- Easily integrated onto vacuum gripper
- Pass-through mounting using M10 screws (GVR09)

Industry-specific applications



### Advantages

- Adaptable to all industries
- Lightweight and compact
- Reduced gripping time
- Direct installation on suction cups
- Excellent mechanical resistance
- Blow-off option
- No clogging
- Silent operation

### Additional Information

#### As standard

- Vacuum switch or blow-off switch with SILGV 10. SILK18C silencer (through-type) on request.

#### Optional

- MS2M5 or MS4M5 blow-off valves with non-return valve on vacuum (see page 11/4).

### Characteristics

Models	Ø nozzle	Air consumed (NI/min)	Maximum vacuum (%)	Air drawn in (NI/min)	At air pressure (bar)
GVR 09	0.9	36	85	21	5
GVR 10	1	44	85	27	5
GVR 12	1.2	67	85	45	5
GVR 14	1.4	108	85	64	5

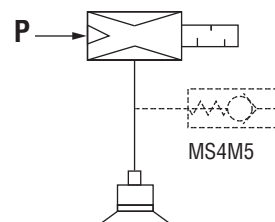
Note: All dimensions are in mm

### Evacuation Time in Seconds per Liter

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %	80 %	85 %
GVR 09	0.31	0.65	1.05	1.52	2.09	2.85	3.87	5.7	7.34
GVR 10	0.24	0.51	0.82	1.18	1.62	2.21	3.01	4.43	5.71
GVR 12	0.14	0.3	0.49	0.71	0.97	1.33	1.81	2.66	3.42
GVR 14	0.1	0.21	0.34	0.5	0.68	0.93	1.27	1.85	2.44

### Specifications

Supply	Non-lubricated filtered air, pressure 2 to 6 bar
Optimum operating pressure	5 bar
Weight	40 g
Material	2017A - Cu Zn
Temperature	0 to 80 °C.



**When ordering, please specify:**  
Model + Nozzle diameter + Silencer  
e.g.: GVR12K

1: Model	2: Ø nozzle	3: Silencer
GVR	09 Ø 0.9 mm 10 Ø 1 mm 12 Ø 1.2 mm 14 Ø 1.4 mm	- Without S SILGV 10 K SILK 18 C <sup>(1)</sup>

(1) SILK 18 C through-type silencer dimensions, see page 11/11.



# GVR 09, 10, 12, 14

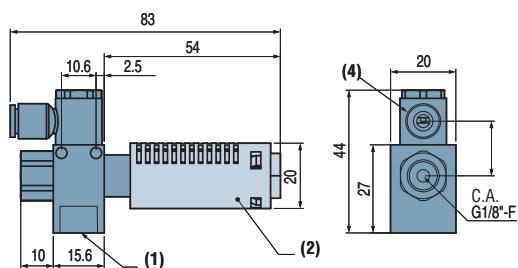
## Micro Ejectors

### Dimensions and Data Curves

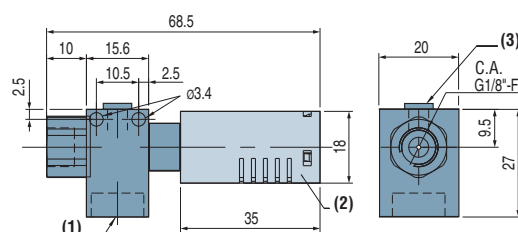


#### Dimensions

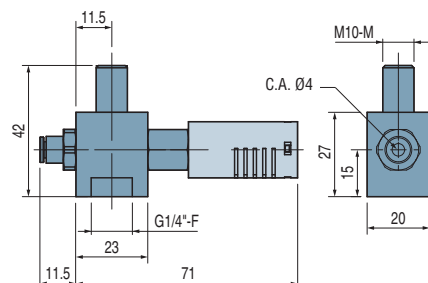
##### GVR 10, 12, 14 + MS4M5



##### GVR 10, 12, 14

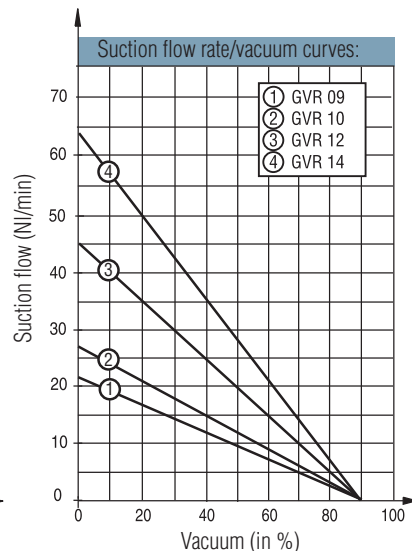
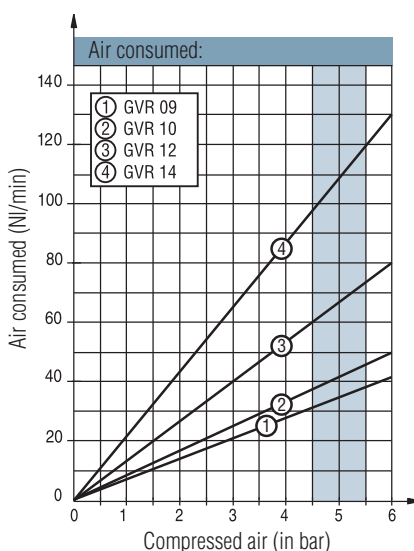
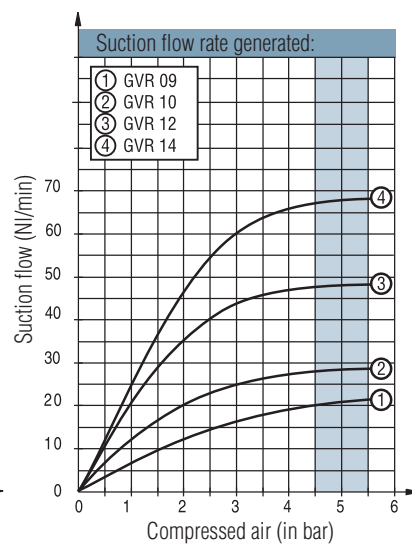
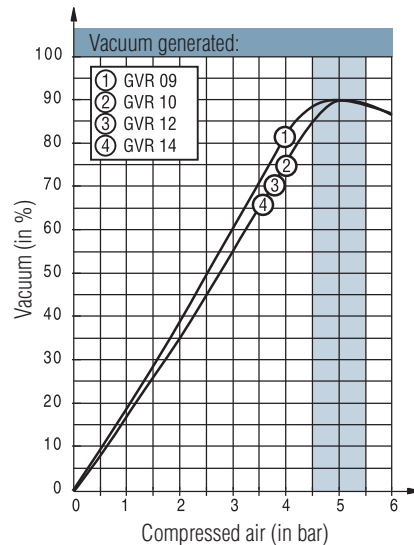


##### GVR 09



- (1) Vacuum G1/4"-F
- (2) Silencer
- (3) M5-F plug for vacuum switch
- (4) Push fitting, outside Ø 6

#### Data Curves



Note: All dimensions are in mm



Owing to their compact size and light weight, the **CVP** Series vacuum cartridges can be used to easily install a simple and reliable vacuum generation system as close to the application as possible.

They meet the flexibility, customization and performance needs of machine manufacturers and integrators of robotic solutions, who wish to easily design flexible, modular and efficient gripping tools.

**CVP** Series vacuum cartridges are suitable for a broad variety of applications and are available in different sizes and suction capacities:

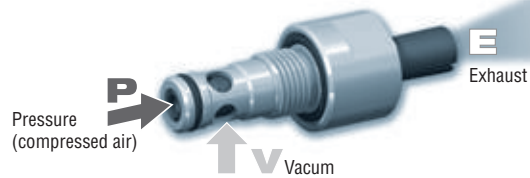
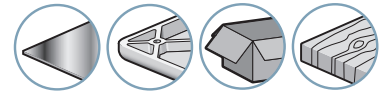
- Size 1: nozzle dia. 1.2, 1.4 and 1.6 mm generating a suction flow rate ranging from 41 to 90 NI/min. Max. vacuum 85%.
- Size 2: nozzle dia. 2.2 and 2.7 mm generating a suction flow rate ranging from 160 to 215 NI/min. Max. vacuum 85%.

#### Advantages

- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.



Industry-specific applications



#### SIZE 1

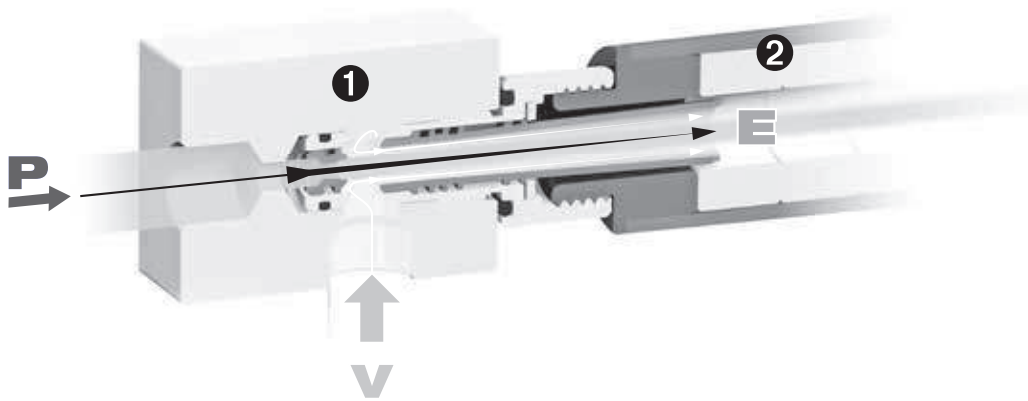
Nozzle dia. 1.2, 1.4 or 1.6 mm



#### SIZE 2

Nozzle dia. 2.2 or 2.7 mm

#### Compact integration



- ① Single-stage Venturi (nozzle + mixer system) ② Option: non-clogging through-type silencer

The CVP Series vacuum cartridges include a single-stage Venturi that uses compressed air to generate a powerful vacuum, thus guaranteeing short evacuation times.

The single-stage technology, consisting of a nozzle and a mixer, works without any moving parts, is dust resistant and maintenance-free.







# CVP

## Vacuum Cartridges

### Implementation, Applications



#### Implementation

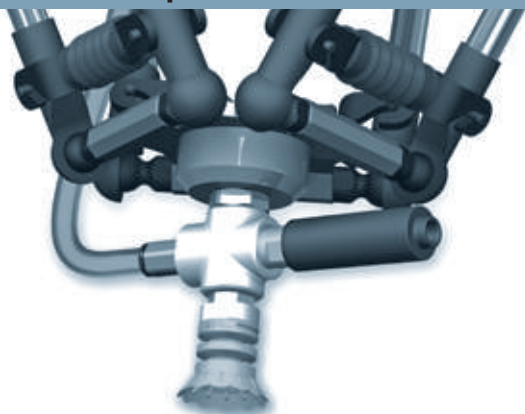
- 1  2 
  - 3  4 
1. Recess is machined to integrate the cartridge
2. Vacuum cartridge is installed.
3. Peripheral equipment is assembled.
4. Pneumatic connections are established for use.



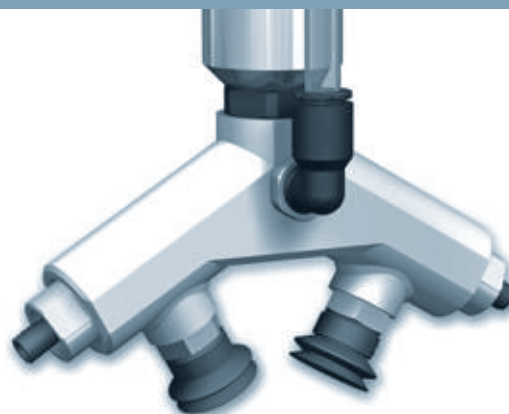
**3D**  
**COVAL**  
**Data**

You will find the 3D files of the cartridges as well as the specifications of the machining operations to be carried out on our website [www.coval.com](http://www.coval.com)

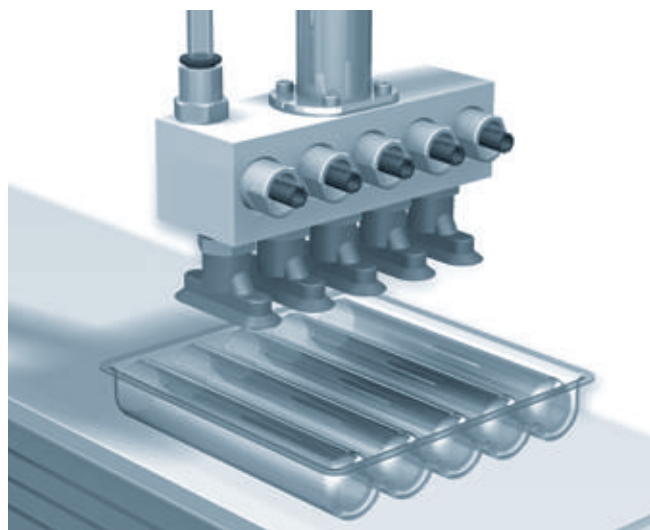
#### Application examples



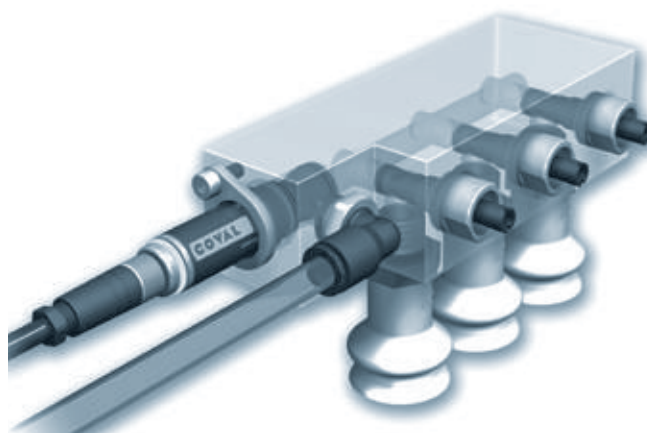
- 1 CVP series vacuum cartridge, with silencer
- 1 FPC series FlowPack suction cup



- 2 CVP series vacuum cartridges
- 2 VSAJ series soft and flexible suction cups



- 5 CVP series vacuum cartridges
- 5 VPO series oblong suction cups



- 1 CBP series multi-cartridge control valve
- 3 CVP series vacuum cartridges
- 3 MVS series soft and flexible suction cups

6

CVP



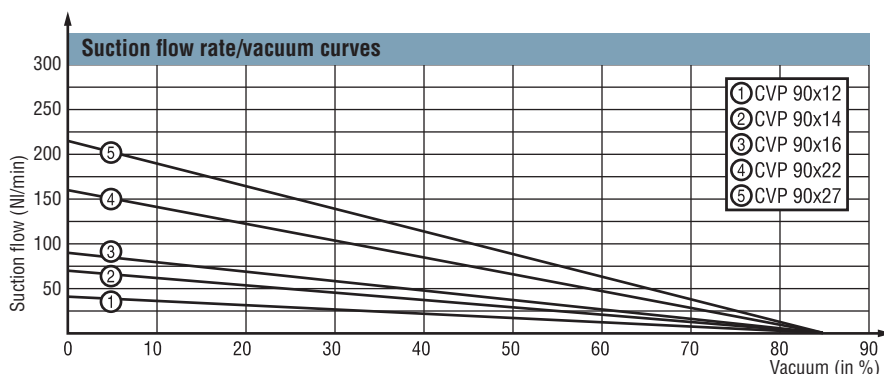
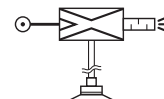
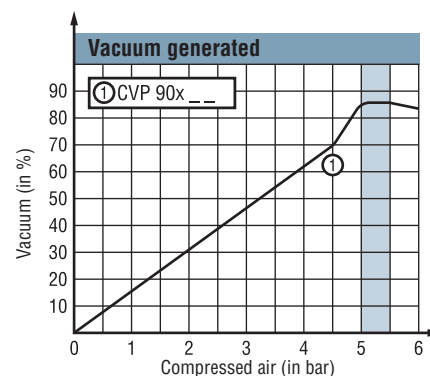
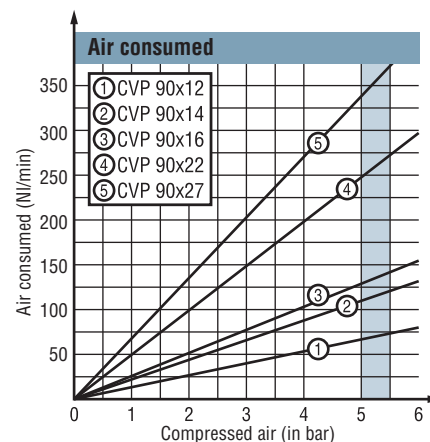


#### Characteristics

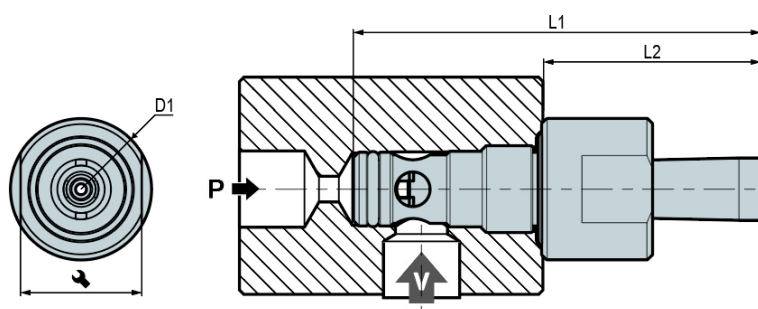
Model	Ø nozzle (mm)	Air consumed (NI/min)	Maximum vacuum (%)	Air drawn in (NI/min)	At optimal air pressure (bar)
CVP90x12	1.2	70	85	41	5 to 5.5
CVP90x14	1.4	115	85	70	5 to 5.5
CVP90x16	1.6	135	85	90	5 to 5.5
CVP90x22	2.2	260	85	160	5 to 5.5
CVP90x27	2.7	355	85	215	5 to 5.5

#### Evacuation time in seconds per liter

% vacuum	20	30	40	50	60	70	80
CVP90x12	0.31	0.53	0.83	1.25	1.91	3.23	6.14
CVP90x14	0.21	0.35	0.55	0.83	1.27	2.14	4.16
CVP90x16	0.15	0.25	0.38	0.57	0.83	1.35	2.63
CVP90x22	0.07	0.11	0.17	0.25	0.37	0.58	1.07
CVP90x27	0.05	0.08	0.12	0.18	0.26	0.44	0.8



#### Dimensions



Model	D1	L1	L2	Wrench
CVP90X12	16	34.2	12.5	14
CVP90X14	16	41.1	19.4	14
CVP90X16	16	46.6	24.9	14
CVP90X22	25	73.4	32.9	22
CVP90X27	25	85.3	44.8	22

Note: All dimensions are in mm

#### Overall characteristics

- C.A. supply 5µ filtered, non-lubricated air relevant to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar. (Optimal at 5 to 5.5 bar.)
- Max. vacuum: 85%.
- Suction flow rate: 41 to 215 NI/min depending on model.
- Air consumption: 70 to 355 NI/min depending on model.
- Operating temperature: from 0 to 50 °C.
- Weight : • size 1 : 6 g  
• size 2 : 23 g.
- Materials : PA 6-6 15 % GF, aluminum, NBR.
- Noise level with silencer (option K):
  - CVP90X12K: 54 dBA
  - CVP90X14K: 59 dBA
  - CVP90X16K: 64 dBA
  - CVP90X22K: 67 dBA
  - CVP90X27K: 75 dBA





#### To place an order

CVP				12		K	
VACUUM LEVEL	90	X					
85% max. vacuum	90						
				NOZZLE DIAMETER		THROUGH-TYPE SILENCER	
				1.2 mm nozzle Ø	12	Without	
				1.4 mm nozzle Ø	14	With silencer	
				1.6 mm nozzle Ø	16		
				2.2 mm nozzle Ø	22		
				2.7 mm nozzle Ø	27		

#### Through-type silencers - option K

- Lateral noise absorption on sound-absorbing material.
- Unrestricted exhaust without pressure loss or clogging.
- Average sound attenuation of 20 dBA.

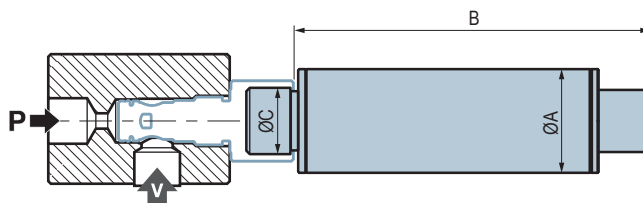
→ Silencer for **CVP size 1**  
(CVP90X12K/CVP90X14K/CVP90X16K)

- **G1/4"-M** silencer
  - Materials: - aluminum thread
  - PA6 tube, 30% GF

→ Silencer for **CVP size 2**  
(CVP90X22K/CVP90X27K)

- **G1/2"-M** silencer
  - Material: - polycarbonate, 30% GF

Model	ØA	B	ØC	Weight (g)
Silencer for size 1	20	68	G1/4"-M	25
Silencer for size 2	30	121	G1/2"-M	92



#### Controlled blow-off / multi-cartridge control valve

In addition to the CVP vacuum cartridges, COVAL has developed a CBP series pilot control valve used to provide equipment with a controlled blow-off function or to pneumatically control one or several CVP series vacuum cartridges.

→ See **CBP** Series, page 6/16.



The ultra-compact and light **CVPC** Series controlled vacuum cartridges are used to effortlessly install a vacuum generation system equipped with an electric control, as close to the corresponding application as possible. They perfectly meet the flexibility, customization and performance needs of machine manufacturers and integrators of robotic solutions, who want to easily design flexible, modular and efficient gripping tools.

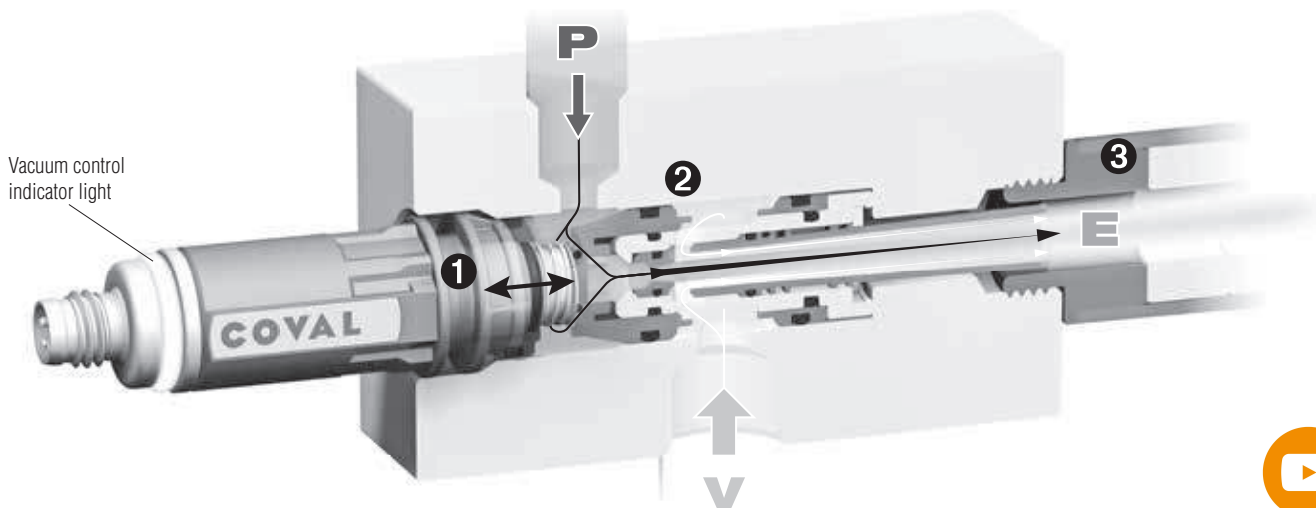
**CVPC** Series controlled vacuum cartridges are suitable for a broad variety of applications and are available in different sizes and suction capacities:

- Size 1: nozzle dia. 1.2, 1.4 and 1.6 mm generating a suction flow rate ranging from 41 to 90 NI/min. Max. vacuum 85%.
- Size 2: nozzle dia. 2.2 and 2.7 mm generating a suction flow rate ranging from 160 to 215 NI/min. Max. vacuum 85%.

#### Advantages

- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Integrated pilot control solenoid valve reduces response times.
- Vacuum technology: powerful single-stage Venturi that is dust resistant and maintenance-free.

#### Compact integration



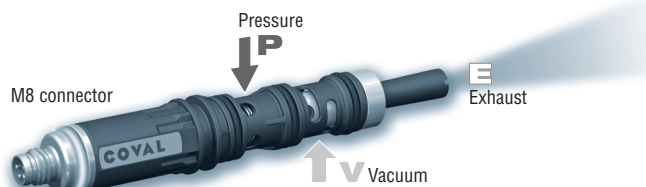
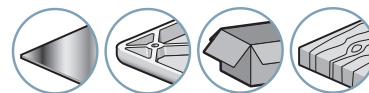
- ① Solenoid valve. ② Single-stage Venturi (nozzle + mixer system). ③ Option: non-clogging through-type silencer.

The innovative and patented design of the **CVPC** Series controlled vacuum cartridges combines two integrated functions:

- A single-stage Venturi that uses compressed air to generate a powerful vacuum, thus guaranteeing short evacuation times. The single-stage technology, consisting of a nozzle and a mixer, works without any moving parts, is dust resistant and maintenance-free.



Industry-specific applications



#### SIZE 1

Nozzle dia. 1.2, 1.4 or 1.6 mm



#### SIZE 2

Nozzle dia. 2.2 or 2.7 mm



- An electro-pneumatic valve that controls compressed air in order to regulate vacuum, ensuring high reactivity and thus a quick response time, meeting the requirements of ultra-fast pick & place applications.





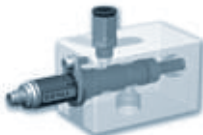
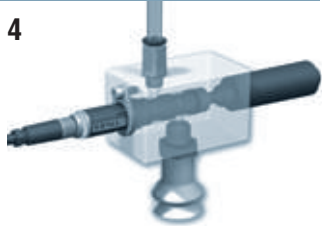
# CVPC

## Controlled Vacuum Cartridges

### Implementation, Applications



#### Implementation

- |   |   |  |   |
|---|---|--|---|
| <p><b>1</b></p>  | <p><b>2</b></p>                      | <p><b>3</b></p>  | <p><b>4</b></p>  |
| <p>1. Recess is machined to integrate the cartridge.</p>  | <p>2. Vacuum cartridge is installed. Two mounting solutions are available: flange or threaded ring (see p. 6/15).</p> | <p>3. Peripheral equipment is assembled.</p>   | <p>4. Pneumatic and electrical connections are established for use.</p>                             |



You will find the 3D files of the cartridges as well as the specifications of the machining operations to be carried out on our website [www.coval.com](http://www.coval.com)

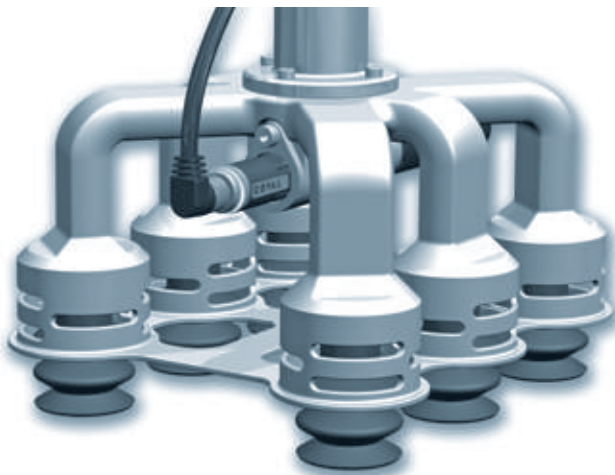
#### Application examples



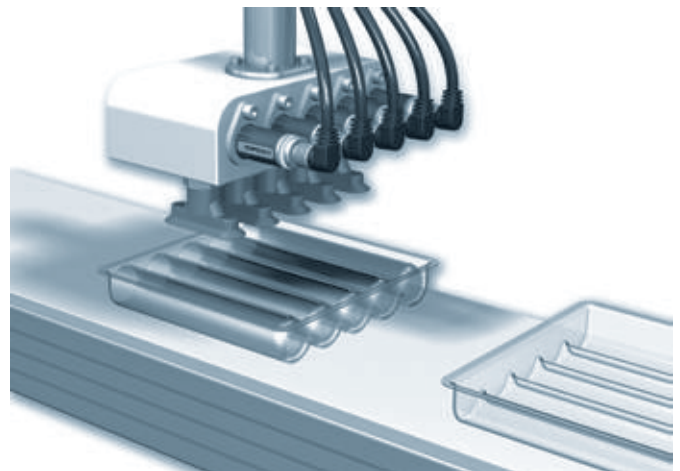
- 1 CVPC series controlled vacuum cartridge
- 1 CBP series controlled blow-off cartridge
- 1 PSK series miniature electronic vacuum switch
- 1 FPC series FlowPack suction cup



- 1 CVPC series controlled vacuum cartridge
- 1 MVS series soft and flexible suction cup



- 1 CVPC series controlled vacuum cartridge
- 6 VS series 2.5 bellows suction cups



- 5 CVPC series controlled vacuum cartridges
- 5 VPO series oblong suction cups

6

CVPC



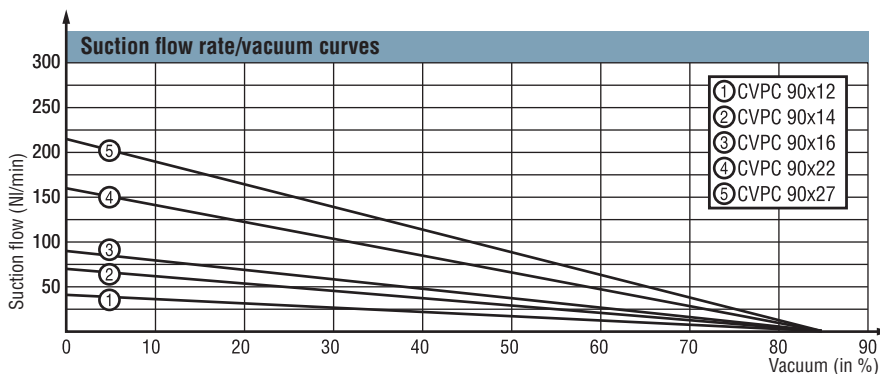
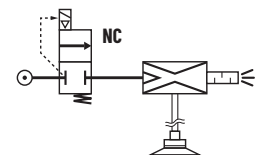
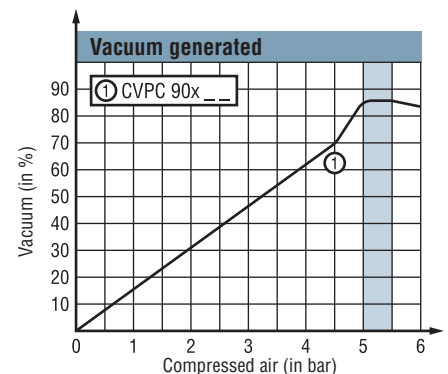
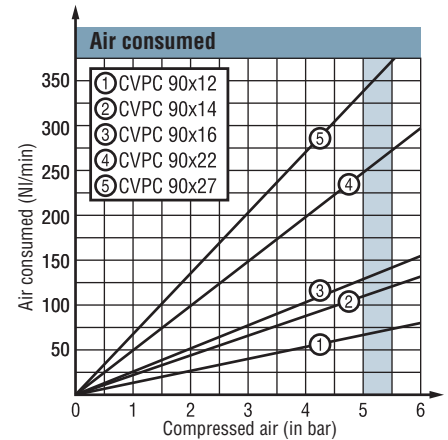


#### Characteristics

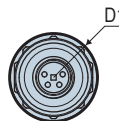
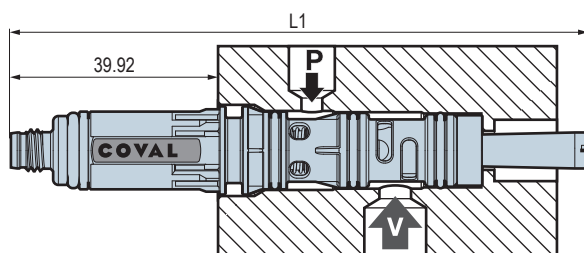
Model	Ø nozzle (mm)	Air consumed (NI/min)	Maximum vacuum (%)	Air drawn in (NI/min)	At optimal air pressure (bar)
CVPC90x12	1.2	70	85	41	5 to 5.5
CVPC90x14	1.4	115	85	70	5 to 5.5
CVPC90x16	1.6	135	85	90	5 to 5.5
CVPC90x22	2.2	260	85	160	5 to 5.5
CVPC90x27	2.7	355	85	215	5 to 5.5

#### Evacuation time in seconds per liter

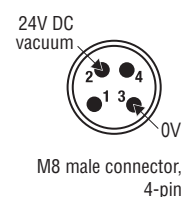
% vacuum	20	30	40	50	60	70	80
CVPC90x12	0.31	0.53	0.83	1.25	1.91	3.23	6.14
CVPC90x14	0.21	0.35	0.55	0.83	1.27	2.14	4.16
CVPC90x16	0.15	0.25	0.38	0.57	0.83	1.35	2.63
CVPC90x22	0.07	0.11	0.17	0.25	0.37	0.58	1.07
CVPC90x27	0.05	0.08	0.12	0.18	0.26	0.44	0.8



#### Dimensions and electrical connections



Model	L1	D1
CVPC90X12	98	16.9
CVPC90X14	105	16.9
CVPC90X16	110	16.9
CVPC90X22	134	16.9
CVPC90X27	147	16.9



Note: All dimensions are in mm

#### Overall characteristics

- C.A. supply 5µ filtered, non-lubricated air relevant to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar. (Optimal at 5 to 5.5 bar.)
- Max. vacuum: 85%.
- Suction flow rate: 41 to 215 NI/min depending on model.
- Air consumption: 70 to 355 NI/min depending on model.
- Electrical degree of protection: IP40.
- Control voltage: 24 V DC (regulated ±10%).
- Current drawn: 35 mA (0.84 W).

- Maximum operating frequency: 4 Hz.
- Endurance: 30 million cycles.
- Weight: 22 g.
- Operating temperature: from 0 to 50 °C.
- Materials: PA 6-6 15 % GF, brass, aluminum, NBR.
- Noise level with silencer (option K):
  - CVPC90X12K : 54 dBA
  - CVPC90X14K : 59 dBA
  - CVPC90X16K : 64 dBA
  - CVPC90X22K : 67 dBA
  - CVPC90X27K : 75 dBA





#### To place an order

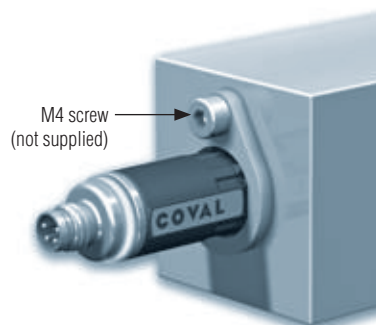
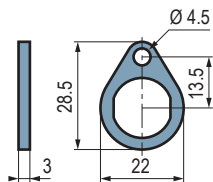
CVPC	90	X		12		K
<b>VACUUM LEVEL</b>	<b>90</b>					
85% max. vacuum	90					
		<b>NOZZLE DIAMETER</b>				<b>THROUGH-TYPE SILENCER</b>
		1.2 mm nozzle Ø		12		Without
		1.4 mm nozzle Ø		14		With silencer
		1.6 mm nozzle Ø		16		
		2.2 mm nozzle Ø		22		
		2.7 mm nozzle Ø		27		

#### Mounting accessories

The CVPC controlled vacuum cartridges offer two mounting solutions:

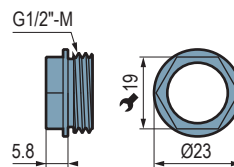
##### Option CVPCFIX1

- Flange mounting



##### Option CVPCFIX2

- Mounting with G1/2"-M threaded ring



6

CVPC

#### Through-type silencers - option K

- Lateral noise absorption on sound-absorbing material.
- Unrestricted exhaust without pressure loss or clogging.
- Average sound attenuation of 20 dBA.

##### → Silencer for CVPC size 1

(CVPC90X12K/CVPC90X14K/CVPC90X16K)

##### ■ G1/4"-M silencer

- Materials: - aluminum thread
- PA6 tube, 30% GF

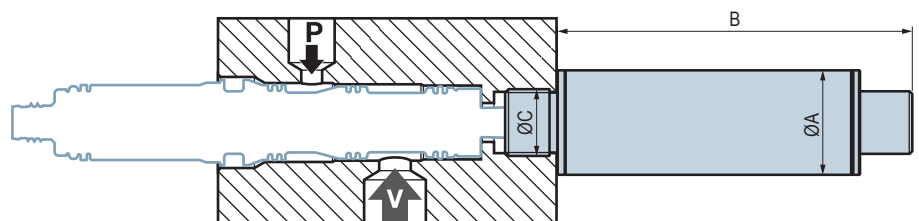
##### → Silencer for CVPC size 2

(CVPC90X22K/CVPC90X27K)

##### ■ G1/2"-M silencer

- Material: - polycarbonate, 30% GF

Model	ØA	B	ØC	Weight (g)
Silencer for size 1	20	68	G1/4"-M	25
Silencer for size 2	30	121	G1/2"-M	92



#### Blow-off valve

In some cases, a blow-off function must be added to the equipment to guarantee quick release and reduce cycle times. This is why COVAL developed an easy-to-integrate controlled blow-off cartridge.

→ See CBP Series, page 6/16.



By means of a cylindrical cartridge design and an M8 connector, the **CBP** series pilot control cartridge easily fulfills the function of a compressed air control valve with an electric control installed as close as possible to where it is needed, and thus meeting the requirements of multiple applications.

The **CBP** Series pilot control cartridge is complementary to the CVPC Series controlled vacuum cartridges for its controlled blow-off function or, when combined with the CVP Series vacuum cartridges, for remote control and/or multi-cartridge control. It is easy to install and meets the needs of machine manufacturers and of integrators of robotic solutions in terms of flexibility and performance.

#### Advantages

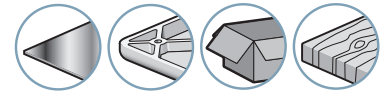
- Ultra-light and compact cartridge design allows for great flexibility and easy integration.
- Pilot solenoid valve 2/2-way.
- Control indicator light.
- M8 connector.

#### Use cases

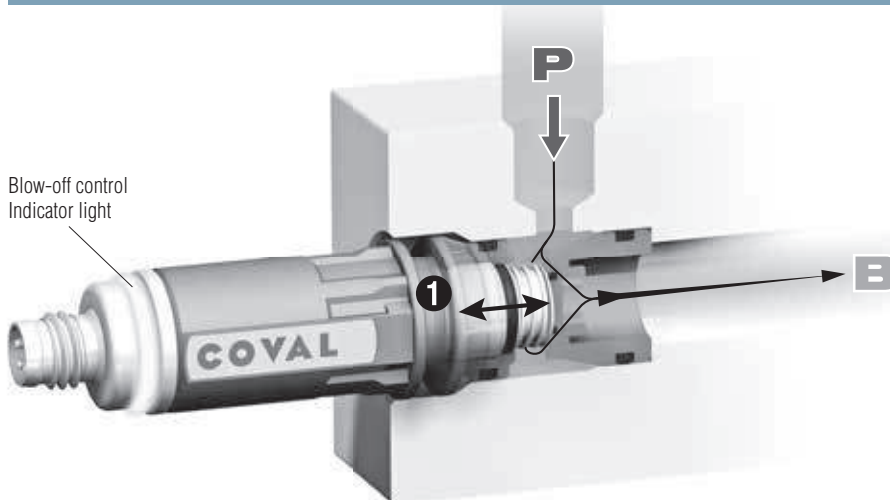
- Electro-pneumatic control valve 2/2-way.
- Blow-off control valve
- Single and multi-cartridge control valve.
- ...



#### Industry-specific applications



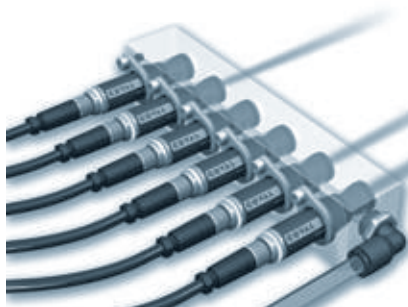
#### Compact integration



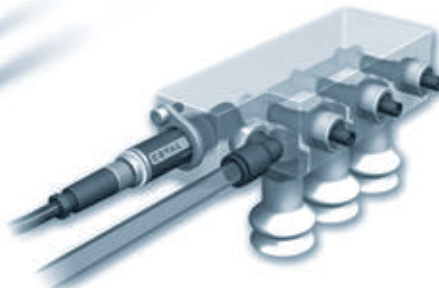
#### 1 Solenoid valve.

The innovative and patented design of the **CBP** Series controlled blow-off / multi-cartridge control valve includes an electro-pneumatic valve that controls the compressed air, providing great reactivity and thus a very short response time.

#### Application examples



- 6 CBP series controlled blow-off cartridges



- 1 CBP series multi-cartridge control valve
- 3 CVP series vacuum cartridges
- 3 MVS series soft and flexible suction



- 1 CVPC series controlled vacuum cartridge
- 1 CBP series controlled blow-off cartridge
- 1 PSK series miniature electronic vacuum switch
- 1 FPC series FlowPack suction cup





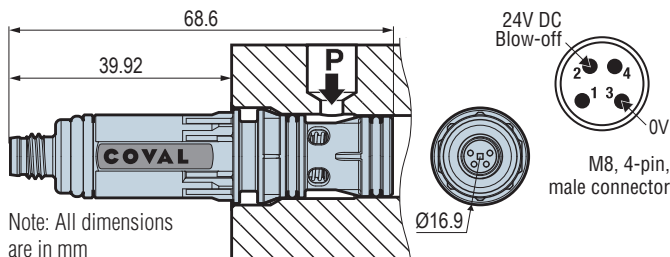
#### Implementation

1. Recess is machined to integrate the cartridge.
2. Cartridge is installed. Two mounting solutions are available: flange or threaded ring (see below).
3. Peripheral equipment is assembled.
4. Pneumatic and electrical connections are established for use.



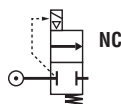
You will find the 3D files of the cartridges as well as the specifications of the machining operations to be carried out on our website [www.coval.com](http://www.coval.com)

#### Dimensions and electrical connections



#### Characteristics

Model	Type	Nominal flow rate at 6 bar $\Delta p_1$ (NI/min)	Nominal diameter (mm)
CBP300	2/2	355	3



#### Overall characteristics

- C.A. supply 5 $\mu$  filtered, non-lubricated air relevant to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 2.5 to 7 bar.
- Electrical degree of protection: IP40.
- Control voltage: 24 V DC (regulated  $\pm 10\%$ ).
- Current drawn: 35 mA (0.84 W).
- Maximum operating frequency: 4 Hz.
- Endurance: 30 million cycles.
- Type of control mechanism: spring return leak valve controlled by an electromagnet.
- Response time for opening/closing: 20/30 ms.
- Weight: 18 g.
- Operating temperature: from 0 to 50 °C.
- Materials: PA 6-6 15 % GF, brass, aluminum, NBR.

#### To place an order

	<b>CBP</b>	<b>300</b>
<b>FLOW RATE</b>		
355 NI/min		<b>300</b>

#### Capacity

One CBP pilot control cartridge can be used to control several CVP vacuum cartridges:

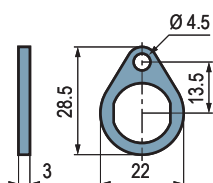
- CVP90X12 > 5 cartridges
- CVP90X14 > 3 cartridges
- CVP90X16 > 2 cartridges
- CVP90X22 > 1 cartridge
- CVP90X27 > 1 cartridge

#### Mounting accessories

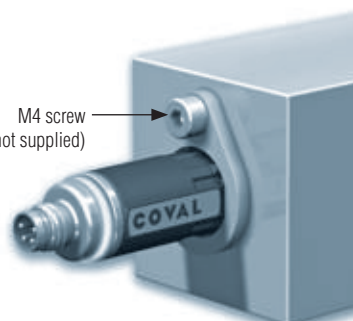
There are two mounting solutions for the CBP Pilot Control Cartridge:

##### Option CVPCFIX1

- Flange mounting.

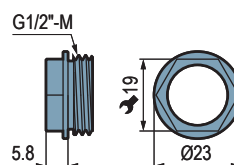


M4 screw  
(not supplied)



##### Option CVPCFIX2

- Mounting with G1/2"-M threaded ring.









# Vacuum Pumps without control

## Chapter 7

### GVP

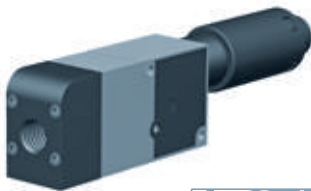


#### Vacuum Pumps

- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- Suction flow rate: 45 to 450 NI/min
- Optimum supply pressure: 4 bar
- Integrated silencer
- Modular design with interchangeable options
- Compact
- Optimized performance for handling all types of objects
- Silent operation
- No clogging
- Adaptable to all industries

P<sub>7/2</sub>

### GEMP



AIR Saving Regulator

#### Simple Vacuum Pumps with ASR (Air Saving Regulator)

- Nozzle Ø: 1.2 ; 1.5 ; 2 ; 2.5 ; 3 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate: 72 to 385 NI/min
- Integrated supply pressure regulator (ASR)
- Integrated silencer
- Very compact and light-weight
- Exceptional energy savings thanks to automatic pressure regulation at 4 bar
- Optimized performance for handling all types of objects
- Silent operation
- No clogging

P<sub>7/8</sub>

### GVEC



#### “Easy Clean” Vacuum Pumps

- Nozzle Ø: 1.5 ; 2.5 ; 3 mm
- Suction flow rate: 95 to 330 NI/min
- Optimum supply pressure: 4 bar
- Materials resistant to corrosion and compatible with food-processing sector
- Very compact and light-weight
- Ideal for applications needing frequent cleaning
- Use in washing or splashing zones
- No clogging

P<sub>7/11</sub>

### LEMP



AIR Saving Regulator

#### Mini Vacuum Pumps without control with ASR (Air Saving Regulator)

- Nozzle Ø: 1; 1.2; 1.4 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate up to 92 NI/min
- Integrated pressure regulator (ASR)
- With or without vacuum switch
- M8 connections
- Stand-alone or island module
- For airtight and porous objects
- Ultra compact and lightweight
- Control panel for monitoring and adjustment
- Energy savings in all networks > 4 bar
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

P<sub>7/14</sub>



# GVP

## Vacuum Pumps



The GVP series vacuum pumps are the simplest in the range. They exist in 5 levels of power (suction rate) and 3 different levels of maximum vacuum:

- Version X (50% vacuum for very porous products).
- Version T (75% vacuum for porous products).
- Version N (85% vacuum for air-tight products).

For the same nozzle diameter, the suction flow rate increases proportionally to the decrease in the maximum vacuum level.

In addition to suction pads, they can also be used for dosing liquid, spraying and tank depressurization.

Industry-specific applications



### Characteristics

Model	Ø Nozzle (mm)	Air consumed (NI/min)	Max. vacuum (%)			Air drawn in (NI/min)			At air pressure (bar)
			X	T	N	X	T	N	
GVP 12	1.2	67	40	75	85	150	63	45	4
GVP 15	1.5	100	50	75	85	180	95	70	4
GVP 20	2	180	50	75	85	250	160	125	4
GVP 25	2.5	270	50	75	85	360	240	200	4
GVP 30	3	400	50	75	85	450	330	265	4

As standard, versions N and T are delivered with silencer S and version X with silencer K. Only exception, the GVP 30 is fitted with silencer K.

### Advantages

- Adaptable to all industries
- Optimized performance for handling all types of objects
- Options
- Light and compact
- Silent operation
- No clogging thanks to the through type silencer

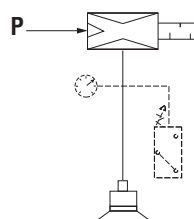
7  
GVP

### Evacuation Time in Seconds per Liter

% vacuum	10 %			20 %			30 %			40 %			50 %			60 %			70 %			80 %			85 %		
versions	X	T	N	X	T	N	X	T	N	X	T	N	X	T	N	X	T	N	X	T	N	X	T	N	X	T	N
GVP12	0.05	0.10	0.14	0.11	0.22	0.30	0.22	0.37	0.49	0.62	0.55	0.71	-	0.78	0.97	-	1.16	1.33	-	1.92	1.81	-	-	2.66	-	-	3.42
GVP15	0.04	0.07	0.09	0.09	0.15	0.20	0.15	0.24	0.32	0.27	0.36	0.46	-	0.52	0.63	-	0.77	0.85	-	1.27	1.16	-	-	1.71	-	-	2.20
GVP20	0.03	0.04	0.06	0.06	0.09	0.12	0.11	0.14	0.19	0.19	0.22	0.28	-	0.31	0.38	-	0.46	0.52	-	0.76	0.71	-	-	1.04	-	-	2.13
GVP25	0.02	0.03	0.03	0.04	0.06	0.07	0.08	0.10	0.11	0.14	0.14	0.16	-	0.21	0.22	-	0.30	0.30	-	0.50	0.41	-	-	0.60	-	-	0.77
GVP30	0.01	0.02	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.11	0.10	0.12	-	0.15	0.17	-	0.22	0.23	-	0.37	0.31	-	-	0.45	-	-	0.58

### Specifications

Supply	Non-lubricated filtered air, pressure 2 to 6 bar
Optimum pressure	4 bar
Weight	100 to 265g
Material	POM - 2017A – Cu Zn
Temperature	0 to 80 °C



For all orders, please specify:  
Model + Nozzle Ø + % vacuum + Silencer + C.A. fitting  
e.g.: GVP30NK14

1: Model	2: Nozzle diameter		3: % vacuum		4: Silencer		5: C.A. fitting	
GVP	12	1.2 mm	X T N	50 % vacuum	-	Without silencer	14	G1/4" Female
	15	1.5 mm		75 % vacuum	S <sup>(1)</sup>	Diffuser		
	20	2 mm		85 % vacuum	K	Through-type		
	25	2.5 mm						
	30	3 mm						

(1) no silencer for nozzle Ø 30.



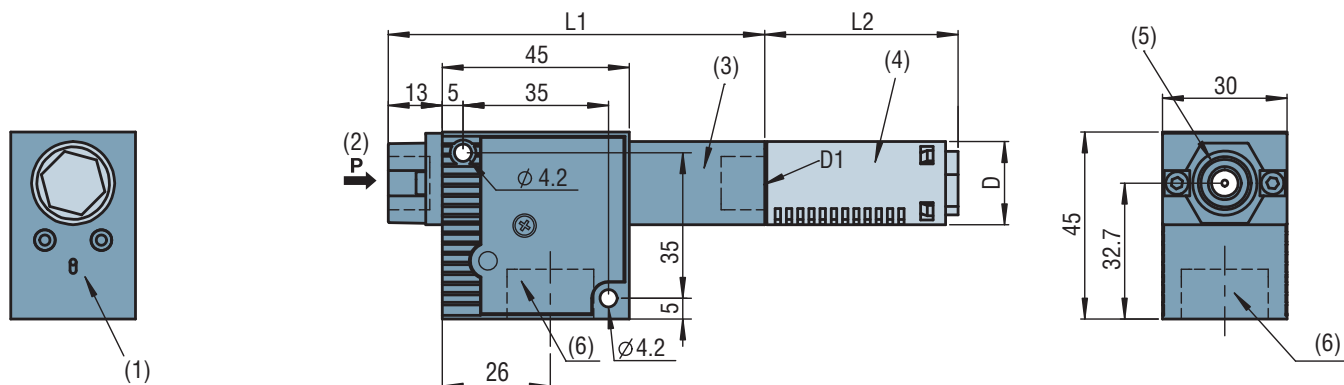
# GVP

## Vacuum Pumps

### Dimensions



#### Dimensions



Models	L1		L2			D		D1	
	X	N/T	S(N/T)	K(N/T)	K(X)	X	N/T	X	N/T
GVP12	76	81	46	68	121	30	20	G1/2 "-F	G1/4 "-F
GVP15	76	91	46	68	121	30	20	G1/2 "-F	G1/4 "-F
GVP20	76	76	62	121	121	30	30	G1/2 "-F	G1/2 "-F
GVP25	76	76	62	121	121	30	30	G1/2 "-F	G1/2 "-F
GVP30	148	148	-	121	121	30	30	G 1/2 "-F	G1/2 "-F

- (1) Vacuum switch option mounting zone
- (2) 4 bar compressed air supply
- (3) Exhaust
- (4) Silencer model S or K
- (5) G1/4"-F
- (6) Vacuum G1/2"-F

Note: all dimensions are in mm

#### Options

- Vacuum switches see pages 7/5 and 7/6.
- Other options see pages 7/6 and 7/7.
- Silencer see page 11/11.

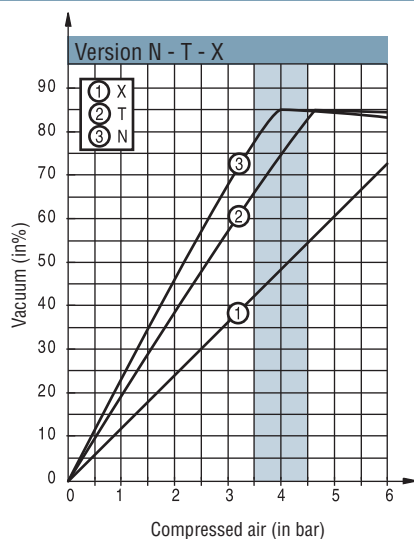
#### Curves

See page 7/4.

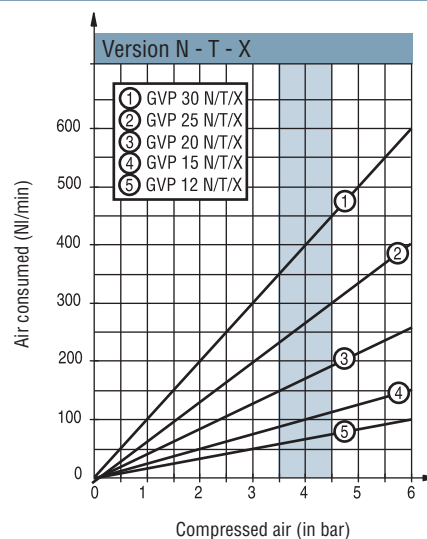




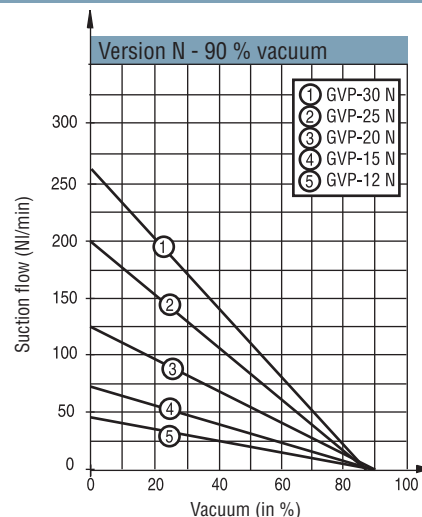
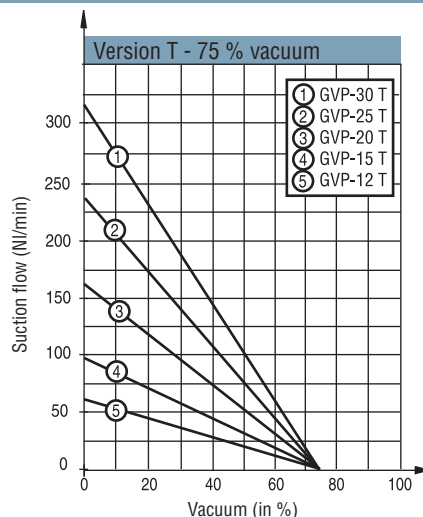
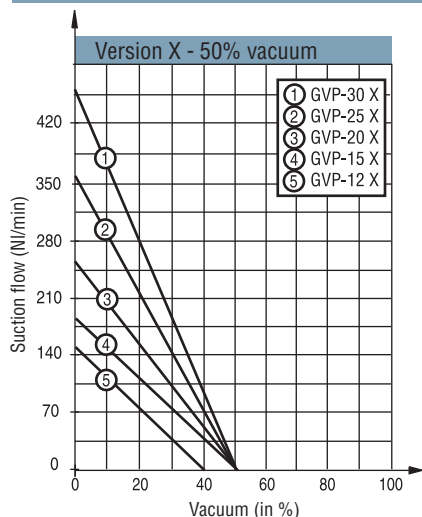
#### Vacuum Generated - Supply pressure 4 bar



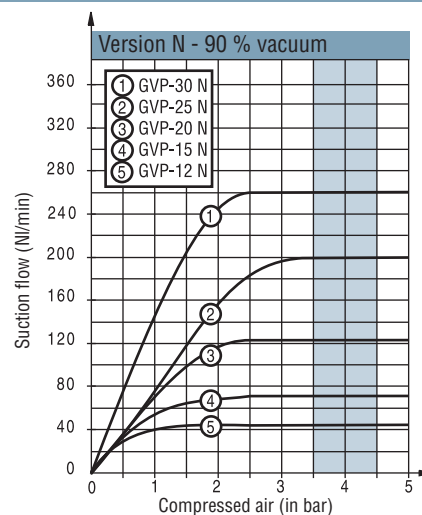
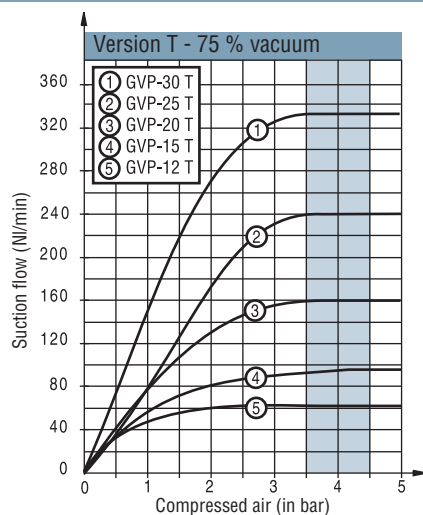
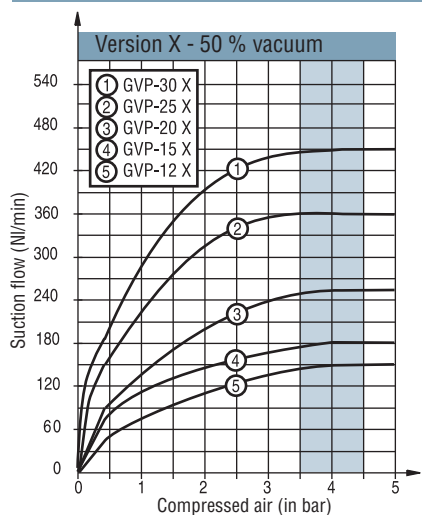
#### Air Consumed - Supply pressure 4 bar



#### Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar



#### Suction Flow Rate Generated - Supply pressure 4 bar



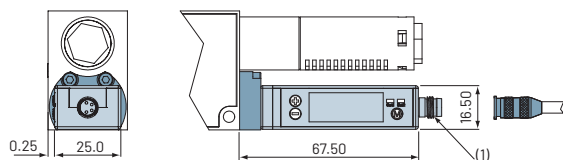


## Customer-mounted Vacuum Pump Options

### Electronic Vacuum Switch with Display

#### GVO PSA 100 C option

(See exact characteristics page 12/4)



Delivered with M8 cable (2 meters)

(1) M8 connector

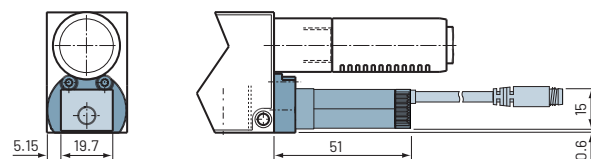
Our top-of-the-range electronic vacuum switch, the PSA 100C has an LED display showing the vacuum value in different units. It also has two separate outputs with independently regulated hysteresis, NO or NC

- PNP as standard
- M8 connector.
- Connection cable, see page 11/12.

### Electronic Vacuum Switch

#### GVOPSP100CX option

(See characteristics page 12/7)



Delivered with M8 cable (2 meters)

(1) M8 4 pole connector

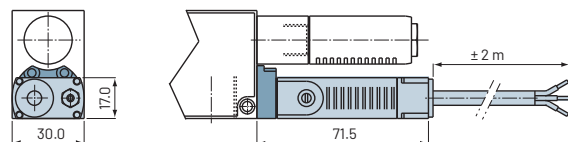
The vacuum data collected is always very reliable even with a large number of suction pads, thanks to the precision of the PSP100CX. It has one output with hysteresis adjustment.

- PNP as standard
- M8 connector.
- Connection cable, see page 11/12.

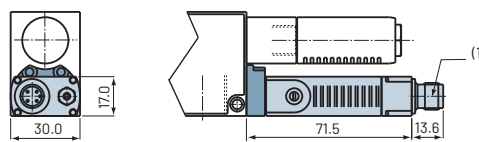
### Vacuum Switch with Electrical Signal

#### GVO PSE 100 E or EC option

(See characteristics page 12/9)



GVO PSE 100 E with cable (length 2 metres)



GVO PSE 100 EC with M12 connector (delivered without connection cable)

(1) M12 male connector

The PSE 100 E or EC vacuum switch indicates the level of vacuum in the suction pad circuit. For a small number of suction pads (5 to 10 maximum). This indication is enough to prove an object is gripped. Hysteresis (125mbar) must also be taken into account according to the use of the vacuum switch data.

Check that the vacuum pump supply pressure generates a level of pressure equal to the threshold setting.

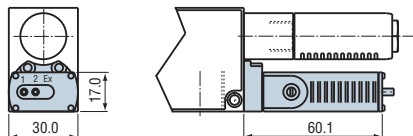
For connection cable, see page 11/12.



## Customer-mounted Vacuum Pump Options

### Vacuum Switch with Pneumatic Signal

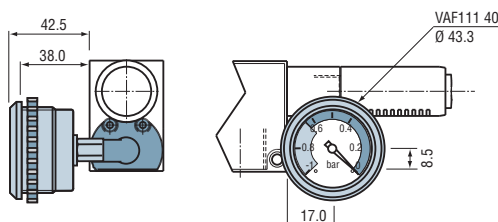
**GVO PSE 100 P NO or NC option** (see characteristics page 12/10)



For use in fully pneumatic applications or explosive environments. The vacuum switch enables a pressure data message to be given when a vacuum threshold is reached.

### Vacuum Gauge

**GVO VAF 111 40 option** (See characteristics page 12/12)

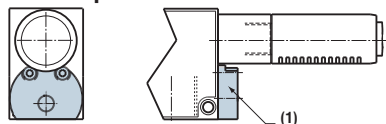


The vacuum gauge displays the level of vacuum in the suction pad circuit. This option makes it simple to keep the status of the vacuum circuit under constant surveillance.

7

### Plug to Shut off Vacuum Data

**GVOB Option**



(1) Plug

This plug option makes it possible to shut off the vacuum signal to avoid affecting operation of the vacuum pump if a GVO option is removed.

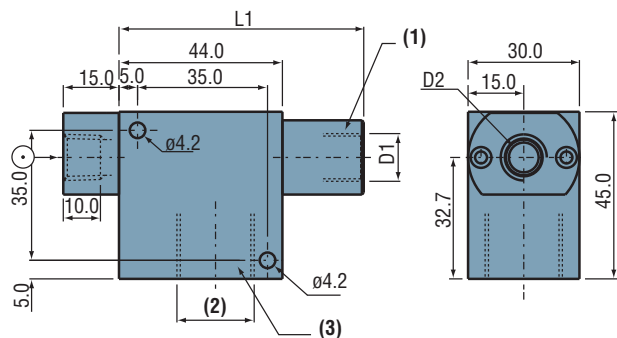


## Factory-mounted Vacuum Pump Options

### GVO AL and GVO AL NPT option (for GVP vacuum pump)

Body and flange G1/4"-F Gas in aluminum (on request).

■ Note: It is no longer possible to mount vacuum gauge options.



**L1** = L1 GVP (plastic) - 1mm

**D1** = D1 (GVP N, T and X)

**D2** = G1/4"-F  
1/4 NPT (on request)

**(1)** Exhaust

**(2)** G1/2"-F

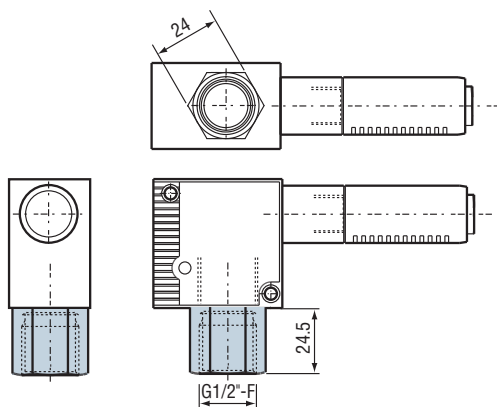
**(3)** Vacuum

### GVO P Option

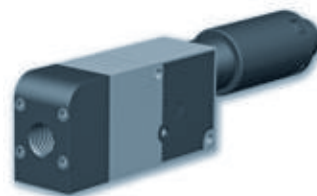
With G1/2"-F protective extension.

The G1/2"-F extension is recommended for double valve models or with pneumatic vacuum switch to protect components during mounting or installation.

The extension is fitted with a 400 micron stainless steel filtration grid as standard.







The GEMP series vacuum pumps are the simplest in the energy-saving range. They automatically regulate the supply pressure to an optimal 4 bar thanks to an integrated pressure regulator (ASR). Energy savings are achieved regardless of the pressure in the compressed air network and without penalizing other applications which require more than 4 bar.

GEMP pumps therefore reduce both energy consumption and the noise level.

Industry-specific applications



### Characteristics

Models	Ø Nozzle (mm)	Air consumed (NI/min)	Maximum vacuum (%)	Air drawn in (NI/min)	At air pressure (bar)
GEMP60x12	1.2	65	60	72	4
GEMP60x15	1.5	97	60	110	4
GEMP60x20	2.0	179	60	189	4
GEMP60x25	2.5	260	60	275	4
GEMP60x30	3.0	385	60	385	4
GEMP90x12	1.2	65	85	50	4
GEMP90x15	1.5	97	85	75	4
GEMP90x20	2.0	179	85	125	4
GEMP90x25	2.5	260	85	200	4
GEMP90x30	3.0	385	85	245	4

### Advantages

- Modular design with interchangeable options
- Compact and light
- Exceptional energy savings
- Optimized performance for all types of applications
- Silent operation
- No clogging

### Evacuation Time in Seconds per Liter

% vacuum	10	20	30	40	50	60	70	80	85
GEMP60x12	0.09	0.2	0.35	0.55	0.9	-	-	-	-
GEMP60x15	0.06	0.14	0.23	0.36	0.59	-	-	-	-
GEMP60x20	0.04	0.08	0.13	0.21	0.34	-	-	-	-
GEMP60x25	0.03	0.05	0.09	0.14	0.24	-	-	-	-
GEMP60x30	0.01	0.04	0.07	0.10	0.17	-	-	-	-
GEMP90x12	0.13	0.27	0.44	0.64	0.88	1.19	1.62	2.37	3.12
GEMP90x15	0.09	0.18	0.29	0.42	0.58	0.79	1.08	1.59	2.08
GEMP90x20	0.05	0.11	0.18	0.25	0.35	0.46	0.65	0.95	1.25
GEMP90x25	0.03	0.07	0.11	0.16	0.22	0.3	0.41	0.59	0.78
GEMP90x30	0.03	0.06	0.09	0.13	0.18	0.24	0.33	0.48	0.64

### Specifications

Supply	Non-lubricated filtered air, 2 to 8 bar
Optimum pressure	4 bar
Weight	100 to 265g
Material	POM - 2017A – Cu Zn – PA6 15 % FV
Operating temperature	0 to 80 °C

### Vacuum Switch Characteristics

See pages 7/9.



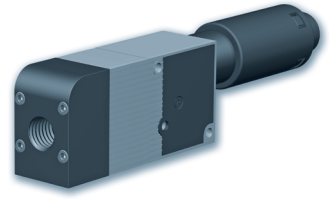
For all orders, please specify:  
Model + % vacuum + X + Ø Nozzle + Vacuum switch.  
e.g.: GEMP90X12VA

1: Model	2: % vacuum	X	4: Nozzle diameter	5: Vacuum switch
GEMP	60 max. 60% vacuum. (porous objects)	X	12 1.2 mm	VA electronic display
	90 max. 85% vacuum (air-tight objects)		15 1.5 mm	VB electronic
			20 2 mm	VC with electrical contact
			25 2.5 mm	VO without vacuum switch
			30 3 mm	

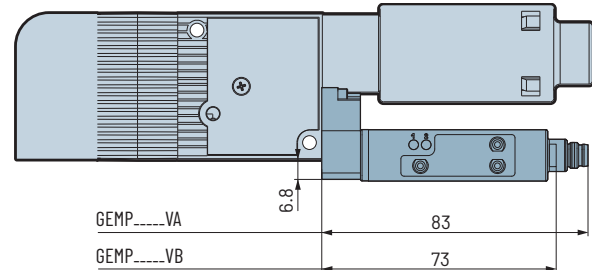
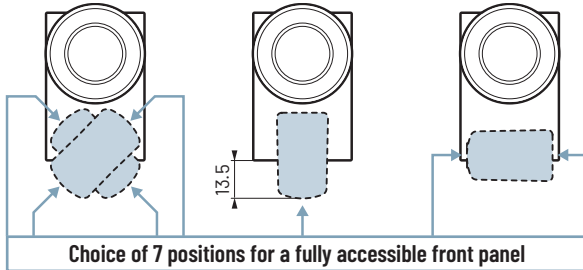


## Simple Vacuum Pump with ASR

### Vacuum Switch Functions and Connections



#### 1 - Modules with Electronic Indexable Vacuum Switch GEMP-----VA or GEMP-----VB

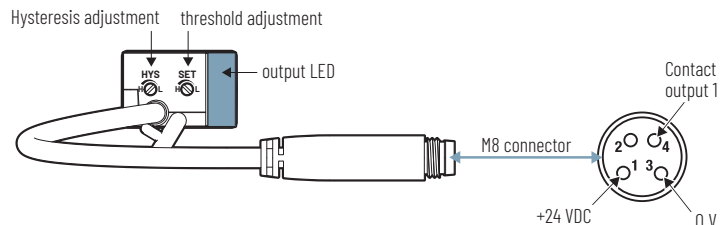
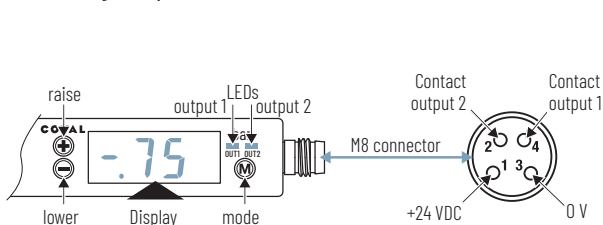


##### Vacuum switch with display, 2 outputs, GEMP-----VA

- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configurable.
- maximum excess pressure: 3 bar.
- repetitivity: +/- 1% of the range.
- output thresholds: 2 x NO / NC.
- switching power: 125 mA transistor PNP
- threshold status display: 2 x LEDs.
- display unit: bar.
- Electrical connection: M8 (4 pins).
- supply voltage: 12 - 24 VDC ± 10%.
- current draw: < 60 mA.
- protection level: IP40.
- working temperature: 0 to 50 °C

##### Electronic vacuum switch, 1 output, GEMP-----VB

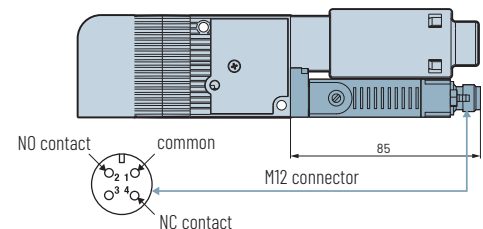
- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -1 ... 0 bar
- hysteresis: configurable from 0 to 10%.
- maximum excess pressure: 3 bar.
- repetitivity: +/- 1% of the range.
- output thresholds: 1 x NO.
- switching power: 125 mA transistor PNP
- threshold status display: 1 x LED.
- electrical connection: M8 (4 poles).
- supply voltage: 18 - 30 VDC (regulated).
- current draw: < 20 mA.
- protection level: IP50.
- working temperature: 0 to 50 °C



#### 2 - Modules with Electrical Contact Vacuum Switch GEMP-----VC

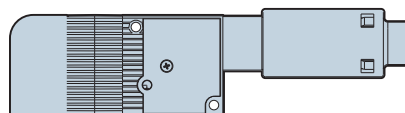
##### Contact vacuum switch, GEMP-----VC

- compatible fluids: non-corrosive gas, dry, non-lubricated air.
- measuring range: -350 to -850 mb.
- hysteresis: 125 mb.
- maximum overpressure: 2 bar.
- repetitivity: 3% of the range.
- breaking capacity: 1 x NO, 1 x NC.
- switching power: 3 A (breaker)
- electrical connection: M12 (4 poles).
- supply voltage: up to 125 V.
- protection level: IP40.
- working temperature: -10 to 50 °C.
- number of operations: 5 million cycles.
- maximum throughput: 30 cycles per minute.



#### 3 - Modules without Vacuum Switch GEMP-----V0

This model without vacuum switch must be accompanied by an independent vacuum switch on the vacuum circuit or a vacuum gauge for manually-controlled vacuum capacity.



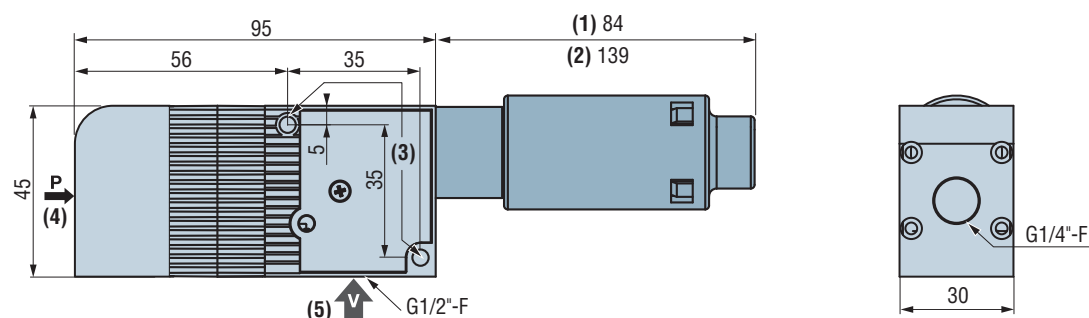
##### Note:

Screw-on electrical connectors, straight and angled M8 and M12 shown p. 11/12.



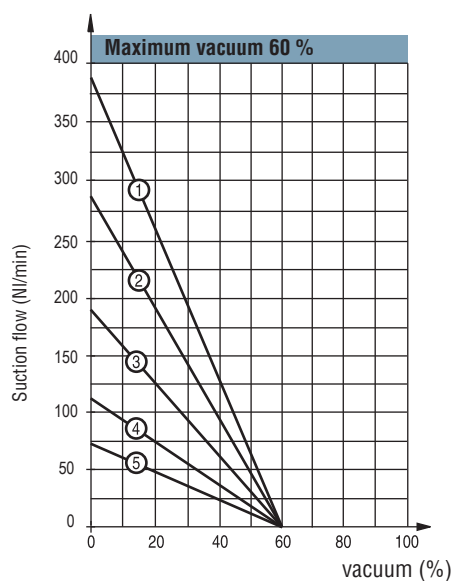


#### Dimensions

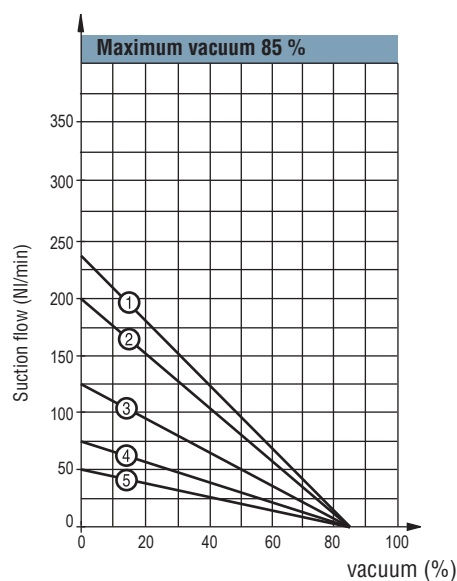


- (1) silencer for nozzles Ø 1.2 or 1.5 mm (GEMP--X12--, GEMP--X15--)
- (2) silencer for nozzles Ø 2 - 2.5 or 3 mm (GEMP--X20--, GEMP--X25--, GEMP--X30--)
- (3) fittings Ø 4.2 mm
- (4) G1/4"-F pressure fitting: pressure at 4 bar
- (5) G1/2"-F vacuum fitting

#### Performance Curves



- 1 - GEMP60X30
- 2 - GEMP60X25
- 3 - GEMP60X20
- 4 - GEMP60X15
- 5 - GEMP60X12



- 1 - GEMP90X30
- 2 - GEMP90X25
- 3 - GEMP90X20
- 4 - GEMP90X15
- 5 - GEMP90X12

Note: all dimensions are in mm





Industry-specific applications



The GVEC series “Easy Clean” vacuum pumps have been designed to meet the needs of vacuum handling applications in industries whose production requires frequent cleaning, particularly in the food-processing sector.

### Characteristics

Model	Ø Nozzle (mm)	Air consumed (NI/min)	Max. vacuum (%)	Air drawn in (NI/min)	At air pressure (bar)
GVEC15T18	1.5	100	75	95	4
GVEC25T14	2.5	270	75	240	4
GVEC30T14	3	400	75	330	4

### Advantages

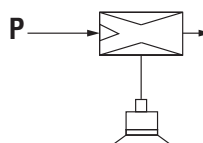
- Plastic and stainless steel materials: meet the requirements of splash zones, are resistant to cleaning agents and corrosion.
- Compact and light design: installation as close as possible to suction cups to improve the evacuation times and production rate.
- Easy disassembly: quick and precise cleaning.

### Evacuation Time in Seconds per Liter

% vacuum	10 %	20 %	30 %	40 %	50 %	60 %	70 %
GVEC15T18	0.07	0.15	0.24	0.36	0.52	0.77	1.27
GVEC25T14	0.03	0.06	0.10	0.14	0.21	0.30	0.50
GVEC30T14	0.02	0.04	0.07	0.10	0.15	0.22	0.37

### Specifications

Supply	Non-lubricated filtered air, pressure 2 to 6 bar	
Optimum pressure	4 bar	
Weight	GVEC15T18	33 g
	GVEC25T14	139 g
	GVEC30T14	159 g
Material	Body and mixer	POM-C
	Nozzle	316L Stainless Steel
	Seal	EPDM
Operating temperature	From 0 to 50 °C	
Cleaning temperature	max. 100°C	



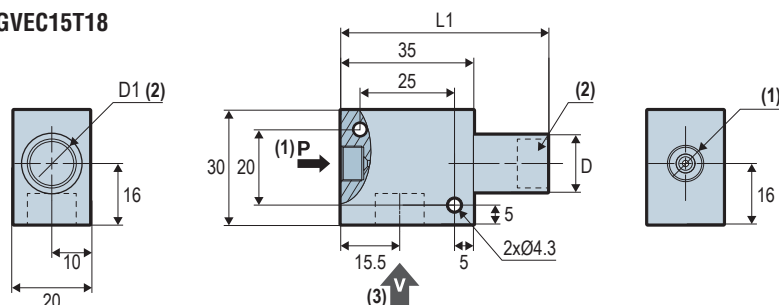
Specify the part number e.g.: GVEC25T14  
Please refer to the characteristics table above



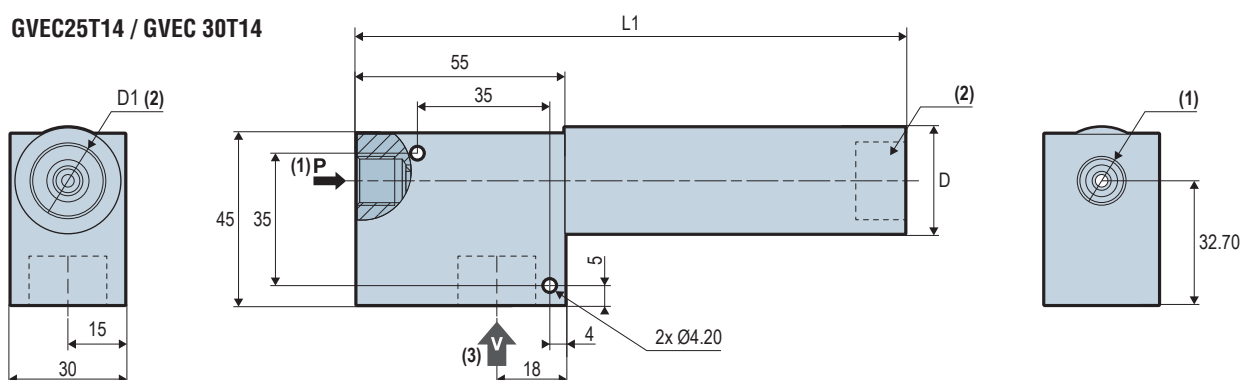


#### Dimensions

##### GVEC15T18



##### GVEC25T14 / GVEC 30T14



Models	L1	D	(1)	D1 (2)	(3)
GVEC15T18	54.6	16	G1/8"-F	G1/4"-F	G1/4"-F
GVEC25T14	120.9	28	G1/4"-F	G1/2"-F	G1/2"-F
GVEC30T14	144.9	28	G1/4"-F	G1/2"-F	G1/2"-F

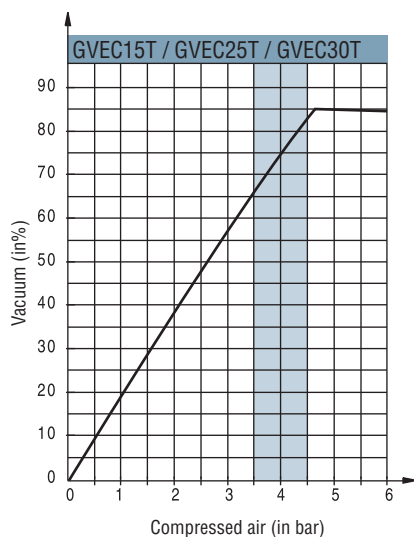
- (1) Pressure fitting
- (2) Exhaust
- (3) Vacuum fitting

Note: all dimensions are in mm

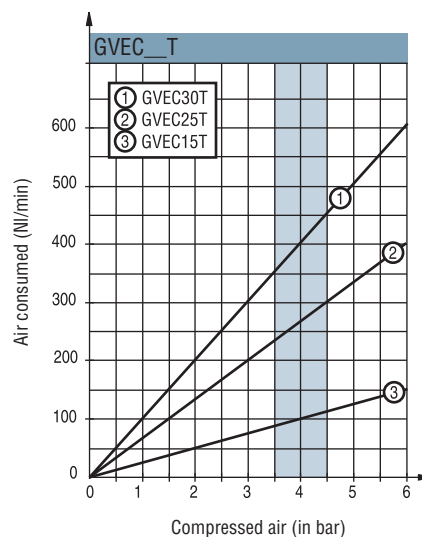




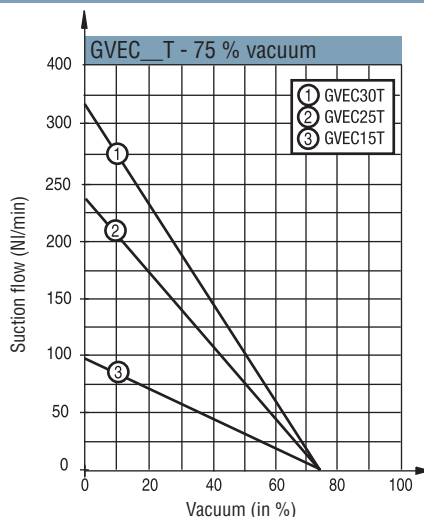
#### Vacuum Generated - Supply pressure 4 bar



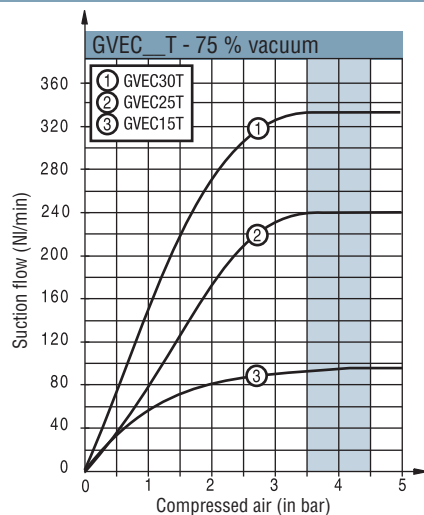
#### Air Consumed - Supply pressure 4 bar



#### Suction Flow Rate/Vacuum Curves - Supply pressure 4 bar



#### Suction Flow Rate Generated - Supply pressure 4 bar



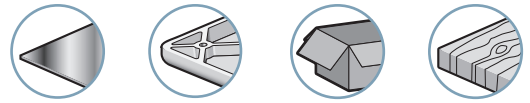


## Mini Vacuum Pumps without control with ASR (Air Saving Regulator)



AIR Saving Regulator

Industry-specific applications



For all objects, porous or airtight

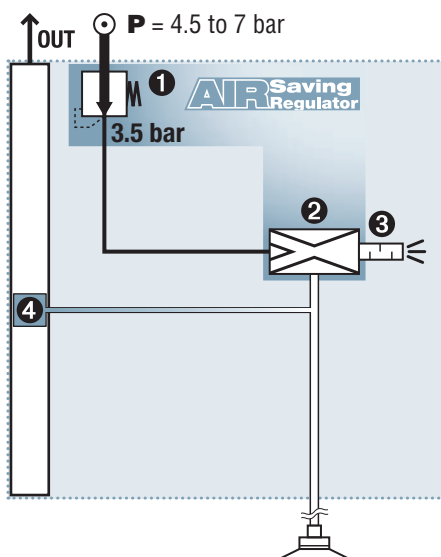
### Advantages

- Simplified installation and use thanks to the Plug & Play system
- Unmatched compactness: Installation close to suction cups  
→ short response times and energy savings.
- No clogging, thanks to the through-type silencer.
- A LEMP for every need: optional vacuum switch.
- Installation: standalone or island assembly.

### Compact Integration

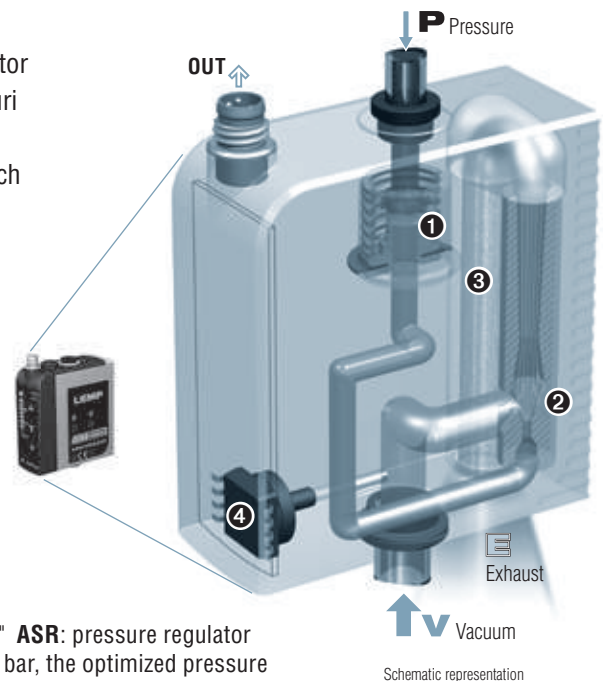
The illustrations below demonstrate the functions integrated in the mini-module, and their respective roles in operation. The result of this COVAL innovation is:

- **A mini module** ( $\approx 110$  g) that is easy to install close to the suction cups, reducing the volume to be evacuated → increased speed and energy savings.
- **A complete module** (including integrated pressure regulator and clog-free silencer), therefore not requiring any additional function or connection.



### Integrated functions

- 1 3.5 bar Pressure regulator
- 2 3.5 bar optimized Venturi
- 3 Clog-free silencer
- 4 Electronic vacuum switch



Schematic representation

Combined "venturi regulator" **ASR**: pressure regulator 1 feeds venturi 2 with 3.5 bar, the optimized pressure for its operation.

→ **No more unnecessary consumption of compressed air.**

AIR Saving Regulator

**40%** Energy savings

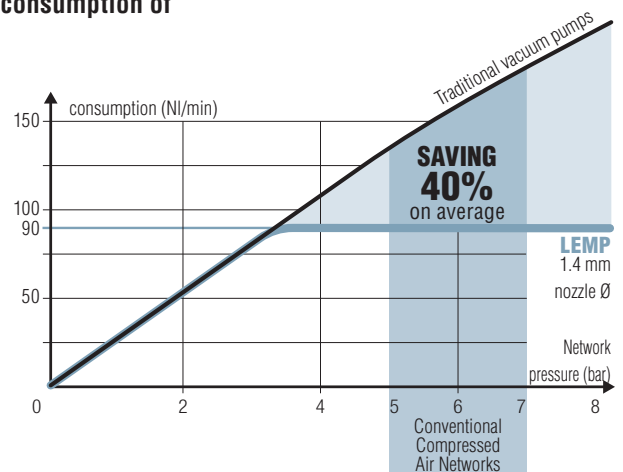
AIR Saving Regulator

### (ASR): Air Saving Regulator

The LEMP vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation. Regardless of pressure supplied by the compressed air network, the integrated regulator feeds the venturi at **3.5 bar** pressure, optimal for its operation.

- No more unnecessary energy consumption.
- No external regulator required and thus the risk of inadvertent misadjustment is eliminated.

Compared to pressures found in most compressed air networks (5-7 bar), the graph opposite demonstrates an achieved economy of 40% on average.



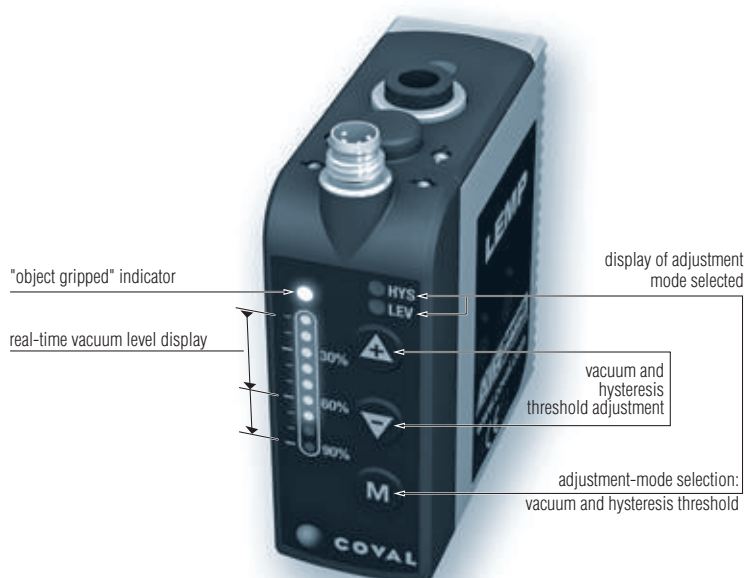




#### Version with Integrated Vacuum Switch

The front dialogue panel shown below displays the real-time vacuum level and lets the operator set the threshold level which triggers the "object gripped" signal allowing operations to continue.

This communications panel is particularly visual and intuitive. It makes it easy to monitor production.



#### Stand-alone or Island Modules?

Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence.

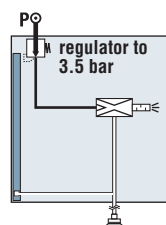
When several suction cups are operating according to different sequences, multiple modules are required, which can be:

- several stand-alone modules,
- an island of these modules with an internal common pressure unit.

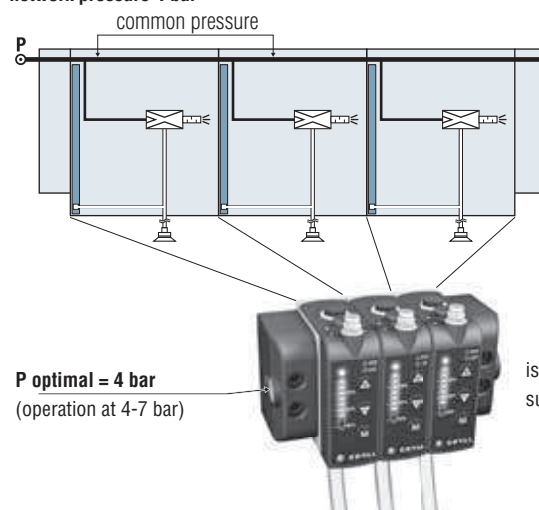
The diagrams below help in the selection:

- Stand-alone modules are complete, with the integrated pressure regulator
- in an island, the integrated regulator is absent: to maintain the advantage of economical and silent operation, it is recommended to reduce the pressure of the island's common pressure unit to 4 bar.

#### 4.5 to 7 bar network pressure



#### network pressure 4 bar



island of 3 modules  
supplying suction cups





#### Select Vacuum Level and Nozzle Diameter

##### ■ Airtight products handling: glass, plastic, coated wood, sheet metal...

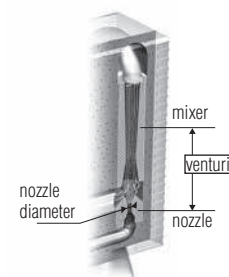
Because vacuum leaks are limited, the vacuum level to be used may be high: between 50% to 80%, to be generated by a 85% max. vacuum level venturi.

Taking into account the volume to be emptied and the response time to do so, the chart below is a guide towards the most economical nozzle and gives the air suction flow.

##### ■ Porous products handling: cardboard, raw wood, pastries...

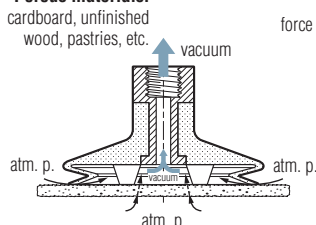
Significant porosity and/or surface vacuum leaks are to be expected. For handling, a vacuum level between 30% to 55% is the best compromise, to be generated by a 60% max. vacuum level venturi.

The chart below is a first indication towards the most economical nozzle ID, to be completed by a product leak flow measurement.

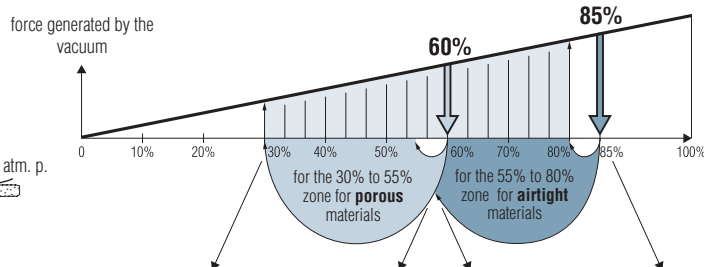


##### Porous materials:

cardboard, unfinished wood, pastries, etc.

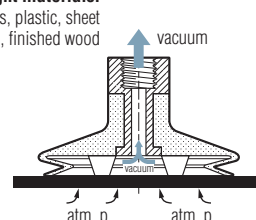


force generated by the vacuum



##### Airtight materials:

glass, plastic, sheet metal, finished wood



#### Porous Objects ▶ Maximum Vacuum Level: 60%

##### Time to create vacuum (seconds) for a volume of 1 liter

vacuum achieved	30%	35%	40%	45%	50%	55%	Air consumed (NI/min)	Air drawn in (NI/min)
ø nozzle								
1.0 mm	0.66	0.83	1.04	1.31	1.70	2.35	44	38
1.2 mm	0.41	0.52	0.66	0.83	1.07	1.49	65	72
1.4 mm	0.27	0.34	0.43	0.54	0.70	0.97	90	92

#### Airtight Objects ▶ Maximum Vacuum Level: 85%

##### Time to create vacuum (seconds) for a volume of 1 liter

vacuum achieved	55%	60%	65%	70%	75%	80%	Air consumed (NI/min)	Air drawn in (NI/min)
ø nozzle								
1.0 mm	1.76	2.04	2.38	2.80	3.33	4.09	44	29
1.2 mm	1.13	1.31	1.53	1.80	2.15	2.64	65	45
1.4 mm	0.73	0.85	0.99	1.16	1.38	1.70	90	70

#### Select with or without Vacuum Switch

For common applications, the vacuum switch is needed, with the dialogue face for digital display and adjustment.

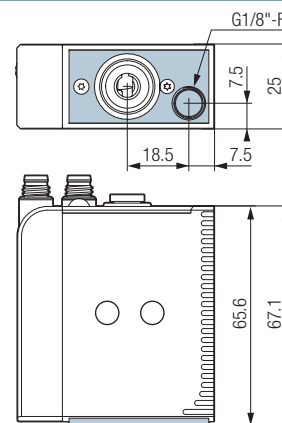
However, some applications may just require a simple operation, without an "object gripped" return signal. The simplified version may then be chosen, with no vacuum switch, display, or adjustment.

#### Exhaust manifold: option E

The LEMP mini vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/8"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece (LEMP\_\_E version).

This option must be specified at time of ordering as it cannot be added later.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.





## Mini Vacuum Pumps without control with ASR

### Configuring a Vacuum Pump



ASR Saving Regulator

Part numbers for an island assembly or components in an island

Part numbers for stand-alone units

**LEMP 60 X 12 VA - B3**

VACUUM LEVEL	
60% max. vacuum → porous objects	<b>60</b>
85% max. vacuum → airtight objects	<b>90</b>

NOZZLE DIAMETER	
Ø 1 mm nozzle	<b>10</b>
Ø 1.2 mm nozzle	<b>12</b>
Ø 1.4 mm nozzle	<b>14</b>

VACUUM SWITCH	
<b>VA</b> ■ Electronic vacuum switch with digital display and adjustment	
<b>V0</b> ■ No vacuum switch and no adjustment	

EXHAUST	
Open (integrated silencer)	<b>-</b>
Exhaust manifold (G1/8"-F)	<b>E</b>

#### ISLAND ASSEMBLIES

<b>B2</b>		LEMP_X____ <b>B2</b> island assembly with 2 identical modules.
<b>B3</b>		LEMP_X____ <b>B3</b> island assembly with 3 identical modules.
<b>B4</b>	...	

If the planned island contains different module types, it must be ordered as separate components in order to then be assembled on site according to the arrangement suitable to the application.

#### COMPONENTS FOR THE ISLAND TO BE ASSEMBLED

<b>B</b>		LEMP_X____ <b>B</b> Module that can be grouped (complete with integrated grouping screw).
		Set of ends for a complete group, with grouping screw and common pressure unit plug.
<b>PART NO.: LEMSETA</b>		

#### EXAMPLE COMPOSITE PART NUMBER FOR AN ISLAND ASSEMBLY:

##### ■ LEMP60X14VAB3

LEMP island assembly, containing 3 x 60% max. vacuum modules, Ø1.4 mm nozzle and vacuum switch.

#### ORDER EXAMPLE FOR AN ISLAND TO BE ASSEMBLED:

##### ■ LEMP60X10VAB

##### ■ LEMP90X12VAB

##### ■ LEMP60X14VAB

##### ■ LEMSETA

3 LEMP modules for a group, of different types.

Set of ends for island.

#### REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

##### ■ LEMP60X12VA

Stand-alone LEMP Module, 60% max. vacuum, Ø1.2 mm nozzle and vacuum switch.

#### Accessory

Protection for standalone mini vacuum pumps LEMP\_\_VA (with one M8 connector), Part No.: **80004409**

The COVER is made of silicone and serves as a protective sleeve for vacuum pumps, protecting them against splashing water, in particular during cleaning cycles.

- High level of protection against splashing water.
- Easy to mount and clean.



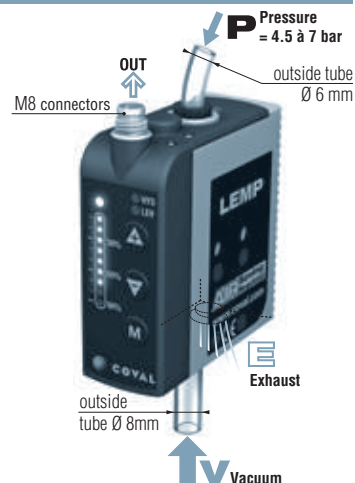
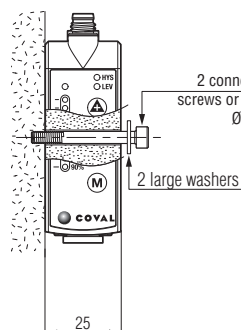
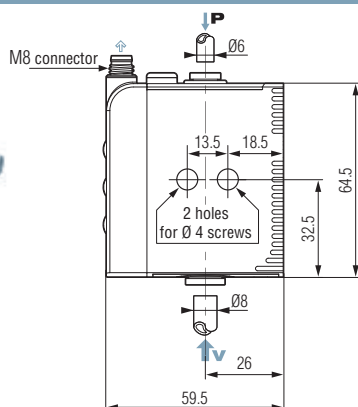




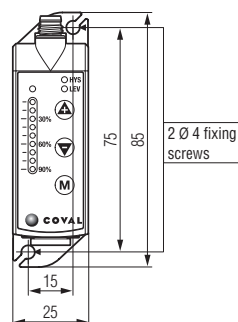
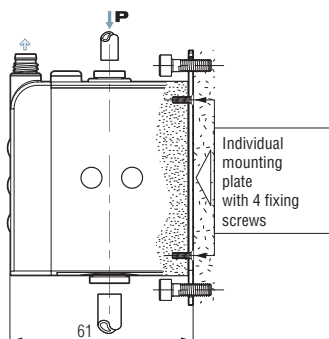
#### Stand-alone Modules



Side mounting



Front mounting



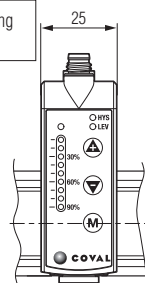
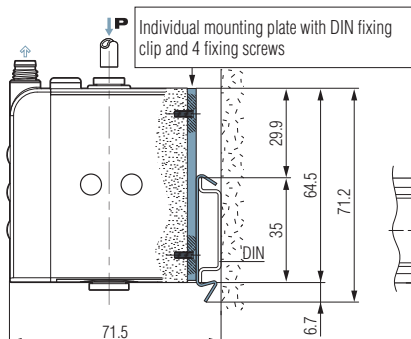
For front mounting, order the necessary kit, in addition to the module:

Front mounting kit:  
1 plate + 4 screws

**Part No.: LEMFIXA**



Mounting on DIN rail

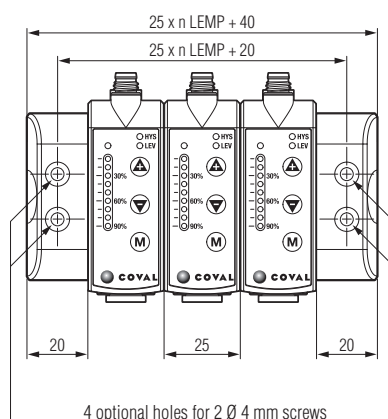


A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

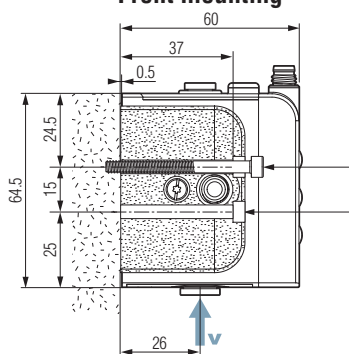
DIN rail mounting kit:  
1 plate/clip + 4 screws

**Part No.: LEMFIXB**

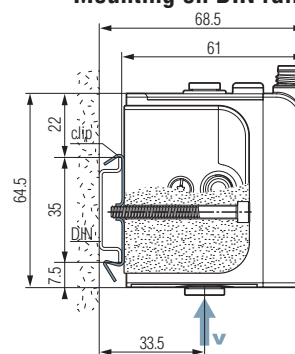
#### Islands



#### Front mounting



#### Mounting on DIN rail



DIN rail mounting kit:  
2 clips + 2 screws

**Part No.: LEMFIXC**





#### Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure:
  - stand-alone module:  $P = 4.5$  bar.
  - island modules:  $P = 4$  bar.
- Maximum vacuum: 60% or 85% depending on model.
- Suction rate: 29 to 92 NI/min depending on model.
- Air consumption: 44 to 90 NI/min depending on model.
- Electrical protection level: IP 65.
- Weight: 90 to 110 g, depending on model.
- Operating temperature: 0 to 50 °C.
- Materials: PA 6-6 15 %FV, brass, aluminum, NBR.

#### Integrated Vacuum Switch Characteristics

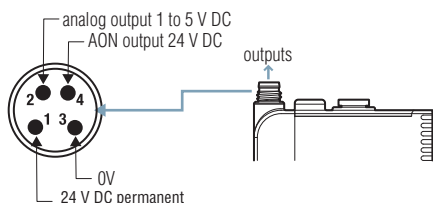
- Measuring range: -1 to 0 bar.
- Precision:  $\pm 1.5\%$  of the range.
- Hysteresis: adjustable from 0% to 100%.
- Output threshold: 1 x T.O.R. in NO.
- Analog output: 1 V DC to 5 V DC on the measuring range.
- Switching power: 125 mA, PNP.
- Threshold status display: 1 green LED.
- Supply voltage 24V DC (regulated  $\pm 10\%$ ).
- Current draw: < 20 mA.
- Protection: against polarity inversions.

#### Integrated Silencer Characteristics

- Noise level: approximately 68 dBA.
- Clog-free silencer.

#### Electrical Connections

##### MODULES WITH VACUUM SWITCH FUNCTION



#### Accessories

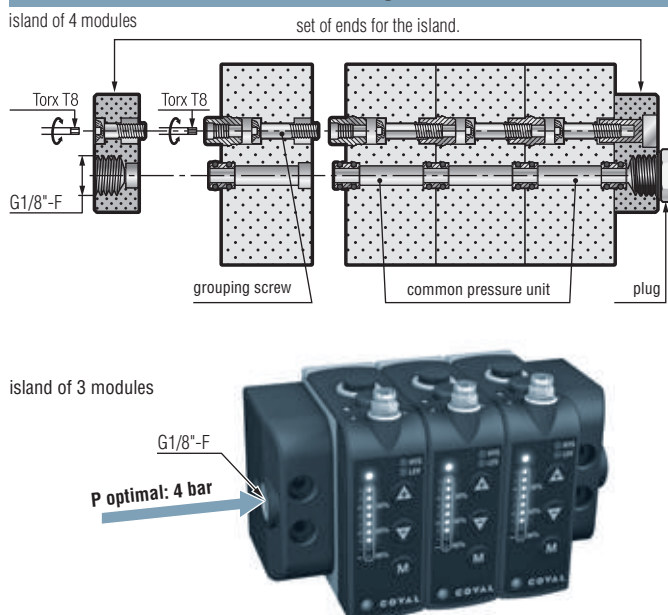
Power supply cable M8, straight, female, 4-pin – open end:

- **CDM8**: length. 2 m.
- **CDM8N**: length. 0.5 m.

Power supply cable M8, elbow, female, 4-pin – open end:

- **CCM8**: length. 2 m.

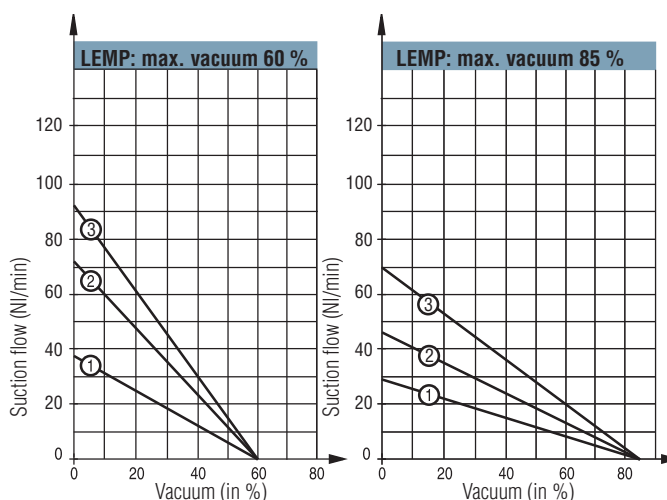
#### Characteristics and Connecting an Island



##### Maximum number of modules in an island:

- Ø 1.4 mm nozzle → 5 modules
- Ø 1.2 mm nozzle → 7 modules
- Ø 1 mm nozzle → 9 modules

#### Suction Flow Rate / Vacuum Curves



- 1 - LEMP60X10
- 2 - LEMP60X12
- 3 - LEMP60X14

- 1 - LEMP90X10
- 2 - LEMP90X12
- 3 - LEMP90X14



# Intelligent Vacuum Pumps

## Chapter 8

### LEM



#### Integrated Mini Vacuum Pumps with ASR (Air Saving regulator)

- Nozzle Ø: 1; 1.2; 1.4 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate up to 92 NI/min
- Integrated pressure regulator (ASR)
- All required functions integrated internally
- M8 connections
- Stand-alone or island module
- For airtight and porous objects
- Ultra compact and lightweight
- Control panel for monitoring and adjustment
- Energy savings in all networks > 4 bar
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

**P** 8/3

### LEMAX



#### Integrated Mini Vacuum Pumps with ASC (Air Saving Control)

- Nozzle Ø: 1; 1.2; 1.4 mm
- Vacuum level: 85%
- Suction flow rate up to 70 NI/min
- Integrated pressure regulator (ASR)
- Integrated vacuum regulation (ASC)
- All required functions integrated internally
- M8 connections
- Stand-alone or island module
- For sealed or slightly porous parts
- Ultra compact and lightweight
- Control panel for monitoring and adjustment
- ASC = 75% to 90% energy savings
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

**P** 8/11

### LEMAX IO



#### Mini Vacuum Pumps with Communication IO-Link

- Nozzle Ø: 1; 1.2; 1.4 mm
- Vacuum level: 85%
- Suction flow rate up to 70 NI/min
- Integrated pressure regulator (ASR)
- Integrated vacuum regulation (ASC)
- IO-Link
- M8 connections
- Stand-alone or island module
- For sealed or slightly porous parts
- Ultra compact and lightweight
- Settings and diagnosis by remote monitoring.
- ASC = 75% to 90% energy savings
- Easy installation and operation thanks to the IO-Link communication interface
- Adaptable to all industries

**P** 8/19

### LEMCOM



#### Mini Vacuum Pumps Communicating via Industrial Field Bus

- Nozzle Ø: 1; 1.2; 1.4 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate up to 92 NI/min
- Integrated pressure regulator (ASR)
- Integrated vacuum regulation (ASC)
- Field bus: PROFINET, EtherNet/IP™
- M8 connections
- Stand-alone or island module
- For sealed or slightly porous parts
- Ultra compact and lightweight
- Settings and diagnosis by remote monitoring.
- ASC = 75% to 90% energy savings
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

**P** 8/27

### LEM+



#### Compact High Flow Vacuum Pumps with ASR (Air Saving Regulator)

- Nozzle Ø: 2; 2.5 mm
- 2 vacuum levels: 60% and 85%
- Suction flow rate up to 275 NI/min
- Integrated pressure regulator (ASR)
- All required functions integrated internally
- M12 connections
- For airtight and porous objects
- Compact and lightweight
- Control panel for monitoring and adjustment
- Energy savings in all networks > 4 bars
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

**P** 8/39



# Intelligent Vacuum Pumps

## Chapter 8

### LEMAX+



#### Compact High Flow Vacuum Pumps with ASC (Air Saving Control)

- Nozzle Ø: 2 ; 2.5 mm
- Vacuum level: 85%
- Suction flow rate up to 200 NI/min
- Integrated pressure regulator (ASR)
- Integrated vacuum regulation (ASC)
- All required functions integrated internally
- M12 connections
- For sealed or slightly porous parts
- Compact and lightweight
- Control panel for monitoring and adjustment
- ASC = 75% to 90% energy savings
- Reduced wiring
- Reduced installation time
- Adaptable to all industries

P 8/45

### GVMAX HD



#### Heavy Duty Communicating Vacuum Pumps

- Nozzle Ø: 2.5 ; 3 mm
- Vacuum level: 85%
- Suction flow rate up to 230 NI/min
- Integrated vacuum regulation (ASC)
- Standard In/Out (SIO) and IO-Link
- NFC
- M12 connections
- Standalone vacuum pumps or in island assemblies
- For sealed or slightly porous parts
- High visibility color display with clear multi-lingual messages and straightforward settings menu
- ASC = 75% to 90% energy savings
- Easy installation and operation thanks to the IO-Link communication interface
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application
- Adaptable to all industries

NFC ))) IO-Link AIR Saving Control

P 8/51

### CMS HD



#### Heavy Duty Multi-stage Vacuum Pumps

- 3 powerful suction flow rates from 700 NI/min to 1600 NI/min
- Vacuum level: 80%
- With or without vacuum and blow-off control
- M12 connections
- Digital inputs/outputs mode (SIO) / IO-Link
- NFC
- 3 exhaust configurations
- For airtight and porous objects
- High visibility color display with clear multi-lingual messages and straightforward settings menu
- Easy installation and operation thanks to the IO-Link communication interface
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application
- Adaptable to all industries

NFC ))) IO-Link

P 8/65

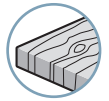
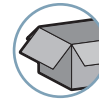
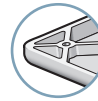
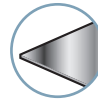


## Integrated Mini Vacuum Pumps with ASR (Air Saving Regulator)



**AIR**Saving  
Regulator

Industry-specific applications



For all objects, porous or airtight

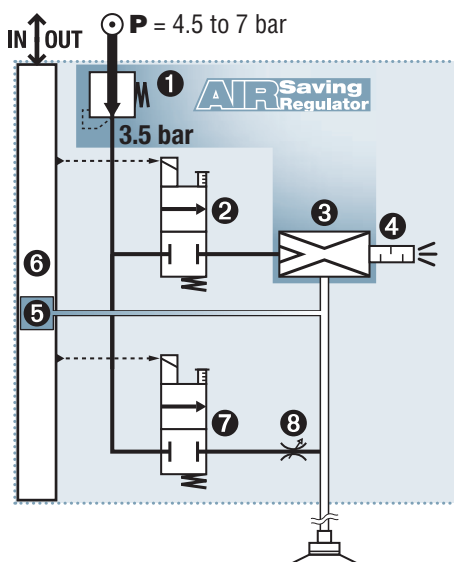
### Advantages

- "All-in-one" solution, no more peripherals to be added.
- Simplified installation and use thanks to the Plug & Play system
- Unmatched compactness: Installation close to suction cups → short response times and energy savings.
- No clogging, thanks to the through-type silencer.
- A LEM for every need: a wide range, with many options.
- Smart dialogue → user friendly at all stages: initial settings, operation, maintenance.

### Compact Integration

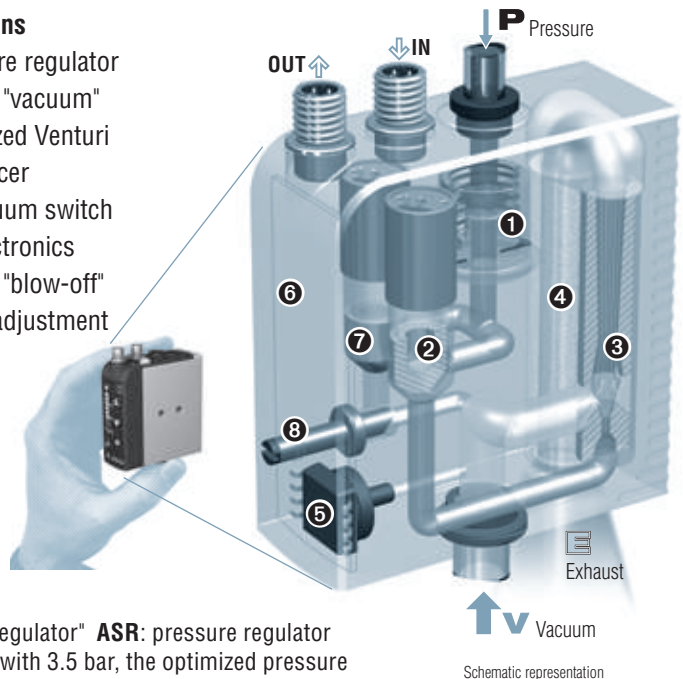
The illustrations below demonstrate the 8 functions integrated in the mini-module, and their respective roles in operation. The result of this COVAL innovation is:

- **A mini module** (≈ 120 g) that is easy to install close to the suction cups, reducing the volume to be evacuated → increased speed and energy savings.
- **A complete module** (including integrated pressure regulator and clog-free silencer), therefore not requiring any additional function or connection.



### Integrated functions

- 1 3.5 bar pressure regulator
- 2 Solenoid valve "vacuum"
- 3 3.5 bar optimized Venturi
- 4 Clog-free silencer
- 5 Electronic vacuum switch
- 6 Integrated electronics
- 7 Solenoid valve "blow-off"
- 8 Blow-off flow adjustment



Combined "venturi regulator" **ASR**: pressure regulator 1 feeds venturi 3 with 3.5 bar, the optimized pressure for its operation.

→ **No more unnecessary consumption of compressed air.**

**AIR**Saving  
Regulator

**40%** Energy savings

**AIR**Saving  
Regulator

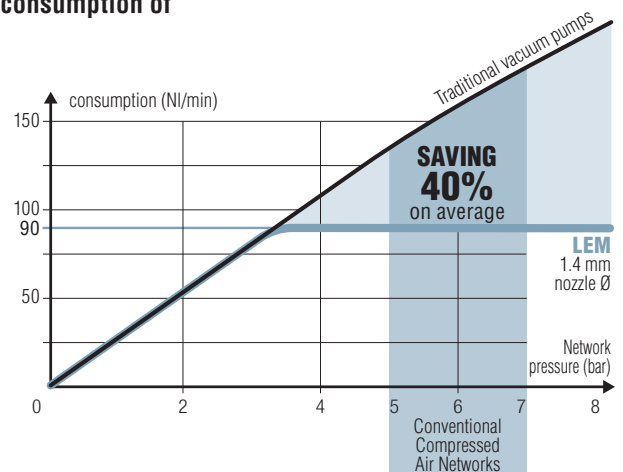
### (ASR): Air Saving Regulator

The LEM vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

Regardless of pressure supplied by the compressed air network, the integrated regulator feeds the venturi at **3.5 bar** pressure, optimal for its operation.

- No more unnecessary energy consumption.
- No external regulator required and thus the risk of inadvertent misadjustment is eliminated.

Compared to pressures found in most compressed air networks (5-7 bar), the graph opposite demonstrates an achieved economy of 40% on average.





## Integrated Mini Vacuum Pumps with ASR Smart Dialogue / Stand-alone and Island Modules



### A Complete Line

- 4 basic configurations, see adjacent illustrations →
- 2 levels : 60% and 85% vacuum.
- 3 standard nozzle diameters: 1, 1.2 and 1.4 mm.
- Air suction flow : up to 92 NI/min.
- Other options on request.

with vacuum switch, display and setting



with blow-off  
(LEM\_\_X\_\_SVA)



without blow-off  
(LEM\_\_X\_\_RVA)

without vacuum switch



with blow-off  
(LEM\_\_X\_\_SVO)

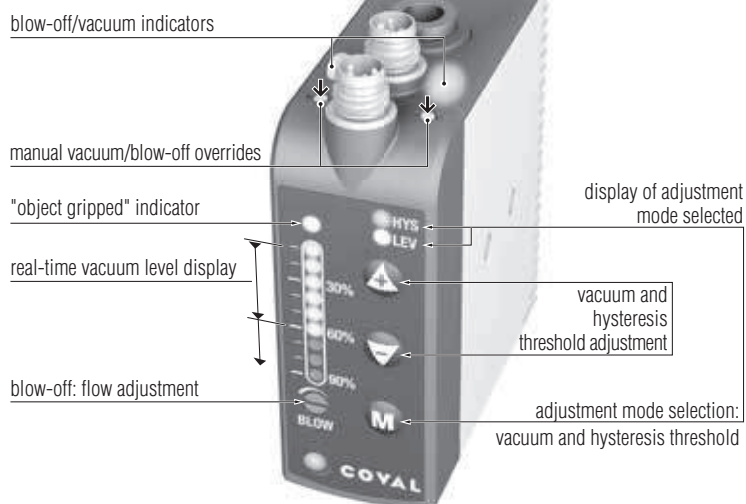


without blow-off  
(LEM\_\_X\_\_RVO)

### Smart Dialogue

The front dialogue panel shown here displays the real-time vacuum level and lets the operator set the threshold level which triggers the "object gripped" signal allowing operations to continue.

This communications panel is particularly visual and intuitive. It makes it easy to monitor production by viewing each of the phases of the cycle: vacuum, blow-off, and rest.



### Mounting Options

Individual mountings, close to vacuum cups or compact island assembly.

side mounting



front mounting



over a DIN rail



island mounting





## Integrated Mini Vacuum Pumps with ASR Stand-alone and Island Modules / Option



AIR Saving  
Regulator

### Stand-alone or Island Modules?

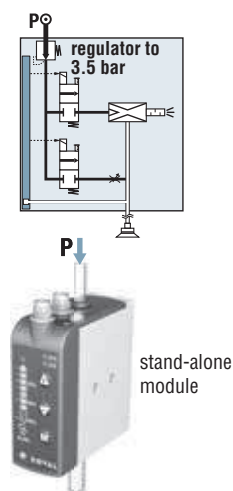
Stand-alone modules are suitable for the most common applications; one module controls one or more suction cups which all operate according to the same sequence. When several suction cups are operating according to different sequences, multiple modules are required, which can be:

- several stand-alone modules,
- an island of these modules with an internal common pressure unit.

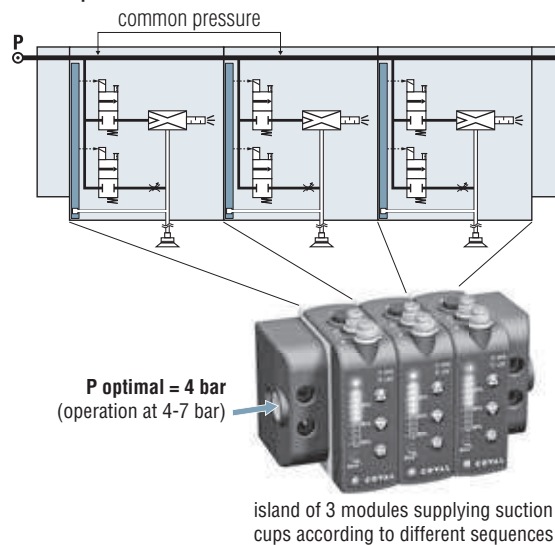
The diagrams help in the selection:

- stand-alone modules are complete, with the integrated pressure regulator (**ASR**)
- in an island, the integrated regulator is absent: to maintain the advantage of economical and silent operation, it is recommended to reduce the pressure of the island's common pressure unit to 4 bar.

4.5 to 7 bar network pressure



network pressure 4 bar

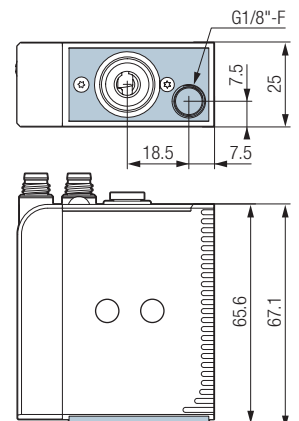
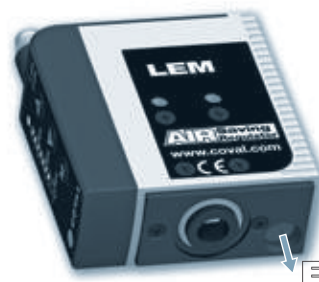


### Exhaust manifold: option E

The LEM mini vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/8"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece (LEM\_\_E version).

This option must be specified at time of ordering as it cannot be added later.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.



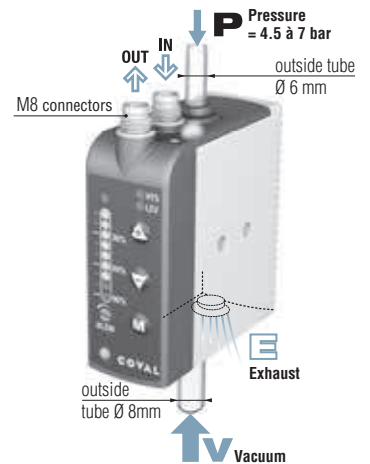
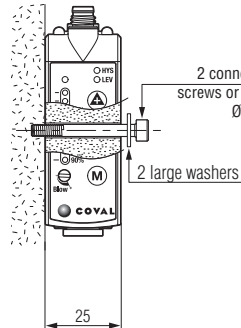
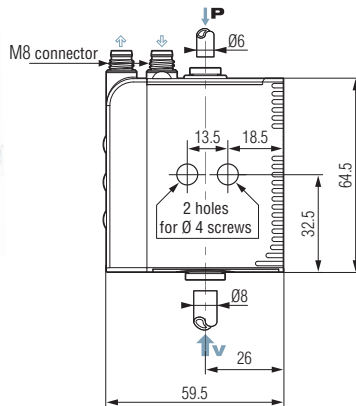




#### Stand-alone Modules



Side mounting



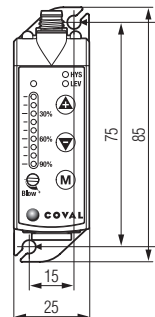
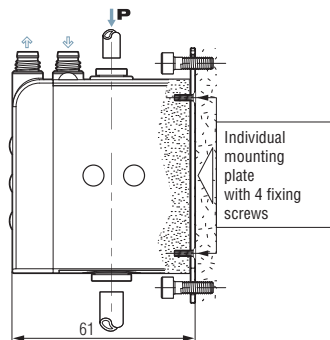
For front mounting, order the necessary kit, in addition to the module:

Front mounting kit:  
1 plate + 4 screws

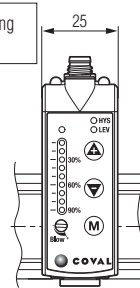
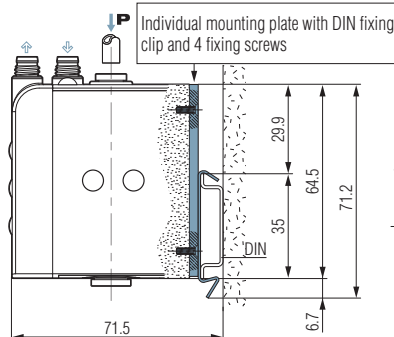
**Part No.: LEMFIXA**



Front mounting



Mounting on DIN rail

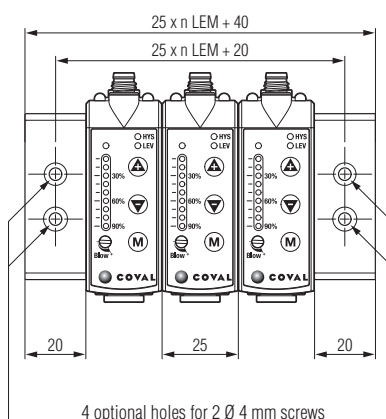


A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

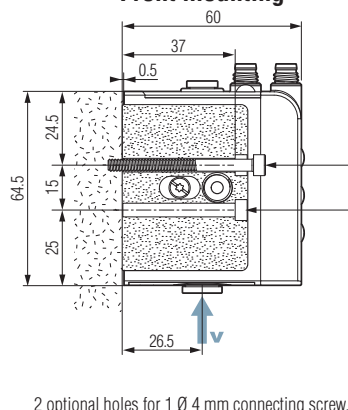
DIN rail mounting kit:  
1 plate/clip + 4 screws

**Part No.: LEMFIXB**

#### Islands

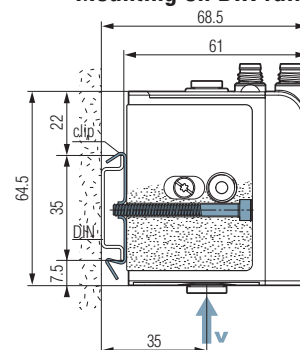


#### Front mounting



2 optional holes for 1 Ø4 mm connecting screw, at each end of the island

#### Mounting on DIN rail



DIN rail mounting kit:  
2 clips + 2 screws

**Part No.: LEMFIXC**





### LEM: Versatile Series for all Applications

The opposite page demonstrates the versatility of this series. In addition to a very wide range of complete, stand-alone, or island vacuum pumps, there are the options of no blow-off and/or no vacuum switch, and for specific applications.

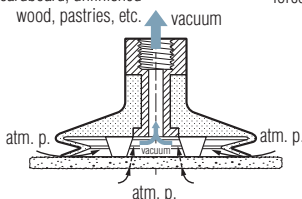
### Select Vacuum Level and Nozzle Diameter

The introductory guide in this catalog shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump.

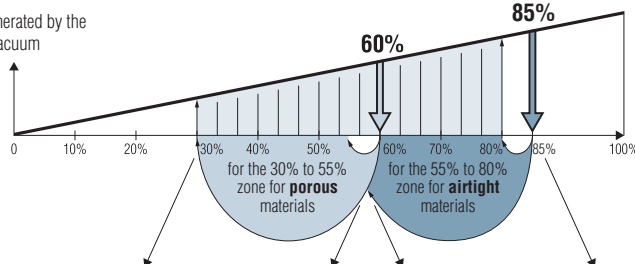
The table below helps to select the nozzle diameter which generates enough vacuumed air flow to respond in the time required by the application, based on a measurement of the material's leakage rate. On the contrary, with an airtight material, the vacuum used is 55% to 80%, obtained by a 85% max. vacuum pump.

- For standard cases, with its integrated blow-off, the LEMAX series is preferable, as it is more economical due to its ASC (Air Saving Control) function.
- For special cases, the LEM series contains versions without blow-off and versions without a vacuum switch. The table below helps to select the nozzle diameter required for the application.

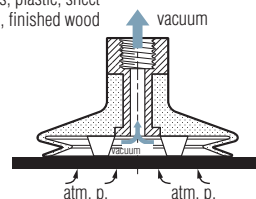
**Porous materials:**  
cardboard, unfinished  
wood, pastries, etc.



force generated by the  
vacuum



**Airtight materials:**  
glass, plastic, sheet  
metal, finished wood



#### Porous Objects ▶ Maximum Vacuum Level: 60%

Time to create vacuum (seconds) for a volume of 1 liter

vacuum achieved	30%	35%	40%	45%	50%	55%	Air consumed (NI/min)	Air drawn in (NI/min)
ø nozzle								
1.0 mm	0.66	0.83	1.04	1.31	1.70	2.35	44	38
1.2 mm	0.41	0.52	0.66	0.83	1.07	1.49	65	72
1.4 mm	0.27	0.34	0.43	0.54	0.70	0.97	90	92

#### Airtight Objects ▶ Maximum Vacuum Level: 85%

Time to create vacuum (seconds) for a volume of 1 liter

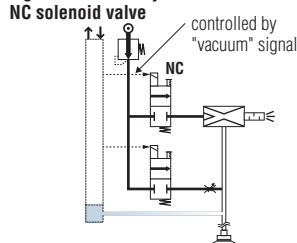
vacuum achieved	55%	60%	65%	70%	75%	80%	Air consumed (NI/min)	Air drawn in (NI/min)
ø nozzle								
1.0 mm	1.76	2.04	2.38	2.80	3.33	4.09	44	29
1.2 mm	1.13	1.31	1.53	1.80	2.15	2.64	65	45
1.4 mm	0.73	0.85	0.99	1.16	1.38	1.70	90	70

### Select Vacuum Controlled by NC or NO Solenoid Valve

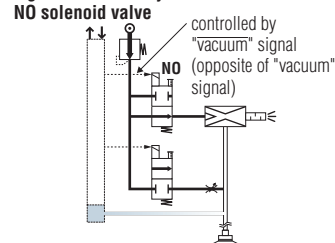
Vacuum controlled by a NC (Normally Closed) solenoid valve remains the simplest standard option to use. In the event of an electricity shutoff, the vacuum is interrupted and the object is released.

Select vacuum controlled by NO (Normally Open) solenoid valve if the application requires holding the object in the event of an electricity shut-off. In this case, make sure to control the NO solenoid valve with the inverse signal of the "vacuum" signal, which is noted as "vacuum".

signal controlled by  
NC solenoid valve



signal controlled by  
NO solenoid valve



### Select with or without Integrated Blow-off

Many applications require integrated blow-off. However, for some applications not requiring blow-off, a simplified version without blow-off is offered.

### Select with or without Vacuum Switch

For common applications, the vacuum switch is needed, with the dialogue face for digital display and adjustment. However, some applications may just require a simple operation, without an "object gripped" return signal. The simplified version may then be chosen, with no vacuum switch, display, or adjustment.



## Integrated Mini Vacuum Pumps with ASR Configuring a Vacuum Pump



AIR Saving  
Regulator

Part numbers for an island assembly or components in an island

Part numbers for stand-alone units

**LEM 60 X 12 S VA - B3**

VACUUM LEVEL	
60% max. vacuum → porous objects	<b>60</b>
85% max. vacuum → airtight objects	<b>90</b>

NOZZLE DIAMETER	
Ø 1 mm nozzle	<b>10</b>
Ø 1.2 mm nozzle	<b>12</b>
Ø 1.4 mm nozzle	<b>14</b>

VACUUM SWITCH	
<b>VA</b>	Electronic vacuum switch with digital display and adjustment
<b>VO</b>	No vacuum switch and no adjustment

### ISLAND ASSEMBLIES

<b>B2</b>		LEM_X..... <b>B2</b> island assembly with 2 identical modules.
<b>B3</b>		LEM_X..... <b>B3</b> island assembly with 3 identical modules.
<b>B4</b>	...	

If the planned island contains different module types, it must be ordered as separate components in order to then be assembled on site according to the arrangement suitable to the application.

### COMPONENTS FOR THE ISLAND TO BE ASSEMBLED

<b>B</b>		LEM_X..... <b>B</b> Module that can be grouped (complete with integrated grouping screw)
		Set of ends for a complete group, with grouping screw and common pressure unit plug.
<b>PART NO.: LEMSETA</b>		

COMPOSITION OF THE MODULE	
<b>S</b>	<ul style="list-style-type: none"> <li>Vacuum controlled by NC solenoid valve → if the electricity is shut off, the vacuum is interrupted.</li> <li>Blow-off controlled by a specific signal</li> </ul>
<b>V</b>	<ul style="list-style-type: none"> <li>Vacuum controlled by NO solenoid valve → vacuum is maintained if electricity is shut off</li> <li>Blow-off controlled by a specific signal</li> </ul>
<b>R</b>	<ul style="list-style-type: none"> <li>Vacuum controlled by NC solenoid valve</li> <li>No blow-off</li> </ul>
<b>U</b>	<ul style="list-style-type: none"> <li>Vacuum controlled by NO solenoid valve</li> <li>No blow-off</li> </ul>

EXHAUST	
Open (integrated silencer)	<b>-</b>
Exhaust manifold (G1/8"-F)	<b>E</b>

### EXAMPLE COMPOSITE PART NUMBER FOR AN ISLAND ASSEMBLY:

#### LEM60X14SVAB3

LEM island assembly, containing 3 x 60% max. vacuum modules, Ø 1.4 mm nozzle, controlled by NC solenoid valve, blow-off and vacuum switch

### ORDER EXAMPLE FOR AN ISLAND TO BE ASSEMBLED:

- LEM60X10VVAB
  - LEM90X12SVAB
  - LEM60X14SVAB
  - LEMSETA
- 3 LEM modules for a group, of different types.
- Set of ends for island.

### REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

#### LEM60X12SVA

Stand-alone LEM Module, 60% max. vacuum, Ø 1.2 mm nozzle, vacuum controlled by NC solenoid valve, blow-off and vacuum switch.

### Additional options: On specific request:

- Modules with enhanced blow-off by integrated isolation valve.
- Modules with non-return valve will maintain vacuum in the event of loss of pneumatic and/or electrical power, during the grip cycle.





AIR Saving  
Regulator

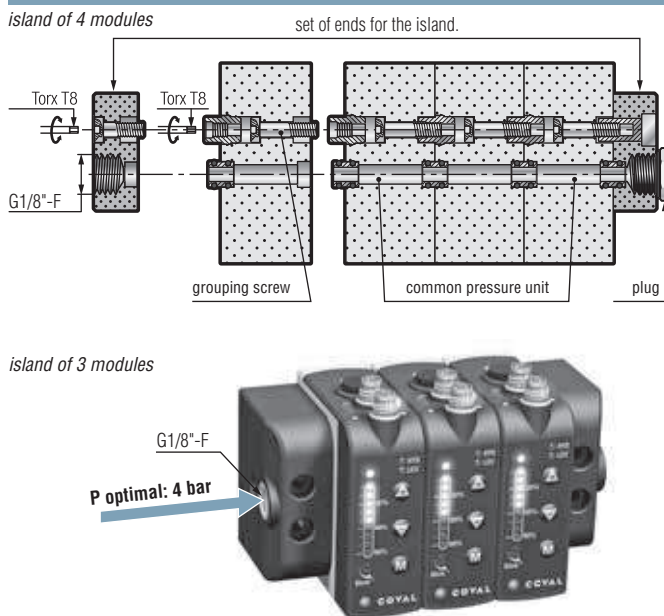
#### Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure: - stand-alone module: P = 4.5 bar.  
- island modules: 4 bar.
- Blow-off: adjustable flow: - stand-alone version: P = 3.5 bar.  
- island version: P network.
- Maximum vacuum: 60% or 85% depending on model.
- Suction rate: 29 to 92 NI/min depending on model.
- Air consumption: 44 to 90 NI/min depending on model.
- Electrical protection level: IP 65.
- Control voltage: 24 V DC (regulated  $\pm 10\%$ ).
- Current draw: 30 mA (0.7 W) vacuum or blow-off.
- Max. operating frequency: 4 Hz.
- Endurance: 30 million cycles.
- Weight: 90 to 120 g, depending on model.
- Operating temperature: 0 to 50 °C.
- Materials: PA 6-6 15 %FV, brass, aluminum, NBR.

#### Integrated Vacuum Switch Characteristics

- Measuring range: -1 to 0 bar.
- Precision:  $\pm 1.5\%$  of the range.
- Hysteresis: adjustable from 0% to 100%.
- Output threshold: 1 x T.O.R. in NO.
- Analog output: 1 V DC to 5 V DC on the measuring range.
- Switching power: 125 mA, PNP.
- Threshold status display: 1 green LED.
- Supply voltage 24V DC (regulated  $\pm 10\%$ ).
- Current draw: < 20 mA.
- Protection: against polarity inversions.

#### Characteristics and Connecting an Island



#### Maximum number of modules in an island:

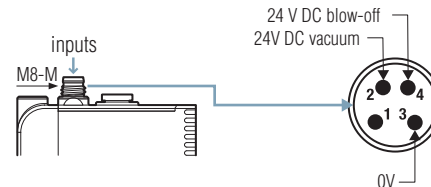
- $\varnothing 1.4$  mm nozzle  $\rightarrow$  5 modules
- $\varnothing 1.2$  mm nozzle  $\rightarrow$  7 modules
- $\varnothing 1$  mm nozzle  $\rightarrow$  9 modules

#### Integrated Silencer Characteristics

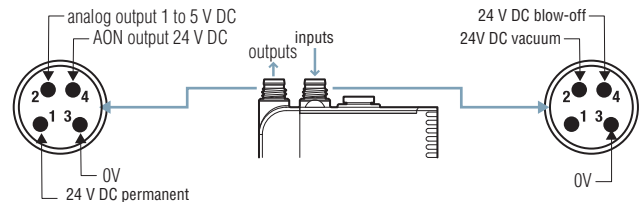
- Noise level: approximately 68 dBA.
- Clog-free silencer.

#### Electrical Connections

##### MODULES WITHOUT VACUUM SWITCH FUNCTION



##### MODULES WITH VACUUM SWITCH FUNCTION



#### Accessories

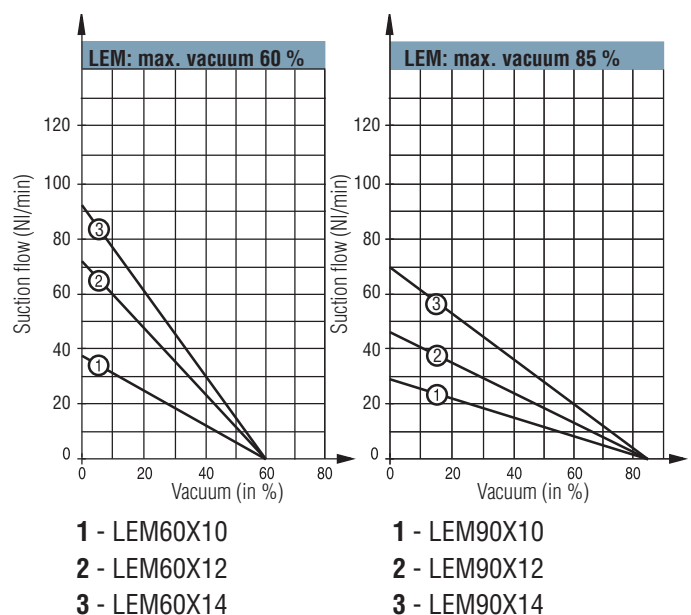
Power supply cable M8, straight, female, 4-pin – open end:

- CDM8: length. 2 m.
- CDM8N: length. 0.5 m.

Power supply cable M8, elbow, female, 4-pin – open end:

- CCM8: length. 2 m.

#### Suction Flow Rate / Vacuum Curves



- 1 - LEM60X10
- 2 - LEM60X12
- 3 - LEM60X14

- 1 - LEM90X10
- 2 - LEM90X12
- 3 - LEM90X14

**Note:** in the same island, it is possible to combine LEM series modules and LEMAX series modules.







## Integrated Mini Vacuum Pumps with "ASC" (Air Saving Control)



AIR Saving Control

Industry-specific applications



For all objects, airtight or not very porous



### Advantages

- Energy savings of 75% to 99% (depending on application) thanks to automatic **ASC** (Air Saving Control) operation.
- "All-in-one" solution, no more peripherals to be added.
- Simplified installation and use thanks to the Plug & Play system.
- Unmatched compactness: installation close to suction cups → short response times and energy savings.
- No clogging, thanks to the through-type silencer.
- Controlled or timed blow-off.
- Gripping safety in the event of electricity shut-off.
- Smart communication → Easier experience at all stages: initial settings, production, maintenance.

### Compact Integration

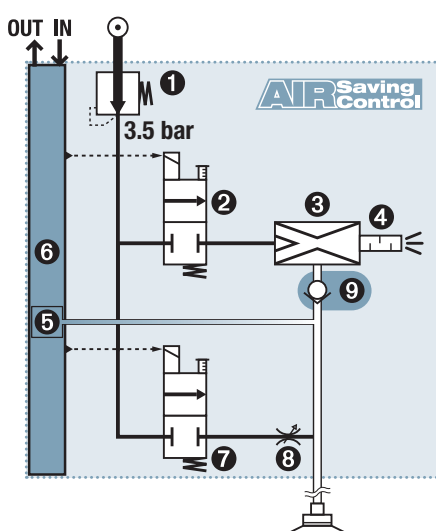
The illustrations below demonstrate the 9 functions integrated in the mini-module, and their respective roles in operation.

The result of this COVAL performance is:

- A **mini module** (≈ 130 g) that is easy to install close to the suction cups, reducing the volume to be evacuated → increased speed and energy savings.
- A **complete module**, therefore not requiring any additional function or connections.

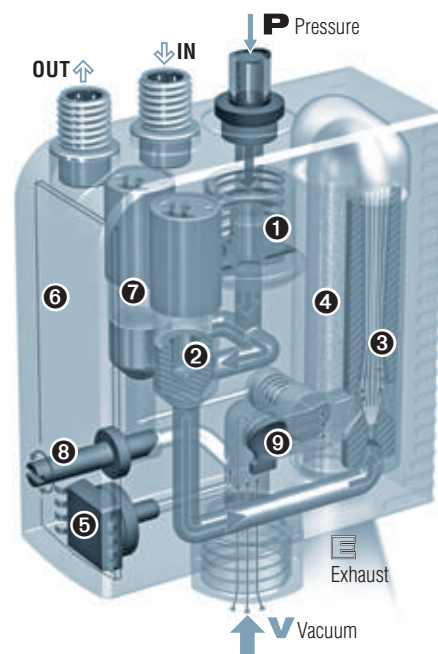
The **LEMAX** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air usage and are adapted for every application:

- 1 3.5 bar pressure regulator
- 2 Solenoid valve "vacuum"
- 3 3.5 bar optimized Venturi
- 4 Through-type silencer
- 5 Electronic vacuum switch
- 6 Integrated electronics
- 7 Solenoid valve "blow-off"
- 8 Blow-off flow adjustment
- 9 Check valve on vacuum

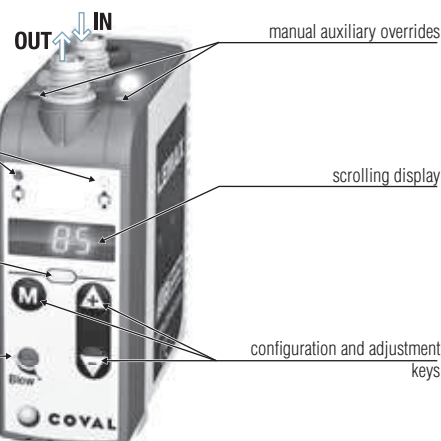


Combination of non-return 9 and advanced electronics 6 ensures the **ASC's** automatic performance.

→ Once desired vacuum level is reached, the **LEMAX** no longer consumes air when gripping the product.



Schematic representation



### Smart Communication

The adjacent illustration presents the display panel which enables:

- Initial settings
- Any adjustments
- Production monitoring
- Maintenance

In particular, the no "**ASC**" alert, (see next page), helps to start maintenance operations in order to return to "**ASC**" operation, which is especially energy-saving.

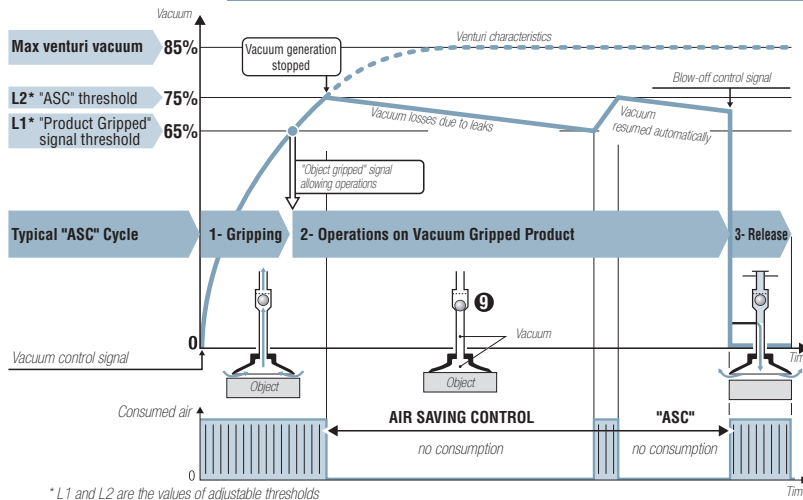
AIR Saving Control

90% energy savings  
(on average).





### "Air Saving Control" Cycle



As illustrated above, the LEMAX module automatically executes the "ASC", cycle, thus saving the maximum amount of energy, based on the following 3 phases.

#### 1- Gripping the object

The "vacuum" solenoid ② starts the cycle by supplying the venturi ③ which generates the vacuum to quickly pick up the object with the suction cup → short-term consumption.

#### 2- Operations on the object held by vacuum

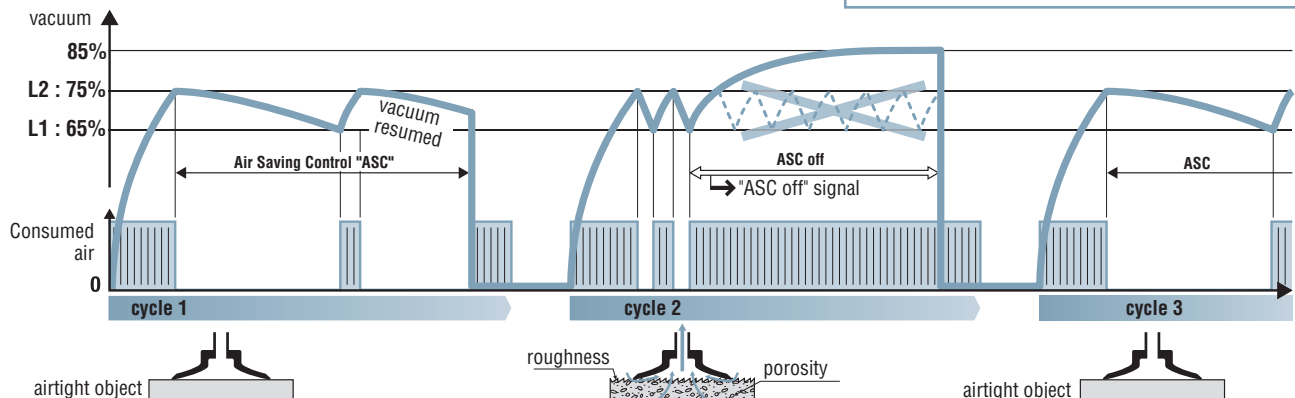
The vacuum level is constantly monitored by the vacuum switch ⑤. When it reaches the L1 threshold (65%), the "gripped object" signal is generated, which allows the planned operations (transfer, machining, etc.). When the vacuum reaches threshold L2 (75%), the supply to the venturi via the solenoid valve ② is cut off → consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ④. Micro-leaks will generally cause the vacuum level to fall slowly. Each time it falls below 65%, vacuum generation is briefly resumed until it reaches threshold L2 (75%).

#### 3- Releasing the object

At the end of operations, blow-off is ordered. The "blow-off" solenoid valve ⑦ generates a stream of air which closes the isolation valve ⑥, blows on the object to release it quickly.

### Smart Adaptation

The illustration below shows the adaptation capacities of the LEMAX module. "ASC" operation is automatic for any object that is airtight enough (cycle 1). If a leak occurs (cycle 2), due to a rough object or to suction-cup wear, the module automatically detects the anomaly, ends the cycle without "ASC" in order to continue production and reports the event for possible maintenance. Production continues. Once everything is returned to normal (cycle 3), "ASC" operation is automatically resumed.



#### 1- Gripping + Transfer (Ø 1.4 mm nozzle, 0.2 l of vacuum)

Phase	Duration	Air consumption		Energy savings achieved
		"ASC" off	"ASC" on	
Gripping	0.28 s	0.4 NI	0.4 NI	75 %
Transfer	1.20 s	1.8 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		2.4 NI	0.6 NI	

#### 2- Clamping + Operations (Ø 1.4 mm nozzle, 0.4 l of vacuum)

Phase	Duration	Air consumption		Energy savings achieved
		"ASC" off	"ASC" on	
Clamping	0.55 s	0.8 NI	0.8 NI	99 %
Operations	60 s	90 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		91 NI	1.0 NI	

### Resulting savings

Energy savings from "ASC" are major, as the two examples opposite above:

- 75% savings for transferring an object after gripping.
- 99% savings for holding an object during a 1 minute operation.

The investment generally pays for itself in just a few months.

### "ASC": AN ADVANTAGE WITHOUT LIMITATIONS

Saving energy has become essential. With LEMAX, thanks to "ASC", energy is automatically saved without interfering with established operations:

- 1- No specific adjustment:** The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.
- 2- Production regardless of what happens:** Operation is always ensured, if necessary without "ASC", if the leakage level is too high.
- 3- Guided maintenance:** Clear display of the need for maintenance to return to auto-regulated "ASC" operation.



The LEMAX vacuum pumps, which integrate an ASR "venturi regulator" combination, share values that COVAL values greatly: they greatly reduce the volume of compressed air consumption and noise level.



## Integrated Mini Vacuum Pumps with "ASC" Selection Guide



### Power Determined by the Venturi Nozzle Diameter

The table shows the power levels generated by each of the nozzle diameters available: when the module is operating with "ASC" off, a larger nozzle draws and consumes more compressed air.

On the other hand, during "ASC" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

In conclusion:

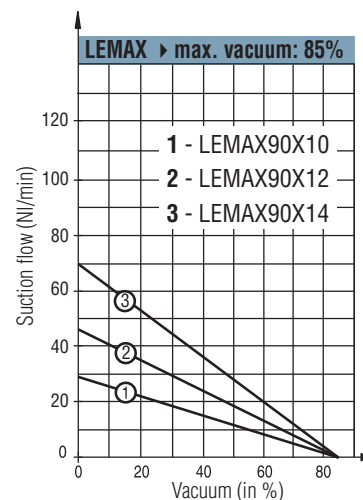
- A large nozzle enables quicker gripping without consuming more during "ASC" operation.
- A small nozzle consumes less only when operating continues without "ASC".

#### Selecting the Nozzle Diameter

Ø nozzle	Venturi characteristics during "ASC off" operation.		"ASC" operation - gripping at 65% vacuum - vacuum shutoff at 75% Time for a volume of 1l		
	air drawn in (NI/min)	air consumed (NI/min)	grip time (s) (65% vacuum)	time (s) up to 75% vacuum	air consumed (NI)
1.4 mm	70	90	0.99	1.38	2.2
1.2 mm	45	65	1.53	2.15	2.2
1.0 mm	29	44	2.38	3.33	2.2



### Suction Flow Rate / Vacuum Curves



### Select Vacuum Controlled by NC or NO Solenoid Valve

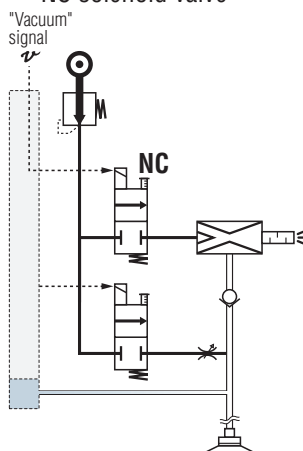
Vacuum controlled by a NC (Normally Closed) solenoid valve remains the simplest standard option to use. In the event of an electricity shutoff, the vacuum is interrupted and the object is released. On the contrary, with vacuum control by NO (Normally Open) solenoid valve, the vacuum continues to be generated in the event of an electrical shutoff: positive object-holding security.

The diagrams opposite show that both versions are controlled by the same "vacuum" signal  $\nu$ :

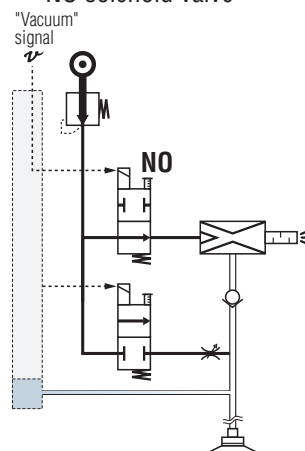
- NC version, the signal  $\nu$  controls the vacuum generation.
- NO version, the signal  $\nu$  controls the vacuum shutdown.

Note, however, that the NO version requires blow-off controlled by a specific signal: automatic, timed blow-off can only be configured in the NC version.

#### ■ NC solenoid valve



#### ■ NO solenoid valve



### Stand-alone or Island Modules?

Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

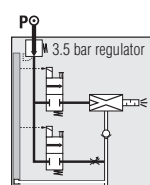
When several suction cups are operating according to different sequences, multiple modules are required, which can be:

- several autonomous modules;
- a group of these modules with an internal common pressure unit.

The illustrations opposite guide the selection:

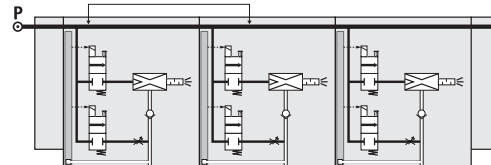
- stand-alone modules are coupled with integrated pressure regulators (ASR)
- in an island, the integrated regulator is removed: to maintain the advantage of economical and silent operation, it is recommended to reduce the island's common pressure supply pressure to 4 bar.

Network pressure:  
4.5 to 7 bar



stand-alone module

common pressure unit (4 bar)



P optimal = 4 bar  
(operation at 4-7 bar)



island of 3 modules  
supplying suction cups  
according to different  
sequences



## Integrated Mini Vacuum Pumps with "ASC" Configuring a Vacuum Pump

AIR Saving Control



Part numbers for an island assembly or components in an island

Part numbers for stand-alone units



**LEMAX 90 X 14 S - - B3**

### VACUUM LEVEL

maximum 85%  
vacuum optimum for  
airtight objects

**90**

### NOZZLE DIAMETER

Ø 1.4 mm nozzle

**14**

Ø 1.2 mm nozzle

**12**

Ø 1 mm nozzle

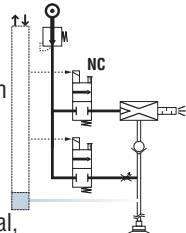
**10**

### COMPOSITION OF THE MODULE

**Vacuum pump controlled by a Normally Closed (NC) solenoid valve**

LEMAX90X...S...

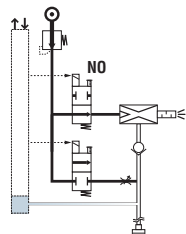
- In the event of an electrical shut-off, vacuum is no longer generated.
- Optional configured blow-off:
  - by specific signal,
  - automatic, timed 0 to 9.9 sec.
 (→ a single control signal vacuum and blow-off).



**Vacuum pump controlled by a Normally Open (NO) solenoid valve**

LEMAX90X...V...

- In the event of an electrical shut-off, the vacuum continues to be generated: gripped object held → positive security.
- Blow-off controlled by a specific signal.



### CONNECTORS

- Vacuum Pump with 2 M8 4-pin Connectors LEMAX90X...



- Discrete I/O.
- "Gripped product" switching output 24V DC / NO.
- 1 configurable auxiliary output:
  - either "Vacuum level" signal analogic 1 to 5V DC.
  - or "Without ASC" signal +5V DC switching output NO.

**C14**

Vacuum Pump with 1 M8 4-pin Connector LEMAX90X...SC14 (S version only)



- "Gripped product" switching output 24V DC / NO.
- Automatic blow-off, timed 0 to 9.9 sec.

### EXHAUST

Open (integrated silencer)

**-**

Exhaust manifold (G1/8"-F)

**E**

### ISLAND ASSEMBLIES

**B2**

LEMAX90X...B2 island assembly with 2 identical modules.



**B3**

LEMAX90X...B3 island assembly with 3 identical modules.



**B4**

...

If the planned island contains different module types, it must be ordered as separate components in order to then be assembled on site according to the arrangement suitable to the application.

### COMPONENTS FOR THE ISLAND TO BE ASSEMBLED

**B**

LEMAX...B Module that can be grouped (complete with integrated grouping screw).



Set of ends for a complete island, with grouping screw and common pressure unit plug.



**PART NO.: LEMSETA**

Input/Output switching type can be set to PNP/NPN

### REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

■ **LEMAX90X14S**

LEMAX, mini vacuum pump, 85% max. vacuum, 1.4 mm nozzle, controlled by a NC (Normally Closed) solenoid valve.

### EXAMPLE COMPOSITE PART NUMBER FOR AN ISLAND ASSEMBLY:

■ **LEMAX90X14SB3**

LEMAX group assembly, containing 3 x 85% max. vacuum modules, Ø 1.4 mm nozzle, controlled by NC (Normally Closed) solenoid valve.

### ORDER EXAMPLE FOR AN ISLAND TO BE ASSEMBLED:

■ **LEMAX90X14VB**

■ **LEMAX90X12SB**

■ **LEMAX90X10VB**

■ **LEMSETA**

3 LEMAX modules for an island, of different types.

→ Set of ends for island.



## Integrated Mini Vacuum Pumps with "ASC"

### Dimensions, Mounting Options

AIR Saving Control

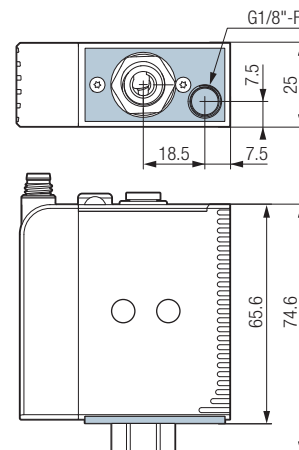


#### Exhaust manifold: option E

The LEMAX mini vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/8"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece (LEMAX\_\_\_E version).

This option must be specified at time of ordering as it cannot be added later.

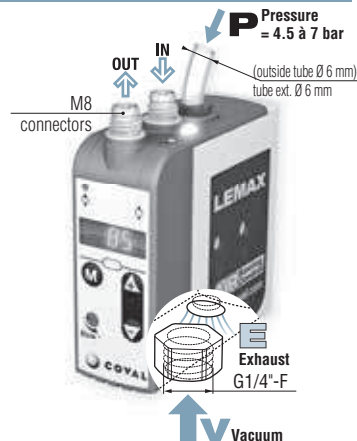
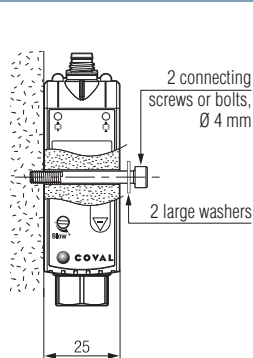
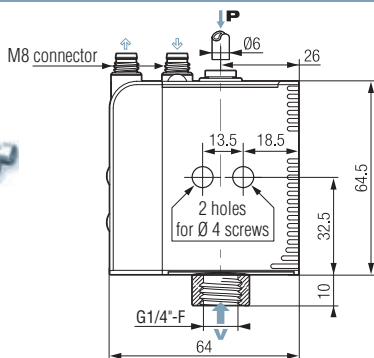
**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.



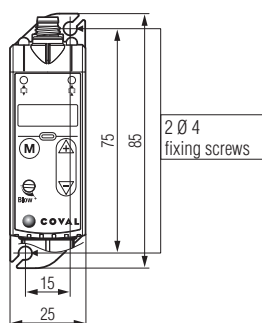
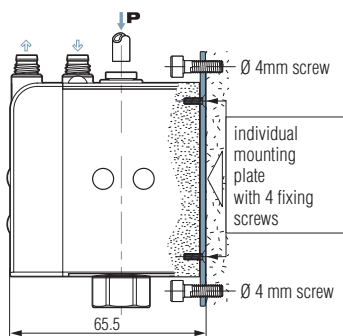
#### Stand-alone Modules



Side mounting



Front mounting



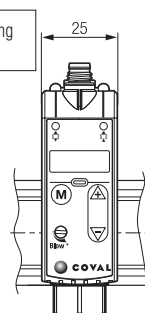
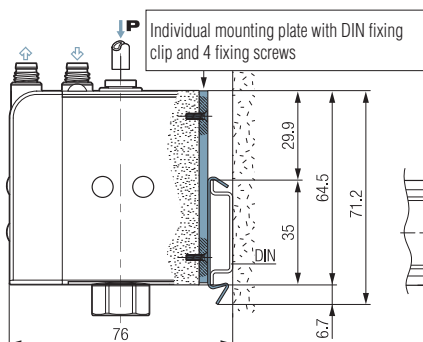
For front mounting, order the necessary kit, in addition to the module:

Front mounting kit:  
1 plate + 4 screws

**Part No.: LEMFIXA**



Mounting on DIN rail



A module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual DIN installation plate, ordered separately:

DIN rail mounting kit:  
1 plate/clip + 4 screws

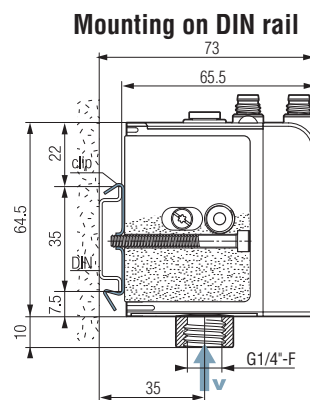
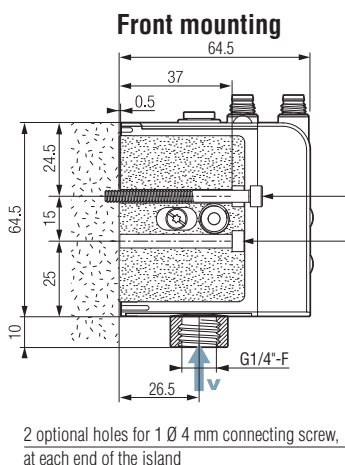
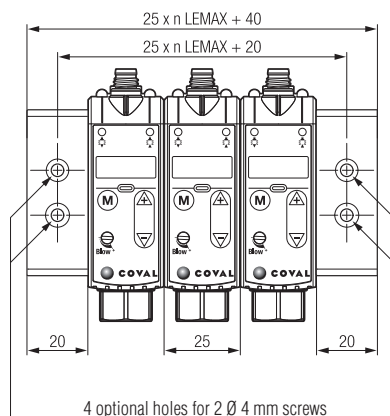
**Part No.: LEMFIXB**





AR Saving Control

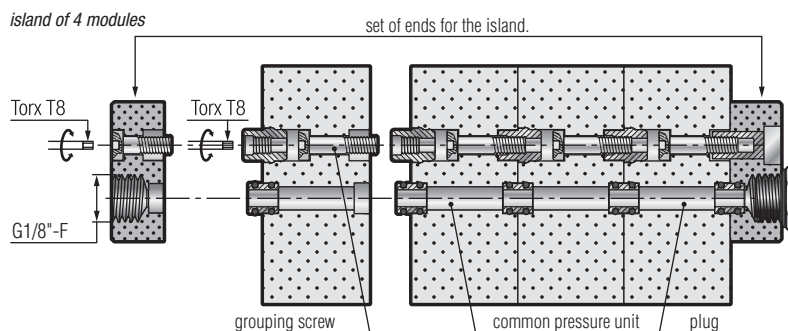
#### Islands



DIN rail mounting kit: 2 clips + 2 screws

Part No.: LEMFIXC

#### Assembling and Connecting an Island



island of 3 modules



#### Maximum number of modules in an island:

- Ø 1.4 mm nozzle → 5 modules
- Ø 1.2 mm nozzle → 7 modules
- Ø 1 mm nozzle → 9 modules

#### Note:

In a single island, it is possible to combine LEMAX series modules and LEM series modules.

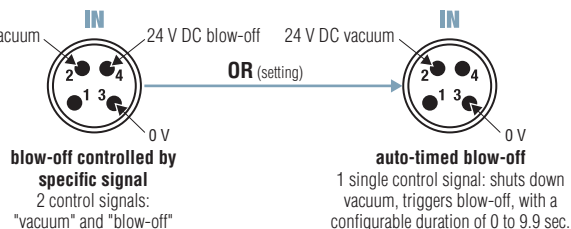
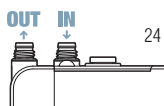
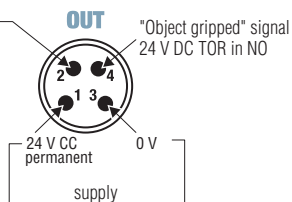




### For NC Vacuum Pumps with 2 M8 4-pin connectors, model LEMAX90X..S..

#### configurable auxiliary output

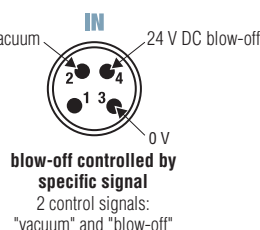
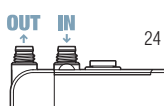
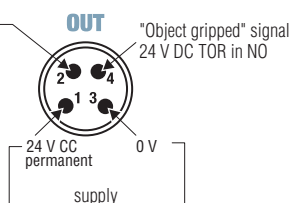
- "vacuum level" signal analog, 1 to 5 VDC
- OR (configuration)
- ASC off signal +5 V TOR in NO



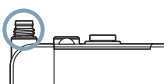
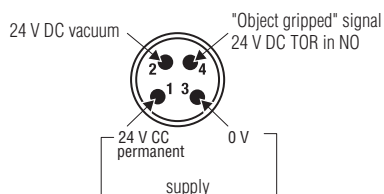
### For NO Vacuum Pumps with 2 M8 4-pin connectors, model LEMAX90X..V..

#### configurable auxiliary output

- "vacuum level" signal analog, 1 to 5 VDC
- OR (configuration)
- ASC off signal +5 V TOR in NO



### For NC Vacuum Pumps with 1 M8 4-pin connector, model LEMAX90X..SC14



#### Accessories



Power supply cable M8, straight, female, 4-pin – open end:

- CDM8: length. 2 m.
- CDM8N: length. 0.5 m.

Power supply cable M8, elbow, female, 4-pin – open end:

- CCM8: length. 2 m.

#### Accessory

**Protection for standalone mini-vacuum pumps LEMAX\_\_SC14**  
(with one M8 connector), Part No.: 80004409

The COVER is made of silicone and serves as a protective sleeve for vacuum pumps, protecting them against splashing water, in particular during cleaning cycles.

- High level of protection against splashing water
- Easy to mount and clean





## Integrated Mini Vacuum Pumps with "ASC" Characteristics



### Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure:
  - stand-alone version: P = 4.5 bar.
  - island version: P = 4 bar.
- Blow-off: adjustable flow:
  - stand-alone version: P = 3.5 bar.
  - island version: P network
- Maximum vacuum: 85%
- Suction rate: 29 to 70 NI/min.
- Air consumption: 44 to 90 NI/min during "ASC" off operation
- Integrated clog-free silencer.
- Noise level: approximately 68 dBA "ASC" off. 0 dBA with "ASC".
- Electrical protection level: IP 65.
- Max. operating frequency: 4 Hz.

- Endurance: 30 million cycles.
- Weight: 130 g.
- Operating temperature: 0 to 50 °C.
- Materials: PA 6-6 15%FV, brass, aluminum, NBR.

### Electrical controls

- Control voltage: 24 V DC (regulated  $\pm 10\%$ ), PNP or NPN.
- Current draw: 30 mA (0.7 W) vacuum or blow-off.

### Integrated electronics

- Power supply 24 V; current draw: <57mA.
- Measuring range: 0 to 99% vacuum.
- Measuring precision:  $\pm 1.5\%$  of the range, compensated in temperature.
- Display: 3 digits, 7 segments.

### Service Characteristics

#### "Object gripped" output signal

- 24 VDC, switching output / NO, switching power: 125 mA PNP or NPN.

#### Configurable auxiliary output, choose either of the following (not available for version LEMAX90X\_**SC14**):

- "vacuum level" signal, analog 1 to 5 V DC of the measuring range.
- "ASC" off signal, +5 V switching output / NO.

#### Input/Output switching type

- can be set to PNP (by default) or NPN.

#### Displays

- Scrolling display: 3 digits, 7 segments.
- Flashing if "ASC" off for maintenance.
- Status indicators: "Vacuum," green LED, "blow-off," red LED.
- "Object gripped" indicator: Green LED on front panel.

#### Configurations

- By mechanical keys and drop-down menu.
- Measurement unit selection (% , mbar, inHg).
- Choice of blow-off type:
  - LEMAX90X\_**S** version: controlled by a specific signal or automatic and adjustable from 0 to 9.9 s.
  - LEMAX90X\_**V** version: controlled by a specific signal.
  - LEMAX90X\_**SC14** version: automatic and adjustable from 0 to 9.9 s.

#### Settings

- Display of the number of cycles (vacuum cycle counter).
- If the application so requires, specific adjustment of thresholds and hysteresis different to original factory settings (L1=65% h1=10%, L2=75%, h2=10%).

#### Autoreactivity

- Constant monitoring of leakage rate: abandon or automatic return to "ASC" operation.



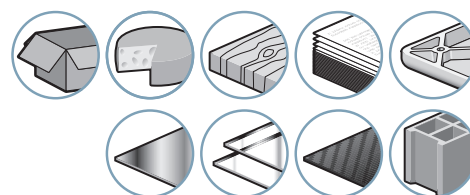
# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

### General Information



Industry-specific applications



#### Advantages

- Easy installation and operation thanks to the IO-Link communication interface.
- Energy savings of 75% to 99% (depending on application) thanks to automatic **ASC** (Air Saving Control) operation.
- "All-in-one" solution, no more peripherals to be added.
- Unmatched compactness: installation close to suction cups → short response times and energy savings.
- No clogging, thanks to the through-type silencer.
- Controlled or timed blow-off.

#### Compact Integration

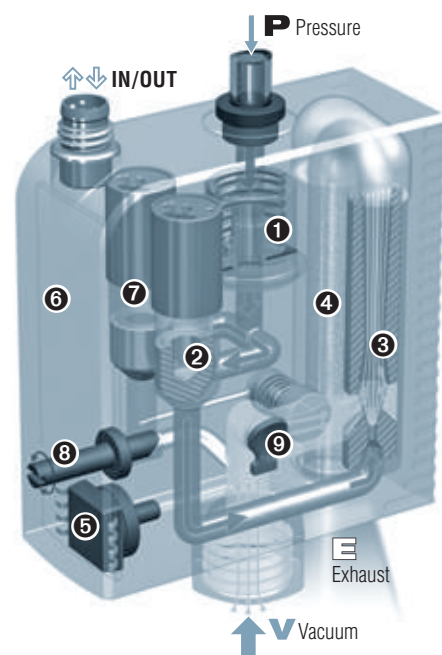
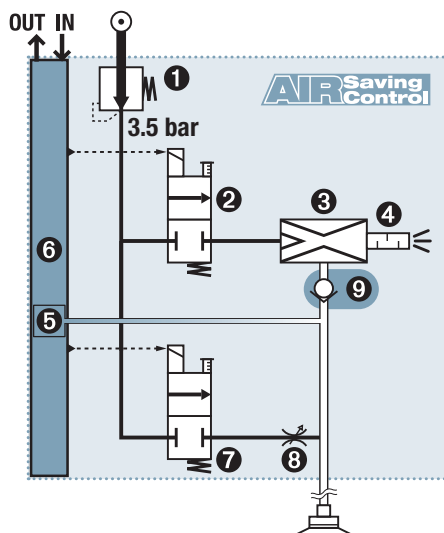
The illustrations below show the 9 functions integrated into the mini-module, and their respective roles in operation.

The result of this COVAL performance is:

- **A mini module** (≈ 130 g) that is easy to install close to the suction cups, reducing the volume to be evacuated → increased speed and energy savings.
- **A complete module**, therefore not requiring any additional function or connections.

The **LEMAX IO** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air usage and are adapted for every application:

- 1 3.5 bar pressure regulator
- 2 Solenoid valve "vacuum"
- 3 3.5 bar optimized Venturi
- 4 Through-type silencer
- 5 Electronic vacuum switch
- 6 Integrated electronics
- 7 Solenoid valve "blow-off"
- 8 Blow-off flow adjustment
- 9 Check valve on vacuum



Schematic representation

Combination of non-return 9 and advanced electronics 6 ensures the **ASC's** automatic performance.

→ Once desired vacuum level is reached, the **LEMAX IO** no longer consumes air when gripping the product.



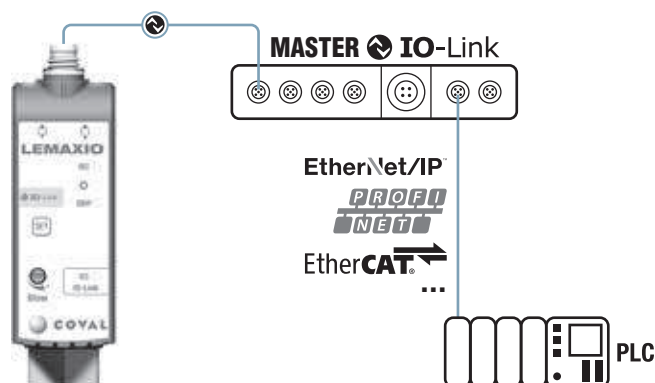
**90%** energy savings (on average)



The IO-Link system provides efficient real-time communication between LEMAX IO vacuum pumps and any higher-level protocol (EtherNet/IP, PROFINET, EtherCAT, etc.) required to monitor the production line. It can be used to control pumps, configure settings, and get feedback to ensure maximum productivity.

#### Advantages:

- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more







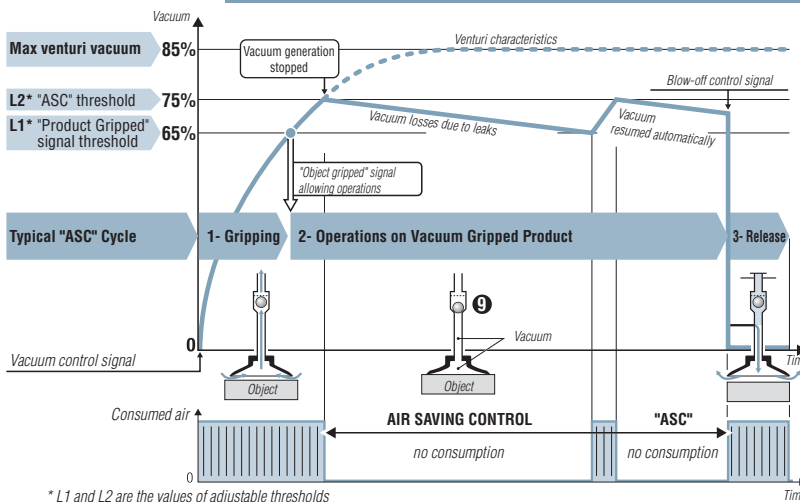
AIR Saving Control

IO-Link



AIR Saving Control

### "Air Saving Control" Cycle



As illustrated above, the LEMAX IO module automatically executes the "ASC", cycle, thus saving the maximum amount of energy, based on the following 3 phases.

#### 1- Gripping the object

The "vacuum" solenoid ② starts the cycle by supplying the venturi ③ which generates the vacuum to quickly pick up the object with the suction cup → short-term consumption.

#### 2- Operations on the object held by vacuum

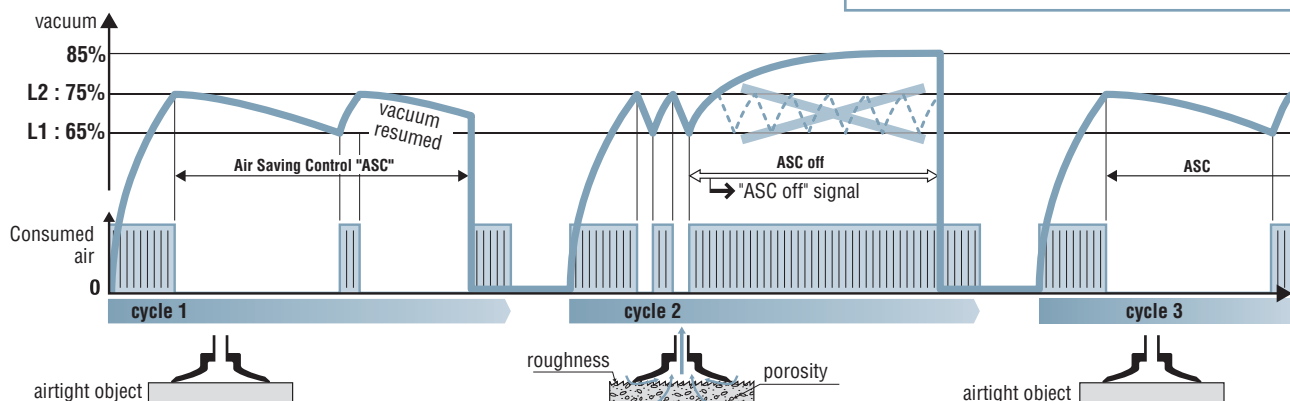
The vacuum level is constantly monitored by the vacuum switch ⑤. When it reaches the L1 threshold (65%), the "gripped object" signal is generated, which allows the planned operations (transfer, machining, etc.). When the vacuum reaches threshold L2 (75%), the supply to the venturi via the solenoid valve ② is cut off → consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ③. Micro-leaks will generally cause the vacuum level to fall slowly. Each time it falls below 65%, vacuum generation is briefly resumed until it reaches threshold L2 (75%).

#### 3- Releasing the object

At the end of operations, blow-off is ordered. The "blow-off" solenoid valve ⑦ generates a stream of air which closes the isolation valve ③, blows on the object to release it quickly.

### Smart Adaptation

The illustration below shows the adaptation capacities of the LEMAX IO module. "ASC" operation is automatic for any object that is airtight enough (cycle 1). If a leak occurs (cycle 2), due to a rough object or to suction-cup wear, the module automatically detects the anomaly, ends the cycle without "ASC" in order to continue production and reports the event for possible maintenance. Production continues. Once everything is returned to normal (cycle 3), "ASC" operation is automatically resumed.



#### 1- Gripping + Transfer (Ø 1.4 mm nozzle, 0.2 l of vacuum)

Phase	Duration	Air consumption		Energy savings achieved
		"ASC" off	"ASC" on	
Gripping	0.28 s	0.4 NI	0.4 NI	75 %
Transfer	1.20 s	1.8 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		2.4 NI	0.6 NI	

#### 2- Clamping + Operations (Ø 1.4 mm nozzle, 0.4 l of vacuum)

Phase	Duration	Air consumption		Energy savings achieved
		"ASC" off	"ASC" on	
Clamping	0.55 s	0.8 NI	0.8 NI	99 %
Operations	60 s	90 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		91 NI	1.0 NI	

### Resulting savings

Energy savings from "ASC" are major, as the two examples opposite above:

- 75% savings for transferring an object after gripping.
- 99% savings for holding an object during a 1 minute operation.

The investment generally pays for itself in just a few months.

### "ASC": AN ADVANTAGE WITHOUT LIMITATIONS

Saving energy has become essential. With LEMAX IO, thanks to "ASC", energy is automatically saved without interfering with established operations:

- 1- No specific adjustment:** The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.
- 2- Production regardless of what happens:** Operation is always ensured, if necessary without "ASC", if the leakage level is too high.
- 3- Guided maintenance:** Clear display of the need for maintenance to return to auto-regulated "ASC" operation.

AIR Saving Control

The LEMAX IO vacuum pumps, which integrate an ASR "venturi regulator" combination, share values that COVAL values greatly: they greatly reduce the volume of compressed air consumption and noise level.

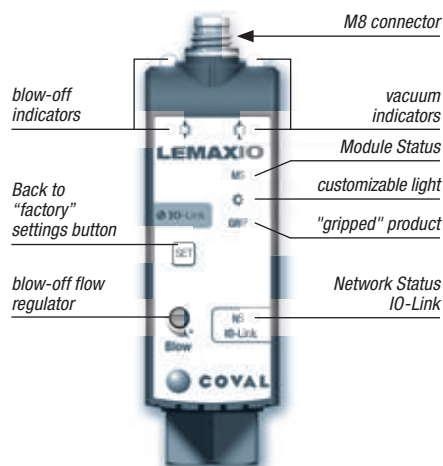


# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link Communication / Selection Guide



### Communication HMI / IO-Link



### Settings, Diagnostics, and Process Data



#### CONFIGURABLE SETTINGS

- "Object gripped" and ASC control thresholds.
- ASC vacuum control system management.
- Automatic blow-off.
- Configurable LED.



#### DIAGNOSTICS

- Cycle counters (vacuum and blow-off control, objects gripped, objects lost, etc.)
- Monitoring of the supply voltage.
- Software version.
- Product number and serial number.



#### PROCESS INPUT DATA

- Vacuum and blow-off control.



#### PROCESS OUTPUT DATA

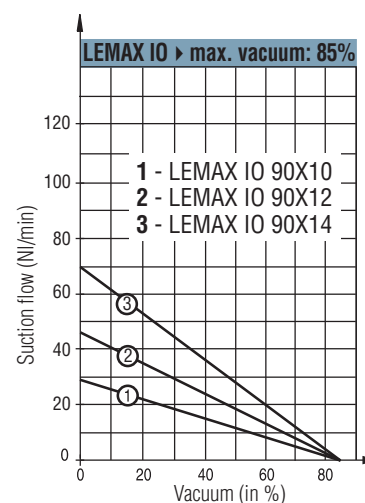
- Instantaneous vacuum level.
- Object gripped and object lost information.
- Status of ASC vacuum regulation system.
- Alarms (high / low voltage).

### Power Determined by the Venturi Nozzle Diameter

Selecting the Nozzle Diameter					
Ø nozzle	Venturi characteristics during "ASC off" operation.		"ASC" operation - gripping at 65% vacuum - vacuum shutoff at 75% Time for a volume of 1l		
	air drawn in (NI/min)	air consumed (NI/min)	grip time (s) (65% vacuum)	time (s) up to 75% vacuum	air consumed (NI)
1.4 mm	70	90	0.99	1.38	2.2
1.2 mm	45	65	1.53	2.15	2.2
1.0 mm	29	44	2.38	3.33	2.2



### Suction Flow Rate / Vacuum Curves



### Electrical Connections



Pin	Designation	Function	Wire
1	24 V DC	L+	Brown
2	/	/	White
3	0 V - GND	L-	Blue
4	IO-Link communication line	C/Q	Black

#### Note

Max. total cable length: 20 meters

### Accessory

Power supply cable M8, straight, female, 4-pin – M12, straight, male, 4-pin:

- CDM8M12: length. 1 m.







AIR Saving Control

IO-Link

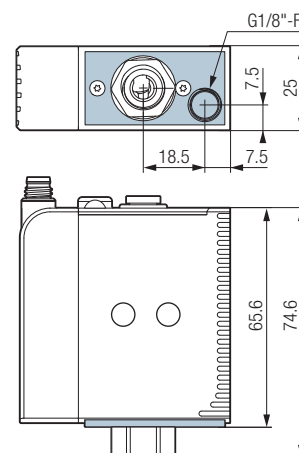


#### Exhaust manifold: option E

The LEMAX IO mini vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/8"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece (LEMAXIO\_\_\_E version).

This option must be specified at time of ordering as it cannot be added later.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.



#### Stand-alone or Island Modules?

Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups which all operate according to the same sequence.

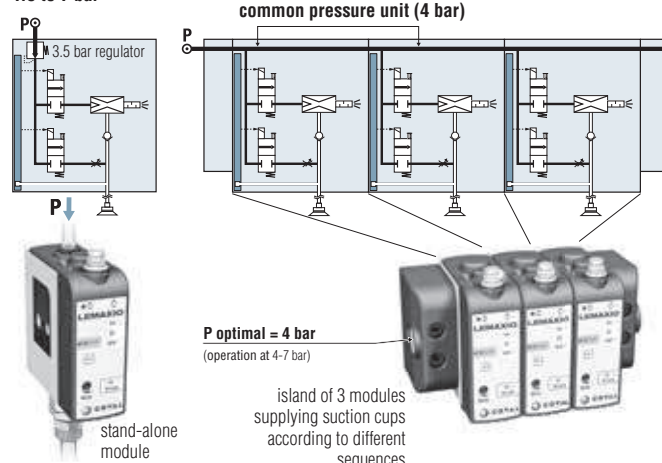
When several suction cups are operating according to different sequences, multiple modules are required, which can be:

- several autonomous modules;
- a group of these modules with an internal common pressure unit.

The illustrations opposite guide the selection:

- stand-alone modules are coupled with integrated pressure regulators
- in an island, the integrated regulator is removed: to maintain the advantage of economical and silent operation, it is recommended to reduce the island's common pressure supply pressure to 4 bar.

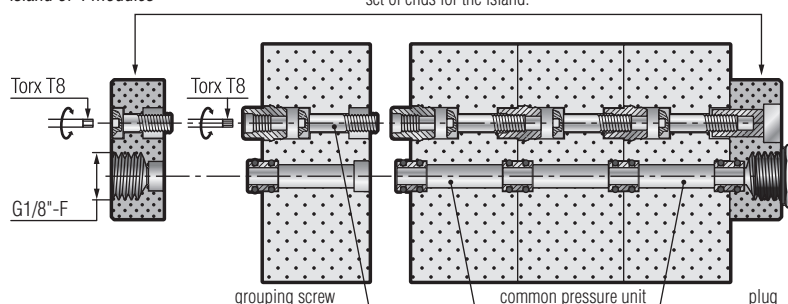
Network pressure:  
4.5 to 7 bar



#### Assembling and Connecting an Island

island of 4 modules

set of ends for the island.



island of 3 modules



#### Maximum number of modules in an island:

- Ø 1.4 mm nozzle → 5 modules
- Ø 1.2 mm nozzle → 7 modules
- Ø 1 mm nozzle → 9 modules



# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link Configuring a Vacuum Pump



AIR Saving Control

IO-Link



Part numbers for an island assembly or components in an island

Part numbers for stand-alone units

**LEMAXIO 90 X 14 S C14 - B2**

### VACUUM LEVEL

maximum 85%  
vacuum optimum  
for airtight objects

**90**

### NOZZLE DIAMETER

Ø 1.4 mm nozzle

**14**

Ø 1.2 mm nozzle

**12**

Ø 1 mm nozzle

**10**

### EXHAUST

Open (integrated silencer)

**-**

Exhaust manifold  
(G1/8"-F)

**E**

### ISLAND ASSEMBLIES

**B2**

LEMAXIO90X...**B2**  
Island assembly  
with 2 identical  
modules.



**B3**

LEMAXIO90X...**B3**  
Island assembly  
with 3 identical  
modules.



**B4**

...

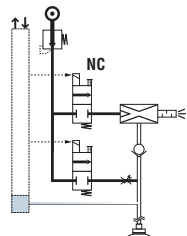
### COMPOSITION OF THE MODULE

#### Vacuum pump controlled by a Normally Closed (NC) solenoid valve

**S**

#### LEMAXIO90X...**S**...

- In the event of an electrical shut-off, vacuum is no longer generated.
- Optional configured blow-off:
  - by specific signal,
  - automatic, timed 0 to 9.9 sec. (→ a single control signal vacuum and blow-off).

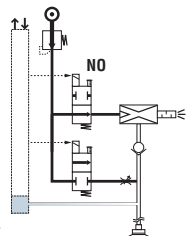


#### Vacuum pump controlled by a Normally Open (NO) solenoid valve

**V**

#### LEMAXIO90X...**V**...

- In the event of an electrical shut-off, the vacuum continues to be generated: gripped object held → positive security.
- Blow-off controlled by a specific signal.



If the planned island contains different module types, it must be ordered as separate components in order to then be assembled on site according to the arrangement suitable to the application.

### COMPONENTS FOR THE ISLAND TO BE ASSEMBLED

**B**

LEMAXIO...**B**  
Module that can be  
grouped  
(complete with integrated  
grouping screw).



Set of ends for a complete  
island, with grouping  
screw and common  
pressure unit plug.



PART NO.: LEMSETA

### REFERENCE EXAMPLE COMPOSED OF A STAND-ALONE MODULE:

#### ■ LEMAXIO90X14SC14

LEMAX IO, mini vacuum pump, 85% max. vacuum, 1.4 mm nozzle, controlled by a NC (Normally Closed) solenoid valve.

### EXAMPLE COMPOSITE PART NUMBER FOR AN ISLAND ASSEMBLY:

#### ■ LEMAXIO90X14SC14B3

LEMAX IO group assembly, containing 3 x 85% max. vacuum modules, Ø 1.4 mm nozzle, controlled by NC (Normally Closed) solenoid valve.

### ORDER EXAMPLE FOR AN ISLAND TO BE ASSEMBLED:

#### ■ LEMAXIO90X14VC14B

#### ■ LEMAXIO90X12SC14B

#### ■ LEMAXIO90X10VC14B

#### ■ LEMSETA

3 LEMAX IO modules for an  
island, of different types.

Set of ends for island.



# LEMAX IO

## Mini Vacuum Pumps with Communication IO-Link

### Dimensions, Mounting Options



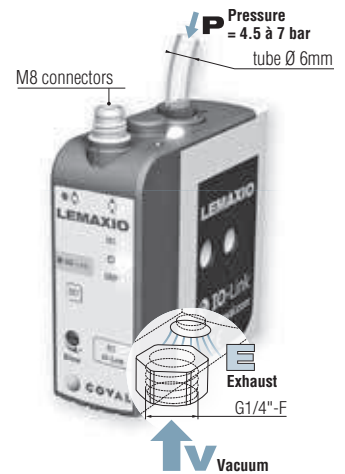
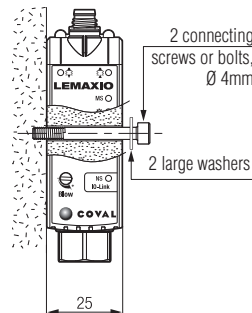
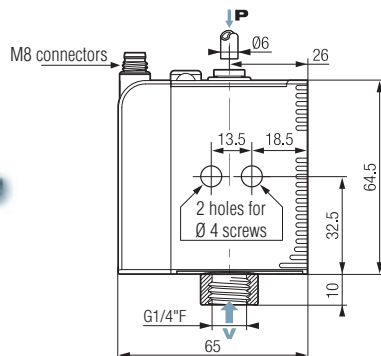
AIR Saving Control

IO-Link

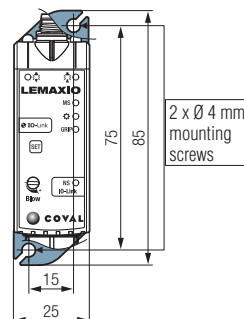
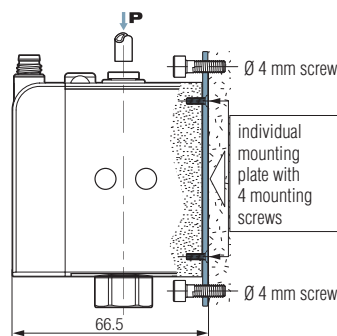


#### 1- Stand-alone Modules

##### Mounting from side



##### Mounting from front

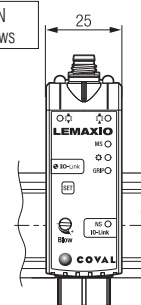
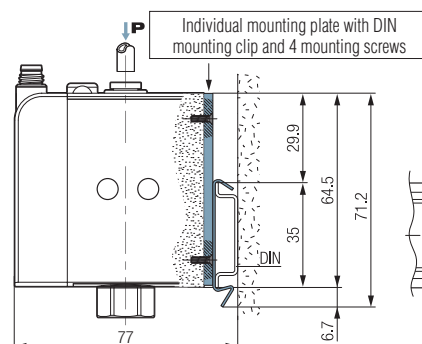


To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:  
1 plate + 4 screws

**Part No.: LEMFIXA**

##### Mounting on DIN rail



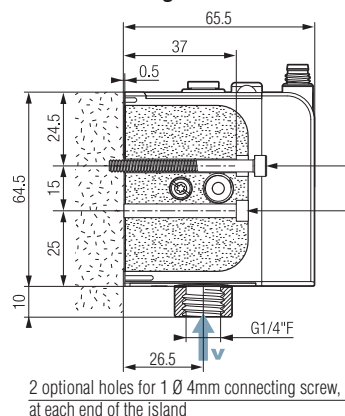
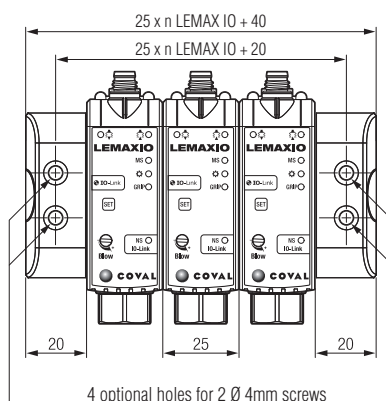
For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

DIN rail mounting kit:  
1 plate/clip + 4 screws

**Part No.: LEMFIXB**

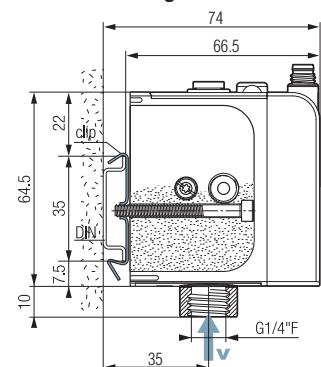
#### 2- Islands

##### Mounting from front



2 optional holes for 1 Ø 4mm connecting screw, at each end of the island

##### Mounting on DIN rail



DIN rail mounting kit:  
2 clips + 2 screws

**Part No.: LEMFIXC**





IO-Link

### Overall Characteristics

- Supply: non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure:
  - stand-alone version: P = 4.5 bar.
  - island version: P = 4 bar.
- Blow-off: adjustable flow:
  - stand-alone version: P = 3.5 bar.
  - island version: P network
- Maximum vacuum: 85%
- Suction rate: 29 to 70 NI/min.
- Air consumption: 44 to 90 NI/min during "ASC" off operation.
- Integrated clog-free silencer.
- Noise level: approximately 68 dBA "ASC" off. 0 dBA with "ASC".
- Electrical protection level: IP 65.
- Max. operating frequency: 4 Hz.
- Endurance: 30 million cycles.
- Weight: 130 g.
- Operating temperature: from 0 to 50°C (32 to 122°F).
- Materials: PA 6-6 15%FV, brass, aluminum, NBR.
- 4-pins M8 male connector.

### Analysis of the vacuum regulation system (ASC)

- Constant monitoring of leakage rate: abandon or automatic return to "ASC" operation.

### Integrated electronics

- 24 V DC supply (regulated  $\pm 10\%$ ).
- Electric consumption < 100 mA, of which 30 mA (0.7W) per vacuum and blow-off pilot.
- Measurement range: 0 to 99% vacuum.
- Measurement accuracy:  $\pm 1.5\%$  of range, temperature compensated.
- Inputs/outputs protected against wiring errors or reversed polarity.
- IO-Link Operation.

### Diagnosis

- Instantaneous vacuum level (0 to 99%).
- Gripped product, loss of product, regulation in process, regulation default information.
- Cycle counters (vacuum, blow-off, gripped piece, ASC, etc.).
- Supply voltage.
- Product reference and serial number.
- Firmware version.

### Accessory

**Protection for standalone mini-vacuum pumps LEMAXIO\_\_SC14**  
(with one M8 connector), Part No.: **80004409**

The COVER is made of silicone and serves as a protective sleeve for vacuum pumps, protecting them against splashing water, in particular during cleaning cycles.

- High level of protection against splashing water
- Easy to mount and clean



### Displays

- Control status indicators:
  - "vacuum": green LED
  - "blowoff": orange LED
- "Part gripped" indicator: green LED
- Configurable indicator: blue LED
- "Module Status" indicator: green/red LED
- "IO-Link Network Status" indicator: green/red LED

### Settings

- Piece gripping (L1) and regulation (L2) thresholds.  
If the application so requires, specific adjustment of thresholds and hysteresis different to original factory settings (L1=65% h1=10%, L2=75%, h2=10%).
- Automatic timed blow-off (0 to 10 seconds) only on LEMAXIO90X\_\_S\_\_
- Activation/deactivation of ASC regulation system.
- Activation/deactivation of the (DIAG ECO) leakage level monitoring system.
- Adjustable blue LED functioning mode
- Valve functioning mode in the event of loss of communication.
- Back to "factory" settings.

### IO-Link

- Revision: 1.1
- Transmission rate: COM2 / 38.4 kbit/s
- Min. cycle time: 3.6 ms
- SIO mode: No.
- Process Data Input (PDI): 4 bytes.
- Process Data Output (PDO): 1 byte.
- IO device description file (IODD) available for download.
- Max. total cable length: 20 meters.







# LEMCOM

## 1st Mini Vacuum Pump on Industrial Fieldbus General Points

In a world where everything is connected, COVAL is innovating once more by unveiling the LEMCOM series: the first vacuum pump on fieldbus.

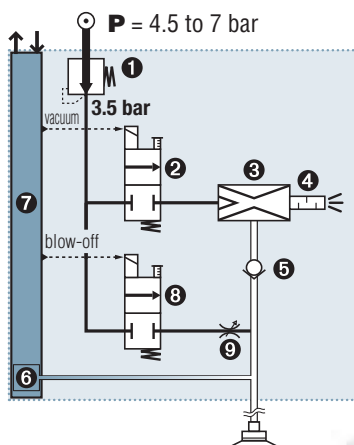
The LEMCOM establishes a verified remote communication between the operator and the vacuum pump, with two possible fieldbus choices, EtherNet/IP and PROFINET. This allows the operator to receive real-time information and more importantly respond at all times to configure, diagnose and maintain the operation.

### Compact Integration: The COVAL Technique

The illustrations demonstrate the COVAL advantage: all necessary functions are integrated into a complete and self-governing mini-module.

#### INTEGRATED FUNCTIONS:

- ❶ Pressure regulator 3.5 bar
- ❷ "Vacuum" solenoid valve
- ❸ 3.5 bar optimized venturi
- ❹ Optimized silencer
- ❺ Vacuum non-return valve
- ❻ Vacuum sensor
- ❼ Integrated electronics: management of "vacuum" functions and communication
- ❽ "Blow-off" solenoid valve
- ❾ Blow-off flow regulator



PROFI  
NET

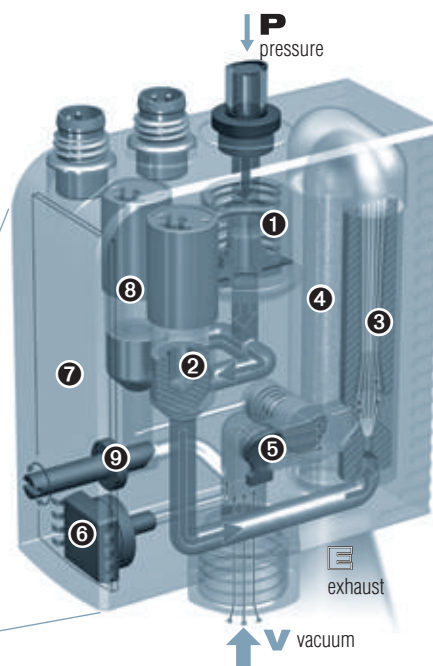
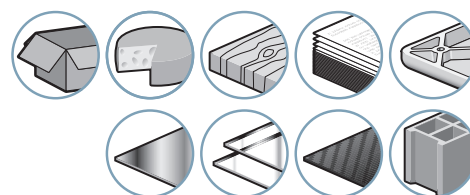
EtherNet/IP™



PROFI  
NET

EtherNet/IP™

Industry-specific applications



Schematic representation

8

LEMCOM

### Easy Integration with Existing Industrial Network

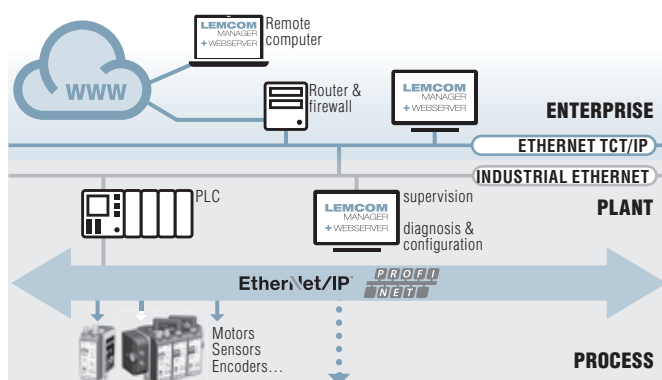
LEMCOM is the first vacuum pump which seamlessly integrates with the field network without the use of gateways or other specific interfaces.

The LEMCOM "master" modules enable the continuity of a fieldbus through their two integrated communication ports. Tested and certified by ODVA (EtherNet/IP) and by PI (PROFINET), LEMCOM is connected very easily to the PLC (EDS file, RSLogix 5000 Add-On Instructions, GSDML file).

Based on a "master/secondary" structure where the "master" is a fully-integrated pump, the LEMCOM design enables the supply and control of 1 to 16 vacuum pumps while requiring only 2 connecting cables.

### Advantages

- **Easy implementation:** Plug & Play, custom configuration for every type of application.
- **Maximum automatic energy savings:**
  - ASR:** 40% savings for porous products.
  - ASC:** 90% savings for airtight products.
- **Compactness:** LEMCOM vacuum pumps are the most compact on the market.
- **Short response times:** Installed in close proximity to vacuum cups.



- **Dust resistant:** Non-clogging through-type silencer.
  - **Safety:** Product gripping is maintained even during power failure.
  - **Supported buses:** EtherNet/IP and PROFINET.
  - **Wiring simplified:** 2 cables are capable of managing 1 to 16 modules.
  - Settings and diagnosis via **remote monitoring**.
  - Nearly unlimited arrangements (stand-alone modules, island assemblies or remote modules).
- An essential innovation for intelligent vacuum gripping.





PROFI  
NET EtherNet/IP



#### 2 Vacuum Levels to Match Precise Application Needs

##### VERSION 60 (Max. 60% vacuum)

To enable a high rate of vacuum flow and compensate for leakage when gripping porous materials.

Suction flow rate (NI/min):

max. vacuum Nozzle Ø	60%
1.0 mm	38
1.2 mm	72
1.4 mm	92



##### VERSION 90 (Max. 85% vacuum)

To enable a high vacuum level and thus increase the holding force for gripping airtight materials.

Suction flow rate (NI/min):

max. vacuum Nozzle Ø	85%
1.0 mm	29
1.2 mm	45
1.4 mm	70



	Porous Materials, Rough Surfaces				Airtight & Semi-Porous Materials				
	Cardboard	Food	Wood	Paper	Plastic	Metal	Glass	Composites	Concrete/Stone
LECOM 60	●	●	●	●	●	●	●	●	●
LECOM 90					■	■	■	■	■

● Air Saving Regulator → 40% of energy savings on average.

■ Air Saving Control → 90% of energy savings on average.

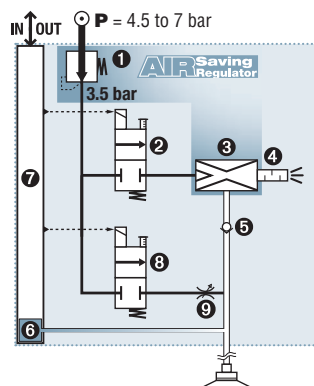
#### Integrated Energy-saving Technologies

##### AIR Saving Regulator

**40%** energy savings  
(on average, see below).

Combined "venturi regulator"  
ASR: pressure regulator ①  
feeds venturi ③ with 3.5 bar,  
the optimized pressure for  
operation.

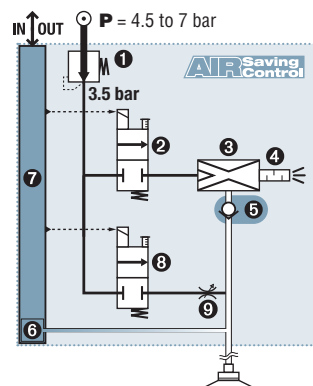
→ No more unnecessary  
consumption of compressed  
air.



##### AIR Saving Control

**90%** energy savings  
(on average).

Combination of non-return  
valve ⑤ and advanced  
electronics ⑦ ensures ASC's  
automatic performance.  
→ Once vacuum is  
established, the pump no  
longer consumes air to hold  
the product.



##### AIR Saving Regulator

##### (ASR): Air Saving Regulator

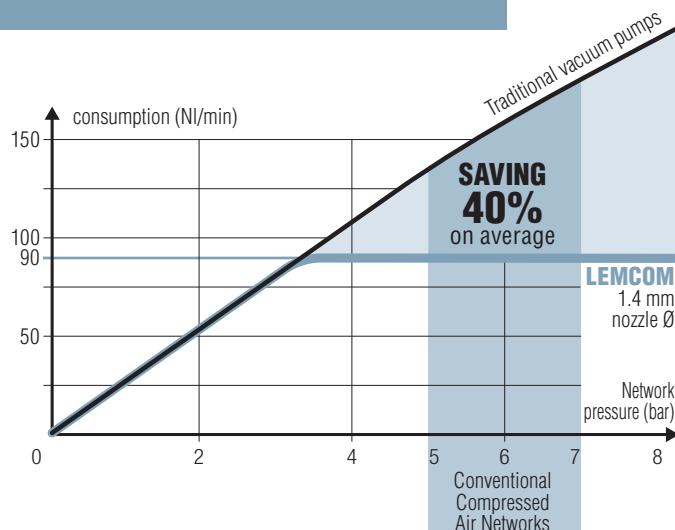
LECOM series vacuum pumps, which integrate an ASR "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation.

Regardless of pressure supplied by the compressed air network, the integrated regulator feeds the venturi at **3.5 bar** pressure, optimal for its operation.

→ No more unnecessary energy consumption.

→ No external regulator required, thus eliminating the risk of improper adjustment.

Compared to pressures found in most compressed air networks (5-7 bar), the graph opposite demonstrates an achieved economy of 40% on average.





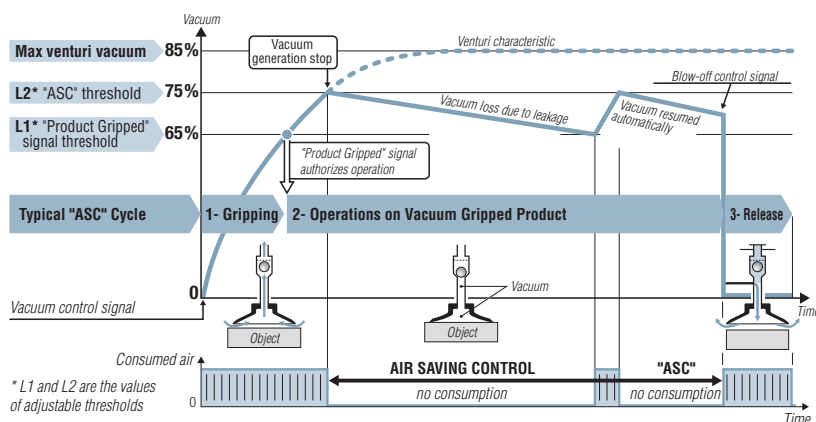


PROFIBUS  
ETHERNET/IP



### AIR Saving Control

#### "Air Saving Control" Cycle



As illustrated above, the LEMCOM module automatically executes the "ASC", cycle, thus saving the maximum amount of energy, based on the following 3 phases.

#### 1- Gripping the object

The "vacuum" solenoid ② starts the cycle by supplying the venturi ③ which generates the vacuum to quickly pick up the object with the suction cup → short-term consumption.

#### 2- Operations on the object held by vacuum

The vacuum level is constantly monitored by the vacuum switch ④. When it reaches the L1 threshold (65%), the "gripped object" signal is generated, which allows the planned operations (transfer, machining, etc.). When the vacuum reaches threshold L2 (75%), the supply to the venturi via the solenoid valve ② is cut off → consumption is halted. The object remains held by the retained vacuum thanks to the closed valve ⑤. Micro-leaks will generally cause the vacuum level to fall slowly. Each time it falls below 65%, vacuum generation is briefly resumed until it reaches threshold L2 (75%).

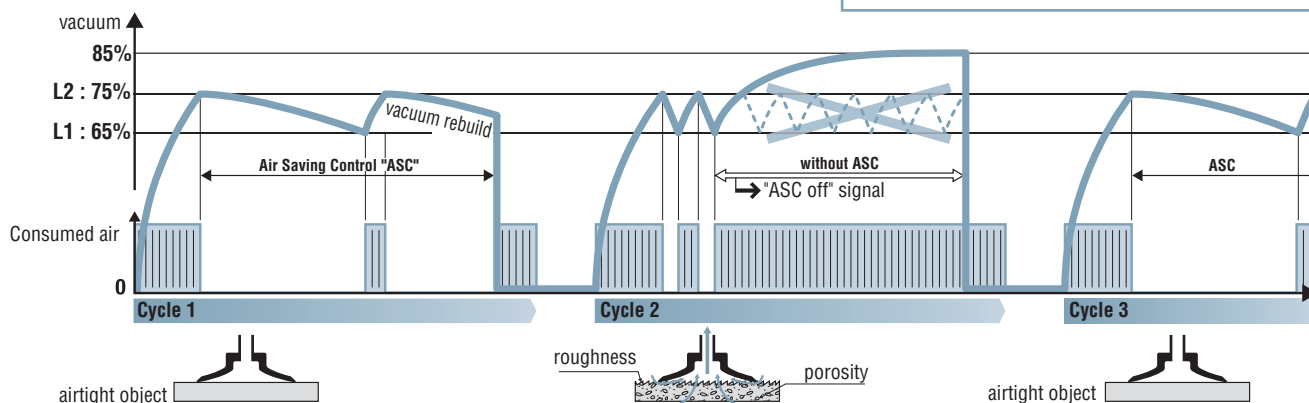
#### 3- Releasing the object

At the end of operations, blow-off is ordered. The "blow-off" solenoid valve ⑥ generates a stream of air which closes the isolation valve ⑦, blows on the object to release it quickly.

### Smart Adaptation

The illustration above shows the adaptation capability of the LEMCOM module. "ASC" operation is automatic for any object that is airtight or generally nonporous (cycle1). If a leak occurs (cycle 2), due to a rough object or suction cup wear:

1/ the module automatically detects the anomaly, 2/ ends the cycle without "ASC" in order to continue production and 3/ reports the event for possible maintenance. Production continues and once everything is returned to normal (cycle 3), "ASC" operation is automatically resumed.



#### 1- Gripping + Transfer (1.4 mm nozzle Ø, emptying 0.2 l)

Phase	Duration	Air consumption		Energy savings achieved
		without "ASC"	with "ASC"	
Gripping	0.28 s	0.4 NI	0.4 NI	75 %
Transfer	1.20 s	1.8 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		2.4 NI	0.6 NI	

#### 2- Clamping + Operations (1.4 mm nozzle Ø, emptying 0.4 l)

Phase	Duration	Air consumption		Energy savings achieved
		without "ASC"	with "ASC"	
Clamping	0.55 s	0.8 NI	0.8 NI	99 %
Operations	60 s	90 NI	0	
Release	0.14 s	0.2 NI	0.2 NI	
		91 NI	1.0 NI	

### Resulting Savings

Energy savings from "ASC" are significant, as the two examples opposite show:

- 75% savings for transferring an object after gripping.
- 99% savings for holding an object during a 1 minute operation.

The product often pays for itself in just a few months.

### "ASC": AN ADVANTAGE WITHOUT LIMITATIONS

Saving energy has become essential. With LEMCOM, thanks to ASC, energy is saved automatically without interfering with established practices:

#### 1- No specific adjustment

The default setting (L1 = 65%, L2 = 75%) is suitable for most applications.

#### 2- Production regardless of conditions

Performance is guaranteed. When necessary, without "ASC", if the leakage level is too high.

#### 3- Guided maintenance

Clear display of the need for maintenance in order to return to autoregulated "ASC" operation.

With LEMCOM, all settings are remotely configurable, and diagnosis is made easier.





PROFI  
NET EtherNet/IP



### Individual or Island Modules?

Stand-alone modules are suitable for the most common applications: one module controls one or more suction cups, all of which operate according to the same sequence.

When several suction cups are operating according to different sequences, multiple modules are required, which can be:

- several autonomous modules, OR
- a group of these modules with an internally shared pressure supply

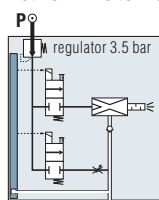
The illustrations shown here guide the selection:

- autonomous modules are coupled with integrated pressure regulators (ASR)
- in a group, the integrated regulator is eliminated: to maintain the advantage of economical and silent operation, it is recommended to reduce the group's common pressure supply to 4 bar.

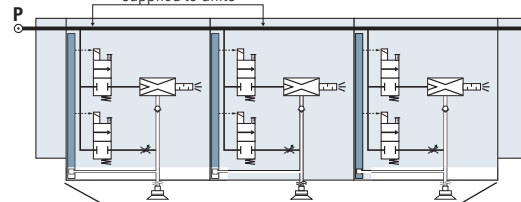
The maximum number of modules in an island depends on the power of the modules that must be active simultaneously:

- 5 modules maximum for nozzle 1.4 mm ID.
- 7 modules maximum for nozzle 1.2 mm ID.
- 9 modules maximum for nozzle 1 mm ID.

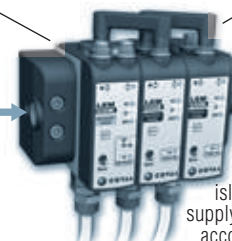
Network: 4.5 to 7 bar



Optimal pressure: 4 bar  
common pressure supplied to units



P optimal = 4 bar  
(operation at 4-7 bar)



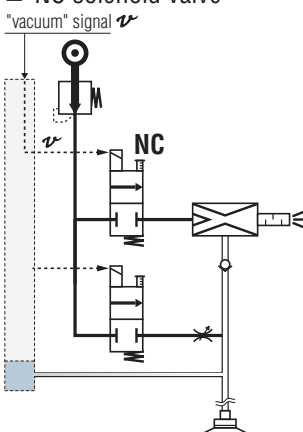
island of 3 modules  
supplying suction cups  
according to different  
sequences or operations

### Vacuum Control by NC or NO Solenoid Valve

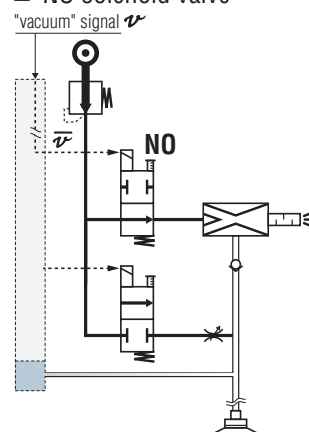
Vacuum control by NC (Normally Closed) solenoid valve is the most common: in the event of an electrical shut-off, vacuum is no longer generated. On the other hand, with a NO (Normally Open) solenoid valve, vacuum continues to be generated in the event of an electrical shut-off, providing positive object-gripped security.

The diagrams opposite show that both versions are controlled by the same "vacuum" signal  $\nu$ : The opposite  $\bar{\nu}$  required for control of the NO solenoid valve is automatically obtained internally by the control electronics.

■ NC solenoid valve

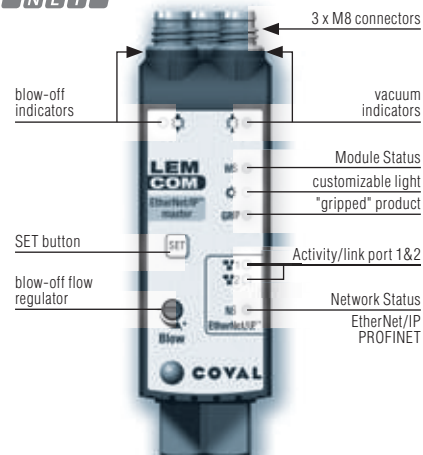


■ NO solenoid valve

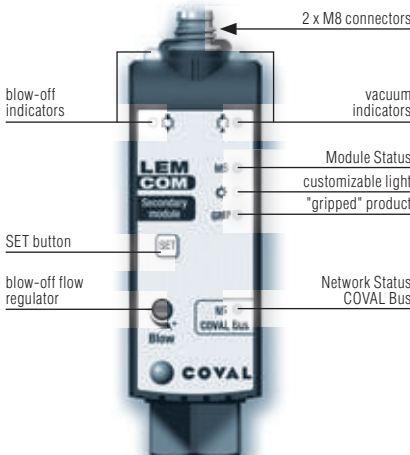


### Communications Panel

LEMCOM master  
PROFI EtherNet/IP



LEMCOM secondary module







**PROFI**  
**NET** EtherNet/IP™

#### Multitude of Innovations

- Maximum intelligence / minimal bulk.
- One "master" module controls up to 15 secondary modules.
- Master module is a fully-integrated pump.
- Remote configuration, monitoring and diagnostics.
- Dedicated Coval bus between master and secondary modules.
- Simplified wiring and installation.
- Standard secondary modules (regardless of the type of bus).
- Additional communications port.
- Supported buses: EtherNet/IP™ / PROFINET / CANopen.
- IP 65 / M8 standard connectors.



EtherNet/IP™ **PROFI**  
**NET**



up to  
**16**  
modules



#### A Simple Product to Utilize

##### LEMCOM master

- On-board 2-Port Ethernet Switch.
- On-board web server.
- Dedicated configuration software.
- M8/RJ45 standard connectors.

EtherNet/IP™ **PROFI**  
**NET**



##### LEMCOM secondary module

- Universal secondary module, whatever the type of bus used.



#### Dedicated application **LEMCOM** MANAGER

##### Vacuum management made easy

Specially developed with vacuum handling applications in mind, LEMCOM Manager is a PC software package which allows you, in just a few clicks, to remotely set up and configure LEMCOM vacuum generators as well as run diagnostics.

Packed with numerous functions such as the import/export of parameters, vacuum cycle analysis, alarm and operation cycle monitoring, configuration help or even embedded firmware updating.

The application allows all LEMCOM mini pumps to be controlled remotely over the network either by the end user or by COVAL's technical support teams.



#### Settings, Diagnosis, and Process Data



##### CONFIGURABLE SETTINGS

- "Product Gripped" and vacuum regulation (ASC) thresholds.
- Automatic blow-off.
- State of valves in the event of loss of communication.
- Client LED status.
- Network parameters.
- Firmware updates...



##### DIAGNOSTIC

- Cycle counters, vacuum and blow-off control, gripped pieces, lost pieces, ASC...
- Power supply voltage.
- Firmware version.
- Product reference.
- Vacuum cycle acquisition...



##### INPUT DATA

- Vacuum and blow-off control.



##### OUTPUT DATA

- Instant vacuum level (0 to 100%).
- "Gripped Product" signal (ON/OFF).
- Regulation system status.
- Alarms (power supply voltage, temperature, preventive maintenance).





**PROFINET** EtherNet/IP



### A Setting for Every Application

The LEMCOM is based on an innovative, efficient product structure:

- The "master" module manages communication on the fieldbus, assures management of the "secondary" modules and is a fully-integrated vacuum pump. Its 2 communication ports enable a continuous fieldbus.
- The "secondary" modules are interconnected with the "master" module via the COVAL bus.

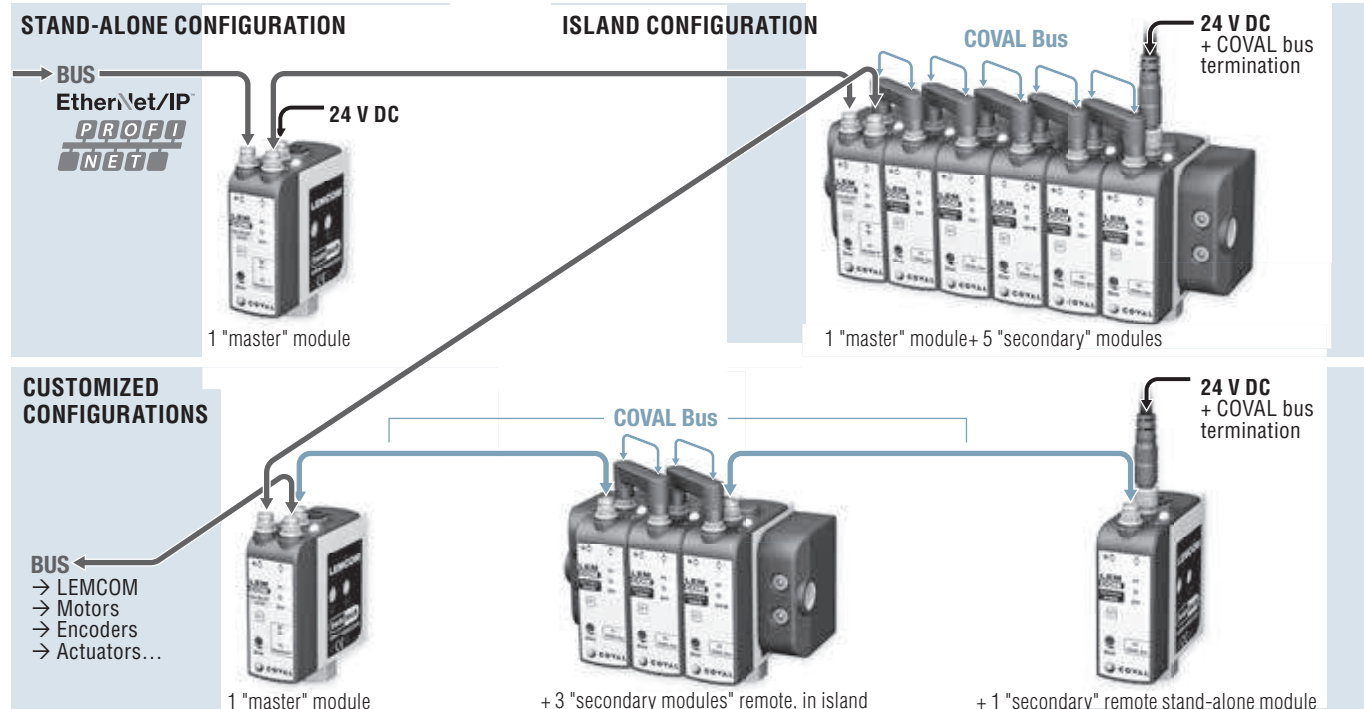
Contact between the "master" module and the "secondary" modules is confirmed by an M8 connecting bridge for island configurations or by a M8/M8 standard cable for configurations based on remote modules.

### Advantages:

This product structure guarantees flexibility in selection, enabling use of LEMCOMs in stand-alone, island or mixed configurations. As a result, vacuum generators may be placed in close proximity to the application, guaranteeing a reduction:

- in gripping time
- in cycle time
- in energy consumption.

Because setup and diagnosis of the LEMCOM is carried out remotely, it is not necessary to install them in easily accessible zones.



### Full Remote Access

LEMCOM parameters can easily be updated remotely and in several ways. Configuration is possible using LEMCOM Manager PC software, the embedded web server (EtherNet/IP and PROFINET) or by sending vacuum parameters directly from the PLC during use or on initialization.

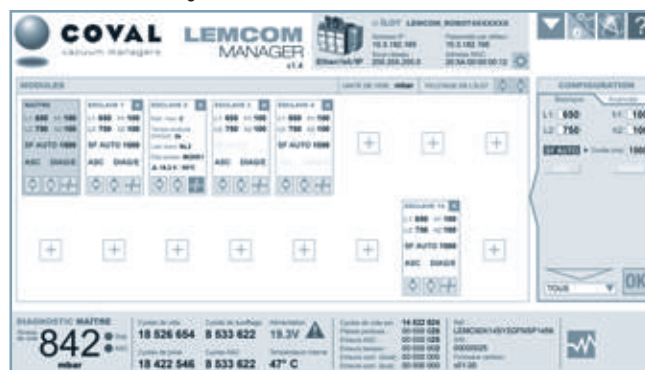
This flexibility enables the LEMCOM user to adapt to all types of applications without direct intervention on the vacuum generator.

**EtherNet/IP** **PROFINET**

- Embedded web server.
- Implicit (I/O) and explicit messaging (setting) (EtherNet/IP).
- Synchronous (I/O) and asynchronous data (configuration) (PROFINET)

### LEMCOM MANAGER

- Dedicated universal application: LEMCOM Manager.







PROFIBUS  
ETHERNET/IP



### Venturi Specifications

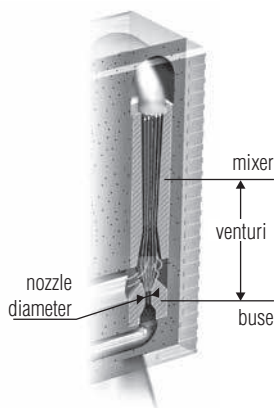
#### 1- Maximum Vacuum Level

Dependent upon the mixer profile:

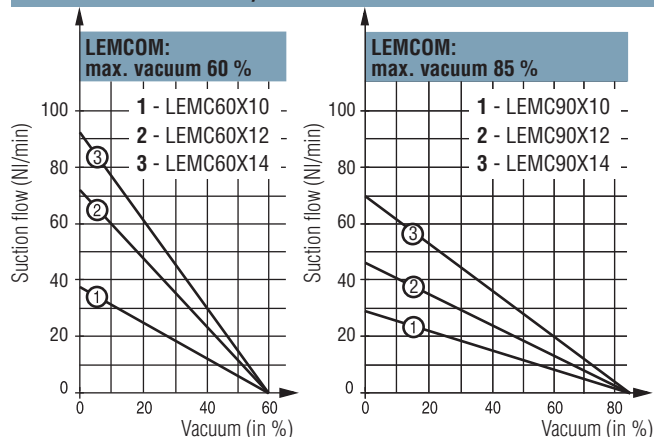
- 85% of maximum vacuum is optimal for gripping airtight products.
- 60% of maximum vacuum is optimal for gripping porous products.

#### 2- Nozzle Diameter

Reflects the generated vacuum flow rate, as well as energy consumption. Hence, it must be selected to meet precise requirements without wasting energy.



### Suction Flow Rate / Vacuum Curves



### Handling of Porous Products: (cardboard, untreated wood, pastries, etc.) → LEMCOM 60% max. vacuum

When porosity and/or surface leaks are expected during gripping, a vacuum level between 35% and 55% is the best economical compromise generated by a maximum **venturi vacuum level of 60%**. To determine the most effective nozzle diameter, use the table at right and measure the leakage flow rate of the material.

Evacuation time (in seconds) of 1 liter volume				Consumed Air (NI/min)	Vacuum flow (NI/min)
vacuum reached Nozzle Ø	35%	45%	55%		
1.0 mm	0.83	1.31	2.35	44	38
1.2 mm	0.52	0.83	1.49	65	72
1.4 mm	0.34	0.54	0.97	90	92

### Handling of Airtight Products: (glass, plastic, coated wood, sheet metal, etc.) → LEMCOM 85% max. vacuum

Gripping done without major leaks will benefit from a high level of vacuum: Between 55% and 75% generated by a maximum **venturi vacuum level of 85%**.

Depending on the volume to be evacuated and the time available for product gripping, use the table below to select the most effective nozzle diameter and vacuum flow rate.

**AIR Saving Control** On airtight products, "ASC" enables you to considerably reduce compressed air consumption. The table below shows:

- A larger nozzle provides a faster grip without consuming more, when using "ASC".
- A smaller nozzle only consumes less when the operation is continued without "ASC".

#### Working without "ASC":

Evacuation time (in seconds) of 1 liter volume				Consumed Air (NI/min)	Vacuum flow (NI/min)
vacuum reached	55%	65%	75%		
Nozzle Ø					
1.0 mm	1.76	2.38	3.33	44	29
1.2 mm	1.13	1.53	2.15	65	45
1.4 mm	0.73	0.99	1.38	90	70

#### When using "ASC" (evacuation of 1 liter volume):

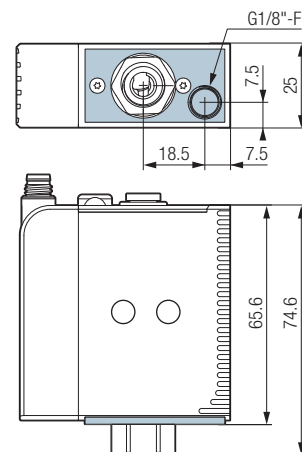
Ø buse	gripping time (65% vacuum) (s)	Time up to 75% vacuum (s)	Consumed Air (NI)
1.0 mm	2.38	3.33	2.2
1.2 mm	1.53	2.15	2.2
1.4 mm	0.99	1.38	2.2

### Exhaust manifold: option E

The LEMCOM mini vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/8"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece. (LEMC\_\_E Version).

This option must be specified at time of ordering as it cannot be added later.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.







**PROFIBUS** EtherNet/IP™



**LEMC 90 X 12 S Y2 G - B2**

VACUUM LEVEL	
60 % max. vacuum is optimal for porous materials	<b>60</b>
85 % max. vacuum is optimal for airtight products	<b>90</b>

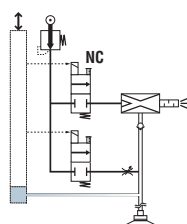
NOZZLE DIAMETER	
1 mm Ø nozzle	<b>10</b>
1.2 mm Ø nozzle	<b>12</b>
1.4 mm Ø nozzle	<b>14</b>

### MODULE COMPOSITION

#### NC Vacuum pump with blow-off

LEMC\_X\_S\_G

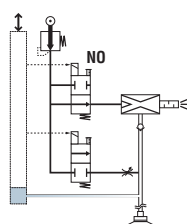
- **NC** vacuum control valve:  
→ in case of electrical cut-off, vacuum generation stops.
- Blow-off configured on site at choice:
  - Blow-off controlled by specific signal;
  - Automatically delayed blow-off time from 0 to 10 s.
- Adjustable blow-off flow rate.



#### NO Vacuum pump with blow-off

LEMC\_X\_V\_G

- **NO** vacuum control valve:  
→ In case of electrical cut-off, vacuum continues to be generated.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatically delayed blow-off time from 0 to 10 s.
- Adjustable blow-off flow rate.



**Q2** **PROFIBUS** master  
LEMC\_X\_Q2G



- On-board 2-Port Ethernet Switch.
- On-board web server.
- Dedicated configuration software.
- M8/RJ45 standard connectors.
- GSDML file.

**Y2** **EtherNet/IP™** master  
LEMC\_X\_Y2G



- On-board 2-Port Ethernet Switch.
- On-board web server.
- Dedicated configuration software.
- M8/RJ45 standard connectors.
- RSLogix 5000 AOI + EDS file.

**Z2** secondary module  
LEMC\_X\_Z2G



- Universal secondary module, can be used with any fieldbus.
- If necessary, M8/M8 "COVAL Bus" 120 Ω termination, available in accessories.

### EXHAUST

Open (integrated silencer)	<b>-</b>
Exhaust manifold (G1/8"-F)	<b>E</b>

### CONFIGURATION

1 stand-alone module

### Island assemblies

**B2** LEMC\_X\_GB2



Island assembly with 2 modules, with connecting bridges for internal "COVAL Bus" and M8/M8 120 Ω termination:

- The first module is of the type selected in "PROTOCOL".
- The following one is a secondary module.

**B3** LEMC\_X\_GB3



Island assembly with 3 modules, with connecting bridges for internal "COVAL Bus" and M8/M8 120 Ω termination:

- The first module is of the type selected in "PROTOCOL".
- The following two are secondary modules.

**B4** ...

NB: LEMC\_X\_Z2GB\_ "Secondary" island modules are delivered without the M8/M8 "COVAL Bus" 120 Ω termination - order separately.

### Components for island assembly

**B** LEMC\_X\_GB



Island module, complete with integrated assembly screw.



Island endplates set complete with assembly screw and plug for common pressure inlet.

**Part No.: LEMSETA**



Connecting bridge for internal "COVAL Bus".

**Part No.: 80001231**

**OPTION:** Version without non-return valve available on request.

### EXAMPLES OF COMPLETE PART NUMBER:

**LEMC90X14SY2G** LEMCOM vacuum pump, 85% maximum vacuum, 1.4 mm Ø nozzle, controlled by a NC (Normally Closed) solenoid valve, stand-alone EtherNet/IP™ "master" module.

**LEMC90X10SY2GB3** Island assembly of 3 LEMCOM vacuum pumps, 85% maximum vacuum, 1 mm nozzle Ø, controlled by a NC (Normally Closed) solenoid valve, EtherNet/IP™ "master" module, 2 secondary modules, with connecting bridges and the M8/M8 "COVAL Bus" 120 Ω termination.





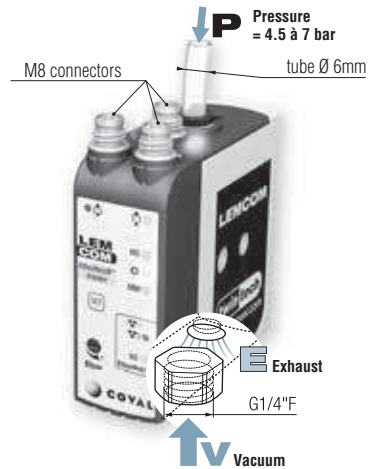
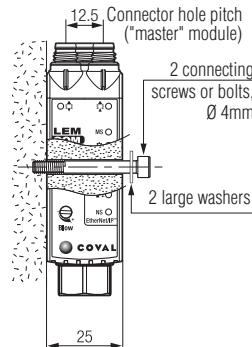
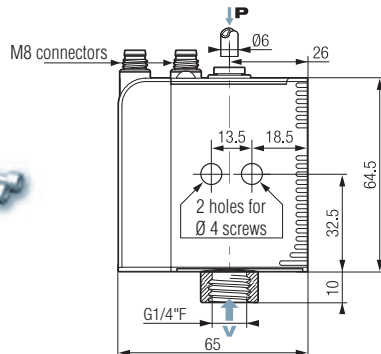
PROFI  
NET

EtherNet/IP

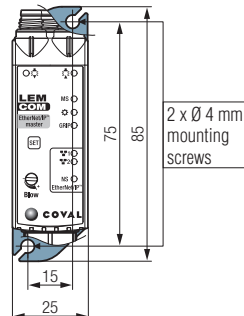
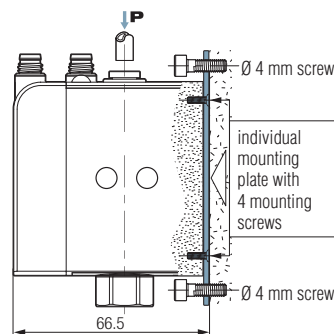


#### 1- Stand-alone Modules

##### Mounting from side



##### Mounting from front

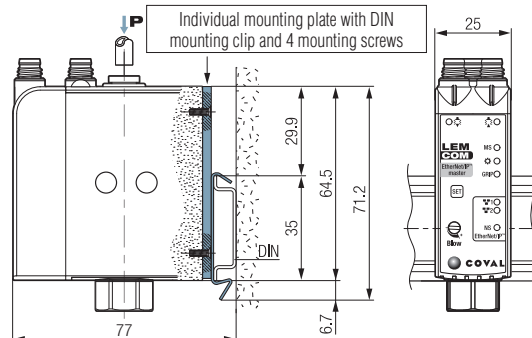


To mount from front, in addition to the module, a mounting kit must be ordered:

Kit for mounting from front:  
1 plate + 4 screws

**Part No.: LEMFIXA**

##### Mounting on DIN rail



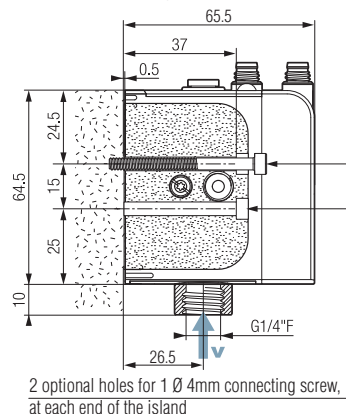
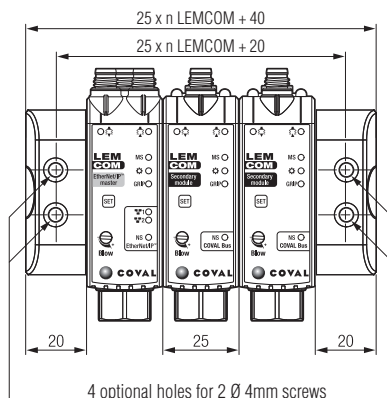
For static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for mounting onto a DIN rail

DIN rail mounting kit:  
1 plate/clip + 4 screws

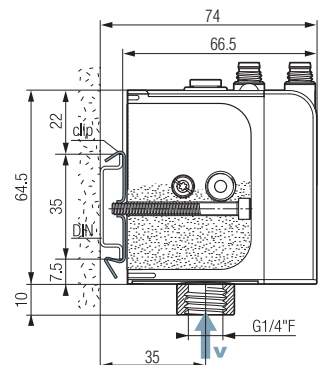
**Part No.: LEMFIXB**

#### 2- Islands

##### Mounting from front



##### Mounting on DIN rail



DIN rail mounting kit:  
2 clips + 2 screws

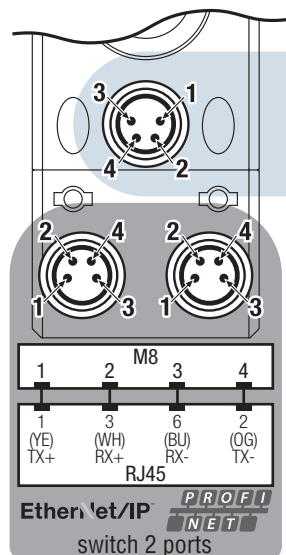
**Part No.: LEMFIXC**



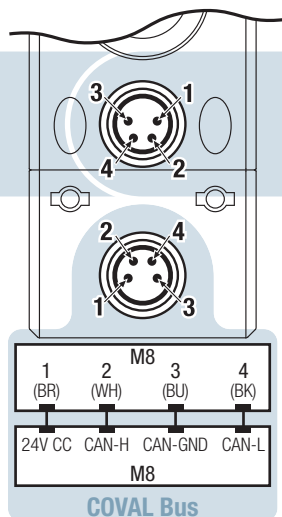


### Electrical Connections

**LEMCOM** master  
EtherNet/IP **PROFI**  
**NET**



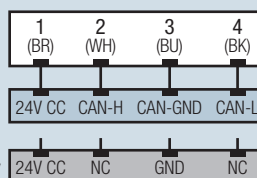
**LEMCOM**  
secondary module



YE: yellow, WH: white, BU: blue,  
OG: orange, BR: brown, BK: black

→ "COVAL bus"

→ power supply



### M8/M8 "COVAL BUS" 120 Ω TERMINATION

Male M8/Female M8 cable integrating a 120 Ω termination resistor. The termination must be integrated on the last "secondary" module of the COVAL Bus, between the final M8 connector of the product and the 24V DC electric supply.



### ACCESSORIES

Cat 5 shielded Ethernet cable: M8, straight, female, 4-pin – RJ45, straight, male, 8-pin – suitable for drag chain use

- **CDM8RJ45L2**: length 2 m.
- **CDM8RJ45L5**: length 5 m.
- **CDM8RJ45L10**: length 10 m.

Other lengths on request.

Cat 5 shielded Ethernet cable: M8, straight, female, 4-pin, on both ends – suitable for drag chain use

- **80003053**: length 1 m.

M8/M8 "COVAL bus" cable: M8, straight, female, 4-pin – M8, straight, female, 4-pin

- **CDM8FFL05**: length 0.5 m.
- **CDM8FFL1**: length 1 m.
- **CDM8FFL2**: length 2 m.
- **CDM8FFL4**: length 4 m.

Other lengths on request.



Power supply cable: M8, straight, female, 4-pin – open end

- **CDM8**: length 2 m.
- **CDM8N**: length 0.5 m.

120 Ω "COVAL bus" termination: M8, straight, female, 4-pin – M8, plug, male, 4-pin

- **80002303**: length 0.2 m.



The COVAL bus is based on a CAN architecture and requires the addition of a bus termination to ensure proper communication between the secondary and master modules. It takes the form of an M8 male/M8 female cable that includes a 120 Ω line termination resistor.

It must be integrated on the last secondary of the COVAL bus, between the module's rear connector and the 24 V DC power supply.

When using a stand-alone master module, this termination is not required.





**PROFI**  
**NET** EtherNet/IP

### Common Specifications

- Supply: Non-lubricated air 5 microns filtered, according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Mini dynamic pressure:
  - stand-alone module: P = 4.5 bar.
  - island modules: 4 bar.
- Blow-off: adjustable flow:
  - stand-alone version: P = 3.5 bar.
  - island version: P network.
- Maximum vacuum: 85%.
- Suction flow rate: From 29 to 92 NI/min.
- Air consumption: From 44 to 90 NI/min, when operating "without ASC".
- Integrated non-clogging silencer.
- Noise level: approximately 68 dBA "ASC off". 0 dBA with ASC.
- Electric protection grade: IP65.
- Maximum operating frequency: 4 Hz.
- Service life: 30 million cycles.
- Weight: 150 g.
- Operating temperature: From 0 to 50°C.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR.
- 4-pins M8 male connectors.

### Self-Adaptation

- Continuous monitoring of the leakage level: Shutoff or automatic return to operation with ASC.

### Integrated electronics

- 24 V DC supply (regulated  $\pm 10\%$ ).
- Electric consumption: "master" < 150 mA, "secondary" < 100 mA, of which 30 mA (0.7W) per vacuum and blow-off pilot.
- Measurement range: 0 to 99% vacuum.
- Measurement accuracy:  $\pm 1.5\%$  of range, temperature compensated.
- Communication ports protected against wiring errors or reversed polarity.

### Service Specifications

#### Settings

- Piece gripping (L1) and regulation (L2) thresholds.
- Automatic blow-off time configurable (0 to 10 seconds).
- Activation/deactivation of ASC regulation system.
- Activation/deactivation of the (DIAG ECO) leakage level monitoring system.
- Adjustable blue LED functioning mode
- Valve functioning mode in the event of loss of communication

#### Diagnosis

- Instantaneous vacuum level (0 to 99%).
- Gripped product, loss of product, regulation in process, regulation default information.
- Cycle counters (vacuum, blow-off, gripped piece, ASC, etc.).
- Supply voltage and internal temperature.
- Product reference and serial number.
- Firmware version.

#### Configuration and diagnosis tools

- LEMCOM Manager PC software (EtherNet/IP, PROFINET and CANopen universal application).
- Embedded web server (EtherNet/IP and PROFINET module).

#### Communication

##### EtherNet/IP:

- 2-port ethernet switch.
- Static IP address or DHCP.
- EDS file & RSLogix 5000 Add-On Instructions.

##### PROFINET:

- 2-port ethernet switch.
- Static IP address or PROFINET DCP.
- GSDML file

##### COVAL Bus:

- CAN link between "master" and "secondary" units / 1 Mbps.
- Connection by specific bridge for island assembly or unshielded female M8/female M8 cable.
- Max total length of the COVAL Bus: 20 meters.







# LEM+

## Compact, High Flow Vacuum Pumps

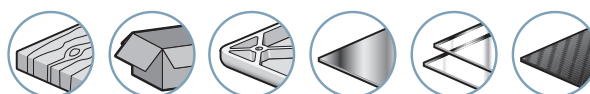
### General Information

**LEM+ Series**, compact, high flow vacuum pumps, integrate **ASR** (Air Saving Regulator) technology that allows up to 40% of energy savings. They are designed for gripping porous products or those with a rough surface. For gripping airtight or semi-airtight products, it is recommended to use the **LEM+ Series**.

**AIR Saving Regulator**



Industry-specific applications



### Advantages

- Easy implementation: Plug & Play, multiple choices, every type of application.
- Maximum automatic energy savings:
  - AIR Saving Regulator ASR**: 40% savings for porous products.
- Compactness: LEM+ vacuum pumps are the most compact on the market.
- Short response times: Possible installation very close to vacuum pads.
- Automatic blow-off: Reduced PLC I/O requirement thanks to the automatic blow-off function (blow-off time configurable from 0 to 10s).
- Dust resistant: Non-clogging through-type silencer.
- Safety: Product gripping is maintained even during power failure.

### Configurations

- 60% or 85% of maximum vacuum.
- NC or NO, depending on safety.
- Combined **ASR** "venturi regulator".
- With or without visual display.
- With or without vacuum sensor.
- With or without controlled blow-off or automatic blow-off function.
- Powerful blow-off as option.
- Versions with 1 or 2 M12 connectors.
- Suction flow rate (NI/min):

max. vacuum nozzle Ø	60%	85%
2.0 mm	189	125
2.5 mm	275	200



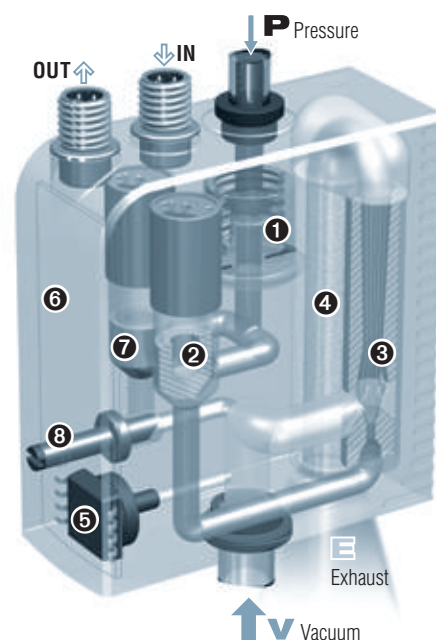
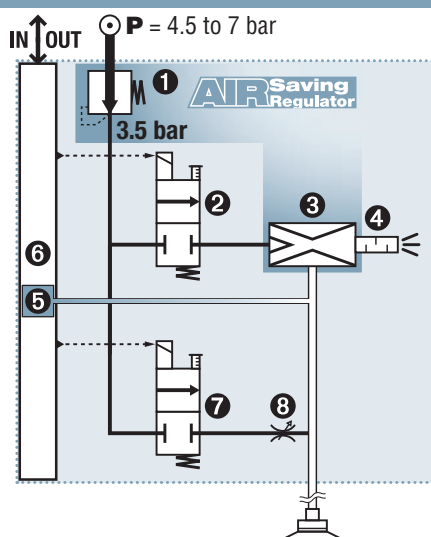
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LEM+

### Integration

The **LEM+** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air and are adapted for every application:

- 1 3.5 bar pressure regulator
- 2 "Vacuum" solenoid valve
- 3 3.5 bar optimized venturi
- 4 Optimized silencer
- 5 Electronic vacuum sensor
- 6 Integrated electronics
- 7 "Blow-off" solenoid valve
- 8 Blow-off flow rate regulator



Schematic representation

**AIR Saving Regulator**

**40%** energy savings  
(on average).

Combined "venturi regulator" **ASR**: pressure regulator 1 feeds venturi 3 with 3.5 bar, optimal for its operation.

→ No more unnecessary consumption of compressed air.



# LEM+

## Compact, High Flow Vacuum Pumps Energy Savings & Intelligence

**AIR Saving Regulator**



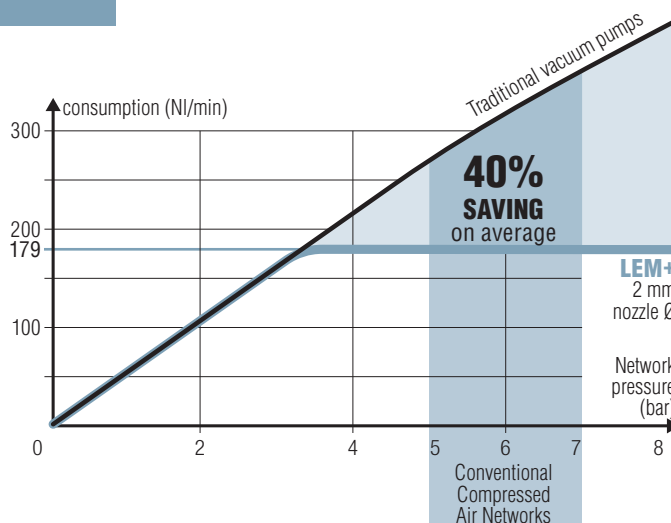
**AIR Saving Regulator**

### (ASR): Air Saving Regulator

The LEM+ vacuum pumps, which integrate an **ASR** "venturi regulator" combination, maintain ideals that COVAL values greatly: reducing both compressed air consumption and noise generation. Regardless of pressure supplied by the compressed air network, the integrated regulator feeds the venturi at **3.5 bar** pressure, optimal for its operation.

- ➔ No more unnecessary energy consumption.
- ➔ No external regulator required and thus the risk of inadvertent misadjustment is eliminated.

Compared to pressures found in most compressed air networks (5-7 bar), the graph opposite demonstrates an achieved economy of 40% on average.



### Intelligence

The front communication face panel allows access and programming of all operations: Various types of monitoring, threshold settings, pump configuration, diagnostics, etc. This front face panel can be locked to prevent an inadvertent misadjustment.

Built-in intelligence, as well as standard factory settings, optimize the implementation, operation, monitoring and maintenance.

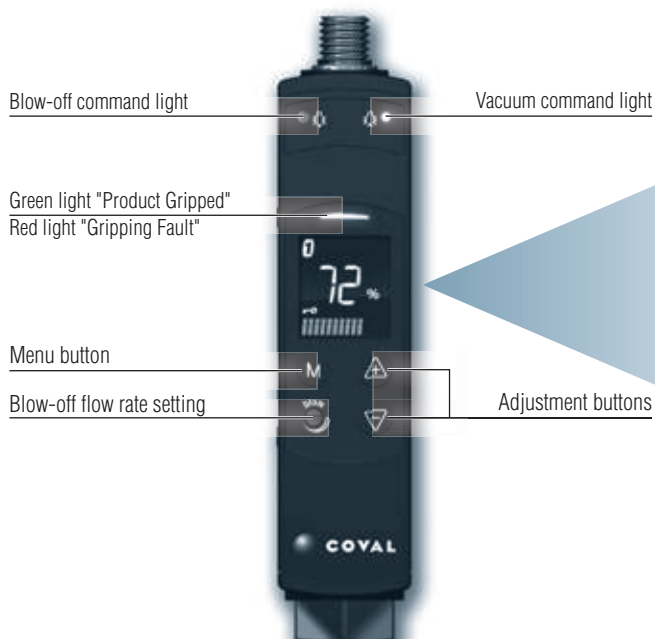
➔ **Simplified & Protected Installation and Operation.**

Due to the high visibility display of the **LEM+** modules, all useful information can be seen at a single glance: vacuum level, product gripped, thresholds reached, energy saving mode activated, etc.

The actual vacuum level is shown with direct reading (selection of different display units), and with "bar graph".

Configuration help messages (multilingual: in French, English, Italian, Spanish, German) are also provided.

➔ **Clear & Complete Communication at Each Stage.**



L1 "Product Gripped" visualization and setting: (vacuum threshold, hysteresis)

Displaying:  
- Vacuum level  
- Setting values

Keypad lock  
ⓘ: Automatic blow-off function activated.



Display units:  
%, mbar, inHg.

Display shows data in many languages / bar graphs



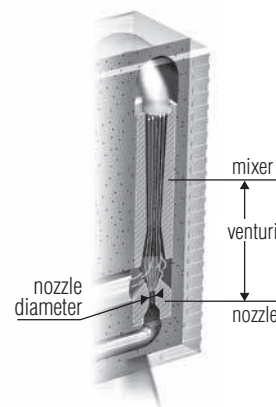
## Compact, High Flow Vacuum Pumps Selection Guide



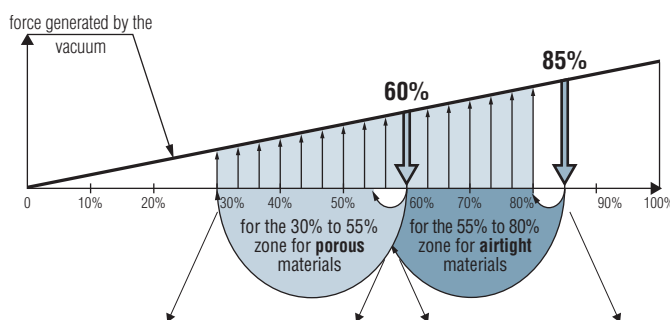
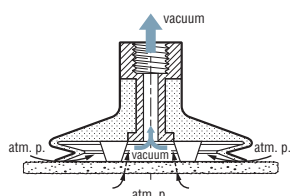
### Select Vacuum Level and Nozzle Diameter

The introductory guide in this catalog shows that for porous objects, a 30-55% vacuum is economical and effective. This is obtained with a 60% maximum vacuum pump. The table below helps to select the nozzle diameter which generates enough vacuumed air flow to respond in the time required by the application, based on a measurement of the material's leakage rate.

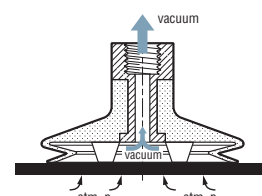
On the contrary, with an airtight material, the vacuum used is 55% to 80%, obtained by a 85% max. vacuum pump. For standard cases, with its integrated blow-off the **LEM+** series is preferable, and more economical due to its **ASC** (Air Saving Control) function. For special cases, the **LEM+** series contains versions without blow-off and versions without a vacuum switch. The table below helps to select the nozzle diameter required for the application.



**Porous materials:**  
cardboard, unfinished wood,  
pastries, etc.



**Airtight materials:**  
glass, plastic, sheet metal,  
finished wood



#### Porous Objects ▶ Maximum Vacuum Level: 60%

Time to create vacuum (seconds) for a volume of 1 liter				Air consumed (NI/min)	Air drawn in (NI/min)
vacuum achieved	35 %	45 %	55 %		
Ø nozzle					
2.0 mm	0.16	0.27	0.42	179	189
2.5 mm	0.11	0.18	0.31	260	275

#### Airtight Objects ▶ Maximum Vacuum Level: 85%

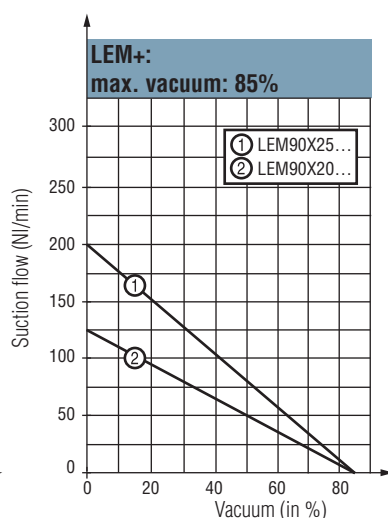
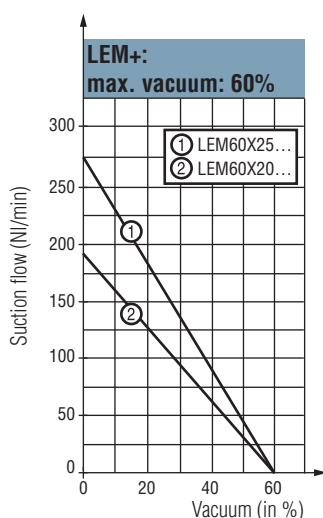
Time to create vacuum (seconds) for a volume of 1 liter				Air consumed (NI/min)	Air drawn in (NI/min)
vacuum achieved	55 %	65 %	75 %		
Ø nozzle					
2.0 mm	0.38	0.55	0.80	179 *	125
2.5 mm	0.26	0.35	0.50	260 *	200

\* To save compressed air, choose **LEM+** → **ASC** reduces the air consumption by 90%

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LEM+

### Suction Flow Rate / Vacuum Curves

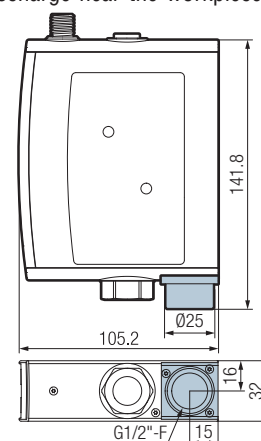


### Exhaust manifold: option E

The LEM+ vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/2"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the workpiece. (LEM\_\_E Version).

This option can be added at a later date by ordering the reference **GVOKITEC2**.

**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.







LEM 60 X 25				S	VA	C15	P	G1	F	—				
<b>VACUUM LEVEL</b> 60 % max. vacuum is optimal for porous materials <b>60</b> 85 % max. vacuum is optimal for airtight products <b>90</b>				<b>VACUUM SENSOR DIALOGUE</b> Vacuum pump without vac. sensor <b>V0</b> <b>C14</b> LEM__X__VOC14PG1 ▪ Simplified LEM+ without settings and dialogue. ▪ Automatic operation until maximum vacuum level.										
<b>NOZZLE DIAMETER</b> 2 mm nozzle Ø <b>20</b> 2.5 mm nozzle Ø <b>25</b>				<b>CONNECTORS</b> one M12 connector 4 pins (C14) 										
<b>MODULE COMPOSITION</b> <b>NC Vacuum Pump Without Blow-Off</b> LEM__X__RV_C__PG1 ▪ Single command signal. ▪ NC vacuum command valve.				R	<b>Vacuum pump with vacuum sensor &amp; dialogue</b> <b>VA</b> <b>C15</b> one M12 connector 5 pins (C15) LEM__X__VAC15PG1 ▪ Electronic vacuum sensor (VA). ▪ "Gripped product" switching output 24V DC / NO. ▪ Front face panel and full dialogue.									
<b>NC Vacuum Pump With Blow-Off</b> LEM__X__SV_C__PG1 ▪ 2 command signals. ▪ NC vacuum command valve. ▪ Blow-off configured on site, at choice: - Blow-off controlled by specific signal; - Automatic blow-off function (blow-off time configurable from 0 to 10s), only with VA option (advantage: reduced PLC I/O requirement). ▪ Adjustable blow-off flow rate.				S	<b>Vacuum pump with vacuum sensor &amp; dialogue</b> <b>VA</b> <b>C24</b> two M12 connectors 4 pins (C24) LEM__X__VAC24PG1 ▪ Electronic vacuum sensor (VA). ▪ Stand alone I/O. ▪ "Gripped product" switching output 24V DC / NO. ▪ 1 auxiliary output: "Vacuum level" signal analogic 1 to 5V DC. ▪ Front face panel with full dialogue.									
<b>NO Vacuum Pump With Blow-Off</b> LEM__X__VV_C__PG1 ▪ 2 command signals. ▪ NO vacuum command valve. ▪ Blow-off controlled by external signal. ▪ Adjustable blow-off flow rate.				V	<b>POWERFUL BLOW-OFF</b>  <table border="1"> <tr> <td>Without</td> <td>—</td> </tr> <tr> <td>With</td> <td><b>F</b></td> </tr> </table> <p>The powerful blow-off option allows you to release the product quickly. Isolation valve F directs the entire blow-off flow to the vacuum pad. The option is only available with LEM+ modules equipped with a blow-off regulation: Version LEM__X__SV... and LEM__X__VV... NB: If option F is selected, no blow-off flow rate setting is available.</p>						Without	—	With	<b>F</b>
Without	—													
With	<b>F</b>													
<b>Safety in Case of Power Failure</b> This version is suitable for applications where product gripping safety must be ensured in the event of an untimely power failure, and this even in the case of leakage (failsafe). This version does not include automatic blow-off function that enables control of the module with a single "vacuum and blow-off" signal.														
<b>EXAMPLE OF COMPLETE PART NUMBER: LEM60X25SVAC15PG1</b> LEM+ vacuum pump, 60% maximum vacuum, 2.5 mm nozzle Ø, controlled by a NC (Normally Closed) solenoid valve with vacuum sensor and dialogue, connection by 1 M12 5-pin connector.														
									<b>EXHAUST</b> Open (integrated silencer) — Exhaust manifold (G1/2"-F) <b>E</b>					

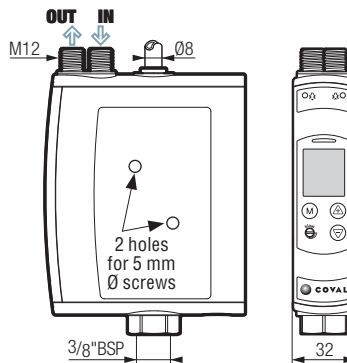
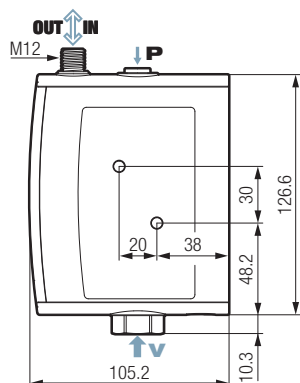




#### Side Mounting

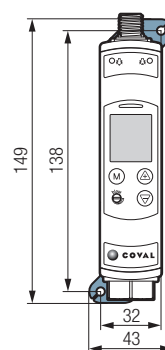
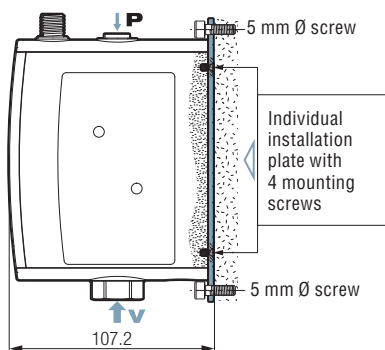
▪ Version: one M12 connector

▪ Version: two M12 connectors



Mounting from the side is the simplest to implement: Two Ø 5 mm through screws or bolts with large washers.

#### Mounting from Front



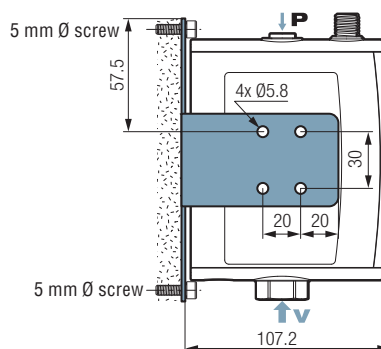
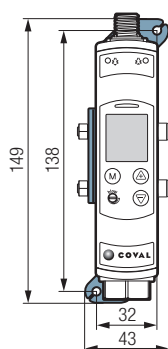
For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:  
1 plate + 4 screws

**Part No.: LEMFIX2A**

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LEM+

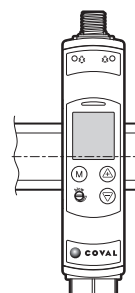
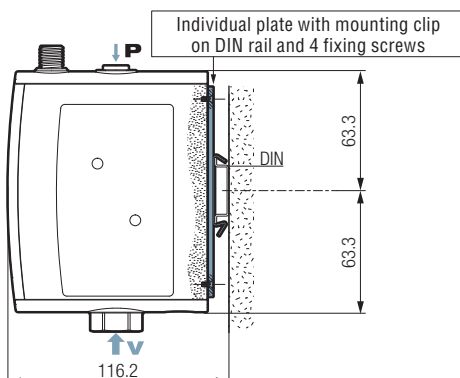


For front installation with side pump mounting this kit is needed in addition to the module:

Front installation kit:  
1 bracket + 2 screws CHC5x40 + 2 nuts

**Part No.: LEMFIX2D**

#### Mounting on DIN rail



For a static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for fixing onto a DIN rail, to be ordered separately:

Kit for mounting on DIN rail:  
1 plate / clip + 4 screws

**Part No.: LEMFIX2B**





#### Specifications

##### COMMON SPECIFICATIONS

- Supply: Non-lubricated air 5 microns filtered, according to ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Blow-off: Adjustable flow rate.
- Powerful blow-off (option F) P = 3.5 bar without flow rate control.
- Maximum vacuum: 60% or 85% depending on model.
- Suction flow rate: From 125 to 275 NI/min, depending on model.
- Air consumption: From 179 to 260 NI/min, depending on model.
- Integrated non-clogging silencer.
- Sound level: From 72 to 75 dBA.
- Display status:
  - of the vacuum control on the front panel: Green LED.
  - of the blow-off control on the front panel: Orange LED.
- Electric protection grade: IP 65.
- Maximum operating frequency: 4 Hz.
- Response time for opening / closing: 20/30 ms.
- Service life: 30 million cycles.
- Weight: From 410 to 460 g, depending on model.
- Operating temperature: From 0 to 50°C.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR, HNBR, PU.

##### Electrical Controls

- Control voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: 30 mA (0.7W) by vacuum or blow-off solenoid valve.

##### VA MODEL SPECIAL SPECIFICATIONS

###### Displays

- Display status of the threshold on the front panel: Green or red LED.
- Black and white LCD display, 7 matrix, symbols, vacuum reading area.
- Displaying the vacuum level and bar graph.
- Displaying number of cycles (vacuum cycles counter).
- Indication of exceeding service life (> 30 million cycles).

###### Settings

- Using membrane keypad and pull down menu.
- Language selection: FR, ENG, DE, IT or ES.
- Blow-off type selection: controlled or automatic (blow-off time configurable from 0 to 10s).
- Measurement unit selection (% , mbar, inHg).
- Manual, electrical, monostable commands.
- If the application requires, specific setting of thresholds and hysteresis that are different from the initial factory settings: L1 = 65%, h1 = 10%.

###### Vacuum Sensor

- Power supply voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: Standby: <25mA / max. 60 mA.
- Measurement range: 0 to 99% of vacuum, 0 to -999 mbar, 0 to -29.9 inHg.
- Measurement accuracy:  $\pm 1.5\%$  of range, temperature compensated.

###### "Gripped Product" Output Signal

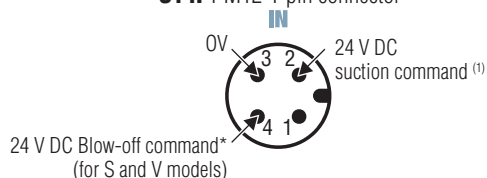
- 24V DC, switching output / NO, switching capacity: 125 mA PNP.

###### Auxiliary output (C24 model only, 2 x M12 4 pins)

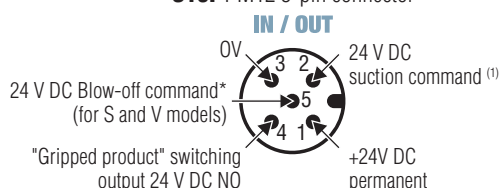
- "Vacuum level" signal, analogic 1 to 5V DC of measuring range.

#### Electrical Connections

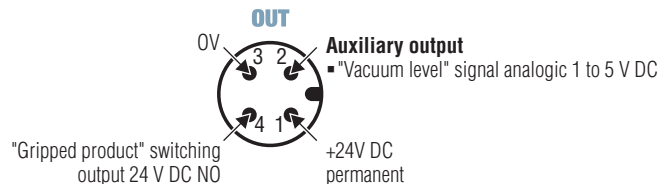
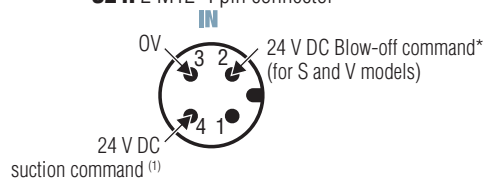
##### • C14: 1 M12 4-pin connector



##### • C15: 1 M12 5-pin connector



##### • C24: 2 M12-4 pin connector



(1) 24 V DC suction command, depending on version:

- for vacuum pumps model **R** and **S** (vacuum control NC valve): 24 V DC vacuum control
- for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command

\* **S** externally controlled blow-off or automatic blow-off function > economy of an automaton outlet.

#### Accessories

Power supply cable: M12, straight, female – open end

- **CDM12N**: 4-pin, length. 2 m.
- **CDM12L5**: 4-pin, length. 5 m.
- **CDM125PL2**: 5-pin, length. 2 m.
- **CDM125PL5**: 5-pin, length. 5 m.



Power supply cable: M12, elbow, female – open end

- **CCM12**: 4-pin, length. 2 m.
- **CCM125PL2**: 5-pin, length. 2 m.





# LEMAX+


## Compact, High Flow Vacuum Pumps

### General Information

**LEMAX+ Series**, compact, high flow vacuum pumps, integrate ASC (Air Saving Control) technology that allows up to 90% of energy savings. They are specifically designed for gripping airtight or semi-airtight products.

For gripping porous products or those with a rough surface, it is recommended to use the **LEM+ Series**.

#### Advantages

- Easy implementation: Plug & Play, multiple choices, every type of application.
- Maximum automatic energy savings:  
 **ASC**: 90% savings for airtight products.
- Compactness: **LEMAX+** vacuum pumps are the most compact on the market.
- Short response times: Possible installation very close to vacuum pads.
- Automatic blow-off: Reduced PLC I/O requirement thanks to the automatic blow-off function (blow-off time configurable from 0 to 10s).
- Dust resistant: Non-clogging through-type silencer.
- Safety: Product gripping is maintained even during power failure.

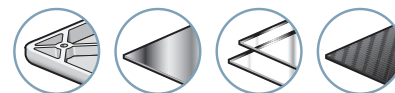
#### Configurations

- 85% of maximum vacuum.
- NC or NO, depending on safety.
- ASC advanced electronics.
- High visibility display.
- Integrated vacuum sensor.
- Vacuum non-return valve.
- Combined **ASR** "venturi regulator".
- External blow-off signal or automatic blow-off function.
- Powerful blow-off as option.
- Versions with 1 or 2 M12 connectors.
- Suction flow rate (NI/min):

max. vacuum	85%
nozzle Ø	
2.0 mm	125
2.5 mm	200



Industry-specific applications



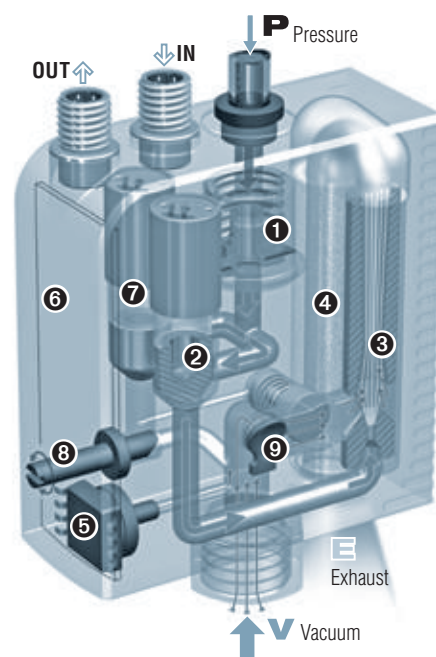
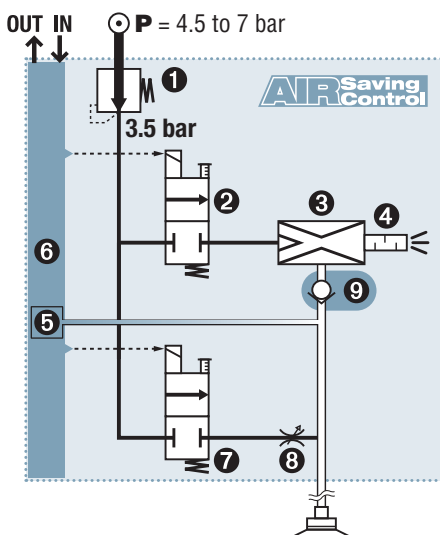
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LEMAX+

#### Integration

The **LEMAX+** compact modules integrate all the functions of "industrial vacuum" including simple, efficient, economical compressed air usage and are adapted for every application:

- 1 3.5 bar pressure regulator
- 2 "Vacuum" solenoid valve
- 3 3.5 bar optimized venturi
- 4 Optimized silencer
- 5 Electronic vacuum sensor
- 6 Integrated electronics
- 7 "Blow-off" solenoid valve
- 8 Blow-off flow rate regulator
- 9 Vacuum non-return valve



Schematic representation

**AIR Saving Control**

**90%** energy savings  
(on average).

Combination of non-return 9 and advanced electronics 6 ensures the ASC's automatic management.

→ Once vacuum is established, the pump does not continue to consume air to hold the product.



# LEMAX+

## Compact, High Flow Vacuum Pumps

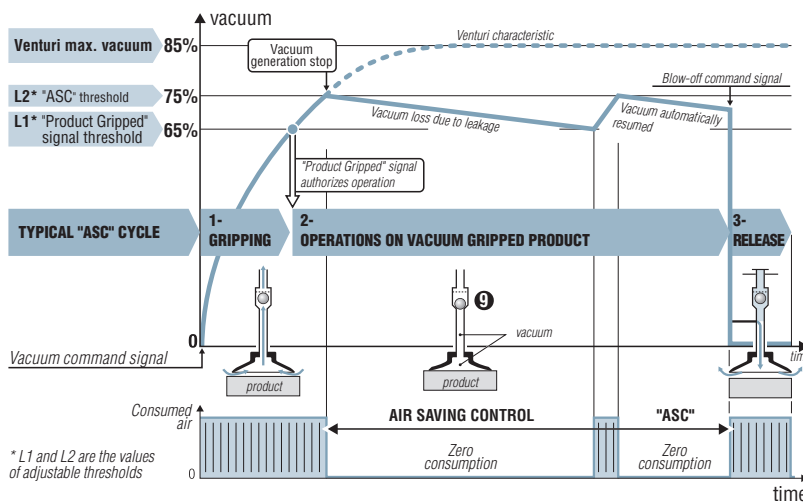
### Energy Saving & Auto-adjustment



AIR Saving Control



#### AIR Saving Control "Air Saving Control" Cycle



As illustrated in the above figure, the LEMAX module automatically executes the "ASC", cycle, thus saving the maximum amount of energy, based on the following 3 phases.

#### 1- Gripping the object

The "vacuum" solenoid ② starts the cycle by supplying the venturi ③ which generates the vacuum to quickly pick up the object with the suction cup → short-term consumption.

#### 2- Operations on the object held by vacuum

The vacuum level is constantly monitored by the vacuum switch ⑤. When it reaches the L1 threshold (65%), the "gripped object" signal is generated, which allows the planned operations (transfer, machining, etc.). When the vacuum reaches threshold L2 (75%), the supply to the venturi via the solenoid valve ② is cut off → consumption is halted. The object remains held by the vacuum maintained thanks to the closed valve ⑤.

Micro-leaks will generally cause the vacuum level to fall slowly. Each time it falls below 65%, vacuum generation is briefly resumed until it reaches threshold L2 (75%).

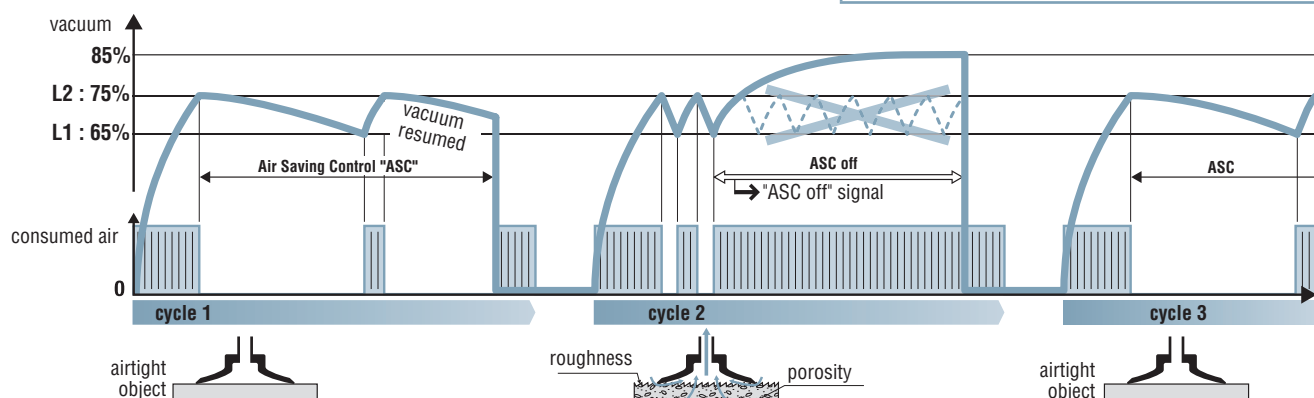
#### 3- Releasing the object

At the end of operations, blow-off is ordered. The "blow-off" solenoid valve ⑦ generates a stream of air which closes the isolation valve ⑤, blows on the object to release it quickly.

#### Smart Adaptation

The illustration below shows the adaptation capacities of the LEMAX module. "ASC" operation is automatic for any object that is air-tight enough (cycle 1).

If a leak occurs (cycle 2), due to a rough object or to suction-pad wear, the module automatically detects the anomaly, ends the cycle without "ASC" in order to continue production and reports the event for possible maintenance. Production continues. Once everything is returned to normal (cycle 3), "ASC" operation is automatically resumed.



#### 1- Gripping + transfer (2 mm nozzle Ø, emptying 0.2 l)

Phase	Duration	Air consumption		
		without "ASC"	with "ASC"	
Gripping	0.16 s	0.45 NI	0.45 NI	achieved economy
Transfer	1.20 s	3 NI	0	
Release	0.14 s	0.3 NI	0.3 NI	
		3.75 NI	0.75 NI	→ 80 %

#### 2- Clamping + operations (2 mm nozzle Ø, emptying 0.4 l)

Phase	Duration	Air consumption		
		without "ASC"	with "ASC"	
Clamping	0.32 s	0.9 NI	0.9 NI	achieved economy
Operations	60 s	179 NI	0	
Release	0.14 s	0.3 NI	0.3 NI	
		180.2 NI	1.2 NI	→ 99 %

#### Resulting Savings

Energy savings from "ASC" are major, as the two examples above show:

- 80 % savings for transferring an object after gripping.
- 99 % savings for holding an object during a 1 minute operation.

The investment generally pays for itself in just a few months.

#### "ASC": AN ADVANTAGE WITHOUT LIMITATIONS

Saving energy has become essential. With LEMCOM, thanks to ASC, energy is automatically saved without interfering with established operations:

##### 1- No specific adjustment

The initial setting (L1 = 65%, L2 = 75%) is suitable for most applications.

##### 2- Production regardless of what happens

Operation is always ensured, if necessary without "ASC", if the leakage level is too high.

##### 3- Guided maintenance

Clear display of the need for maintenance to return to auto-regulated "ASC" operation.

AIR Saving Regulator

Specially designed by COVAL, the LEMAX+ vacuum pumps integrate the ASR (regulator-venturi) combination which greatly reduces the compressed air consumption and noise level.



# LEMAY+

## Compact, High Flow Vacuum Pumps

### Intelligence & Selection Guide

AIR Saving Control



#### Intelligence

The front communication face panel allows access and programming of all operations: Various types of monitoring, threshold settings, pump configuration, diagnostics, etc. This front face panel can be locked to prevent an inadvertent misadjustment.

Built-in intelligence, as well as standard factory settings, optimize the implementation, operation, monitoring and maintenance.

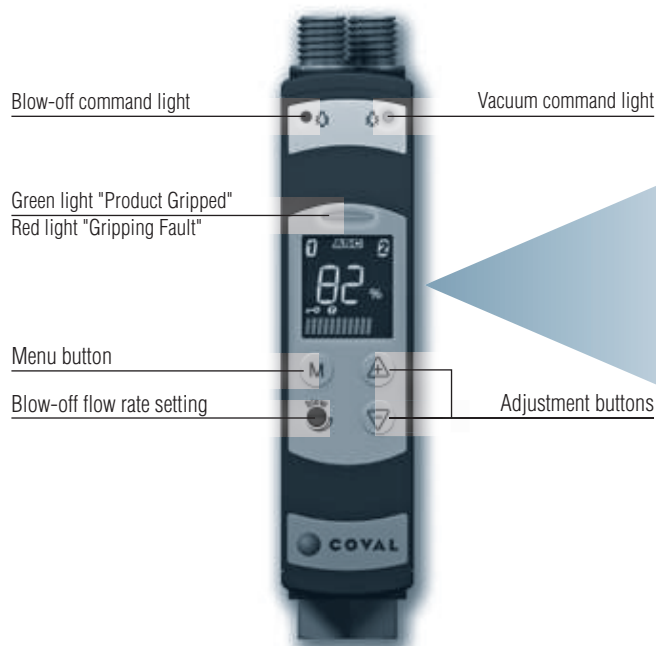
#### → Simplified & Protected Installation and Operation.

Due to the high visibility display of the **LEMAY+** modules, all useful information can be seen at a single glance: vacuum level, product gripped, thresholds reached, energy saving mode activated, etc.

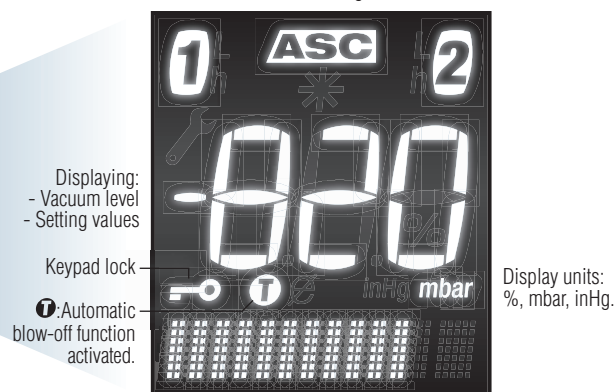
The actual vacuum level is shown with direct reading (selection of different display units), and with "bar graph".

Configuration help messages (multilingual: in French, English, Italian, Spanish, German) are also provided.

#### → Clear & Complete Communication at Each Stage.



L1 "Product Gripped" visualization and setting: (vacuum threshold, hysteresis)  
 "ASC" monitoring  
 L2 "ASC Threshold" visualization and setting: (vacuum threshold, hysteresis)



Display shows data in many languages / bar graphs

8

LEMAY+

#### Power Determined by the Venturi Nozzle Diameter

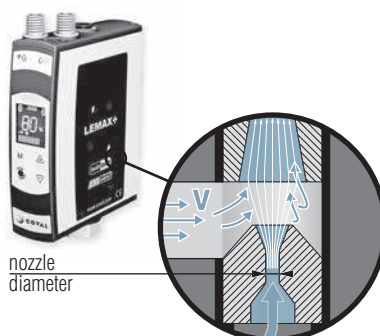
The table shows the power levels generated by each of the nozzle diameters available: when the module is operating "ASC" off, a larger nozzle draws and consumes more compressed air.

On the other hand, during "ASC" operation, a large nozzle quickly reaches the vacuum threshold generating power shut-off.

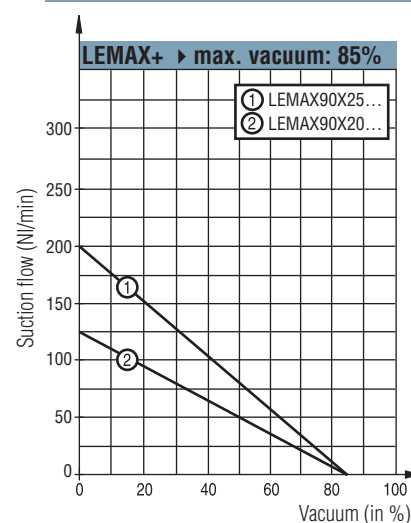
In conclusion:

- A large nozzle enables quicker gripping without consuming more during "ASC" operation.
- A small nozzle does not consume less when operating with "ASC" off.

Nozzle Diameter Selection					
nozzle Ø	Venturi Specifications While Working Without "ASC"		Evacuation of 1L Volume. "ASC" Operation: - Gripping at 65% Vacuum - Stop Vacuum at 75%		
	Vacuum flow (NI/min)	Consumed Air (NI/min)	Gripping Time (65% Vacuum) (s)	Time Until 75% Vacuum (s)	Consumed Air (NI)
2.0 mm	125	179	0.55	0.80	2.2
2.5 mm	200	260	0.35	0.50	2.2



#### Suction Flow Rate / Vacuum Curves







**LEMAX 90 X 25**

**S C15 P\* G1**

**F**

**-**

#### VACUUM LEVEL

85 % max. vacuum is optimal for airtight products

**90**

#### NOZZLE DIAMETER

2 mm nozzle Ø

**20**

2.5 mm nozzle Ø

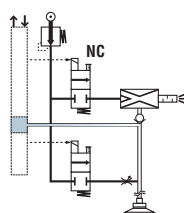
**25**

#### MODULE COMPOSITION

##### NC Vacuum Pump With Blow-Off

LEMAX\_\_X\_\_SV\_C\_\_PG1

- 2 command signals.
- NC** vacuum command valve.
- Blow-off configured on site, at choice:
  - Blow-off controlled by specific signal;
  - Automatic blow-off function (blow-off time configurable from 0 to 10s.).
- Advantage: reduced PLC I/O requirement.
- Adjustable blow-off flow rate.

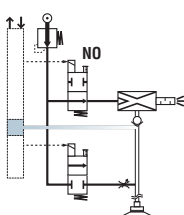


**S**

##### NO Vacuum Pump With Blow-Off

LEMAX\_\_X\_\_VV\_C\_\_PG1

- 2 command signals.
- NO** vacuum command valve.
- Blow-off controlled by external signal.
- Adjustable blow-off flow rate.



**V**

#### Safety in Case of Power Failure

This version is suitable for applications where product gripping safety must be ensured in the event of an untimely power failure, and this even in the case of leakage (failsafe).

This version does not include automatic blow-off function that enables control of the module with a single "vacuum and blow-off" signal.

#### EXAMPLE OF COMPLETE PART NUMBER:

**LEMAX90X25SC24PG1**

LEMAX+ vacuum pump, 85% maximum vacuum, 2.5 mm nozzle Ø, controlled by a NC (Normally Closed) solenoid valve, connection by 2 M12 4-pin connectors.

#### CONNECTORS

**C15**

Vacuum Pump with 1 M12 5-pin Connector  
LEMAX90X\_\_C15PG1

OUT/IN



- "Gripped product" switching output 24V DC / NO.

**C24**

Vacuum Pump with 2 M12 4-pin Connectors  
LEMAX90X\_\_C24PG1

OUT IN



- Stand alone I/O.
- "Gripped product" switching output 24V DC / NO.
- 1 configurable auxiliary output:
  - either "Vacuum level" signal analogic 1 to 5V DC.
  - or "Without ASC" signal +5V DC switching output NO.

\*P = PNP electronic

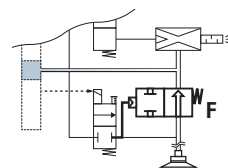
→ NPN version available upon request.

#### POWERFUL BLOW-OFF

**-** Without

**F** With

The powerful blow-off option allows you to release the product quickly.



Isolation valve **F** directs the entire blow-off flow to the vacuum pad.

NB: If option **F** is selected, no blow-off flow rate setting is available.

#### EXHAUST

Open (integrated silencer)

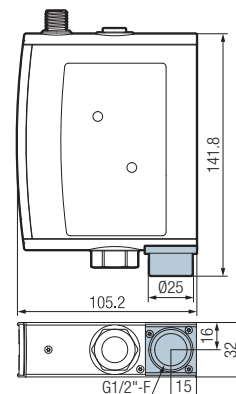
**-**

Exhaust manifold (G1/2"-F)

**E**

The LEMAX+ vacuum pumps can be equipped with the "exhaust manifold" option, which provides a G1/2"-F connection to the exhaust in order to add a silencer, transfer the exhaust outside the work area or to avoid air discharge near the work-piece. (LEMAX\_\_E Version).

This option can be added at a later date by ordering the reference **GVOKITEC2**.



**Note:** The design of the exhaust manifold and vacuum pumps do not guarantee the complete sealing of the exhaust and therefore cannot be used in a "clean room" environment.



# LEMAX+

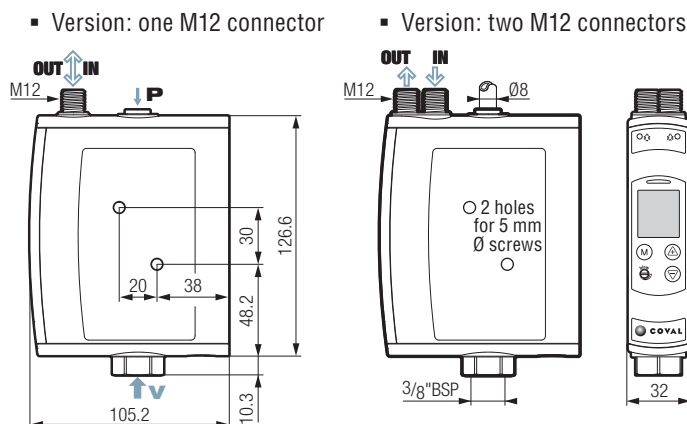
## Compact, High Flow Vacuum Pumps

### Dimensions, Mounting Options

AIR Saving Control

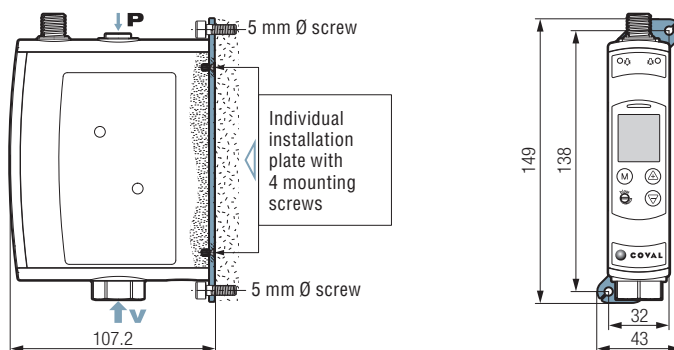


#### Side Mounting



Mounting from the side is the simplest to implement: Two  $\varnothing 5$  mm through screws or bolts with large washers.

#### Mounting from Front



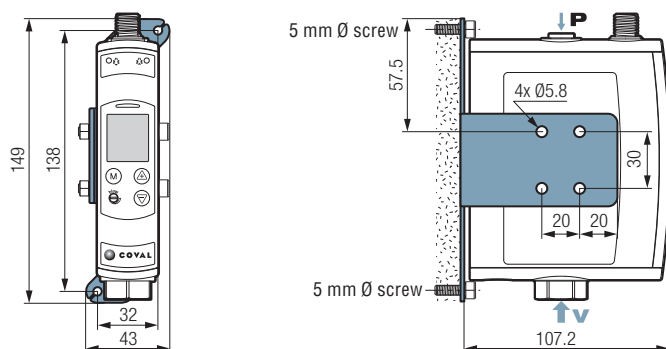
For mounting from the front, in addition to the module, you need to order an additional kit:

Mounting from front kit:  
1 plate + 4 screws

**Part No.: LEMFIX2A**

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LEMAX+

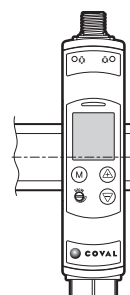
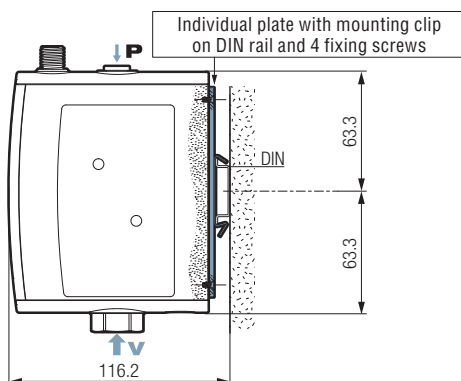


For front installation with side pump mounting this kit is needed in addition to the module:

Front installation kit:  
1 bracket + 2 screws CHC5x40 + 2 nuts

**Part No.: LEMFIX2D**

#### Mounting on DIN rail



For a static mounting (for example, in a cabinet), a module can be clipped onto a DIN rail. For this purpose, the module must first be equipped with an individual plate for fixing onto a DIN rail, to be ordered separately:

Kit for mounting on DIN rail:  
1 plate / clip + 4 screws

**Part No.: LEMFIX2B**





#### Specifications

- Supply: Non-lubricated air 5 microns filtered, according to standard ISO 8573-1:2010 [4:5:4].
- Operating pressure: 4.5 to 7 bar.
- Blow-off: Adjustable flow rate.
- Powerful blow-off (option F) P = 3.5 bar without flow rate control.
- Maximum vacuum: 85%.
- Suction flow rate: From 125 to 200 NI/min, depending on model.
- Air consumption: From 179 to 260 NI/min, depending on model (when operating "without ASC").
- Integrated non-clogging silencer.
- Sound level: From 72 to 75 dBA "without ASC". 0 dBA with ASC available.
- Display status:
  - of the vacuum control on the front panel: Green LED.
  - of the blow-off control on the front panel: Orange LED.
- Electric protection grade: IP 65.
- Maximum operating frequency: 4 Hz.
- Response time for opening / closing: 20/30 ms.
- Service life: 30 million cycles.
- Weight: From 410 to 460 g, depending on model.
- Operating temperature: From 0 to 50°C.
- Materials: PA 6-6 15% FG, brass, aluminum, NBR, HNBR, PU.

#### Electrical Controls

- Control voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: 30 mA (0.7W) by vacuum or blow-off solenoid valve.

#### Displays

- Display status of the threshold on the front panel: Green or red LED.
- Black and white LCD display, 7 matrix, symbols, vacuum reading area.
- Displaying the vacuum level and bar graph.
- Displaying number of cycles (vacuum cycles counter).
- Indication of exceeding service life (> 30 million cycles).

#### Settings

- Using membrane keypad and pull down menu.
- Language selection: FR, ENG, DE, IT or ES.
- Blow-off type selection: controlled or automatic (blow-off time configurable from 0 to 10s).
- Measurement unit selection (% , mbar, inHg).
- Manual, electrical, monostable commands.
- If the application requires, specific setting of thresholds and hysteresis that are different from the initial factory settings: L1 = 65%, h1 = 10%).

#### Vacuum Sensor

- Power supply voltage: 24V DC ( $\pm 10\%$  regulated).
- Current consumption: Standby: <25mA / max. 60 mA.
- Measurement range: 0 to 99% of vacuum, 0 to -999 mbar, 0 to -29.9 inHg.
- Measurement accuracy:  $\pm 1.5\%$  of range, temperature compensated.

#### "Gripped Product" Output Signal

- 24V DC, switching output / NO, switching capacity: 125 mA PNP.

#### Configurable auxiliary output

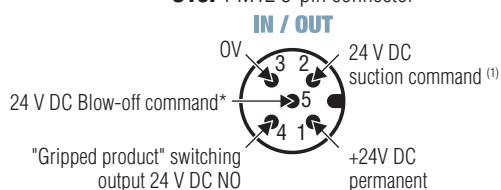
- (C24 model only, 2 x M12 4 pins)
  - either "Vacuum level" signal, analogic 1 to 5V DC of measuring range.
  - or "without ASC" signal +5V DC NO switching output.

#### ASC: Regulation & Self-Adaptation

- Continuous monitoring of the leakage level: Back-off or automatic return to operation with ASC.

#### Electrical Connections

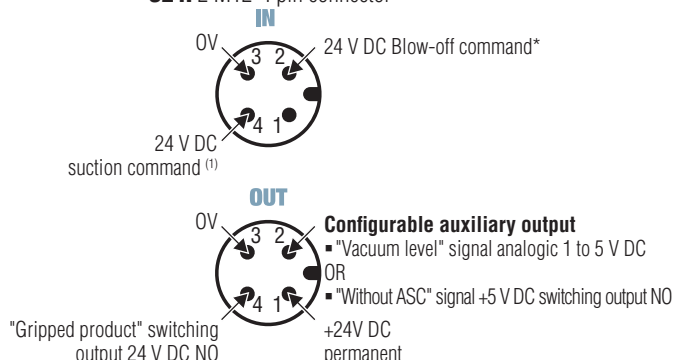
- C15:** 1 M12 5-pin connector



(1) 24 V DC suction command, depending on version:  
 - for vacuum pumps model **S** (vacuum control NC valve): 24 V DC vacuum control  
 - for vacuum pumps Model **V** (vacuum control NO valve): 24 V DC vacuum off command

\* **S** externally controlled blow-off or automatic blow-off function > economy of an automaton outlet.

- C24:** 2 M12-4 pin connector



#### Accessories

Power supply cable: M12, straight, female – open end

- CDM12N:** 4-pin, length. 2 m.
- CDM12L5:** 4-pin, length. 5 m.
- CDM125PL2:** 5-pin, length. 2 m.
- CDM125PL5:** 5-pin, length. 5 m.



Power supply cable: M12, elbow, female – open end

- CCM12:** 4-pin, length. 2 m.
- CCM125PL2:** 5-pin, length. 2 m.





# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### General Information

COVAL's **GVMAX HD** series Heavy Duty communicating vacuum pumps are the result of many years of listening, discussions and feedback from manufacturers, integrators and users from the automotive, aerospace and packaging industries.

Our **GVMAX HD** vacuum pumps meet their expectations in terms of power, robustness, ease-of-configuration and use, communication and modularity, all while remaining compact and light for easy integration in a smart factory.

#### Advantages

- Robust: Resistant to the harsh environments of metal stamping and sheet metal production lines
- High performance: Optimized Venturi system that guarantees powerful suction flow rates and reduced evacuation times
- Modular: Easy maintenance; SMART SWAP quick-mounting system
- Communicating: Efficient communication system for all use levels, clear and easy-to-read HMI, NFC technology for mobile use, and IO-Link communications interface for straightforward networking

#### Main Specifications

- 85% vacuum
- Vacuum control: NC, NO or pulse-triggered bistable control
- Powerful suction flow rates:
  - Dia. 2.5 mm nozzle → 185 NI/min
  - Dia. 3.0 mm nozzle → 230 NI/min
- Blow-off: Standard or powerful, controlled or automatic timed
- Non-return valve
- 1 or 2 M12 connectors
- Degree of protection: IP65
- Standalone vacuum pumps or in island assemblies
- High-visibility color display with clear multi-lingual messages and straightforward settings menu
- Remote HMI available depending on version
- Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application
- IO-Link communications interface
- Air Saving Control (ASC) smart vacuum control system guarantees 90% energy savings on average
- Supply pressure monitoring (pressure sensor)
- Vacuum network status analysis and monitoring



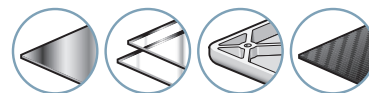
NFC )))

IO-Link

AIR Saving Control



Industry-specific applications



NFC )))

IO-Link

AIR Saving Control

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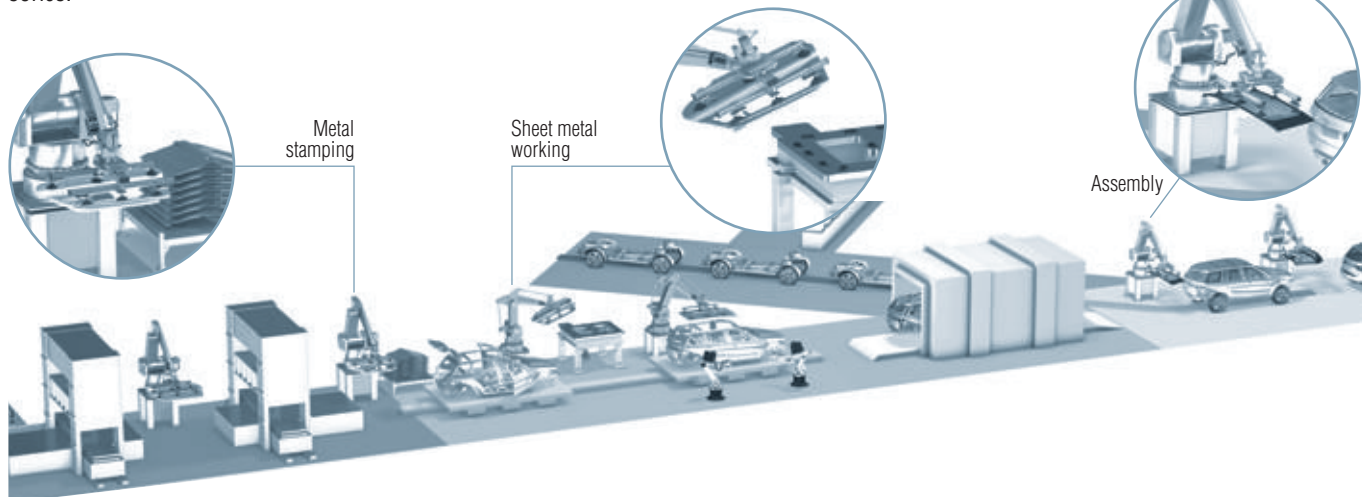
GVMAX HD



#### Safety, Productivity, and Flexibility at every step of manufacturing

COVAL provides the various players in the automotive industry a global approach to vacuum handling for all their gripping, moving, placing, and holding needs for varied body parts, glass, and accessories.

COVAL solutions, such as vacuum pumps and suction cups, are equipped on robots for stamping presses, welding, assembly, and glass production.





# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### General Information



#### GVMAX HD Makes Vacuum Management Easy



Onboard installation and diagnostic tools:

- Vacuum network sizing support and clogging detection
- Compressed air consumption monitoring
- Supply voltage monitoring



#### Inputs / Outputs

Digital (SIO) / IO-Link

M12 connectors available in 4 versions:

- One 5 or 8-pin connector
- or two 4 or 5\*-pin connectors

\*Version for use with remote HMI



3-color status indicator light

1.54" high-visibility color LCD display with clear multilingual messages and straightforward settings menu

Settings keypad



NFC )))

Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile application.



**SMART SWAP** Quick-mounting system: Allows you to mount the GVMAX HD module onto its pneumatic socket or remove it in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

Pressure



Pneumatic socket:

Combines the compressed air supply and the vacuum outlet

- NC, NO or pulse-triggered bistable vacuum control
- Blow-off: Standard or powerful, controlled or automatic timed



Vacuum generation with single-stage Venturi pump

- Short evacuation times
- No moving parts
- Dust resistant
- No maintenance required



Air Saving Control (ASC), our smart vacuum control system: Averages 90% energy savings



Exhaust



Vacuum

Open clog-free silencer

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GVMAX HD



# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Integration and Performance



#### Integrated Functions

GVMAX HD vacuum pumps include all the "vacuum" functions required for an easy, efficient and economical use of compressed air and suitable for any application:

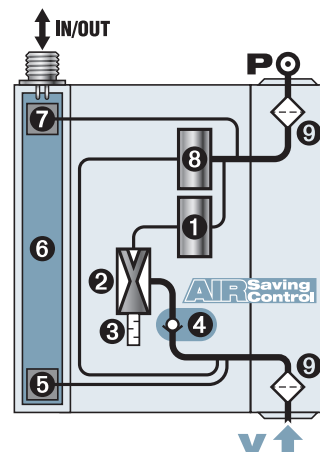
- ❶ "Vacuum" solenoid valve
- ❷ Single-stage Venturi pump
- ❸ Open silencer
- ❹ "Vacuum" non-return valve
- ❺ Electronic vacuum switch
- ❻ Integrated electronics
- ❼ Pressure sensor
- ❽ "Blow-off" solenoid valve
- ❾ 350  $\mu$ m filter screen



**90%** energy savings  
(on average, see p. 8/56)

The combined action of the non-return valve ❹ and of the integrated electronics ❻ automatically ensures ASC management.

→ Once the vacuum has been established, the pump does not consume any more air to hold the object.



#### Performance determined by the Venturi pump's nozzle diameter

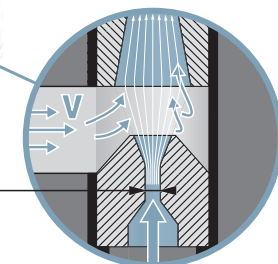
The table specifies the performance levels and evacuation times generated for each nozzle diameter available.

When handling airtight objects, the ASC vacuum control system can help to considerably reduce the consumption of compressed air.

		Evacuation time (seconds) of a volume of 1 liter				Max. vacuum (%)	Air drawn in (NI/min)	Air consumed (NI/min)	Air pres- sure level (bar)
Nozzle dia.	Vacuum reached	45 %	55 %	65 %	75 %				
2.5 mm		0.17	0.24	0.35	0.52	85	185	294	5
3.0 mm		0.15	0.20	0.27	0.42	85	230	380	5.5



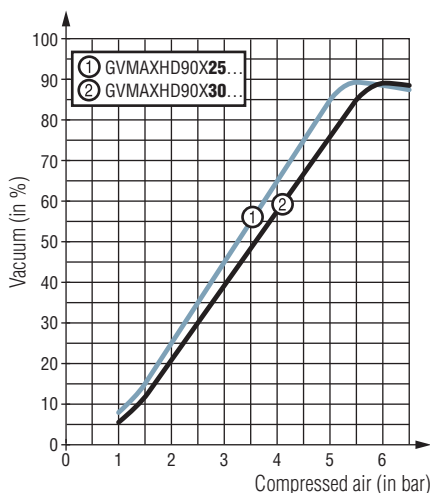
Nozzle diameter



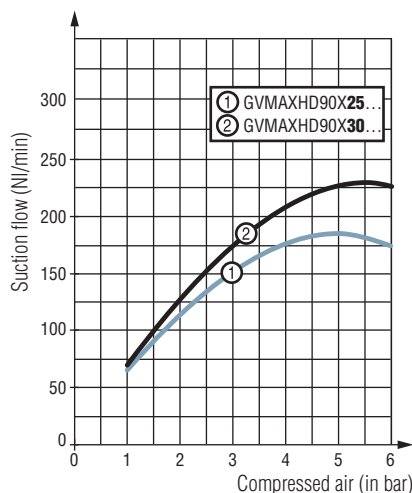
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GVMAX HD

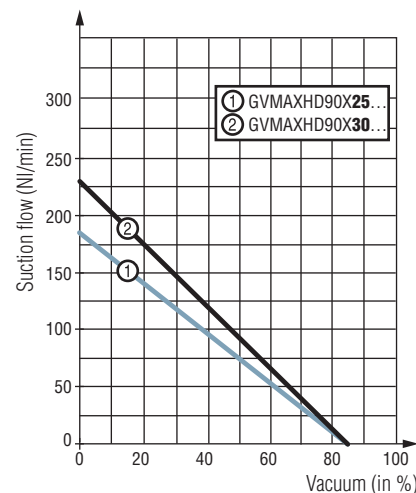
#### Vacuum Generated/Compressed Air



#### Suction Flow Rate/Compressed Air



#### Suction Flow Rate/Vacuum





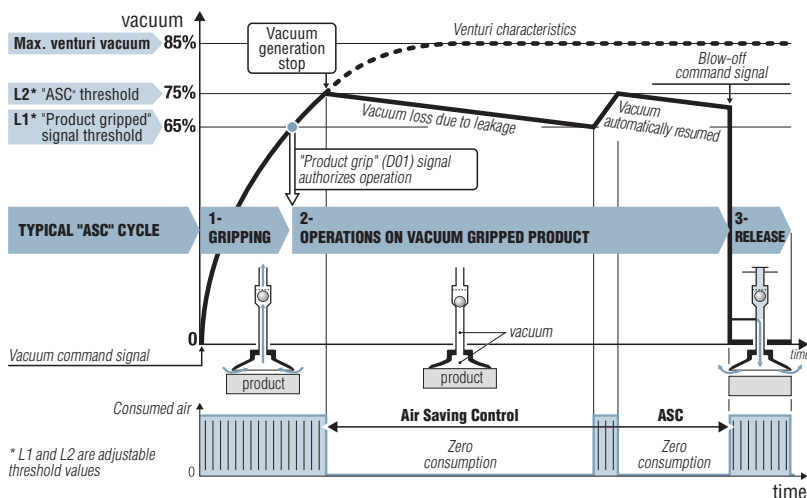
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Energy Savings and Smart Adaptation



Averages 90% energy savings



Air Saving Control (ASC) is a smart vacuum control system that stops the consumption of compressed air as soon as the required level of vacuum is reached, thus avoiding any unnecessary consumption and contributing to savings on the equipment's operating costs.

For airtight objects, the GVMAX HD vacuum pumps automatically execute the above "ASC" cycle, thus leading to maximal energy savings, according to the following 3 phases:

- 1- Object is gripped: vacuum generated by the Venturi pump
- 2- Operations on object held in place by vacuum: at the L2 vacuum threshold (75%), the supply of the Venturi pump is cut off → the consumption becomes zero; the object remains held in place owing to the non-return valve. If micro-leaks make the vacuum drop to threshold L2 less the defined hysteresis value, vacuum generation is briefly switched on again.
- 3- Object is released: by an external or an automatic timed blow-off command (according to the settings).

#### 1- Gripping + transfer (nozzle dia. 2.5 mm, emptying 0.6 l)

Phase	Duration	Air consumption		
		w/o "ASC"	with "ASC"	
Gripping	0.50 s	2.42 NI	2.42 NI	Achieved economy
Transfer	2.00 s	9.67 NI	0	
Release	0.14 s	0.68 NI	0.68 NI	
		12.77 NI	3.10 NI	76 %

#### 2- Clamping + operations (nozzle dia. 2.5 mm, emptying 1 l)

Phase	Duration	Air consumption		
		w/o "ASC"	with "ASC"	
Clamping	0.83 s	4.01 NI	4.01 NI	Achieved economy
Operations	60 s	290 NI	0	
Release	0.14 s	0.68 NI	0.68 NI	
		294.69 NI	4.69 NI	98 %

#### → Resulting savings

"ASC" energy savings are major as shown in the 2 examples below:

- 76% savings when transferring an object after gripping
- 98% savings when clamping an object during an operation lasting 1 min

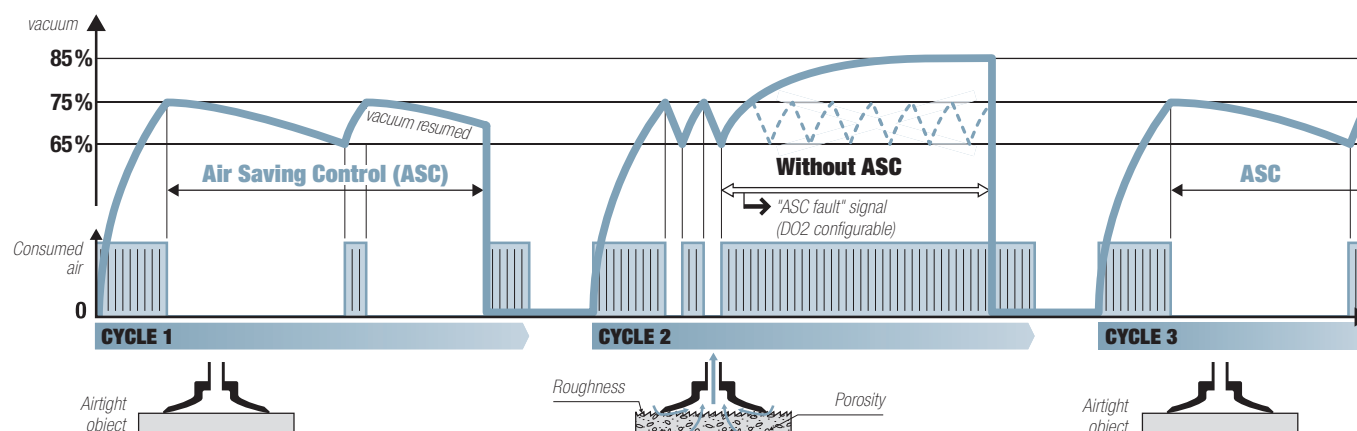
The investment generally pays off within just a few months.

#### ENERGY SAVING APP

Calculate the savings you can generate with our ASC technology using our ENERGY SAVING APP available online.



#### Smart adaptation



The above illustration shows the GVMAX HD's ability to adapt. "ASC" operation is automatic for any object that is adequately airtight (cycle 1). Should a leakage occur (cycle 2), due to a rough or porous object, or due to a leak in the vacuum network, the vacuum pump would automatically detect the unwanted condition,

complete the cycle without ASC in order to keep production running, and report the situation for possible maintenance. Production keeps running. As soon as everything returns to normal (cycle 3), operation with ASC is automatically restored.



# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps Straightforward Communication



### Easier Integration, Use, and Diagnostics

The GVMAX HD heavy duty vacuum pump series include various features that enable setup, use, and diagnostics in all situations and at all levels (operators, process, networked factory), with the aim in mind of keeping the use and management of the pumps as straightforward as possible and thus allowing for their easy integration in your smart factory.

#### Advantages:

- Straightforward wiring and installation
- Remote configuration, control, and diagnostics
- Installation and diagnostic tools

### Settings, Diagnostics, and Process Data



#### CONFIGURABLE SETTINGS

- Choice of language: EN, FR, DE, IT or ES
- "Object gripped" and ASC control thresholds
- ASC vacuum control system management
- Automatic blow-off
- Vacuum measurement unit: kPa, %, mbar, inHg
- Pressure measurement unit: MPa, bar, Psi
- Software updates, and more



#### DIAGNOSTICS

- Cycle counters (vacuum and blow-off control, objects gripped, objects lost, etc.)
- Vacuum network sizing support to prevent pressure loss
- Clogging detection function
- Supply pressure monitoring
- Supply voltage monitoring
- Software version
- Product item number and serial number



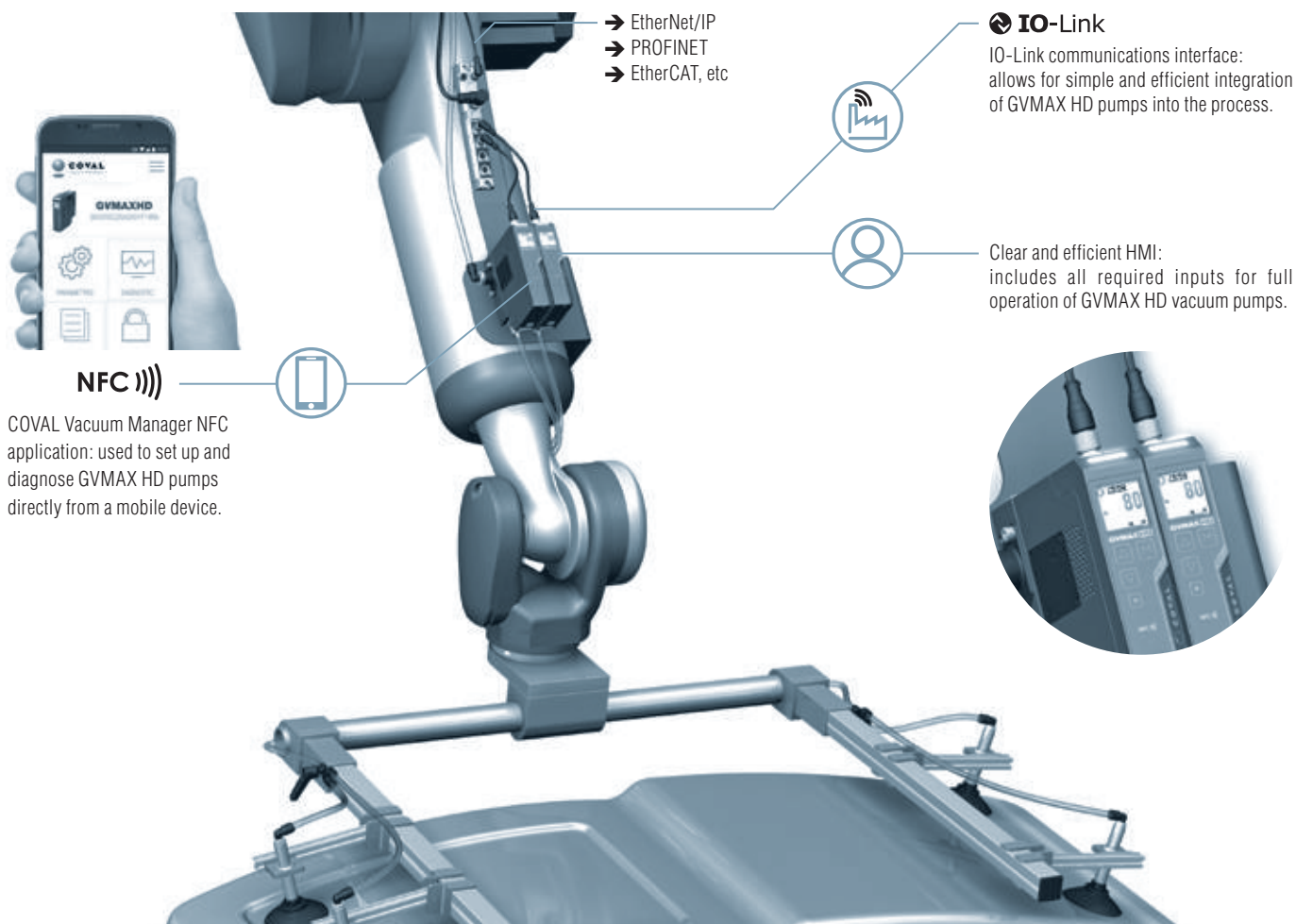
#### PROCESS INPUT DATA

- Vacuum and blow-off control



#### PROCESS OUTPUT DATA

- Instantaneous vacuum level
- Object gripped and object lost information
- ASC vacuum control system status
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure



→ EtherNet/IP  
→ PROFINET  
→ EtherCAT, etc

#### IO-Link

IO-Link communications interface: allows for simple and efficient integration of GVMAX HD pumps into the process.

Clear and efficient HMI: includes all required inputs for full operation of GVMAX HD vacuum pumps.

NFC )))

COVAL Vacuum Manager NFC application: used to set up and diagnose GVMAX HD pumps directly from a mobile device.



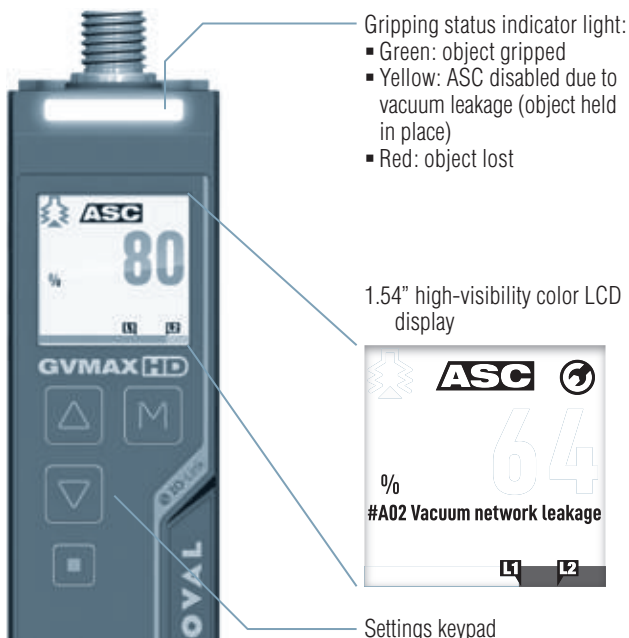
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Straightforward Communication



#### HMI

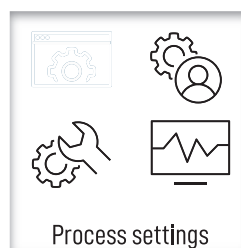


The GVMAX HD HMI allows for easy and efficient reading of the pump's operation.

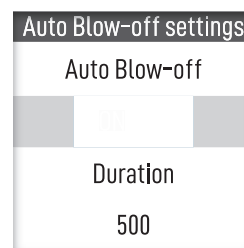
The high-visibility display includes all required inputs for full operation:

- Main information is easy to read
- Multilingual: EN - FR - DE - IT - ES
- Simple and clear event messages
- Intuitive settings and diagnostics menus
- Configurable display orientation: 0 – 90 – 180 – 270°
- Lockable to prevent undesired changes

*Note: a version with remote HMI is available (see p. 8/57)*



#### Multilingual



EN FR DE IT ES

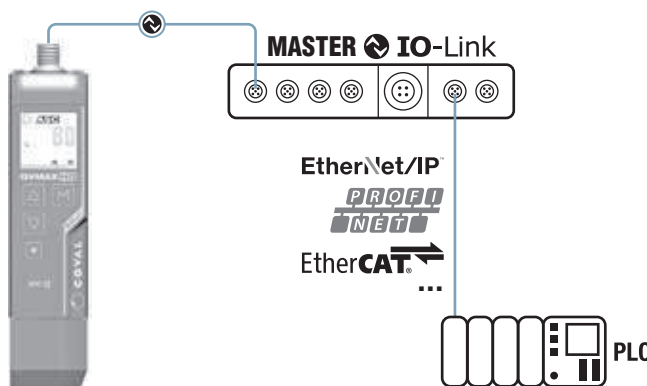


#### IO-Link

The IO-Link system provides efficient real-time communication between GVMAX HD vacuum pumps and any higher-level protocol (EtherNet/IP, PROFINET, EtherCAT, etc.) required to monitor the production line. It can be used to control pumps, configure settings, and get feedback to ensure maximum productivity.

#### Advantages:

- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more



#### NFC )))

The NFC wireless technology integrated in GVMAX HD and in the COVAL Vacuum Manager application makes all setup and diagnostic functions available and modifiable on your mobile devices.

#### Additional features:

- Read/write settings with the power on or off
- Copy settings from one GVMAX HD to another
- Backup up to 5 setting configurations
- COVAL support: send a report including the settings and diagnostic data to COVAL for technical support





# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps Configuration



### Available Configurations

#### VA version (standalone)

GVMAX HD module screw-mounted onto its pneumatic socket



Versions with patented **SMART SWAP** system to quickly mount the GVMAX HD module onto its pneumatic socket



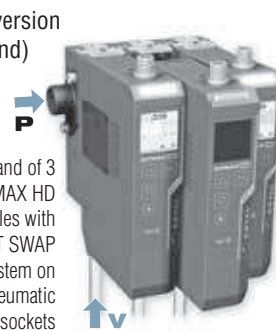
#### RA version (standalone)

GVMAX HD standalone module with SMART SWAP system and pneumatic socket



#### RB version (island)

Island of 3 GVMAX HD modules with SMART SWAP system on pneumatic sockets



### Remote HMI

To make it easier to use and set up vacuum pumps in certain use cases, the GVMAX HD range includes a version without a front dialog panel that can be used with a remote HMI.

#### Advantages:

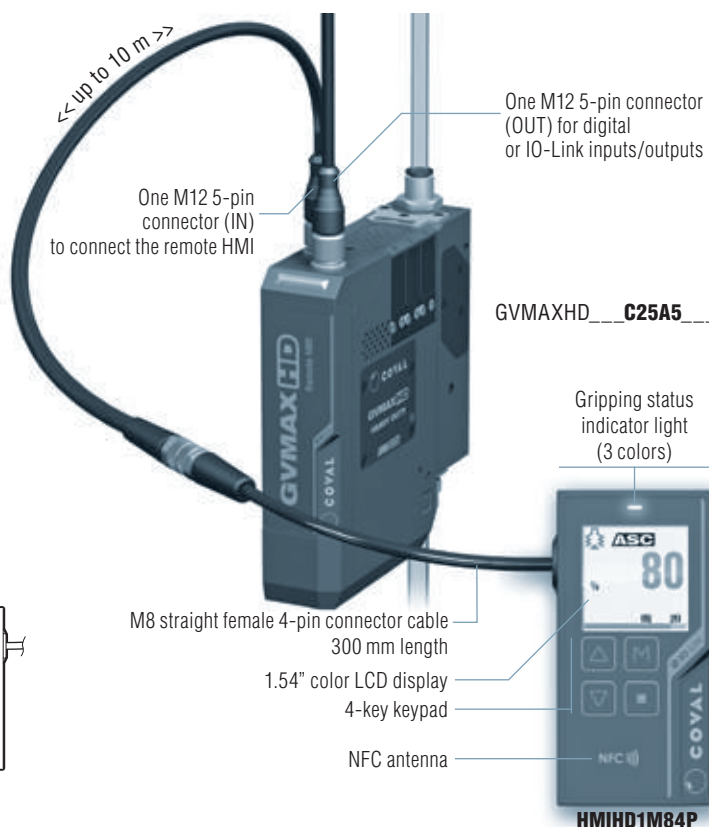
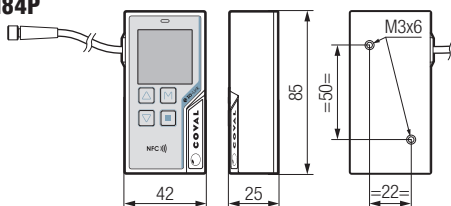
- Place the HMI in an easily accessible and visible area
- Use one HMI for several GVMAX HD vacuum pumps
- Copy settings from one pump to another
- Use the GVMAX HD vacuum pump without any HMI connected

#### → GVMAX HD vacuum pump without HMI

- Part No.: GVMAXHD **C25A5**
- Two M12 5-pin connectors
  - M12 blanking plug provided for use without HMI

#### → Remote HMI

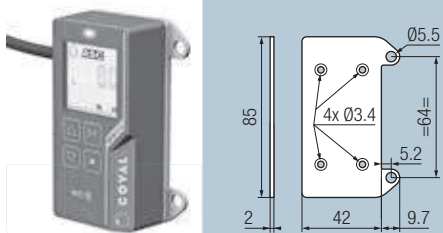
Part No.: **HMIHD1M84P**



### Accessories for remote HMI

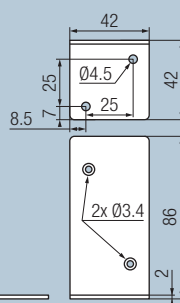
#### Front mounting plate

- + 2 x M3x6 TORX
- + 2 x M5x50 CHC
- Part No.: **HMIHD1FIXA**



#### 90° angled mounting plate

- + 2 x M3x6 TORX
- Part No.: **HMIHD1FIXB**



#### Connector cable

- M12 4-pin, female / M8 4-pin, male
- 2 m length: Part No. **CDM8MM12F4PL2**
- 5 m length: Part No. **CDM8MM12F4PL5**
- Other lengths available upon request.





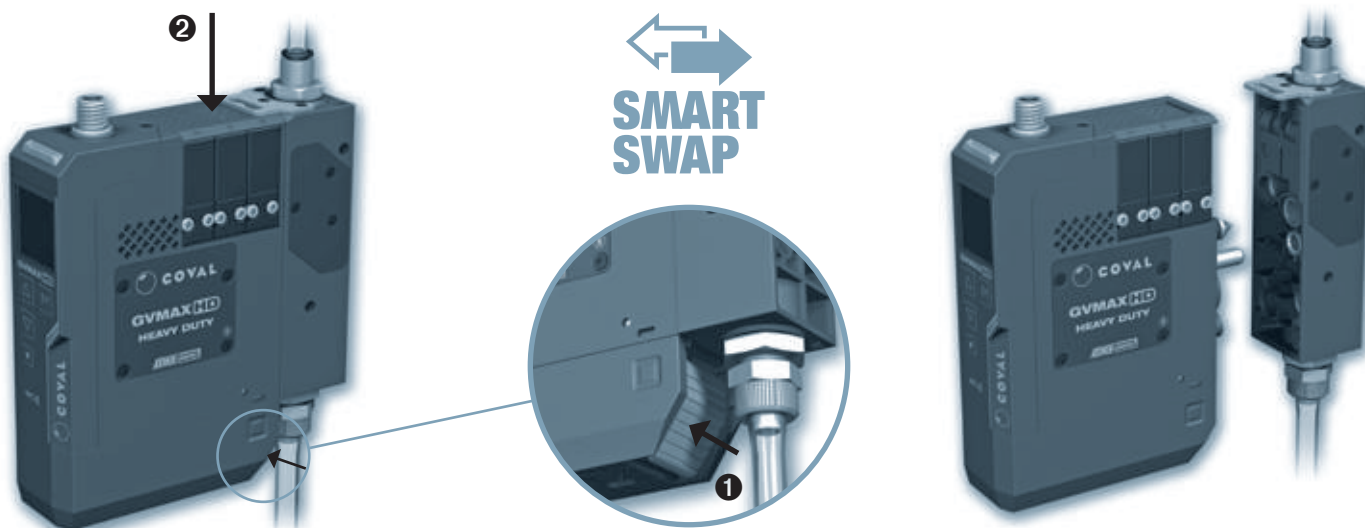
# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Modularity and Maintenance



#### SMART SWAP Quick-Mounting System



COVAL's patented SMART SWAP quick-mounting system allows you to mount the GVMAX HD module onto its pneumatic socket or remove it in the blink of an eye, without needing to disconnect compressed air and vacuum tubes.

No tools required, just two steps by operator to release: press release tab **1** at back of silencer and apply pressure to upper housing **2** of GVMAX HD.

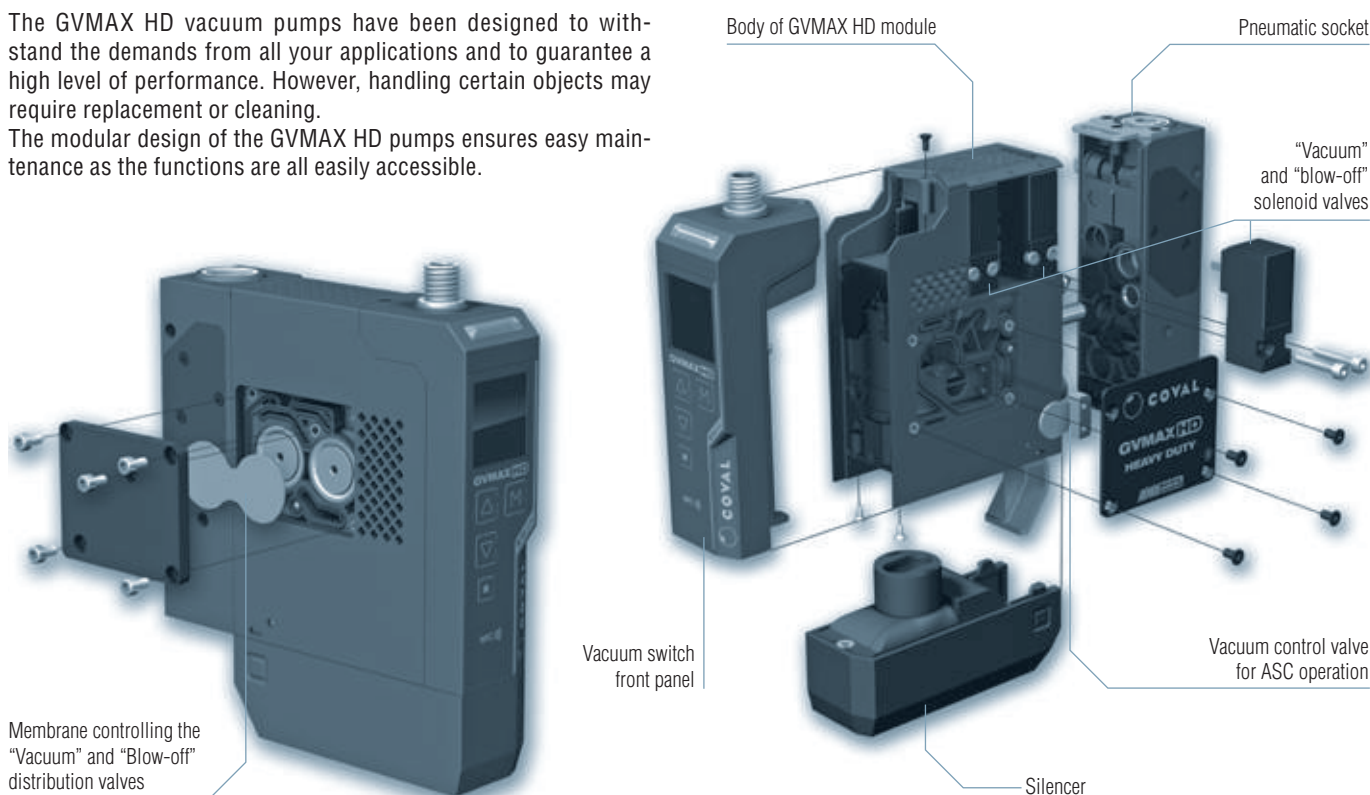
- There is a locking screw on the release tab, which can be tightened to require operators to use a screwdriver to remove the module.
- Removal under pressure is made possible by the integrated non-return valve.



#### Modularity/Maintenance

The GVMAX HD vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain objects may require replacement or cleaning.

The modular design of the GVMAX HD pumps ensures easy maintenance as the functions are all easily accessible.



8

GVMAX HD



# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Selection guide



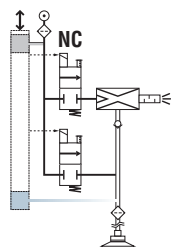
#### Vacuum Control: 3 Solutions

**Model GVMAXHD\_\_S:** vacuum pump with **NC** vacuum control and **NC** blow-off  
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

■ **NC** blow-off and vacuum control: solenoid valves

■ Choice of blow-off settings:

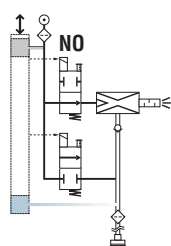
- Controlled by external signal
- Automatic timer from 50 to 9999 ms (advantage: saves one controller output)



**Model GVMAXHD\_\_V:** vacuum pump with **NO** vacuum control and **NC** blow-off  
In the event of power failure, vacuum is still generated: object is held in place  
→ fail-safe.

In the event of compressed air failure, the vacuum is no longer maintained.

- **NO** vacuum control solenoid valve
- **NC** blow-off control solenoid valve
- Blow-off controlled by external signal



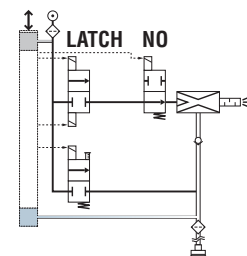
**Model GVMAXHD\_\_L:** vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off (patented system)

In the event of power failure, the vacuum pump maintains its previous state.

More specifically, one of the following two scenarios will take place should the failure occur:

- During vacuum generation, the vacuum is maintained → fail-safe
  - During blow-off or when the pump is off, the pump remains "Off"
- Vacuum control is automatically stopped when the blow-off command is activated.

The vacuum can only be stopped with the blow-off command.

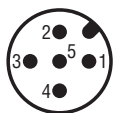


In the event of compressed air failure, the vacuum is no longer maintained.

- Pulse-triggered bistable vacuum control solenoid valve (50 ms min.)
- **NC** blow-off control solenoid valve
- Blow-off controlled by external signal

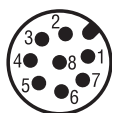
#### Electrical Connections

■ **C15A1:** One M12 5-pin male connector



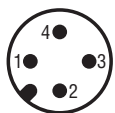
- 1 24 V DC
- 2 24 V DC suction command <sup>(1)</sup>
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q
- 5 24 V DC blow-off command

■ **C18A1:** One M12 8-pin male connector



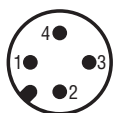
- 1 24 V DC object gripped DO1
- 2 24 V DC
- 3 /
- 4 24 V DC suction command <sup>(1)</sup>
- 5 24 V DC ASC Status DO2 - C/Q <sup>(2)</sup>
- 6 24 V DC blow-off command
- 7 0 V - GND
- 8 /

■ **C24A2:** Two M12 4-pin male connectors



Rear connector:  
IN

- 1 /
- 2 24 V DC blow-off command
- 3 0 V - GND
- 4 24 V DC suction command <sup>(1)</sup>



Front connector:  
OUT

- 1 24 V DC
- 2 24 V DC ASC Status DO2 <sup>(2)</sup>
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q

Note: The Digital Outputs 1 and 2 signals can be swapped in the parameter settings.

Version for use with remote HMI

■ **C25A5:** Two M12 5-pin male connectors



Rear connector:  
IN

- 1 24 V DC
- 2 RS485 +
- 3 0 V - GND
- 4 RS485 -
- 5 /



Front connector:  
OUT

- 1 24 V DC
- 2 24 V DC suction command <sup>(1)</sup>
- 3 0 V - GND
- 4 24 V DC object gripped DO1 - C/Q
- 5 24 V DC blow-off command

⊗ : Connections for IO-Link

<sup>(1)</sup> 24 V DC suction command, depending on version:

- **S:** 24 V DC vacuum control
- **V:** 24 V DC vacuum off command
- **L:** 24 V DC vacuum control with min. pulse-triggering of 50 ms

<sup>(2)</sup> DO2 configurable: - ASC status (default)

- or Pressure fault (below 5 bar or above 8 bar)
- or Power supply fault (below 21.6 V or above 26.4 V)
- or ASC fault
- or Object lost

#### Accessories

Power supply cable: M12, straight, female – open end

- **CDM12N:** 4-pin, length. 2 m.
- **CDM12L5:** 4-pin, length. 5 m.
- **CDM125PL2:** 5-pin, length. 2 m.
- **CDM125PL5:** 5-pin, length. 5 m.



Power supply cable: M12, elbow, female – open end

- **CCM12:** 4-pin, length. 2 m.
- **CCM125PL2:** 5-pin, length. 2 m.





# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Selection guide



#### Blow-off Function

There are 2 different versions of GVMAX HD vacuum pumps that feature different blow-off types to meet the requirements of any application:

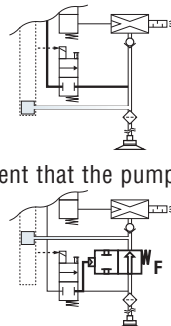
##### ■ Standard blow-off (version GVMAXHD...F1)

The blow-off flow is directed into the vacuum network and ensures the object is released in most applications.

##### ■ Powerful blow-off (version GVMAXHD...F2)

This type of blow-off allows for objects to be quickly released in the event that the pump cannot be placed as close as possible to the suction cups, or to reduce the cycle time as much as possible.

The isolation valve **F** directs the entire blow-off flow towards the suction cups. In this case, the blow-off pressure is identical to the vacuum pump's compressed air supply pressure.



The blow-off control mode is configurable on GVMAX HD...**S** pumps:

- Controlled by external signal
- Automatic timer, adjustable from 50 to 9999 ms (advantage: saves one controller output)

On GVMAX HD...**V** and **L** pumps, the blow-off control mode is controlled by an external signal.

#### Standalone Vacuum Pumps or in Island Assemblies?

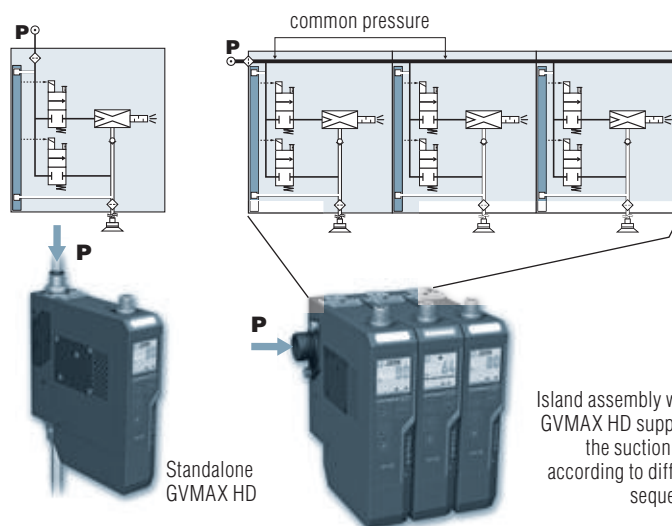
Standalone GVMAX HD vacuum pumps meet the needs of most common applications: a GVMAX HD controls one or several suction cups, which all operate according to the same sequence. Whenever several suction cups operate according to different sequences, several vacuum pumps are required. The choices are as follows:

- Several standalone pumps
- An island assembly including 1 to 4 vacuum pumps and a shared internal pressure supply

##### Standalone vacuum pumps are available in 2 versions:

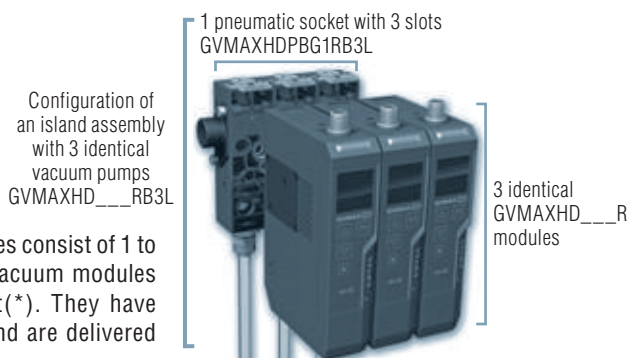
- GVMAXHD...**VA**: pneumatic socket forms an integral part of the GVMAX HD module
- GVMAXHD...**RA**: patented SMART SWAP to quickly mount the GVMAX HD module on its pneumatic socket

**GVMAXHD...RB1/2/3/4 mounted on an island:** equipped as standard with the SMART SWAP system to quickly mount the GVMAX HD module on its pneumatic socket



Island assembly with 3 GVMAX HD supplying the suction cups according to different sequences

#### Configuration of Island Assemblies



Standard island assemblies consist of 1 to 4 identical GVMAX HD vacuum modules and a pneumatic socket(\*). They have specific part numbers and are delivered assembled.

For island assemblies consisting of different GVMAX HD vacuum modules, sub-assemblies must be ordered separately:

- Pneumatic socket in versions with 1, 2, 3, or 4 slots (\*)
- GVMAX HD modules with SMART SWAP quick-mounting system (version R) depending on the selected configurations

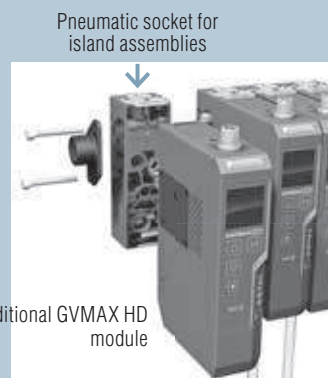
Custom island assemblies are delivered unassembled.

(\*) Assembled pneumatic sockets are supplied as standard with the pressure connection on the left side (version L). On request, an R version with right-hand pressure connection or a T version with top pressure connection is available.

#### Adding to an island assembly

A GVMAX HD vacuum pump can be added to an existing island assembly by ordering the pneumatic socket: for islands **GVMAXHDPBG1RB** and version **R** of the desired GVMAX HD module.

**Reminder:** 4 GVMAX HD/island





# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

### Configuring a Vacuum Pump



**GVMAXHD90X 25 L C15A1 X G1 F1 D RB3L**

NOZZLE DIA.	
2.5 mm dia	<b>25</b>
3.0 mm dia	<b>30</b>

BLOW-OFF	
Standard blow-off	<b>F1</b>
<b>Powerful blow-off</b> <i>The powerful blow-off option is used when the object needs to be released quickly.</i>	<b>F2</b>

#### GENERATOR CONTROL

Vacuum pump with <b>NC</b> vacuum control and <b>NC</b> blow-off Choice of blow-off settings: ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	<b>S</b>
Vacuum pump with <b>NO</b> vacuum control and <b>NC</b> blow-off ▪ Blow-off controlled by external signal	<b>V</b>
Vacuum pump with <b>pulse-triggered bistable</b> vacuum control and <b>NC</b> blow-off ▪ Blow-off controlled by external signal	<b>L</b>

CONNECTOR(S)	
<b>C15A1</b>	1 x M12 5-pin male
<b>C18A1</b>	1 x M12 8-pin male
<b>C24A2</b>	2 x M12 4-pin male
<b>C25A5</b>	2 x M12 5-pin male For use with remote HMI

#### CONFIGURATIONS

##### Standalone vacuum pumps

<b>VA</b>	<b>GVMAXHD90X __XG1_D_VA</b> GVMAX HD module screwed onto its pneumatic socket	
<b>RA</b>	<b>GVMAXHD90X __XG1_D_RA</b> Standalone GVMAX HD module with SMART SWAP quick-mounting system and pneumatic socket	

##### Vacuum pumps mounted on an island (with SMART SWAP quick-mounting system)

<b>RB1L *</b>	<b>GVMAXHD90X __XG1_D_RB1L</b> 1 x GVMAX HD module with SMART SWAP quick-mounting system and pneumatic socket with 1 slot ▪ Left lateral pressure connection	
<b>RB2L *</b>	<b>GVMAXHD90X __XG1_D_RB2L</b> Island consisting of 2 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 2 slots ▪ Common pressure supply ▪ Left lateral pressure connection	
<b>RB3L *</b>	<b>GVMAXHD90X __XG1_D_RB3L</b> Island consisting of 3 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 3 slots ▪ Common pressure supply ▪ Left lateral pressure connection	
<b>RB4L *</b>	<b>GVMAXHD90X __XG1_D_RB4L</b> Island consisting of 4 GVMAX HD modules with SMART SWAP quick-mounting system and pneumatic socket with 4 slots ▪ Common pressure supply ▪ Left lateral pressure connection	

\* On request, an **RB\_R** version with right-hand pressure connection or a **RB\_T** version with top pressure connection is available.

#### Sample Part number consisting of a standalone vacuum pump:

**GVMAXHD90X30VC24A2XG1F1DVA**

Standalone GVMAX HD module screw-mounted onto a pneumatic socket, max. vacuum 85%, 3.0 mm nozzle, controlled by an NO vacuum solenoid valve, 2 M12 4-pin connectors, with standard blow-off.

#### Sample Part number consisting of an island:

**GVMAXHD90X25LC18A1XG1F2DRB3L**

Island assembly consisting of 3 GVMAX HD modules with SMART SWAP quick-mounting system and 1 pneumatic socket with 3 slots, left lateral pressure connection, max. vacuum 85%, 2.5 mm nozzle, pulse-triggered bistable vacuum control, 1 M12 8-pin connector, with powerful blow-off.

#### Mounting accessories for GVMAX HD

- GVMAXHDFIXA:** front panel installation kit (1 plate + 4 fastening screws)
- GVMAXHDFIXB:** DIN rail installation kit (1 clip + 2 fastening screws)

#### Remote HMI

Only to be used with GVMAXHD \_\_C25A5\_\_

- Part No. HMIHD1M84P**

With M8 4-pin female connector cable, 0.3 m length



#### Accessories for remote HMI

- Front mounting plate: Part No. **HMIHD1FIXA**
- 90° angled mounting plate: Part No. **HMIHD1FIXB**
- M12 4-pin female / M8 4-pin male connector cable
  - 2 m length: Part No. **CDM8MM12F4PL2**
  - 5 m length: Part No. **CDM8MM12F4PL5**
  - Other lengths available upon request.



# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

Build your own island assembly



To build a custom island assembly containing different GVMAX HD vacuum modules, you need to order the parts below separately:

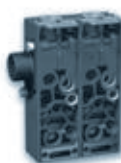
Note: Custom island assemblies come unassembled.

### 1 Select the Pneumatic Socket

**GVMAXHDPBG1RB\_L** sockets come assembled with the corresponding set of end pieces and the pressure connection on the left side.



**GVMAXHDPBG1RB1L\***  
Pneumatic socket  
with 1 slot



**GVMAXHDPBG1RB2L\***  
Pneumatic socket  
with 2 slots



**GVMAXHDPBG1RB3L\***  
Pneumatic socket  
with 3 slots



**GVMAXHDPBG1RB4L\***  
Pneumatic socket  
with 4 slots

\* On request, an R version with right-hand pressure connection or a T version with top pressure connection is available.

### 2 Select the GVMAX HD Modules (1 module for each slot in the socket)



**GVMAXHD90X 25 L C15A1 X G1 F1 D R**

NOZZLE DIA.		CONNECTOR(S)	BLOW-OFF
2.5 mm dia	<b>25</b>	<b>C15A1</b> 1 x M12 5-pin male	<b>F1</b> Standard blow-off
3.0 mm dia	<b>30</b>	<b>C18A1</b> 1 x M12 8-pin male	<b>F2</b> <b>Powerful blow-off</b> The powerful blow-off option is used when the object needs to be released quickly.
		<b>C24A2</b> 2 x M12 4-pin male	
		<b>C25A5</b> 2 x M12 5-pin male For use with remote HMI	



#### GENERATOR CONTROL

Vacuum pump with **NC** vacuum control and **NC** blow-off  
Choice of blow-off settings:  
▪ Controlled by external signal  
▪ Automatic timed from 50 to 9999 ms (advantage: saves one controller output)

**S**

Vacuum pump with **NO** vacuum control and **NC** blow-off  
▪ Blow-off controlled by external signal

**V**

Vacuum pump with **pulse-triggered bistable** vacuum control and **NC** blow-off  
▪ Blow-off controlled by external signal

**L**

#### Example of a custom island assembly:

- 1 X **GVMAXHDPBG1RB3** → 1 pneumatic socket with 3 slots and SMART SWAP quick-mounting system
- 1 X **GVMAXHD90X25SC18A1XG1F1DR**
- 1 X **GVMAXHD90X30VC18A1XG1F2DR**
- 1 X **GVMAXHD90X25LC15A1XG1F1DR** } 3 GVMAX HD modules of different types for island assembly

#### Accessories for island assemblies

##### Part No. GVMAXHDPBG1RB



Single-slot pneumatic socket with SMART SWAP quick-mounting system to add a GVMAX HD vacuum pump to an existing island assembly.

##### Part No. 80005594



Complete set of island assembly end pieces (version R) containing the following items:  
▪ Right flange with G1/2"-F pressure connection + 350 µm filter screen.  
▪ Left sealing flange.  
▪ Flange fastening screws.

##### Part No. 80005413



Complete set of island assembly end pieces (version L) containing the following items:  
▪ Left flange with G1/2"-F pressure connection + 350 µm filter screen.  
▪ Right sealing flange.  
▪ Flange fastening screws.

##### Part No. 80005960



Complete set of island assembly end pieces (version T), containing the following items:  
▪ 2 sealing flanges.  
▪ Flange fastening screws.



# GVMAX HD

## Heavy Duty Communicating Vacuum Pumps

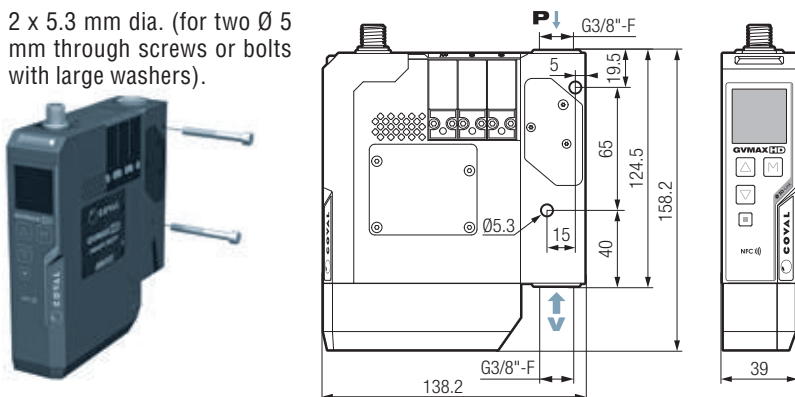
### Dimensions and Installation Options



Note: All dimensions are in mm.

#### Lateral installation (standalone version)

2 x 5.3 mm dia. (for two Ø 5 mm through screws or bolts with large washers).



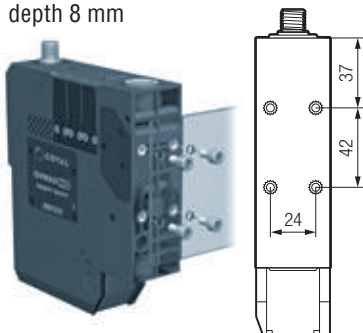
You can access 3D files of all our products in formats compatible with the main CAD software on our website  
[www.coval.com](http://www.coval.com)



#### Front Panel Installation

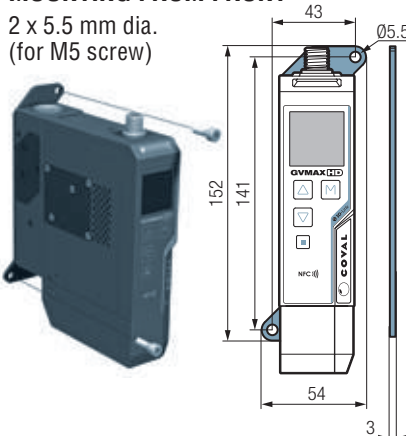
##### MOUNTING FROM REAR

4 x M5 screw threads, depth 8 mm



##### MOUNTING FROM FRONT

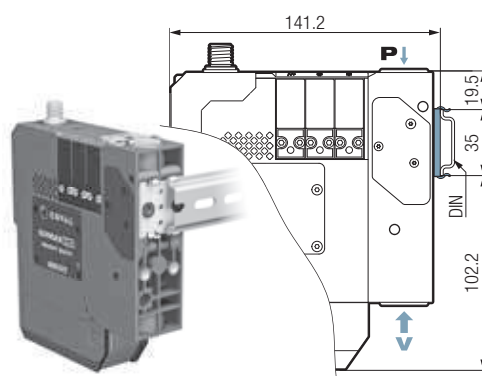
2 x 5.5 mm dia. (for M5 screw)



For front panel installation, order the following installation kit:

Part No.: **GVMAXHDFIXA**  
(1 plate + 4 fastening screws)

#### Installation on DIN Rail



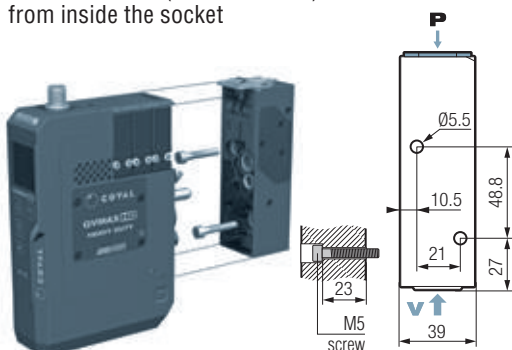
The pump can be mounted on a DIN rail for a static installation (e.g. in a cabinet). In this case, it must be equipped with an installation clip that is to be ordered separately:

Part No.: **GVMAXHDFIXB**  
(1 clip + 2 fastening screws) *Note: For an island assembly, you need to order 2 installation kits.*

#### Front Panel Installation for Modules with SMART SWAP Quick-mounting System

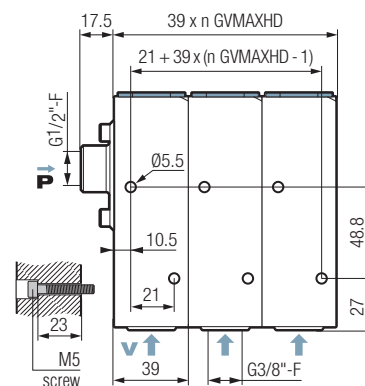
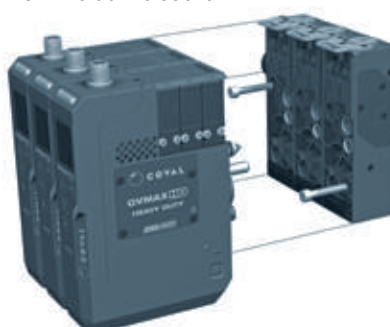
##### STANDALONE VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket



##### ISLAND VERSION

2 x 5.5 mm dia. (for M5 screws) from inside the socket







- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Operating pressure: from 2 to 8 bar
- Optimal dynamic pressure:
  - 5 bar for dia. 2.5 mm nozzle
  - 5.5 bar for dia. 3.0 mm nozzle
- Powerful blow-off (option F2): network pressure
- Pressure connection:
  - Standalone vacuum pump: G3/8"-F with removable 350 µm filter screen
  - Island assembly: G1/2"-F with 350 µm filter screen
- Vacuum connection: G3/8"-F with removable 350 µm filter screen
- Max. vacuum: 85%
- Air suction flow rate: 185 / 230 NI/min
- Air consumption: 294 / 380 NI/min, when operating "without ASC"
- Integrated non-clogging silencer
- Noise level: approx. 71 dBA "without ASC" 0 dBA with ASC
- Degree of protection: IP65
- Max. operating frequency: 4 Hz
- Endurance: 50 million cycles
- Weight: 870 g
- Operating temperature: from 0 to 50 °C
- Materials: PA GF, brass, aluminum, steel, NBR, PU, FKM
- M12 male connectors

#### Analysis of ASC vacuum control system

- Permanent monitoring of leakage level: abort or automatically return to ASC operation

#### Integrated electronics

- 24 V DC power supply (regulated ±10 %)
- Vacuum measuring range: 0 to 99 %
- Pressure measuring range: 0 to 10 bar
- Vacuum and pressure measurement accuracy: ±1.5% of the range, compensated for temperature
- Inputs/outputs protected against reversed wiring and polarity
- Consumption: 170 mA max. (without load)
- Configurable input/output switching mode: PNP or NPN
- IO-Link or SIO (Standard Inputs Outputs) operation

#### DO1/DO2 output signals

- Configurable as PNP or NPN
- NO or NC
- Breaking capacity: 330 mA
- DO2 configurable (see Parameter settings)

#### Diagnostics

- Instantaneous vacuum level (unit transmitted over IO-Link: mbar)
- Available information: Object gripped, object lost, control in progress, and control fault
- Cycle counters (vacuum, blow-off, object gripped, object lost, ASC, etc.)
- Vacuum network sizing support to prevent head losses
- Clogging detection function
- Supply pressure monitoring
- Supply voltage monitoring
- Product item number and serial number
- Software version

#### Information displayed

- LED gripping status indicator on front panel (green: object gripped ; yellow: ASC disabled due to vacuum leakage (object held in place) ; red: object lost)
- 1.54" high-visibility color LCD display:
  - Displays vacuum level with bar graph and thresholds
  - Warns when service life has been exceeded (> 50 million cycles)
  - Explicit fault messages
  - "Suction cup" icon indicating the control status of control functions:
    - Green suction cup: vacuum control
    - Orange suction cup: blow-off control
    - Red suction cup: simultaneous vacuum and blow-off controls
  - Configurable display orientation: 0 – 90 – 180 – 270°

#### Parameter settings

- Performed with 4-key membrane keyboard
- Choice of language: EN, FR, DE, IT, or ES
- Choice of blow-off type:
  - Controlled
  - Automatic timed, adjustable from 50 to 9999 ms
- Choice of vacuum measurement unit (kPa, %, mbar, inHg)
- Choice of pressure measurement unit (MPa, bar, Psi)
- Monostable electrical manual controls
- Object gripped (L1) and L2 control thresholds
- Whenever required by the application, specific threshold and hysteresis settings that are different from the initial factory settings can be defined: L1=65%, h1=10%, L2=75%, h2=10%
- DO2 configurable (24 V DC) (only on C18A1 et C24A2 models):
  - ASC status (default)
  - or Pressure fault (below 5 bar or above 8 bar)
  - or Power supply fault (below 21.6 V or above 26.4 V)
  - or ASC fault
  - or Object lost
- Activation/deactivation of the ASC control system
- Activation/deactivation of the leakage level monitoring system (DIAG ECO) + adjustment of monitoring parameters

#### Communication

##### IO-Link

- Revision: 1.1
- Transmission rate: COM3 - 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

##### NFC

- COVAL VACUUM MANAGER Mobile app available:
  - Android, version 8.1 and higher
  - iOS, version 13 and higher



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### General Information

COVAL's **CMS HD** series of multi-stage Heavy Duty vacuum pumps for industry specific applications are the result of many years of listening to and getting feedback from manufacturers, integrators, and users in the food, packaging, and robotics industries.

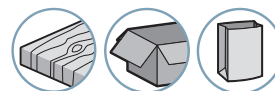
The **CMS HD** multi-stage vacuum pumps meet their expectations in terms of power, robustness, ease of configuration and use, communication, and modularity, while remaining compact and light for a simplified integration in a smart factory.



NFC ))))

IO-Link

Industry-specific applications



### Advantages

- Robust: resistant to the harsh environments of production lines
- High performance: optimized multi-stage Venturi system that guarantees powerful suction flow rates and reduced compressed air consumption.
- Modular: configurable according to needs and easy maintenance.
- Communicating: efficient communication system for all use levels, clear and easy to read HMI, NFC technology for mobile use, and IO-Link communications interface for straightforward networking.

### Main Specifications (depending on version)

- 80% vacuum
- 3 powerful suction flow rates:
  - CMSHD90X50 → 700 NI/min
  - CMSHD90X100 → 1100 NI/min
  - CMSHD90X150 → 1600 NI/min
- With or without vacuum and blow-off control
- Vacuum control: NC, NO
- With or without vacuum switch
- Blow-off controlled or automatic timed
- 1 or 2 M12 connectors
- Digital inputs/outputs mode (SIO) / IO-Link
- 3 exhaust configurations
- Degree of protection: IP65
- PNP / NPN
- Supply pressure monitoring (pressure sensor)
- Supply voltage monitoring
- Vacuum network status analysis and monitoring with a network sizing tool to prevent pressure loss, as well as a clogging detection function
- Remote HMI option features the following:
  - High-visibility color display with clear multi-lingual messages and straightforward settings menu
  - Easy set up made possible by NFC technology and COVAL Vacuum Manager mobile application

### A Complete Range

For each application, a suitable CMS HD:

#### CMSHD\_\_NVO

- without control



#### CMSHD\_\_SVOC15P / VVOC15P

- with vacuum and blow-off control
- without vacuum switch
- one M12 5-pin connector
- Digital inputs/outputs mode
- visual indicators of vacuum and blow-off controls



#### CMSHD\_\_SVX\_ / VVX\_

- with vacuum and blow-off control
- with vacuum switch, and pressure sensor
- M12 connectors available in 3 versions:
  - one 5 or 8-pin connector
  - or two 4-pin connectors
- Digital inputs/outputs (SIO) / IO-Link Mode



#### Accessory: remote HMI Part No.: HMIHD1M84P

Compatible with CMSHD\_\_VX\_\_

- 1.54" color LCD display
- 4-key keypad
- Can be moved up to 10 m
- NFC





# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### General Information



NFC )))

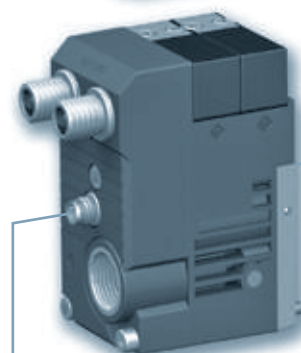
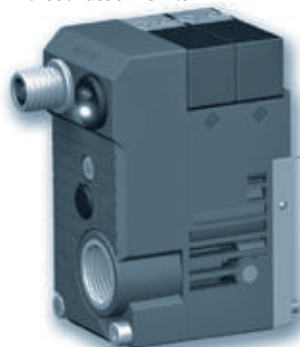
IO-Link

CMS HD, "tailor-made" solution

**CMSHD\_\_NVO\_\_**  
Pressure connection  
end plate



**CMSHD\_\_SVO / VVO\_\_**  
Control valve block for  
vacuum and blow-off  
without vacuum switch



**CMSHD\_\_SVX / VVX\_\_**  
Control valve block for vacuum  
and blow-off with vacuum switch,  
pressure sensor, compatible with  
remote HMI



Remote HMI  
Part No.: **HMIHD1M84P**

**CMSHD90X50\_ / CMSHD90X100\_**  
Simple body



**CMSHD90X150\_**  
Double body

Different configurations  
available for the exhaust:

**CMSHD\_\_\_\_K**  
Silencer



**CMSHD\_\_\_\_F**  
Diffuser



**CMSHD\_\_\_\_E**  
Collector exhaust



*Note: Exhaust options are delivered  
mounted in line. They can be mounted by  
the user at 90° on the front panel of the  
CMS HD.*

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CMS HD



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### General Information



NFC ))))  
IO-Link

#### CMS HD with control and vacuum switch



**Digital inputs/outputs**  
(SIO) / IO-Link

M12 connectors available in 3 versions:

- one 5 or 8-pin connector
- or two 4-pin connectors



Onboard installation and diagnostic tools:

- Vacuum network sizing support and clogging detection
- Supply pressure and voltage monitoring

M8 connector  
for remote HMI

**P**  
Pressure

- NC, NO vacuum control
- Blow-off controlled or automatic timed

**V**  
Vacuum

**E**  
Exhaust



Vacuum generation with  
multi-stage Venturi pump:

- high suction rates
- silent operation

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CMS HD



Clear and efficient HMI:  
includes all required inputs for full  
operation of CMS HD multi-stage vacuum pumps.

Accessory: remote HMI  
Part No.: HMIHD1M84P



Gripping status indicator light (2 colors)

1.54" high-visibility color LCD display  
with clear multilingual messages and  
straightforward settings menu

Settings keypad



NFC ))))

Straightforward setup and diagnostics  
made possible by NFC technology  
and COVAL Vacuum Manager mobile  
application.



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Integration and Performance



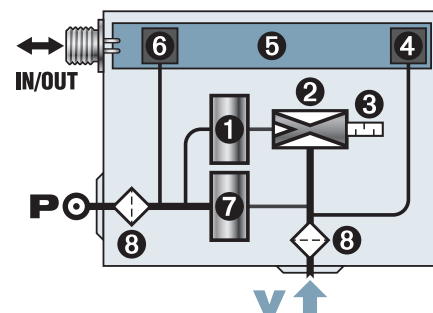
NFC )))

IO-Link

#### Integrated Functions

CMS HD multi-stage vacuum pumps include all the "vacuum" functions required for an easy, efficient and economical use of compressed air and suitable for any application:

- ❶ "Vacuum" solenoid valve
- ❷ Multi-stage Venturi pump
- ❸ Through-type silencer
- ❹ Electronic vacuum switch
- ❺ Integrated electronics
- ❻ Pressure sensor
- ❼ "Blow-off" solenoid valve
- ❽ Removable filter screens

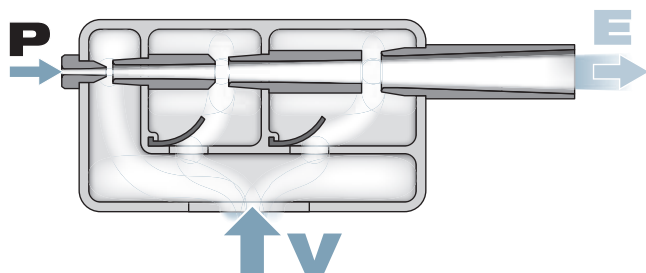


#### Primary Functions

Multi-stage technology consists of maximizing the energy input of the compressed air by cascading several stages of Venturi profiles and by combining their respective flows.

Intermediate valves allow the progressive isolation of each stage to obtain a maximum vacuum level.

This technology makes it possible to generate a high suction flow rate at a low vacuum level.



#### Performance Determined by CMS HD Model

Model	Max. vacuum (%)	Air drawn in (NI/min)	Air consumed (NI/min)	Air pressure level* (bar)
CMSHD90X50	80	700	220	5.5
CMSHD90X100	80	1100	420	5.5
CMSHD90X150	80	1600	620	5.5

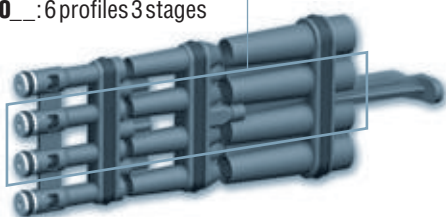
\* 6 bar for versions with control:

CMSHD90X50S\_ / CMSHD90X50V\_ / CMSHD90X100S\_ / CMSHD90X100V\_

\* 6.5 bar for versions with control:

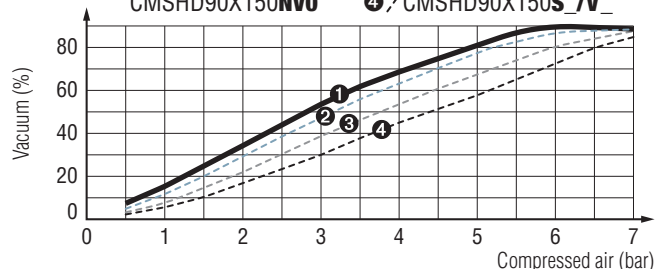
CMSHD90X150S\_ / CMSHD90X150V\_

- CMSHD90X50\_: 2 profiles 3 stages
- CMSHD90X100\_: 4 profiles 3 stages
- CMSHD90X150\_: 6 profiles 3 stages



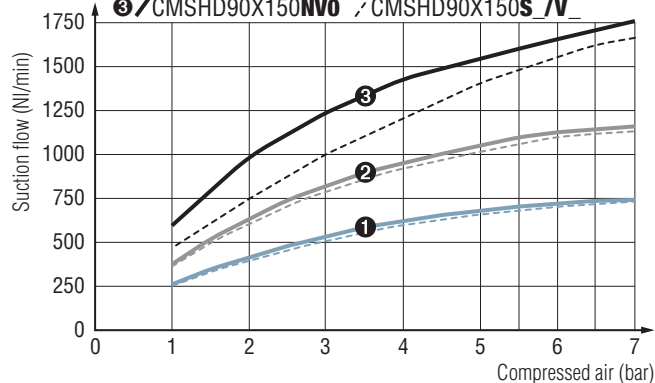
#### Vacuum / Compressed air

- ❶ / CMSHD90X50NVO
- ❷ / CMSHD90X50S\_ / V\_
- CMSHD90X100NVO
- ❸ / CMSHD90X100S\_ / V\_
- CMSHD90X150NVO
- ❹ / CMSHD90X150S\_ / V\_

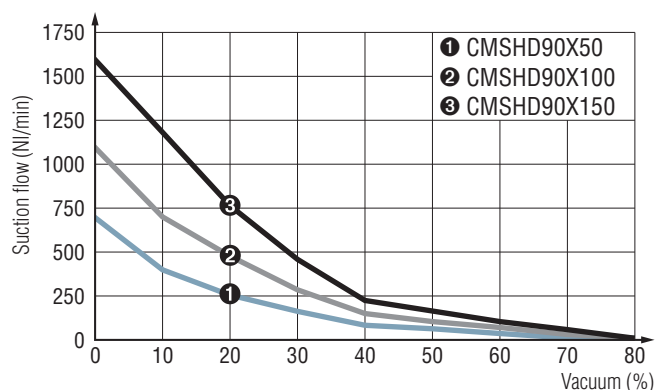


#### Suction flow / Compressed air

- ❶ / CMSHD90X50NVO
- ❷ / CMSHD90X100NVO
- ❸ / CMSHD90X150NVO
- ❹ / CMSHD90X50S\_ / V\_
- ❺ / CMSHD90X100S\_ / V\_
- ❻ / CMSHD90X150S\_ / V\_



#### Suction Flow / Vacuum



The values represent the average characteristics of our products.



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Straightforward Communication



NFC ))))  
IO-Link

#### Easier Integration, Use, and Diagnostics

The **CMSHD\_\_VX** Heavy Duty multi-stage vacuum pump series includes various features that enable setup, use, and diagnostics in all situations and at all levels (operators, process, networked

factory), with the aim in mind of keeping the use and management of the pumps as straightforward as possible and thus allowing for their easy integration in your smart factory.

#### Settings, Diagnostics and Process Data



##### CONFIGURABLE SETTINGS

- Choice of language: EN, FR, DE, IT or ES
- "Object gripped" thresholds
- Automatic blow-off
- Vacuum measurement unit: kPa, %, mbar, inHg
- Pressure measurement unit: MPa, bar, psi
- Software updates, and more



##### DIAGNOSTICS

- Cycle counters (vacuum and blow-off control, objects gripped, objects lost, etc.)
- Vacuum network sizing support to prevent pressure loss
- Clogging detection function
- Supply pressure and voltage monitoring
- Software version
- Product part number and serial number



##### PROCESS INPUT DATA

- Vacuum and blow-off control



##### PROCESS OUTPUT DATA

- Instantaneous vacuum level
- Object gripped and object lost information
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure

8



IO-Link

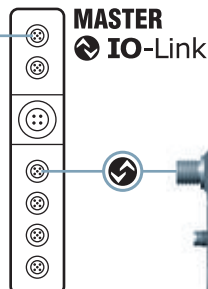
The IO-Link system provides efficient real-time communication between **CMSHD\_\_VX\_\_** multi-stage vacuum pumps and any higher-level protocol (EtherNet/IP, PROFINET, EtherCAT, etc.) required to monitor the production line. It can be used to control pumps, configure settings, and get feedback to ensure maximum productivity.

#### Advantages:

- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more
- Onboard installation and diagnostic tools



EtherNet/IP  
PROFINET  
EtherCAT  
...





# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Straightforward Communication



NFC )))

IO-Link



#### Remote HMI (accessory)

To make it easier to use and set up multi-stage piloted vacuum pumps, the CMS HD series has a remote HMI as an accessory.

#### Advantages:

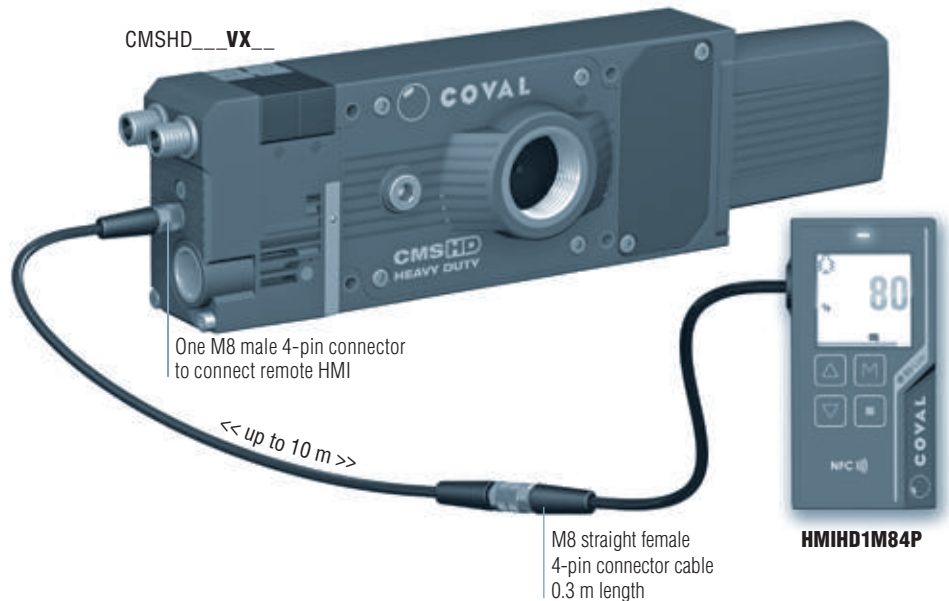
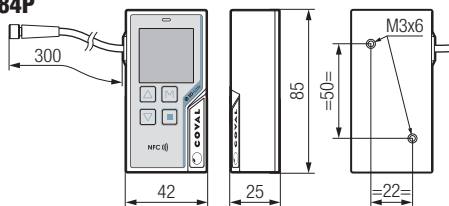
- Place the HMI in an easily accessible and visible area
- Use one HMI for several CMS HD multi-stage vacuum pumps
- Copy settings from one pump to another
- Use the CMS HD multi-stage vacuum pump without any HMI connected

#### CMS HD multi-stage vacuum pumps compatible with the remote HMI:

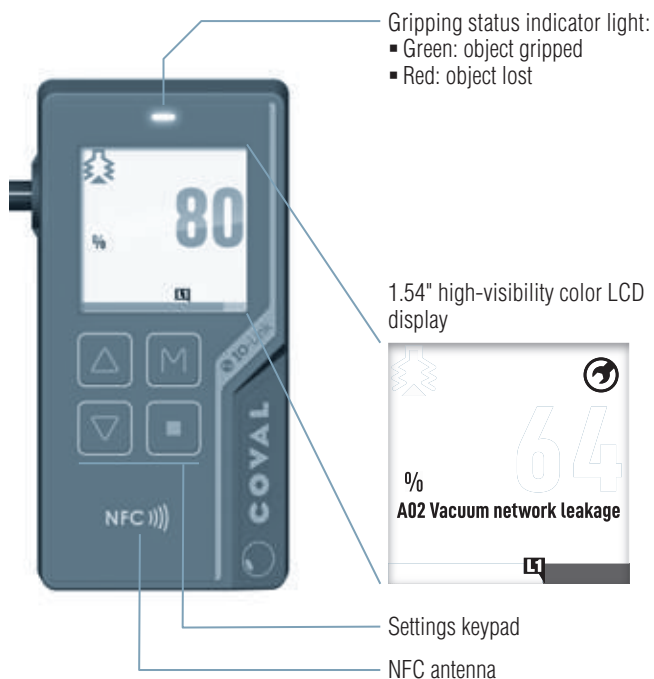
→ CMSHD\_\_\_VX\_\_\_ versions  
with M8 connector  
(electrical connections: see p. 8/73)

#### → Remote HMI

Part No.: **HMIHD1M84P**



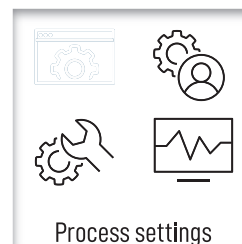
#### Remote HMI Dialog Front Panel



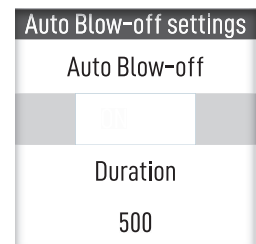
The remote HMI allows for easy and efficient reading of the pump's operation.

The high-visibility display includes all required inputs for full operation:

- Main information is easy to read
- Multilingual: EN - FR - DE - IT - ES
- Simple and clear event messages
- Intuitive settings and diagnostics menus
- Configurable display orientation: 0 - 90 - 180 - 270°
- Lockable to prevent undesired changes



Multilingual



EN FR DE IT ES

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CMS HD



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

Straightforward Communication



NFC ))))

IO-Link



NFC ))))

The NFC wireless technology integrated in remote HMI and in the COVAL Vacuum Manager application makes all setup and diagnostic functions available and modifiable on your mobile devices.

### Additional features:

- Read/write settings with the power on or off
- Copy settings from one CMS HD to another
- Backup up to 5 setting configurations
- COVAL support: send a report including the settings and diagnostic data to COVAL for technical support



GET IT ON  
Google Play



Download on the  
App Store

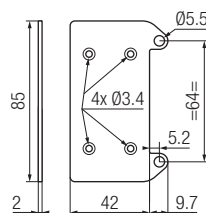
**NFC APP: COVAL Vacuum Manager**  
Available for Android and iOS

### Accessories for remote HMI

#### Front mounting plate

- + 2 x M3x6 TORX
- + 2 x M5x50 CHC

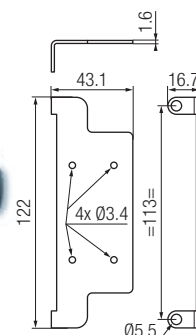
Part No.: **HMIHD1FIXA**



#### Side mounting plate

- + 2 x M3x6 TORX
- + 2 x M5x50 CHC

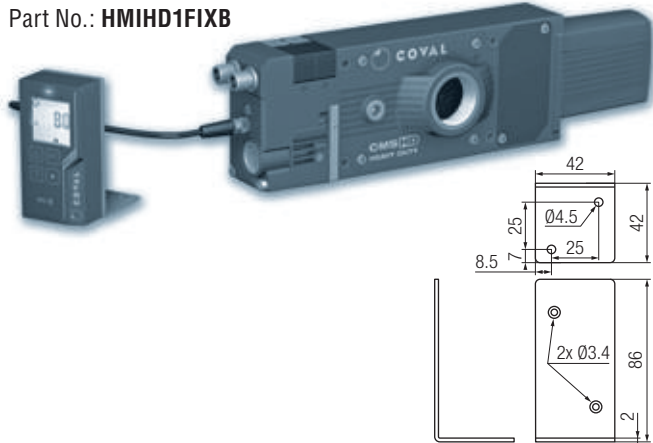
Part No.: **HMIHD1FIXC**



#### 90° angled mounting plate

- + 2 x M3x6 TORX

Part No.: **HMIHD1FIXB**



#### Connecting cable

M8 4-pin, female / M8 4-pin, male, compatible with cable chain

- 2 m length: Part No. **CDM8MF4PL2**
- 5 m length: Part No. **CDM8MF4PL5**
- Other lengths available upon request.



Note: all dimensions are in mm.



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Modularity and Maintenance



NFC )))  
IO-Link

#### Choice of 3 equipment options for the exhaust

Various configuration options are available for the CMS HD exhaust:

##### Through-type silencer

###### CMSHD...K version

- reduction of the noise level (-10 dBA compared to a diffuser)
- non-clogging



##### Diffuser

###### CMSHD...F version

- ultra-compact



##### Exhaust collector

###### CMSHD...E version

- G1" female connection



The exhaust options are delivered in-line but, depending on the environment, they can be positioned by the user on the front panel.

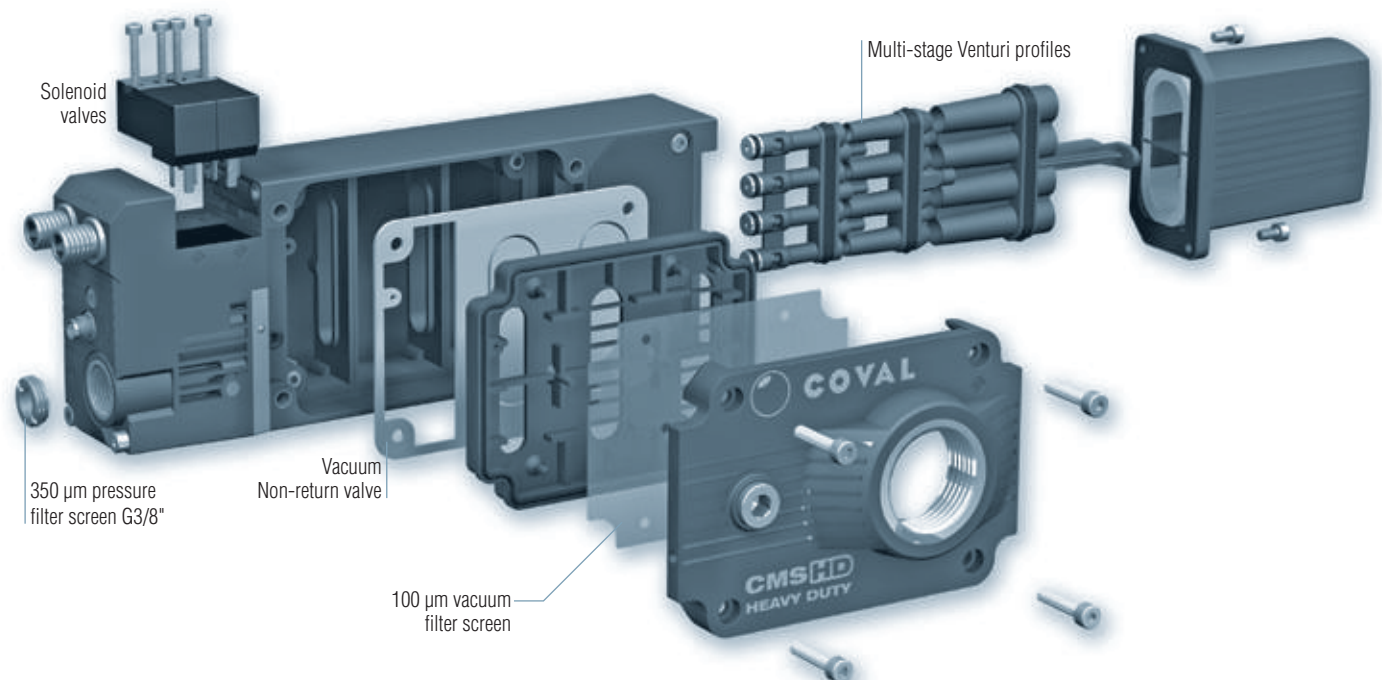


#### Modularity/Maintenance

The CMS HD multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain parts may

require replacement or cleaning.

The modular design of the CMS HD multi-stage pumps ensures easy maintenance as the functions are all easily accessible.







NFC ))))

IO-Link

#### Vacuum Control: 2 Solutions

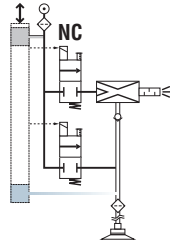
**Model CMSHD\_\_S:** vacuum pump with **NC** vacuum control and **NC** blow-off control. In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

■ NC blow-off and vacuum control: solenoid valves

■ Choice of blow-off settings

(only on CMSHD\_\_SVX\_\_models):

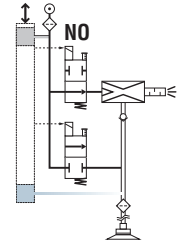
- controlled by external signal
- automatic timer from 50 to 9999 ms (advantage: saves one controller output)



**Model CMSHD\_\_V:** vacuum pump with **NO** vacuum control and **NC** blow-off control. In the event of power failure, vacuum is still generated: part is held in place → fail-safe.

In the event of compressed air failure, the vacuum is no longer maintained.

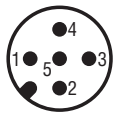
- NO vacuum control solenoid valve
- NC blow-off control solenoid valve
- Blow-off controlled by external signal



#### Electrical Connections

##### VOC15P:

- One M12 5-pin male connector

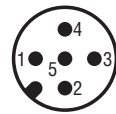


- |   |  |
|---|--|
| 1 | /                                      |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC blow-off command               |
| 5 | /                                      |



##### VXC15X:

- One M12 5-pin male connector



- |   |  |
|---|--|
| 1 | 24 V DC                                |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC object gripped DO1 - C/Q       |
| 5 | 24 V DC blow-off command               |



- One M8 4-pin male connector  
→ remote HMI



- |   |               |
|---|---------------|
| 1 | 24 V DC       |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND     |
| 4 | RS485 (DATA-) |

##### VXC18X:

- One M12 8-pin male connector



- |   |  |
|---|--|
| 1 | 24 V DC object gripped DO1                   |
| 2 | 24 V DC                                      |
| 3 | /  |
| 4 | 24 V DC suction command <sup>(1)</sup>       |
| 5 | 24 V DC object lost DO2 - C/Q <sup>(2)</sup> |
| 6 | 24 V DC blow-off command                     |
| 7 | 0 V - GND                                    |
| 8 | /  |



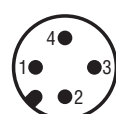
- One M8 4-pin male connector  
→ remote HMI



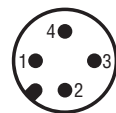
- |   |               |
|---|---------------|
| 1 | 24 V DC       |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND     |
| 4 | RS485 (DATA-) |

##### VXC24X:

- Two M12 4-pin male connectors



IN



OUT

- |   |  |
|---|--|
| 1 | 24 V DC                                |
| 2 | 24 V DC object lost DO2 <sup>(2)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC object gripped DO1 - C/Q       |
| 5 | /                                      |

- One M8 4-pin male connector  
→ remote HMI



- |   |               |
|---|---------------|
| 1 | 24 V DC       |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND     |
| 4 | RS485 (DATA-) |



: connections for IO-Link

<sup>(1)</sup> 24 V DC suction command, depending on version:

- **S:** 24 V DC vacuum control
- **V:** 24 V DC vacuum off command

<sup>(2)</sup> DO2 configurable:

- Object lost (default)
- or Power supply fault (below 21.6 V or above 26.4 V)
- or Pressure fault (below 5 bar or above 8 bar)



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Configuring a Vacuum Pump



NFC )))  
IO-Link

#### CMS HD Without Control

**CMSHD90X 100 N VO G4 K**

SUCTION FLOW RATE	
700 NI/min	<b>50</b>
1100 NI/min	<b>100</b>
1600 NI/min	<b>150</b>

EXHAUST	
<b>K</b>	Through-type silencer
<b>E</b>	Exhaust collector
<b>F</b>	Diffuser

Sample part number consisting of a multi-stage vacuum pump without control:  
**CMSHD90X100NVOG4K**

Multi-stage vacuum pump without control, max. vacuum 80%, suction flow rate 1100 NI/min with Through-type silencer

#### CMS HD With Control

**CMSHD90X 100 S VX C15X G4 K D**

SUCTION FLOW RATE	
700 NI/min	<b>50</b>
1100 NI/min	<b>100</b>
1600 NI/min	<b>150</b>

##### GENERATOR CONTROL

Vacuum pump with **NC** vacuum control and **NC** blow-off control. Choice of blow-off settings (only on CMSHD\_\_SVX\_\_models):

- Controlled by external signal
- Automatic timer from 50 to 9999 ms (advantage: saves one controller output).

Vacuum pump with **NO** vacuum control and **NC** blow-off control.

- Blow-off controlled by external signal

**S**

**V**

##### VACUUM SWITCH / HMI

Multi-stage vacuum pump without vacuum switch and HMI

- Simplified CMS HD with control, without settings and dialogs
- Digital inputs/outputs mode (SIO)

Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI

- Electronic vacuum switch
- Digital Output DO1 "object gripped" 24 V DC / NO
- Digital input/outputs mode (SIO) / IO-Link
- Compatible with remote HMI

**VO**

**VX**

##### CONNECTORS

- One M12 5-pin male PNP

**C15X**

**C18X**

**C24X**

- One M12 5-pin male configurable as PNP or NPN
- One M8 4-pin male for remote HMI

- One M12 8-pin male configurable as PNP or NPN
- One M8 4-pin male for remote HMI
- Digital Output DO2 configurable 24 V DC / NO

- Two M12 4-pin male configurable as PNP or NPN
- One M8 4-pin male for remote HMI
- Digital Output DO2 configurable 24 V DC / NO

##### EXHAUST\*

- K** Through-type silencer
- E** Exhaust collector
- F** Diffuser

\* Exhaust accessories are delivered mounted in line by default.

##### PRESSURE SENSOR

- None on **VO** versions
- Standard on **VX** versions

**D**

Sample part number consisting of a multi-stage vacuum pump with control:

**CMSHD90X100SVXC15XG4FD**

Multi-stage vacuum pump with control, max. vacuum 80%, suction flow rate 1100 NI/min, NC vacuum and blow-off control, one M12 5-pin connector and one M8 4-pin connector, with diffuser.

8

CMS HD



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

### Examples of Composed Part Numbers



NFC ))))

IO-Link

#### CMSHD90X50NVOG4E

Multi-stage vacuum pump without control, max. vacuum 80%, suction flow rate 700 NI/min with exhaust collector.



#### CMSHD90X150NVOG4K

Multi-stage vacuum pump without control, max. vacuum 80%, suction flow rate 1600 NI/min with through-type silencer.

#### CMSHD90X100SVOC15PG4F

Multi-stage vacuum pump with control, max. vacuum 80%, suction flow rate 1100 NI/min, NC vacuum and blow-off control, one M12 5-pin connector, with diffuser.



#### CMSHD90X100VVXC15XG4ED + HMIHD1M84P + HMIHD1FIXA

Multi-stage vacuum pump with control, max. vacuum 80%, suction flow rate 1100 NI/min, NO vacuum control and NC blow-off control, one M12 5-pin connector and one M8 4-pin connector, with exhaust collector + remote HMI and front mounting plate.

#### CMSHD90X150SVXC24XG4KD

Multi-stage vacuum pump with control, max. vacuum 80%, suction flow rate 1600 NI/min, NC vacuum and blow-off control, one M12 5-pin connector and one M8 4-pin connector, with through-type silencer.



8

CMS HD



# CMS HD

## Heavy Duty Multi-stage Vacuum Pumps

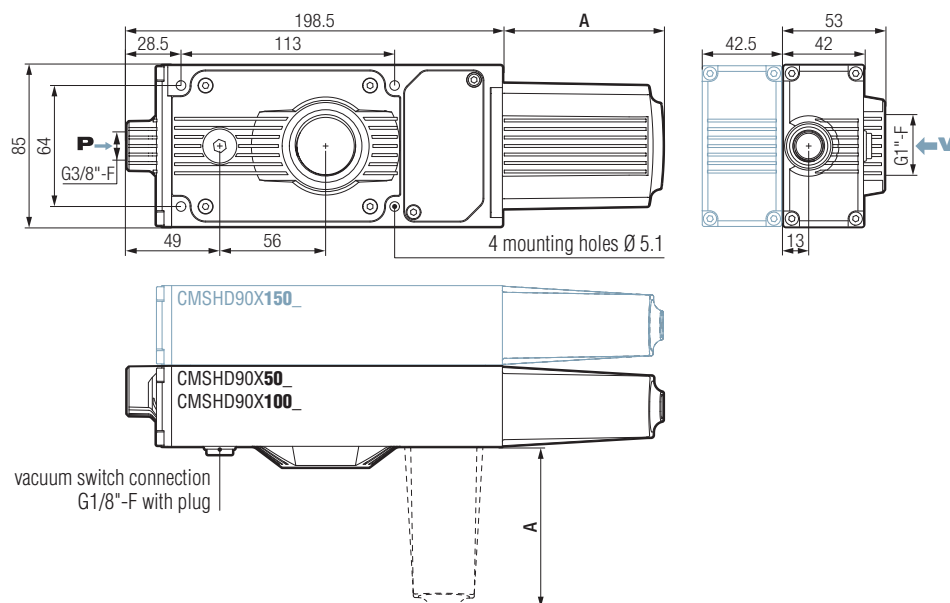
### Dimensions



NFC ))))

IO-Link

#### CMS HD Without Control

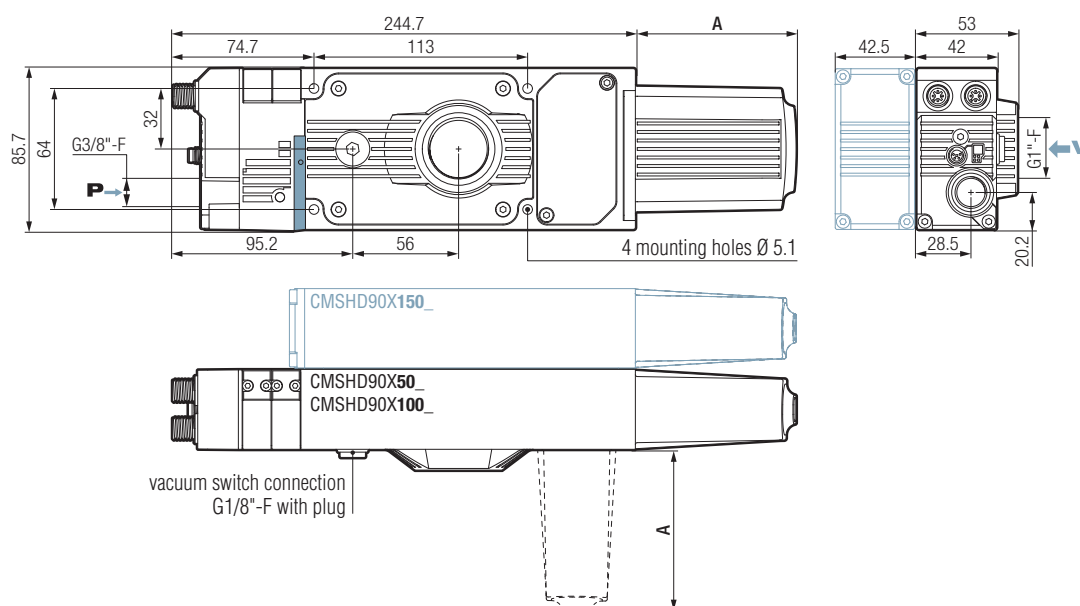


Note: all dimensions are in mm.



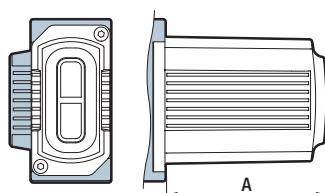
You can access 3D files of all our products in formats compatible with the main CAD software on our website [www.coval.com](http://www.coval.com)

#### CMS HD With Control

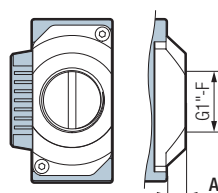


#### Exhaust Options

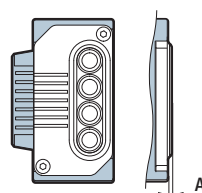
**Through-type silencer**  
CMSHD\_\_\_K version



**Exhaust collector**  
CMSHD\_\_\_E version



**Diffuser**  
CMSHD\_\_\_F version



Exhaust Type	A
Silencer	85
Collector	10
Diffuser	2





NFC )))

IO-Link

- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Operating pressure: from 2 to 8 bar
- Optimal dynamic pressure:
  - CMSHD\_**NVO** (without control): 5.5 bar
  - CMSHD90X50**S**/50**V**/100**S**/100**V** (with control) : 6 bar
  - CMSHD90X150**S**/150**V** (with control) : 6,5 bar
- Pressure connection: G3/8"-F with removable 350 µm filter screen
- Vacuum connection: G1"-F with removable 100 µm filter screen
- Connection for version with exhaust collector: G1"-F
- Vacuum switch connection G1/8"-F
- Max. vacuum: 80%
- Air suction flow rate: 700 to 1600 NI/min
- Air consumption: 220 to 620 NI/min
- Noise level:
  - with silencer:
    - CMSHD90X**50**\_**K**: 59 dBA
    - CMSHD90X**100**\_**K**: 62 dBA
    - CMSHD90X**150**\_**K**: 67 dBA
  - with diffuser (CMSHD\_**F** version): + 10 dBA to the silencer version
- Degree of protection: IP65
- Max. operating frequency: 4 Hz
- Endurance: 50 million cycles
- Weight:
  - CMSHD without control:
    - CMSHD\_**50/100**: 645 g
    - CMSHD\_**150**: 1330 g
  - CMSHD with control:
    - CMSHD\_**50/100**: 890 g
    - CMSHD\_**150**: 1575 g
- Operating temperature: from 0 to 50° C
- Materials: PA GF, brass, aluminum, steel, NBR, PU, FKM
- M12 and M8 male connectors (depending on version)

#### Integrated electronics

- 24 V DC power supply (regulated ±10%)
- Vacuum measuring range: 0 to 99%
- Pressure measuring range: 0 to 10 bar
- Vacuum and pressure measurement accuracy: ±1.5% of the range, compensated for temperature
- Inputs/outputs protected against reversed wiring and polarity
- Consumption: 170 mA max. (without load)
- Input/Output switching mode: PNP or PNP/NPN configurable
- Digital inputs/outputs mode (SIO) / IO-Link

#### DO1/DO2 output signals (only on CMSHD\_**VX** models)

- Configurable as PNP or NPN
- NO or NC
- Breaking capacity: 330 mA
- DO1: object gripped output (factory setting 40%)
- DO2 configurable (see parameter settings)

#### Diagnostics

- Instantaneous vacuum level (unit transmitted over IO-Link: mbar)
- Available information: Object gripped, object lost
- Cycle counters (vacuum, blow-off, object gripped, object lost, etc.)
- Vacuum network sizing support to prevent head losses
- Clogging detection function
- Supply pressure monitoring
- Supply voltage monitoring
- Product part number and serial number
- Software version

#### Indicator on model CMSHD\_**VOC15P**\_\_\_\_\_

- Status LED for control functions:
  - green LED: vacuum control
  - orange LED: blow-off control

#### Information displayed on remote HMI

- LED gripping status indicator on front panel
  - Green: object gripped
  - Red: object lost
- 1.54" high-visibility color LCD display:
  - Displays vacuum level with bar graph and thresholds
  - Warns when service life has been exceeded (> 50 million cycles)
  - Explicit fault messages
  - "Suction cup" icon indicating the status of control functions:
    - Green suction cup: vacuum control
    - Orange suction cup: blow-off control
    - Red suction cup: simultaneous vacuum and blow-off control
  - Configurable display orientation: 0 - 90 - 180 - 270°

#### Parameter settings available with the remote HMI or IO-Link (only on CMSHD\_**VX** models)

- Choice of blow-off type:
  - Controlled
  - Automatic timed, adjustable from 50 to 9999 ms
- Object gripped (L1) control thresholds
- Whenever required by the application, specific threshold and hysteresis settings that are different from the initial factory settings can be defined: L1 = 40%, h1 = 10%
- DO2 configurable (24 V DC) (only on CMSHD\_**VXC24X** and **VXC18X** models):
  - Object lost (default)
  - or Power supply fault (below 21.6 V or above 26.4 V)
  - or Pressure fault (below 5 bar or above 8 bar)

#### + Additional settings available with the remote HMI

(performed with 4-key membrane keyboard):

- Choice of language: EN, FR, DE, IT, or ES
- Choice of vacuum measurement unit (kPa, %, mbar, inHg)
- Choice of pressure measurement unit (MPa, bar, psi)
- Monostable electrical manual controls

#### Communication

##### IO-Link

- Revision: 1.1
- Transmission rate: COM3 - 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

##### NFC

- COVAL VACUUM MANAGER Mobile app available:
  - Android, version 8.1 and higher
  - iOS, version 13 and higher





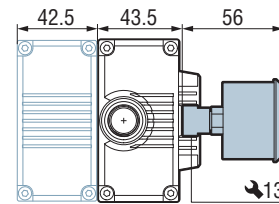
NFC )))  
IO-Link

#### To visualize the vacuum level

##### Vacuum gauge Ø 40 mm

Part No. VAF11140RDM18G

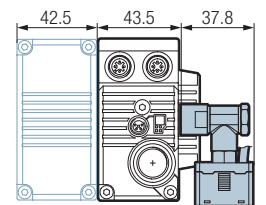
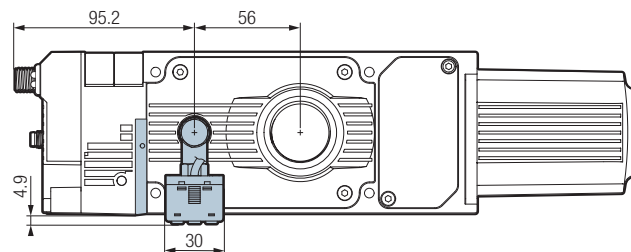
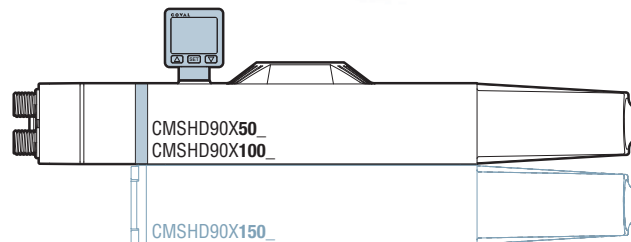
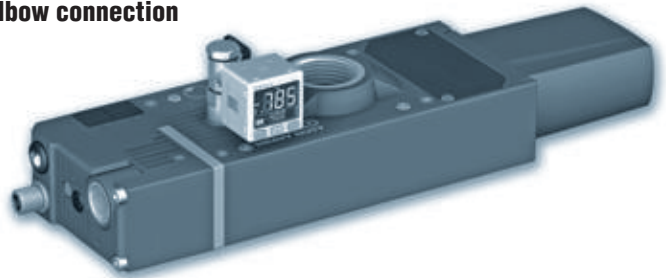
- Damping: by silicone movement (patented).
- Measuring: Bourdon tube in CuSn.
- Precision: cl. 2.5 (+/- 2.5% of max. scale value).
- Frame: black ABS
- Vacuum connection: G1/8"-M



##### Electronic vacuum switch with 3-color display with adjustable elbow connection

Part No. PSD100CPNPRCOM18G

- One M8 4-pin connector.
- 1 PNP digital output (NO or NC). Max. load current: 125 mA, Max. supply voltage: 24 VDC, Residual voltage:  $\leq 1.5$  V.
- 1 analog output (Output voltage: 1 to 5 V  $\pm 2.5\%$  F.S. (within rated pressure range), linearity:  $\leq \pm 1\%$  F.S. / Output impedance: approx. 1 k $\Omega$ )
- Pressure rating range: 0 ~ -101.3 kPa.
- Pressure setting range: 10 ~ -101.3 kPa.
- Max. pressure: 300 kPa.
- Fluid: Air, non-corrosive/non-flammable gas.
- Hysteresis: adjustable.
- Response time:  $\leq 2.5$ ms, with anti-vibration function.
- 7 segment LCD display : 2 color (red/green) main display, orange sub-display (refresh rate: 5 times/1sec.).
- Choice of pressure unit display: kPa, MPa, kgf/cm<sup>2</sup>, bar, psi, InHg, mmHg.
- Power supply voltage: 12 to 24 V DC  $\pm 10\%$ .
- Current consumption:  $\leq 40$ mA (without load).
- Repeatability (switch output):  $\leq \pm 0.2\%$  F.S.  $\pm 1$  digit.
- Protection: IP40.
- Ambient temperature range: 0 – 50° C (operation).
- Adjustable elbow connection 360°: G1/8"-M



#### Remote HMI

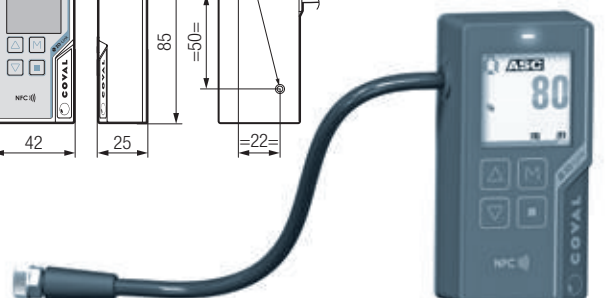
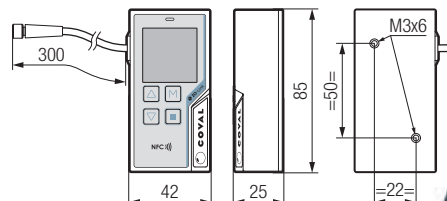
(for CMSHD\_\_VX\_\_ only)

Part No. HMIHD1M84P

- With M8 4-pin female connector, 0.3m length

##### Accessories for remote HMI (see details on p. 8/71)

- Front mounting plate: Part No. HMIHD1FIXA
- 90° angled mounting plate: Part No. HMIHD1FIXB
- Side mounting plate: Part No. HMIHD1FIXC
- M8 4-pin, female / M8 4-pin, male, connecting cable:
  - 2 m length: Part No. CDM8MF4PL2
  - 5 m length: Part No. CDM8MF4PL5
  - Other lengths available upon request.





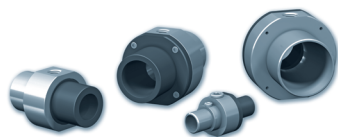




# Air Amplifiers

## Chapter 9

### M--C

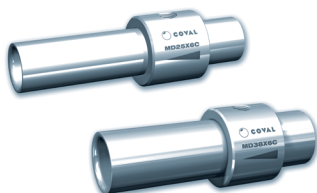


#### Air Amplifiers

- Operating principle based on the COANDA effect
- Bore diameter (Ø): 6, 10, 20, 30, 40 mm
- Flow rate: between 200 and 5000 NI/min depending on the supply pressure (between 1.5 and 6 bar)
- Body material: aluminum
- Recommended for gripping lightweight, porous products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers

P<sub>9/2</sub>

### MD



#### Air Amplifiers

- Operating principle based on the COANDA effect
- Bore diameter (Ø): 26,6 and 38,1 mm
- Flow rate: between 2015 and 4370 NI/min depending on the supply pressure (between 3 and 5 bar)
- Body material: aluminum
- Recommended for gripping lightweight, porous products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, depressurizing chambers

P<sub>9/5</sub>

### TVM



#### Pipes for Air Amplifiers

- Flexible polyurethane hose with steel spiral reinforcement.
- 4 sizes available: Ø 25, 40, 50 and 60 mm
- Anti-static properties according to DIN 53486
- Commonly used with COVAL air amplifiers (M--C series)
- High resistance to abrasion, cutting lubricant and UV rays

P<sub>9/6</sub>



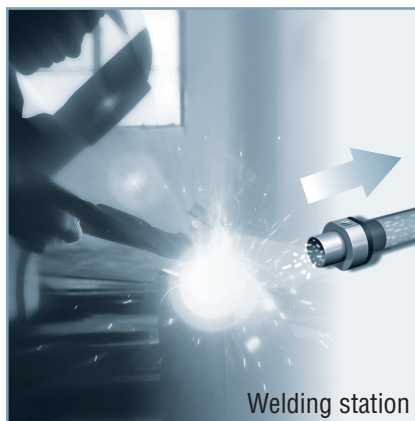
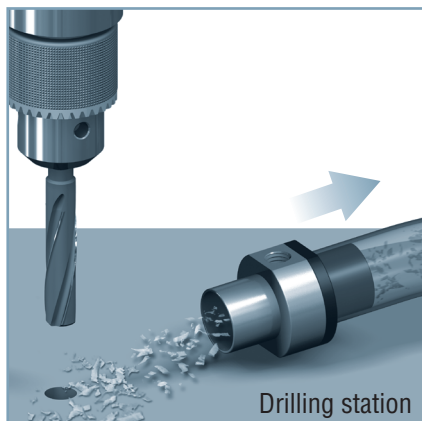
# M--C - MD

## Air Amplifiers

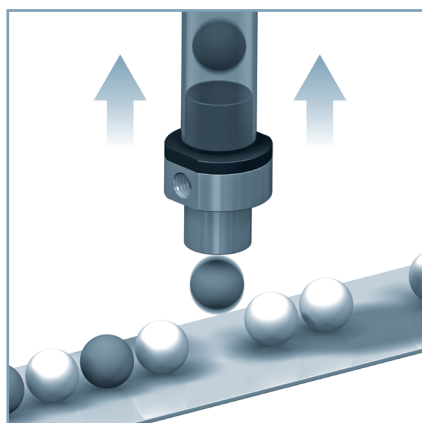
### Applications



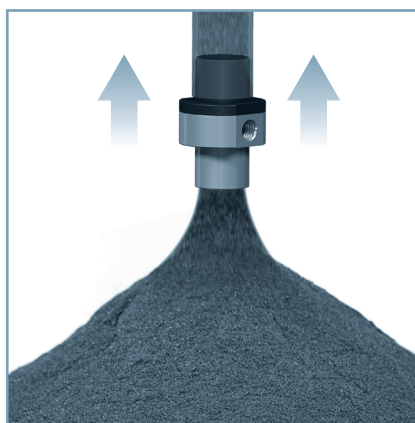
#### BLOW-OFF, CLEANING, WASTE SUCTION



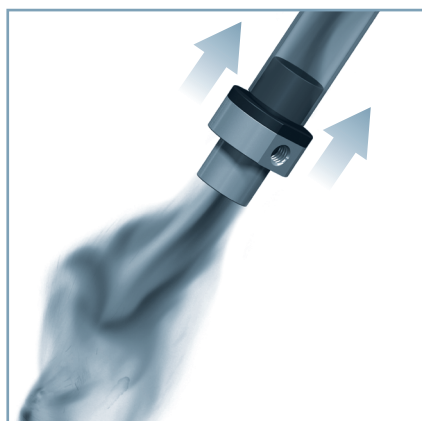
#### SORTING BY WEIGHT



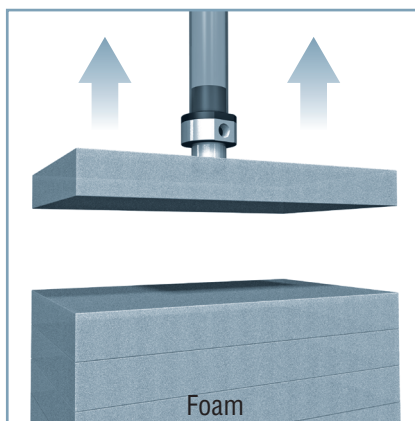
#### TRANSPORT OF GRANULES (rice, grains of wheat or coffee, etc.)



#### DEGASSING, SMOKE EVACUATION



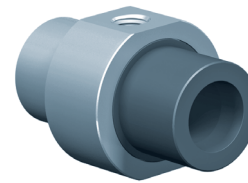
#### GRIPPING AND / OR UNSTACKING VERY POROUS LOADS





# M-C

## Air Amplifiers



By virtue of the COANDA effect, the motor flux draws in air at room temperature. This physical phenomenon greatly amplifies the flow which results in very high suction produced with low consumption.

- Gripping of very porous, lightweight products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, chamber depressurization, etc.

### Operation requirement

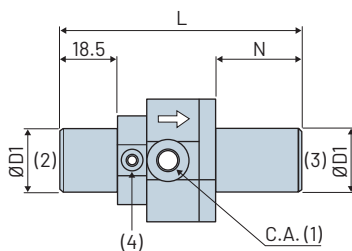
Compressed air filtration at 5 microns for the M6C model and 20 microns for the other models.

### Characteristics

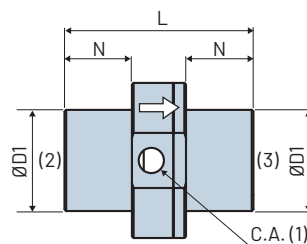
	L	N	M	C.A.	ØD	ØD1	ØD2	(g)
<b>M 6 C</b>	77	27.5	37	G1/8"-F	39	20	6	100
<b>M 10 C</b>	60	20	36	G1/8"-F	40	25	10	100
<b>M 20 C</b>	90	30	55	G1/4"-F	60	40	20	295
<b>M 30 CV</b>	105	35	72	G1/4"-F	77	50	30	495
<b>M 40 CV</b>	112	40	86	G3/8"-F	92	60	40	600

Note: all dimensions are shown in (mm).

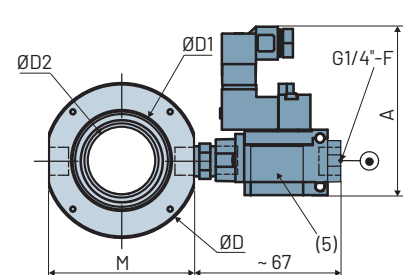
**M6C**



**M10C - M20C - M30CV - M40CV**



**M...AP214E1**



### Specifications

<b>Compressed air</b>	Dry non-lubricated 1.5 to 5 bar
<b>Maximum pressure drop</b>	see table page 9/4
<b>Materials</b>	Aluminum body
<b>Temperature</b>	0°C to 80°C / 32 to 212°F

- (1) Compressed air
  - (2) Suction
  - (3) Discharge
  - (4) M5 connector
  - (5) Control valve, optional. Note: the valve is incompatible with the M40C model.
- A = 77 mm for an AP2 valve + DIN connection (connector supplied)

### Additional information

- Stainless steel versions are available on request.
- The 5 products present the best amplification ratio (consumption/suction). COVAL can study smaller amplification ratios (higher consumption) but higher maximum vacuum for transporting heavy objects.



### For all orders, please specify:

Model + bore Ø + C.A. control + C.A. fitting + valve controls

Example : M30CVAP214E1

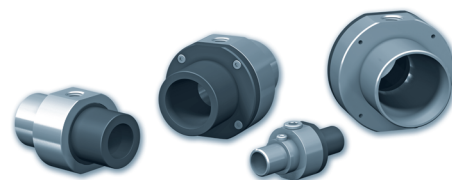
1: Model	2: Bore Ø	3: C.A. controls	4: Valve controls
<b>M</b>	<b>6 C</b> 6 mm <b>10 C</b> 10 mm <b>20 C</b> 20 mm <b>30 CV</b> 30 mm <b>40 CV</b> 40 mm	<b>-</b> Without control valve <b>AP214</b> C.A. control valve	<b>E1</b> 24 V DC DIN



# M-C

## Air Amplifiers

### Performance Curves

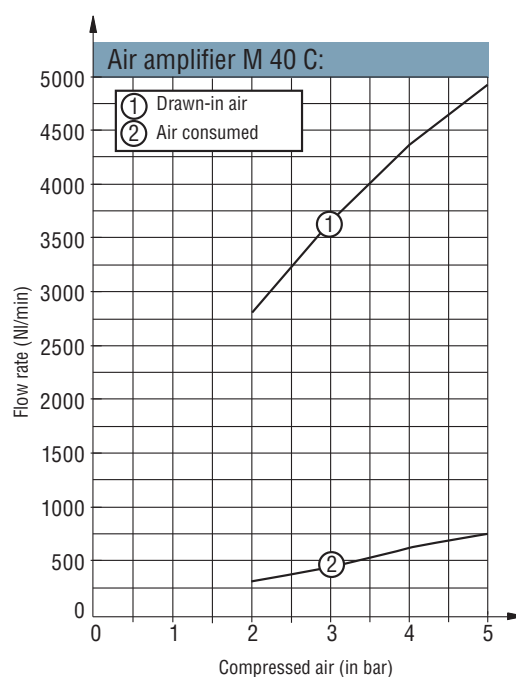
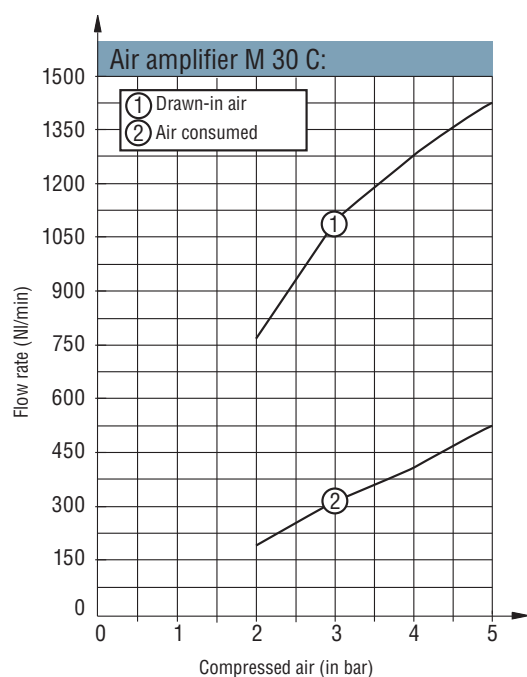
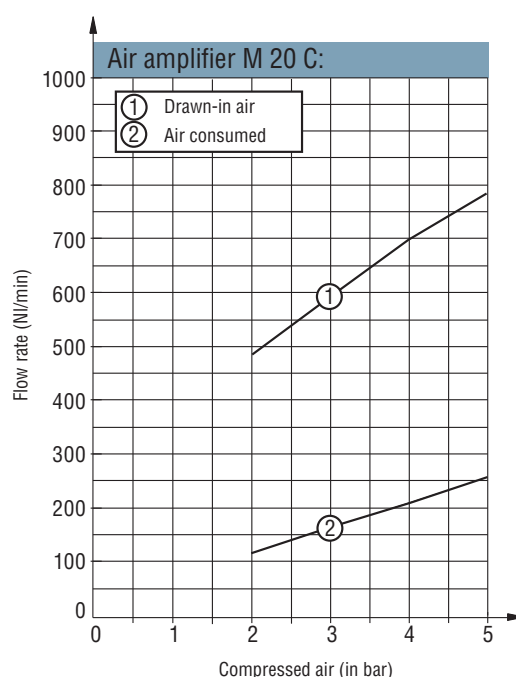
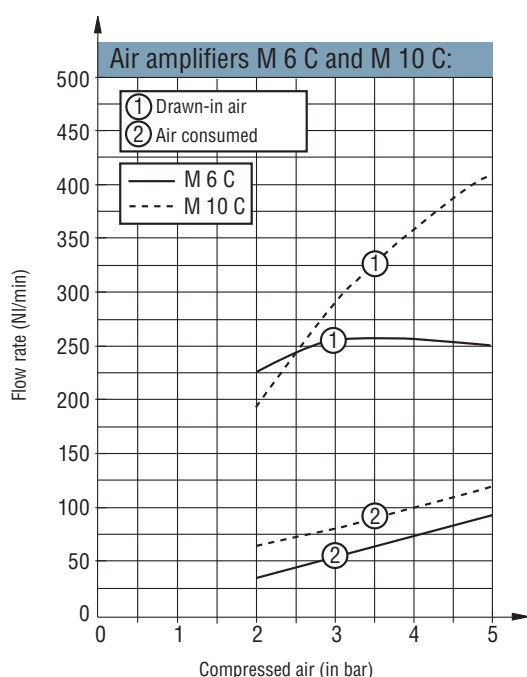


#### Maximum Vacuum / Supply Pressure

	Supply pressure / Maximum vacuum (in Bar)		Maximum vacuum (in mm CE)	
	2	3	4	5
<b>M 6 C</b>	900	1500	2000	2600
<b>M 10 C</b>	200	500	700	1000
<b>M 20 C</b>	207	310	400	510
<b>M 30 CV</b>	90	130	220	280
<b>M 40 CV</b>	140	200	284	360

#### Maximum Overpressure / Supply Pressure

	Supply pressure / Maximum overpressure (in Bar)		Maximum overpressure (in mm CE)	
	2	3	4	5
<b>M 6 C</b>	100	550	1300	2000
<b>M 10 C</b>	400	700	1500	2000
<b>M 20 C</b>	220	340	500	600
<b>M 30 CV</b>	45	70	100	160
<b>M 40 CV</b>	96	145	199	290





# MD

## Air Amplifiers



By virtue of the COANDA effect, the motor flux draws in air at room temperature. This physical phenomenon greatly amplifies the flow which results in very high suction produced with low consumption.

- Gripping of very porous, lightweight products: foam, carpet, cakes, leather, etc.
- Transport of powdery materials: powders, granules, etc.
- Transporting small, lightweight objects: paper clips, rice, coffee, etc.
- Smoke evacuation, chamber depressurization, etc.

### Characteristics MD25X6C

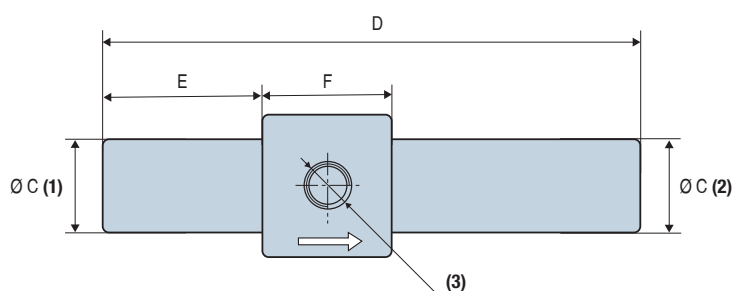
Pressure (bar)	Level of vacuum (%)	Suction rate: (NI/min)	Consumption (NI/min)
3	6.1	2015	478
4	8.7	2200	614
5	10.9	2370	734

### Characteristics MD38X6C

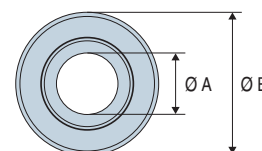
Pressure (bar)	Level of vacuum (%)	Suction rate: (NI/min)	Consumption (NI/min)
3	2.7	3500	478
4	4	3975	614
5	5	4370	734

### Dimensions

	Ø A	Ø B	Ø C	D	E	F	(3)	(g)
MD25X6C	25.6	56.5	37.7	191	38.5	50.8	G3/8"-F	470
MD38X6C	38.1	69.9	50.8	191	38.1	50.8	G3/8"-F	640



- (1) Suction  
(2) Discharge  
(3) Pressure connection G3/8"-F



### Specifications

Supply	Non-lubricated air filtered to 5 microns according to standard ISO 8573-1:2010 [4:5:4]
Operating pressure:	3 to 5 bar
Materials	Aluminum body
Temperature	°C to 80°C / 32 to 212°F

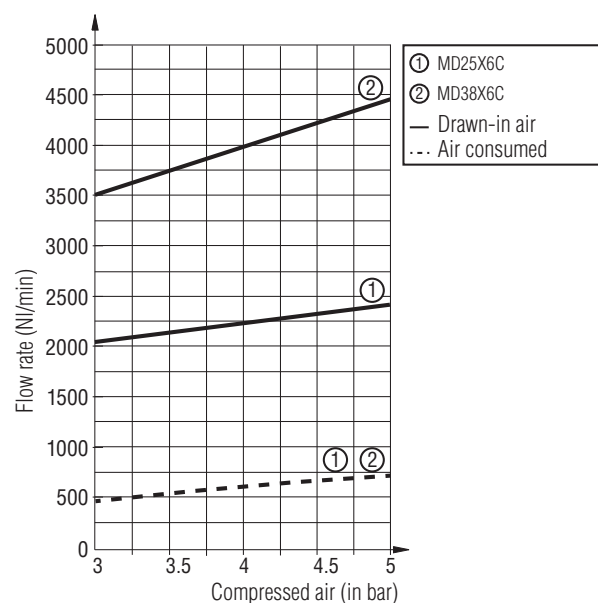
Note: all dimensions are shown in (mm).



For all orders, please specify:  
Model + bore Ø + version  
Example : MD25X6C

1: Model	2: Bore Ø	3: Version
MD	25 25.6 mm	X6C
	38 38.1 mm	

### Performance Curves





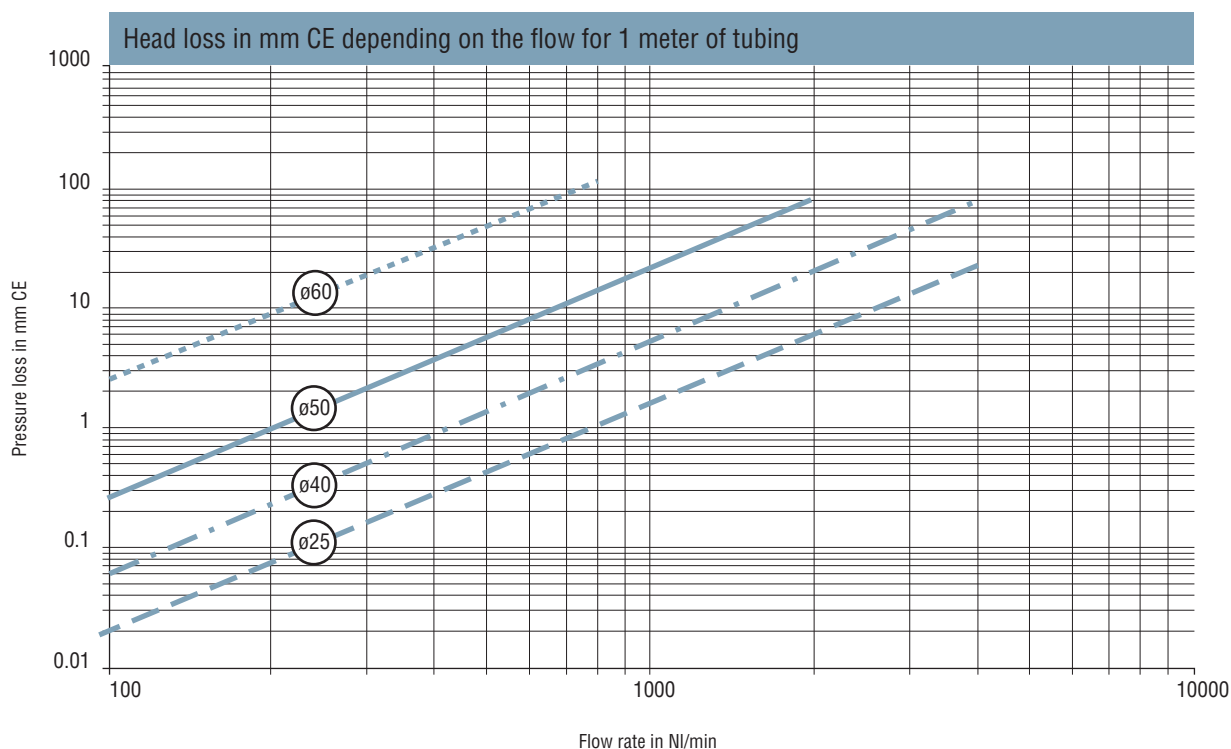


Flexible polyurethane tube reinforced with a steel spiral covered in PVC.  
Highly resistant to abrasion, cutting fluids and UV light.

■ Anti-static treatment in compliance with standard DIN 53486.

### Specifications

Diameter D (mm)	Ø 25 - Ø 40 - Ø 50 - Ø 60
Bend radius	10 x D
Maximum pressure drop	-250 mbar
Maximum pressure	1 bar
Temperature	-40°C to 100°C / -40 to 212°F
Anti-static	R < 108 Ohm



**For all orders, please specify :**

**Model + Diameter + Length**

**Example: TVM4010**

1: Model	2: Diameter	3: Length (m)
TVM	25 Ø 25 mm	- In meters
	40 Ø 40 mm	10 A ring
	50 Ø 50 mm	
	60 Ø 60 mm	



# Electric vacuum pumps and Blowers

## Chapter 10

### PVS



#### Dry vane vacuum pumps

- Flow rate up to 112 m<sup>3</sup>/h
- Maximum vacuum: -150 mbar absolute (85% relative vacuum)
- Available voltages:
  - Single-phase 230 V
  - Three-phase 230/400 V
- Available in 50 or 60 Hz
- Wide range of vacuum to meet specific applications
- Vibration free
- Reduced maintenance: Oil-free operation, air cooling, self-lubricated bearings

**P**<sub>10/2</sub>

### TCL



#### Side-channel Blowers, single-stage and two-stage

- Flow rate up to 1250 m<sup>3</sup>/h
- Maximum vacuum: -410 mbar absolute
- Available:
  - 50 and 60 Hz
  - Single-stage and two-stage
- Wide range of vacuum to meet specific applications
- Vibration-free
- Maintenance-free: self-lubricated bearings, contactless impeller

**P**<sub>10/6</sub>

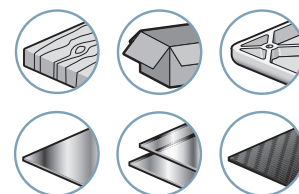


The electric dry vane vacuum pumps in series PVS are compact and robust. They are equipped with a vacuum filter, vacuum and blow-off control valves. Their functioning is silent and vibration free and they meet a wide variety of applications.

### Advantages

- Wide range of vacuum to meet specific applications
- Vibration free
- Reduced maintenance: Oil-free operation, air cooling, self-lubricated bearings
- Integrated safety valve
- Available in 50 or 60 hz - Alternating or three-phase current

### Industry-specific applications



### Characteristics

Model	Hz	m³/h	Vacuum (%)	kW	Rotation speed (min-1)	Voltage(V)	Amper (A)	Vacuum connection	dB(A)	⚖️ (kg)
PVS4T3	50	4.1	85	0.18	2800	175-260/300-450	1.08/0.62	G1/4"-F	59	7
	60	4.7		0.216	3360	202-300/350-520	1.08/0.62		61	
PVS8M1	50	8	85	0.35	2700	230 +/-10%	3.9	G3/8"-F	58	9.5
	60	9.1		0.42	3200		3.4		61	
PVS8T3	50	8	85	0.37	2800	175-260/300-450	2.35/1.35	G3/8"-F	58	9.5
	60	9.1		0.44	3150	202-300/350-520	2.4/1.4		61	
PVS10M1	50	10	85	0.37	1380	230 +/-10%	3.0	G1/2"-F	60	16
	60	12		0.44	1630		3.4		62	
PVS10T3	50	10	85	0.37	1420	175-260/300-450	2.3/1.33	G1/2"-F	60	16
	60	12		0.45	1700	202-300/350-520	2.35/1.36		62	
PVS16M1	50	16	85	0.55	1360	230 +/-10%	4.6	G1/2"-F	61	22.5
	60	19		0.66	1600		5.2		64	
PVS16T3	50	16	85	0.55	1420	175-260/300-450	3.8/2.2	G1/2"-F	61	22.5
	60	19		0.70	1700	202-300/350-520	3.9/2.25		64	
PVS25M1	50	25	85	0.80	1350	230 +/-10%	6.4	G3/4"-F	62	29
	60	30		1.00	1600		7.2		67	
PVS25T3	50	25	85	0.75	1430	190-255/330-440	3.9-4.85/2.25-2.8	G3/4"-F	62	29
	60	30		0.90	1690	190-290/330-500	4.65-4.25/2.7-2.45		67	
PVS40M1	50	40	85	1.10	1350	230 +/-10%	7.6	G3/4"-F	67	41
	60	48			1620		7.3		72	
PVS40T3	50	40	85	1.25	1430	190-255/330-440	5.2-6.2/3.0-3.6	G3/4"-F	67	41
	60	48		1.50	1680	190-290/330-500	6.9-5.7/4.0-3.3		72	
PVS55T3	50	55	90	2.2	1440	Δ230/Y400	8.2/4.8	G1"-F	71	76
	60	66		2.6	1705		9.0/5.2		73	
PVS100T3	50	98	90	3.0	1445	Δ230/Y400	12.1/7.0	G1" 1/2-F	75	100
	60	112		3.6	1705		12.7/7.4		77	

Version M1: Single phase (1~)

Version T3: Three-phase (3~)

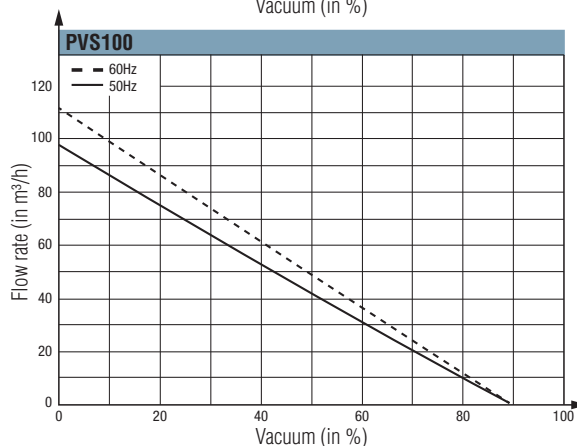
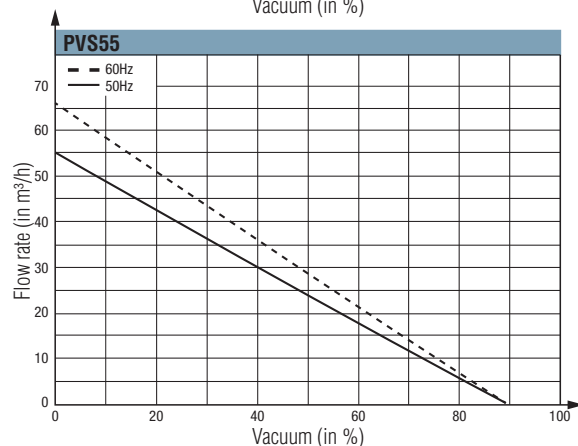
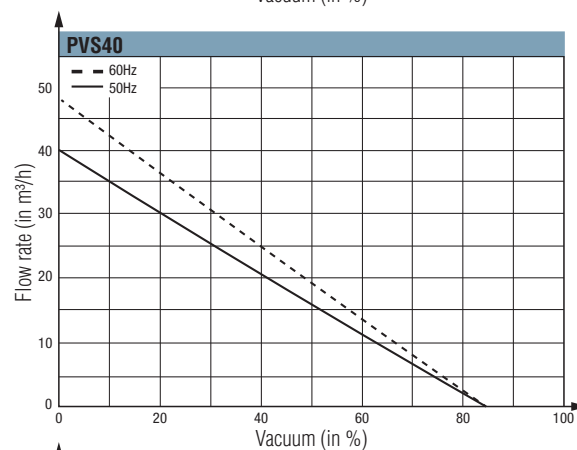
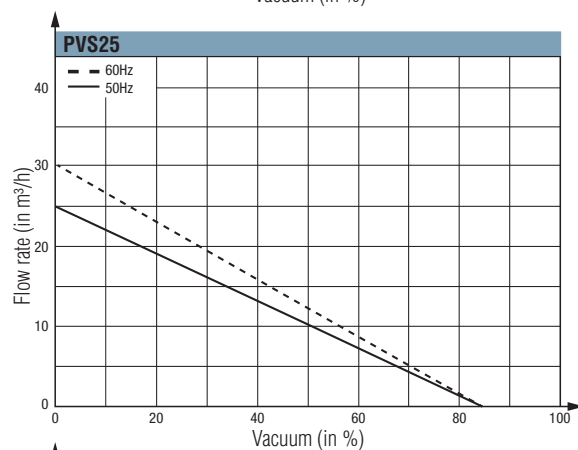
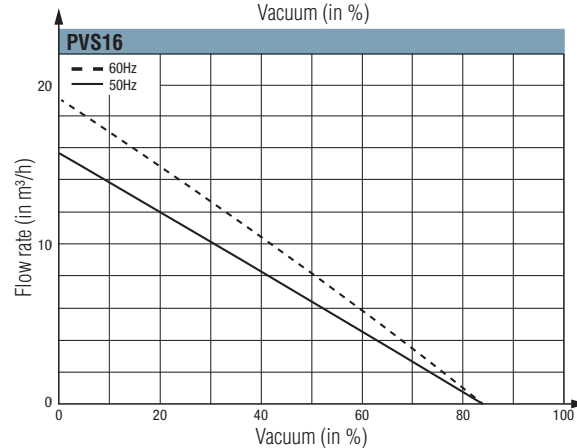
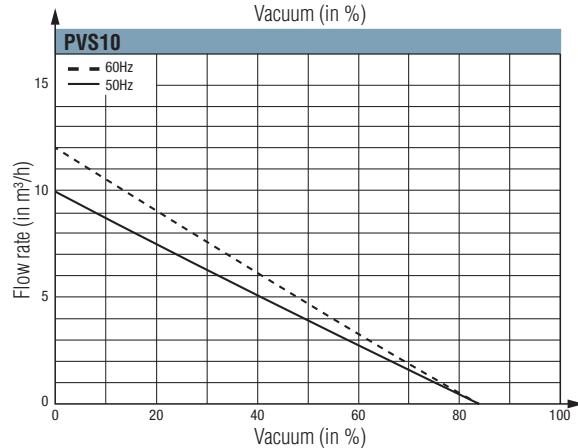
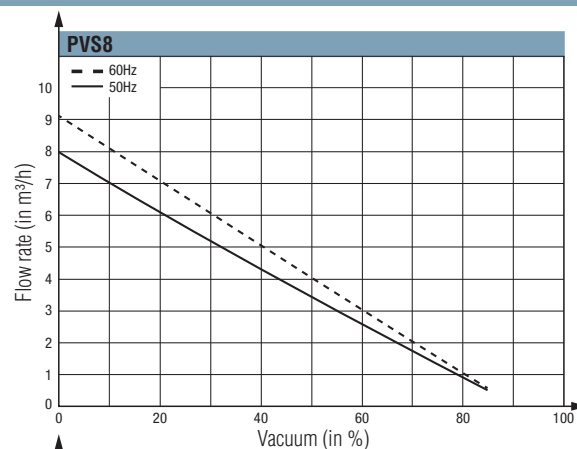
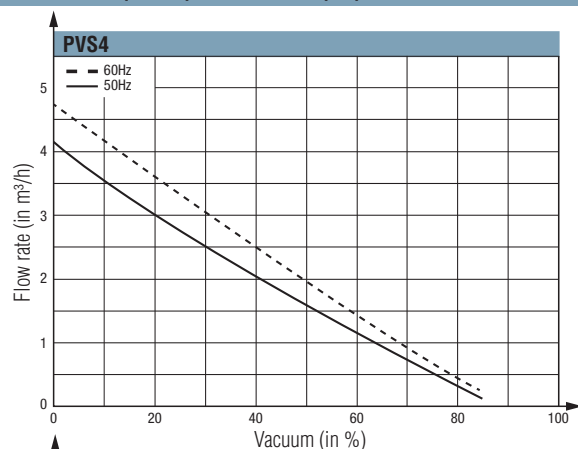
### Specifications

Electrical protection level	PVS4 to 40 : IP54 PVS55 and 100 : IP55
Protection class	ISO F
Materials	Steel, aluminium, polyethylene, carbone
Ambient temperature:	From 5°C to 45°C





#### Flow rate (m³/h) / Vacuum (%)

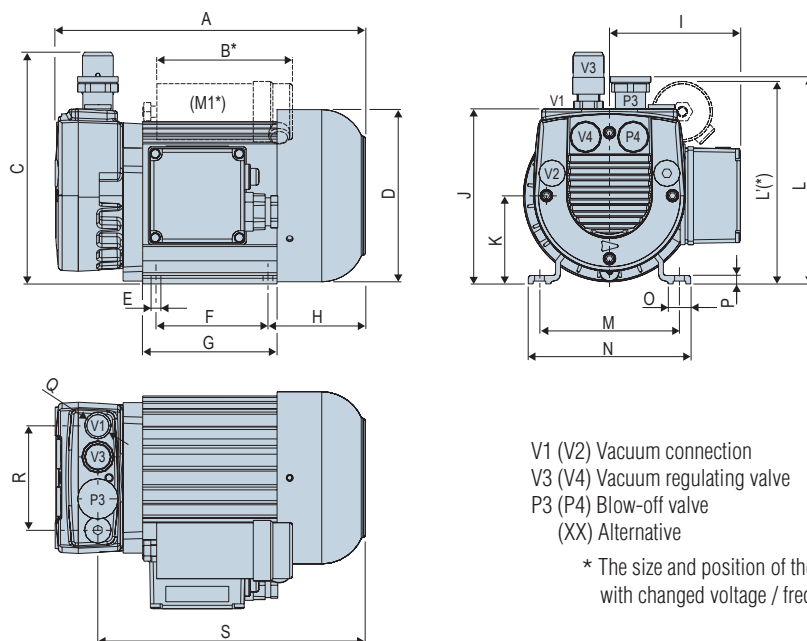




# PVS

## Dry vane vacuum pumps

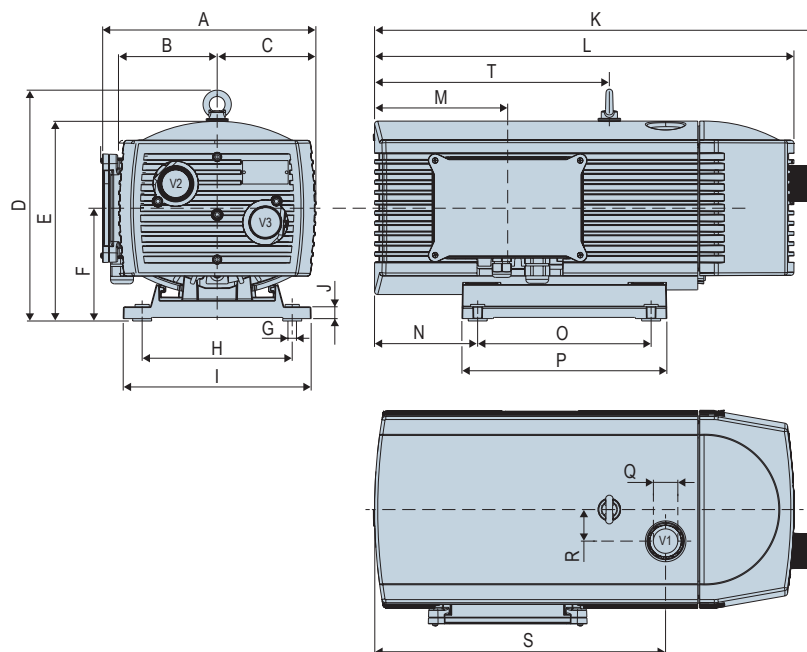
### Dimensions



V1 (V2) Vacuum connection  
V3 (V4) Vacuum regulating valve  
P3 (P4) Blow-off valve  
(XX) Alternative

\* The size and position of the capacitor can change with changed voltage / frequency.

Model	A	B	C	D	E	F	G	H	I	J	K	L	L'	M	N	O	P	Q	R	S
PVS4T3	221.5	-	165.5	125	7	80	96	69.5	93	125.5	63	148	-	100	116	16	6	G1/4"-F	74.6	191
PVS8M1	253	94	171.5	125	7	80	116	89.5	93	131	63	154	143	100	116	16	6	G3/8"-F	79	198
PVS8T3	252	-	179.5	141	7	80	101	82.5	101	139	71	162	-	112	136	16	7	G3/8"-F	79	219

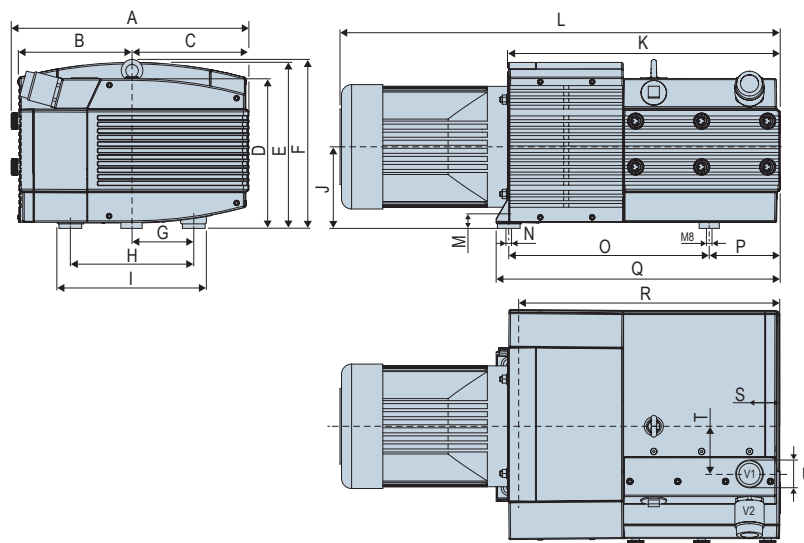


V1 Vacuum connection  
V2 Vacuum regulating valve  
V3 Exhaust air connection

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
PVS10	206	90	90	-	189	107	7	112	142	15	429	387	123	106	160	200	G1/2"-F	35	257	-
PVS16	231	102.5	102.5	-	205	113	7	125	155	15	452	416	151.5	73	202	242	G1/2"-F	35	291.5	263
PVS25	260	125	125	293	253	143	7	190	238	15	505	465	161.5	96	220	260	G3/4"-F	40	302	263
PVS40	270	125	125	293	253	143	7	190	238	15	572	532	168.5	131	220	260	G3/4"-F	40	363.5	298

Note : All dimensions are in mm  
The values represent the average characteristics of our products.





V1 Vacuum connection  
V2 Vacuum regulating valve

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
PVS55T3	353	195	141	289	312	328	95	190	250	162	415	704	30	12	326	96	448	397	46	85	G1"-F
PVS100T3	470	223	230	297	330	336	122.5	245	295	162	539	843	30	12	398	140	563	501	60	95	G1/2"-F

Note : All dimensions are in mm  
The values represent the average characteristics of our products.





The TCL Series side-channel blowers, thanks to their high suction capacities, allow the handling of cartons, mousses, or other porous materials.

Industry-specific applications



### Advantages

- High suction capacity
- Vibration-free
- Maintenance-free: self-lubricated bearings, contactless impeller
- Integrated safety valve (optional)
- Wide range of vacuum to meet specific applications

### Characteristics

Models	Hz	m³/h	Vacuum (%) <sup>1</sup>	kW	Number of stages	Voltage (V) <sup>2</sup>	Intensity (A)	dB(A) <sup>3</sup>	Weight (g)
TCL210T40A2S	50	210	39	4.0	2	345-415 Δ / 600-720 Y	10 Δ / 5.8 Y	72	44
	60	250	41	4.6		380-480 Δ / 660-720 Y	9.9 Δ / 5.71 Y	74	44
TCL315T43A2S	50	315	36	4.3	2	345-415 Δ / 600-720 Y	10 Δ / 5.2 Y	73	54
	60	375	32	4.8		380-480 Δ / 660-720 Y	10.4 Δ / 6 Y	76	54
TCL530T75A2S	50	530	40	7.5	2	345-415 Δ / 600-720 Y	16.7 Δ / 9.6 Y	74	86
	60	620	36	8.6		380-480 Δ / 660-720 Y	17.3 Δ / 10 Y	78	86
TCL1050T125B1S	50	1050	29	12.5	1	345-415 Δ / 600-720 Y	28 Δ / 16.2 Y	74	116
	60	1250	27	14.5		380-480 Δ / 660-720 Y	29 Δ / 16.7 Y	79	116

(1) Relief valves are available for limiting differential pressure

(2) Other voltages are available on request

(3) Noise level measurement acc. to EN ISO 3744 at a distance of 1m with hoses connected

### Specifications

Degree of electrical protection	IP55
Thermal class	ISO F
Certifications	CE, UL and CSA
Materials	Housing and impeller made of die-cast aluminium
Ambient temperature	-25°C to +40°C

### Accessories on demand:

- Safety valve
- Reversing valve
- Sound proofing box

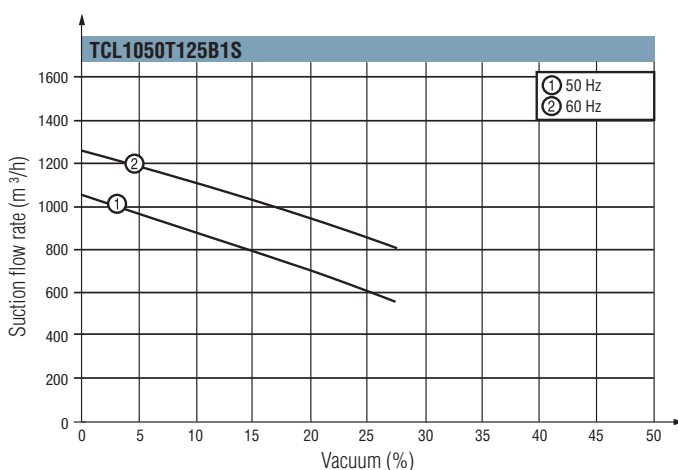
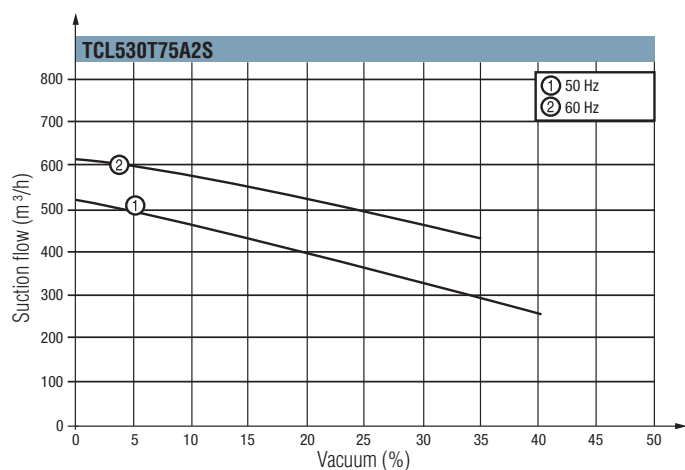
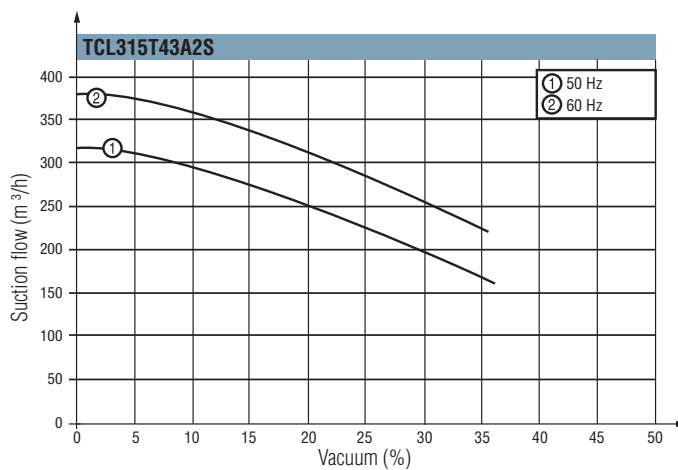
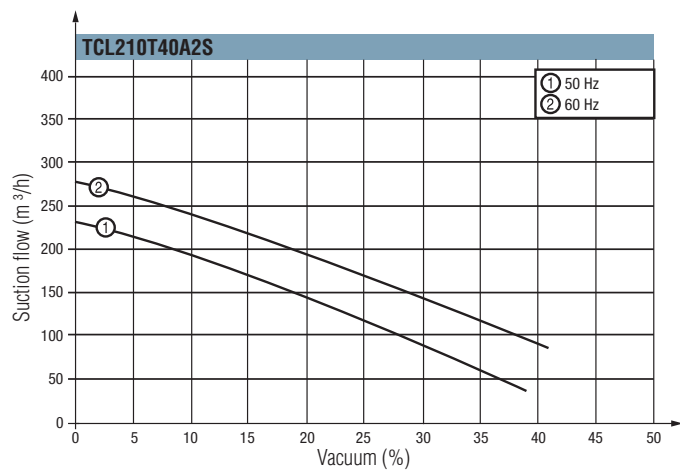


Specify the part number: **TCL210T40A2S**  
Please refer to the characteristics table above



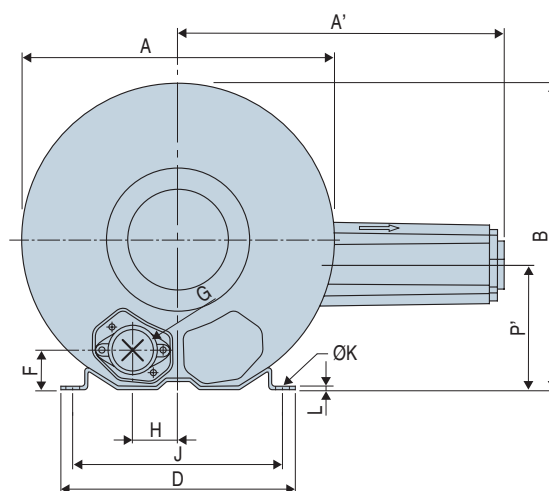
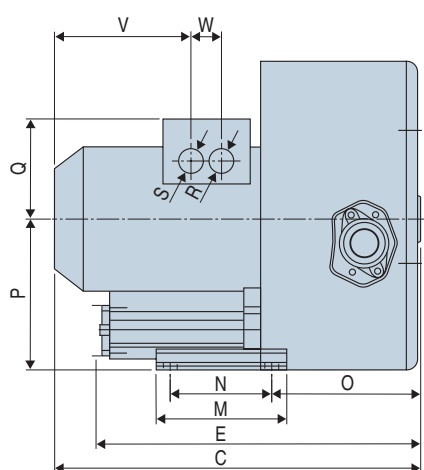


### Suction flow (m<sup>3</sup>/h) / Vacuum (%)

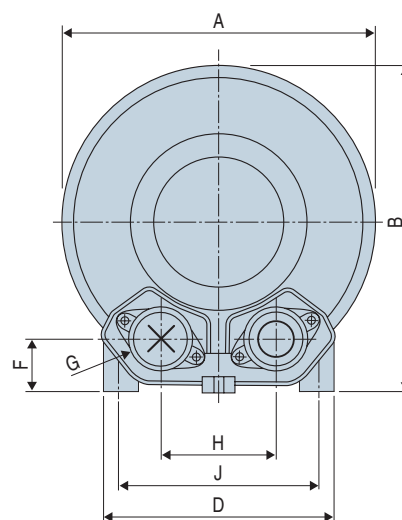
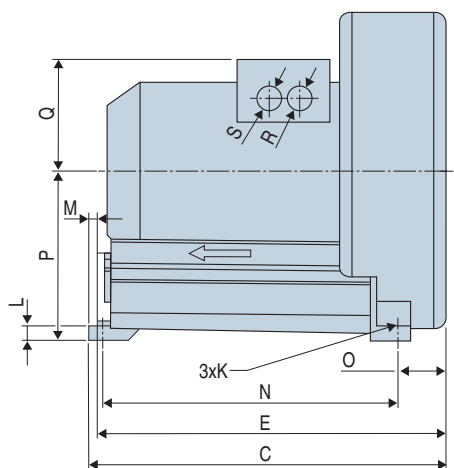


Curves are valid for continuous operation; medium: air at 15 °C, measured at inlet port and atmospheric back pressure of 1013 hPa (mbar abs.), Tolerance: ± 10%; ambient temperature : -25°C to +40°C





Models	A	A'	B	C	D	E	F	G	H	J	K	L	M	N	O	P	P'	Q	R	S
TCL210T40A2S	372	431	361	500	295	404	48	G 2"	60	260	14	4	155	115	171	175	144	135	4xM32x1.5	
TCL315T43A2S	426	426	420	526	325	449	54	G 2"	63	290	15	4.5	180	140	205	198	164	148	4xM32x1.5	
TCL530T75A2S	500	579	491	589	394	575	66	G 2 ½"	76	356	15	6	217	170	236	241	200	167	4xM32x1.5	



Model	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S
TCL1050T125B1S	560	579	645	412	613	92	G 4"	207	360	15	21	39	533	89	300	197	4xM32x1.5	

Dimensions in mm  
The values are representative of the average characteristics of our products.







# Vacuum Pump Accessories

## Chapter 11

### QR



#### Diffuser-type Silencers

- Pressure connection by G1/8" female fitting
- Connection to vacuum network by G1/8" male thread
- Release rate to atmosphere: about 150 NL/min
- Allows a quick and automatic release to atmosphere of a vacuum network
- Reduces cycle times
- Avoids the addition of a blow-off distributor
- Check valve control synchronized with ejector's supply

**P** 11/3

### MS



#### Blow-off Devices

- Direct connection on the micro- and mini-ejectors via an M5 fitting
- Pressure connection by push fitting for Ø 4x6 or 2.7x4 tube
- 100 NL/min blow-off flow at 5 bar
- Allows direct blow-off on the VR type micro-ejectors or any other M5 fitting
- Reduces cycle times
- Avoids using a vacuum-proof distributor

**P** 11/4

### FVI



#### Vacuum Filters

- A range of 8 different models of vacuum filters for optimum adaptation depending on the source of vacuum generation
- 3 filtration materials: paper, polyester and stainless steel
- 6 types of fitting, depending on the model: G3/8", G1/2", G3/4", G1"1/4, G1"1/4 and G2"
- Ideal vacuum filter for high suction flow rate vacuum sources
- Solution optimized to suit each operating environment thanks to three types of filtering material used in the filter cartridges
- A wide range adapted to your application
- Easy-to-replace cartridges in case of clogging

**P** 11/5

### FVUM FVUG

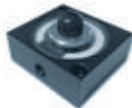


#### Vacuum Filters

- A range of 4 models
- 2 sizes and 3 types of fittings: G1/4", G3/8" and G1/2"
- Transparent tank
- Transparent tank, visual checking on clogging possible
- Different models mean you can select a solution adapted to your application

**P** 11/7

### FVG



#### Mini Vacuum Filters

- A range of 4 models
- Ideal for mounting with micro and mini in-line ejectors
- Easy-to-replace cartridges in case of clogging

**P** 11/8

### FVL12



#### In-line Filter

- 400 micron stainless steel screen
- Easy to mount in-line on the vacuum network or directly on the vacuum pump

**P** 11/9

### FVL68



#### In-line Vacuum Filter

- Simple push connection for 6x8mm hose
- Quick integration into vacuum network

**P** 11/9

### FSLI



#### Liquid Separator Vacuum Filters

- 2 filtration (60 and 100 microns)
- Transparent tank
- Manual drain
- We particularly recommend using the FSL series liquid separator vacuum filters to retain liquid and particles that may be found in a vacuum network

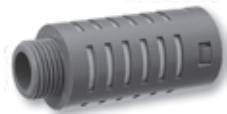
**P** 11/10



# Vacuum Pump Accessories

## Chapter 11

### SIL GV



#### Diffuser-type Silencers

- Noise reduction of between 30 and 39 dBA
- Passage of air through a soundproof material
- Available in 4 sizes
- 4 types of fitting, M-5F, G1/8", G1/4", G 1/2"
- Very good sound reduction
- Air outlet gently diffused
- Reduced size

**P** 11/11

### SIL K--C



#### Through Type Silencers

- Through type silencer
- Noise reduction of between 30 and 33 dBA
- Noise absorbed laterally by soundproof textile
- Available in 5 sizes
- 3 types of fitting, G1/8", G1/4", G1/2"
- Noise reduction mastered
- No clogging
- No pressure loss
- Ideal for dusty environments
- Possibility of collecting the exhaust

**P** 11/11

### CD CC



#### Screw-type Electrical Connectors

- M8 and M12
- 4 and 5 poles
- Straight or elbow(90°)

**P** 11/12





Economic solution developed especially for micro ejectors to respond to applications requiring a quick release back to atmospheric pressure of a vacuum network with reduced space and weight.

Operating:

When the ejector is pressurized to generate vacuum it applies to the internal valve of the QR18 and blocks atmospheric evacuation. When the pressure is interrupted to stop vacuum generation, the network is automatically vented to atmosphere.

#### Advantages

- Allows a quick and automatic release to atmosphere of a vacuum network.
- Reduces cycle times
- Avoids the addition of a blow-off distributor.
- Check valve control synchronized with ejector's supply
- No energy consumption
- Easy disassembly for cleaning

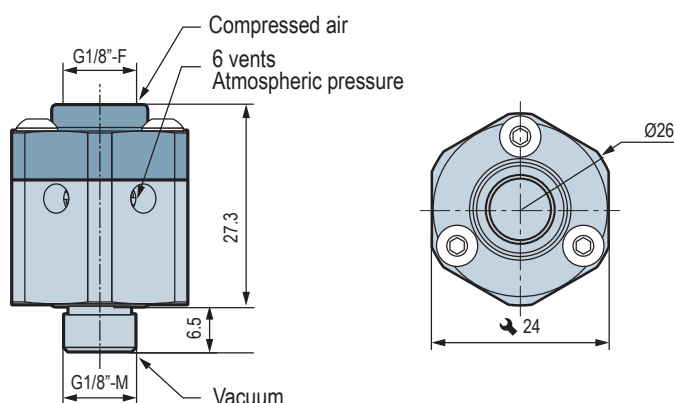
#### Specifications

Model	Fitting	Weight (g)
QR18	G1/8"	35

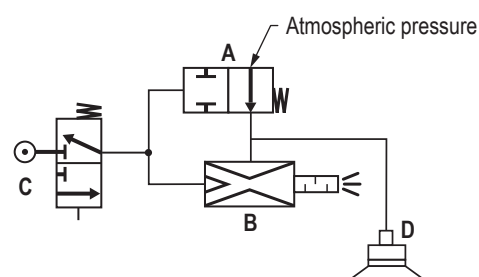
- Pressure connection by G1/8" female fitting
- Connection to vacuum network by G1/8" male thread
- Operating pressure: 2 to 7 bar
- Release rate to atmosphere: about 150 NI / min
- Nominal diameter : 4mm
- Materials : aluminium, nitrile (NBR), brass, steel
- Operating temperature : 0 to 50°C



#### Dimensions



#### Pneumatic assembly



- A: QR18 Quick Release device  
 B: Ejector (Venturi).  
 C: Compressed air distributor  
 D: Vacuum network



**Specify the part number: QR18**  
**Please refer to the characteristics table above**

Note: All dimensions are in mm



# MS

## Quick Release Devices



Economical solution developed especially for Coval micro-ejectors to suit applications requiring blow-off combined with very reduced size and weight. This device enables the user to connect the compressed air network directly onto the M5 push fitting.

### Advantages

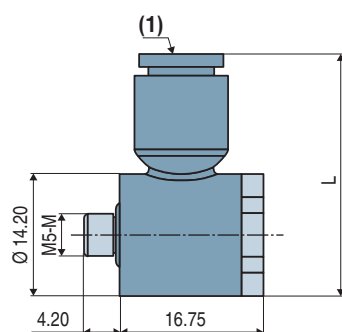
- Allows blow-off on VR or any other M5 fitting
- Reduces cycle times
- Avoids using a vacuum-proof distributor.

### Technical Characteristics

Model	Push fitting	L
MS2M5	Ø 2.7x4	25.8
MS4M5	Ø 4x6	28.10

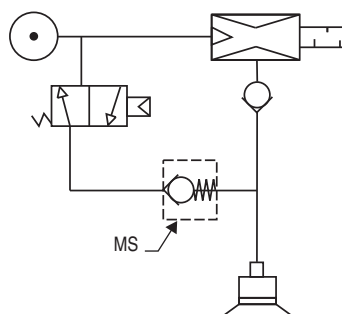
- Pressure connection by push fitting for Ø 4x6 or 2.7x4 tube
- Connection to the vacuum network by M5 male threaded fitting
- Blow-off flow rate at 5 bar: 100 NI/min
- Materials: polyamide PA 6.6 + brass (CuZn) + nitrile (NBR)

### Dimensions



(1) Push fitting

### Pneumatic Diagram



MS

11



For all orders, please specify:  
Model + Push fitting  
e.g. : MS2M5

1: Model	2: Push fitting
MS2M5	Ø 2.7x4
MS4M5	Ø 4x6

Note: all dimensions are shown in (mm)



# FVI

## Vacuum Filters



The FVI range is compatible with pneumatic vacuum generators (venturi) or electric vacuum pumps (the FVI 2 model is suitable for a suction turbine). Each filter is fitted with an interchangeable cartridge treated to guarantee long life expectancy for the whole unit.

The filtering element consists of a 5 micron filter (made of paper for version C), which is sufficient to protect pumps and venturi under normal operating conditions.

Note: For filtration leaving large deposits (powder), mount the filter horizontally or upside down.

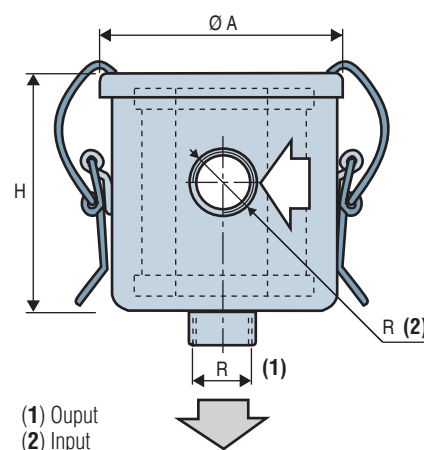
Important: These filters are designed for vacuum. They cannot withstand pressure greater than atmospheric pressure.

Filter cartridge available in 3 versions: paper, polyester and stainless steel.

### Characteristics

Models	A	H	R	Flow rate (NI/min)	Weight (g)
FVI 38	79	76	G3/8"-F	400	270
FVI 12	101	86	G1/2"-F	600	600
FVI 34	101	86	G3/4"-F	600	600
FVI 114	135	96	G1"1/4-F	1400	1050
FVI 114 G	173	156	G1"1/4-F	2400	1850
FVI 2	201	258	G2"-F	5000	3900

Note: all dimensions are shown in (mm)



### Specifications

Body material	Stamped steel sheet
Treatment	Black paint
Filtration	5 microns with a paper cartridge 3 microns with a polyester cartridge 60 microns with a stainless steel cartridge
Pressure loss	2 to 4% vacuum with a new filter 5 to 7% vacuum with average clogging



For all orders, please specify:  
Model + Fitting + Filtering material  
e.g.: FVI34P

1: Model	2: Fitting	3: Filtering material
FVI	38 G3/8" 12 G1/2" 34 G3/4" 114 G1"1/4 114G G1"1/4 2 G2"	C Paper P Polyester I Stainless steel





### Filter

Models	Use
<b>FVI 38</b>	GVP 20
<b>FVI 12</b>	GVP 25 - 30 - PVR 6 (6 m³/h)
<b>FVI 34</b>	Vacuum pumps: 10/16 m³/h
<b>FVI 114</b>	Vacuum pumps: 20/25 m³/h
<b>FVI 2</b>	Turbine

### Filtration

COVAL offers three filtration principles:

#### Model C: CE filtration element

- Paper cartridge with 5 micron filtration.
- No damp cleaning process possible.
- Incompatible to very humid conditions

#### Model P: PE filtration element

- Polyester cartridge with 3 micron filtration.
- Damp cleaning possible.

#### Model I: IE filtration element

- Stainless steel cartridge, 60 micron filtration.
- For use in very damp environments (water, liquid)

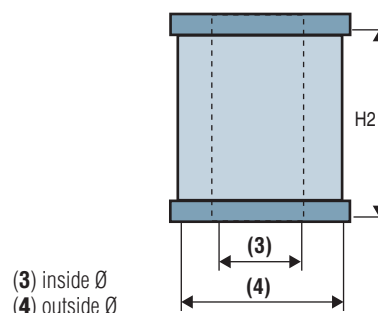
### Accessories

Models	Replacement cartridge (*)	External Ø	Internal Ø	H2
<b>FVI 38</b>	FVI 38*E	51	23	57
<b>FVI 12</b>	FVI 12*E	64	38	68
<b>FVI 34</b>	FVI 12*E	64	38	68
<b>FVI 114</b>	FVI 114*E	98	60	71
<b>FVI 114 G</b>	FVI 114G*E	125	64	125
<b>FVI 2</b>	FVI 2*E	149	88	221

(\*) Specify the filter material: **C** (paper) ; **P** (polyester) ; **I** (stainless steel).

Note: all dimensions are shown in (mm)

### Replacement cartridge



### Other Models

#### FVG 11-2-3-5-6 series vacuum filters, for micro-ejectors

- Polyester cartridge
- See page 11/8

#### FVUM 14-38 series vacuum filters for GVP 12 and 15 vacuum pumps

- FVUG 38-12 vacuum filters, in-line stainless steel cartridge for GVP 15 and 25 vacuum pumps and small electric vacuum pumps.
- See page 11/7



# FVUM. FVUG

## In-line Filters

The advantage of this range of filters is that they are equipped with a transparent tank so that clogging is visible.



### Characteristics

Models	A	B	C	D	G	Flow rate (NI/min)
FVUM 14	75	60	49.5	49.5	G1/4"-F	150
FVUM 38	75	64	49.5	51.5	G3/8"-F	350
FVUG 38	90.5	126.5	75	112.5	G3/8"-F	350
FVUG 12	90.5	130	75	114.5	G1/2"-F	500

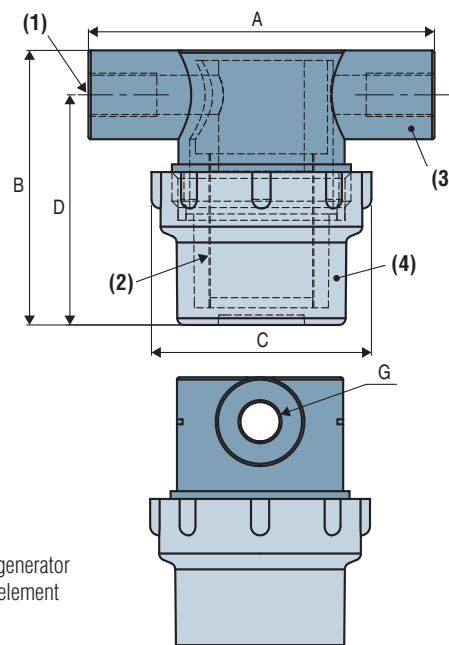
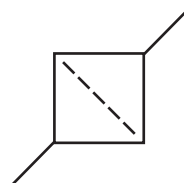
Note: all dimensions are shown in (mm)

### Operating range

■ - 1 to 10 bar

### Specifications

Body material	High: nylon 6.6 Tank: transparent polyamide
Filtration	Two options available: 50 micron stainless steel grill or Polyethylene 80 micron
Temperature	0 to 50°C



- (1) Vacuum generator
- (2) Filtering element
- (3) Body
- (4) Tank



For all orders, please specify:  
Model + Size + Fitting + Type of cartridge  
e.g.: FVUG38P

1: Model	2: Size	3: Fitting	4: Cartridge
FVU	M G	Mini Large	14 38 12
			G1/4" for M series G3/8" for M and G series G1/2" for G series
			- P
			Stainless steel Polyethylene



To order a replacement filtering element, please specify:  
e.g.: FVUM12E

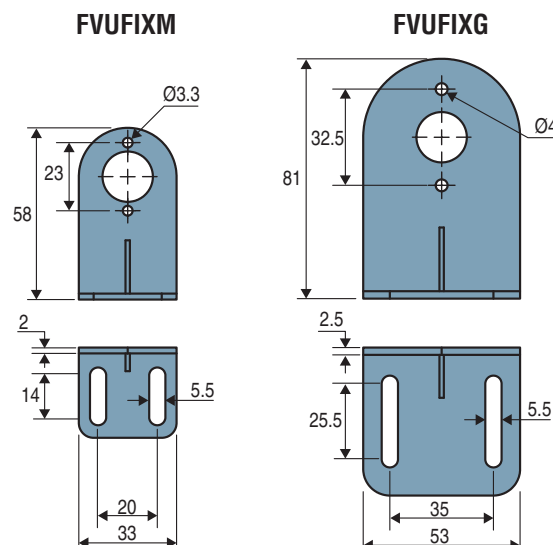
Model	Reference of the filtering element
FVUM14 and 38	FVUM12E (Stainless steel)
FVUG12 and 38	FVUG12E (Stainless steel)
FVUM14P and 38P	FVUM12PE (Polyethylene)
FVUG12P and 38P	FVUG12PE (Polyethylene)

### Mounting bracket for vacuum filter

Model	Designation	Material
FVUFIXM	Mounting bracket for filter FVUM	Stainless steel
FVUFIXG	Mounting bracket for filter FVUG	Stainless steel



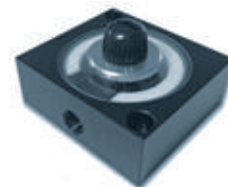
Please specify part n°, eg: FVUFIXM  
Please see table above





# FVG

## Mini Vacuum Filters



FVG series vacuum filters are especially recommended for fine filtration. Their light weight allows easy on-board installation.

### Mini-filters

Models	Vacuum pumps
<b>FVG 3</b>	GVP 10 - VR 07 - VR 09
<b>FVG 5</b>	GVP 12 and 14
<b>FVG 6</b>	GVP 20

### Characteristics

Models	A	B	C	E	F	G	D1	D2
<b>FVG 3</b>	8	20.5	33.8	55	50	18	G1/8"-F	G1/8"-F
<b>FVG 5</b>	12.5	25	42	65	50	23	G1/4"-F	G1/4"-F
<b>FVG 6</b>	15	30	47	70	60	23	G3/8"-F	G3/8"-F

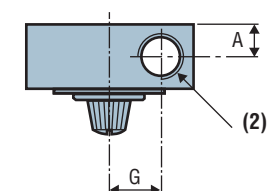
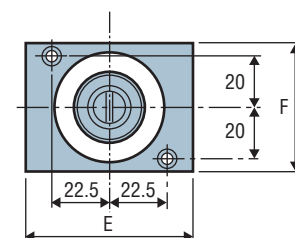
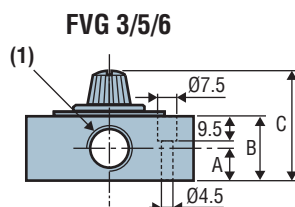
Note: all dimensions are shown in (mm)

### Specifications

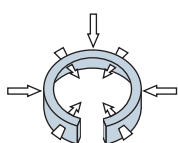
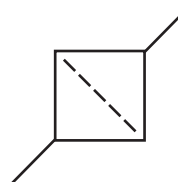
<b>Operating pressure</b>	-1 to 5 bar
<b>Temperature</b>	0 to 60 °C
<b>Filtration (μ)</b>	FVG 3-5-6 : 40
<b>Weight (g)</b>	FVG 3/5/6: 70/138.5/220
<b>Material</b>	Body : POM Hood : Polycarbonate Seal : Nitrile (NBR) Screws / large washers : Polyethylene and plated steel Filter : Porex

### Accessories

Replacement cartridges: interchangeable filtration element.  
Add E to the filter model reference to order the replacement cartridge.



(1) D1 (input)  
(2) DE (Output)



Filtration angle 300°



For all orders, please specify:  
**Model + Type + Filter or Cartridge**  
e.g.: FVG5

1: Model	2: Type	3: Filter or Cartridge
<b>FVG</b>	<b>3</b> FVG 3 <b>5</b> FVG 5 <b>6</b> FVG 6	<b>-</b> Filter <b>E</b> Cartridge



# FVL 12

## In-line Filter



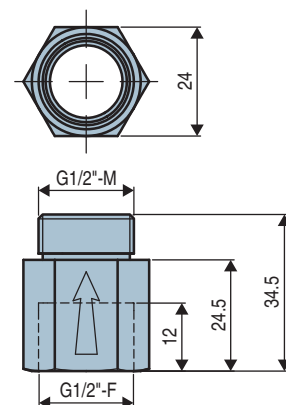
The FVL12 in-line filter allows quick integration for vacuum pumps GVP and GEMP.

### Specifications

<b>Material</b>	Body: Nickel-plated brass Grille: 400 micron stainless steel
<b>Weight</b>	50 g

Mounting on option

The FVL 12 series in-line filter can also be mounted as a GVO P option on GVP series vacuum pumps. See page 7/7.



Note: all dimensions are shown in (mm)



For all orders, please specify: FVL12

# FVL 68

## In-line Vacuum Filter



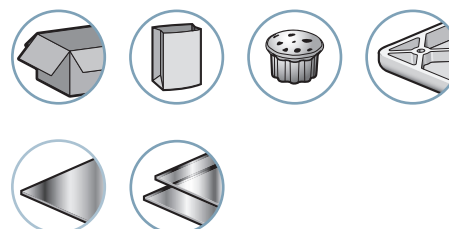
The FVL68 in-line filter ensures quick integration into a vacuum network, thanks to its push fitting for 6 x 8 calibre pipes.

Ideal for protecting a vacuum generator from normal clogging. The FVL is equipped with a 400 micron filtering grille.

### Applications

The FVL68 in-line filter is ideal for protecting LEM mini vacuum pumps. Installation directly onto the vacuum outlet of the pump, using a 6 x 8 push fitting.

Industry-specific applications

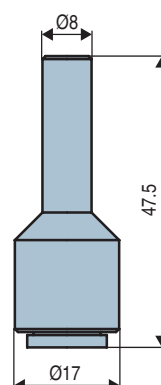


### Specifications

<b>Material</b>	Body: POM Grille: 400 micron stainless steel Push fitting Brass – Steel and polymer
<b>Weight</b>	7 g.

Dimensions

Example usage



Note: all dimensions are shown in (mm)



For all orders, please specify: FVL68



# FSLI

## Liquid Separator Vacuum Filter



We particularly recommend using the FSLI series liquid separator vacuum filter to retain liquid and particles that may be found in a vacuum network.

The filtering element consists of a 50 micron stainless steel filter and protects the vacuum generator under normal operating conditions.

### Advantages

- Transparent tank that makes clogging visible.
- Manual drain in the bottom of the tank used to remove any liquid and dirt (Note: This operation must only be carried out when the vacuum network is at atmospheric pressure).

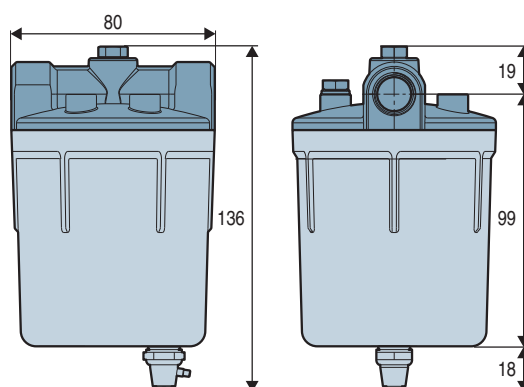
### Characteristics

Model	Fitting	Stainless steel filtering	Flow rate <sup>(1)</sup> (NI/min)
FSLI38X50	G3/8"-F	50 µ	350

(1) The flow rate may vary according to the viscosity of the liquid drawn in.

### Specifications

<b>Material</b>	Lid: molded aluminium Tank: transparent polycarbonate Filter cartridge: stainless steel Accessories: stainless steel, brass and nickel-plated brass Seal: nitrile
<b>Filtering</b>	Two options available: 50 microns
<b>Operating range</b>	-1 to 2 bar
<b>Pressure max.</b>	2 bar
<b>Temperature</b>	0 to 50 °C



For all orders, please specify:

- For complete filter: FSLI38X50
- For a replacement filtering element: FVUM12E

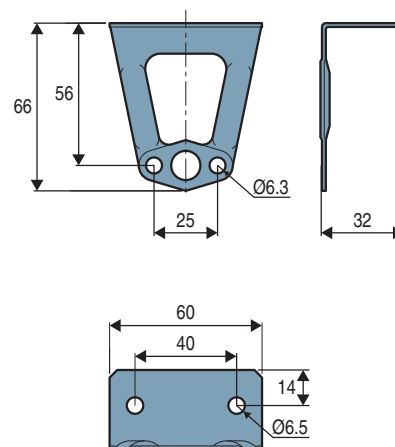
### Mounting bracket for FSLI series liquid separator filter

Material: zinc-plated steel

#### Model

**FSL38FIX** Mounting bracket for FSLI filter

Note: Supplied with two M6 screws to mount bracket on filter.



Specify part n°: FSL38FIX

Note: all dimensions are shown in (mm)

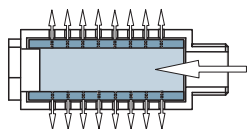


# SIL GV. SIL K -- C

## Diffuser Type Silencers, Through-type Silencers

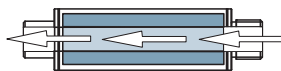
From when it was founded, COVAL has always given particular attention to reducing the noise of vacuum pumps and improving their performance.

Often copied, never equalled, the acoustic performance of COVAL vacuum pumps stems from the inside shape of the venturi system and the innovative design of the hit-tech soundproof materials used for the silencers.



### Diffuser type silencer

- Very good noise reduction
- Air output gently diffused.



### Through-type silencer

- Noise reduction mastered.
- No clogging.
- No pressure loss.

## SIL GV series diffuser-type silencers

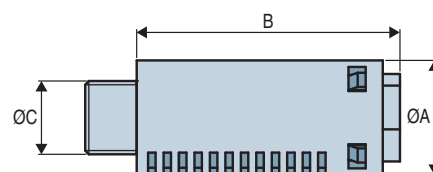
Noise reduction by breaking up the air jet in a baffle inside the diffuser. Passage of air through a soundproof material.



### Characteristics

Models	ØA	B	ØC	Weight (g)	Medium-level noise reduction (dBA)
SIL GV 10 M5 F	18	36	M5-F	5	30
SIL GV 10	18	36	G1/8"-M	5	30
SIL GV 15	20	46	G1/4"-M	10	35
SIL GV 20	30	62	G1/2"-M	29	39

Note: all dimensions are shown in (mm)



### Specifications

Material	POM (Polyoxymethylene) + interior: Textile soundproof material
Temperature	-10 to 50 °C

## SIL K -- C series through-type silencers

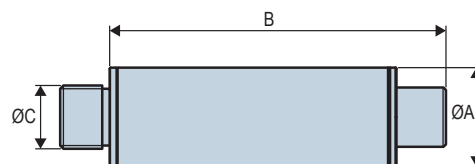
- Noise absorbed laterally by soundproof material.
- Free output without pressure loss or clogging.



### Characteristics

Models	ØA	B	ØC	Weight (g)	Medium-level noise reduction (dBA)	Materials
SIL K 18 C	20	68	G1/8"-M	22	33	thread: aluminum
SIL K 14 C	20	68	G1/4"-M	25	31	tube: PA6, 30% GF
SIL K 38 C	30	121	G3/8"-M	90	33	polycarbonate, 15% GF
SIL K 12 C	30	121	G1/2"-M	92	33	
SIL K 12 CS	30	54	G1/2"-M	61	28	

Note: all dimensions are shown in (mm)



### Specifications

Material	Anodised aluminium and black Polyamide or Polycarbonate (according to Ø) interior: Textile soundproof material
Temperature	-10 to 50 °C

### Special:

COVAL develops tailor-made through-type silencers according to specifications, male or female fitting, length, diameter, characteristics on request.



# CD-CC

## Connectors

### M8 / M12 / RJ45



#### Single-Ended Cordsets

##### Cable properties

Models	Connection	Number of conductors	Orientation	Cable length	Cable
CDM8	M8 - Female - A-Coded	4	Straight	2 m	PUR
CDM8N	M8 - Female - A-Coded	4	Straight	0.5 m	PVC
CCM8	M8 - Female - A-Coded	4	Elbow	2 m	PVC
CDM12N	M12 - Female - A-Coded	4	Straight	2 m	PUR
CDM12L5	M12 - Female - A-Coded	4	Straight	5 m	PVC
CCM12	M12 - Female - A-Coded	4	Elbow	2 m	PVC
CCM12L5	M12 - Female - A-Coded	4	Elbow	5 m	PVC
CDM125PL2	M12 - Female - A-Coded	5	Straight	2 m	PUR
CDM125PL5	M12 - Female - A-Coded	5	Straight	5 m	PUR
CCM125PL2	M12 - Female - A-Coded	5	Elbow	2 m	PUR
CDM128PL2	M12 - Female - A-Coded	8	Straight	2 m	PUR



##### Specifications

Cable : Drag chain compatible

Open end

#### Double-Ended Cordsets

##### Characteristics

Models	Connection 1	Connection 2	Number of conductors	Orientation	Cable length	Specifications	Cable
CDM8MF4PL2	M8 - Male - A-Coded	M8 - Female - A-Coded	4	Straight	2 m	-	PUR
CDM8MF4PL5	M8 - Male - A-Coded	M8 - Female - A-Coded	4	Straight	5 m	-	PVC
CDM8M12	M8 - Female - A-Coded	M12 - Male - A-Coded	4	Straight	1 m	-	PVC
CDM8MM12F4PL2	M8 - Male - A-Coded	M12 - Female - A-Coded	4	Straight	2 m	-	PVC
CDM8MM12F4PL5	M8 - Male - A-Coded	M12 - Female - A-Coded	4	Straight	5 m	-	PUR
CDM8FFL05	M8 - Female - A-Coded	M8 - Female - A-Coded	4	Straight	0.5 m	COVAL bus cable	PUR
CDM8FFL1	M8 - Female - A-Coded	M8 - Female - A-Coded	4	Straight	1 m	COVAL bus cable	PUR
CDM8FFL2	M8 - Female - A-Coded	M8 - Female - A-Coded	4	Straight	2 m	COVAL bus cable	PUR
CDM8FFL4	M8 - Female - A-Coded	M8 - Female - A-Coded	4	Straight	4 m	COVAL bus cable	PUR
CDM8RJ45L2	M8 - Female - A-Coded	RJ45	4	Straight	2 m	Cat 5 shielded Ethernet cable	PUR
CDM8RJ45L5	M8 - Female - A-Coded	RJ45	4	Straight	5 m	Cat 5 shielded Ethernet cable	PUR
CDM8RJ45L10	M8 - Female - A-Coded	RJ45	4	Straight	10 m	Cat 5 shielded Ethernet cable	PUR
80003053	M8 - Female - A-Coded	M8 - Female - A-Coded	4	Straight	1 m	Cat 5 shielded Ethernet cable	PUR



CDM8MF4PL\_



CDM8M12



CDM8MM12F4PL\_



CDM8FFL\_



CD8RJ45L\_



80003053

##### Specifications

Cable : Drag chain compatible



Specify part n°, eg: CDM8N  
Refer to characteristics table above



# Vacuum Switch Range

## Chapter 12

### PSK



#### Mini Vacuum Switch

- 1 digital output
- Adjustable vacuum threshold
- 3 vacuum port sizes available
- M8 connection

- Ultra-compact and lightweight
- LED visual indicators

**P**<sub>12/3</sub>

### PSA 100 C



#### Electronic Vacuum Switch with Display

- 2 configurable digital outputs
- NO or NC outputs
- Adjustable hysteresis
- IP 65

- The PSA100 C electronic vacuum switch is the most efficient vacuum measuring component in the COVAL range.
- It can be easily installed on all machines and robots, etc. thanks to its compact lightweight design.

**P**<sub>12/4</sub>

### PSD 100



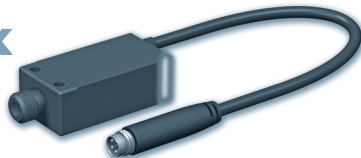
#### Vacuum Switch with 3-colour Display

- 1 to 5 VDC analog output
- Response time: < 5ms
- 2 vacuum fittings available
- M8 connection

- The compact PSD100 electronic vacuum switch is used to check the exact level of vacuum in the system.
- Analog output

**P**<sub>12/5</sub>

### PSP 100 CX



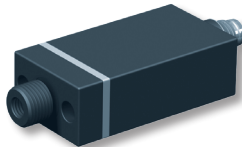
#### Electronic Vacuum Switch

- 1 configurable digital output
- Response time: < 5ms
- 2 vacuum fittings available
- M8 connections

- The PSP100 electronic switch reduces size while accurately monitoring the vacuum level
- Adjustable digital output and hysteresis.

**P**<sub>12/7</sub>

### PSP 100 ANA



#### Electronic Vacuum Switch Analog Output

- 1 Analog output from 1V to 5 VDC
- Response time: < 5ms
- 2 vacuum port sizes available
- M8 connections

- The PSP100 ANA electronic switch reduces size while accurately monitoring the vacuum level
- Analog output

**P**<sub>12/8</sub>

### PSE 100 E



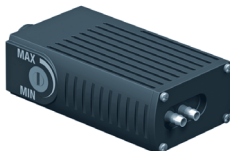
#### Electric Vacuum Switch

- Adjustment range -300mb to -850mb
- All voltages
- Cable or M12 connector outputs

- The PSE 100 E vacuum switch with electric output is used to check the vacuum level in the circuit.
- It is adapted to all electrical automated systems.
- The choice between the NO or NC function is made during wiring.

**P**<sub>12/9</sub>

### PSE 100 P



#### Pneumatic Vacuum Switch

- 2 versions available (NO or NC)
- Adjustment range: -300mb to -850mb
- The PSE 100 E series vacuum switch with pneumatic output enables the vacuum level in the system to be checked by means of a patented system.

- This vacuum switch exists in two versions:
- NO version, recommended for "air-saving" on the vacuum pump
- N.C. version to cover the "safety" function (object detected, etc.) and "SFC signal" function.

**P**<sub>12/10</sub>



# Vacuum Switch Range

## Chapter 12

### PSE 100 PK



#### Pneumatic Vacuum Switch

- 2 versions available (NO or NC)
- Adjustment range:
  - NC: -250 to -830mb
  - NO: -350 to -880mb
- The vacuum switch with pneumatic output is used to check the vacuum level in the circuit. It is recommended for measuring slowly changing vacuum levels such as regulating or checking vacuum levels in networks over 1 liter.
- NO version, recommended for "air-saving" on the vacuum pump.
- NC version to cover the "safety" function (object detected, etc.) and "SFC signal" function.

**P** 12/11

### VAF 111



#### Needle Vacuum Gauge

- VAF 111 series vacuum gauges are recommended for viewing the level of vacuum on a network for maintenance, checking and adjustment purposes (Green zone of use: -0.65 to -1 bar)
- 3 diameters available: 40, 50 and 63 mm
- Zone for use printed red and green

**P** 12/12



# PSK

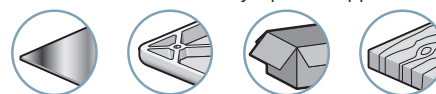
## Mini Vacuum Switch



The PSK series adjustable vacuum switches, due to a compact and ultra-light design, enable installation close to the suction cups for reduced response times. PSKs are ideal for applications requiring only a simple "object gripped" signal, and offer an economical and effective solution for applications with one vacuum generator per suction cup.

- Simple installation, plug-in port or thread-in fitting
- Compact size : 26 x 10 x 10.4 mm
- Weight: 8.3 g

Industry-specific applications



### Specifications

<b>Model</b>	<b>PSK 100</b>
<b>Setting pressure range</b>	0 to 100% vacuum (0~-101.3 kPa)
<b>Withstand pressure</b>	0.6 MPa
<b>Fluid</b>	Air, Non-corrosive/Non-flammable gas
<b>Power supply voltage</b>	10.8 to 30 VCC
<b>Load current</b>	80mA max.
<b>Internal voltage drop</b>	≤ 0.8 V
<b>Current consumption</b>	10 mA max.
<b>Sensor type</b>	PNP
<b>Output short circuit protection</b>	Yes
<b>Setting method</b>	Adjusting by VR
<b>Response time</b>	Approx. 1ms
<b>Repeatability</b>	≤ +/-1% F/S/
<b>Hysteresis</b>	3% F.S. max.
<b>Indicator</b>	Red LED turns ON
<b>Enclosure</b>	IP 40
<b>Temperature characteristic</b>	≤ +/-3% F/S/ of detected pressure (25°C) at temp. Range of 0-50°C
<b>Ambient temp. range</b>	Operation : 0 ~ 60°C (32 ~ 140°F), Storage : -20 ~ 70°C (-4 ~ 158°F) (No condensation or freezing)
<b>Ambient humidity range</b>	Operation/Storage: 35 85% RH (No condensation)
<b>Vibration</b>	Total amplitude 1.5 mm, 10Hz-55Hz-10Hz scan for 1 minute, two hours each direction of X, Y and Z
<b>Shock</b>	980m/s <sup>2</sup> (100G), 3 times each in direction of X, Y and Z
<b>vacuum connection</b>	Push-in tube or thread-in
<b>Electrical connection</b>	M8 connection 3-pin (Cable L:150 mm)
<b>Weight</b>	Approx. 8.3 g (with M8, 3-pin male connector)

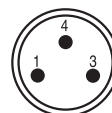
### Advantages

- Simple installation:  
Plug-in port for push-to-connect fittings
- Compact size:  
Extremely compact size to fit the most confined areas

### Additional Information

#### Electrical connections

- M8, 3-pin male connector

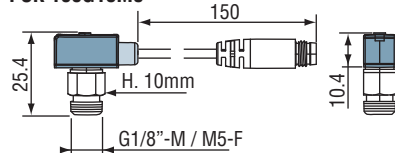


- 1 = + (Brown)
- 3 = - (Blue)
- 4 = out (Black)

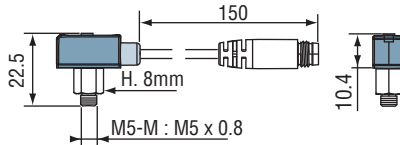
- Ø6mm stem for one-touch push fitting, Male M5 or G1/8"-M.

### Dimensions

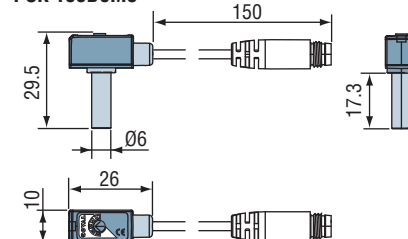
PSK 100G18M8



PSK 100M5M8



PSK 100D6M8



For all orders, please specify:  
**Model + Measuring range + Vacuum connection + Connection**  
Example: PSK100G18M8

1: I	2: Measuring range	3: Vacuum connection	4: Connection
PSK	100 0 to 100% vacuum	D6 Ø 6 mm G18 G 1/8"-M, M5-F M5 M5 male	M8 M8, 3-pin male connector



# PSA 100 C

## Electronic Vacuum Switch with Display



The PSA100C series electronic vacuum switch is the most efficient COVAL vacuum measuring component. It can be easily installed on all machines and robots, etc. thanks to its compact lightweight design.

Moreover it has a digital vacuum level display with two independently-adjustable digital outputs. Every aspect has been designed to make it easy to use.

Advantages: front panel programming, simplified adjustment and threshold locking, display inversion, your choice of NO or N.C. outlets (hysteresis can be independently adjusted for each output).

Industry-specific applications

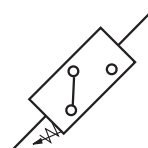


### Specifications

Compatible fluids	All non-corrosive, filtered, non-lubricated gases
Supply	12 to 24 V CC $\pm$ 10%
Current consumed	$\leq$ 60 mA
PNP transistor output	125 mA with 24 V DC, programmable NO or NC
Output viewing	Led
Output 1	Green LED
Output 2	Red LED
Programming	Keyboard
Display	Bar
EMC	Industrial standard Class B
Protection	IP 40
Electrical connection	M8, 4-pin connector
Pneumatic connection	G1/8" or M5-F
Shock resistance	100 G on XYZ
Display resolution	1%
Adjustment resolution	1%
Rating range	0.10 ~ -1.00 bar
Setting range	0.00 ~ -1.00 bar
Maximum overpressure	3 bar
Weight	30 g

### Advantages

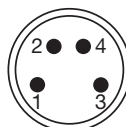
- 2 configurable digital outputs
- Adjustable hysteresis
- M8 F connector
- LED display
- PNP



### Additional Information

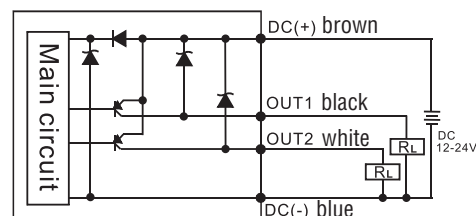
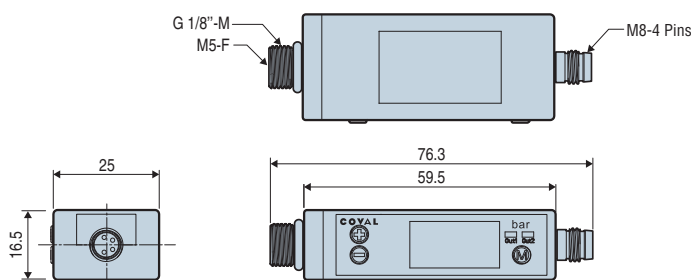
#### Electrical connections

- M8 connector



- 1 = + 24 V DC
- 2 = Output 2
- 3 = Common
- 4 = Output 1

### Dimensions



### Accessories

- Straight or elbow connector, see page 11/12.
- Mounting on vacuum pump:
  - GVP series: GVO PSA 100 C
  - GEMP series: VA option

Note: all dimensions shown in (mm)



For all orders, please specify: PSA 100 C



# PSD 100

## Vacuum Switch with 3-color Display

The new PSD100 series mini-vacuum switch with display offers easy reading thanks to the size of its screen and its 3-color display.

Its compactness and lightness facilitate its integration on all machines.

Easily adjustable, it is equipped with an extremely precise electronic vacuum level sensor and has an adjustable digital output as well as an analog output. The PSD100 has mounting accessories on option, making it very easy to install.



Industry-specific applications



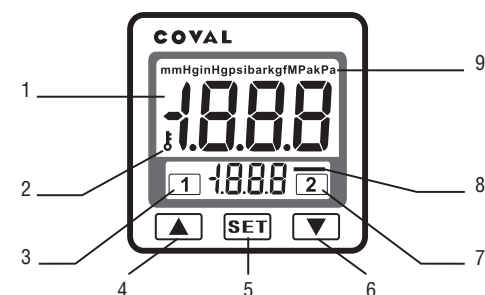
### Specifications

<b>Pressure rating range</b>		0.0 ~ -101.3 kPa					
<b>Pressure setting range</b>		10.0 ~ -101.3 kPa					
<b>Max. pressure</b>		300 kPa					
<b>Fluid</b>		Air, non-corrosive/non-flammable gas					
<b>Pressure setting resolution</b>	kPa	MPa	kgf/cm <sup>2</sup>	bar	psi	inHg	mmHg
	0.1	/	0.001	0.001	0.01	0.1	1
<b>Power supply voltage</b>		12 to 24 V DC $\pm 10\%$ , ripple (P-P) 10% or less					
<b>Current consumption</b>		$\leq 40$ mA (without load)					
<b>Switch output</b>		1 PNP digital output (2x on PNP2 version) Max. load current: 125 mA Max. supply voltage: 24 VDC Residual voltage: $\leq 1.5$ V					
<b>Repeatability (Switch output)</b>		$\leq \pm 0.2\%$ F.S. $\pm 1$ digit					
<b>Hysteresis</b>	<b>Threshold mode</b>	Adjustable (1 to 8 digits)					
	<b>Hysteresis mode</b>	Adjustable					
	<b>Window comparator mode</b>	Adjustable (1 to 8 digits)					
<b>Response time</b>		$\leq 2.5$ ms (anti-vibration function: 25 ms, 100 ms, 250 ms, 500 ms, 1000 ms and 1500 ms selection)					
<b>Output short circuit protection</b>		Yes					
<b>7 segment LCD display</b>		Two colour (red / green) main display, orange sub-display (refresh rate: 5 times / 1 sec.)					
<b>Indicator accuracy</b>		$\leq \pm 2\%$ F.S. $\pm 1$ digit (ambient temperature: $25 \pm 3^\circ\text{C}$ )					
<b>Switch ON indicator</b>		Orange OUT 1 / OUT 2 (PNP2 only)					
<b>Analog output (voltage power) (PNP version only)</b>		Output voltage: 1 to 5 V $\leq \pm 2.5\%$ F.S. (within rated pressure range), linearity: $\leq \pm 1\%$ F.S. / Output impedance: approx. 1 k $\Omega$					
<b>Environnement</b>	<b>Enclosure</b>	IP40					
	<b>Ambient temp. range</b>	operation: $0 - 50^\circ\text{C}$ / storage: $-10 - 60^\circ\text{C}$ (no condensation or freezing)					
	<b>Ambient humidity</b>	Operation / Storage: 35-85% RH (no condensation)					
	<b>Permissible voltage</b>	1000 V AC in 1-min (between case and lead wire)					
	<b>Insulation resistance</b>	50 M Ohm min. (at 500 V DC, between case and lead wire)					
	<b>Vibrations</b>	Total amplitude 1.5 mm or 10 G, 10 Hz-150 Hz-10 Hz scan for 1 minute, two hours in each direction of X, Y and Z					
	<b>Shocks</b>	100 m/s <sup>2</sup> (10 G), 3 times each in direction of X, Y and Z					
<b>Temperature characteristic</b>		$\leq \pm 2\%$ F.S. of detected pressure ( $25^\circ\text{C}$ ) at temp. range of $0 - 50^\circ\text{C}$					
<b>Port size</b>		G1/8", M5-F					
<b>Lead wire</b>		Oil-resistance cable (0.15 mm <sup>2</sup> )					
<b>Weight</b>		Approx. 45 g (with M8, 4-pin male connector)					

### Advantages

- 3-colour digital LCD display, easy readability.
- 6 pressure units available (kPa, bar, psi, inHg, mmHg, kgf/cm<sup>2</sup>).
- PNP version:
  - 1 PNP digital output (NO or NC).
  - 1 analog output (1-5V).
- PNP2 version:
  - 2 PNP digital outputs (NO or NC).
- Double display showing the measured value and threshold value at the same time.
- "Key lock function" with indicator light, «Lock» mode with light indicator to prevent an accidental misadjustment.
- "Power-save function" with indicator light.
- 3 mounting solutions.

### Panel Description



- 1 - 2-colour main display
- 2 - Lock indicator
- 3 - Output 1 indicator
- 4 - Button
- 5 - Setting button
- 6 - Button
- 7 - Output 2 indicator (PNP2 version)
- 8 - Setting mode (sub-display section)
- 9 - Pressure unit display section



For all orders, please specify:  
**Model.**  
Example: PSD100CPNP

1: Model	2: Electrical connection	3: Outputs
PSD100CPNP	M8 connector	1 digital output PNP 1 analog output
PSD100LPNP2	2 m cable	2 digital outputs PNP

### Accessories

- CDM8: M8 Female connector – 4 poles, 2 m.
- PSDFIXA: Vertical attachment bracket.
- PSDFIXB: Horizontal attachment bracket.
- PSDFIXC: Front attachment kit.
- PSDFIXD: Front attachment kit + front protective lid.



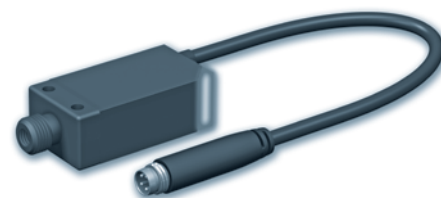




# PSP 100 CX

## Electronic Vacuum Switch

The electronic vacuum switch PSP100CX integrates standard threshold and hysteresis adjustment. It is equipped with two vacuum connections (G1/8"-Male, M5-Female) and an M8 connector 4-pin for electrical connection.



Industry-specific application

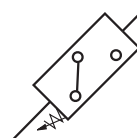


### Specification

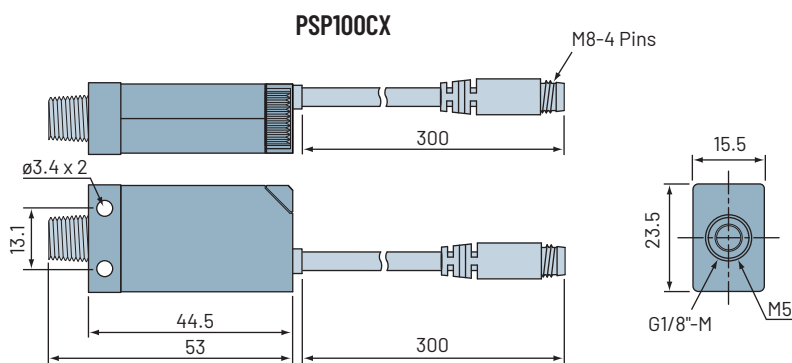
<b>Models</b>	<b>PSP100CX</b>
<b>Compatible fluids</b>	All non-corrosive, filtered, non-lubricated gases
<b>Supply</b>	Regulated 12-24 V DC, polarity inversion protection
<b>Current consumed</b>	< 21 mA
<b>Transistor output</b>	NO 80 mA with 24 VDC
<b>Thermal drift</b>	± 3% of the measuring scale between 0 and 50°C / 32 and 122°F
<b>Output viewing</b>	LED
<b>Response time</b>	< 5 ms
<b>Threshold adjustment</b>	By 3/4 turn potentiometer
<b>Hysteresis adjustment</b>	0 to 10% adjustment by 3/4 turn potentiometer
<b>EMC</b>	Industrial standard class B
<b>Materials</b>	PA 66 and brass
<b>Temperature</b>	Operation: 0 to 50 °C / 32 to 122 °F Storage: -20 to 60 °C / -4 to 140 °F
<b>Protection</b>	IP 40
<b>Electrical connection</b>	M8 connector 4-pin (cable length: 0.3 m)
<b>Pneumatic connection</b>	G1/8"-M or M5-F
<b>Weight</b>	22 g
<b>Adjustment range</b>	0 to -1 bar

### Advantages

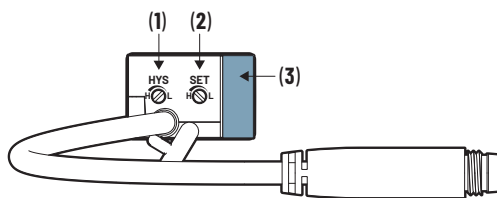
- 1 adjustable digital output
- Adjustable hysteresis
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar
- PNP



### Dimensions



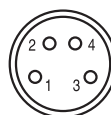
- (1) Hysteresis adjustment  
(2) Threshold adjustment  
(3) Threshold display LED



### Additional Information

#### Electrical connections

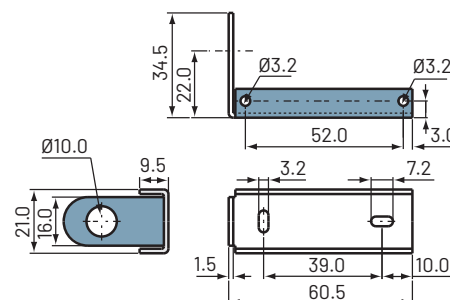
- M8 connector 4-pin (cable length: 0.3 m)



- 1 = + 24 V - Brown  
2 = -  
3 = 0 V - Blue  
4 - Contact - Black

### Accessories

- Vacuum switch attachment - Clip Part No: PSEF



#### Accessories

- Straight or angled connector, see page 11/12.
- Mounting on vacuum pump:
  - GVP series: GVOPSP100CX
  - GEMP series: VB option

Note: all dimensions shown in (mm)



For all orders, please specify: PSP100CX



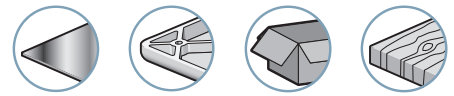
# PSP 100 ANA

## Electronic Vacuum Switch Analog Output



The PSP 100 ANA contains an analog output. It is fitted with 2 vacuum connections as standard (G1/8" male or M5 Female) and one M8 electrical connector.

Industry-specific applications



### Specifications

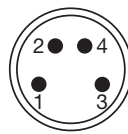
<b>Compatible fluids</b>	All filtered, non-corrosive, non-lubricated gases
<b>Supply</b>	24 V DC (18 V DC min / 30 V DC max)
<b>Current draw</b>	< 20 mA
<b>Analog output</b>	1 to 5 VDC from 0 to -1 bar
<b>Thermal drift</b>	± 3% of the measuring scale between 0 and 50°C
<b>Response time</b>	< 5 ms
<b>EMC</b>	Industrial standard Class B
<b>Materials</b>	PA 66 and brass
<b>Temperature</b>	Operation: 0 to 50 °C / 32 to 122 °F Storage: -10 to 60 °C / 14 to 140 °F
<b>Protection</b>	IP 50
<b>Electrical connection</b>	M8 connector (4 pins)
<b>Pneumatic connection</b>	G1/8" Male and M5 Female
<b>Weight</b>	22 g

### Advantages

- 1 analog output from 1 to 5 VDC
- Measuring range: 0 / -1 bar
- Overpressure: +3 bar max.
- PNP

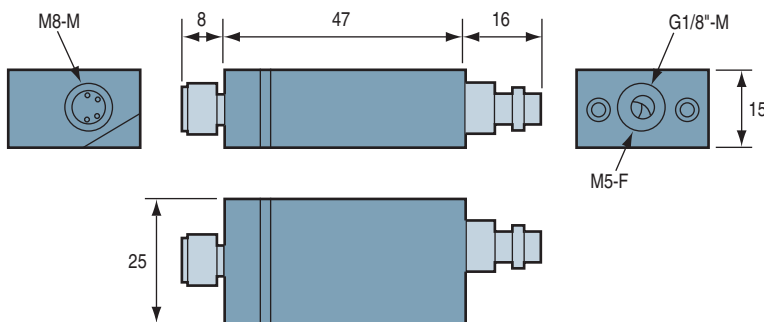
### Electrical connections

- M8 connector



- 1 = + 24 V (Brown)
- 2 = analog output from 1 to 5 VDC (white)
- 3 = 0 V common (blue)
- 4 = -

### Dimensions



Note: all dimensions shown in (mm)

### Accessories

- Straight or elbow connector, see page 11/12.

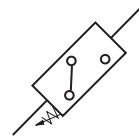


For all orders, please specify: PSP 100 ANA



- It is adapted to all electrical automated systems.
- The choice between the NO or NC function is made during wiring.

Models	Two versions: PSE 100 E and PSE 100 EC
Compatible fluids	All non-corrosive gases
Switching power	250 V - 5 A with cable 250 V - 3 A with M12 connector
Electrical connection	M12 female connector or 3 wire PVC cable, length 2 m
Adjustment range	-400 mb to -800 mb
Precision	3%
Hysteresis	125 mb
Repetitivity	< 3% of the whole range
Maximum speed	30 cycles per minute
Permissible overpressure	2 bar (destructive at 5 bar)
Mechanical endurance	5 x 10 <sup>6</sup> operations
Materials	Body: Polyacetal - Vacuum sensor: nitrile membrane
Protection	IP 54 with hollow shaft connected - IP 40 without this fitting
Weight	PSE 100 E: 165 g and PSE 100 EC: 37 g
Temperature	-10 °C to 80 °C / 14 °F to 176 °F

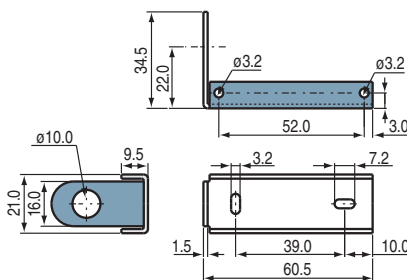



- 
- A diagram showing a cable with a central core and four twisted pairs. A vertical dashed line on the left indicates a cross-section of the cable.

- Straight PVC cable, 2 meters: Part No CD M12.  
Elbow PVC cable, 2 meters: Part No CC M12.  
See page 11/12.

- (1) Adjustment screw
- (2) Atmospheric pressure hollow shaft fitting for tube, inside Ø 2.7mm
- (3) M12 male connector
- (4) Approx. 2 meters
- (5) Cable, 3 conductors
- (6) Vacuum

### Vacuum switch attachment - Clip Part No: PSE.F



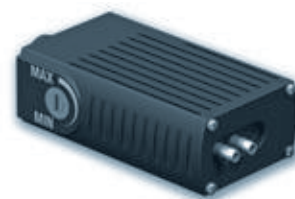
 **For all orders, please specify:  
Model + Version.  
Example: PSE100EC**

<b>1: Model</b>	<b>2: Version</b>	
<b>PSE 100 E</b>	-	PVC cable, length 2m
	C	M12 connector



# PSE 100 P

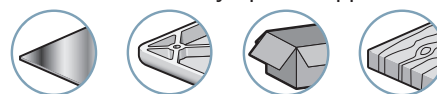
## Pneumatic Vacuum Switch



The PSE 100 P series vacuum switch with pneumatic output allows the vacuum level in the system to be checked by means of a patented system

This vacuum switch exists in two versions: NO version recommended for the "air saving" function on a venturi and NC version for the "safety" function (object detected, etc.) and "SFC signal".

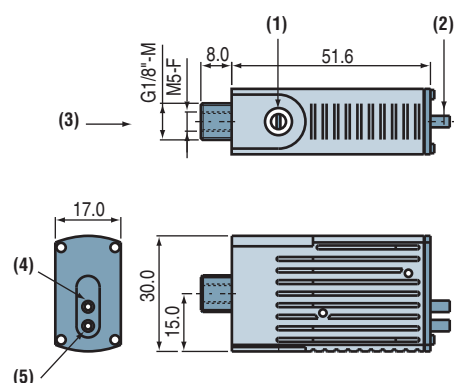
Industry-specific applications



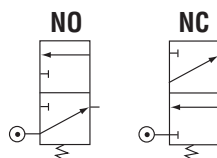
### Specifications

<b>Models</b>	<b>Two versions: NO and NC</b>
<b>Compatible fluids</b>	All non-corrosive gases
<b>Operating pressure</b>	2 to 6 bar
<b>Adjustment range</b>	-400 mb to -800 mb
<b>Precision</b>	3%
<b>Hysteresis</b>	80 to 100 mb
<b>Repetitivity</b>	< 3% of the whole range
<b>Maximum speed</b>	30 cycles per minute
<b>Permissible overpressure</b>	2 bar (destructive at 5 bar)
<b>Mechanical endurance</b>	5 x 10 <sup>6</sup> operations
<b>Materials</b>	Body: Polyacetal - Vacuum sensor: nitrile membrane
<b>Weight</b>	32 g
<b>Temperature</b>	-10 °C to 80 °C / 14 °F to 176 °F
<b>Flow rate at 6 bar</b>	70 NI/min

### Dimensions



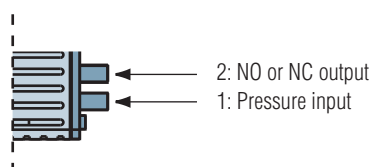
- (1) Vacuum threshold - Adjustment screw
- (2) Hollow shaft for tube, inside Ø 2.7 mm
- (3) Vacuum
- (4) NO or NC output
- (5) Pressure input



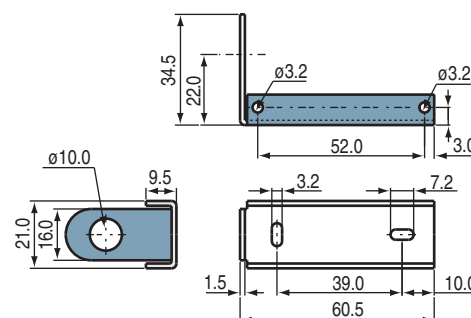
### Additional Information

- Mounting as GVO option in the GVP / GEMP vacuum pump range.

### Pneumatic connection



Vacuum switch attachment - Clip Part No: PSE.F



 For all orders, please specify:  
Model + Version.  
Example: PSE100PNO

1: Model	2: Version
PSE 100 P	NO Normally Open (NO)
	NF Normally Closed (NC)

Note: all dimensions shown in (mm)



# PSE 100 PK

## Pneumatic Vacuum Switch



The PSE 100 K vacuum switch with pneumatic output is used to check the vacuum level in the circuit.

It is recommended for measuring slowly changing vacuum levels such as regulating or checking vacuum levels in networks over 1 liter.

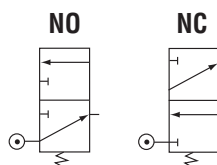
This vacuum switch exists in two versions: NO version recommended for the "air saving" function on a venturi and NC version for the "safety" function (object detected, etc.) and "SFC signal".

Industry-specific applications

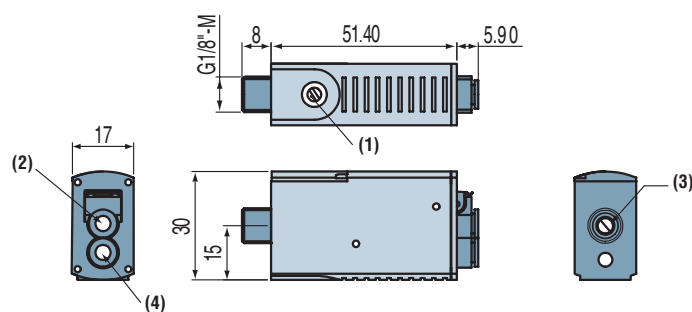


### Specifications

Models	Two versions: NO and NC
Compatible fluids	All non-corrosive, non-lubricated gases
Operating pressure	2 to 6 bar
Adjustment range	NF: -250 to -830 mb, NO: -350 to -880 mb
Precision	± 10 %
Hysteresis	NF: 10 mb - NO: 200 mb
Repetitivity	< 3% of the whole range
Maximum speed	30 cycles per minute
Permissible overpressure	2 bar (destructive at 5 bar) (on vacuum measuring orifice)
Mechanical endurance	5 x 10 <sup>6</sup> operations
Materials	Body: Polyacetal - Vacuum sensor: nitrile membrane
Weight	32 g
Temperature	-10 °C to 80 °C / 14 °F to 176 °F
Flow rate at 6 bar	66 NI/min



### Dimensions



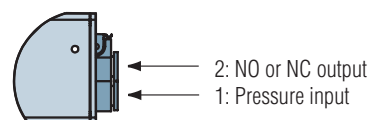
- (1) Vacuum threshold adjustment  
(2) Signal output, NC or NO tube

- (3) M5 Vacuum input  
(4) Pressure input Ø4 tube

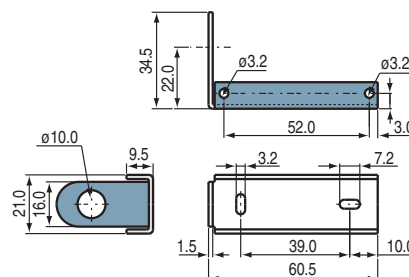
### Additional Information

- Mounting in GVO option in the GVP / GEMP vacuum pump range.

#### Pneumatic connection



Vacuum switch attachment - Clip Part No: PSE.F



Note: all dimensions shown in (mm)



For all orders, please specify:  
Model + Version.  
Example: PSE100PKNO

1: Model	2: Version
PSE 100 PK	NO Normally Open (NO)
	NF Normally Closed (NC)



# VAF 111

## Vacuum Gauge

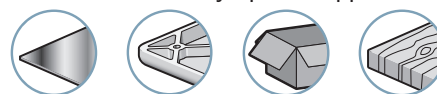


VAF 111 series vacuum gauges are recommended for visually checking the vacuum level for maintenance, monitoring and adjustment purposes.

They are mounted as options on modular vacuum pumps GVP series, reference GVO VAF11140.

See page 7/6.

Industry-specific applications



### Characteristics

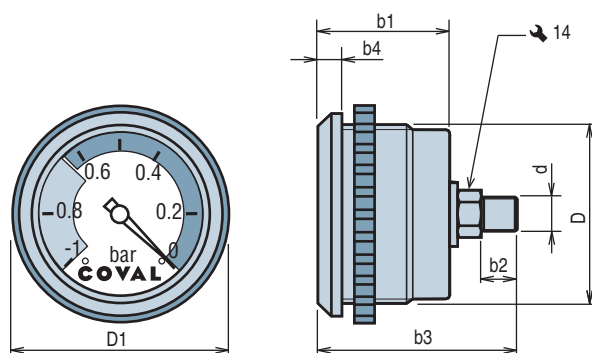
Models	D <sup>(1)</sup>	D1	b1	b2	b3	b4	d
VAF 111 40	40	43	32.5	12	52	4	G1/8"-M
VAF 111 50	50	54	32.5	12	52	4	G1/4"-M
VAF 111 63	63	68	32.5	12	52	4	G1/4"-M

(1) Flush-mounting diameter.  
All dimensions shown in (mm)

### Specifications

Damping	By silicone movement - Patented
Ring	Chrome
Measuring	Bourdon tube in CuSn
Precision	cl.2.5 (± 2.5% of max. scale value)
Housing	Black ABS
Temperature	0 to 60°C / 32 to 140°F
Flush-mounting	Ring included in the delivery
Option	as per quantity, possibility of customized dial.

### Dimensions



For all orders, please specify:  
Model + Version.  
Example: VAF11150

1: Model	2: Version
VAF 111	40 Ø 40 mm
	50 Ø 50 mm
	63 Ø 63 mm







# Gripping Solutions

## Chapter 13

### CVGC

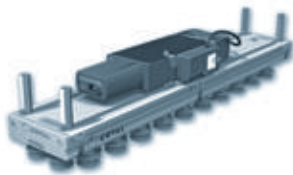


#### Carbon Vacuum Grippers for Collaborative Robots

- 3 standard formats (150x150, 240x120, 320x160 mm)
- Ultra-light and compact, due to their carbon design
- Foam gripping interface
- Plugin URCap
- Simple and efficient integration into collaborative robots
- Integrated Vacuum generator and vacuum switch
- Wide range of connections and gripping interface for a simplified installation

**P** 13/2

### CVGL



#### Compact and Light Vacuum Grippers

- 3 standard lengths (424, 624, 824 mm)
- Light and compact
- Configurable gripping interface (foam, suction cups, COVAL-flex)
- IO-Link and NFC communication interface
- Configurable following applications
- Random Gripping of various products
- Vacuum generators integrated or separated
- HMI as option
- Adaptable to all activity sectors

**P** 13/6

### MVG



#### Modular Vacuum Grippers

- Custom sizing from 150x150 to 1200x1000 mm
- Ultra-light
- Configurable gripping interface (foam, suction cups, COVAL-flex)
- Multi-zone
- IO-Link and NFC communication interface
- Thanks to their high degree of modularity, The MVGs vacuum grippers provide the optimal handling solution for products of varied sizes, shapes and weight,
- Staggered or multiple grip/release
- External or independant vacuum generation
- HMI as option
- Adaptation to all activity field

**P** 13/24

### CSGS



#### Bags/sacks Gripping System

- 2 suction cups sizes are available
- 2 lifting capacity: 35 and 60 kgs
- 4 suction power
- Robust and compact
- The CSGS is a complete assembly, suction cup + vacuum pump, for paper or plastic sacks handling of 25 to 60 kgs load
- Quick and economical installation

**P** 13/42

NFC )))  IO-Link

NFC )))  IO-Link





With their innovative design, Coval's **CVGC** carbon vacuum grippers correspond perfectly to the weight constraints, flexibility and safety of collaborative robot applications.

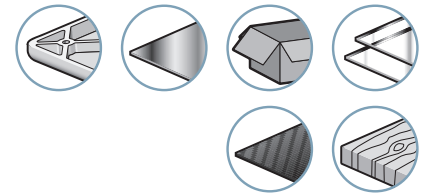
The **CVGC** series is composed of:

- a carbon structure, 2.5 times lighter than aluminum and offering mechanical strength 6 times greater
- flexible material on the gripper edges, to protect both gripper and operator
- foam gripping interface, for versatile product handling
- a plastic "function" block, including vacuum generator, pilot control cartridge, silencer and vacuum switch...

... all this, in a very compact and ultralight design, guarantees a fast setup and easy integration on the robot.

The three standard formats allow you to choose your **CVGC** and ensure the handling of your loads: corrugate, plastics, metal/glass plates, etc.

Industry-specific applications



### Advantages

- Ultra-light and compact, due to their carbon design.
- Suitable for collaborative robot applications, heavy-duty robots and special machines.
- Fully integrated, allowing for an easy and fast installation.

### Characteristics

	Dimensions L x W x H (mm)	Air drawn in (NI/min)	Air consumed (NI/min)	Capacity <sup>(1)</sup> (kg)	Weight <sup>(2)</sup> (kg)
<b>CVGC 150X150</b>	150 x 150 x 90	90	135	30	0.8
<b>CVGC 240X120</b>	240 x 120 x 90	180	270	38	1.0
<b>CVGC 320X160</b>	320 x 160 x 90	210	345	68	1.3

(1) Indicative force for a vacuum gripper with foam interface covered 100% by the load, including a safety factor of 2 for horizontal handling and rigid, airtight surface.

(2) Weight indicated for a gripper with A31 or A50 mounting. For a gripper with A63 mounting, add 136 g.

**URCap plugin**  
available for e-Series robots



### Applications

The **CVGC** vacuum gripper provide a unique solution for the handling of products in various industrial sectors:

- Packaging
- Plastics
- Metal
- Glass
- Composite
- Wood







#### Ultra-light

Carbon design guarantees strength, rigidity and an unmatched lightness.

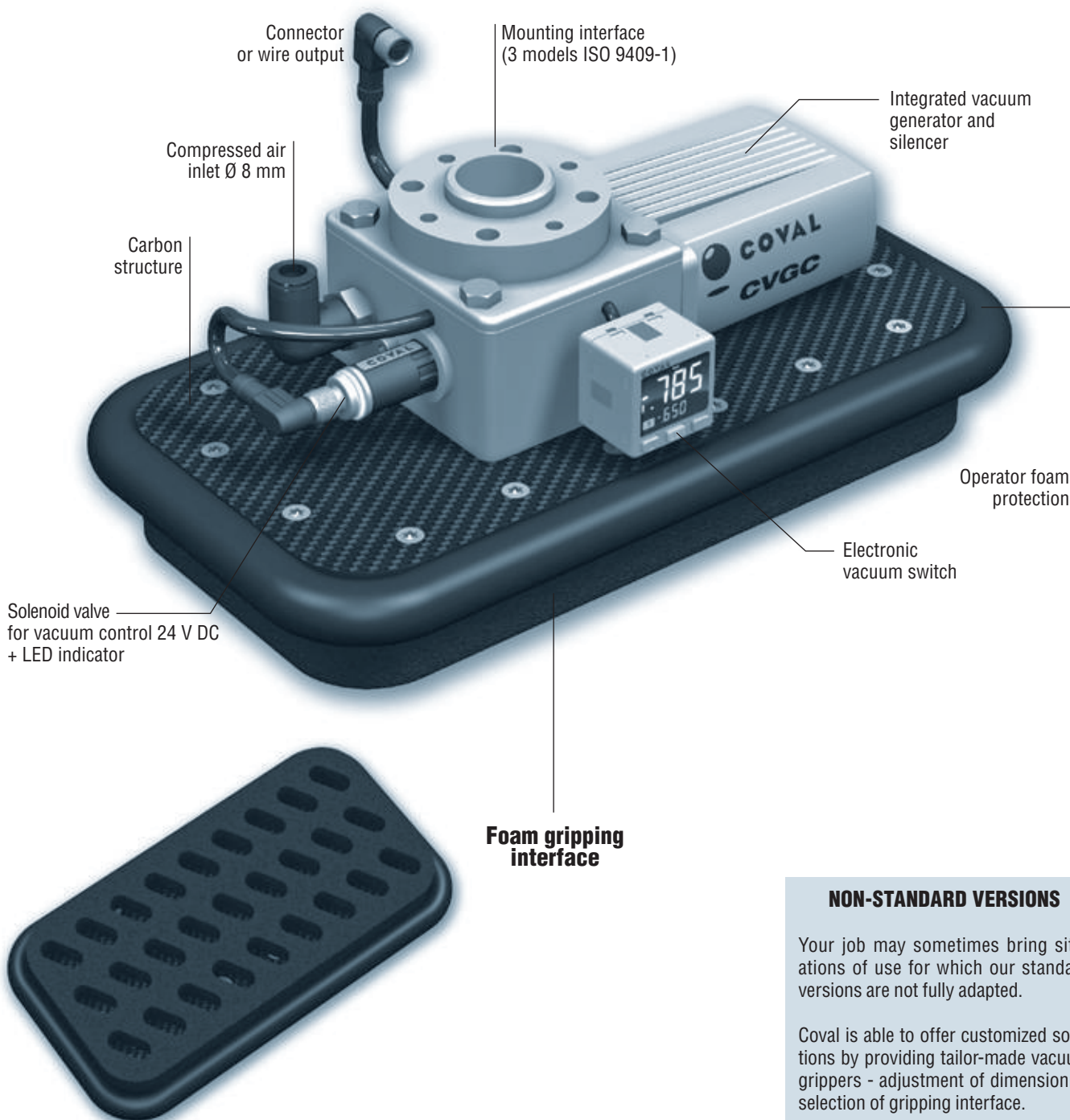


#### Vacuum Generator Integrated



#### 3 Standard Formats

150 x 150 mm  
240 x 120 mm  
320 x 160 mm



#### NON-STANDARD VERSIONS


Your job may sometimes bring situations of use for which our standard versions are not fully adapted.

Coval is able to offer customized solutions by providing tailor-made vacuum grippers - adjustment of dimension or selection of gripping interface.



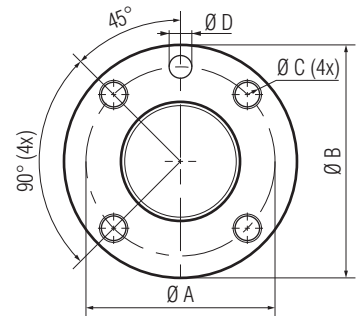


#### To Order

	<b>CVGC</b>	<b>240X120</b>	<b>A50</b>		<b>C1</b>
<b>DIMENSIONS</b>			<b>ISO 9409-1 ROBOT MOUNTING INTERFACE</b>		<b>ELECTRICAL CONNECTIONS</b>
150 x 150 mm	<b>150X150</b>		<b>A31</b>	ISO 9409-1-31.5-4-M5	<b>C1</b> M8 - Female 8-pins
240 x 120 mm	<b>240X120</b>		<b>A50</b>	ISO 9409-1-50-4-M6	<b>C2</b> M8 - Male 5-pins
320 x 160 mm	<b>320X160</b>				<b>C3</b> M8 - Male 8-pins
					<b>C4</b> Wire outlet 2 m.
					<b>C5</b> Wire outlet 5 m.
			<b>A63</b>	ISO 9409-1-63-4-M6	<b>C6</b> Molex connector 8-pins

#### ISO 9409-1 Robot Mounting Interface

Version	Standard	Ø A (mm)	Ø B (mm)	Ø C (mm)	Ø D (mm)	
<b>A31</b>	ISO 9409-1-31.5-4-M5	31.5	40	M5 (4 screws)	5	Fanuc CR-4, CR-7, CR-7 A/L, CR-14 A/L
<b>A50</b>	ISO 9409-1-50-4-M6	50	63	M6 (4 screws)	6	Universal Robots UR3, UR5, UR10, UR16 + e-Series Omron/Techman TM5, TM12, TM14 Doosan Robotics A0509, A0509S, A0912, A0912S, M0609, M0617, M1013, M1509, H2017, H2515 Fanuc CRX10-iA
<b>A63</b>	ISO 9409-1-63-4-M6	63	80	M6 (4 screws)	6	Yaskawa HC10, HC10DT



#### Electrical Connections

- **C1:** M8 connector - female 8-pins elbow, cable length 150 mm

Universal Robots CB3 UR3, UR5, UR10 + e-Series UR3e, UR5e, UR10e, UR16e (URCap plugin available) / Fanuc CRX10-iA

1	"Vacuum level" signal analogic 1 to 5 V DC
2	-*
3	-*
4	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
5	+24V DC permanent
6	-*
7	Vacuum Control 24 V DC PNP/NPN
8	0 V - GND

\* not used in this configuration

- **C2:** M8 connector - male 5-pins elbow, cable length 150 mm

Omron/Techman TM5, TM12, TM14

1	+24V DC permanent
2	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
3	Vacuum Control 24 V DC PNP/NPN
4	"Vacuum level" signal analogic 1 to 5 V DC
5	0 V - GND

- **C3:** M8 connector - male 8-pins elbow, cable length 150 mm

Doosan Robotics A0509\*, A0509S\*, A0912\*, A0912S\*, M0609, M0617, M1013, M1509, H2017, H2515  
\* Robots manufactured since 21-JAN-2021

1	"Gripped product" switching output 24 V DC PNP/NPN NO or NC
2	Vacuum Control 24 V DC PNP/NPN
3	-*
4	-*
5	+24V DC permanent
6	-*
7	-*
8	0 V - GND

\* not used in this configuration

- **C4 / C5:** 5-wire output, cable length 2 m (C4) or 5 m (C5)

Fanuc CR-4, CR-7, CR-7, CR-7 A/L, CR-14 A/L + any application requiring cables to be routed outside the robot arm + any robot whose housing connection does not match C1/C2/C3/C6.

1	Brown: +24V DC permanent
2	Blue: 0 V - GND
3	Black: "Gripped product" switching output 24 V DC PNP/NPN NO or NC
4	White: Vacuum Control 24 V DC PNP/NPN
5	Grey: "Vacuum level" signal analogic 1 to 5 V DC

- **C6:** Molex 8-pole connector, 50 mm long cable.

Yaskawa HC10, HC10DT (+ analog I/O card if required).

1	Brown: +24V DC permanent
2	Blue: 0 V - GND
3	Black: "Gripped product" switching output 24 V DC PNP/NPN NO or NC
4	White: Vacuum Control 24 V DC PNP/NPN
5	Grey: "Vacuum level" signal analogic 1 to 5 V DC
6	-*
7	-*
8	-*

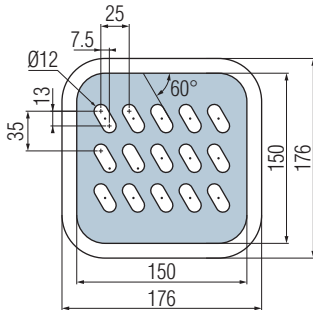
\* not used in this configuration



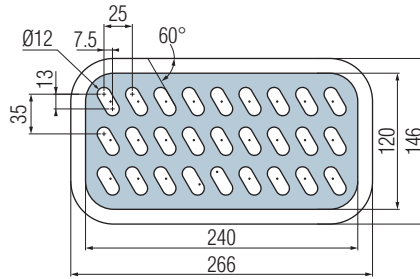


#### Dimensions

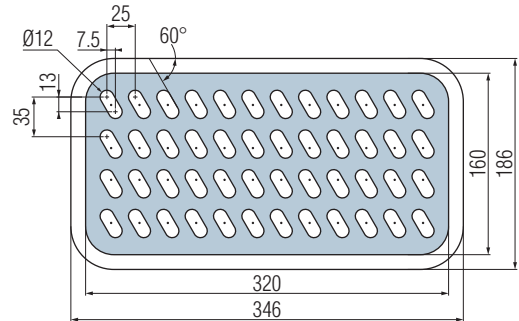
**CVGC150X150A**



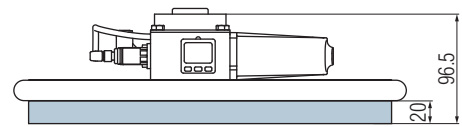
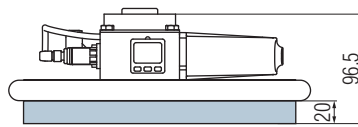
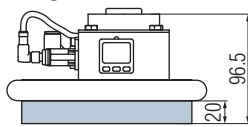
**CVGC240X120A**



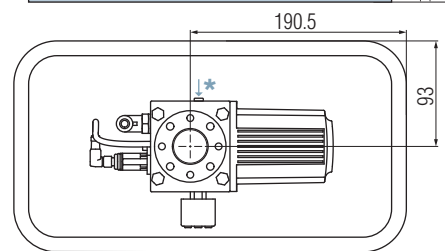
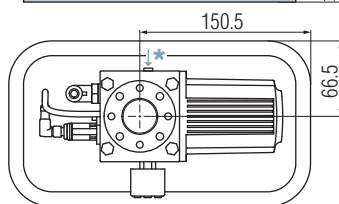
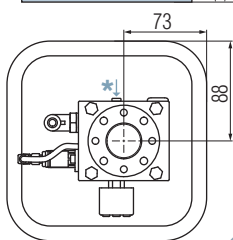
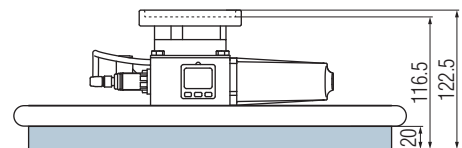
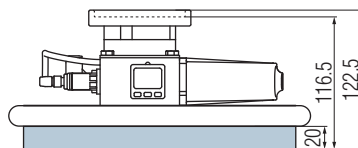
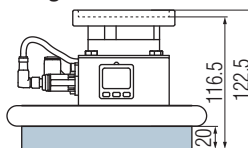
**CVGC320X160A**



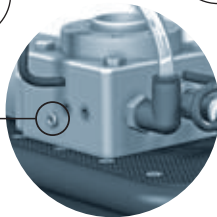
#### Mounting interfaces A31 or A50



#### Mounting interface A63

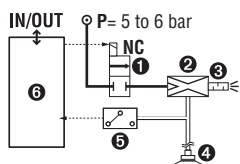


\* M5 connection for external blow-off (M5 connector)



Note: All dimensions are in mm.

#### General Characteristics



- 1 "Vacuum" solenoid valve
- 2 Venturi
- 3 Through-type silencer
- 4 Foam gripping interface
- 5 Electronic vacuum switch
- 6 Input / Output board

- Supply: non-lubricated air, 5 microns filtered, according to ISO 8573-1:2010 [4:5:4].
- Operating pressure: from 5 to 6 bar
- Optimal pressure:
  - CVGC 150x150 : 5.5 bar
  - CVGC 240x120 : 6 bar
  - CVGC 320x160 : 6.4 bar
- Maximum vacuum: 85%.
- Vacuum command light: orange LED
- Electric protection grade: IP40
- Control voltage: 24 V DC +/-10%
- Vacuum control: 24 V DC PNP/NPN

- Power consumption: 65 mA (no load)
- The switching type of the inputs / outputs is configurable to PNP or NPN
- Outputs:
  - 1 x "Vacuum level" signal analogic 1 to 5 V DC (depending on robot model, see "Electrical Connections" section)
  - 1 x "Gripped product" switching output 24 V DC PNP/NPN NO or NC (125 mA max.)
- Service life: 30 million cycles
- Operating temperature: from 0 to 50° C.
- Materials:
  - Gripper: carbon, PA 6.6 15% FG, brass, stainless steel, PETP.
  - Valve: aluminum, steel, NBR.
  - Foam gripping interface: EPDM.
- Noise level:
  - CVGC 150x150: 72 dBA
  - CVGC 240x120: 71 dBA
  - CVGC 320x160: 66 dBA

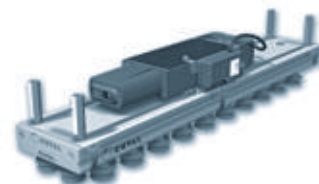
The values represent the average characteristics of our products.



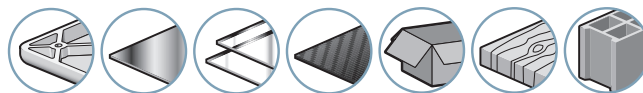
With the CVGL series, COVAL introduces a universal solution to the vacuum gripper that is flexible, simple, and economical.

Handling parts of various sizes, shapes, and weights is no longer a complex, costly, and time-consuming task.

With a single CVGL module easily integrated into the process, the user can simply and safely perform random gripping of assorted parts.



Industry-specific applications



### Advantages

The CVGL series is composed of standard subassemblies which allow COVAL to offer a tailor-made solution meeting the specific application requirements of integrators and end users:

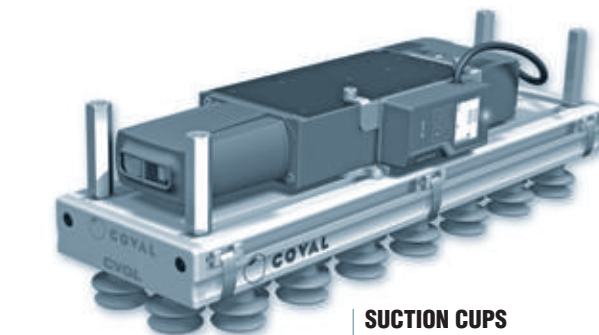
- Compact
- Lightweight
- Integrated functions
- Communicating
- Modularity
- Performance
- Ease of use
- Universal mounting

### A Complete System

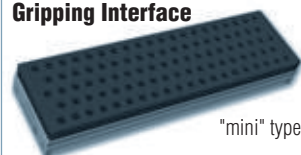
Simply configure your CVGL vacuum gripper:

- 1 light and robust aluminum profile
- 1 universal mounting system
- 3 standard lengths (424, 624, 824mm)
- 3 suction levels
- 3 gripping interface technologies
- 3 standard hole/cup patterns
- 3 flow control technologies
- 2 control versions (vacuum and blow-off)
- 2 solutions for vacuum display
- + The Vacuum Manager experience of COVAL

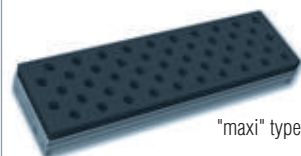
**= YOUR CVGL SOLUTION**



### FOAM Gripping Interface



"mini" type



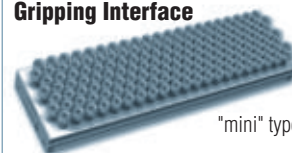
"maxi" type

### "COVAL-flex" Gripping Interface

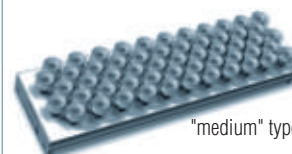


COVAL-flex

### SUCTION CUPS Gripping Interface



"mini" type



"medium" type



"maxi" type  
1.5 bellows suction cups



"maxi" type  
2.5 bellows suction cups

### Applications

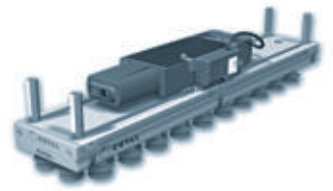
The CVGL series vacuum grippers offer a single solution for the handling of products in multiple industrial sectors:

- Packaging
- Plastics
- Metal
- Glass
- Concrete/stone
- Composites
- Wood

The adaptability and the flexibility of COVAL CVGL Series vacuum grippers responds to numerous robotic applications.







#### Modular Grippers



**Ultra-light**  
Reduced payload weight



**External or integrated vacuum generation**



**3 standard lengths**  
424, 624, and 824 mm



**3 flow control technologies**



**Configurable gripping interface**  
depending on the products to be handled



**Communication and Control**

- Digital inputs/outputs (SIO)/IO-Link
- HMI
- NFC

G1"-F connection for external vacuum generator (electric or pneumatic)

CMS HDE series integrated vacuum generator

Vacuum display:

- HMI
- vacuum gauge
- electronic vacuum switch

LENGTH: 424, 624, or 824 mm

Extra-thin aluminum profile with T-shaped lateral groove.

Gripper optimization with flow control technologies

Flexible Gripping Interface  
**COVAL-flex**

"Suction cup" Gripping Interfaces: wide range of suction cups (shapes, diameters, materials, etc.)

"Foam" Gripping Interfaces

#### Gripper interface quick change system, ref: CVGL \_\_\_\_ C

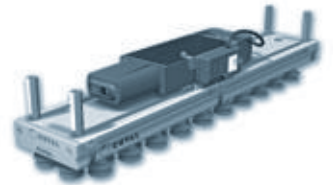
To simplify maintenance and increase the flexibility of the CVGL series vacuum grippers, COVAL has developed an ultra-compact and easy-to-use solution for replacing the gripper interface. Very straightforward, the spring-loaded clips allow you to replace a worn or damaged gripper interface in a matter of seconds, or to install another type of interface (foam / suction cups / COVAL-flex).

Number of clips according to the length of the gripper:

- CVGL424: 6 clips.
- CVGL624: 8 clips.
- CVGL824: 10 clips.







#### Multi-zone

CVGL vacuum grippers can create independent gripping zones, guaranteeing optimization of vacuum management (increased vacuum level, reduced leaks and energy consumption).

- Staggered grip/release points.
- Management of formats to be handled.
- Pallet Layer Optimization.
- Simple or multiple grip/release points.

As each multi-zone application is different, COVAL will work with you to determine the best configuration for your process.

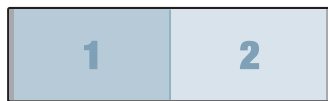
Examples of configuration:



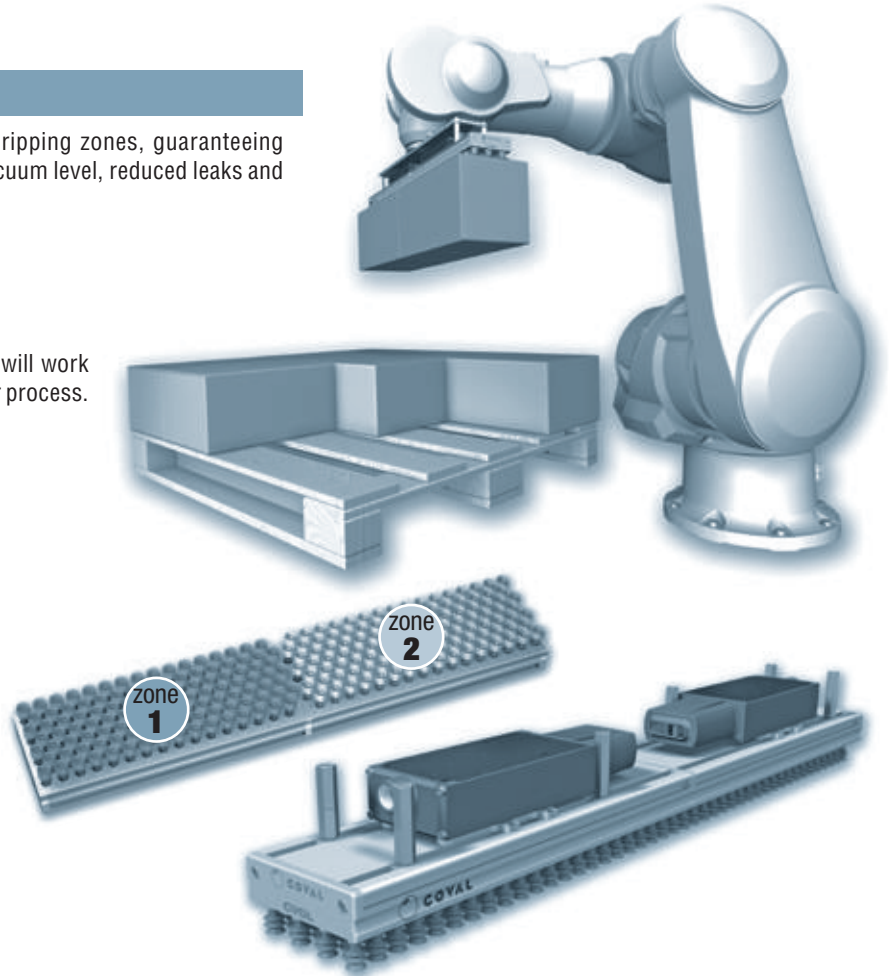
CVGL with 2 zones



CVGL with 3 zones



CVGL with 2 zones



#### Ultra-light and compact design

The main design objective of the CVGL vacuum gripper is to minimize space and weight, while maintaining a highly modular configuration, to meet the needs of robotic applications.

Thanks to COVAL's aluminum profile, the CVGL vacuum grippers fully meet this objective. The ultra-thin profile allows for easy integration on robots.

The CVGL profile integrates the vacuum connections on the upper part, which provides greater compactness, as well as a T-slot on the side for mounting additional accessories such as sensors.

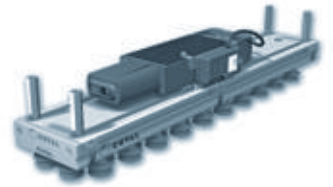
The technologies and materials used in the design of the CVGL vacuum gripper considerably reduce the on-board weight. This makes the CVGL the benchmark in its field, allowing smaller robots to be used, increasing accelerations and thus optimizing the installation in order to achieve savings.

#### Mass (in kg) depending on options

GRIPPING INTERFACE	Length (mm)	Vacuum gripper without vacuum generator (G0)	Vacuum gripper with 1 CMSHDE__50_ vacuum generator (D1)		Vacuum gripper with 1 CMSHDE__100_ vacuum generator (D2)		Vacuum gripper with 2 CMSHDE__100_ vacuum generators (D3)
			without control	with control	without control	with control	without control
<b>Foam Interface</b> <b>Mini F2S / Maxi F2B type</b> with flow control nozzles (H version)	424	1.8	2.4	2.7	2.4	2.7	–
	624	2.6	–	–	3.2	3.5	–
	824	3.4	–	–	4.0	4.3	4.6
<b>Foam Interface</b> <b>Mini F2S / Maxi F2B type</b> with airtight or check valves (E and V versions)	424	2.0	2.6	2.9	2.6	2.9	–
	624	2.8	–	–	3.4	3.7	–
	824	3.7	–	–	4.3	4.6	4.9
<b>Suction cup Interface</b> <b>Mini, Medium, or Maxi type</b> with flow control nozzles (H version)	424	2.2	2.8	3.1	2.8	3.1	–
	624	3.2	–	–	3.8	4.1	–
	824	4.1	–	–	4.7	5.1	5.3

Average values shown





### Choice of Gripping Interface

With CVGL, COVAL gives you a choice of 3 complementary gripping interface technologies: vacuum grippers with foam, suction cup grippers, and grippers with a COVAL-flex interface.

In order to optimize the performance of the CVGL series for different applications, the vacuum grippers are available in different gripping patterns, hole diameters, and cup sizes → A broad range which meets all application requirements.

#### "FOAM" Interface

- Handling of rigid products.
- Gripping textured or uneven surfaces.
- Flow control nozzles, airtight valves, or check valves.
- 2 standard hole diameters (Ø 12, 16mm).
- 2 standard hole patterns.
- 3 standard lengths (424, 624, and 824mm) or custom length.

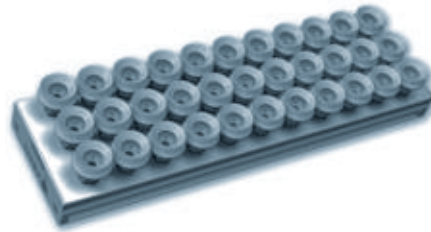
#### "SUCTION CUP" Interface

- Handling of flexible products.
- Wide range of cup options.
- Flow control nozzles in multiple diameters.
- 4 types of standard suction cups (Ø 14, Ø 25, Ø 30 and Ø 33 mm).
- 3 standard cup patterns.
- 3 standard lengths (424, 624, and 824mm) or custom length.

#### "COVAL-flex" Interface

- Handling of aluminum cans, canned food, glass containers, etc.
- Flexible interface, extremely tear-resistant.
- Hole pattern dependent upon application requirements, completely customizable.

**COVAL-flex**



### Standard Hole/Cup Patterns

In order to optimize the performance of the CVGL series for different applications, the vacuum grippers are available in different gripping patterns, hole diameters, and cup sizes.

#### "MINI" type

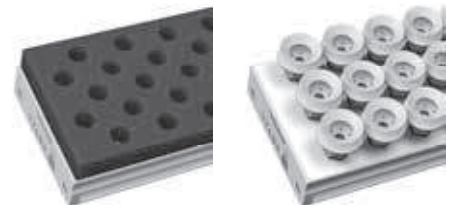
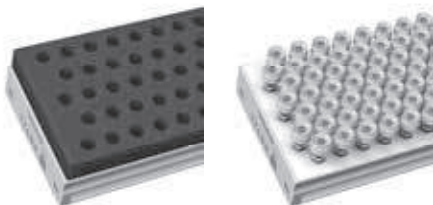
- Reduced hole spacing, allowing small, flexible pieces to be gripped.
- The multitude of gripping points guarantees a strong grip, even with random positioning of products.
- Dimensions, refer to page 18.

#### "MEDIUM" type

- An intermediate distribution of gripping points between the "mini" and "maxi" type.
- Ideal for handling dense loads with reduced gripping surface.
- Dimensions, refer to page 18.

#### "MAXI" type

- Large gripping point surfaces, allowing heavy loads to be gripped.
- Ideal for gripping parts with rigid gripping surfaces.
- Dimensions, refer to page 18.

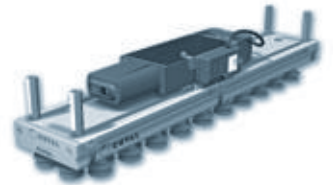


### Vacuum Gripping Force

*\* Indicative force for a vacuum gripper 100% covered by the load, without safety factor, on a rigid and airtight surface.*

Part number	Total length of the vacuum gripper (mm)	Force at 80% vacuum (N)*	Force at 45% vacuum (N)*
CVGL 424_ _ _ _	424	1035	600
CVGL 624_ _ _ _	624	1550	900
CVGL 824_ _ _ _	824	2070	1200

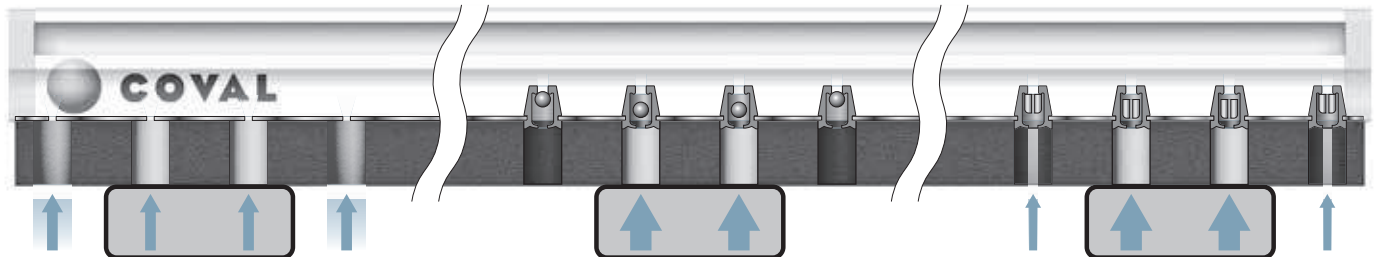




### Flow Control Technologies

COVAL offers 3 flow control technologies to optimize your vacuum gripper and perfectly respond to the constraints of your application.

The COVAL vacuum management team will assist you in the selection and configuration of your CVGL vacuum gripper.



#### Flow control nozzles

- Limits the leakage rate of uncovered zones.
- Economic solution.
- Customizable calibration.
- Horizontal and vertical handling.

#### Airtight valves (COVAL patent)

- Isolates uncovered zones.
- Provides energy savings.
- Meets specific needs.
- Instant gripping.
- Quick release to blow-off.
- Horizontal handling.

#### Check valves (COVAL patent)

- Limits the leakage rate of uncovered zones.
- Instant gripping.
- High versatility of applications.
- Quick release to blow-off.
- Horizontal handling.

### Vacuum Generation

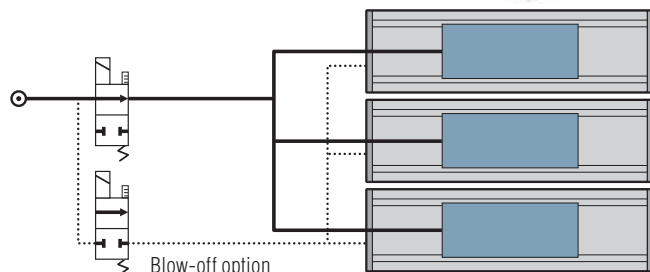
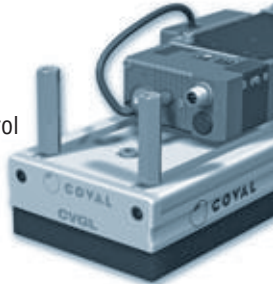
#### Integrated vacuum generator, CMS HDE Series

Integration of a multi-stage vacuum generator on the CVGL gripper provides a comprehensive and compact gripping solution, as well as easy integration in your process.

Options: integration of a vacuum and/or blow-off solenoid control valve with M12 connector and a vacuum level display (electronic vacuum switch display or vacuum gauge), or HMI with LCD display.

#### Advantages:

- A comprehensive solution.
- 3 standard sizes.
- Option: vacuum and blow-off control valve.
- Option: visual display of vacuum level.
- Option: IO-Link communication interface.



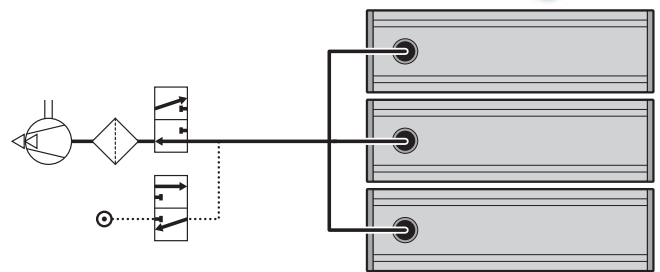
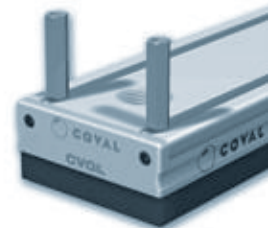
#### External vacuum generator

The CVGL vacuum grippers may also be used with an independent vacuum generator. Depending on the application, an external generator may be necessary (a blower, an electric vacuum pump or a pneumatic generator, CMS HD Series). The CVGL series vacuum gripper G0 version is equipped with a G1"-F flange allowing the vacuum source to be easily connected.

Option: integration of a vacuum level display (electronic vacuum switch display or vacuum gauge).

#### Advantages:

- Reduced weight.
- Adaptation to user environment.
- Option: visual display of vacuum level.



### Technical data of the CMS HDE series integrated vacuum generators

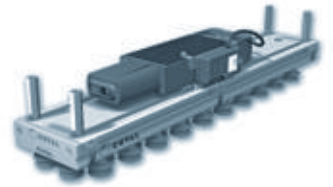
Integrated vacuum generator	Model	Consumption (NI/min)	Flow rate (NI/min)	Max. vacuum (%)	Sound level (dBA)
CVGL___D1 CMSHDE_50		220	700	80	59
CVGL___D2 CMSHDE_100		420	1100	80	62
CVGL___D3 2xCMSHDE_100		840	2200	80	65

### Generator configurations by vacuum gripper length

Vacuum generator	CVGL 424 _	CVGL 624 _	CVGL 824 _
G0	■	■	■
CMSHDE_50 (D1 Version)	■	—	—
CMSHDE_100 (D2 Version)	■	■	■
2xCMSHDE_100 (D3 Version)	—	—	■



## Compact and Light Vacuum Grippers Integrated Multi-stage Vacuum Pumps

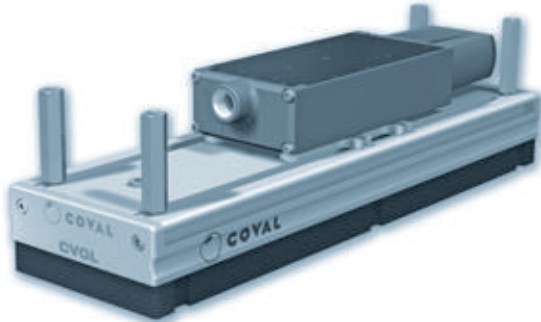


The CVGL vacuum grippers have a wide range of configurations with the CMS HDE Series multi-stage vacuum pumps, allowing for a specialized solution for each application.

### CVGL\_\_D\_N0K

CMSHDE\_\_NV0G4K multi-stage vacuum pump

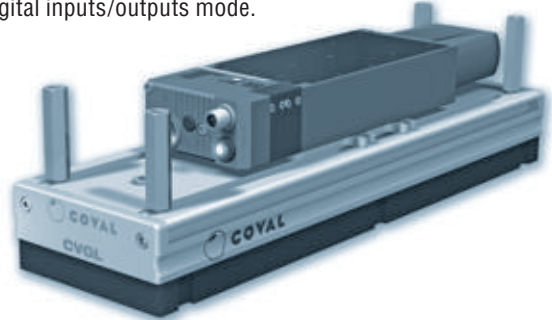
- Without control.



### CVGL\_\_D\_S1 / V1K

CMSHDE\_\_V0C15PG4K multi-stage vacuum pump

- With vacuum and blow-off control.
- Without vacuum switch.
- One M12 5-pin connector.
- Visual indicators of vacuum and blow-off controls.
- Digital inputs/outputs mode.



### CVGL\_\_D\_S2 / V2K

CMSHDE\_\_VXC15PG4KD multi-stage vacuum pump

- With vacuum and blow-off control.
- With vacuum switch, and pressure sensor.
- One M12 5-pin connector.
- One M8 4-pin connector for HMI (VI option).
- Digital inputs/outputs (SIO) / IO-Link Mode.



VI Version: Clear and efficient HMI: includes all required inputs for full operation of CMS HDE multi-stage vacuum pumps.

Gripping status indicator light (2 colors).

1.54" high-visibility color LCD display with clear multilingual messages and straightforward settings menu.

Settings keypad.



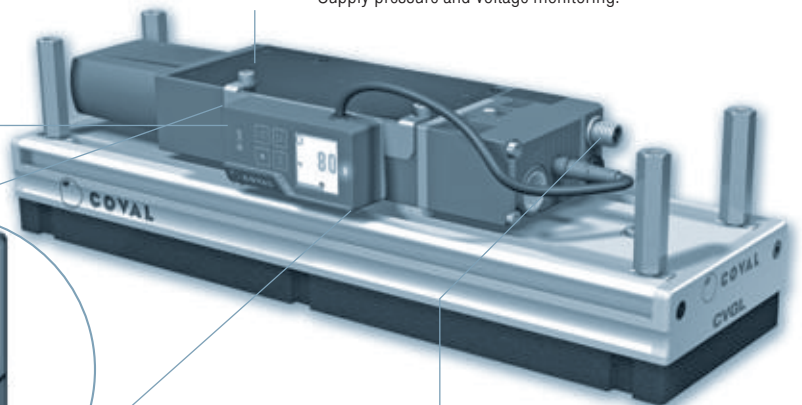
NFC )))

Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile application.



Onboard installation and diagnostic tools:

- Clog detection.
- Supply pressure and voltage monitoring.



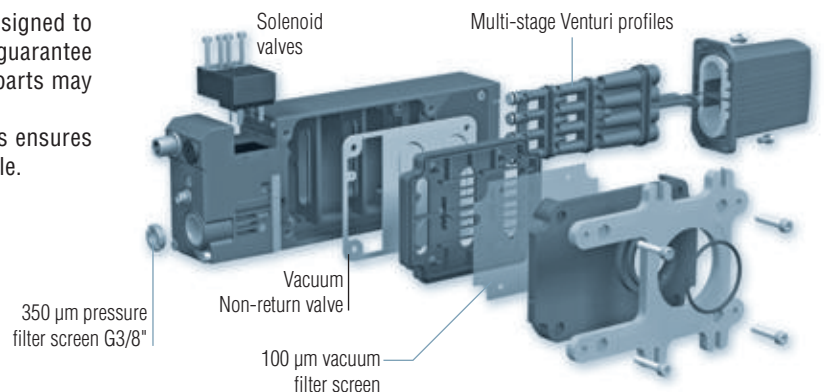
Digital inputs/outputs (SIO) / IO-Link

- M12 5-pin connector.

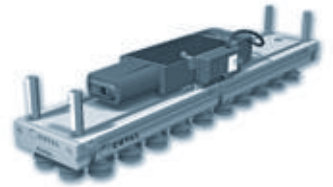
### Modularity/Maintenance

The CMS HDE multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain parts may require replacement or cleaning.

The modular design of the CMS HDE multi-stage pumps ensures easy maintenance as the functions are all easily accessible.







#### Easier Integration, Use, and Diagnostics

The **CMSHD\_\_VX** Heavy Duty multi-stage vacuum pump series includes various features that enable setup, use, and diagnostics in all situations and at all levels (operators, process, networked

factory), with the aim in mind of keeping the use and management of the pumps as straightforward as possible and thus allowing for their easy integration in your smart factory.

#### Settings, Diagnostics, and Process Data



##### CONFIGURABLE SETTINGS

- Choice of language: EN, FR, DE, IT or ES.
- "Object gripped" thresholds.
- Automatic blow-off.
- Vacuum measurement unit: kPa, %, mbar, inHg.
- Pressure measurement unit: MPa, bar, psi.
- Software updates, and more.



##### DIAGNOSTICS

- Cycle counters (vacuum and blow-off control, objects gripped, objects lost, etc.).
- Vacuum network sizing support to prevent pressure loss.
- Clogging detection function.
- Supply pressure and voltage monitoring.
- Software version.
- Product part number and serial number.



##### PROCESS INPUT DATA

- Vacuum and blow-off control.



##### PROCESS OUTPUT DATA

- Instantaneous vacuum level.
- Object gripped and object lost information.
- Alarms (high/low pressure, high/low voltage).
- Instantaneous pressure.

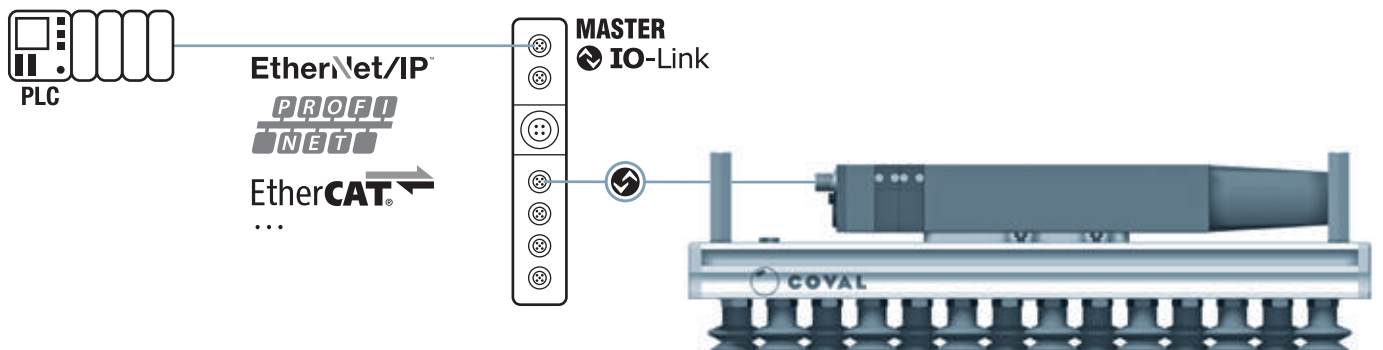


#### IO-Link

The IO-Link system provides efficient real-time communication between **CMSHD\_VXC15X** multi-stage vacuum pumps and any higher-level protocol (EtherNet/IP, PROFINET, EtherCAT, etc.) required to monitor the production line. It can be used to control pumps, configure settings, and get feedback to ensure maximum productivity.

##### Advantages:

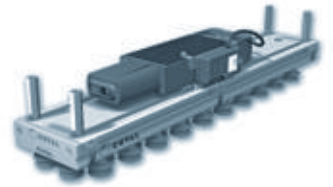
- Straightforward wiring, installation, and setup
- Availability of diagnostic status data
- Simpler preventive maintenance and vacuum pump replacement without manual setup, and more
- Onboard installation and diagnostic tools





## Compact and Light Vacuum Grippers

### Straightforward Communication



#### Mounted or Remote HMI

To facilitate the use and configuration of the vacuum generator, the CVGL range has an HMI that can be mounted on the generator or used remotely.

#### Advantages:

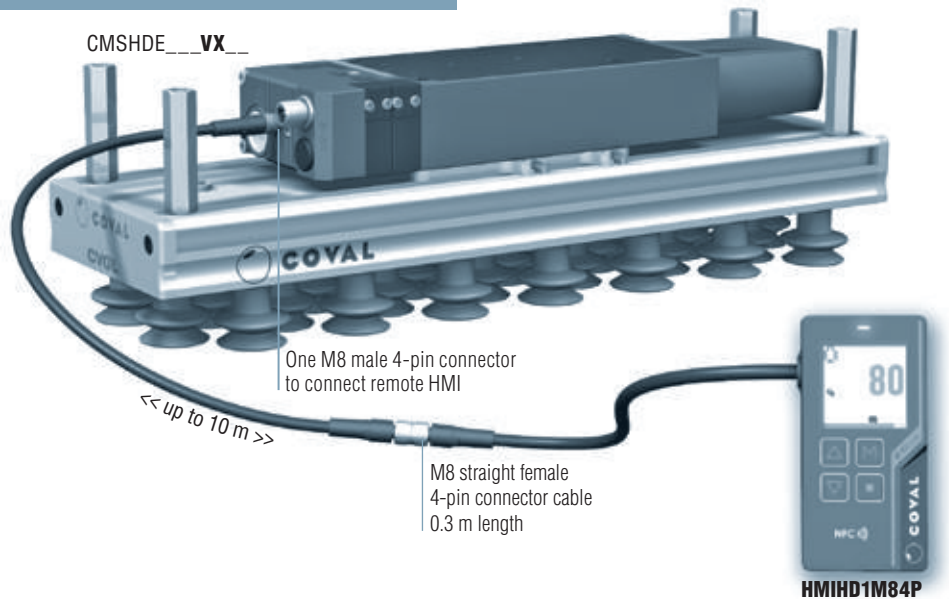
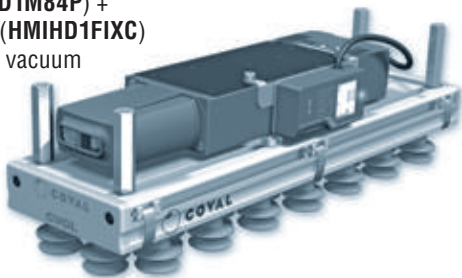
- Position the HMI on the vacuum generator or in an easily accessible and visible area.
- Use one HMI for multiple vacuum generators.
- Copy settings from one vacuum generator to the next.
- The vacuum generator will continue to operate with the HMI removed.

#### CVGL vacuum generators compatible with HMI:

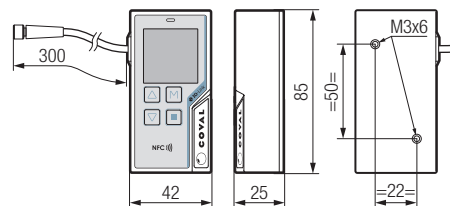
→ CVGL\_\_S2 / V2\_\_ versions with M8 connector.

CVGL\_\_VI version:

- HMI (ref: HMIHD1M84P) + mounting plate (HMIHD1FIXC) mounted on the vacuum generator.



- Accessory: Remote HMI
- Ref: HMIHD1M84P (see accessories for HMI page 13/14).



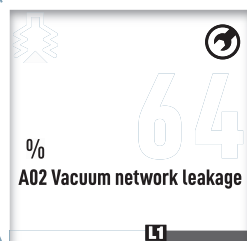
Note: all dimensions are in mm.

#### Remote HMI Dialog Front Panel



- Gripping status indicator light:
- Green: object gripped
  - Red: object lost

1.54" high-visibility color LCD display

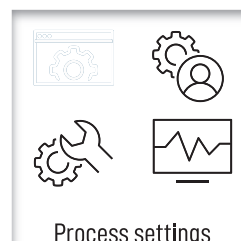


NFC antenna

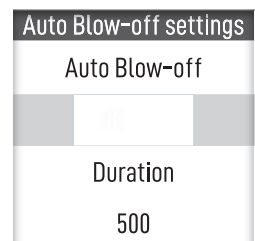
Settings keypad

The HMI allows for a simple and efficient reading of the pump's operation. The high-visibility display includes all required inputs for full operation:

- Main information is easy to read
- Multilingual: EN - FR - DE - IT - ES
- Simple and clear event messages
- Intuitive settings and diagnostics menus
- Configurable display orientation: 0 - 90 - 180 - 270°
- Lockable to prevent undesired changes



Multilingual



EN FR DE IT ES



## Compact and Light Vacuum Grippers

Straightforward Communication



NFC )))

The NFC wireless technology integrated in remote HMI and in the COVAL Vacuum Manager application makes all setup and diagnostic functions available and modifiable on your mobile devices.

### Additional features:

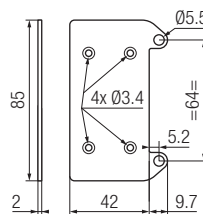
- Read/write settings with the power on or off.
- Copy settings from one CMS HD to another.
- Backup up to 5 setting configurations.
- COVAL support: send a report including the settings and diagnostic data to COVAL for technical support.



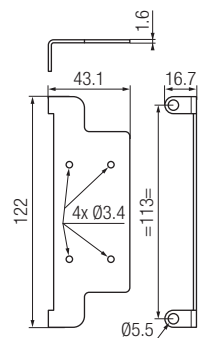
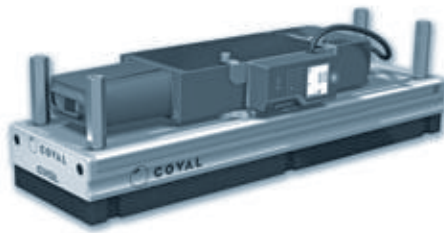
**NFC APP: COVAL Vacuum Manager**  
Available for Android and iOS

### Accessories for HMI

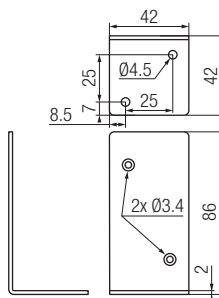
**Front mounting plate**  
+ 2 x M3x6 TORX  
+ 2 x M5x50 CHC  
Part No.: **HMIHD1FIXA**



**Side mounting plate**  
+ 2 x M3x6 TORX  
+ 2 x M5x50 CHC  
Part No.: **HMIHD1FIXC**



**90° angled mounting plate**  
+ 2 x M3x6 TORX  
Part No.: **HMIHD1FIXB**



### Connecting cable

M8 4-pin, female / M8 4-pin, male, compatible with cable chain

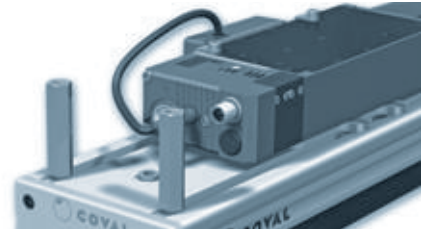
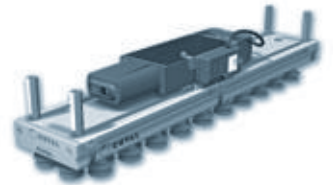
- 2 m length: Part No. **CDM8MF4PL2**
- 5 m length: Part No. **CDM8MF4PL5**
- Other lengths available upon request.



*in mm, any versions*

Note: all dimensions are in mm.





#### Multi-stage Vacuum Control

When necessary, the CVGL series vacuum grippers with integrated vacuum generator (versions D1 and D2) can be equipped with a vacuum and/or blow-off control valve to optimize product release. This also enables cleaning of the vacuum network, flow control nozzles, check valves, or airtight valves.

A vacuum switch or analog gauge is available as an option for those requiring a visual display of the vacuum level in the system (see below).

#### Vacuum Control: 2 Solutions

**Model CVGL\_\_S\_:** vacuum pump with **NC** vacuum control and **NC** blow-off control.

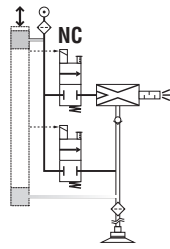
In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

■ **NC blow-off and vacuum control:** solenoid valves

■ **Choice of blow-off settings**

(only on CVGL\_\_S2\_ models):

- controlled by external signal
- automatic timer from 50 to 9999 ms (advantage: saves one controller output)



**Model CVGL\_\_V\_:** vacuum pump with **NO** vacuum control and **NC** blow-off control.

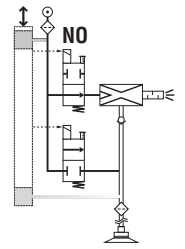
In the event of power failure, vacuum is still generated: object is held in place → fail-safe.

In the event of compressed air failure, the vacuum is no longer maintained.

■ **NO vacuum control solenoid valve**

■ **NC blow-off control solenoid valve**

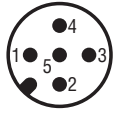
■ **Blow-off controlled by external signal**



#### Electrical Connections

**CVGL\_\_S1 / V1:**

■ One M12 5-pin male connector



- |   |  |
|---|--|
| 1 | /                                      |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC blow-off command               |
| 5 | /                                      |

⊗ : connections for ⊗ **IO-Link**

<sup>(1)</sup> 24 V DC suction command, depending on version:

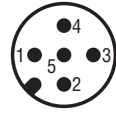
- **S:** 24 V DC vacuum control

- **V:** 24 V DC vacuum off command



**CVGL\_\_S2 / V2:**

■ One M12 5-pin male connector



- |   |  |
|---|--|
| 1 | 24 V DC                                |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC object gripped D01 - C/Q       |
| 5 | 24 V DC blow-off command               |

■ One M8 4-pin male connector → HMI



- |   |               |
|---|---------------|
| 1 | 24 V DC       |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND     |
| 4 | RS485 (DATA-) |



#### Vacuum Level Display

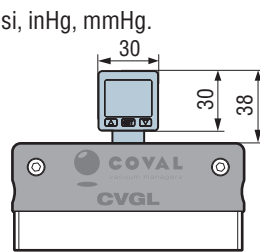
When required, CVGL series grippers can incorporate a vacuum level display with an electronic vacuum switch or vacuum gauge:

■ **Option VA - electronic vacuum switch**

**with 3-color display (PSD100CPNP):**

CVGL\_\_\_\_X\_\_**VA**

- Pressure rating range: 0 ~ -101.3 kPa.
- Pressure setting range: 10 ~ -101.3 kPa.
- Max. pressure: 300 kPa.
- Fluid: Air, non-corrosive/non-flammable gas.
- Hysteresis: adjustable.
- Response time: ≤ 2.5ms, with anti-vibration function.
- 7 segment LCD display: 2 color (red/green) main display, orange sub-display (refresh rate: 5 times/1sec.)
- Choice of pressure unit display: kPa, MPa, kgf/cm<sup>2</sup>, bar, psi, inHg, mmHg.
- Power supply voltage: 12 to 24 V DC ±10%.
- Current consumption: ≤ 40 mA (without load).
- Repeatability (switch output): ≤ ±0.2% F.S. ±1 digit.
- Electrical connection: M8 (4-pin).
- Protection: IP40.
- Ambient temperature range: 0 – 50° C (operation).
- Material (enclosure): PA 6.6 20%GF.

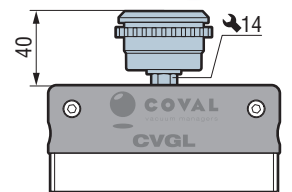


■ **Option VF - vacuum gauge**

(VAF11140):

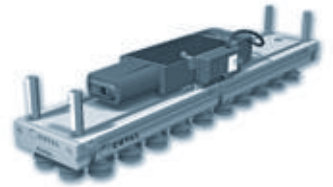
CVGL\_\_\_\_X\_\_**VF**





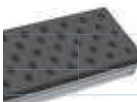
- Vacuum gauge with needle.
- Damping: by silicone movement (patented).
- Measuring: Bourdon tube in CuSn.
- Precision: cl. 2.5 (+/- 2.5% of max. scale value).
- Frame: black ABS



Note: all dimensions are in mm.



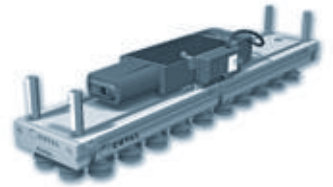





	CVGL	424	D		VSA33JK	X		H	X	
OVERALL LENGTH										ASSEMBLY TYPE
	424 mm	424							X	Screw mounting
	624 mm	624							C	Quick-mounting spring clips
	824 mm	824								
HOLE/CUP PATTERN LAYOUT										
	Staggered		Q							
	Straight*		D							
<i>* Only available for "maxi" type gripping interface with minimum suction cup Ø 26mm.</i>										
SUCTION CUPS GRIPPING INTERFACES							FILTER		TECHNOLOGY	
	"mini" type interface: 2.5 bellows suction cups Ø 14 mm in silicone 35 Shore with flow control nozzles.			VSP14BF		X	Without	H	Flow control nozzles	
	"medium" type interface: 1.5 bellows suction cups Ø 25 mm in natural rubber with flow control nozzles.			VSA25JI						
	"maxi" type interface: 1.5 bellows suction cups Ø 33 mm in natural rubber with flow control nozzles.			VSA33JK						
	"maxi" type interface: 2.5 bellows suction cups Ø 30 mm in white silicone 35 Shore with flow control nozzles.			MVS30EK						
FOAM GRIPPING INTERFACES							FILTER		TECHNOLOGY	
	Foam "mini" type interface, EPDM (thickness 20 mm)			F2S		X	Without	H	Flow control nozzles	
	Foam "maxi" type interface, EPDM (thickness 20 mm)			F2B		F	With filter	E	Airtight valves	
COVAL-flex GRIPPING INTERFACES									V	Check valves
<p>"COVAL-flex" gripping interfaces are designed to respond to specific applications. Our vacuum team will recommend and define any applications of yours which can benefit from its special features.</p>										

#### SPECIAL VERSIONS

There can be instances where the standard CVGL versions will not match your application requirements. COVAL can provide you personalized solutions based on your specifications, by integrating specific function and suggesting custom lengths and suction cup types.



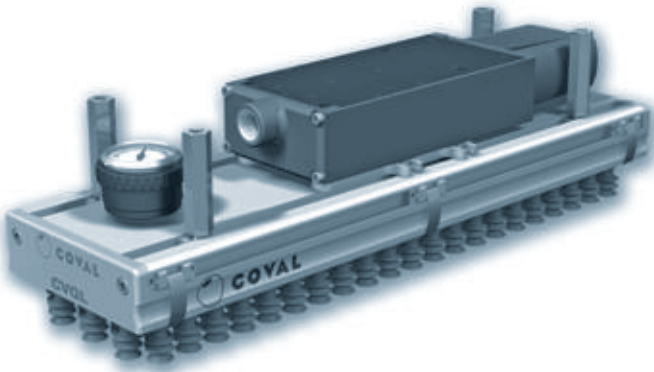


	D1	S	1	K	VA
<b>VERSION WITHOUT VACUUM GENERATOR</b>	<b>G0</b>	<b>N</b>	<b>0</b>	<b>X</b>	
Without vacuum generator		Without	Without	Without	
<b>VERSIONS WITH VACUUM GENERATOR*</b>	<b>D1</b>	<b>N</b>	<b>0</b>	<b>K</b>	
1 x <b>CMSHDE_50</b> multi-stage vacuum pump Flow rate: 700 NI/min		Without	Without	Through-type silencer	
1 x <b>CMSHDE_100</b> multi-stage vacuum pump Flow rate: 1100 NI/min	<b>D2</b>	<b>S*</b>	<b>1</b>		
2 x <b>CMSHDE_100</b> multi-stage vacuum pump Flow rate: 2200 NI/min	<b>D3</b>		<b>2</b>		
* See p.13/10 table of possible configurations		<b>CMSHDE_S_</b> Vacuum pump with <b>NC</b> vacuum control and <b>NC</b> blow-off control. Choice of blow-off settings (only on CVGL__S2_models): ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output).			
		<b>CMSHDE_V_</b> Vacuum pump with <b>NO</b> vacuum control and <b>NC</b> blow-off control. ▪ Blow-off controlled by external signal			
* Only for D1 and D2.		<b>CMSHDE_VOC15P_</b> Multi-stage vacuum pump without vacuum switch and HMI ▪ One M12 5-pin male PNP ▪ Digital inputs/outputs mode (SIO)			
		<b>CMSHDE_VXC15X_</b> Multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI ▪ One M12 5-pin male configurable as PNP or NPN ▪ One M8 4-pin male for remote HMI ▪ Electronic vacuum switch ▪ Digital Output DO1 "object gripped" 24 V DC / NO ▪ Digital input/outputs mode (SIO) / <b>IO-Link</b> ▪ Compatible with HMI (for VI option)			
<b>VACUUM LEVEL DISPLAY</b>					
Without					<b>VO</b>
 Vacuum switch with electronic display					<b>VA</b>
 Vacuum gauge (for versions with control, option available for 624 mm in length and longer)					<b>VF</b>
 HMI on CMS HDE (compatible with S2 and V2 versions only)					<b>VI</b>



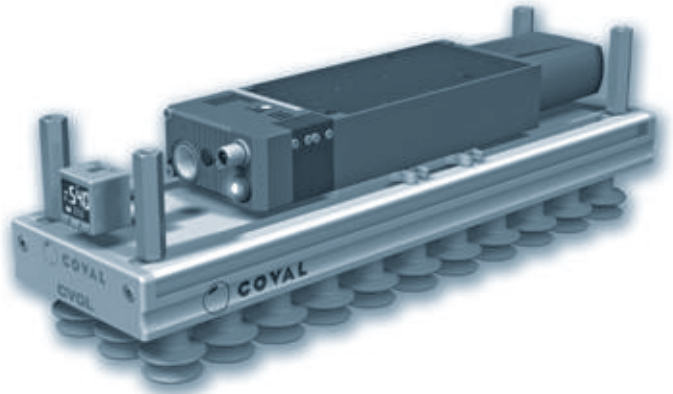
#### CVGL424DVSA33JKXHXD2S1KVA

CVGL vacuum gripper length 424mm, "straight" cup pattern layout, "maxi" type gripping interface, 1.5 bellows suction cups Ø33mm in natural rubber with flow control nozzles, with 1 integrated vacuum generator CMSHDE\_100, vacuum generator control and NC blow-off, vacuum level display with electronic display vacuum switch.



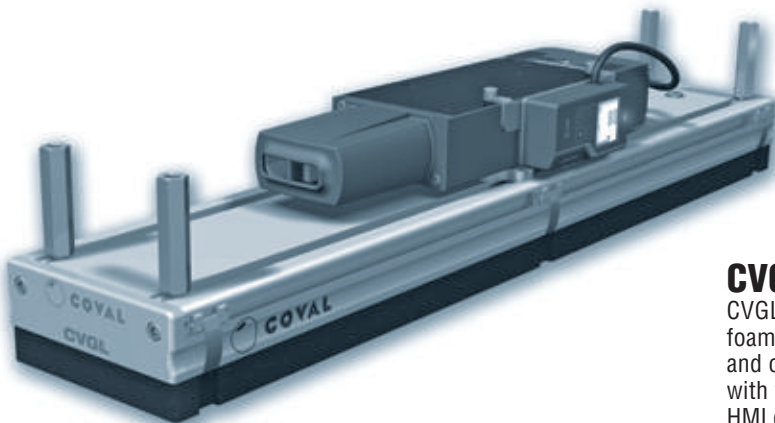
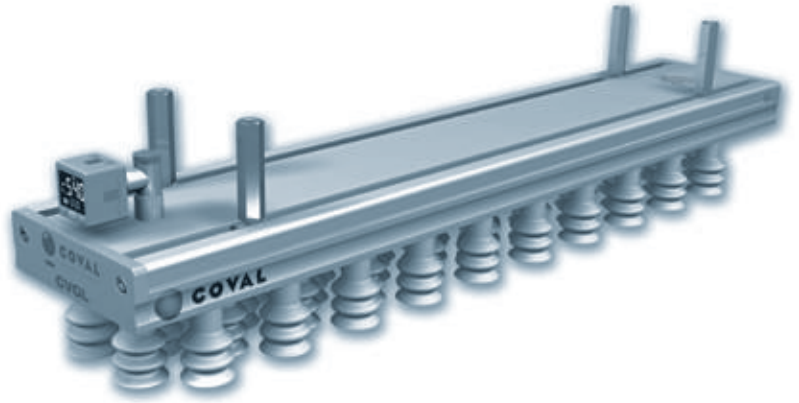
#### CVGL424QVSP14BFXHCD1N0KVF

CVGL vacuum gripper length 424mm, "staggered" cup pattern layout, "mini" type gripping interface, 2.5 bellows suction cups Ø33mm in silicon 35 Shore with flow control nozzles, with 1 integrated vacuum generator CMSHDE\_50, without vacuum generator control and vacuum level display with mechanical gauge vacuum switch.



#### CVGL624QMVS30EKXHXGONOXVA

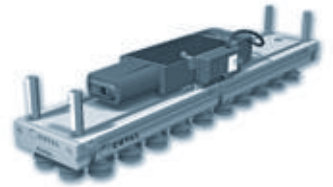
CVGL vacuum gripper length 624mm, "staggered" cup pattern layout, "maxi" type gripping interface, 2.5 bellows suction cups Ø30mm in silicon 35 Shore with flow control nozzles, without vacuum generator, and vacuum level display with electronic display vacuum switch.



#### CVGL624QF2BFVD2S2KVI

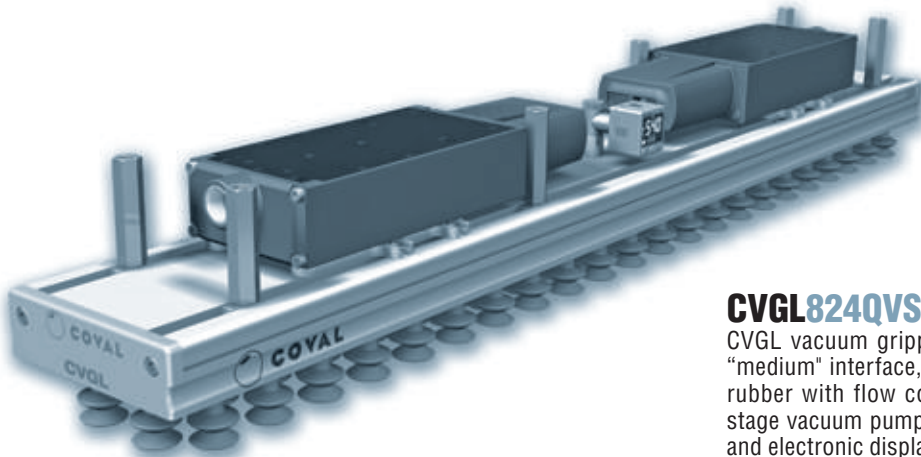
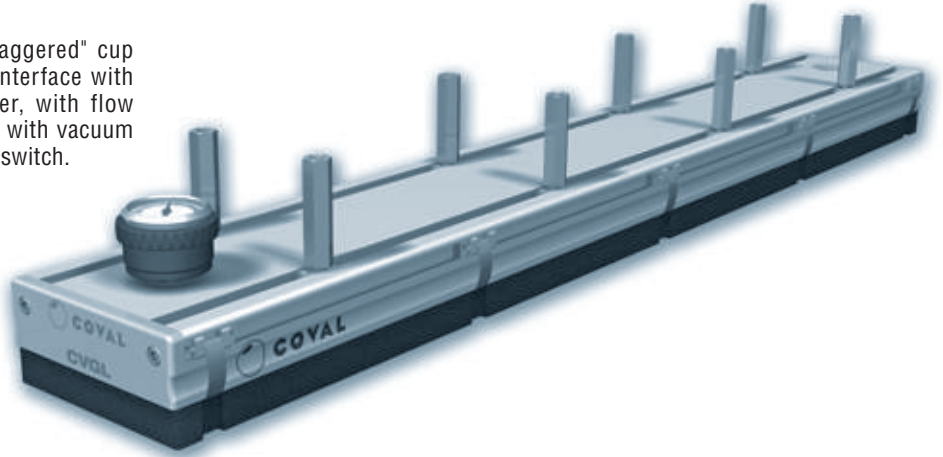
CVGL vacuum gripper length 624mm, "staggered" hole pattern, foam "maxi" interface with quick mounting spring clips, with filter and check valves, with CMSHDE\_100\_ multi-stage vacuum pump, with through-type silencer, NC vacuum control and blow-off, with HMI display.





#### CVGL824QF2SXHCGON0XVF

CVGL vacuum gripper length 824mm, "staggered" cup pattern layout, foam "mini" type gripping interface with quick mounting spring clips, without filter, with flow control nozzles, without vacuum generator, with vacuum level display with mechanical gauge vacuum switch.



#### CVGL824QVSA25JIXHDX3NOKVA

CVGL vacuum gripper length 824mm, "staggered" cup pattern, "medium" interface, suction cups 1.5 bellows Ø25 mm in natural rubber with flow control nozzles, with 2 CSMHDE\_100\_ multi-stage vacuum pumps without control, with through-type silencer, and electronic display vacuum switch.

#### MVG Series modular vacuum grippers

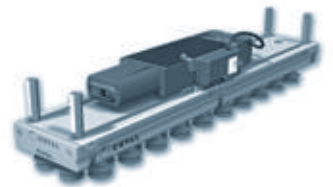
For applications requiring customized dimensions, COVAL has developed a modular vacuum gripper, the **MVG Series**.

Thanks to their modularity, the MVG vacuum grippers offer the optimal handling solution for various sizes, shapes, and weights.

- Customized formats from 150x150mm to 1200x1000mm.
- Configurable gripping interface (foam, suction cups, or COVAL-flex).
- Multi-zone.
- Staggered grip / release points.
- Integrated or external vacuum generator.
- Adaptable to all industry sectors.







#### G0 versions

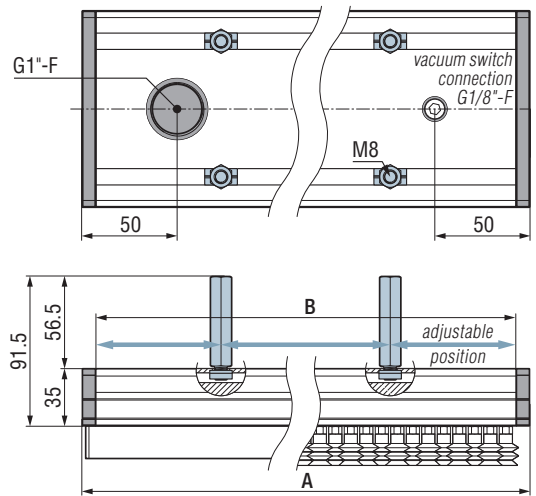
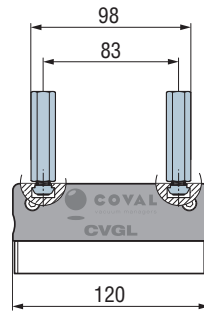
(with external vacuum generator).

The COVAL CVGL series vacuum grippers G0 version (with external vacuum generator), can be mounted on all types of automated or robotic systems, via M8 spacers, sliding in the grooves of the aluminum profile.

- CVGL 424 and 624: 4 x M8 spacers.
- CVGL 824: 6 x M8 spacers.

#### Dimensions

	CVGL424	CVGL624	CVGL824
A	424	624	824
B	408	608	808



#### D1 or D2 versions, without control

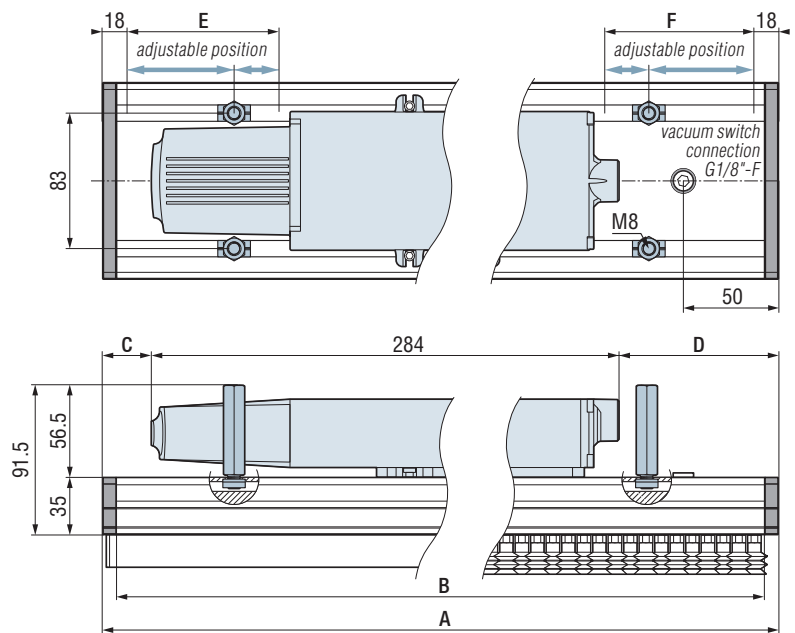
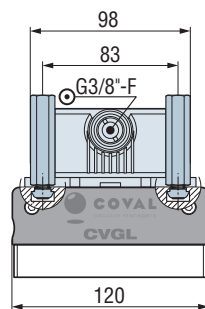
(1 integrated vacuum generator, CMS HDE series).

The COVAL CVGL series vacuum grippers, D1 and D2 versions, are mounted on all types of automated systems via M8 spacers pre-installed on sliding nuts.

- CVGL 424 and 624: 4 x M8 spacers.
- CVGL 824: 8 x M8 spacers.

#### Dimensions

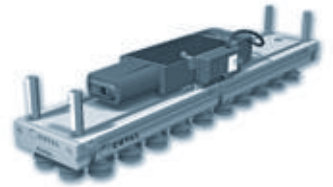
	CVGL424	CVGL624	CVGL824
A	424	624	824
B	408	608	808
C	15	134	233
D	125	207	307
E	76	194	294
F	116	198	298



You can access 3D files of all our products in formats compatible with the main CAD software on our website  
[www.coval.com](http://www.coval.com)

Note: all dimensions are in mm.





#### D1 or D2 versions, with control

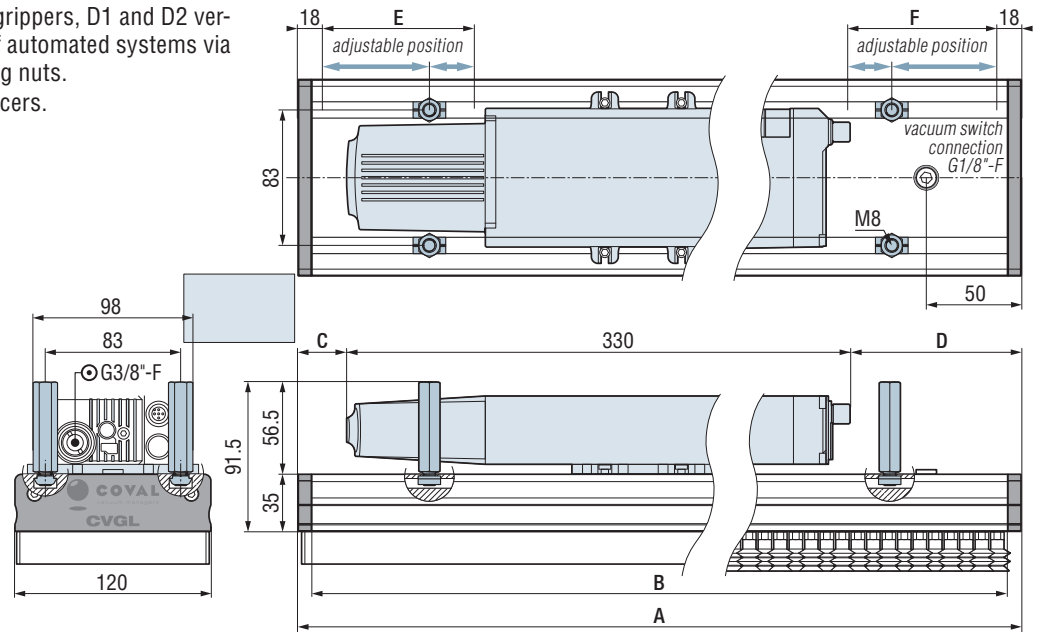
(1 integrated vacuum generator, CMS HDE series).

The COVAL CVGL series vacuum grippers, D1 and D2 versions, are mounted on all types of automated systems via M8 spacers pre-installed on sliding nuts.

- CVGL 424 and 624: 4 x M8 spacers.
- CVGL 824: 8 x M8 spacers.

#### Dimensions

	CVGL424	CVGL624	CVGL824
A	424	624	824
B	408	608	808
C	15	134	234
D	78	160	260
E	76	194	294
F	47	129	229

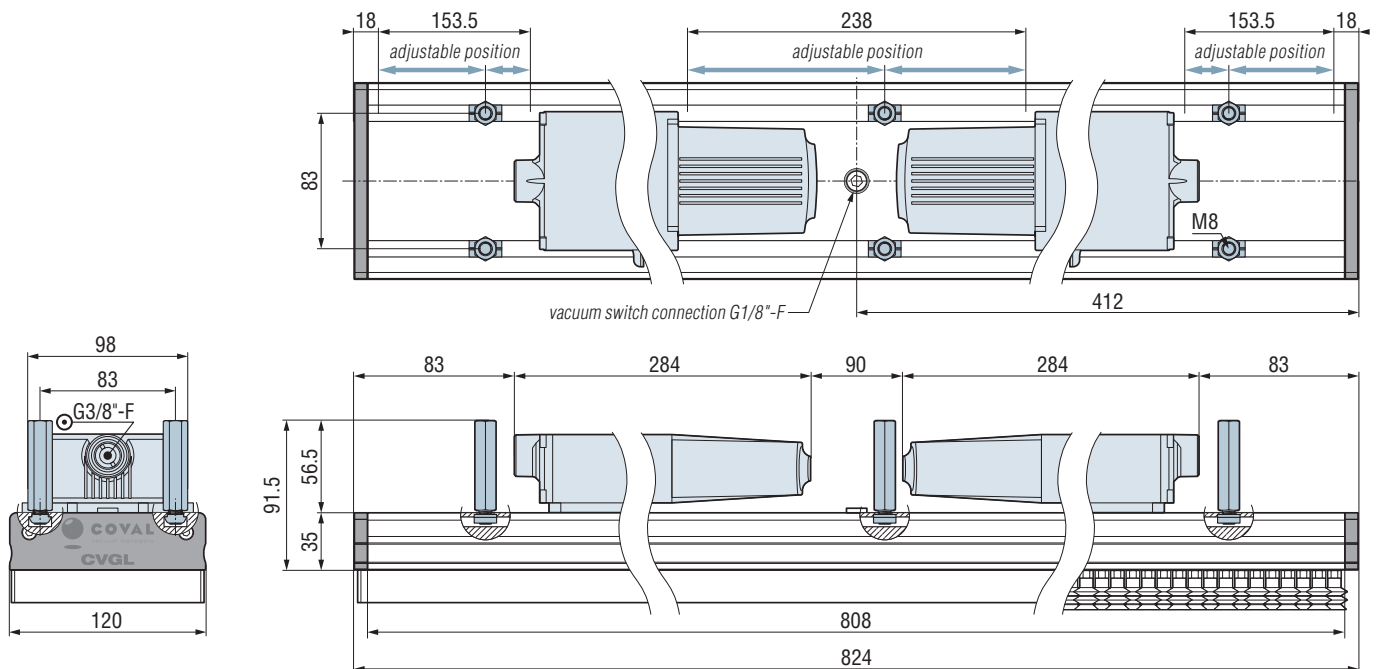


#### D3 versions

(2 integrated vacuum generators, CMS HDE series).

The CVGL vacuum grippers, D3 version, utilizes adjustable M8 spacers.

- CVGL 824: 6 x M8 spacers.

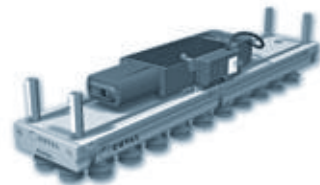


Note: all dimensions are in mm.



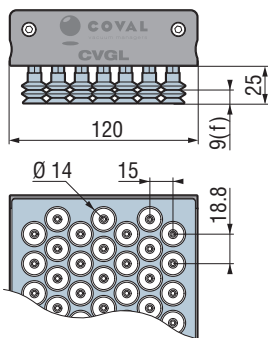
## Compact and Light Vacuum Grippers

### Gripping Interfaces and Characteristics

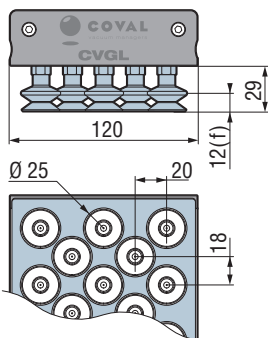


#### CVGL Series with Suction Cup Gripping Interface

"MINI" type suction cup gripping interface



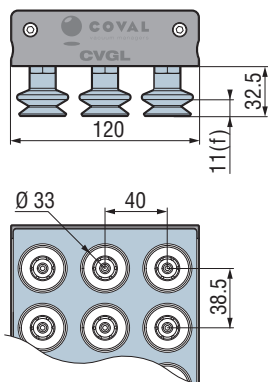
"MEDIUM" type suction cup gripping interface



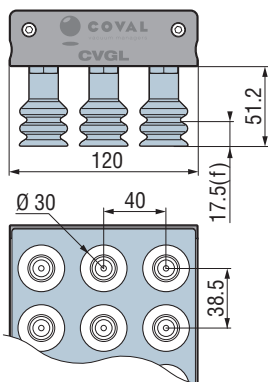
f: suction cup deflection

"MAXI" type suction cup gripping interface, STRAIGHT PATTERN

model VSA33

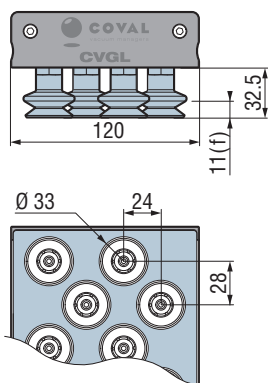


model MVS30

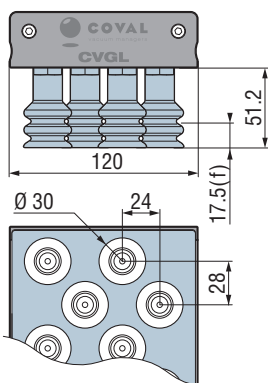


"MAXI" type suction cup gripping interface, STAGGERED PATTERN

model VSA33



model MVS30

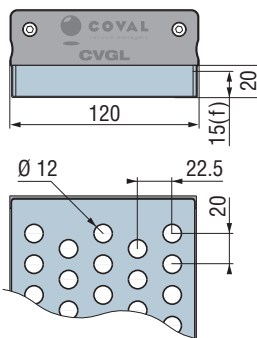


#### NUMBER OF SUCTION CUPS PER GRIPPING INTERFACE

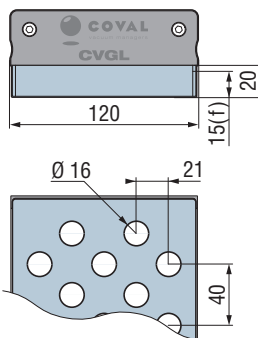
	CVGL424	CVGL624	CVGL824
"Mini" type suction cup Ø14 mm (Ø16 mm max.)	150	220	297
"Medium" type suction cup Ø25 mm (Ø18 to 25 mm)	55	83	113
"Maxi" type, STRAIGHT pattern Ø30 or Ø33 mm suction cups (Ø36 mm max.)	33	48	63
"Maxi" type, STAGGERED pattern Ø30 or Ø33 mm suction cups (Ø36 mm max.)	28	42	58

#### CVGL Series with Foam Gripping Interface

"MINI" type foam gripping interface



"MAXI" type foam gripping interface



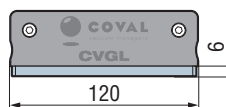
f: foam compression

#### NUMBER OF GRIPPING POINTS PER INTERFACE

	CVGL424	CVGL624	CVGL824
"mini" type gripping interface Ø12 mm	98	148	198
"maxi" type gripping interface Ø16 mm	50	75	100

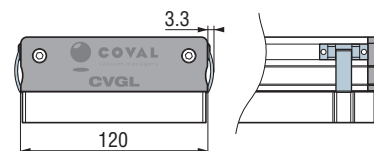
#### CVGL Series with "COVAL-flex" Gripping Interface

**COVAL-flex**



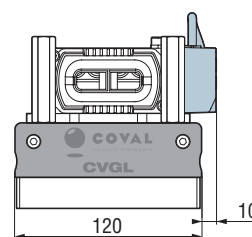
#### Option: quick installation of the interface

Option: CVGL \_\_\_\_ **C**  
quick installation of the interface via spring clips



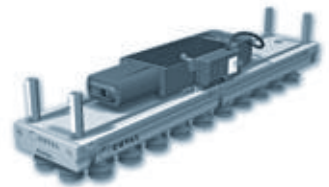
#### Option: HMI mounted on the vacuum generator

Option: CVGL \_\_\_\_ **VI**



Note: all dimensions are in mm.





#### General Characteristics

- Temperature: from 0 to 50°C (32 to 122° F).
- Material of the gripper: aluminum, PA 6.6 15% GF, brass, stainless steel, neoprene.
- Foam gripping interface material: EPDM.
- Suction cup gripping interface materials:
  - "mini" type interface: silicone 35 Shore.
  - "medium" type interfaces: natural rubber 50 Shore.
  - "maxi" type interfaces: natural rubber 50 Shore or white silicone 35 Shore.

#### Multi-stage Vacuum Pumps General Characteristics

- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Operating pressure: from 2 to 8 bar
- Optimal dynamic pressure:
  - CSMHDE\_NVO (for CVGL\_GON grippers) without control: 5.5 bar.
  - CSMHDE\_S\_ / CSMHDE\_V\_ with control (for CVGL\_S\_ / CVGL\_V\_ grippers): 6 bar.
- Pressure connection: G3/8"-F with removable 350 µm filter screen
- Max. vacuum: 80%
- Air suction flow rate: 700 to 2200 NI/min
- Air consumption: 220 to 840 NI/min
- Noise level:
  - CSMHDE90X50\_K : 59 dBA
  - CSMHDE90X100\_K : 62 dBA
- Degree of protection: IP65
- Max. operating frequency: 4 Hz
- Endurance: 50 million cycles
- Materials: PA GF, brass, aluminum, steel, NBR, PU, FKM
- M12 and M8 male connectors (depending on version)

#### Integrated electronics

- 24 V DC power supply (regulated ±10%)
- Inputs/outputs protected against reversed wiring and polarity
- Consumption: 170 mA max. (without load)

Only on models CSMHDE\_VX\_ installed on CVGL\_S2 / V2:

- Vacuum measuring range: 0 to 99%
- Pressure measuring range: 0 to 10 bar
- Vacuum and pressure measurement accuracy: ±1.5% of the range, compensated for temperature
- Input/Output switching mode: PNP or PNP/NPN configurable
- Digital inputs/outputs mode (SIO) / IO-Link

#### DO1 output signal

Only on models CSMHDE\_VX\_ installed on CVGL\_S2 / V2:

- Configurable as PNP or NPN
- NO or NC
- Breaking capacity: 330 mA
- DO1: object gripped output (factory setting 40%)

#### Diagnostics

Only on models CSMHDE\_VX\_ installed on CVGL\_S2 / V2:

- Instantaneous vacuum level (unit transmitted over IO-Link: mbar)
- Available information: Object gripped, object lost
- Cycle counters (vacuum, blow-off, object gripped, object lost, etc.)
- Supply pressure monitoring

- Supply voltage monitoring
- Product part number and serial number
- Software version

#### Indicator

Only on models CSMHDE\_VOC15P\_ installed on CVGL\_S1 / V1:

- Status LED for control functions:
  - Green LED: vacuum control
  - Orange LED: blow-off control

#### Information displayed on HMI (VI option)

- LED gripping status indicator on front panel (Green: object gripped, Red: object lost)
- 1.54" high-visibility color LCD display:
  - Displays vacuum level with bar graph and thresholds
  - Warns when service life has been exceeded (> 50 million cycles)
  - Explicit fault messages
  - "Suction cup" icon indicating the status of control functions:
    - Green suction cup: vacuum control
    - Orange suction cup: blow-off control
    - Red suction cup: simultaneous vacuum and blow-off control
  - Configurable display orientation: 0 - 90 - 180 - 270°

#### Parameter settings available with the HMI or IO-Link

Only on models CSMHDE\_VX\_ installed on CVGL\_S2 / V2:

- Choice of blow-off type (CVGL\_S2 only):
  - Controlled
  - Automatic timed, adjustable from 50 to 9999 ms
- Object gripped (L1) control thresholds
- Whenever required by the application, specific threshold and hysteresis settings that are different from the initial factory settings can be defined: L1 = 40%, h1 = 10%

#### + Additional settings available with the HMI

(performed with 4-key membrane keyboard):

- Choice of language: EN, FR, DE, IT, or ES
- Choice of vacuum measurement unit (kPa, %, mbar, inHg)
- Choice of pressure measurement unit (MPa, bar, psi)
- Monostable electrical manual controls

#### Communication

##### IO-Link

- Revision: 1.1
- Transmission rate: COM3 - 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

##### NFC

- COVAL VACUUM MANAGER Mobile app available:
  - Android, version 8.1 and higher
  - iOS, version 13 and higher



# MVG

## Modular Vacuum Grippers

### General Information



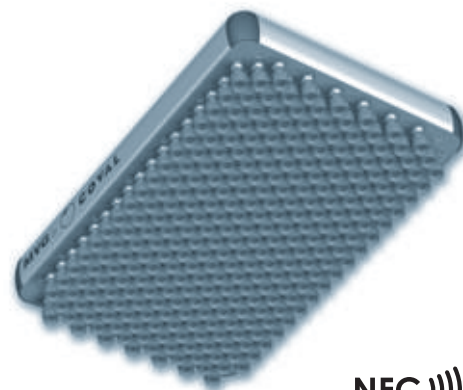
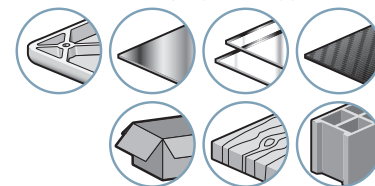
COVAL's MVG series vacuum grippers fully meet integrator and end user expectations in terms of power, robustness, communication, and ease of setup and use, while they remain compact and lightweight for easier integration in a smart factory.

Their highly modular and flexible design makes them an optimal solution for handling objects of various sizes, shapes, and weights.

COVAL's next generation vacuum grippers feature CMS HDE series multi-stage vacuum pumps. These pumps have a heavy-duty design offering high reliability even in harsh environments (IP65) and a long service life, withstanding up to 50 million cycles. The modular design of these vacuum pumps contributes to their durability and allows for special configurations as well as targeted maintenance of specific parts to optimize reparability.

Next generation CMS HDE multi-stage vacuum pumps thus further increase the reliability of MVG series vacuum grippers and their adaptability.

Industry-specific applications



NFC ))))

IO-Link



### Custom Made by Design

The modular design of the MVG series vacuum grippers with standard sub-assemblies provides great flexibility when it comes to selecting dimensions, gripping interface, and the vacuum generator to fully meet the application requirements.

Moreover, to optimize production cycles and palletization planning, MVG grippers can be equipped with several independent gripping zones (multi-zone), ensuring multiple or staggered gripping/release points.

### Advantages

- Customized formats
- Compact and lightweight
- Multi-zone
- IO-Link and NFC communication interface
- Adapts to products
- Adapts to installation
- Easy to install and use
- Readily available
- COVAL service

### Applications

MVG series vacuum grippers offer a unique solution for handling products in different industrial sectors:

- Packaging
- Plastics
- Metal
- Glass
- Concrete/stone
- Composites
- Wood



COVAL-flex



# MVG

## Modular Vacuum Grippers

### General Information



**Custom sizes**  
From 150 x 150 to  
1200 x 1000 mm



**Ultra-lightweight**  
Reduced payload weight

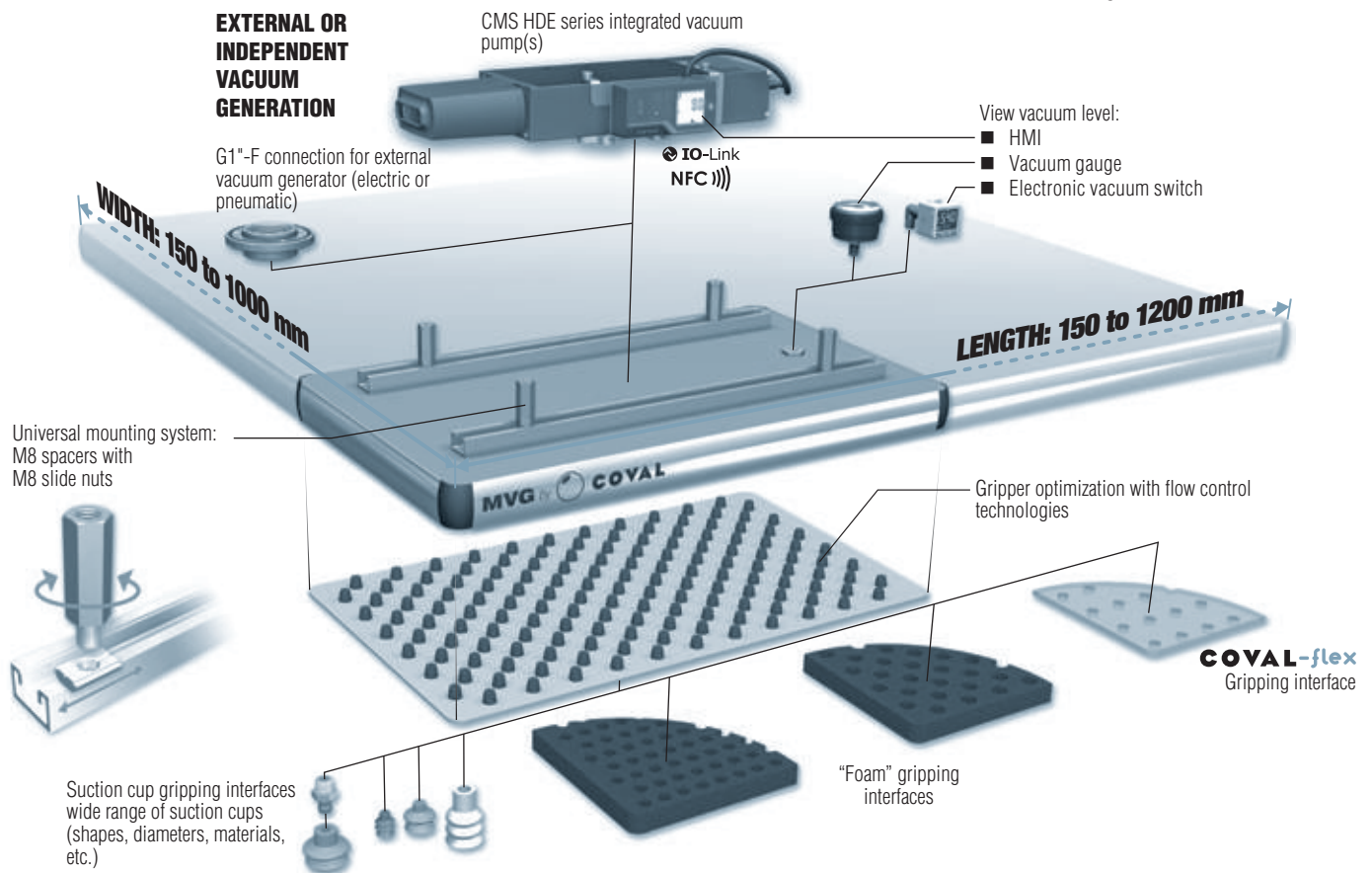


**Configurable gripping interface**  
depending on the products to  
be handled



**Communication and control**

- Digital inputs/outputs (SIO)/IO-Link
- HMI
- NFC



### ADD COMMUNICATION AND SMART TECHNOLOGY

Integrating the CMS HDE multi-stage **VX** version vacuum pumps on **MVG** vacuum grippers makes them easier to use and set up.



Clear and efficient HMI.



Onboard installation and diagnostic tools.

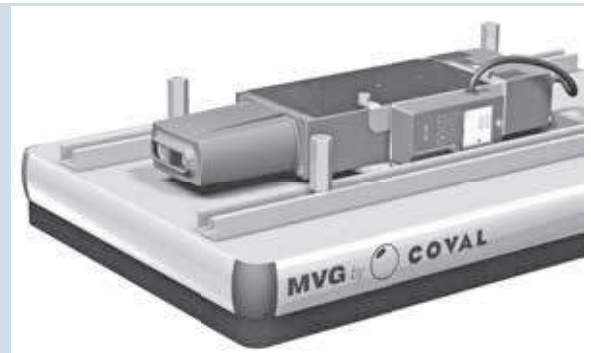


Digital inputs/outputs (SIO)/IO-Link (quick and cost-effective installation, ongoing diagnostics, centralized setup, and efficient communication).



Straightforward setup and diagnostics.

A **MVG** vacuum gripper equipped with a CMS HDE vacuum pump becomes more versatile and fully compatible with the handling robots at the heart of Industry 4.0.





# MVG

## Modular Vacuum Grippers

### Ultra-Lightweight and Multi-Zone Design

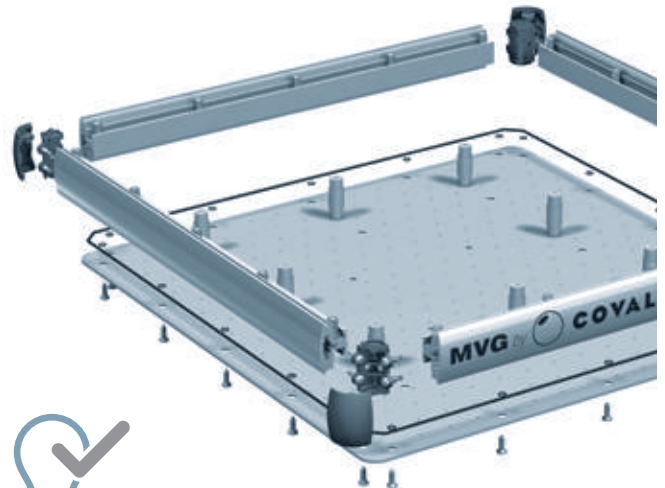


#### Ultra-Lightweight and Compact Design

The main objective in designing the MVG vacuum gripper was to reduce its footprint and weight as much as possible, while keeping a highly modular configuration to meet the needs of robotic applications.

With their patented assembly concept, MVG vacuum grippers fully meet this objective. The lightweight and strong aluminum profile frame allows for easy integration on robots. Furthermore, the vacuum connections on MVG vacuum grippers is located at the top, which makes the grippers even more compact.

The technologies and materials used in the MVG vacuum gripper's design considerably reduce the payload weight, which makes it the benchmark in its area, allowing for smaller robots to be implemented, increasing accelerations, and thus optimizing the installation for cost savings.



**PATENTED  
TECHNOLOGY**



#### Multi-Zone

Independent gripping zones can be created on MVG vacuum grippers to ensure optimized vacuum management (higher vacuum levels, fewer leaks, and lower energy consumption). To achieve this, each zone has its own integrated or external vacuum generator.

- Staggered grip/release points
- Management of formats to be handled
- Optimized palletizing layers
- Single or multiple grip/release points

As each multi-zone application is different, COVAL will gladly assist in determining the best configuration for your process.

*Examples of configuration:*



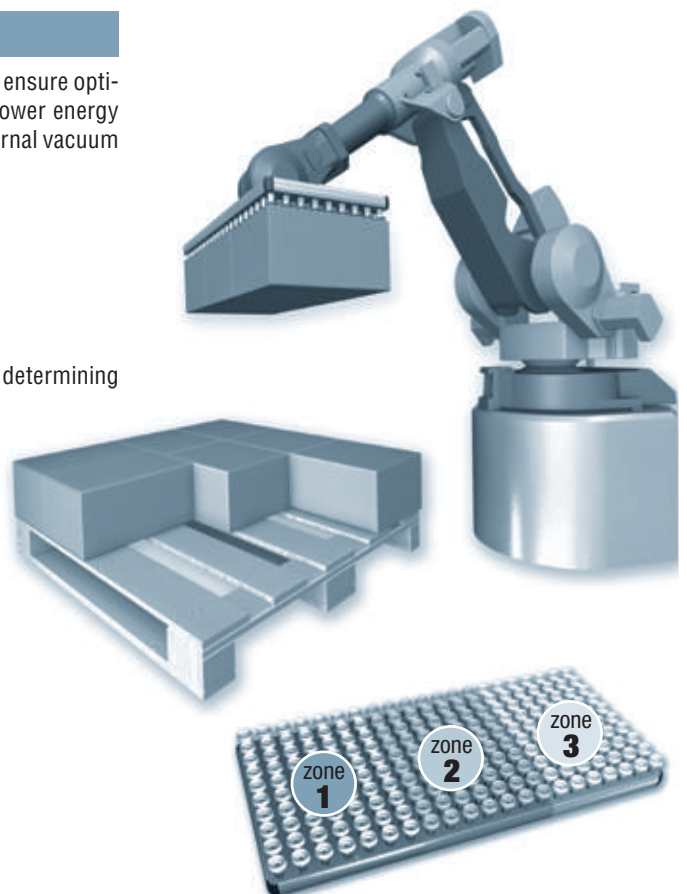
MVG with 2 zones



MVG with 3 zones



MVG with 4 zones





# MVG

## Modular Vacuum Grippers

### Integrated Technologies



COVAL's MVG series lets you choose among three gripping interface technologies that can be combined to meet your vacuum handling needs: foam, suction cups, or COVAL-flex.

To optimize the performance of MVG series vacuum grippers according to the application at hand, available grip patterns have various spacing and hole diameters: → a broad range that meets all your application requirements.



#### Choice of Gripping Interface

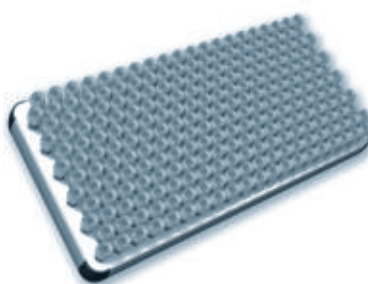
##### "FOAM" Interface

- Handle rigid products
- Grip textured or uneven surfaces
- Flow control nozzle, airtight valve, or check valve
- 2 hole diameters (Ø 12 and 16 mm)
- 2 grip patterns



##### "SUCTION CUP" Interface

- Handle flexible products
- Wide range of options
- Flow control nozzle (various diameters)
- 4 types of standard suction cups (Ø 14, Ø 25, Ø 30 and Ø 33 mm)
- 3 grip patterns



##### "COVAL-flex" Interface

- Handle aluminum cans, canned food, glass containers, etc.
- Flexible, extremely tear-resistant interface
- Grip pattern fully customizable according to the application

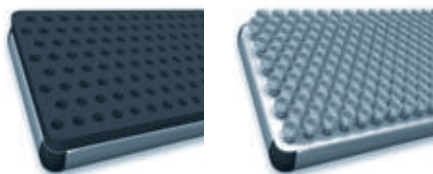


**COVAL-flex**

#### Grip Patterns

##### "MINI"

- Reduced hole spacing, to grip smaller objects
- Tight grip pattern ensures a strong hold, even with randomly placed objects



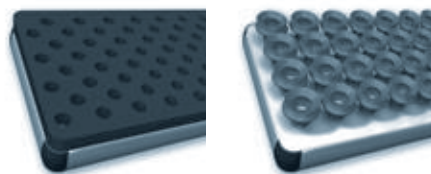
##### "MEDIUM"

- A medium-tight grip pattern between mini and max
- Ideal for handling dense loads with a reduced gripping surface



##### "MAX"

- Large gripping surface to grip heavy loads
- Ideal for handling objects with a rigid gripping surface





# MVG

## Modular Vacuum Grippers

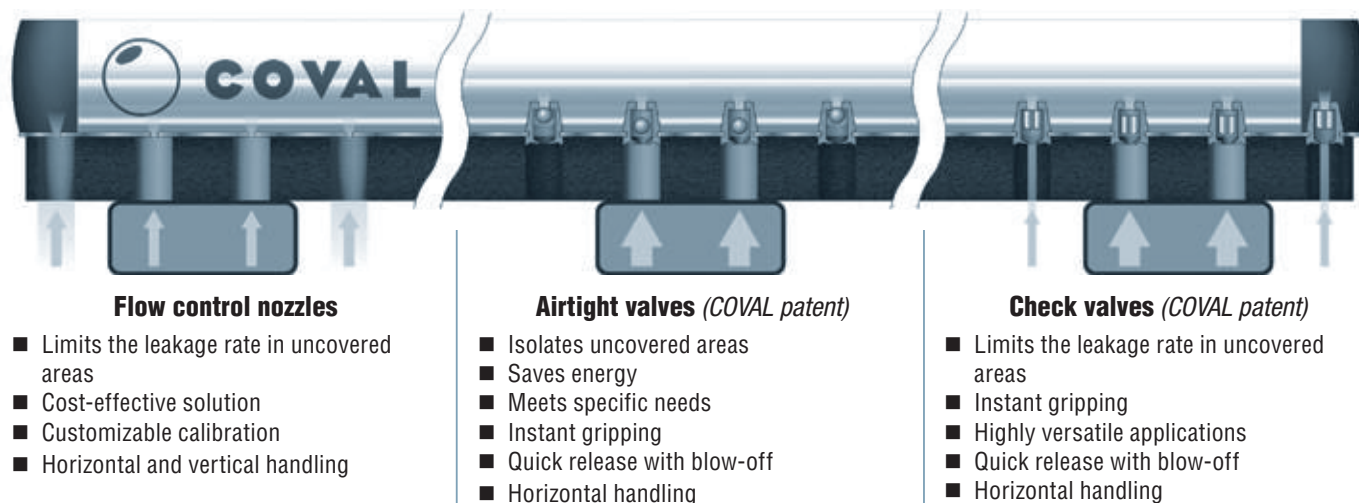
### Integrated Technologies



#### Flow Control Technologies

COVAL offers three different flow control technologies to optimize your vacuum gripper and fully address your application requirements.

The COVAL vacuum management team will gladly help you choose and configure your MVG vacuum gripper.



#### Vacuum Generation

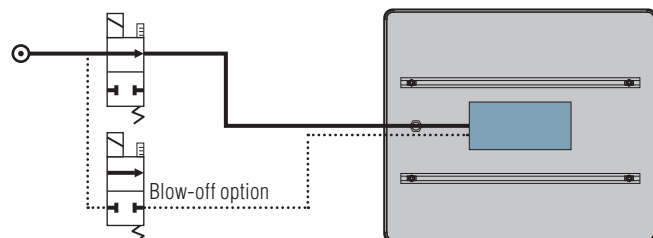
##### Integrated vacuum generator, CMS HDE series

Integrating a multi-stage vacuum generator on the MVG gripper provides a comprehensive and compact gripping solution, and ensures easy integration in your process.

Options: add a vacuum and/or blow-off control valve with M12 connector and a vacuum level display (electronic vacuum switch display or vacuum gauge), or an HMI with LCD display.

##### Advantages:

- A comprehensive solution
- 3 levels of suction power
- Option: vacuum and blow-off control
- Option: vacuum level display
- Option: IO-Link communication interface



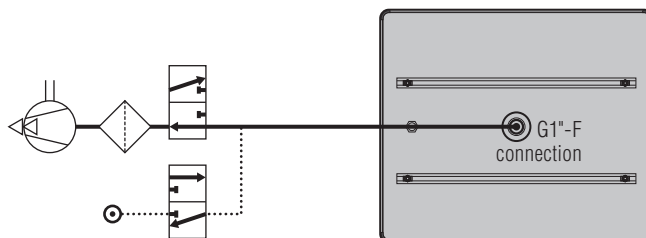
##### External vacuum generator

MVG vacuum grippers can also be used with an external vacuum generator. Depending on the application, an independent generator may be required (impeller, electric vacuum pump, or CMS HD series multi-stage vacuum pump). Version G0 of the MVG series vacuum grippers features a G1"-F flange to easily connect the vacuum source.

Option: add a vacuum level display (electronic vacuum switch display or vacuum gauge).

##### Advantages:

- Reduced weight
- Adapts to environment in which it is used
- Option: vacuum level display



#### Technical data of integrated CMS HDE series multi-stage vacuum pumps

Vacuum gripper	Integrated vacuum pump	Consumption (NI/min)	Flow rate (NI/min)	Max. vacuum (%)	Noise level (dBA)
MVG ____ D1	CMSHDE__50	220	700	80	59
MVG ____ D2	CMSHDE__100	420	1100	80	62
MVG ____ D3	2xCMSHDE__100	840	2200	80	65

#### Vacuum pump configurations by gripper length

Integrated vacuum pump	Version	Min. gripper dimensions*
CMSHDE__50 (Version D1)	Without control (version NVO)	450 x 260 mm
	With control (versions VOC15P and VXC15P)	500 x 260 mm
CMSHDE__100 (Version D2)	Without control (version NVO)	450 x 260 mm
	With control (versions VOC15P and VXC15P)	500 x 260 mm
2xCMSHDE__100 (Version D2)	Without control (version NVO)	900 x 260 mm

\* Dimensions are indicative and may change depending on selected options.



# MVG

## Modular Vacuum Grippers

### Integrated Multi-Stage Vacuum Pumps

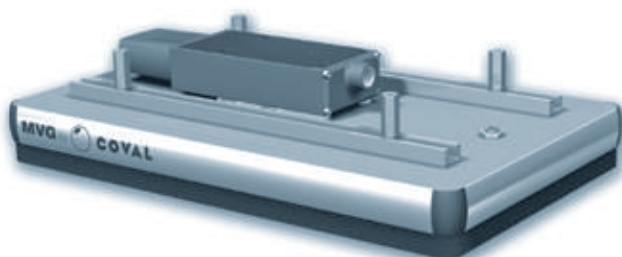


To adequately address the requirements of each application, there is a wide range of **CMS HDE series** multi-stage vacuum pump configurations to choose from for MVG series vacuum grippers.

#### MVG\_\_D\_NOK

CMSHDE\_\_NVOG4K multi-stage vacuum pump

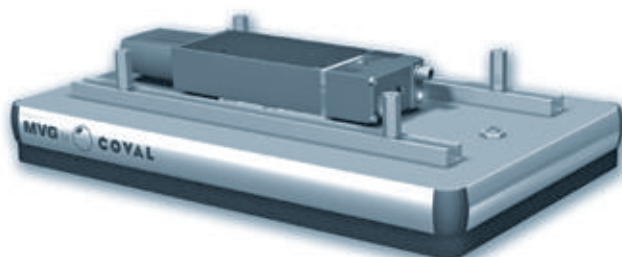
- Without control



#### MVG\_\_D\_S1 / V1K

CMSHDE\_\_VOC15PG4K multi-stage vacuum pump

- With vacuum and blow-off control
- Without vacuum switch
- One M12-5-pin connector
- Visual vacuum/blow-off indicators
- Digital inputs/outputs mode



#### MVG\_\_D\_S2 / V2K

CMSHDE\_\_VXC15PG4KD multi-stage vacuum pump

- With vacuum and blow-off control
- With vacuum switch and pressure sensor
- One M12-5-pin connector
- One M8 4-pin connector for the HMI (option VI)
- Digital inputs/outputs mode (SIO)/IO-Link

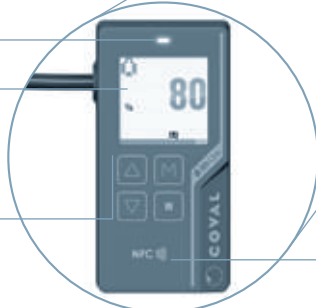


Version **VI**: Clear and efficient HMI: includes all required inputs for full operation of CMS HDE multi-stage vacuum pumps.

Status indicator (2 colors)

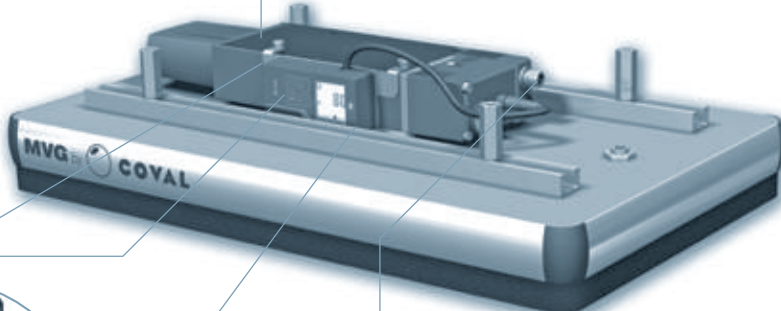
1.54" high-visibility color LCD display with clear multilingual messages and straightforward settings menu

Settings keypad



Onboard installation and diagnostic tools:

- Vacuum network clogging detection
- Supply pressure and voltage monitoring



Inputs/Outputs  
Digital inputs/outputs (SIO)/IO-Link

- M12 5-pin connector

NFC )))



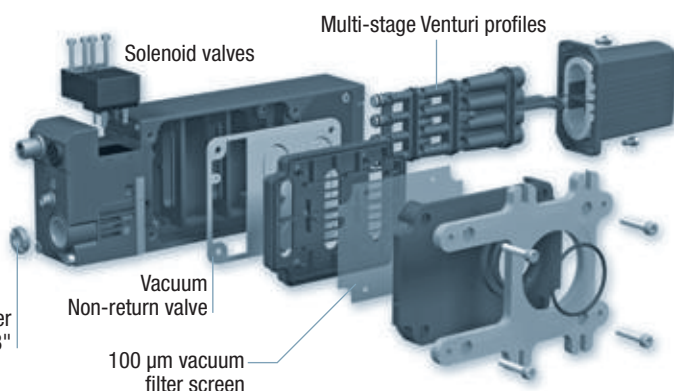
Straightforward setup and diagnostics made possible by NFC technology and COVAL Vacuum Manager mobile app.

### Modularity/Maintenance

The CMS HDE multi-stage vacuum pumps have been designed to withstand the demands from all your applications and to guarantee a high level of performance. However, handling certain parts may require replacement or cleaning.

The modular design of the CMS HDE multi-stage pumps ensures easy maintenance as the functions are all easily accessible.

350 µm pressure filter screen G3/8"





# MVG

## Modular Vacuum Grippers

### Straightforward Communication



#### Easier Integration, Use, and Diagnostics

Designed to keep vacuum gripper use and management as straightforward as possible and thus allowing for their easy integration in your smart factory, MVG\_\_S2 / V2\_ vacuum grippers include

various features that allow for their setup, use, and diagnostics in all situations and at all levels (operators, process, networked factory).

#### Settings, Diagnostics, and Process Data



##### CONFIGURABLE SETTINGS

- Choice of language: EN, FR, DE, IT, or ES
- "Object gripped" control thresholds
- Automatic blow-off
- Unit of measurement for vacuum: kPa, %, mbar, inHg
- Unit of measurement for pressure: MPa, bar, psi
- Software updates



##### DIAGNOSTIC

- Cycle counters (vacuum and blow-off control, objects gripped, objects lost, etc.)
- Clogging detection function
- Supply pressure and voltage monitoring
- Software version
- Product part number and serial number



##### PROCESS INPUT DATA

- Vacuum and blow-off control



##### PROCESS OUTPUT DATA

- Instantaneous vacuum level
- Object gripped and object lost information
- Alarms (high/low pressure, high/low voltage)
- Instantaneous pressure level

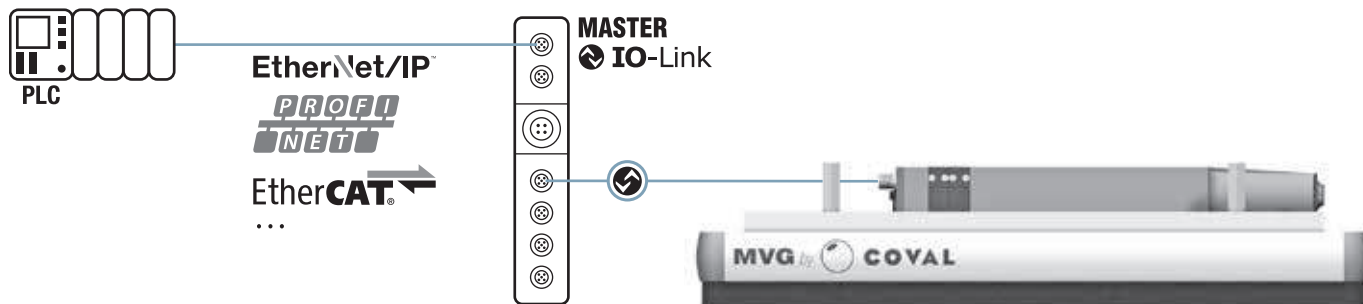


#### IO-Link

The IO-Link system that is integrated in **CMSHDE\_VXC15X** multi-stage vacuum pumps ensures efficient real-time communication between MVG vacuum grippers and any higher-level protocol (EtherNet/IP, PROFINET, EtherCAT, etc.) required to monitor the production line. It can be used to control pumps, configure settings, and get feedback to ensure maximum productivity.

#### Advantages:

- Straightforward wiring, installation, and setup
- Remote setup, control, and diagnostics
- Easier preventive maintenance and vacuum pump replacement without manual setup
- Installation and diagnostic tools, and more





# MVG

## Modular Vacuum Grippers

### Straightforward Communication



#### Mounted or Remote HMI

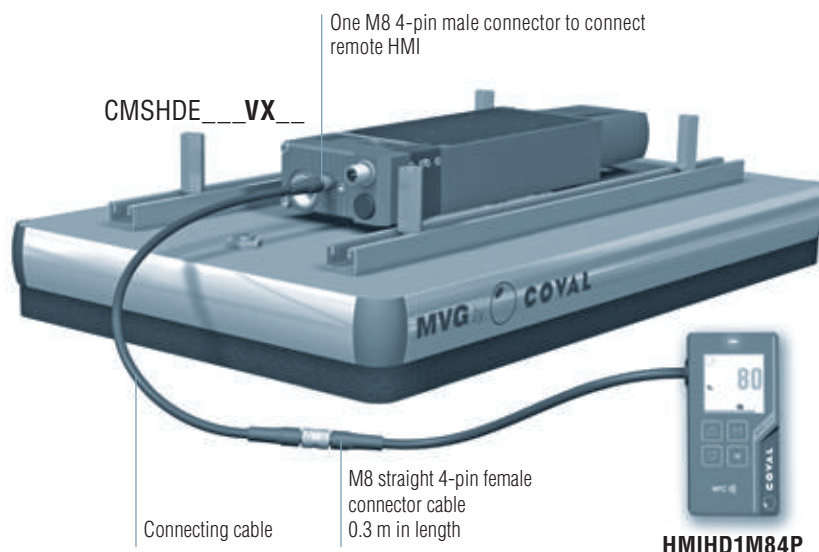
To make it easier to set up and use the vacuum grippers, the MVG range includes an HMI that can be mounted on the vacuum gripper or installed remotely.

#### Advantages:

- Place the HMI on the vacuum gripper or in an easy-to-access and visible area
- Use a single HMI for several vacuum grippers
- Copy settings from one gripper to another
- Keep using the vacuum gripper even with the HMI removed

**MVG vacuum grippers compatible with the HMI:**

→ MVG **S2 / V2** versions with M8 connector

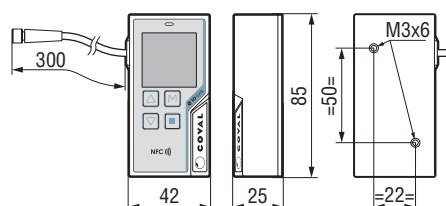


MVG **VI** version:

- HMI (part no.: **HMIHD1M84P**) + mounting plate (**HMIHD1FIXC**) mounted on the vacuum gripper

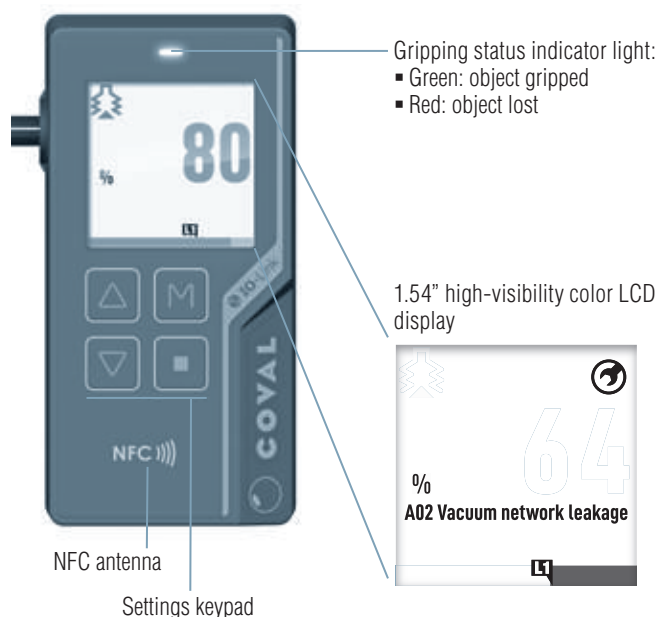


Accessory: Remote HMI (part no.: **HMIHD1M84P**)  
See accessories for HMI.



Note: all dimensions are in mm.

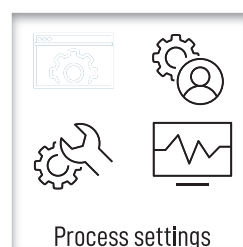
#### HMI Dialog Front Panel



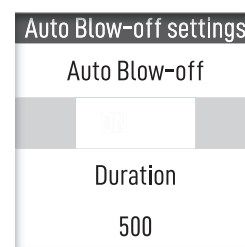
The HMI allows for easy and efficient reading of the vacuum gripper's operation.

The high-visibility display includes all required inputs for full operation:

- Main information is easy to read
- Multilingual: EN – FR – DE – IT – ES
- Simple and clear event messages
- Intuitive settings and diagnostics menus
- Configurable display orientation: 0 – 90 – 180 – 270°
- Lockable to prevent undesired changes



Multilingual



EN FR DE IT ES



# MVG

## Modular Vacuum Grippers

### Straightforward Communication



NFC )))

The NFC wireless technology integrated in the HMI together with the COVAL Vacuum Manager app allow you to access and make changes to all the configuration and diagnostic functions using your mobile devices.

#### Additional functions:

- Read/write settings with the device powered off or on
- Copy settings from one gripper to another
- Save up to 5 setting configurations
- COVAL support: Send a report specifying the settings and diagnostic data to the COVAL departments to get technical support.

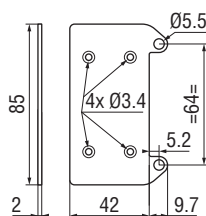


**NFC APP: COVAL Vacuum Manager**  
Available for Android and iOS

#### Accessories for Remote HMI

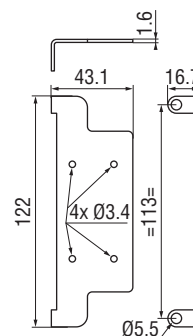
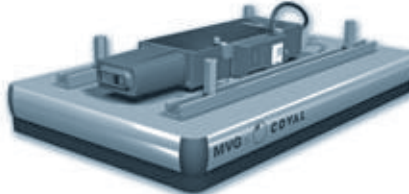
##### Front mounting plate

+ 2 x TORX M3x6  
+ 2 x CHC M5x50  
Part no.: **HMIHD1FIXA**



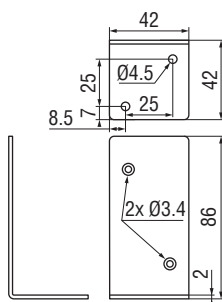
##### Side mounting plate

+ 2 x TORX M3x6  
+ 2 x CHC M5x50  
Part no.: **HMIHD1FIXC**



##### 90° angled mounting plate

+ 2 x TORX M3x6  
Part no.: **HMIHD1FIXB**



##### Connecting cable

M8 4-pin female/M8 4-pin male, compatible with cable chain

- 2 m length: part no. **CDM8MF4PL2**
- 5 m length: part no. **CDM8MF4PL5**
- Other lengths available upon request.



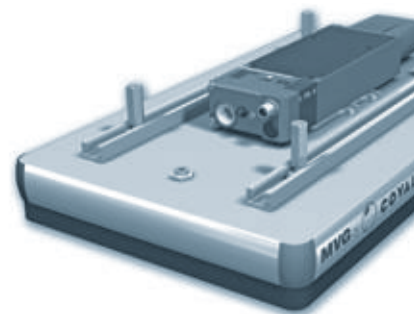
Note: all dimensions are in mm.



# MVG

## Modular Vacuum Grippers

### Product Selection Guide



#### Multi-Stage Vacuum Pump Control

Where required, MVG series vacuum grippers with integrated multi-stage vacuum pump (versions D1 and D2) can be equipped with a vacuum and/or blow-off control valve to optimize object release. This also enables cleaning of the vacuum network, flow control nozzles, check valves, or airtight valves.

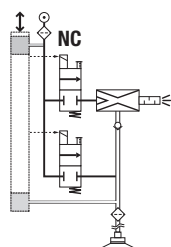
A vacuum switch or analog gauge is available as an option for those requiring a visual display of the vacuum level in the system (see below).

#### Vacuum Control: Two Solutions

Model MVG\_**S**: vacuum gripper featuring a vacuum pump with **NC** vacuum control and **NC** blow-off control.

In the event of power failure, vacuum is no longer generated. In the event of compressed air failure, the vacuum is no longer maintained.

- NC blow-off and vacuum control valves
- Choice of blow-off settings (only on MVG\_**S2** models):
  - Controlled by external signal
  - Automatic timer from 50 to 9999 ms (advantage: saves one controller output)

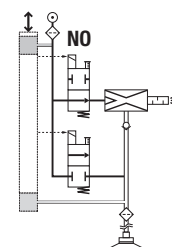


Model MVG\_**V**: vacuum gripper featuring a vacuum pump with **NO** vacuum control and **NC** blow-off control.

In the event of power failure, vacuum is still generated: object is held in place → fail-safe.

In the event of compressed air failure, the vacuum is no longer maintained.

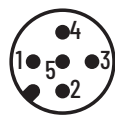
- NO vacuum control valve
- NC blow-off control valve
- Blow-off controlled by external signal



#### Electrical Connections

MVG\_**S1/V1**:

- One M12 5-pin male connector

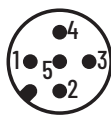


- |   |  |
|---|--|
| 1 | /                                      |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC blow-off command               |
| 5 | /                                      |



MVG\_**S2/V2**:

- One M12 5-pin male connector



- |   |  |
|---|--|
| 1 | 24 V CC                                |
| 2 | 24 V DC suction command <sup>(1)</sup> |
| 3 | 0 V - GND                              |
| 4 | 24 V DC object gripped DO1 - C/Q       |
| 5 | 24 V DC blow-off command               |



- One M8 4-pin male connector → HMI



- |   |               |
|---|---------------|
| 1 | 24 V CC       |
| 2 | RS485 (DATA+) |
| 3 | 0 V - GND     |
| 4 | RS485 (DATA-) |

<sup>(1)</sup> 24 V DC suction command, depending on version:

- **S**: 24 V DC vacuum control
- **V**: 24 V DC vacuum off command

⊗ : connections for ⊗ IO-Link



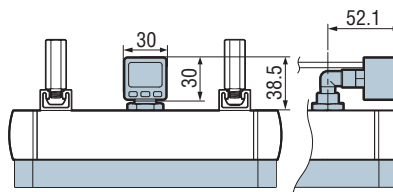


#### Vacuum Level Display

Where required, MVG series grippers can include a vacuum level display with an electronic vacuum switch or vacuum gauge:

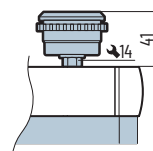
##### ■ Option VA – electronic vacuum switch with digital display (PSD100CPNP): MVG\_\_\_\_\_X\_\_VA

- Pressure rating range: 0 ~ -101.3 kPa
- Pressure setting range: 10 ~ -101.3 kPa
- Max. pressure: 300 kPa
- Fluid: air, non-corrosive/non-flammable gas
- Hysteresis: adjustable
- Response time:  $\leq 2.5$  ms, with anti-vibration function
- 7-segment LCD display: 2 color (red/green) main display, orange sub-display (refresh rate: 5 times/second)
- Choice of pressure unit display: kPa, MPa, kgf/cm<sup>2</sup>, bar, psi, inHg, mmHg
- Power supply voltage: 12 to 24 V DC  $\pm 10\%$
- Current consumption:  $\leq 40$  mA (without load)
- Repeatability (switch output):  $\leq \pm 0.2\%$  F.S.  $\pm 1$  digit
- Electrical connection: M8 (4-pin)
- Degree of protection: IP40
- Operating temperature: 0 – 50 °C
- Enclosure material: PA 6.6 20%GF



##### ■ Option VF – vacuum gauge (VAF11140): MVG\_\_\_\_\_X\_\_VF

- Damping: by silicone movement (patented)
- Measuring: Bourdon tube in CuSn
- Precision: cl. 2.5 (+/- 2.5% of max. scale value)
- Enclosure: black ABS

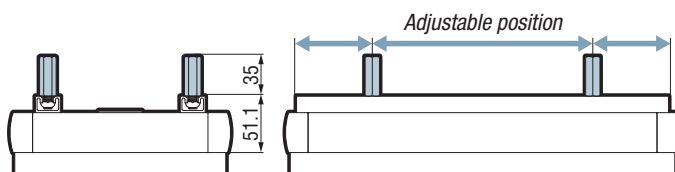
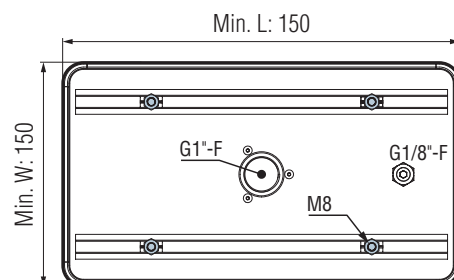


##### ■ Option VI - IHM : MVG\_\_\_\_\_X\_\_VI

#### Version G0

The G0 version of COVAL MVG series vacuum grippers (with external vacuum generator) can be mounted on all types of automated or robotic systems, using M8 spacers that slide in the grooves on the aluminum profile (fastened using M8 screws).

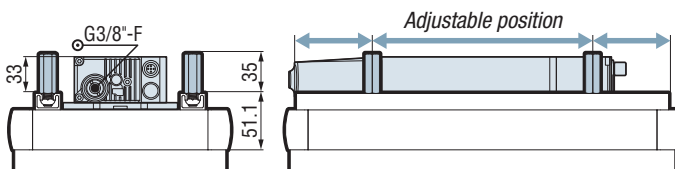
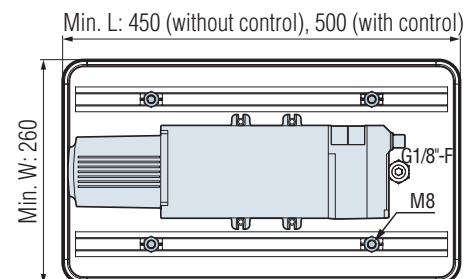
The number of M8 spacers used depends on the vacuum gripper's size.



#### Version D1 or D2

The D1 and D2 versions of COVAL MVG series vacuum grippers (with an integrated CMS HDE series vacuum generator) can be mounted on all types of automated or robotic systems, using M8 spacers that slide in the grooves on the aluminum profile (fastened using M8 screws).

The number of M8 spacers used depends on the vacuum gripper's size.



**3D  
COVAL  
Data**

You can access 3D files of all COVAL products in formats compatible with the main CAD software on COVAL's website [www.coval.com](http://www.coval.com)

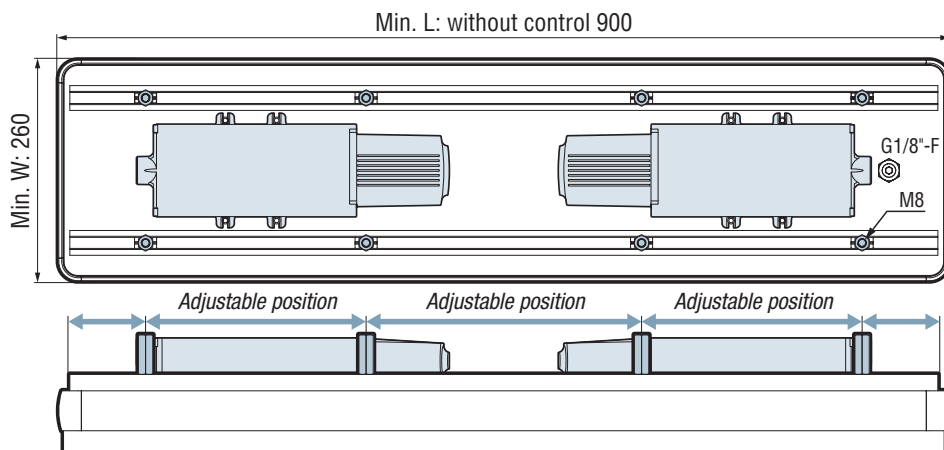
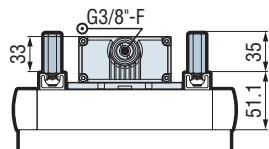
Note: all dimensions are in mm. Dimensions are indicative and may change depending on selected options.





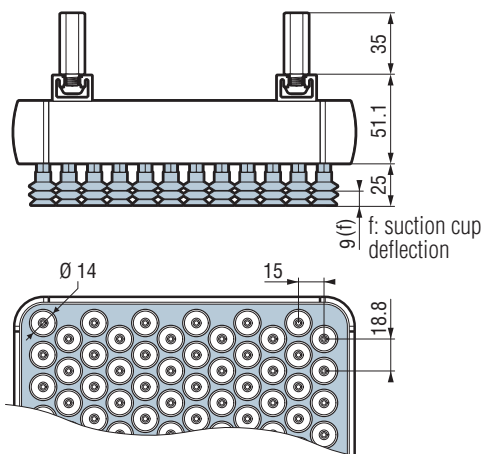
#### Version D3

The D3 version of COVAL's MVG series vacuum grippers (with two integrated CMS HDE series vacuum generators) feature adjustable M8 spacers. The number of M8 spacers used depends on the vacuum gripper's size.

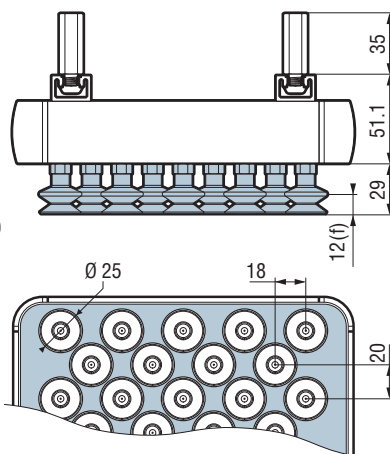


#### MVG Series with Suction Cup Gripping Interface

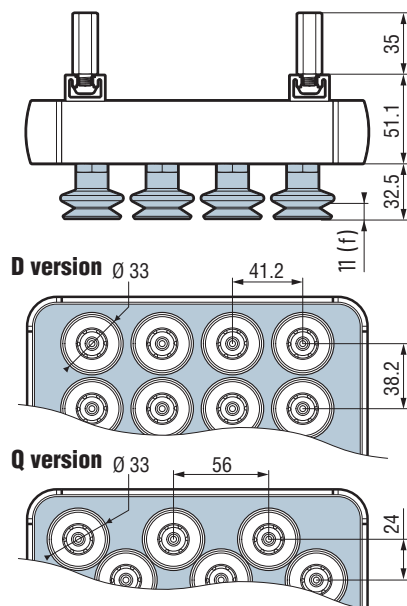
##### "Mini" suction cup interface



##### "Medium" suction cup interface

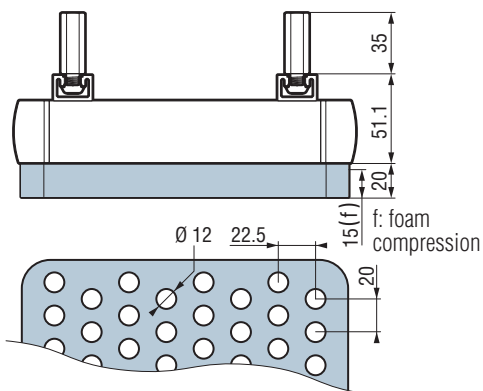


##### "Max" suction cup interface

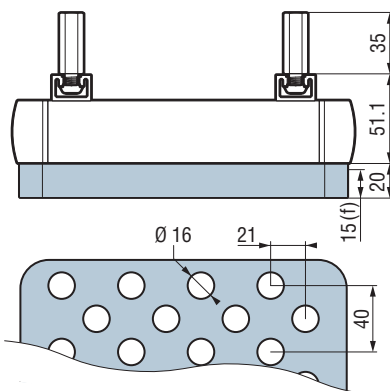


#### MVG Series with Foam Gripping Interface

##### "Mini" foam interface



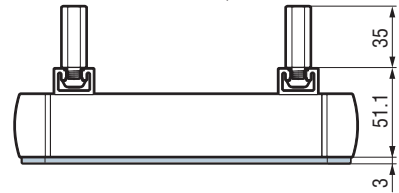
##### "Max" foam interface



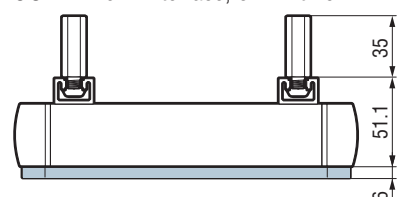
#### "COVAL-flex" Gripping Interface

##### COVAL-flex

"COVAL-flex" interface, 3 mm thick



"COVAL-flex" interface, 6 mm thick



Note: all dimensions are in mm.





	<b>MVG</b>	...	<b>X</b>	...	<b>D</b>	<b>VSA33JK</b>	<b>X</b>		<b>H</b>	<b>X</b>	
--	------------	-----	----------	-----	----------	----------------	----------	--	----------	----------	--

<b>LENGTH</b>	↓
Overall length (mm): from 150 to 1200 mm	...

<b>WIDTH</b>	↓
Overall width (mm): from 150 to 1000 mm	...

<b>GRIP PATTERN LAYOUT</b>	↓
Staggered	<b>Q</b>
Straight*	<b>D</b>

\* Only available for "max" suction cup interface with min. suction cup dia. of 26 mm.

	<b>SUCTION CUP GRIPPING INTERFACES</b>		<b>FILTER</b>		<b>TECHNOLOGY</b>
	<b>"Mini" interface:</b> 2.5 bellows suction cups Ø 14 mm made of 35 Shore silicone with flow control nozzles.	<b>VSP14BF</b>	<b>X</b>	Without	<b>H</b> Flow control nozzles
	<b>"Medium" interface:</b> 1.5 bellow suction cups Ø 25 mm made of natural rubber with flow control nozzles.	<b>VSA25JI</b>			
	<b>"Max" interface:</b> 1.5 bellow suction cups Ø 33 mm made of natural rubber with flow control nozzles.	<b>VSA33JK</b>			
	<b>"Max" interface:</b> 2.5 bellows suction cups Ø 30 mm made of 35 Shore white silicone with flow control nozzles.	<b>MVS30EK</b>			

	<b>FOAM GRIPPING INTERFACES</b>		<b>FILTER</b>		<b>TECHNOLOGY</b>
	<b>"Mini" interface:</b> EPDM (20 mm thick)	<b>F2S</b>	<b>X</b>	Without	<b>H</b> Flow control nozzles
	<b>"Max" interface:</b> EPDM (20 mm thick)	<b>F2B</b>	<b>F</b>	With	<b>E</b> Airtight valves

	<b>COVAL-flex GRIPPING INTERFACES</b>				<b>V</b> Check valves
	COVAL-flex gripping interfaces are designed to meet the needs of specific applications. COVAL's sales team would be happy to provide any recommendations or further information you may require should your application be able to use any of their special				





	D1	S		1		K		VA
<b>VERSION WITHOUT VACUUM GENERATOR</b>			<b>GENERATOR CONTROL</b>		<b>GENERATOR CONFIGURATION</b>		<b>EXHAUST</b>	
Without generator	<b>G0</b>	<b>N</b>	Without	<b>0</b>	Without	<b>X</b>	Without	
<b>VERSIONS WITH VACUUM GENERATOR*</b>			<b>GENERATOR CONTROL</b>		<b>GENERATOR CONFIGURATION</b>		<b>EXHAUST</b>	
1 x <b>CMSHDE_50</b> multi-stage vacuum pump Flow rate: 700 NI/min	<b>D1</b>	<b>N</b>	Without	<b>0</b>	Without	<b>K</b>	Through-type silencer	
1 x <b>CMSHDE_100</b> multi-stage vacuum pump Flow rate: 1100 NI/min	<b>D2</b>	<b>S*</b>	<b>CMSHDE__S__</b> Multi-stage vacuum pump with <b>NC</b> vacuum control and <b>NC</b> blow-off control. Choice of blow-off settings (only on MVG__S2__ models): ▪ Controlled by external signal ▪ Automatic timer from 50 to 9999 ms (advantage: saves one controller output)	<b>1</b>	<b>CMSHDE__VOC15P</b> Controlled multi-stage vacuum pump without vacuum switch or HM ▪ One M12 5-pin male PNP ▪ Digital inputs/outputs mode (SIO)			
2 x <b>CMSHDE_100</b> stage vacuum pumps Flow rate: 2200 NI/min	<b>D3</b>			<b>2</b>	<b>CMSHDE__VXC15X</b> ▪ Controlled multi-stage vacuum pump with integrated vacuum switch and pressure sensor, without HMI ▪ One M12 5-pin configurable as PNP/NPN ▪ One M8 4-pin male for remote HMI ▪ Electronic vacuum switch ▪ Digital Output DO1 "object gripped" 24 V DC/NO ▪ Digital inputs/outputs mode (SIO)/ ▪ IO-Link ▪ Compatible with HMI (for option VI)			
* See table: "Vacuum pump configurations by gripper length".								
* Only for D1 and D2.								
<b>VACUUM LEVEL DISPLAY</b>								
Without								<b>V0</b>
Electronic vacuum switch with display								<b>VA</b>
Vacuum gauge								<b>VF</b>
HMI on CMS HDE (option only compatible with versions S2 and V2)								<b>VI</b>

Integration of the VA, VF, and VI options depends on the gripper size and on the integrated vacuum generator(s).

→ To be confirmed during gripper engineering and design study.





#### **MVG200X200QF2BFHXGONOXV0**

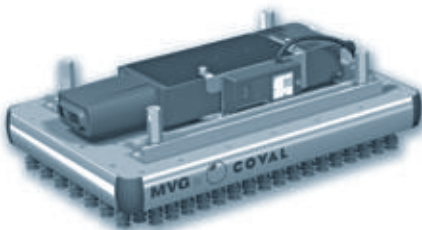
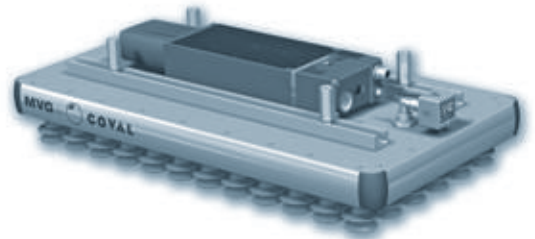
MVG vacuum gripper, 200 x 200 mm, “staggered” grip pattern layout, “max” EPDM foam gripping interface with filter, nozzles, and no integrated vacuum generator.

⚖ 1.6 kg.

#### **MVG500X265DVSA33JKXHXD2S1KVA**

MVG vacuum gripper, 500 x 265 mm, “straight” grip pattern layout, “max” gripping interface, 1.5 bellows suction cups Ø 33 mm made of natural rubber with flow control nozzles, a CMSHDE\_100 multi-stage vacuum pump, NC vacuum and blow-off control, and electronic vacuum switch with display for vacuum level display.

⚖ 4.9 kg.



#### **MVG380X250QVSP14BFXHXD2V2KVI**

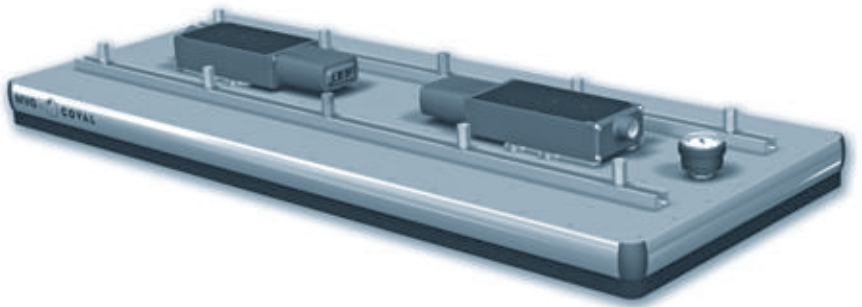
MVG vacuum gripper, 380 x 250 mm, “staggered” grip pattern layout, “mini” gripping interface, 2.5 bellows suction cups Ø 14 mm made of 35 Shore silicone with flow control nozzles, a CMSHDE\_100\_ multi-stage vacuum pump with NO vacuum control and NC blow-off control, vacuum switch, pressure sensor, and HMI.

⚖ 4.9 kg.

#### **MVG1000X400QF2SXHXD3NOKVF**

MVG vacuum gripper, 1000 x 400 mm, “staggered” grip pattern layout, “mini” EPDM foam gripping interface with nozzles, CMS HDE 100 multi-stage vacuum pumps without control, and vacuum gauge for vacuum level display.

⚖ 10.8 kg.





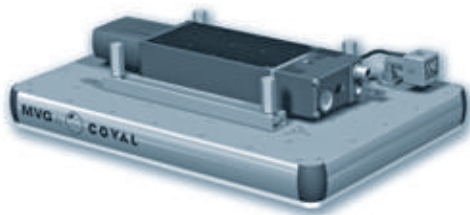
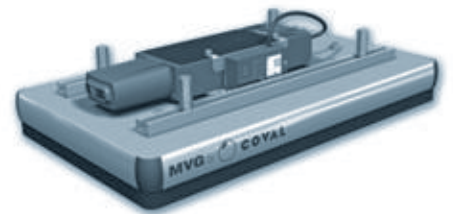
#### COVAL CUSTOMIZATION



There might be situations where the standard MVG configurations available here will not match your application requirements.



COVAL can provide customized solutions, based on your operating specifications, integrating specific functions (e.g. multi-zoning) or by suggesting a gripping interface based on the COVAL range of suction cups (a wide choice of shapes, diameters and materials) to efficiently meet all your requirements.



#### MVG410X280Z01G6XHxD2S1KVA

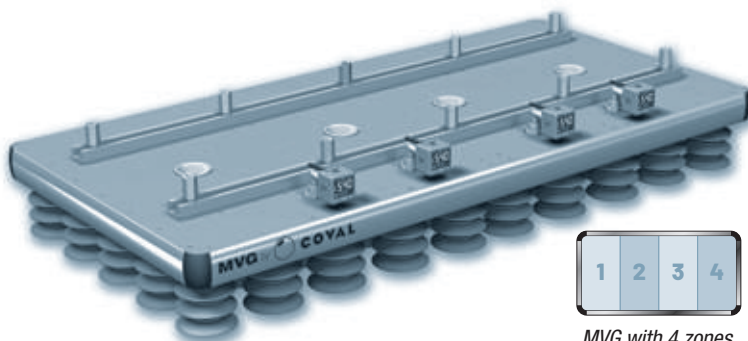
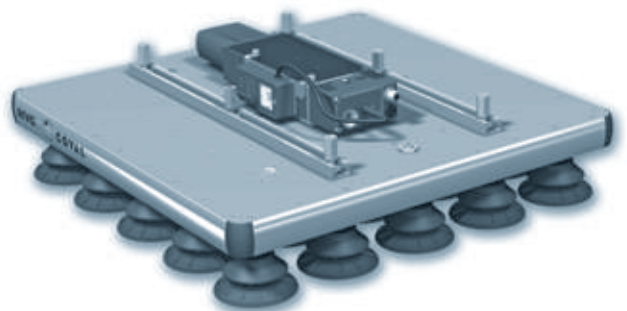
MVG vacuum gripper, 410 x 280 mm, "straight" grip pattern layout, 6 mm-thick COVAL-flex gripping interface with nozzles, a CSMHDE\_100 multi-stage vacuum pump with NC vacuum and blow-off control, electronic vacuum switch with display for vacuum level display, and 4 through-holes for customer's fitting requirements.

⚖ 5 kg.

#### MVG500X500Z01CBC85HPXHxD2S2KVI

MVG vacuum gripper, 500 x 500 mm, "straight" grip pattern layout, gripping interface with C series 1.5 bellows suction cups Ø 85 mm made of nitrile with nozzles, a CSMHDE\_100 multi-stage vacuum pump with NC vacuum and blow-off control, vacuum switch, pressure sensor, HMI, and an M12 bulkhead adapter for sensor.

⚖ 8.5 kg.



MVG with 4 zones

#### MVG800X400Z04VS62JNXHXGONOXVA

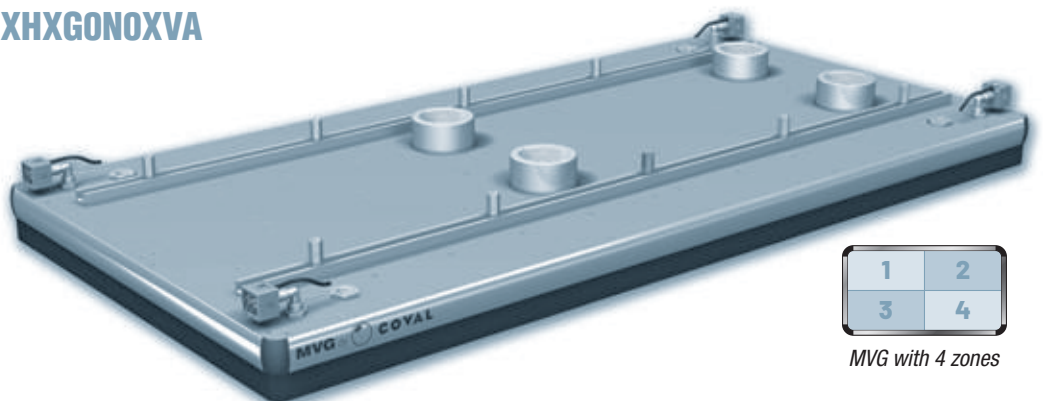
MVG vacuum gripper, 800 x 400 mm, "straight" grip pattern layout, gripping interface with VS series 2.5 bellows suction cups Ø 62 mm made of natural rubber with flow control nozzles, 4 independent zones equipped with an electronic vacuum switch with display, and no integrated vacuum generator.

⚖ 11 kg.

#### MVG1200X600Z04F3BXHXGONOXVA

MVG vacuum gripper, 1200 x 600 mm, "straight" grip pattern layout, "max" 30 mm-thick EPDM foam gripping interface with nozzles, 4 independent zones equipped with an electronic vacuum switch with display, and no integrated vacuum generator.

⚖ 17.8 kg.



MVG with 4 zones



# MVG

## Modular Vacuum Grippers

### Technical Specifications



#### General Specifications

- Operating temperature: 0 to 50 °C (32 to 122 °F)
- Material of gripper: aluminum, PA 6.6 15% GF, brass, stainless steel, neoprene
- Material of foam gripping interface: EPDM
- Materials of suction cup gripping interface:
  - Mini interface: 35 Shore silicone
  - Medium interface: 50 Shore natural rubber
  - Max interface: 50 Shore natural rubber or 35 Shore white silicone

#### Specifications of Multi-Stage Vacuum Pumps

- Supply: non-lubricated air, filtered to 5 microns, according to standard ISO 8573-1:2010 [3:4:4]
- Operating pressure: from 2 to 8 bar
- Optimal dynamic pressure:
  - CMSHDE\_**NVO** (for MVG\_**D\_NO** grippers) without control: 5.5 bar
  - CMSHDE\_**S** / CMSHDE\_**V** with control (for MVG\_**S**/MVG\_**V** grippers): 6 bar
- Pressure connection: G3/8"-F with removable 350 µm filter screen
- Max. vacuum: 80%.
- Air suction flow rate: 700 to 2200 NI/min
- Air consumption: 220 to 840 NI/min
- Noise level:
  - CMSHDE90X**50\_K**: 59 dBA
  - CMSHDE90X**100\_K**: 62 dBA
- Degree of protection: IP65
- Max. operating frequency: 4 Hz
- Endurance: 50 million cycles
- Materials: PA GF, brass, aluminum, steel, NBR, PU, FKM
- M12 and M8 male connectors (depending on version)

#### Integrated electronics

- 24 V DC power supply (regulated ±10%)
- Inputs/outputs protected against reversed wiring and polarity
- Consumption: 170 mA max. (without load)

Only on models CMSHDE\_\_\_**VX**\_\_\_ installed on MVG\_\_\_**S2** / **V2** vacuum grippers:

- Vacuum measuring range: 0 to 99%
- Pressure measuring range: 0 to 10 bar
- Vacuum and pressure measurement accuracy: ±1.5% of the range, compensated for temperature
- Input/output switching mode: PNP or configurable as PNP/NPN
- Digital inputs/outputs mode (SIO) / IO-Link

#### DO1 output signal

Only on models CMSHDE\_\_\_**VX**\_\_\_ installed on MVG\_\_\_**S2** / **V2** vacuum grippers:

- Configurable as PNP or NPN
- NO or NC
- Breaking capacity: 330 mA
- DO1: object gripped output (factory setting 40%)

#### Diagnostic

Only on models CMSHDE\_\_\_**VX**\_\_\_ installed on MVG\_\_\_**S2** / **V2** vacuum grippers:

- Instantaneous vacuum level (unit transmitted over IO-Link: mbar)
- Available information: object gripped, object lost
- Cycle counters (vacuum, blow-off, object gripped, object lost, etc.)

- Supply pressure monitoring
- Supply voltage monitoring
- Product part number and serial number
- Software version

**Indicator** on model CMSHDE\_\_\_**VOC15P**\_\_\_ installed on MVG\_\_\_**S1** / **V1** vacuum grippers:

- Status LED for control functions:
  - Green LED: vacuum control
  - Orange LED: blow-off control

#### Information displayed on HMI (option VI)

- LED gripping status indicator on front panel (green: object gripped, red: object lost)
- 1.54" high-visibility color LCD display:
  - Displays vacuum level with bar graph and thresholds
  - Warns when service life has been exceeded (> 50 million cycles)
  - Explicit fault messages
  - "Suction cup" icon indicating the status of control functions:
    - Green suction cup: vacuum control
    - Orange suction cup: blow-off control
    - Red suction cup: simultaneous vacuum and blow-off control
  - The display rotation can be configured as follows: 0 – 90 – 180 – 270°.

#### Parameter settings available with the HMI or IO-Link

Only on models CMSHDE\_\_\_**VX**\_\_\_ installed on MVG\_\_\_**S2** / **V2** vacuum grippers:

- Choice of blow-off type (only MVG\_**S2**):
  - Controlled
  - Automatic timed, adjustable from 50 to 9999 ms
- Object gripped (L1) control thresholds
- Whenever required by the application, specific threshold and hysteresis settings that are different from the initial factory settings can be defined: L1 = 40%, h1 = 10%

#### + Additional parameter settings available with the HMI

(performed with 4-key membrane keypad):

- Choice of language: EN, FR, DE, IT, or ES
- Choice of vacuum measurement unit (kPa, %, mbar, inHg)
- Choice of pressure measurement unit (MPa, bar, Psi)
- Monostable electrical manual controls

#### Communication

##### IO-Link

- Revision: 1.1
- Transmission rate: COM3 – 230.4 kbit/s
- Min. cycle time: 1 ms
- SIO mode: Yes
- Process Data Input (PDI): 6 bytes
- Process Data Output (PDO): 1 byte
- IO device description file (IODD) available for download

##### NFC

- The COVAL Vacuum Manager mobile app is available on the following devices:
  - Android version 8.1 and higher
  - iOS version 13 and higher



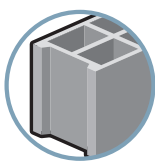
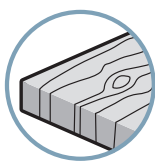
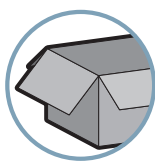
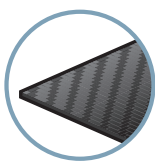
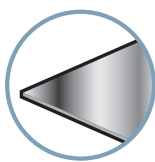
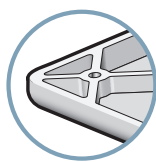
# MVG

## Modular Vacuum Grippers

### Applications



Industry-specific applications





The CSGS system is a comprehensive package that includes a specific suction pad and an optimized vacuum generator and guarantees high reliability for handling plastic or paper bags from 25 to 60 kg, used for packing powder and/or granulated products.

It is particularly recommended for robotic palletizing and de-palletizing applications that require a quick and secure implementation.

#### Gripping capacity:

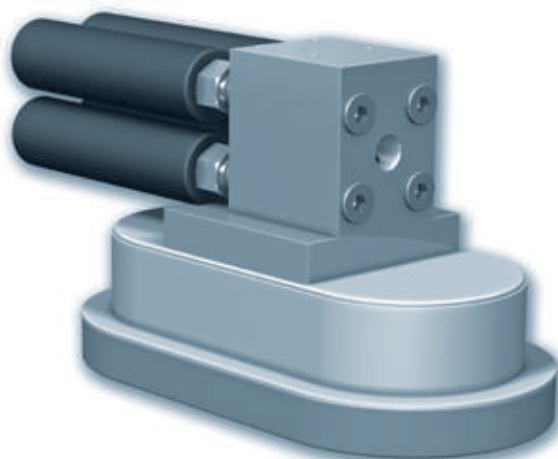
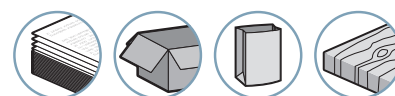
The CSGS...X35 models are equipped with a 250x150 mm suction pad allowing them handle loads of up to 35 kg, depending on the bag's resilience. The CSGS...X60 models are equipped with a 360x190 mm suction pad and can handle loads of up to 60 kg.

#### Advantages

- The CSGS system is designed to support the load handled by the suction pad and thus allows it to be installed directly onto the robot's arm.
- The CSGS system allows for a quick and cost-effective installation: it is fed by a single small-sized compressed air hose, which avoids the complexity of setting up a vacuum network consisting of large pipes and vacuum valves.
- The suction pad features a foam lip that ensures the maximum flexibility required for gripping a variety of product types.
- The specific vacuum generator has been designed to provide high air intake flow rates thus allowing for shorter response times and the handling of porous products.
- It does not include any membrane and has no internal moving parts. It therefore is clog-free and can be installed without requiring any filter on the vacuum network.
- Very low noise level thanks to external silencers.
- No heat emission, vibration-free.



Industry-specific



#### Specifications

<b>Feed pressure</b>	Non-lubricated filtered air 2 to 6 bar
<b>Optimal pressure</b>	4 bar
<b>Weight</b>	From 7 to 8.3 kg, depending on model
<b>Materials</b>	NR, aluminum, CuZn, steel
<b>Temperature</b>	From 10 to 50 °C

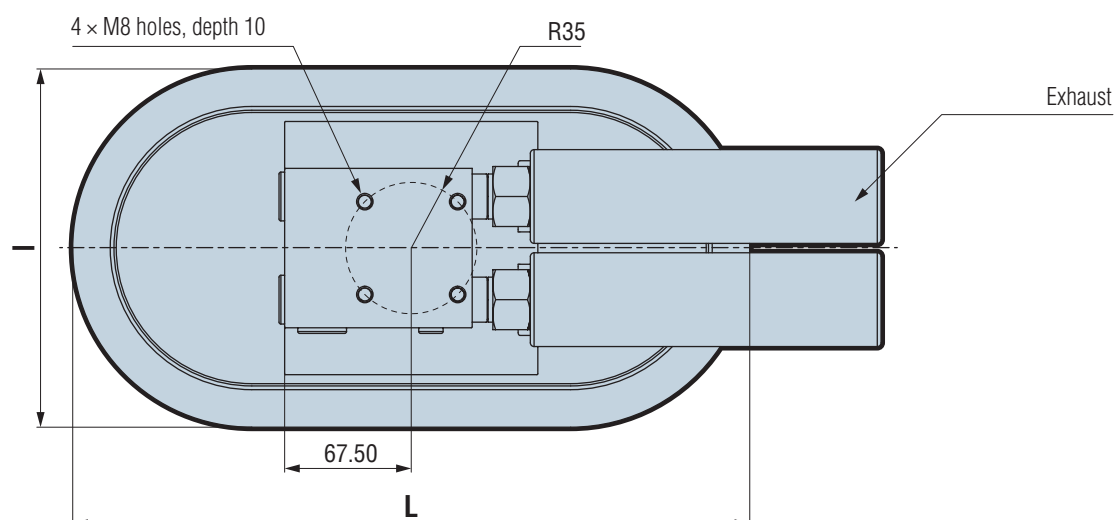
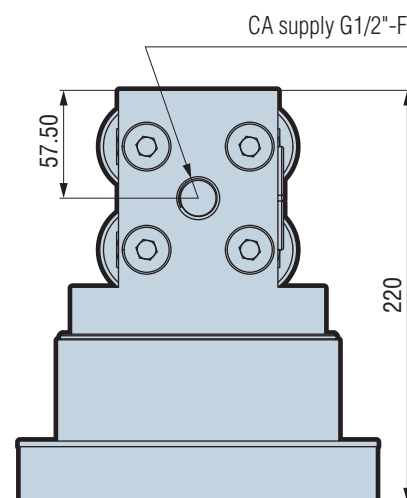
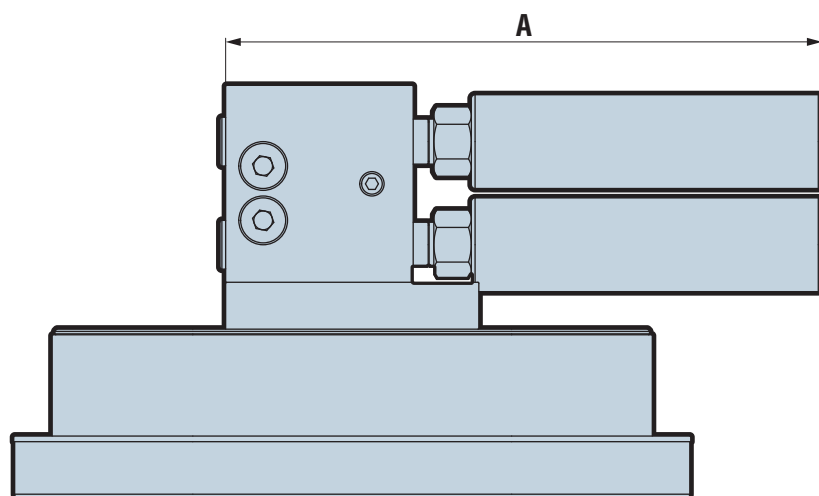
#### Characteristics

Model	Air consumed (l/min)			Maximum vacuum (%)	Air drawn (l/min)
	4 bar	5 bar	6 bar		
<b>CSGS4X15X35</b>	400	480	560	75	720
<b>CSGS4X20X35</b>	720	864	1008	75	1000
<b>CSGS4X25X60</b>	1080	1296	1512	84	1440
<b>CSGS4X30X60</b>	1600	1920	2240	84	1800



Please specify model, e.g.: CSGS4X15X35  
Refer to characteristics table above





Model	L	I	A	Silencer
CSGS4X15X35	250	150	229	SILK12C
CSGS4X20X35	250	150	229	SILK12C
CSGS4X25X60	360	190	318	SILK34C
CSGS4X30X60	360	190	390	SILK34C

All dimensions are in mm.



# Peripheral Devices

## Chapter 14

### VRU



#### Vacuum Rotary Union

- Connection: G3/4"-F
- Mounting interface: ISO 9409-1-50-4-M6
- Flow Rate: 1500 NI/min

- Compact and lightweight
- Excellent mechanical resistance
- Continuous rotation
- Ideal for cobotic

**P** 14/2

### VRS



#### Vacuum Rotary Connection

- Connection: G3/4"-F
- Flow Rate: 1500 NI/min
- Maximum speed: 40 tr/min

- Compact and lightweight
- Excellent mechanical resistance
- Continuous rotation
- Ideal for cobotic

**P** 14/3

### NVS

### NVR

### NVA



#### Vacuum Feeders

- Vacuum feeders, 1 input, 4 to 8 outputs
- NVS: Screwed feeder fittings
- NVR: Push fitting feeder fittings
- NVA: Threaded aluminum feeder

- Facilitates optimum vacuum management by improved distribution
- Eliminates air pressure loss
- Simplifies connection
- Less time-consuming installation
- Compact and lightweight

**P** 14/4

### RDV

### RCOV

### Y



#### Screwed Vacuum Fittings with O-ring

- RDV, RCOV and RY series: Straight, adjustable elbow or Y fitting
- Diameter options: 5.5/8, and 6/8, 7/10, 8/10, 1 0/12
- Gas fittings options: 1/2", 1/4", 1/8", 3/8"

- 100% vacuum-tight
- Integrated O-ring
- Improved circuit sealing
- Can be removed and reinstalled without requiring preparation of the tubing

**P** 14/5

### RVM

### RVF

### RVT

### TVR

### COV



#### Fittings, Vacuum Tubes, Collars

- Rigid tubes allow a vacuum network to be installed with no pressure loss

- Barbed fittings guarantee a rigid connection between the source and the vacuum tube

- Collars used on TVR type pipes to guarantee network sealing

**P** 14/6

### REV 38



#### Vacuum Regulator

- Adjustment precision: 3.4 mbar
- Materials used in the VITON body and lacquered aluminum foundry
- Adjustment by threaded pin
- G3/8" fitting attachment bracket

- Direct connection to a vacuum pump
- Very fine adjustment

**P** 14/7

### AG



#### Vacuum Valves, 3 channels

- Connection to the vacuum network
- Electric control
- Voltage: 12 VDC, 24 VDC or VAC, 110 VAC, 220 VAC
- NO or NC for the vacuum or compressed air supplied servo

- Facilitates vacuum or compressed air network management
- NO or NC option allows adaptation to suit the application

**P** 14/8

### PA



#### Angular Jaw Clamps

- Adjustment of finger speed with compressed air regulator
- 3 models

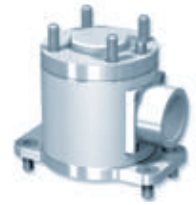
- For use on all types of manipulators
- Recommended for injection press unloading robots for parts or sprue

**P** 14/10



## VRU

# Vacuum Rotary Union




The VRU Series Vacuum Rotary Union, with its robust and lightweight design, provides a direct connection between the robot and the gripper, while also allowing an external vacuum supply to the gripper.

Its continuous rotation system avoids coiling of the hose and eliminates force constraints when used with collaborative robots.

## Advantages

- Compact and lightweight
- Excellent mechanical resistance
- Easy integration: Mounting interface: ISO 9409-1-50-4-M6
- Continuous rotation
- Ideal for cobotic

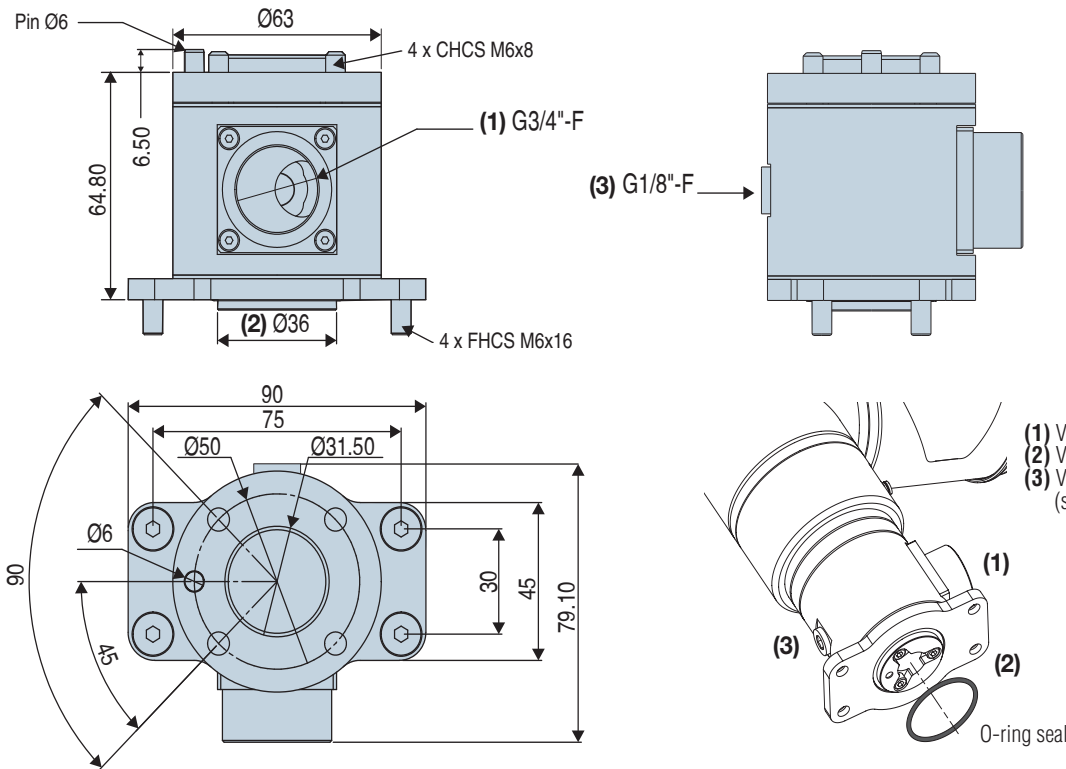
## Characteristics

Model	Flow Rate (l/min)	Connection	 (g)
VRU34A50	1500	G3/4"-F	440

## Specifications

<b>Materials</b>	Steel - Aluminum - POM - Brass - NBR Nitrile
<b>Temperature range</b>	From -10 to +50°C

## Dimensions



Note: All dimensions are in mm.  
The values represent the average characteristics of our products.



**To order please specify: VRU34A50**

## Accessory

G3/4" on-line rotating seal, part n° VRS34MF



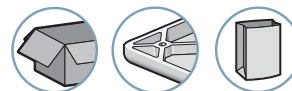
# VRS

## Vacuum Rotary Connection



The VRS Series Vacuum Rotary Connection, with its robust and lightweight design, provides an in line rotary connection for vacuum supplies. Its continuous rotation system avoids coiling of the hose and eliminates force constraints when used with collaborative robots.

Industry-specific applications



### Advantages

- Compact and lightweight
- Excellent mechanical resistance
- Continuous rotation
- Ideal for cobotic

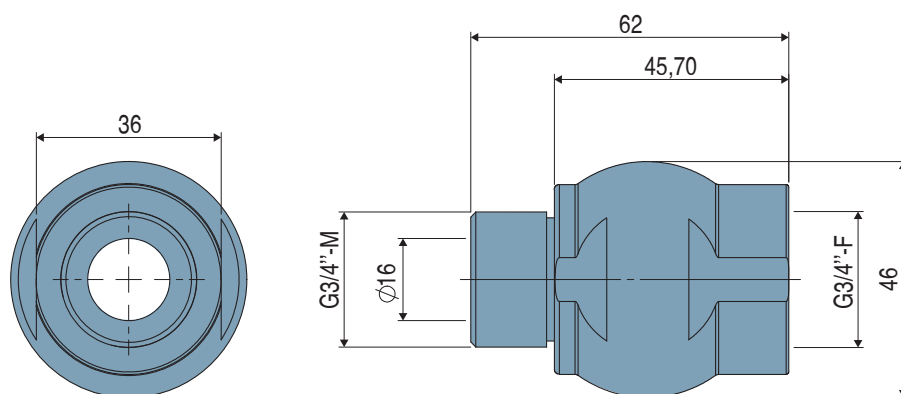
### Characteristics

Model	Flow Rate (Nl/min)	Through bore Ø (mm)	Maximum speed (tr/min)	Connection	Weight (g)
VRS34MF	1500	16	40	G3/4"-M/F	135

### Specifications

Materials	Aluminum - NBR Nitrile - Steel
Temperature range	From -10 to +50°C

### Dimensions



Note: All dimensions are in mm.  
The values represent the average characteristics of our products.



To order please specify: VRS34MF

### Accessory

Vacuum Rotary Union part n° VRU34A50



# NVS, NVR, NVA

## Vacuum Feeders

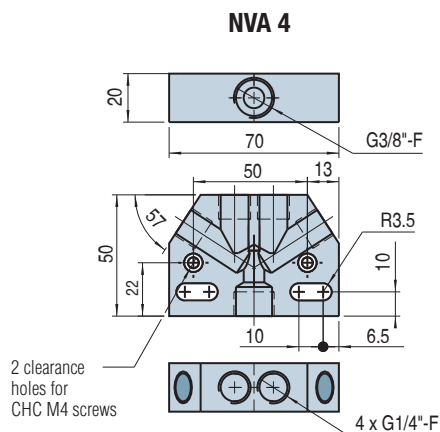
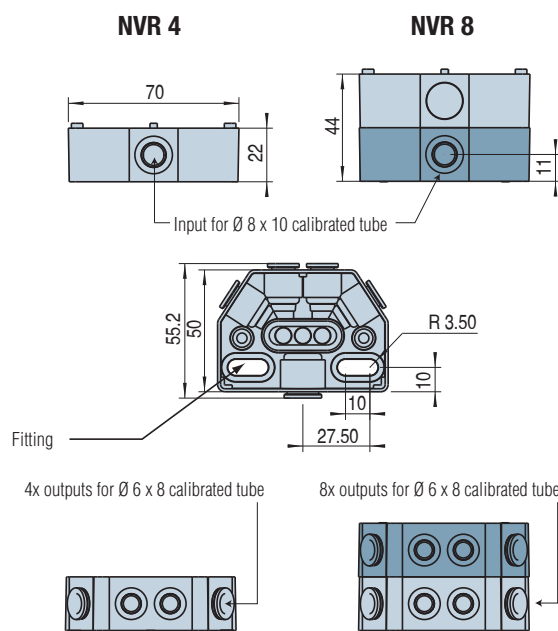
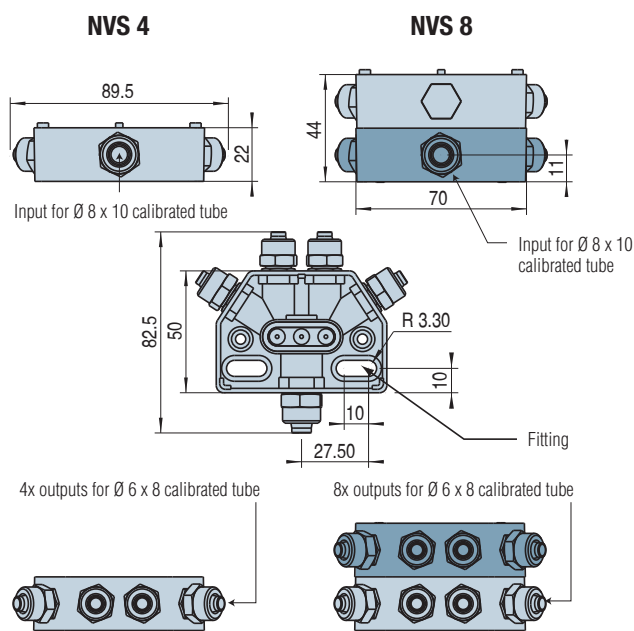


The NVS and NVR series vacuum feeders enable distribution of the vacuum in 4 to 8 channels by a simple unit. The 8/10 inputs and 4 or 8 6/8 outputs eliminate pressure loss.

### Characteristics

		Screwed vacuum fittings		Push fittings		Threaded
Models		NVS 4	NVS 8	NVR 4	NVR 8	NVA 4
Material	Body	PA 6.6 – 30 % fiber glass, black, ULVO94				Aluminium 2014 A
	fitting	Nickel-plated brass		PA		
For tube		calibrated polyamide or polyurethane (PUR)				4 x G1/4"-F and 1 x G3/8"-F
Vacuum		■ ++	■ ++	■	■	
Pressure (up to 10 bar max.)		-	-	■	■	■

■ ++ Recommended for vacuum networks with regulation



For all orders, please specify:  
Model + Type + Number of outlets  
e.g.: NVS8

1: Model	2: Type	3: Number of outlets
NV	S screwed fittings	4 4 outputs - 1 input
	R push fittings	8 8 outputs - 1 input
	A threaded	4 4 outputs - 1 input

Note: All dimensions are in mm

Note: for NVA series, one reference only: NVA4



# RDV, RCOV, Y

## Screwed Vacuum Fittings with O-ring



### Characteristics

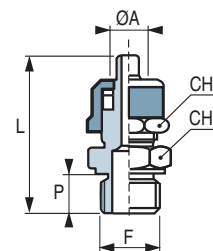
Range of special vacuum-tight fittings, fitted with O-ring (blue).

- 100% vacuum-tight and improved circuit sealing
- Can be removed and reinstalled without requiring preparation of the tubing
- Adjustable fittings for improved vacuum distribution
- Material: nickel-plated brass

### RDV Series Straight Fitting

Ref.	ØA	F	CH	CH1	P	L
RDV1868	6/8*	G1/8"-M	14	14	6	26
RDV1468	6/8*	G1/4"-M	17	14	8	29
RDV14810	8/10	G1/4"-M	17	16	9	30.5
RDV3868	6/8*	G3/8"-M	19	14	9	30.5
RDV38810	8/10	G3/8"-M	19	16	9	32
RDV38812	8/12	G3/8"-M	19	19	9	32.3
RDV12810	8/10	G1/2"-M	24	16	10	33.5
RDV381012	10/12	G3/8"-M	19	19	9	32.3
RDV12812	8/12	G1/2"-M	24	19	10	34.5
RDV121012	10/12	G1/2"-M	24	19	10	34

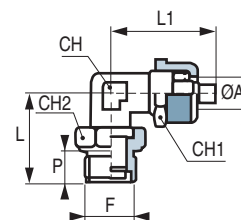
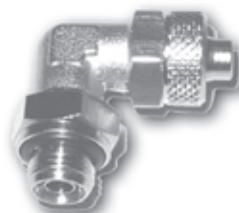
\* 6/8 fittings are 5.5/8 compatible.



### RCOV Series Elbow Fitting

Ref.	ØA	F	CH	CH1	CH2	P	L	L1
RCOV1868	6/8*	G1/8"-M	10	14	14	7	24	22
RCOV1468	6/8*	G1/4"-M	13	14	17	9	28.5	27.5
RCOV14810	8/10	G1/4"-M	13	16	17	9	28.5	28
RCOV3868	6/8	G3/8"-M	13	14	22	9	29	27.5
RCOV38810	8/10	G3/8"-M	13	16	22	9	29	28
RCOV12810	8/10	G1/2"-M	17	16	26	10	35	34
RCOV121012	10/12	G1/2"-M	17	19	26	10	35	34

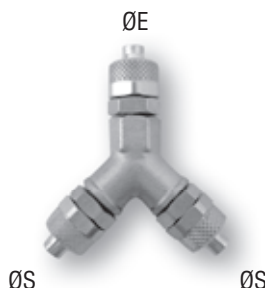
\* 6/8 fittings are 5.5/8 compatible.



### Y Fitting, Y Series

Ref.	ØE	ØS
Y68	6/8*	6/8*
Y810	8/10	8/10
Y81068	8/10	6/8
Y812	8/12	8/12
Y81268	8/12	6/8
Y1012	10/12	10/12
Y1012810	10/12	8/10

\* 6/8 fittings are 5.5/8 compatible.



Note: All dimensions are in mm



# RVM, RVF, RVT, TVR, COV

## Fittings, Vacuum Tubes, Collars

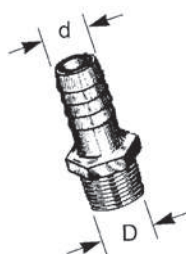
### Fittings RVM, RVF, RVT

Barbed fittings used to connect the vacuum source to the vacuum tube to guarantee a rigid connection.

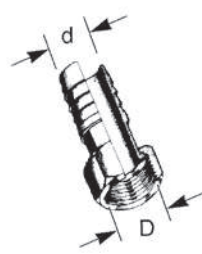
Material: **brass**

Models	D	D1	D2	d*
RVM 1014	G1/4"-M	-	-	10
RVM 1038	G3/8"-M	-	-	10
RVM 1538	G3/8"-M	-	-	15
RVM 1512	G1/2"-M	-	-	15
RVM 2012	G1/2"-M	-	-	20
RVM 2034	G3/4"-M	-	-	20
RVF 1038	G3/8"-F	-	-	10
RVF 1512	G1/2"-F	-	-	15
RVF 2034	G3/4"-F	-	-	20
RVT 1012	-	G1/2"-F	G3/8"-M	10
RVT 1534	-	G1/2"-F	G3/4"-M	15

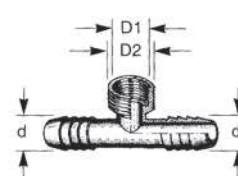
(\*) Inside diameter of the suitable pipe



RVM



RVF



RVT

### Vacuum Tubes TVR

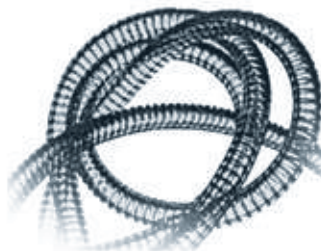
Thanks to their rigid design and steel coil, they ensure there is no pressure loss on the vacuum network.

Colour: **Crystal**

Models	inside Ø	outside Ø	r*
TVR 10	10	16	18
TVR 15	15.5	22.5	30
TVR 20	19.5	27.5	37

\*r: minimum curve fitting

TVR vacuum tubes hold a 90% vacuum with an ambient temperature of 30°C.



### Collars COV

Accessory to be used for attaching TVR type pipes to guarantee perfect sealing.

Material: **stainless steel**

Models	Tube réf.	L
COV 10	TVR 10	7
COV 15	TVR 15	7
COV 20	TVR 20	7

Other dimensions and shapes on request.



Note: All dimensions are in mm



# REV 38

## Vacuum Regulator



When connected to an electric vacuum pump, the REV series vacuum regulator ensures a precise, stable vacuum. The user can obtain very fine adjustment thanks to the adjustment knob.

### Characteristics

- Vacuum supply (Max): -1013 mbar
- Adjustment precision: 3.4 mbar
- Through flow: 85 NI/min to -846 mbar
- Operating temperature : 4 to 90°C / 40 to 194°F

### Specifications

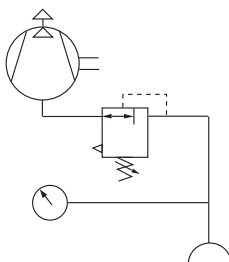
Adjustment	By threaded pin
------------	-----------------

Material:

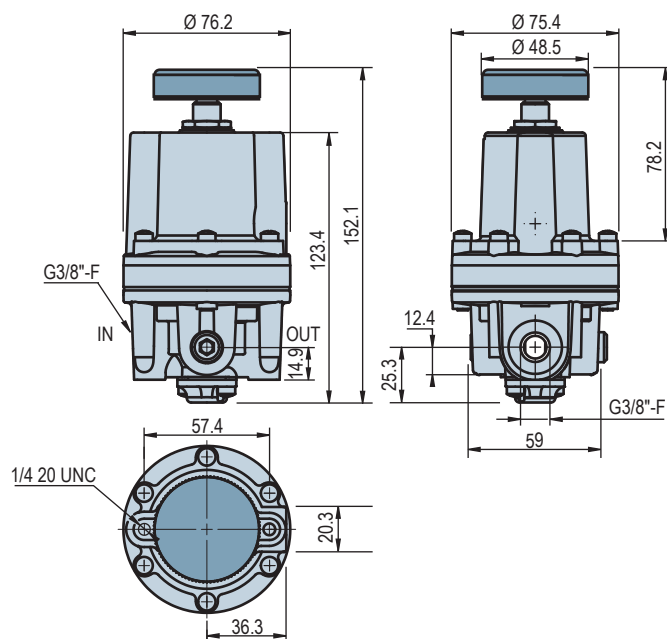
Body: **Aluminum**

Internal system: **brass, zinc-plated steel**

Elastomer: **Nitrile**



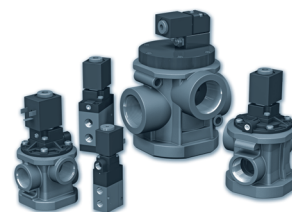
### Dimensions



For all orders, please specify: REV 38



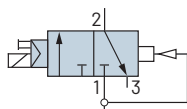
## Vacuum Valves, 3 channels



The **3-channel AG vacuum valves** are designed to optimize vacuum networks, offering increased efficiency in various applications. Available in configurations with vacuum or compressed air supplied servos, and in normally open or closed modes, they offer flow rates ranging from 1.5 to 180 m<sup>3</sup>/h and various control voltages, thus meeting diverse industrial needs.

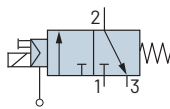
### NC vacuum supplied servo

- 1: Pump
- 2: Use
- 3: Exhaust



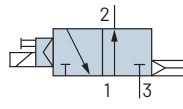
### NC C.A. supplied servo

- 1: Pump
- 2: Use
- 3: Exhaust



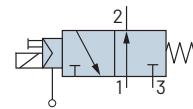
### NO vacuum supplied servo

- 1: Pump
- 2: Use
- 3: Exhaust



### NO C.A. supplied servo

- 1: Pump
- 2: Use
- 3: Exhaust

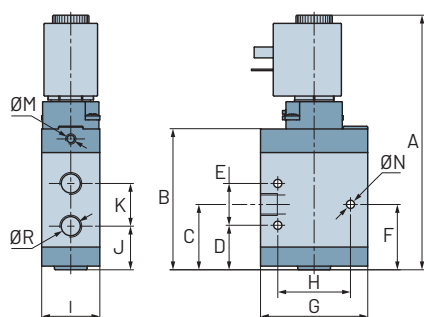


## Characteristics and Dimensions

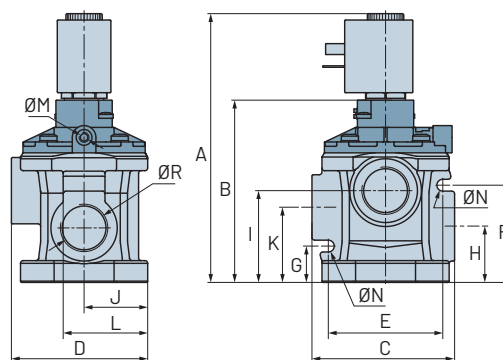
Ref. NO C.A. servo	Ref. NC C.A. servo	Ref. NO Vacuum servo	Ref. NC Vacuum servo	Ø R	Diagram	A	B	C	D	E	F	G	H	I	J	K	L	Ø M*	Ø N
AG 3002	AG 3001	-	-	G1/8"-F	1	111	55.5	22.5	9.7	-	20.2	35	28	22	10.5	18	-	G1/8"-F	4.5
AG 3010	AG 3009	AG 3211	AG 3210	G1/4"-F	1	140.2	77.5	36	22.5	23	34	59	40	32	24	23.5	-	M5-F	4.5
AG 3012	AG 3011	AG 3215	AG 3214	G3/8"-F	1	140.1	77.5	36	24.5	23	36	59	40	32	24	23.5	-	M5-F	4.5
AG 3021	AG 3020	AG 3223	AG 3222	G1/2"-F	2	148	100.3	78.5	75	63	53.5	20	30	50.5	35	41	46.5	M5-F	6.5
AG 3041	AG 3040	AG 3233	AG 3232	G3/4"-F	2	147.9	100.3	78.5	75	63	53.5	20	30	50.5	35	41	46.5	M5-F	6.5
AG 3051	AG 3050	AG 3243	AG 3242	G1"-F	2	164.7	117.1	100	95	76	62.5	25.5	38	64	44.7	51	60.3	M5-F	9
AG 3063	AG 3062	AG 3257	AG 3256	G1 1/2"-F	3	202	152	158	138	113	113	34	68	96	59	68	84	G1/8"-F	11

\* Only available on Servo A.C.

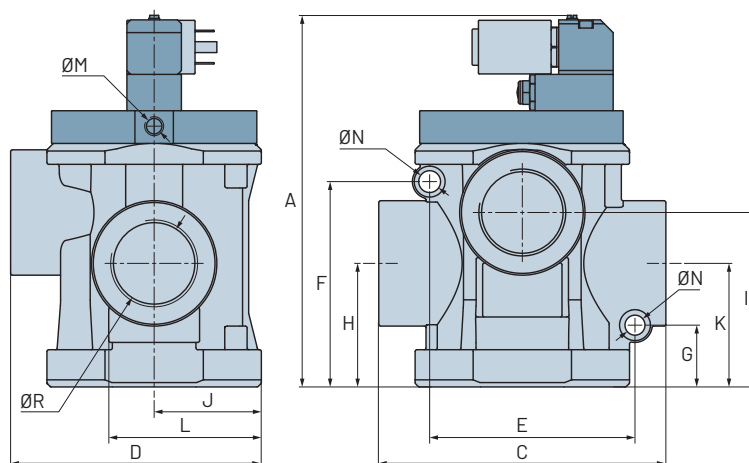
1



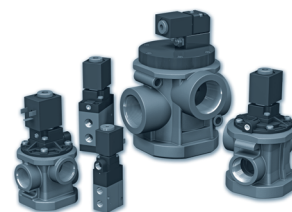
2



3







## Specifications

Fluid	Non-lubricated 50 micron filtered air. If lubrication is used it must be uninterrupted	
Maximum vacuum	97 %	
Operating temperature	-20 °C to 40 °C / -4 to 104 °F	
Fluid temperature	Max 40 °C	
Dynamic seal	Polyurethane	
Static seal	NBR	
Coil power	11 VA	10 VA
Voltage	12 VDC / 24 VDC	24 VAC / 110 VAC / 220 VAC
Minimum vacuum for vacuum supplied servo	20 %	

## Characteristics

Fitting	G1/8"	G1/4"	G3/8"	G1/2"	G3/4"	G1"	G1 1/2"
Nominal diameter [mm]	5.5	8	10	15	19	25	39
Flow rate [m³/h]	1.5	4	10	20	35	90	180
Response time (activation) <sup>(1)</sup>	15	18	18	20	20	20	60
Response time (deactivation) <sup>(1)</sup>	25	28	28	40	40	45	40
Minimum control pressure (bar) for C.A. servo	1.5	2.5	2.5	3	3	3	4
Weight (g)	195	552	540	816	778	1214	3456

(1) with monostable electrical control

## Voltage code

Code	E1	E2	E3	E4	E5	E7
Voltage	24 VDC	220 VAC	24 VAC	110 VAC	48 VAC	12 VCC

Note: All dimensions are in mm



For all orders, please specify:  
Model + Voltage  
e.g.: AG3215E1



## Angular Jaw Clamps



The PA series angular jaw clamps are used in robotics and the plastics industry and more generally on all types of manipulators. They are particularly recommended for use on injection press unloading robots.

Choose a clamp with a theoretical force Coval to at least twice the effective force required.

The clamping forces in the table above are theoretical forces and are given for a pressure of 6 bar. Gripping force is inversely proportional to the distance between the gripping point and the fulcrum.

For example, for a PA 20 clamp with the gripping point 25mm from the fulcrum, the clamping force will be:

$$F = 10.1 \text{ (table below)} \times 15/25 = 6.06 \text{ kg.}$$

The weight of the objects to be handled is added to that of the clamp and must not exceed 1/20th of the force exerted on the gripping point.

The opening and closing speed of the fingers can be adjusted with the compressed air regulator.

- **DE:** double action clamp using compressed air.
- **SEF:** closure by compressed air, opening by return spring (simple closing effect).
- **SEO:** opening by compressed air, closure by return spring (simple opening effect).

### Characteristics

Models	Clamping force(kg)	Min. pressure (bar)	Weight (g)	Magnetic sensor option
PA 16 SEF	4	2.5	120	-
PA 16 SEO	5.2	2.5	120	-
PA 16 DE <sup>(1)</sup>	5.5 to 6.5	1.5	120	-
PA 20 SEF	7.5	2	190	yes
PA 20 SEO	8.5	2	190	yes
PA 20 DE <sup>(1)</sup>	10.1 to 12.2	1.2	190	yes
PA 32 SEF	16.5	1.8	490	yes
PA 32 SEO	19.5	1.8	490	yes
PA 32 DE <sup>(1)</sup>	22 to 24	1	490	yes
PA 50 DE <sup>(1)</sup>	52 to 60	0.8	1660	yes

(1) The clamping force above is given in bar at a distance of 15 mm from the fulcrum for models PA 16 - 20 - 32 and 30 mm from the fulcrum for models PA 50.

### Specifications

Compressed air	Filtered, lubricated or non-lubricated
Maximum pressure	10 bar
Material	Anodized aluminum
Seal	Nitrile (NBR)
Heat treatment	On and fingers
Operating temperature	-10 to 70 °C / 14 to 158 °F



For all orders, please specify:  
**Model + Action + Magnetic sensor**  
 e.g.: PA20SEOM

1: Model	2: Actions	3: Magnetic sensors
PA 16 to PA 50	SEF Simple closing effect SEO Simple opening effect DE Double action	- Without M For PA 20 - 32 - 50







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## Learning Material

### Test Case



**Vacuokit 1**  
*Standard*

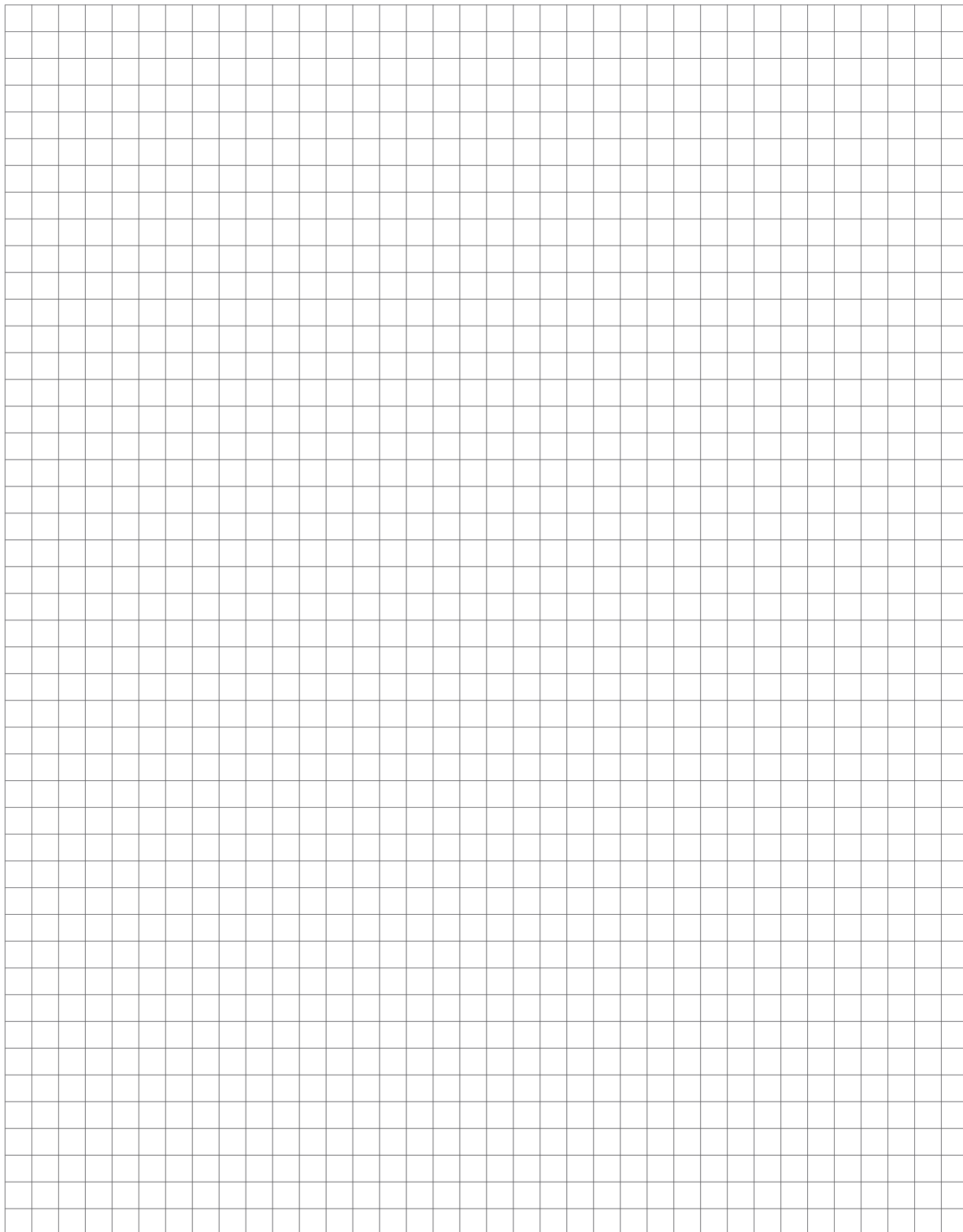
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**Vacuokit 3**  
*Food Industry*

More information 









## CONTACTS



### ► COVAL FRANCE

#### COVAL S.A.S.

Head Offi  
ZA Les Petits Champs  
10 allée Jean-Baptiste Venturi  
26120 Montélier  
France  
Tel : +33 (0)4 75 59 91 91  
[www.coval.com](http://www.coval.com)



### ► COVAL INC.

#### COVAL VACUUM TECHNOLOGY INC.

901 Jones Franklin Road  
Suite 100  
Raleigh, NC 27606  
U.S.A.  
Phone: (919) 233-4855  
[www.coval-inc.com](http://www.coval-inc.com)



### ► COVAL GERMANY

#### COVAL VAKUUMTECHNIK GMBH

Hohenloher Str. 6  
72768 Reutlingen  
Deutschland  
Fon: +49 (0)7121 7999-250  
[www.coval-germany.com](http://www.coval-germany.com)



### ► COVAL IBERICA

#### SISTEMAS DE VACÍO COVAL, S.L.

c/ Coroleu, 61-63 local 1  
08030 Barcelona  
España  
Tel.: + 34 930 185 441  
[www.coval-iberica.com](http://www.coval-iberica.com)



### ► COVAL ITALIA

#### COVAL ITALIA S.R.L A SOCIO UNICO

Via Ferrero, 112  
10098 - RIVOLI (TO)  
Italia  
Tel: +39 011 958 8660  
[www.coval-italia.com](http://www.coval-italia.com)



### ► COVAL CHINA

#### COVAL VACUUM TECHNOLOGY (SHANGHAI) CO., LTD.

NO.12 of Building 1, Hangdu Road NO.18,  
Pudong New District,  
Shanghai 201317 CHINA  
Tel: +86 21 64295600  
[www.coval.net.cn](http://www.coval.net.cn)



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Head Offi

ZA Les Petits Champs

10 allée Jean-Baptiste Venturi

26120 Montélier - France

Tel : +33 (0)4 75 59 91 91

[www.coval.com](http://www.coval.com)